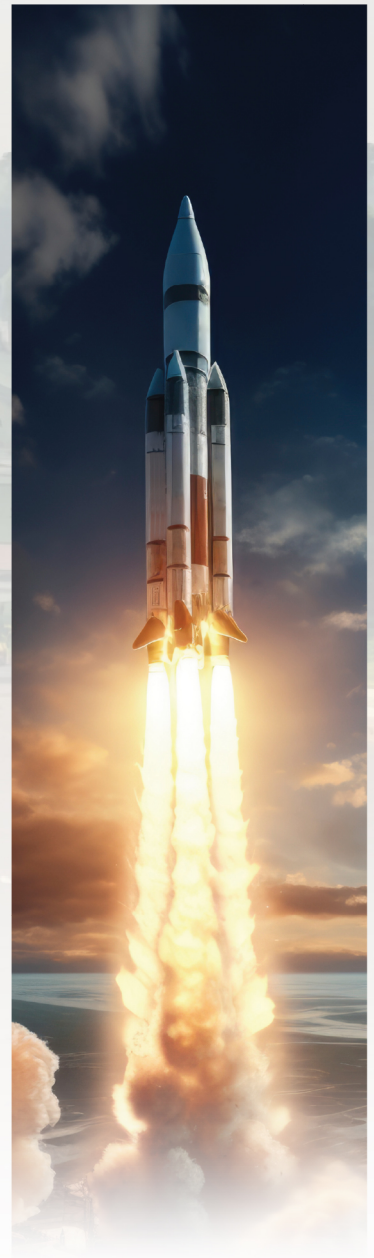


Current Affairs

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POLITY AND GOVERNANCE

1.1. FREEDOM OF PRESS: BALANCING RIGHTS AND ACCOUNTABILITY

Context:

- The **Delhi High Court**, while granting bail on **16 July 2026** to two accused in an assault case against freelance YouTube reporters, observed that anyone with a **mobile phone and microphone** claiming to be a "reporter" without training or accreditation raises accountability concerns.



About the Case

- Justice Girish Kathpalia** granted bail to two accused in an assault case involving reporters recording an unauthorised place of worship in **Seemapuri, Delhi**.

Key Features of the Observation

Incident Background

- Reporters were filming an unauthorised place of worship when agitated local residents, including the accused, dragged them into a bus and assaulted them.

Court's Findings

- The court noted the reporters were **not associated with any accredited news organisation**.
- Held that the assault, prosecution's claim of an "attack on freedom of the press," remains a **"grey area"** given the reporters' unaccredited status.

Call for Regulatory Framework

- Justice Kathpalia observed that with the **rapid proliferation of social media and digital platforms**, a significant section of media has become largely **unregulated and unorganised**.
- Called on the **legislature** to consider an appropriate regulatory framework balancing **press freedom** with **professional accountability, ethical standards, and rule of law**.

Strategic/Constitutional Significance

- Reinforces the debate on media accreditation versus press freedom under India's constitutional scheme.
- Press freedom relies entirely on Article 19(1)(a), which is why the Delhi High Court considers rights for unaccredited reporters a "grey area."

About Article 19(1)(a) of the Indian Constitution

- Guarantees all citizens the **fundamental right to freedom of speech and expression**, from which **freedom of the press** is judicially derived (not separately enumerated).
- Subject to **reasonable restrictions under Article 19(2)** -sovereignty/integrity of India, security of the State, public order, decency/morality, contempt of court, defamation, and incitement to an offence.
- Press freedom in India has **no separate statutory accreditation requirement** to claim constitutional protection, though bodies like the **Press Council of India (1966)** oversee professional/ethical standards for accredited journalists.
- Landmark cases: **Romesh Thappar v. State of Madras (1950)** and **Sakal Papers v. Union of India (1962)** established press freedom as implicit in Article 19(1)(a).

1.2. NATIONAL ROAD SAFETY BOARD: STRENGTHENING ROAD SAFETY

Context:

- The Centre has constituted the **National Road Safety Board**, an advisory statutory body, amid record **road fatalities of 1,77,175 in 2024** (per the latest report of the **Ministry of Road Transport and Highways**).



Objectives of the National Road Safety Board

- The National Road Safety Board was set up under the **Motor Vehicles Act, 1988. Section 215B** of this Act legally requires the government to set up this Board.
- Formulating **comprehensive guidelines for highway architecture and construction to minimize transit hazards**.
- Recommending the use of cutting-edge tech solutions to streamline vehicular flow and proactively prevent crashes.
- Spearheading nationwide outreach campaigns to foster a culture of responsible driving and commuter awareness.
- Partnering with state-level authorities to guarantee that traffic laws and safety protocols are strictly and consistently applied across the country.

India's International Commitments to Road Safety

- India formally committed to the **United Nations' Decade of Action for Road Safety** (spanning 2011 to 2020), a global pact designed to drastically lower the number of transit-related casualties worldwide.
- To shape its domestic policies, India draws inspiration from premier international models like Sweden's "**Vision Zero**" approach.

Legislative Background

- Idea traces to the **Sundar Committee's 2007 report**, which proposed a board with powers to **prescribe standards, monitor compliance, conduct safety audits, and coordinate action** across agencies.
- First introduced in Parliament via the **National Road Safety and Traffic Management Board Bill, 2010**, largely confined to **highways and mechanised vehicles**.
- Parliamentary Standing Committee on Transport (July 2010 report)** noted several proposed functions were already discharged by existing institutions.

Statutory Timeline

- Statutory provision came into force with rules notified in **September 2021**; the **board itself remained unconstituted** until now.
- As recently as **May 2026**, the **Supreme Court** pressed the Centre to operationalise the board, acting as a parallel force driving road safety reforms via **PIL S. Rajaseekaran v. Union of India** (pending since **2012**).

1.3. JUDICIAL REFORMS: SC SUGGESTS RAISING RETIREMENT AGE TO 61**Context:**

- The Supreme Court, hearing the *All India Judges Association* case, directed all States and UTs to consider raising the retirement age of subordinate judicial officers from 60 to 61 years, pending its final decision on a uniform retirement age of 62 years.

**Why the Suggestion Was Made**

- **Career stagnation and Pay disparities** owing to limited promotional avenues among judicial officers.
- Loss of **experienced judges** at a time of rising case pendency and the need for **uniformity in service conditions** nationwide.

About the Subordinate Judiciary

- Comprises courts functioning below the **High Courts**: District & Sessions Courts, Civil Judges (Senior/Junior Division), Judicial Magistrates, Metropolitan Magistrates, and specialised courts such as Family and Commercial Courts.
- Governed constitutionally by **Articles 233–237** under **Part VI**.

Appointment and Control

- **District Judges** are appointed under **Article 233** by the **Governor**, in consultation with the **High Court**; eligibility requires at least **7 years as an advocate/pleader**, or promotion within the judicial service.
- **Article 235** vests **control over subordinate courts** — posting, promotion, leave, and discipline — in the **High Court**, safeguarding judicial independence from the executive.

Retirement Age

- Retirement Age Currently stands at **60 years**, though it varies by State service rules while the Court's suggestion of **61 years** is a **recommendation, not a mandate** — States must amend their own service rules to give effect to it.

Implications

- **Advantages:** Retains experienced judges, reduces vacancies, speeds up case disposal, ensures uniform service conditions, and boosts morale.
- **Concerns:** May delay junior officers' promotions, increase States' salary/pension burden, and requires State service-rule amendments.

All India Judges Association Case

- **AIJA v. Union of India:** Landmark case driving reforms in subordinate judiciary through directions on uniform pay, service conditions, infrastructure, and career progression.

Constitutional Provisions

- **Article 233A:** Validates certain past District Judge appointments/promotions made despite procedural irregularities under Articles 233/235.

- **Article 234:** Governor recruits judicial officers (other than District Judges) as per rules framed after consulting the State PSC and High Court.
- **Article 236:** Defines "District Judge" and "judicial service."
- **Article 237:** Extends these provisions to specified classes of Magistrates.
- **Seventh Schedule (List III, Entry 11A):** Administration of justice and organisation of subordinate courts fall under the Concurrent List, hence implementation rests with States/UTs.

1.4. RIGHT TO PROTEST: BALANCING RIGHTS AND PUBLIC ORDER

Context:

- A recent protest that escalated into clashes between demonstrators and the police has brought renewed attention to the constitutional right to protest, the limits of police powers, and the legal provisions governing public demonstrations in India.



Right to Protest: Constitutional Position

- The **Right to Protest** is **not a Fundamental Right by itself**, but is derived from:
 - **Article 19(1)(a)** – Freedom of Speech and Expression.
 - **Article 19(1)(b)** – Right to Assemble Peaceably and Without Arms.
 - **Article 19(1)(c)** – Right to Form Associations or Unions.
- However, these rights are **not absolute** and are subject to **reasonable restrictions** under:
 - **Article 19(2)** – Restrictions on free speech.
 - **Article 19(3)** – Restrictions on peaceful assembly.

Grounds for Reasonable Restrictions

- Under **Articles 19(2) and 19(3)**, the State may impose **reasonable restrictions** on the right to protest in the interests of the **sovereignty and integrity of India, security of the State, friendly relations with foreign States, public order, decency or morality, contempt of court, defamation, and incitement to an offence.**

When Can a Protest Become Unlawful?

Under the **Bharatiya Nyaya Sanhita (BNS), 2023:**

- It may become unlawful if it:
 - Use criminal force or violence.
 - Obstructs the execution of law.
 - Compels a person through force or intimidation.
 - Disturbs public order or threatens public safety.

Police Powers to Regulate Protests

Police may regulate demonstrations to:

- Maintain **public order**.

- Prevent violence and damage to property.
- Ensure public safety.
- Manage traffic and essential services.

Prohibitory Orders under BNSS, 2023

- **Section 163** empowers the Executive Magistrate to issue orders restricting assemblies, marches or demonstrations in urgent situations to prevent:
 - o Public nuisance
 - o Danger to human life
 - o Rioting or affray
- Such orders are preventive in nature and are generally issued for a limited period.

Prohibitory Orders under BNSS, 2023

- **Section 163 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023** empowers an Executive Magistrate to temporarily prohibit assemblies, marches, or demonstrations to prevent **public nuisance, danger to human life, rioting, or affray**.
- These orders are **preventive** and are generally issued for a **limited period**.

Use of Force by Police

- The police may use force **only when necessary** and in accordance with the principles of **legality, necessity, proportionality, and minimum force**.
- Force should be **used gradually, only as a last resort after peaceful measures fail**, and **remain subject to judicial scrutiny**.

Important Supreme Court Judgements

Mazdoor Kisan Shakti Sangathan (MKSS) v. Union of India (2018)

- The Supreme Court held that the **right to protest is a constitutional right**, but it must be balanced with the rights of other citizens.

Amit Sahni v. Commissioner of Police (Shaheen Bagh Case), 2020

- Public roads and public spaces cannot be occupied indefinitely in the name of protest.
- The right to protest must be exercised without causing disproportionate inconvenience to the public.

1.5. FOOD SAFETY IN INDIA: STATE FOOD SAFETY INDEX

Context:

- Recent reports of food poisoning events—such as those in Indore (Madhya Pradesh) and Bhiwandi (Maharashtra)—alongside findings from the latest **Accidental Deaths and Suicides in India (ADSI) report**, have brought the implementation of the **Food Safety and Standards (FSS) Act** under scrutiny.
- Data highlights a crucial structural correlation: states reporting high numbers of food poisoning cases and casualties simultaneously register low to moderate scores on the central **State Food Safety Index (SFSI)**.



About the State Food Safety Index (SFSI)

- The State Food Safety Index is an annual assessment released by the **Food Safety and Standards Authority of India (FSSAI)** to evaluate the performance of States and Union Territories across India's food safety ecosystem.
- **The Five Key Parameters of SFSI:**
 - o **Human Resources and Institutional Data:** Measures the availability of regulatory staff (like Food Safety Officers) and institutional mechanisms.
 - o **Compliance:** Evaluates the licensing, registration, and regular inspections of Food Business Operators (FBOs).
 - o **Food Testing Infrastructure and Surveillance:** Tracks the availability of laboratories, mobile food testing labs, and overall sample testing efficiency.
 - o **Training and Capacity Building:** Assesses training programs conducted for regulatory staff and food handlers.
 - o **Consumer Empowerment:** Focuses on consumer awareness initiatives like *Eat Right India*, food fortification, and grievance redressal mechanisms.
- **Key Trend Alert:** Data shows that nearly **three-fourths of all Indian States and UTs** scored less than 50 out of the maximum 100 points on the SFSI. States like Jharkhand (26.5) and Uttar Pradesh (44.25) reflect this lower threshold, which directly aligns with higher mortality/morbidity rates from foodborne illnesses.

Institutional Framework & Enforcement Mechanisms

- **FSSAI vs. State Authorities:** While the FSSAI (a statutory body under the Ministry of Health & Family Welfare) ensures overall coordination, policy framework, and standards setting, the **State Food Safety Authorities** are primarily responsible for **field-level enforcement and inspections**.
- **Regulatory Deficit:** Field enforcement is severely restricted by high vacancy rates. FSSAI's officer vacancies have scaled from roughly 30% to nearly 40% over the last five years, and as of late FY 2025-26, only 2,997 of the 4,208 sanctioned Food Safety Officer (FSO) positions across States/UTs are filled.
- **Risk-Based Inspections:** Under the FSS Act, periodic inspections and analysis of food samples from registered Food Business Operators (FBOs) are mandatory. A recent amendment to the Act has transitioned food safety inspection frequencies to a **dynamic risk-based assessment** of FBOs based on their establishment type, past compliance records, and other risk indices.

Global and National Burden of Foodborne Diseases

- **Global Burden (WHO Estimates):** Unsafe food causes approximately 866 million illnesses and 1.5 million deaths globally on an annual basis. Furthermore, 57.1 million Disability-Adjusted Life Years (DALYs)—representing the years of potential life lost due to premature mortality and years productive life lost due to disability—were attributed to foodborne diseases, with **children under 5 years bearing 30% of this entire burden**.
 - o **Disability-Adjusted Life Years (DALYs):** A DALY represents one lost year of healthy life due to disease, disability, or premature death. It is developed by the World Health Organization (WHO) and the World Bank under the **Global Burden of Disease (GBD) Study**.
- **India's Global Standing:** According to a country-wise analysis of "foodborne years of lives lost" per 100,000 persons, India ranks **15th globally**, placing it alongside several low-income African nations experiencing high health burdens from foodborne pathogens.

1.6. NEW FCRA 2.0 PORTAL AND E-OCI CARD LAUNCHED**Context:**

- Recently, the Union Home Minister **Amit Shah** launched the **FCRA 2.0 Portal** and the **e-OCI (Electronic Overseas Citizen of India) Card** to improve transparency, efficiency, and digital governance in foreign contribution regulation and OCI services.

**FCRA 2.0 Portal: Key Features**

The new portal replaces the earlier paper-based system with a fully digital platform.

- Hosting:** The portal is hosted on MeghRaj (the National Government Cloud) to ensure data security and reduce the threat of data breaches.
- Paperless Compliance:** Eliminates the physical submission of compliance documents.
- Advanced Tools:** Integrated with Aadhaar-based authentication, e-Sign facilities, and Optical Character Recognition (OCR)-based document analysis for quick verification.

The e-Overseas Citizen of India (e-OCI) Card

The OCI scheme was introduced to grant a form of lifetime residency and professional freedom to Persons of Indian Origin (PIOs), short of dual citizenship.

- Core Objective:** To streamline and digitize processes for more than **50 lakh (5 million) OCI cardholders**.
- The "Age 20" Rule Modification:** Previously, OCI booklets had to be re-issued every time a cardholder obtained a new passport after turning 20 years old. Under the new e-OCI system, **this requirement is eliminated**. Cardholders no longer need a physical re-issuance of the booklet; instead, their registration number becomes unique, and they can perform real-time verification and update passport details digitally online.
- Security & Convenience:** The completely digital document eliminates the risk of loss or physical damage and allows real-time immigration verification at borders.

What is FCRA?

- The **Foreign Contribution (Regulation) Act (FCRA), 2010** regulates the acceptance and utilization of **foreign contributions** and foreign hospitality by individuals, associations, and NGOs.
- Objectives**
- Ensure foreign funds do not affect:
 - National security
 - Sovereignty and integrity of India
 - Public interest
 - Democratic institutions
- Administered by:** Ministry of Home Affairs (MHA)

Who Needs FCRA Registration?

Organizations receiving foreign donations such as:

- NGOs
- Trusts

- Societies
- Section 8 Companies
- Charitable and educational institutions

What is OCI?

- **OCI (Overseas Citizen of India)** is an immigration status granted to eligible Persons of Indian Origin (except citizens of Pakistan and Bangladesh, subject to provisions).

OCI Cardholders Get

- Multiple-entry lifelong visa
- Exemption from registration with FRRO
- Parity with NRIs in specified economic, educational and financial matters

OCI Cardholders Cannot

- Vote in elections
- Contest elections
- Hold constitutional offices
- Purchase agricultural or plantation land

1.7. MGNREGA WAGES: ENSURING RURAL LIVELIHOOD SECURITY

Context:

- The Central Government has fixed a **national floor wage of ₹300 per day** under the **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)**. The revised wage rates will come into effect from **October 1**, ensuring that no State offers wages below the prescribed national minimum.



Key Highlights

- **The Floor Wage Rule:** The Central government has set a minimum baseline wage of ₹300 per day under the VB-G RAM G Act.
- **Impact on States:** 21 States and Union Territories that previously offered less than ₹300/day under MGNREGA have had their wages automatically bumped up to meet this baseline. States already paying above ₹300 saw comparatively smaller adjustments.
- **State-Wise Trends (Highs & Lows):**
 - o **Highest Wage Rate:** Haryana continues to hold the highest regular wage rate at **₹409 per day** (excluding a special rate of ₹450 applicable to certain gram panchayats in Sikkim).
 - o **Other Top States:** Goa (₹406) and Kerala (₹401) are the only other states offering daily wages above ₹400.
 - o **Lowest Increase:** Telangana recorded the absolute lowest increase of just ₹1 (a 0.33% rise from ₹307 to ₹308). Wages remained completely unchanged from former MGNREGA levels in the UT of Dadra and Nagar Haveli and Daman and Diu.

Background of Rural Employment and Development Policy in India

- India's wage employment initiatives progressed through multiple phases, beginning with early programmes such as the Rural Manpower Programme (1960s) and the Crash Scheme for Rural Employment (1971).
- 1980s–1990s: National Rural Employment Programme (NREP) and Rural Landless Employment Guarantee Programme (RLEGP) were later merged into the **Jawahar Rozgar Yojana (JRY)**.
- A major shift came with the Maharashtra Employment Guarantee Act of 1977, which introduced the concept of a statutory right to work.
- These experiences culminated in the enactment of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2005, providing a nationwide legal framework for rural employment generation.

MGNREGA Evolution and the Limits of Incremental Reform

- Enacted in 2005 to enhance livelihood security in rural areas.
- Guarantees 100 days of wage employment every financial year to every rural household willing to undertake **unskilled manual work**.

Rationale for a New Statutory Framework

- The need for reform is also rooted in broader socio-economic changes. MGNREGA was built in 2005, but rural India has transformed. Poverty levels declined from 27.1 per cent in 2011-12 to 5.3 per cent in 2022-23.
- The Viksit Bharat- G RAM G Act, 2025 responds to this context by modernising rural employment guarantees, strengthening accountability, and aligning employment creation with long term infrastructure and climate resilience goals.

About Viksit Bharat- G RAM G Act 2025

- Employment guarantee increased from 100 days to 125 days per rural household in a financial year.
- Introduces a national minimum wage floor of ₹300 per day, with states free to pay higher wages.
- Emphasises GIS-based planning, satellite mapping, and digital monitoring for project implementation.
- Overall implementation is overseen by the Ministry of Rural Development.

Funding Pattern between the two Schemes

Category	MGNREGA	VB–G RAM G
Labour wages	100% by Centre	60:40 ratio
Material costs	75:25 ratio	60:40 ratio
Administrative expenses	75:25 ratio	60:40 ratio
Number of guaranteed workdays	100	125
Exceptions for any States or Union Territories	None	90:10 ratio in total expenditure for NE States, Himachal Pradesh, Uttarakhand, and Jammu and Kashmir. Full expenditure to be borne by the Centre for UTs without legislatures

1.8. E20 ETHANOL BLENDING: INDIA'S BIOFUEL TRANSITION**Context:**

- A petition has been filed in the Supreme Court challenging the "silent compulsion" of the nationwide E20 petrol rollout. The petition seeks full public disclosure of the chemical composition of the fuel and its technical compatibility safeguards, urging the court to establish an independent expert committee to evaluate the real-world impacts of higher ethanol blends on legacy vehicles.

**Key Technical & Legal Challenges**

- **Legacy Compatibility:** BIS specifications confirm E20 compatibility is strictly vehicle-specific, exposing older, uncalibrated engines to accelerated component wear and fuel-pump failures.
- **Constitutional & Consumer Scrutiny:** A Supreme Court petition by advocate Narendra Kumar Goswami invokes fundamental freedoms, **Article 300A** (right to property), and the **Consumer Protection Act**, arguing that full disclosure of fuel compatibility in a state-mandated market is a strict constitutional requirement.
- **Resource Strain:** Scaling 1G biofuels diverts essential food crops and severely depletes groundwater via water-intensive feedstocks like sugarcane.

What is E20 Fuel and How is it Structured?

- **Composition:** E20 is a specialized automotive fuel blend consisting of 20% ethanol and 80% conventional petrol by volume.
- **Octane Upgrade:** Standard petrol in India holds a **Research Octane Number (RON)** of 91 to 92. In contrast, E20 fuel is mandated to have a minimum rating of **95 RON**.
- **Combustion Mechanics:** RON functions as a direct indicator of fuel stability. A higher octane rating increases the fuel's resistance to premature detonation under high pressure, leading to smoother and cleaner engine combustion.
- **Energy Density:** Ethanol possesses a lower energy density compared to pure petrol. Consequently, uncalibrated engines using E20 fuel experience a minor reduction in real-world fuel economy and mileage.

Chemical & Material Properties of Ethanol

- **Formula:** Ethanol (C_2H_5OH) is a clear, volatile, and biodegradable alcohol.
- **Hygroscopic:** Absorbs moisture from the air, which may cause **phase separation** and corrosion in older fuel systems.
- **Source:** Produced by fermenting biomass such as **sugarcane, maize, wheat, and damaged food grains**.
- **Fuel Grade:** Mixed with **denaturants** to make it undrinkable.

India's Ethanol Blending Policy

- **Launch:** Ethanol Blended Petrol (EBP) Programme to reduce crude oil imports, cut emissions, and support farmers.

- **E10 Target:** Achieved nationwide in **June 2022**.
- **E20 Target:** Advanced from **2030 to ESY 2025–26**.
- **Achievement:** India reached **19.93% ethanol blending by July 2025**, effectively achieving the **E20 target** ahead of schedule.

1.9. RIGHT TO LEGAL REPRESENTATION AND FAIR TRIAL

Context:

- The **Supreme Court**, while hearing a case arising from the **Faizabad Bar Association's resolution** refusing to represent the accused in the **Ayodhya Ram Temple theft case**, held that **Bar Associations cannot collectively resolve to deny legal representation to an accused person**.
- The Court declared such resolutions **illegal, unconstitutional, and contrary to professional ethics**, reaffirming that the **right to legal representation is an essential component of the Right to Fair Trial under Article 21**.



Constitutional Provisions

- **Article 21** – Right to Life and Personal Liberty; includes the **Right to Fair Trial** and **Right to Legal Representation**.
- **Article 22(1)** – Every arrested person has the right to **consult and be defended by a legal practitioner of his/her choice**.
- **Article 39A (DPSP)** – Directs the State to provide **free legal aid** and ensure **equal access to justice**.

Supreme Court's Observations

- Every accused, irrespective of the nature of the offence, has the **constitutional right to legal representation**.
- **Bar Associations cannot pass resolutions** directing advocates not to appear for a particular accused.
- Such resolutions violate:
 - o **Fundamental Rights** of the accused.
 - o **Professional ethics** governing advocates.
 - o **Rule of Law** and **fair trial principles**.
- Advocates have the **freedom to accept or decline a brief individually**, but **Bar Associations cannot collectively prohibit representation**.

Bar Council of India (BCI) Rules

Under the **Bar Council of India Rules (Standards of Professional Conduct and Etiquette)**:

- An advocate is generally **bound to accept any brief** in courts or tribunals where he/she ordinarily practices.
- An advocate may refuse a brief **only for special and sufficient reasons**.
- The decision to accept or refuse a case **rests with the individual advocate**, not the Bar Association.

Important Judicial Pronouncements**1. A.S. Mohammed Rafi v. State of Tamil Nadu (2010)**

- Supreme Court held that **Bar Associations cannot prevent advocates from defending an accused.**
- Declared such resolutions **illegal and unconstitutional.**

2. A.S. Kureshi v. High Court of Gujarat (2009)

- Gujarat High Court held that refusal by a Bar Association to accept briefs is **unlawful.**
- Distinguished between **individual refusal** by an advocate and **collective boycott** by a Bar Association.

3. Jayalalithaa v. State of Karnataka (2014)

- Supreme Court observed that **a fair trial is the cornerstone of criminal justice.**
- Every accused must receive a **fair, impartial, and reasonable trial.**

Historical Precedents of Bar Boycotts

Despite clear legal rulings, Bar Associations have historically passed such resolutions during highly publicized or sensitive criminal cases:

- **2008 Mumbai Terror Attacks:** A Bar resolution opposed representing Ajmal Kasab.
- **2012 Delhi Gangrape Case:** Lawyers at Saket courts passed a resolution refusing representation.
- **2019 Hyderabad Vet Case:** Lawyers collectively declined to defend the accused.

About Bar Council of India (BCI)

- Statutory Body established under the Advocates Act, 1961.
- Regulates legal education and professional standards.
- Prescribes the Code of Professional Ethics for advocates.

1.10. HIV DIAGNOSIS: STRENGTHENING INDIA'S PUBLIC HEALTH RESPONSE**Context:**

- Recently, the **Karnataka State AIDS Prevention Society (KSAPS)** launched a special awareness and screening campaign to improve **HIV diagnosis and treatment uptake** in the State.

Key Points

- According to the **Karnataka State AIDS Prevention Society (KSAPS)**, around **56,406 people** in the State are estimated to be unaware of their HIV-positive status.
- The initiative seeks to strengthen **early diagnosis, treatment, and counselling services**, especially among people outside the formal healthcare system.
- The campaign has been launched under **Project Padma Basavathpatha**, which focuses on reaching vulnerable and high-risk populations.
- The programme aims to encourage people to voluntarily undergo **HIV testing**, as many individuals avoid testing due to stigma and discrimination.



- As part of the initiative, **mobile awareness campaigns** have been launched in collaboration with the **National AIDS Control Organisation (NACO)**.
- **BreakFree QR codes** have been introduced to enable individuals to access a confidential self-risk assessment and information on HIV testing centres and counsellors.

National AIDS Control Organisation (NACO)

- Established in **1992** under the **Ministry of Health and Family Welfare**.
- Responsible for implementing the **National AIDS Control Programme (NACP)**.
- India follows the global **95-95-95 targets**, which aim to ensure that:
 - o 95% of people living with HIV know their status.
 - o 95% of diagnosed individuals receive treatment.
 - o 95% of those receiving treatment achieve viral suppression.

About HIV/AIDS

- **HIV (Human Immunodeficiency Virus)** attacks the body's immune system, particularly **CD4 (T-helper) cells**.
- If left untreated, HIV can progress to **AIDS (Acquired Immunodeficiency Syndrome)**, the most advanced stage of infection.
- HIV spreads through:
 - o Unprotected sexual contact.
 - o Infected blood transfusions.
 - o Sharing contaminated needles.
 - o Mother-to-child transmission during pregnancy, childbirth, or breastfeeding.
- HIV does **not** spread through casual contact, food, water, or mosquito bites.

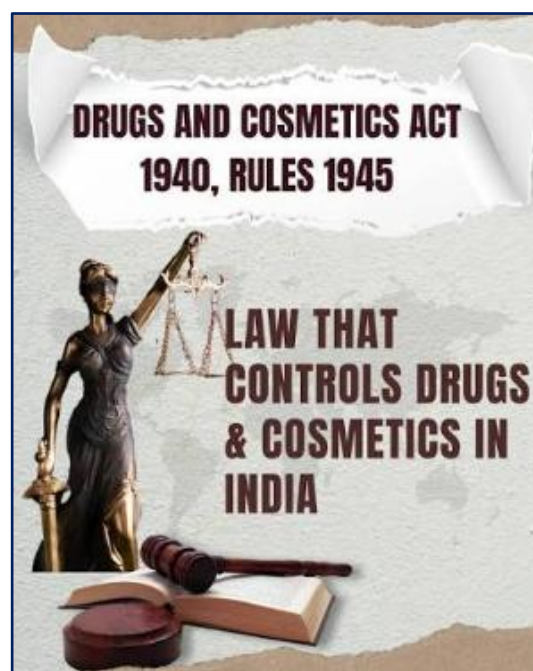
1.11. DRUG REGULATION IN INDIA: KEY AMENDMENTS

Context:

- The Union Ministry of Health and Family Welfare has amended the **Drugs and Cosmetics Rules, 1945** to regulate the production and sale of medicinal products containing alcohol. The amendment seeks to prevent the misuse of medicines with high alcohol content and strengthen quality control mechanisms.

Why was the amendment introduced?

- The government observed that certain medicinal products containing **ethyl alcohol** were being misused as intoxicants.
- Some of these formulations contain high concentrations of ethyl alcohol, in certain cases up to 80–90% v/v, making them susceptible to misuse for intoxication.
- The amendment aims to:
 - o Prevent diversion of medicinal products for non-medical use.



- o Ensure better regulation of alcohol-containing medicines.
- o Strengthen monitoring and record-keeping mechanisms.

Key Amendments

- Formulations containing more than 12% v/v ethyl alcohol in quantities exceeding 30 mL will no longer be exempt under Schedule K and must obtain licences under the **Drugs and Cosmetics Act, 1940**.
- These products have been included under **Schedule H1** of the Drugs Rules, making them subject to **stricter prescription** and regulatory requirements.
- Manufacturers and sellers must maintain detailed records of production, distribution, sales, prescriptions, and inventory.

The Main Schedules for Medical Drugs Include

- **Schedule H:** Prescription drugs that can be sold only on the prescription of a registered medical practitioner.
- **Schedule H1:** Drugs subject to stricter regulation and record-keeping requirements due to the risk of misuse.
- **Schedule X:** Narcotic and psychotropic substances requiring stringent control and special storage records.
- **Schedule K:** Drugs exempted from certain provisions relating to manufacture, sale, and distribution under specified conditions.
- **Schedule G:** Drugs that must carry the warning: "Caution: It is dangerous to take this preparation except under medical supervision."
- **Schedule C and C1:** Biological and special products, such as vaccines, sera, and blood products.
- **Schedule M:** Prescribes Good Manufacturing Practices (GMP) and requirements for pharmaceutical manufacturing units.

About the Drugs and Cosmetics Act, 1940

- It regulates the import, manufacture, and distribution of drugs and cosmetics in India and ensures their safety, efficacy, and quality.
- Administered by the Ministry of Health and Family Welfare, the Act is enforced by the Central Drugs Standard Control Organisation (CDSCO) and State Drug Authorities.
- It lays down standards for drugs, cosmetics, medical devices, and clinical trials.

1.12. CISF AND ILLEGAL COAL MINING: STRENGTHENING ENFORCEMENT

Context:

- Recently, under the Government's "**Zero Coal Leakage Plan**," the Central Industrial Security Force (CISF) recovered over **428 metric tonnes** of illegally mined coal during a five-day operation across **Jharkhand and West Bengal**, leading to four FIRs under the **Mines and Minerals (Development and Regulation) Act, 1957** (MMDR Act).



The "Zero Coal Leakage" Initiative

- **Objective:** To eliminate the illegal mining, transit loss, theft, and unauthorized diversion of coal resources through coordinated, time-bound enforcement.
- **Nodal Agencies:** Jointly driven by the **Ministry of Coal**, local police, state district administrations, and Central Public Sector Undertakings (CPSUs) under **Coal India Limited (CIL)** (such as BCCL, ECL, and CCL).
- **Technological Intervention:** The plan leverages modern tools including drone surveillance, GPS-enabled transit-route monitoring, real-time e-way bill verification, and Integrated Command and Control Centres to track coal supply chains seamlessly.

Legal and Statutory Framework: MMDR Act, 1957

The legal actions against illegal mining are processed under the provisions of the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act)**.

- **Empowerment of Central Forces:** Under designated sections of the MMDR Act (Sections 22, 23B, and 24), authorized officers of the CISF and coal companies possess the statutory power to search, seize illegally transported minerals/vehicles, and initiate prosecution.
- **Constitutional Domain (Center vs. State):**
 - Under the **Seventh Schedule** of the Indian Constitution, the regulation of mines and mineral development falls under both the **Union List (Entry 54)** and the **State List (Entry 23)**.
 - The regulation of **major minerals** (like Coal, Lignite, Iron Ore) is controlled directly by the Central Government under the MMDR Act.
 - **Minor minerals** (like sand, gravel, clay) fall completely under the administrative and regulatory purview of respective **State Governments**.
- **Cognizable Offenses:** Amendments to the MMDR Act make illegal mining, trespassing, and unauthorized storage cognizable offenses. State governments are also permitted to establish **Special Courts** for speedy trials related to illegal mining.

Distribution of Key Coalfields

- **Bharat Coking Coal Limited (BCCL):** Chiefly operates around the **Dhanbad** region in Jharkhand (the "Coal Capital of India").
- **Eastern Coalfields Limited (ECL):** Spans parts of West Bengal (Raniganj coalfields) and Jharkhand (Rajmahal).
- **Central Coalfields Limited (CCL):** Concentrated primarily in the Ranchi, Bokaro, and Karanpura coalfields of Jharkhand.

1.13. DISTRICT DEVELOPMENT COUNCILS: LOCAL GOVERNANCE IN J&K

Context:

- Recently, the first-ever District Development Councils (DDCs) in Jammu and Kashmir completed their five-year tenure in February 2026. The absence of fresh elections has triggered a debate over democratic decentralization and the future relevance of the DDC model in the Union Territory.



What are District Development Councils (DDCs)?

- **Origin & Authority:** The DDCs were established by the Ministry of Home Affairs by amending the **Jammu and Kashmir Panchayati Raj Act, 1989** and its 1996 Rules. They replaced the erstwhile District Planning and Development Boards.
- **Structure & Composition:**
 - o Each district in J&K is divided into **14 constituencies**, meaning there are 14 directly elected members per council.
 - o It creates a **three-tier rural governance structure**: Gram Panchayats (Halqa Panchayats), Block Development Councils (BDCs), and District Development Councils (DDCs).
 - o Apart from elected members, the DDC includes local Members of Parliament (MPs), Members of Legislative Assembly (MLAs), and Chairpersons of BDCs within the district.
- **Administrative Head:** The **Additional District Development Commissioner (ADDC)** serves as the Chief Executive Officer (CEO) of the DDC.
- **Tenure:** 5 Years.

Key Constitutional Provisions**1. 73rd and 74th Constitutional Amendment Acts (1992)**

- **73rd C.A.A:** Focused on rural governance, this Act introduced **Part IX** (Articles 243-O) and the **Eleventh Schedule** (29 functions). Key features include a **mandatory three-tier structure** (Gram Panchayat, Panchayat Samiti, Zila Parishad) for states with over 2 million people, the establishment of Gram Sabhas, and mandatory five-year election cycles.
- **74th C.A.A:** This Act focuses on urban governance, adding **Part IXA** (Articles 243P-ZG) and the **Twelfth Schedule** (18 functions). It mandates three types of municipalities—Nagar Panchayats, Municipal Councils, and Municipal Corporations—along with Ward Committees for improved urban administration.

2. About District Planning Committee (DPC) — Article 243ZD

- **Mandate:** **Article 243ZD** (introduced via the 74th Amendment) mandates that every state must constitute a DPC at the district level.
- **Objective:** To consolidate developmental plans prepared by both rural Panchayats and Urban Local Bodies (ULBs), integrating them into a holistic draft district development plan.
- **Composition Rule:** At least **four-fifths (80%)** of the DPC members must be elected by and from amongst the elected members of the district panchayat and urban municipalities. The allocation must be proportional to the ratio between the rural and urban populations of that district.

DDCs vs. DPCs: Structural Divergence

Feature	District Planning Committee (DPC)	District Development Council (DDC)
Source of Power	Constituted under the Constitution of India (Article 243ZD).	Created through an Executive Order / Statutory Amendment to the J&K Panchayati Raj Act.
Core Function	Acts as a coordinating, bottom-up planning body that aggregates mandates generated from lower tiers.	Acts as a parallel administrative authority exercising direct executive and developmental powers.
Functional Direction	Strengthens democratic decentralization from the ground up.	Functions as a structure from above, often seen as competing with or bypassing traditional Zila Parishads.

Major Concerns & Pitfalls of the DDC Model

- **Bypassing Constitutional Institutions:** Critics argue that the DDC acts as a parallel structure that effectively bypasses traditional Zila Parishads and constitutional DPCs, potentially reinforcing bureaucratic control over local representation.
- **The Per-Capita Representation Imbalance:** Seats are uniformly allocated across districts without weightage to demographic variations.
Example: Srinagar (population ~12 lakh) and Kishtwar (population ~2.5 lakh) are both allocated exactly 14 DDC members, causing a stark skew in per-capita political voice.
- **Concentration of Power:** With the J&K State Assembly being absent or weakened over the last few years, key financial and executive functions have remained under the functional oversight of the Union administration via bureaucrats, rather than local legislative bodies.

1.14. LADAKH GOVERNANCE: LOCAL AUTONOMY AND CONSTITUTIONAL SAFEGUARDS

Context:

- Recently, the Ladakh administration announced the creation of **17 new tehsils** to strengthen grassroots governance in the Union Territory.
- With this reorganisation, all districts of Ladakh are expected to be brought under the **Ladakh Autonomous Hill Development Council (LAHDC) Act**, amid ongoing discussions on constitutional safeguards and greater local autonomy.



Major Administrative Reforms

- **District Expansion:** Ladakh recently expanded from **2 districts** (Leh and Kargil) to **7 districts**. The five newly notified districts are **Sham, Nubra, Changthang, Zaskar, and Drass**.
- **Creation of Tehsils:** An additional 17 new tehsils have been approved, increasing the total number of tehsils in the Union Territory (UT) from 15 to 32.
- Alongside this, the Ministry of Home Affairs (MHA) has proposed a customized, "**sui generis**" (**unique**) model of governance under **Article 371** of the Constitution to protect Ladakh's land, jobs, and distinct cultural identity.
- **New service-delivery divisions created:**
 - o **4 divisions** — Public Health Engineering (PHE) & Flood Control Department
 - o **5 divisions** — Public Works Department (PWD) & PMGSY (Pradhan Mantri Gram Sadak Yojana)
- **Universalizing AHDCs:** Earlier, **only Leh and Kargil** had Autonomous Hill Development Councils (AHDCs); now, all seven districts of Ladakh will have elected local self-governing bodies to strengthen governance, local administration, and the jurisdiction of the LAHDCs.

About the Ladakh Autonomous Hill Development Council (LAHDC)

- Constituted under the **Ladakh Autonomous Hill Development Councils Act, 1997**; councils were established in **Leh (1995)** and **Kargil (2003)**.
- Each council has **30 members**—**26 elected** and **4 nominated** members—with a tenure of **five years**.
- The council is headed by a **Chief Executive Councillor (CEC)**, who enjoys the **rank of a Cabinet Minister**.
- LAHDCs are **responsible for** local planning, agriculture, health, education, rural development, infrastructure, tourism, and environmental protection.

Administrative Structure of Ladakh

- Ladakh became a Union Territory on **31 October 2019** under the **Jammu and Kashmir Reorganisation Act, 2019**.
- **Executive Head:** The Lieutenant Governor (LG) administers the UT on behalf of the President of India.
- **Judicial Jurisdiction:** Falls under the jurisdiction of the High Court of Jammu & Kashmir and Ladakh.
- **Parliamentary Representation:** Ladakh constitutes one single Lok Sabha constituency.
- Various groups in Ladakh have demanded **Sixth Schedule status, statehood, a separate Public Service Commission, job reservations for locals, and constitutional safeguards for land and culture.**

LAHDC vs Sixth Schedule

Feature	LAHDC (Ladakh)	Sixth Schedule Councils (e.g., Assam, Meghalaya)
Legal basis	Statutory (state/UT Act)	Constitutional (Article 244(2) & 275(1))
Legislative power	Very limited/advisory	Can make laws on land, forest, village admin, inheritance, marriage, social customs
Judicial power	None	Can set up village/district councils courts for tribal disputes
Financial autonomy	Limited	Greater — controls royalty, taxation on land/forest produce in some cases
Amendment protection	Can be altered by ordinary legislation	Requires constitutional amendment

About Article 371

- Article 371 is part of **Part XXI of the Constitution** and provides special provisions for certain states to address their unique social, cultural, and administrative needs.
- It empowers **the President** to assign special responsibilities to Governors in matters such as regional development, law and order, and equitable distribution of resources.
- **Articles 371A to 371J** grant special provisions to states such as Maharashtra, Gujarat, Nagaland, Assam, Manipur, Andhra Pradesh, Sikkim, Mizoram, Arunachal Pradesh, Goa, Karnataka, and Telangana.

1.15. SEAFARER-FiRST: STRENGTHENING MARITIME SECURITY AND WELFARE**Context:**

- **Recently**, the Ministry of Ports, Shipping and Waterways (MoPSW) launched the Seafarer-FiRST initiative with a real-time dashboard to protect Indian seafarers in high-risk maritime regions, including the Strait of Hormuz, Persian Gulf, and Gulf of Oman.

**Seafarer-FiRST Dashboard – Key Features**

- **Developed by:** Directorate General of Shipping (DG Shipping) under the **Ministry of Ports, Shipping and Waterways (MoPSW)**.
- **Objective:** To ensure the safety, welfare, and real-time monitoring of Indian seafarers operating in high-risk maritime zones.

- **Coverage:** Tracks Indian seafarers on **both Indian-flagged and foreign-flagged vessels**, particularly in the **Persian Gulf, Strait of Hormuz, and Gulf of Oman**.
- **Real Time Monitoring:** Provides vessel-by-vessel tracking of:
 - o Vessel location
 - o Ownership details
 - o Cargo information
 - o Crew strength and welfare
 - o Threat perception
 - o Intended voyage and next port of call
 - o Availability of food, fuel, medicines, and communication facilities
- **Institutional Coordination:** Operated round the clock by **MoPSW** in coordination with the **Ministry of External Affairs (MEA), Indian Navy, DG Shipping**, and Indian diplomatic missions.
- **Family Support:** Dedicated liaison officers serve as single points of contact for seafarers' families, assisting with welfare, repatriation, and legal or contractual issues.
- **Compliance Mechanism:** Ship owners, managers, and recruitment/placement agencies must submit regular compliance reports ensuring that no Indian seafarer sails without adequate safety information and protective measures.

Key Concepts

Who is a Seafarer?

- A person employed or engaged to work on a **merchant ship**, including:
 - o Navigating officers
 - o Marine engineers
 - o Deck and engine crew (ratings)
 - o Catering staff
 - o Technical personnel

Directorate General of Shipping (DG Shipping)

- **Established:** 1949
- **Ministry:** Ministry of Ports, Shipping and Waterways (MoPSW)
- **Headquarters:** Mumbai
- India's principal maritime administration responsible for:
 - o Merchant shipping regulation
 - o Ship registration
 - o Seafarer certification and welfare
 - o Maritime safety and training
 - o Implementation of the **Merchant Shipping Act, 1958**
 - o Prevention of marine pollution

INTERNATIONAL RELATIONS

2.1. INDIA AND THE UNSC: BID FOR 2028–29 TERM

Context:

- India is officially launching a diplomatic campaign to secure a non-permanent seat at the **United Nations Security Council (UNSC)** for the **2028-29 term**. The bid necessitates substantial diplomatic mobilization to secure international support, as India will be directly contesting against Tajikistan for the **Asia-Pacific region** seat.



What is the United Nations Security Council (UNSC)?

- The UNSC is one of the **six principal organs** of the United Nations, primarily responsible for the maintenance of international peace and security.
- It is the **only UN body** possessing the authority to issue **legally binding resolutions** on member states.

How is the Membership Structured?

- Total Members:** The UNSC currently consists of **15 member states**, where each member holds one vote.
- Permanent Members (P5):** Five nations hold permanent status—**China, France, Russia, the United Kingdom, and the United States**.
- Veto Power:** The P5 nations possess an absolute **veto power**, allowing any single permanent member to block a resolution regardless of international support.
- Non-Permanent Members:** Ten seats are allocated on a regional basis. The UN General Assembly (UNGA) elects five non-permanent members each year by a **two-thirds majority** for **two-year terms**.
- Re-election:** A retiring member is **not eligible for immediate re-election**.
- Historical Expansion:** While the UN has grown to 193 member states today, the UNSC composition has expanded **only once (in 1965)**, increasing from 11 to 15 members.

What are the Prominent Negotiating Groups?

Negotiating Group	Core Composition	Key Objectives & Characteristics
G4 (Group of Four)	Brazil, India, Germany, and Japan	Mutually support each other's bids for permanent UNSC seats ; heavily advocate for the inclusion of African nations in the permanent category.
Uniting for Consensus (Coffee Club)	Led by Italy, Spain, Pakistan, South Korea, etc. (Approx. 40 states)	Strictly opposes the expansion of permanent seats to prevent the entrenchment of new regional powers. Proposes expanding only the non-permanent category.
L.69 Group	Diverse pre-reform group of developing countries (Asia, Africa, Latin America)	Seeks an expansion of both permanent and non-permanent categories ; demands better representation for developing nations and Small Island Developing States (SIDS).

Committee of Ten (C-10)	10 African nations mandated by the African Union (AU)	Promotes the Ezulwini Consensus , demanding at least two permanent seats with full veto powers and five non-permanent seats exclusively for Africa.
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2.2. SUDAN CONFLICT: KORDOFAN, DARFUR AND BLUE NILE

Context:

- The ongoing conflict between the Sudanese Armed Forces (SAF) and the paramilitary Rapid Support Forces (RSF), which erupted in April 2023, has severely intensified.
- According to a UNICEF report, active warfare and drone strikes are heavily concentrated in the **Kordofan, Darfur, and Blue Nile** states of Sudan, leading to massive civilian casualties and acute humanitarian crises.

Key Geographical & Strategic Insights

1. Darfur Region

- Location & Borders:** Located in **western Sudan**, it shares international borders with Chad, the Central African Republic, and Libya.
- Topography:** Features the **Jabal Marrah**, a volcanic massif towering 900 meters above the Sudanic plain. The drainage from this massif supports a settled population, contrasting with the northern and eastern parts of Darfur which are hyper-arid or semi-deserts.
- Significance:** Darfur has historically faced prolonged ethnic conflicts, including the 2003 war which targeted non-Arab indigenous populations such as the Fur, Zaghawa, and Masalit peoples.

2. Kordofan Region

- Location:** Situated in the **central-southern** belt of Sudan, it is administratively split into North, South, and West Kordofan states.
- Topography:** Dominated by the **Nuba Mountains** in South Kordofan, which are home to the indigenous Nuba peoples.
- Resource Profile:** West Kordofan hosts critical oilfields that are essential to Sudan's economic infrastructure, rendering it a highly contested zone.
- Water Scarcity:** The region lacks perennial streams, meaning both populations and livestock are heavily dependent on permanent wells and groundwater.

3. Blue Nile State

- Location:** Positioned in the **southeastern corner** of Sudan, bordering Ethiopia and South Sudan.
- The Blue Nile River:** The state is named after the river that originates in **Lake Tana (Ethiopia)**. It flows through this region before merging with the White Nile at Khartoum to form the main Nile River.
- Economic/Strategic Value:** The region encompasses the **Roseires Dam**, a critical reservoir used for generating hydroelectric power and managing agricultural irrigation along the fertile clay plains of central Sudan.



Geographic Profile of Sudan

- **Borders:** It is a Northeast African nation bordered by seven countries: **Egypt** (North), **Libya** (Northwest), **Chad** (West), **Central African Republic** (Southwest), **South Sudan** (South), **Ethiopia** (Southeast), and **Eritrea** (East).
- **Maritime Access:** Its eastern coastline opens up to the **Red Sea**, hosting the vital maritime trade hub of Port Sudan.
- **Major Drainage:** The Nile Basin covers the vast majority of its area, driven by the confluence of the White Nile (from Uganda) and the Blue Nile (from Ethiopia) meeting at the capital city, **Khartoum**.

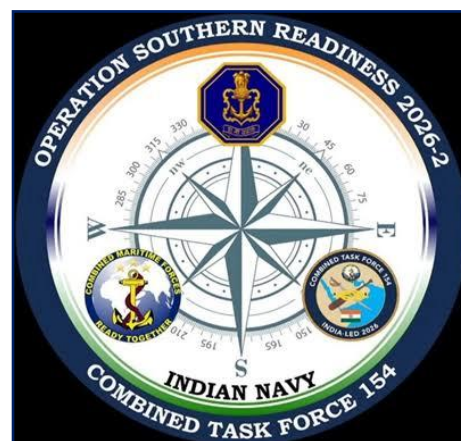
2.3. INDIA AND CMF: ADVANCING MARITIME SECURITY COOPERATION

Context:

- The Indian Navy will host **Operation Southern Readiness 26-2** at the **Southern Naval Command, Kochi**, from **20–23 July 2026**.

About Operation Southern Readiness 26-2

- A **four-day multinational maritime security training engagement** conducted under the **Indian Navy-led CTF 154** in partnership with the **Combined Maritime Forces (CMF)**.



Key Features of Operation Southern Readiness 26.2

Command Structure

- Conducted under the aegis of the Navy-led **Combined Task Force 154 (CTF 154)**, which is CMF's dedicated **Training Task Force**.
- India assumed command of CTF 154 in February 2026 - the **first time** an Indian Navy officer has led this multinational training task force.

Participating Nations

- Around **25 countries** are taking part, including **Australia, Canada, Thailand, the UAE, Oman, Djibouti, Seychelles, the United States, and the United Kingdom**.

Training Components

- Combines **classroom instruction, simulation-based modules, and practical exercises**.
- **Key subject areas:** maritime law, maritime domain awareness and information sharing, counter-narcotics operations, force protection, asymmetric threats, and maritime uncrewed systems.
- Includes **hands-on training** in damage control and firefighting.

Strategic Significance

- Underscores the Indian Navy's **growing role in regional capacity building** through its association with the CMF.
- Reflects deepening maritime cooperation and interoperability with **CMF partner nations**.

What is the Combined Maritime Forces (CMF)?

- CMF is a **multinational naval partnership**, currently comprising **47 member nations**, that works to promote security, stability, and prosperity across **~3.2 million square miles** of international waters.

- **Established in 2001–02**, initially with 12 member nations, under the leadership of the **U.S. Naval Forces Central Command (NAVCENT)**.
- **Headquartered in Manama, Bahrain.**
- Its focus areas include **counter-piracy, counter-narcotics, counter-smuggling**, and upholding the **International Rules-Based Order (IRBO)** at sea.
- Operates through **Combined Task Forces (CTFs)** - e.g., CTF 150 (maritime security), CTF 151 (counter-piracy), CTF 152 (Gulf maritime security), CTF 153 (Red Sea security), and CTF 154 (training).
- **India joined CMF as an associate member in 2022.**

2.4. MARITIME NEUTRALITY AND INTERNATIONAL LAW

Context:

- Recent attacks on neutral merchant ships carrying Indian seafarers during the U.S.–Iran conflict have revived debates on **UNCLOS, International Humanitarian Law, maritime neutrality, naval blockades, and protection of civilian shipping.**



Two primary legal frameworks governing naval warfare:

- **International Humanitarian Law (IHL) / Law of Naval Warfare**
- **United Nations Convention on the Law of the Sea (UNCLOS)**, UNCLOS is often called the "Constitution of the Oceans."

Important Maritime Zones (UNCLOS)

- **Territorial Sea (Up to 12 NM):** Sovereign territory extending to the airspace and seabed, subject only to the foreign right of innocent passage.
- **Contiguous Zone (Up to 24 NM):** A buffer zone where the coastal state lacks sovereignty but can enforce customs, fiscal, immigration, and sanitary laws.
- **Exclusive Economic Zone (Up to 200 NM):** Area where the state has exclusive rights to exploit economic resources, while other nations retain navigation and overflight freedoms.
- **High Seas & The Area (Beyond 200 NM):** Global commons open to all nations for peaceful use, with deep seabed minerals regulated as the common heritage of mankind.

International Humanitarian Law (IHL)

- **Codified primarily in 1949 Geneva Conventions**
- **Governs conduct of war (Jus in Bello)**, not legality of war.

Four Core Principles of IHL

- Distinction
- Proportionality
- Military Necessity
- Precaution

Jus ad Bellum vs Jus in Bello

- **Jus ad Bellum:** Legality of using force (UN Charter)

- **Jus in Bello:** Conduct during armed conflict (IHL)

Protection of Neutral Merchant Ships

- Neutral merchant vessels are **generally protected** from attack.
- Civilian objects like:
 - Oil tankers
 - Container ships
 - Food carriers
 - Fertilizer ships
 - Submarine cables
 - Pipelines are protected unless they become military objectives.

Transit Passage

- Applies through **international straits**.
- Continues even **during armed conflict**.
- Codified under **UNCLOS Part III (Articles 37–44)**.

When Can Neutral Merchant Ships Be Attacked?

According to the **San Remo Manual (1994)**, if they:

- Carry **contraband**
- Violate a lawful **naval blockade**
- Refuse visit/search after warning
- Make an **effective contribution to enemy military action**

UN Charter Provisions

- **Article 2(4):** Prohibits the use of force against another state's territorial integrity or political independence.
- **Article 42:** UN Security Council may authorize a blockade.
- **Article 51:** Recognizes the inherent right of self-defence.

2.5. TEESTA RIVER PROJECT: INDIA-BANGLADESH WATER COOPERATION

Context:

- India has stated that it will consider "**all related developments**" while formulating its approach to the **Teesta River Comprehensive Management and Restoration Project (TRCMRP)** in Bangladesh.
- The statement comes after **Bangladesh discussed the Teesta project with China** during Prime Minister **Muhammad Yunus'** recent visit, making the issue significant from the perspectives of **India–Bangladesh relations, transboundary water sharing, and regional geopolitics**.



About the Teesta River

- **Origin:** Rises from the **Pahunri glacier** (also called Teesta Kangse) in the Eastern Himalayas, in the **Tso Lhamo lake** region of North Sikkim.
- **Course:** Flows through **Sikkim** and **West Bengal** (India) before entering **Bangladesh**, where it joins the **Brahmaputra (Jamuna)** river.
- **Basin states:** Sikkim and West Bengal in India; Rangpur division in Bangladesh.

- **Right-bank tributary** of the Brahmaputra — a key distinction often tested (many assume it's a Ganga tributary; it is not).
- Known as **Trishna/Tri-Srota** in some historical references — associated with three streams.

Teesta River Water Sharing Dispute

- The Teesta is one of the **54 transboundary rivers** shared between India and Bangladesh.
- Water sharing remains unresolved due to differing requirements of:
 - **West Bengal**
 - **Government of India**
 - **Bangladesh**
- A proposed **2011 Teesta Water Sharing Agreement** could not be signed due to objections from the **West Bengal Government**.
- The river is crucial for irrigation in:
 - North Bengal
 - Northwestern Bangladesh

TRCMRP (Teesta River Comprehensive Management and Restoration Project)

- A Bangladesh-led master plan for **dredging, embankment construction, and river management** of the Teesta to address flooding, erosion, and low dry-season flow.
- Originally, **China** had shown interest in funding and implementing this project (part of its outreach in South Asia/BRI-adjacent engagement).
- India has separately offered to prepare a **feasibility report** for the same project, creating a competitive dynamic between India and China over Bangladesh's river management infrastructure.

2.6. INDIA-AUSTRALIA DEFENCE COOPERATION: EXERCISE PITCH BLACK

Context:

- The **Indian Air Force (IAF)** is participating in **Exercise Pitch Black 2026**, a major multinational air combat exercise hosted by Australia.



Core Facts About Exercise Pitch Black

- **Type:** A premier, large-scale **multinational biennial air combat warfare exercise**.
- **Host Country:** Conducted and hosted by the **Royal Australian Air Force (RAAF)**.
- **Origin:** First conducted in **1983** as a small-scale bilateral exercise between regional forces, it has grown into one of the Indo-Pacific region's largest training events.
- **Operational Base:** Centered primarily around northern Australian bases including **Darwin, Tindal, and Amberley**.
- **Key Objective:** To simulate complex, realistic aerial warfare and coalition operations, thereby enhancing strategic interoperability and force integration among partner nations.

Key Highlights of the 2026 Edition

- **Scale & Participation:** Features **20 nations** (including the host Australia and India), involving more than 100 aircraft and 2,500+ military personnel.

- **Participating Nations Include:** India, Australia, USA, France, Japan, South Korea, Indonesia, Singapore, Germany, UK, and others.
- **India's Component:** The IAF has deployed **4 Rafael multirole fighter jets**, **2 C-17 Globe master III strategic transport aircraft**, and over 120 Air Warriors.
- **Notable Debuts:** The 2026 edition marks the first-ever participation of Japan's **F-35 Lightning II** stealth fighters and Indonesia's **T-50I Golden Eagle** aircraft in this framework.

Strategic Significance for India

- **Indo-Pacific Synergy:** Aligns with India's vision of a *Free, Open, and Inclusive Indo-Pacific*, strengthening collective security ties with key regional partners like Australia (a fellow **QUAD** member).
- **Interoperability:** Allows the IAF to exercise joint tactical planning and large-force engagements alongside advanced global air platforms.
- **Deepening Bilateral Ties:** Operates under the umbrella of the India-Australia **Comprehensive Strategic Partnership**, mirroring increased defence coordination across domains.

India–Australia Defence Cooperation

- India and Australia are **Comprehensive Strategic Partners** (since **2020**).
- Defence cooperation has expanded through:
 - **Exercise AUSINDEX** (Naval Exercise).
 - **Exercise Malabar** (Quad Naval Exercise).
 - **Exercise Pitch Black** (Air Exercise).
- Both countries cooperate under the **Quad** framework to promote a **free, open, inclusive, and rules-based Indo-Pacific**.

2.7. HUMAN RIGHTS CRISES IN SUDAN AND MYANMAR

Context:

- Amnesty International has alleged that the **Rapid Support Forces (RSF)** committed **ethnic cleansing and crimes against humanity** during attacks on **El-Fasher** in Sudan between **2024 and 2025**.
- A leading conflict monitor has reported that **over 100,000 people have been killed in Myanmar** since the **2021 military coup**, highlighting the worsening humanitarian crisis.



Sudan Crisis: Key Highlights

- Amnesty International alleged that the **Rapid Support Forces (RSF)** committed **ethnic cleansing and crimes against humanity**.
- The alleged atrocities occurred during attacks on **El-Fasher**, the capital of **North Darfur State**.
- The attacks reportedly targeted settlements inhabited by the **Zaghawa ethnic community**.
- Sudan has been witnessing an armed conflict since **April 2023** between:
 - **Sudanese Armed Forces (SAF)**

- o **Rapid Support Forces (RSF)**

- The conflict has triggered one of the world's largest humanitarian crises.

Myanmar Crisis: Key Highlights

- A conflict monitoring group estimates that **over 100,000 people** have been killed since the **2021 military coup**.
- The military seized power on **1 February 2021**, overthrowing the elected civilian government.
- The coup triggered nationwide protests, armed resistance, and a prolonged civil conflict.
- Violence has displaced millions and caused widespread humanitarian suffering.

Sudan: Important key Facts

- **Capital:** Khartoum
- **Region:** Northeast Africa
- **Borders:** Egypt, Libya, Chad, Central African Republic, South Sudan, Ethiopia, Eritrea
- **Sea Border:** Red Sea
- **Important Rivers:** White Nile and Blue Nile meet at **Khartoum**.
- **Deserts:** The Libyan Desert and the Nubian Desert dominate the northern landscapes.
- **Mountains:** Sudan's highest peak is the **Deriba Caldera**. It is located in the **Marrah Mountains** in the Darfur region of western Sudan.
- **Gezira Plain:** The Gezira Plain is a massive, flat farming region in Sudan, located south of Khartoum between the Blue Nile and White Nile rivers.
- **Important Cities in News:** El-Fasher, Wad Madani, Kadugli & Dilling, Babanusa, El Geneina

Myanmar: Important Key Facts

- **Capital:** Naypyidaw
- **Largest City:** Yangon
- **Borders:** India, Bangladesh, China, Laos, Thailand
- **Water Bodies:** Bay of Bengal and Andaman Sea
- **Major Rivers:** Irrawaddy (Ayeyarwady), Chindwin, Sittang and Salween
- **Major mountain ranges:** Rakhine Mountains, Shan Plateau, Dawna Range, Tenasserim Mountains etc.
- **Sittwe Port & The Kaladan Project:** Located on the western coast in Rakhine State, the strategic city of Sittwe hosts the India-developed Sittwe Port. This port is the anchor of the Kaladan Multi-Modal Transit Transport Project (KMMTTP), designed to connect Kolkata port directly to Mizoram via Myanmar, bypassing the vulnerable Siliguri Corridor ("Chicken's Neck").
- **Other Important Places in News:** Mandalay (major cultural city), Rakhine State–Maungdaw (Rohingya crisis and Bangladesh border), Kachin State–Myitsone (China-backed dam project), and Shan State (ethnic conflict and drug trafficking).

2.8. INDUS WATERS TREATY: WATER DIPLOMACY AND NATIONAL SECURITY**Context:**

- India's transboundary water strategy has shifted from historic **strategic restraint** to a **security-linked enforcement framework** under the IWT.
- Persistent cross-border terrorism, culminating in the **Pahalgam attack**, prompted India to place the treaty **"in abeyance"** after Pakistan ignored formal notices in 2023 and 2024 to modify the outdated 1960 pact.

**Introduction**

India's suspension of the Indus Waters Treaty (1960) marks a significant shift by linking transboundary water governance with national security concerns. While it enhances India's strategic leverage over the Western rivers, it also raises important legal, diplomatic, and geopolitical questions regarding the future of shared river management in South Asia.

What is the Indus Waters Treaty?

- A landmark transboundary water-sharing agreement signed in Karachi on **September 19, 1960**, brokered by the **World Bank**.
- It partitions the Indus Basin by granting India full rights over the **Eastern Rivers** (Ravi, Beas, Sutlej) and allocating the **Western Rivers** (Indus, Jhelum, Chenab) to Pakistan.
- India is permitted restricted "run-of-the-river" usage on the Western rivers for domestic consumption, agriculture, and **hydropower generation** subject to rigid specifications.
- It establishes a permanent bilateral institutional channel called the **Permanent Indus Commission (PIC)** composed of high-level commissioners from both states.

Legal Architecture of the Indus Waters Treaty

- Governed strictly by its text, **Article XII(3)** explicitly permits modification of treaty provisions "from time to time" but mandates another formal government-level treaty.
- The legal framework is perpetual, containing **no unilateral exit clause** or internal revival mechanisms should a party suspend execution.
- Features a rigid, three-tiered dispute resolution structure rising from **Questions** (handled by the PIC) to **Differences** (Neutral Expert) and **Disputes** (Court of Arbitration).
- Pakistan lacks external legal recourse to enforce compliance because of India's operational reservations under the **International Court of Justice (ICJ) statute**.

Significance of the IWT Suspension

- Strategic Leverage Over Cross-Border Terror:** It explicitly establishes a new national security doctrine that **"blood and water cannot flow together,"** making resource sharing conditional on peace.
- Unshackled Infrastructure and Hydropower Development:** India gains complete design flexibility to construct extensive run-of-the-river projects and dams on the **Jhelum and Chenab** without Pakistani technical vetos.
- Enhanced Regional Flood and Water Management:** Suspension allows India to implement unrestrained storage and water control measures to safeguard the flood-vulnerable **Kashmir Valley**.

4. **Information and Hydrological Data Dominance:** Ceasing the mandatory monthly exchange of hydrological flow data directly hampers **Pakistan's monsoon planning** and agricultural flood preparedness.
5. **Dismantling a Rigid, Non-Ecological Partition Model:** The move breaks a static 1960 framework that completely ignores **climate change impacts**, environmental flows, and shared transboundary groundwater resources.

Challenges Associated with the IWT Suspension

1. **Critical Infrastructure and Engineering Deficits:** India currently lacks the required **diversion canals and storage reservoirs** to immediately halt or re-route massive volumes of the Western rivers.
2. **Severe Humanitarian and Economic Fallout Downstream:** Disrupting a basin that feeds **80% of Pakistan's agriculture** risks triggering catastrophic food insecurity and severe urban water shortages.
3. **Risk of Asymmetric or Military Escalation:** Weaponizing a life-sustaining resource could push a water-stressed neighbor toward **asymmetric gray-zone conflicts** or direct border confrontations.
4. **International Diplomatic Scrutiny and Reputational Risks:** Bypassing a historic, World Bank-brokered treaty may generate friction with global stakeholders and alter perceptions of India as a **responsible upper riparian state**.
5. **Complex International Legal Deadlock:** Stepping outside a treaty lacking an exit clause leaves no **orderly legal pathway** or off-ramp, complicating long-term regional diplomacy.

Way Forward

1. **Accelerate Domestic Water Infrastructure Projects:** Fast-track the funding and construction of long-delayed domestic storage structures, canals, and **hydroelectric stations** to fully capture permissible river waters.
2. **Formulate a Climate-Resilient Integrated Strategy:** Incorporate advanced research, like IIT Gandhinagar's basin data, into regional plans to handle the **20% drop in Eastern basin rainfall**.
3. **Establish Strict Security Thresholds for Future Dialogue:** Outline clear, conditional terms under which India will engage with the PIC, ensuring **verifiable action against terror infrastructure** precedes talks.
4. **Strengthen Center-State Collaborative Water Planning:** Foster seamless institutional linkages between the Union government and riparian states like **Punjab and Jammu & Kashmir** to maximize resource allocation.
5. **Launch Proactive Global Diplomatic Outreach:** Deploy targeted diplomatic communications to brief global partners and the **World Bank**, clearly contextualizing the suspension as a security necessity.
6. **Implement Strict Domestic Environmental Safeguards:** Enforce robust local standards on sewage treatment and pollution control to prevent environmental degradation of rivers flowing through Indian territory.

Conclusion

The suspension of the **Indus Waters Treaty** reflects India's shift towards linking water governance with national security. Going forward, India must complement its strategic leverage with stronger water infrastructure, climate-resilient management, and responsible diplomacy to safeguard both national interests and regional stability.

2.9. IRAN AND THE STRAIT OF HORMUZ: GEOPOLITICS AND ENERGY SECURITY**Context:**

- The recent escalation involving **Iran's actions in the Strait of Hormuz**, attacks on Gulf states, and proxy warfare has heightened concerns over **regional stability, global energy security, and maritime trade**, underscoring the challenge of balancing geopolitical rivalry with economic development.

**Introduction**

Iran has pursued a strategy of **proxy warfare, military deterrence, and maritime coercion** to counter Western influence. While it has secured short-term tactical gains, the strategy has deepened its diplomatic and economic isolation, highlighting the relevance of India's balanced and pragmatic approach in West Asia.

Iran's Disruptive Strategy**1. Proxy Warfare**

Iran supports proxy groups such as **Hezbollah, Hamas, the Houthis, and Shia militias** to expand its regional influence, counter the **US and Israel**, and avoid direct military confrontation.

2. Maritime Coercion

Iran uses the **Strait of Hormuz** as a strategic tool by threatening shipping, attacking tankers, and disrupting maritime trade to exert geopolitical and economic pressure.

3. Ideological Resistance

Iran projects itself as a defender of the **Palestinian cause** and an opponent of **Western imperialism**, using the "Axis of Resistance" narrative to enhance its regional influence and domestic legitimacy.

4. Strategic Partnerships

Iran has strengthened ties with **Russia, China, and North Korea** to reduce the impact of Western sanctions, secure economic and military support, and counter diplomatic isolation.

Why is the Strait of Hormuz Strategically Important?**Global Significance**

- **World's busiest energy chokepoint:** It is one of the most critical maritime routes for transporting oil and natural gas worldwide.
- **Carries around one-fifth of global crude oil trade:** Nearly **20% of the world's seaborne crude oil** passes through the Strait, making it vital for global energy supply.
- **Vital for Qatar's LNG exports:** It serves as the primary route for exporting **Liquefied Natural Gas (LNG)** from Qatar, one of the world's largest LNG exporters.
- **Gateway to Asian markets:** It connects major Gulf oil producers with energy-importing economies such as **India, China, Japan, and South Korea**.

Importance for India

- **Major source of crude oil imports:** A significant share of India's crude oil imports from the Gulf passes through the Strait of Hormuz.
- **Critical trade corridor:** It facilitates India's trade with West Asia, including energy, fertilizers, and other essential commodities.

- **Energy security:** Any disruption can threaten India's uninterrupted supply of crude oil and natural gas.
- **Connectivity through Chabahar Port & INSTC:** Escalating tensions may hamper the **Chabahar Port** and the **International North-South Transport Corridor (INSTC)**, affecting India's strategic connectivity with **Central Asia and Afghanistan**.
- **Inflation:** Higher oil prices resulting from disruptions increase transportation and production costs, fueling inflation.
- **Shipping costs:** Geopolitical tensions raise freight charges and insurance premiums for ships using the route.
- **Current Account Deficit (CAD):** Costlier energy imports increase India's import bill, widening the Current Account Deficit.

India's Stand on the Iran Crisis

1. **Strategic Autonomy:** India follows a policy of **strategic autonomy**, maintaining balanced relations with Iran, Israel, the Gulf countries, and the United States without aligning with any bloc.
2. **Support for Dialogue and Peace:** India consistently advocates **de-escalation, restraint, and peaceful resolution of disputes** through diplomacy, while opposing further military escalation in West Asia.
3. **Safeguarding Energy Security:** Given its dependence on Gulf energy supplies, India seeks to ensure the **uninterrupted flow of crude oil and LNG** by diversifying import sources and strengthening strategic petroleum reserves.
4. **Protection of Maritime Trade:** India supports **freedom of navigation and secure sea lanes**, emphasizing the safety of shipping through the Strait of Hormuz to protect global trade and its own economic interests.
5. **Pragmatic Engagement with Iran:** India continues to engage Iran based on **national interests**, particularly through projects like the **Chabahar Port** and the **International North-South Transport Corridor (INSTC)**, while complying with international obligations and maintaining strong ties with the Gulf Cooperation Council (GCC) and Israel.

Challenges Faced by India Due to the Iran–West Asia Crisis

1. Energy Security

Disruptions in the **Strait of Hormuz** can affect India's crude oil and LNG imports, increasing energy costs and supply vulnerabilities.

2. Trade and Supply Chain Disruptions

Regional instability may disrupt shipping routes, raise freight and insurance costs, and adversely impact India's trade with West Asia.

3. Economic Pressures

Higher global oil prices can fuel inflation, widen the **Current Account Deficit (CAD)**, increase fiscal pressure, and slow economic growth.

4. Safety of the Indian Diaspora

Escalating conflict could threaten the safety of millions of Indians residing in West Asia, requiring evacuation and enhanced consular support.

5. Connectivity Challenges

The crisis may delay projects such as the **Chabahar Port** and the **International North-South Transport Corridor (INSTC)**, affecting India's connectivity with Central Asia and Afghanistan.

6. Diplomatic Challenges

India's policy of **strategic autonomy** will be tested as it seeks to balance relations with Iran, Israel, the Gulf countries, and major powers while protecting its national interests.

Way Forward

For Iran

- **Shift from coercion to diplomacy:** Iran should prioritise dialogue and peaceful engagement over military coercion and proxy warfare to rebuild regional trust.
- **Reduce dependence on proxy warfare:** Limiting support to armed non-state actors can help reduce regional instability and improve diplomatic relations.
- **Ensure freedom of navigation:** Iran should respect international maritime law and guarantee the safe passage of commercial vessels through the Strait of Hormuz.
- **Reintegrate into the global economy:** Pursuing diplomatic engagement and sanctions relief can attract investment, technology, and trade for economic growth.
- **Expand energy exports through peaceful engagement:** Stable relations with neighbouring countries can help Iran maximise its oil and gas exports and strengthen its economy.

For the International Community

- **Encourage dialogue:** Major powers and regional organisations should facilitate sustained diplomatic engagement among all stakeholders.
- **Avoid escalation:** Countries should exercise restraint and refrain from actions that could trigger wider regional conflict.
- **Strengthen maritime security:** Greater international cooperation is needed to secure sea lanes and protect global energy and trade routes.
- **Promote regional confidence-building:** Confidence-building measures, regular dialogue, and security cooperation can reduce mistrust among regional actors.
- **Support negotiated settlements:** Disputes should be resolved through diplomacy, international law, and multilateral institutions rather than military action.

For India

- **Continue strategic autonomy:** India should maintain balanced relations with Iran, Israel, the GCC, and major powers while pursuing its national interests.
- **Diversify energy imports:** Expanding energy sourcing from multiple regions will reduce dependence on any single route or supplier.
- **Accelerate renewable energy transition:** Increasing the share of renewable energy will lower vulnerability to external oil price shocks.
- **Strengthen Chabahar Port and INSTC:** Faster implementation of these projects will improve India's connectivity with Central Asia and reduce dependence on traditional trade routes.
- **Enhance naval capabilities in the Indian Ocean:** Strengthening maritime surveillance and naval preparedness will help secure India's sea lines of communication.
- **Deepen partnerships with Iran and GCC countries:** Expanding economic, energy, and strategic cooperation with all regional partners will enhance India's role as a stable and trusted stakeholder in West Asia.

Conclusion

Iran's coercive strategy may yield short-term gains but risks long-term isolation and instability. In contrast, **India's strategic autonomy, balanced diplomacy, and commitment to multilateralism** provide a sustainable framework for safeguarding its energy security and advancing regional stability.

2.10. INDIA–CANADA RELATIONS: STRATEGIC RESET AND NEW OPPORTUNITIES

Context:

- The **2026 visit of Canadian PM Mark Carney** to India marked a historic reset following diplomatic strains, driven by **geopolitical shifts, defense modernization, clean energy needs, and economic complementarities**.



Introduction

The **India–Canada reset** transitions bilateral ties toward **pragmatic cooperation** in defense, trade, nuclear energy, and technology. Canada's focus on **defense reinvestment** and **supply chain diversification** complements India's **Viksit Bharat 2047** clean energy and growth goals, though overcoming **security concerns** remains vital.

The Nuances of the Bilateral Reset

- **Diplomatic Transition:** Shifts relations from past friction toward **pragmatic, future-oriented cooperation**.
- **Economic Target:** Sets a goal to double bilateral two-way trade to **USD 50 billion by 2030** through renewed **CEPA negotiations**.
- **Civil Nuclear Contract:** Secures a **USD 2.6 billion Cameco uranium deal** to support India's target of **100 GW nuclear capacity by 2047**.
- **Defense Dialogue:** Establishes the first-ever **India–Canada Defence Dialogue** alongside joint naval participation in **RIMPAC** and **Talisman Sabre**.
- **Critical Mineral Supply Chains:** Signs an MoU on the **Critical Minerals Value Chain** to integrate Canada's **31 critical minerals** into Indian manufacturing.
- **Tech & Global Alliances:** Joins Canada to the **International Solar Alliance (ISA)**, **Global Biofuels Alliance (GBA)**, and the **ACITI tech partnership**.

Significance of the India–Canada Partnership

1. **Clean Energy & Nuclear Security:** Sourcing **high-grade Canadian uranium** (up to 15% ore grade) directly powers India's **clean energy transition** and reduces single-supplier risks.
2. **Strategic Indo-Pacific Alignment:** Aligns with Canada's **Indo-Pacific Strategy**, positioning India as a vital anchor for a **free, open, and rules-based order**.
3. **Supply Chain Resilience:** Integrates Canadian **rare earths, cobalt, and tungsten**, helping diversify high-tech and defense supply chains away from monopolistic markets.
4. **Capital Flow & Trade Synergies:** Connects **Canadian pension funds** (over **USD 75 billion** invested in India) with India's expanding industrial and consumer market.
5. **Diaspora & Soft Power Bridge:** Capitalizes on the **1.8 million Indian diaspora** (4% of Canada's population) to strengthen **academic, research, and talent mobility**.

Challenges Associated with Bilateral Relations

1. **Separatist Extremism:** Persistent **anti-India separatism** and transnational organized crime networks hinder institutional trust between security agencies.
2. **Trade & Regulatory Hurdles:** Differences over **agricultural tariffs**, non-tariff barriers, and **IPR rules** create delays in finalizing **CEPA**.
3. **Consular & Visa Backlogs:** Diplomatic staff cutbacks during previous tensions created severe **visa processing bottlenecks** for students and professionals.
4. **Domestic Political Pressures:** Bilateral momentum remains vulnerable to internal **electoral dynamics** and vote-bank politics in Canada.
5. **Execution Bottlenecks:** Delays in operationalizing **defense R&D** and joint initiatives risk losing initial diplomatic momentum.

Way Forward

1. **Strict Security Coordination:** Implement the joint **NSA action plan** to target **violent extremism** and organized crime.
2. **Early Harvest Trade Agreement:** Finalize an **interim trade deal** in non-controversial sectors while negotiations for **CEPA** continue.
3. **Streamline Visa Capacity:** Restore full **consular staffing** in Ottawa and New Delhi to eliminate **visa backlogs**.
4. **Operationalize Defence Engagements:** Institutionalize regular **Defence Dialogue meetings** and promote **subsystem defense manufacturing**.
5. **Expand Clean Energy Supply Chains:** Leverage Canadian entry into the **ISA** and **GBA** for joint ventures in **bio-energy and solar storage**.
6. **Strengthen Track II Ties:** Re-activate the **India–Canada CEO Forum** and expand academic frameworks like the **AICTE–Mitacs internships**.

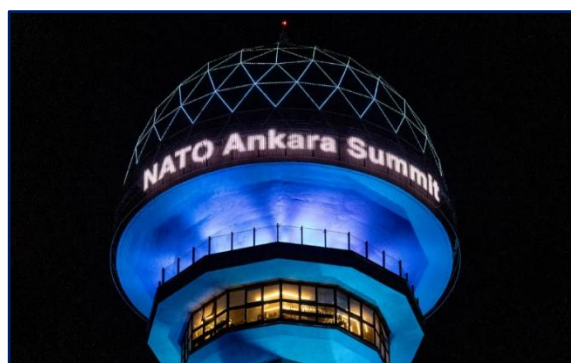
Conclusion

The **India–Canada reset** marks a shift from historical friction to **strategic pragmatism**. By addressing **security concerns** and leveraging **economic, energy, and defense complementarities**, both nations can build a resilient alliance that anchors **Indo-Pacific stability**.

2.11. NATO ANKARA SUMMIT 2026: STRENGTHENING COLLECTIVE DEFENCE

Context:

- The 32 NATO member nations convened at the Ankara Summit (July 7–8, 2026) to operationalize commitments from the 2025 Hague Summit. The primary focus was on enforcing collective defense, achieving a 5% GDP defense spending target, and scaling industrial capacity amidst complex global security challenges.



Introduction

The 2026 Ankara Summit marks a strategic transition for NATO, shifting its focus from political discourse to tangible military readiness and industrial expansion. This reorientation reflects the alliance's response to an increasingly volatile security environment and heightened superpower competition.

Key Dimensions and Structural Challenges in NATO's Strategic Pivot

1. Unprecedented Financial Commitments and Collective Defense

- **Reaffirming Article 5:** The 32 allies endorsed an ironclad commitment to collective defense under Article 5 of the Washington Treaty and the preservation of the transatlantic bond.
- **The Hague Defence Commitment:** Allies unanimously backed a benchmark to allocate at least 5% of their respective Gross Domestic Products (GDPs) to defense by 2035—a significant hike over the historic 2% target.
- **Shift from declaration to execution:** The summit focused heavily on transforming political promises into tangible military capability through sustained investment, industrial scaling, and innovation.

2. Bottlenecks in the European Defence Industrial Base (DIB)

- **Severe production deficits:** European defense majors like MBDA and Rheinmetall have warned of systemic shortages in conventional ammunition and critical military hardware.
- **Exposed strategic mismatches:** High-intensity engagements, such as the conflict in Ukraine and US operations in the Middle East, have highlighted critical shortages in air defense interceptors, precision-guided munitions, and artillery rockets.
- **Lack of alliance-wide coordination:** Despite capable individual defense industries across Europe, the lack of synchronized procurement priorities across the 32 member states continues to fragment manufacturing output.

3. Deepening Structural Dependence on the United States

- **Escalating import share:** Nearly 50% of Europe's defense spending between 2022 and 2024 went toward US suppliers, up from 28% in 2019–2021.
- **Surge in Foreign Military Sales (FMS):** US FMS notifications for European customers quadrupled since 2008, reaching \$76 billion in 2024.
- **Risk to strategic autonomy:** Without a self-sustaining domestic defense industry, increased European spending risks deepening long-term technological and logistical dependency on Washington.

4. Shift in Global Arms Market Dynamics

- **Transition to a seller's market:** As NATO members massively scale up procurement, the global arms bazaar is shifting inexorably from a buyer's market to a seller's market.
- **Resource diversion and supply delays:** Global suppliers are prioritizing NATO replenishment orders, leading to extended delivery timelines for non-aligned nations.
- **Strained Western stockpiles:** High consumption rates in concurrent conflicts are depleting precision weapon inventories faster than the current global defense manufacturing base can replace them.

5. Strategic Fallout for Developing Defense Economies and India

- **Supply chain disruptions:** Rising NATO demand is directly causing procurement delays for non-aligned nations, exemplified by delays in foreign supply of critical fighter jet engines for indigenous programs like the Tejas LCA.
- **Escalating acquisition costs:** Competition for key components, raw materials, and high-tech defense sub-assemblies is driving up global defense procurement budgets.

- **Imperative for indigenous self-reliance:** Vulnerabilities in global supply chains emphasize that critical security needs cannot rely on overstretched foreign suppliers who face their own domestic compulsions.

Strategic Frameworks & Comparative Models

- **Licensed Co-Production Models (e.g., Patriot Systems in Ukraine):** NATO's initiative to permit localized production of advanced equipment under license offers a model for rapid technology transfer and capacity building.
- **Unified Joint Procurement (EU Defense Mechanisms):** Emerging efforts to pool defense orders across European states seek to eliminate duplicate R&D spending and reduce unit costs.
- **Aatmanirbhar Bharat Framework (India):** India's push for indigenization through Positive Indigenization Lists, Defense Industrial Corridors, and private sector integration acts as a counter-strategy against international supply chain chokepoints.

Way Forward

- **Accelerate Domestic Indigenization (Aatmanirbhar Bharat):** India must rapidly advance its indigenous manufacturing capabilities across critical defense sectors to insulate its military modernization from global supply chain shocks.
- **Focus on Emerging and Disruptive Technologies (EDTs):** Prioritize national R&D investments in new-age defense domains, including Artificial Intelligence, autonomous systems, cyber warfare, quantum technologies, and resilient communication networks.
- **Diversify Strategic Defense Partnerships:** Cultivate multi-aligned defense manufacturing joint ventures and technology transfers to avoid critical single-source supply dependencies.
- **Strengthen Public-Private Defense Collaboration:** Foster deeper integration between defense public sector undertakings (DPSUs), private defense firms, and MSMEs to scale domestic production capacity rapidly.
- **Institutionalize Co-Development and Local Production:** Require foreign OEMs (Original Equipment Manufacturers) engaging in domestic defense contracts to establish long-term maintenance, repair, overhaul (MRO), and localized production facilities within India.

Conclusion

The 2026 Ankara Summit signals NATO's definitive shift towards sustained military preparedness and industrial scaling. While strengthening European deterrence, it inadvertently strains global arms supply chains. Consequently, India must prioritize building a self-reliant defense industrial base to secure its strategic autonomy.

3.1. RBI'S DATA GOVERNANCE FRAMEWORK FOR BANKS

Context:

- The Reserve Bank of India (RBI) recently issued a draft document titled '**Guidance on Regulatory Expectations for Data Governance**' for banks and other Regulated Entities (REs).



Objective

The framework aims to strengthen data governance across the banking system, improving data quality, accountability, risk management, and security while ensuring strict compliance with the **Digital Personal Data Protection (DPDP) Act, 2023**.

Key Pillars of the Data Governance Framework (DGF)

- Mandatory Establishment:** All Regulated Entities (REs) are directed to establish a comprehensive DGF that aligns seamlessly with their overall risk management framework.
- Proportionate Application:** The framework must be customized and proportionate to the size, complexity, business model, and technology infrastructure of each specific bank.
- Core Components:** It spans the entire data lifecycle, specifically addressing:
 - Organizational structure and accountability
 - Clear data policies and processes
 - Advanced technological systems
 - Robust internal audit mechanisms
- Periodic Review:** RBI mandates that banks must review this framework **annually** or more frequently if operational requirements dictate.

Significance

1. Managing the "3Vs" of Data

- Volume, Variety, and Velocity:** Rapid banking digitalization makes data a critical asset.
- Core Goal:** Managing these three aspects ensures data stays accurate, secure, consistent, and useful across systems.

2. Risk Mitigation

- Beyond IT:** Poor data management impacts the entire bank, not just the tech team.
- Systemic Safety:** Strong governance prevents wider financial, operational, compliance, and reputational risks.

Data Governance Framework (DGF) vs DPDP Act, 2023

Feature	RBI Data Governance Framework (DGF)	Digital Personal Data Protection (DPDP) Act, 2023
Nature	Sector-specific regulatory guidance (Draft).	Umbrella central legislation passed by Parliament.

Primary Focus	Institutional data management, data lifecycle quality, risk management, and operational security in banking.	Protection of personal data of digital citizens (Digital Nagriks) and processing obligations.
Applicability	Restricted to RBI-regulated entities (Banks, NBFCs, etc.).	Broadly applicable to all data fiduciaries processing personal data within or linked to India.
Core Regulator	Reserve Bank of India (RBI).	Data Protection Board of India (DPBI).

3.2. INDIA'S WINDFALL TAX REGIME

Context:

- The Central Government has revised the **Special Additional Excise Duty (SAED)** on petroleum exports for the fortnight beginning 16 July. The duty on **diesel** and **ATF** exports has been increased, while the duty on **petrol** exports has been reduced.
- The revision is based on changes in **global crude oil prices** and gross refining margins (GRMs) to tax extraordinary profits and ensure domestic fuel availability.



What is Windfall Tax?

- A **Windfall Tax** is an **additional tax imposed on companies** that earn sudden and extraordinary ("supernormal") profits due to external market conditions rather than improvements in efficiency or productivity.
- In India, this tax is collected through the **Special Additional Excise Duty (SAED)**.

Example:

If global crude oil prices surge because of a war or supply disruption, oil companies may earn unusually high profits without making any additional investment. The government taxes a portion of these unexpected gains through **Windfall Tax (SAED)**.

How Do Companies Earn Windfall Gains?

- Windfall gains arise when oil companies earn unexpected profits due to external factors, such as geopolitical conflicts, supply chain disruptions, rising global crude oil prices, or higher Gross Refining Margins (GRMs).
- These profits are market-driven and result from favourable global conditions rather than improvements in a company's efficiency or productivity.

Windfall Tax in India

- India introduced the Windfall Tax in July 2022 after global crude oil prices surged following the Russia–Ukraine conflict. It was imposed on domestic crude oil production and the exports of diesel, ATF, and petrol.
- The tax is levied through the Special Additional Excise Duty (SAED), with rates reviewed every fortnight based on global crude oil prices and refining margins.

Impact on Oil Companies

- **Lower Profits:** Reduce windfall gains of refiners.
- **Weaker Exports:** Higher duties reduce export competitiveness.
- **Investment Concerns:** Frequent tax revisions create policy uncertainty.

Impact on the Economy

- **Higher Revenue:** Boosts government finances.
- **Controls Inflation:** Ensures domestic fuel availability.
- **Energy Security:** Strengthens fuel supply during global disruptions.

3.3. NIIF AND INDIA'S INFRASTRUCTURE FINANCING

Context:

- Recently, the **Union Cabinet** approved an **additional investment of ₹30,000 crore** in the **National Investment and Infrastructure Fund (NIIF)** to establish a **second fund (NIIF II)**.
- The new fund will focus on financing **core infrastructure projects**, with the objective of mobilizing larger domestic and foreign investments.
- This approval raises the Government of India's total capital commitment to **₹60,000 crore** in NIIF.



What is the National Investment and Infrastructure Fund (NIIF)?

- It is India's Sovereign Anchored Fund (established in 2015), professionally run and managed by National Investment and Infrastructure Fund Limited (NIIFL).
- **Nature:** Government-backed investment platform (Alternative Investment Fund).
- **Administrative Ministry:** Ministry of Finance.
- **Setup:** NIIF was registered as a Category II Alternate Investment Funds (AIF) under SEBI Regulations.
- **Objective:** Mobilize long-term capital for infrastructure development in India.
- **Ownership Structure:** Government of India holds 49%; institutional investors hold 51%.
- **Capital Raised from:** Sovereign Wealth Funds, Pension Funds, Multilateral Development, and leading Domestic Financial Institutions.

Why was NIIF created?

NIIF was established to:

- Bridge India's infrastructure financing gap.
- Attract domestic and global institutional investors.
- Reduce dependence on government budgetary resources.
- Support long-term economic growth through infrastructure investment.

Cabinet Approval: Key Highlights

- Additional Government investment: **₹30,000 crore**
- Total Government commitment increases to **₹60,000 crore**

- Creation of NIIF II (Second Fund)
- Fund expected to mobilize nearly **₹3 lakh crore** through public and private investments.
- Designed to attract larger investments from sovereign wealth funds, pension funds, insurance companies and global investors.

Priority Sectors

The new fund will invest in:

- Transport Infrastructure
- Energy
- Digital Infrastructure
- Urban Infrastructure
- Water & Sanitation
- E-mobility
- Logistics

Expected Benefits

- Accelerates infrastructure creation.
- Enhances private sector participation.
- Generates employment opportunities.
- Improves India's logistics efficiency.
- Supports sustainable economic growth.
- Strengthens public-private investment partnerships.

Funding Model

- Government acts as the **anchor investor**.
- Additional capital is mobilized from:
 - o Sovereign Wealth Funds
 - o Pension Funds
 - o Insurance Companies
 - o Multilateral Development Banks
 - o Domestic & Global Institutional Investors

3.4. URBAN CLIMATE RESILIENCE AND INCLUSIVE GOVERNANCE

Context:

- Traditional urban development heavily prioritizes physical infrastructure and technology-driven solutions. However, true urban resilience is tested by how its systems support the health, dignity, and well-being of the essential workforce that sustains city life. As climate change accelerates, urban governance must transition into a socio-ecological model that addresses systemic human vulnerability.



Institutional Gaps in Current Urban Systems

- **Policy and Departmental Silos:** Public health, labor welfare, urban housing, and climate adaptation function as parallel, uncoordinated tracks rather than a single, integrated safety net for workers.
- **Fragmented Institutional Mandate:** The presence of unelected state parastatals (e.g., water or development authorities) strips Urban Local Bodies (ULBs) of unified command over city services.
- **Incomplete Fiscal Devolution:** Despite the 74th Constitutional Amendment, state governments hold back revenue powers, keeping municipalities financially dependent and under-resourced for local climate emergencies.
- **Delivery Deficits in Social Safety Nets:** Complicated paperwork, rigid documentation, and lack of ground-level awareness block contract and informal laborers from accessing existing health and welfare benefits.
- **Severe Climate and Human Data Gaps:** Municipalities lack localized, empirical data tracking micro-level heat exposure, out-of-pocket health costs, and climate-induced damages within low-income grids.

Why Urban India Needs an Integrated Approach

- **The "Double Burden" of the Urban Poor:** Marginalized frontline workers (e.g., sanitation workers, waste collectors, street vendors) experience climate vulnerabilities as both an **occupational hazard** (prolonged outdoor exposure to heat stress, dehydration, vector diseases) and a **residential crisis** (living in overcrowded, poorly ventilated informal settlements with inadequate drainage).
- **Amplification of Urban Heat Islands (UHI):** Concrete-heavy urban spaces trap heat, elevating nighttime temperatures by 3–5°C relative to surrounding areas. This uneven distribution of environmental risk hit low-income blocks without cooling access the hardest.
- **Rapid, Unplanned Spatial Agglomeration:** Unregulated structural growth converts natural water buffers (wetlands, floodplains) into real estate, leading to frequent urban flash floods (e.g., Bengaluru, Chennai) that wipe out the assets of marginalized communities.

Government Scheme

- **National Mission on Sustainable Habitat (NMSH) 2.0:** One of the eight core missions under the National Action Plan on Climate Change (NAPCC) that mandates climate risk-informed urban planning, energy-efficient building codes, and low-carbon urban growth.
- **ClimateSmart Cities Assessment Framework (CSCAF):** A first-of-its-kind self-assessment roadmap tracking cities across 28 indicators (like green cover, water, and waste management) to integrate climate resilience into municipal budgets and policies.
- **AMRUT 2.0 (Atal Mission for Rejuvenation and Urban Transformation):** Focuses on creating climate-resilient cities through circular water economies, 100% sewage coverage, flood-mitigating stormwater drains, and the development of elderly-friendly green spaces.
- **Pradhan Mantri Awas Yojana - Urban (PMAY-U):** Integrates sustainable construction practices like thermal-comfort designs and passive cooling to protect informal settlement residents from rising extreme temperatures.

Way Forward

A. Labour & Occupational Sensitization

- **Tailored Heat Action Plans (HAPs):** Formalize occupational guidelines for municipal and third-party contract workers. Implement altered summer shift timings, set up shaded rest zones across transit routes, and mandate hydration infrastructure.
- **Routine Epidemiological Tracking:** Establish early clinical tracking systems to identify symptoms of chronic heat exhaustion and kidney stress in outdoor workforces.

B. Transforming Built Infrastructure & Informal Settlements

- **Localized Environmental Retrofitting:** Channel capital toward targeted upgrades in slums—such as passive cooling designs, white/cool roofs, decentralized drinking water networks, and robust storm-water drainage.
- **Nature-Based Solutions (NbS):** Expand green-blue infrastructure (e.g., pocket forests, restoring urban wetlands like the East Kolkata Wetlands) to naturally buffer micro-climates and curb UHI effects.

C. Strengthening the Social & Public Health Safety Net

- **Climate-Ready Primary Healthcare:** Train Urban Primary Health Centres (UPHCs) to diagnose and treat climate-sensitive ailments (heat strokes, vector-borne surges) proactively.
- **Convergent Social Portals:** Eliminate bureaucratic bottlenecks by creating unified, documentation-light social security registries that link migrant/informal workers to medical insurance and climate disaster relief funds.

D. Data-Driven & Fiscal Decentralization

- **Urban Climate Vulnerability Assessment (UCVA):** Map high-resolution socioeconomic grids to identify which communities suffer from the highest environmental exposures.
- **Empowering Urban Local Bodies (ULBs):** Devote real financial autonomy to ULBs under the **74th Constitutional Amendment**, allowing cities to issue green bonds or municipal bonds tailored for localized adaptation needs.

Conclusion

Cities are fundamentally defined by the socio-ecological systems that enable their people to live, work, and stay healthy—not just by their concrete, steel, and digital infrastructure. For states like Karnataka to chart a sustainable urban future, climate adaptation must pivot from purely protecting physical assets to actively reducing human vulnerability at the margins.

3.5. INDIA SEMICONDUCTOR MISSION (ISM) 2.0

Context:

- The Expenditure Finance Committee under the Ministry of Finance has approved an enhanced budgetary outlay of ₹1.25 lakh crore for the India Semiconductor Mission (ISM) 2.0. This major financial upgrade from the ₹76,000 crore allocated during ISM 1.0 aims to build a resilient, end-to-end indigenous chip manufacturing ecosystem and integrate India into the global semiconductor value chain.



Core Contours of ISM 2.0

- **Strategic Objective:** Transition India from an import-dependent tech economy to a competitive global player under the *Make in India–Make for the World* framework.
- **Expanded Scope (Beyond Fabs):** Unlike ISM 1.0, which focused primarily on fabrication plants, ISM 2.0 mandates the domestic production of essential upstream components, including **semiconductor equipment, specialty chemicals, and industrial gases**.

- **Full-Stack IP Development:** Emphasizes the creation of indigenous semiconductor Intellectual Property (IP) to ensure secure, globally competitive chip solutions.
- **Immediate Financial Provision:** A dedicated budgetary allocation of **₹1,000 crore for FY 2026–27** has been earmarked to initiate applied R&D, industry-led training, and supply chain resilience measures.

Key Macro Targets

- **Self-Sufficiency Timeline:** Achieve **70–75% self-reliance** in fulfilling domestic semiconductor demand by **2029**.
- **Advanced Node Fabrication:** Establish indigenous manufacturing capabilities for cutting-edge **3 nm and 2 nm chips by 2035**.
- **Market Scale:** Expand the domestic semiconductor market valuation to **\$100–110 billion by 2030** (scaling up from \$38 billion in 2023).

Allied Government Initiatives

- **Modified Programme for Semiconductor Ecosystem:** An overarching policy framework with a financial outlay of **₹8,000 crore (FY 2026–27)** to expand fabrication and advanced packaging capacities.
- **Design Linked Incentive (DLI) Scheme:** Provides direct fiscal support exclusively to **fabless companies** and startups engaged in semiconductor IP development and design.
- **Digital India RISC-V (DIR-V) Programme:** A strategic initiative to promote the development of **open-source microprocessors**, eliminating reliance on restrictive foreign licensing costs.
- **Chips to Startup (C2S) Programme:** Aims to generate high-quality design manpower by providing universities and startups with access to advanced **Electronic Design Automation (EDA)** tools and fabrication facilities.
- **Indigenous Microprocessors:** Focuses on developing sovereign processing engines, such as the **DHRUV64**, to reduce dependence on imported commercial chips.

Legacy and Status of ISM 1.0 (As of Dec 2025)

- **Fiscal Support:** Approved in December 2021, it provided up to **50% direct fiscal support** for setting up silicon fabs, compound semiconductors, and testing facilities.
- **Project Realization:** Successfully anchored **10 major projects** with cumulative investments of **₹1.60 lakh crore** across six Indian states.

3.6. INDIA'S BAN ON IMPORTS LINKED TO FORCED LABOUR

Context:

- Recently, India amended the Foreign Trade Policy (FTP), 2023 to ban the import of goods produced wholly or partly using forced labour. The move comes amid a U.S. Section 301 investigation and a proposed 12.5% tariff on Indian exports over the absence of such a prohibition.



Key Highlights of the Amendment

- **The Prohibition:** A new Paragraph 2.20B has been inserted into the FTP 2023, stating: "*The import of goods produced or manufactured, wholly or in part, through the use of forced labour is prohibited*".
- **Implementation Timeline:** The provisions will take effect **30 days** from their publication in the Official Gazette (issued on July 13, 2026).
- **Enquiry & Enforcement Mechanism:** The Central Government can notify specific prohibited goods based on enquiries conducted by the **Director General of Foreign Trade (DGFT)**. The detailed inquiry procedures will be governed by the **Handbook of Procedures, 2023**.
- **Formal Definition:** The amendment adopted the definition of "**Forced Labour**" from the **ILO Forced Labour Convention, 1930 (No. 29)**.

Background & International Context

- **USTR Section 301 Probe:** The US proposed tariffs on countries, including **India**, over alleged inadequate enforcement against imports made with **forced labour**.
- **Regulatory Shift:** Moves from relying only on domestic labour laws to a **trade-based import ban**, aligning India's **FTP** with global supply-chain standards.

International Labour Organization (ILO) Convention No. 29

- **About**
 - Established: 1919.
 - Became the first specialised agency of the United Nations in 1946.
 - Headquarters: Geneva, Switzerland.
 - Has a unique tripartite structure comprising governments, employers, and workers.
- **Important Conventions**
 1. Convention No. 29 (Forced Labour Convention, 1930): Calls for the suppression of forced or compulsory labour in all its forms.
 2. Convention No. 105 (Abolition of Forced Labour Convention, 1957): Abolishes the use of forced labour in specified circumstances.
 3. India has ratified both Convention No. 29 and Convention No. 105.

3.7. INDEX OF CORE INDUSTRIES (ICI) AND INDUSTRIAL GROWTH

Context:

- The **Ministry of Commerce and Industry** will release an updated **Index of Core Industries (ICI)** on **20 July 2026**, with a new **base year of 2022-23** and recalibrated industries and weightages.

About the Index of Core Industries (ICI)

1. Measures the **combined and individual growth** of **eight core industries** that have a bearing on the overall **Index of Industrial Production (IIP)**.

Key Features of the Revision

Base Year Change

- Replaces the existing **ICI series** based on **base year 2011-12**.



Release Scope

- The **20 July 2026** release will include the **provisional ICI for June 2026**, along with the **back series from April 2023 to May 2026**.

Methodology

- Weights for the **2022-23 ICI series** are derived from the weights of the **2022-23 IIP series**, released by the **Ministry of Statistics and Programme Implementation (MoSPI)**.

Strategic Significance

- Reflects periodic **base-year revisions** to keep industrial output measurement aligned with the **current economic structure**.

What is the Index of Industrial Production (IIP)?

- A composite indicator measuring **short-term industrial growth** across **mining, manufacturing, and electricity** sectors.
- Released monthly by the **National Statistical Office (NSO)**, under **MoSPI**.
- Classified by **use-based category**: primary goods, capital goods, intermediate goods, infrastructure/construction goods, consumer durables, and consumer non-durables.
- **Eight Core Industries** (44.87% weight in current IIP): Coal, Crude Oil, Natural Gas, Refinery Products, Fertilizers, Steel, Cement, Electricity.

3.8. INDIAN TEA INDUSTRY AND ITS GLOBAL SIGNIFICANCE

Context:

- Recently, the Indian tea industry reported record achievements in **production, exports, auction prices, and domestic consumption**, reaffirming India's position as one of the world's leading tea-producing nations.



About Indian Tea Industry

Tea is one of India's most important **plantation crops** and a major agricultural export. The sector employs millions of people, particularly women, and plays a significant role in the rural economy.

Key Facts

- India is the **second-largest tea producer** in the world after China.
- Produces around **1.5 billion kg** of tea annually.
- Contributes nearly **20% of global tea production**.
- Nearly **80% of India's tea production is consumed domestically**.

Climatic Conditions for Tea Cultivation

Tea is a **climate-sensitive crop** that thrives in tropical and subtropical regions. Even minor weather changes can affect both the yield and quality of tea.

Ideal Conditions

- **Temperature:** 15°C–23°C

- **Rainfall:** 150–300 cm annually.
- **Climate:** Warm, humid with at least 5 hours of sunlight daily.
- **Soil:** Slightly acidic, calcium-free, well-drained soil.
- **Relief:** Sloping terrain for proper drainage.

Major Tea-Growing Regions

- The major tea-growing areas include **Assam** (the largest producer), **West Bengal** (Darjeeling and Dooars), **Tamil Nadu** (Nilgiris), **Kerala**, **Himachal Pradesh** (Kangra Valley), **Tripura**, and **Arunachal Pradesh**.

Types of Tea Produced in India

India produces over **1,000 varieties** of tea. Climatic conditions, altitude and processing techniques give Indian teas their unique flavour and aroma.

Tea Type	Key Feature
Black Tea	Most produced and exported variety
CTC Tea	Crush–Tear–Curl process; widely consumed in India
Orthodox Tea	Premium quality; mainly exported
Green Tea	Rich in antioxidants
White Tea	Rare; produced from young buds
Oolong Tea	Partially oxidized; niche market
Darjeeling Tea	GI-tagged; famous for muscatel flavour
Assam Tea	Strong, bright and malty
Nilgiri Tea	Aromatic flavour from Western Ghats

About Tea Board of India

The **Tea Board of India** is the apex statutory body responsible for regulating and promoting the tea industry.

About

- **Established:** 1953 (Tea Act, 1953)
- **Operational since:** 1954
- **Headquarters:** Kolkata
- **Ministry:** Ministry of Commerce & Industry
- **Overseas Offices:** Dubai and Moscow
- Reconstituted every **three years**.

Conclusion

India's tea industry combines **favourable agro-climatic conditions, diverse tea varieties, strong institutional support, and targeted government initiatives**, making it one of the country's most important plantation sectors and a significant contributor to agricultural exports.

3.9. RBI'S FOREIGN CURRENCY SWAP FACILITY AND FOREX RESERVES

Context:

- The **RBI** has operationalised a **Special Foreign Currency Swap Facility** to mobilise foreign exchange through **FCNR(B) deposits, ECBs, and OFCBs**.
- The facility has attracted **over US\$20 billion**, boosting **India's forex reserves** and external sector stability.

What is RBI's Special Swap Facility?

- It is a **temporary liquidity window** introduced by the RBI to encourage banks to raise foreign currency from overseas.
- Banks mobilise foreign currency through specified sources and swap it with the RBI for rupees at a concessional swap rate.

Objective

- Increase foreign exchange inflows, strengthen forex reserves, improve balance of payments (BoP), and stabilise the rupee during periods of external uncertainty.

Sources of Foreign Currency under the Swap Facility

1. FCNR(B) Deposits (Foreign Currency Non-Resident Bank Deposits)

- **Who can open?** Non-Resident Indians (NRIs) with authorised Indian banks.
- **Deposit Currency:** Maintained in designated foreign currencies (e.g., US Dollar, Euro, Pound Sterling, Japanese Yen).
- **Exchange Rate Protection:** Both the principal and interest are repaid in the same foreign currency, protecting depositors from exchange rate fluctuations.
- **Repatriation:** Both principal and interest are fully repatriable, allowing NRIs to transfer funds abroad without restrictions.

2. External Commercial Borrowings (ECBs)

- **Meaning:** Foreign currency loans raised by eligible Indian companies from overseas lenders.
- **Purpose:** Used for capital expenditure, infrastructure projects, manufacturing, and business expansion, subject to RBI guidelines.
- **Lenders:** International banks, foreign financial institutions, export credit agencies, and other recognised overseas lenders.
- **Regulation:** Governed by the RBI's External Commercial Borrowing (ECB) Framework.

3. Overseas Foreign Currency Borrowings (OFCBs)

- **Meaning:** Foreign currency borrowings raised by Indian banks from overseas financial markets.
- **Purpose:** Helps banks mobilise additional foreign currency resources to meet domestic funding requirements.
- **Significance:** Increases the availability of foreign exchange in the banking system and supports the RBI's efforts to strengthen forex reserves and liquidity under the special swap facility.



About Foreign Currency Swap

A **currency swap** is an agreement in which two parties exchange one currency for another and agree to reverse the transaction at a future date at predetermined terms.

In this case:

- Banks bring foreign currency (e.g., US dollars) to RBI.
- RBI provides equivalent rupee liquidity.
- At maturity, the transaction is reversed as per agreed conditions.

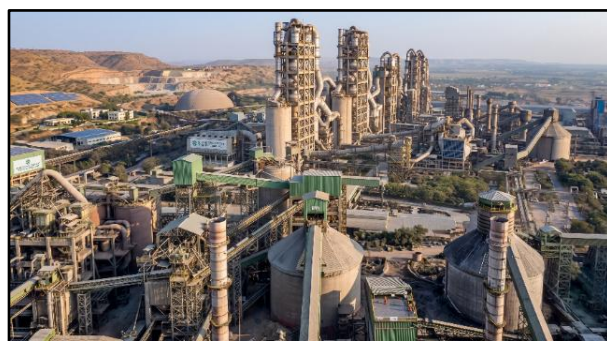
FCNR(B) vs NRE vs NRO Accounts

Feature	FCNR(B) Foreign (Currency Non-Resident (Bank) Account)	NRE (Non-Resident External Account)	NRO (Non-Resident Ordinary Account)
Who can open?	NRIs/PIOs	NRIs/PIOs	NRIs/PIOs
Deposit Currency	Foreign Currency	Indian Rupee (INR)	Indian Rupee (INR)
Source of Funds	Foreign earnings remitted from abroad	Foreign earnings remitted from abroad	Income earned in India (rent, pension, dividend, etc.) and foreign remittances
Exchange Rate Risk	No (Deposit and repayment in same foreign currency)	Yes	Yes
Repatriation	Fully repatriable	Fully repatriable	Repatriation is restricted (subject to RBI rules and limits)
Interest	Paid in foreign currency	Paid in INR	Paid in INR
Used For	Holding savings in foreign currency without exchange rate risk	Maintaining overseas income in India	Managing income generated in India

3.10. CHEMICAL PARKS AND SELF-RELIANCE IN INDIA

Context:

- The Union Cabinet approved the **Bharat Audyogik Vikas Yojana Rasayan (BHAVYA-Rasayan)** with a total outlay of **₹3,030 crore** to establish **three dedicated chemical parks** across the country, aimed at strengthening India's self-reliance in the chemical sector.



What does the scheme entail?

Information & Broadcasting Minister Ashwini Vaishnaw noted that each park has the potential to attract between ₹20,000 crore and ₹50,000 crore in investment, furthering India's push toward self-reliance in the chemicals sector.

Why is it significant?

The scheme is expected to act as a "multiplier," catalysing far larger private investment and positioning India as a competitive, self-reliant hub for chemical manufacturing.

About the Chemicals Sector in India

- Chemicals are a **key input industry**, feeding into pharmaceuticals, agriculture (fertilizers / agrochemicals), textiles, and consumer goods.
- India is among the world's largest producers of chemicals but remains significantly **import-dependent** for speciality and intermediate chemicals.
- The **Department of Chemicals and Petrochemicals**, under the **Ministry of Chemicals and Fertilizers**, is the nodal body for sectoral policy.

Functions of Dedicated Chemical Parks

- Provide **plug-and-play infrastructure** to reduce setup time and cost for chemical manufacturing units.
- Ensure **common effluent treatment and safety infrastructure**, given the hazardous nature of chemical manufacturing.
- Enable **cluster-based development**, improving logistics, raw material access, and ease of doing business.

Economic Benefits of BHAVYA-Rasayan Scheme

- **Value-chain development:** Strengthens the chemical industry across upstream, downstream, and ancillary segments, ensuring efficient resource use and lower logistics costs.
- **Cost competitiveness:** Shared common infrastructure and basic utilities, tailored to industry needs, will enhance cost efficiency and global competitiveness.
- **Global integration:** Enables deeper integration of Indian chemical manufacturers into global value chains, boosting exports and import substitution.
- **Sustainable growth:** Centralized facilities — including Common Effluent Treatment Plants, Treatment Storage and Disposal Facilities, and hazardous waste management infrastructure — will support environmental compliance and eco-friendly industrial development.
- **Broader economic impact:** Growth in the chemicals sector will have a cascading effect on downstream industries, generating employment and driving progress toward the **Viksit Bharat @ 2047** goal.

3.11. NFSA AND ANTYODAYA ANNA YOJANA: PROPOSED REFORMS IN FOOD SECURITY

Context:

The proposed **2026 amendment to the National Food Security Act (NFSA), 2013** seeks to reform **Antyodaya Anna Yojana (AAY)** entitlements by shifting from a purely household-based allocation to a **per-capita entitlement model**, aiming to improve equity while raising concerns over federalism and food security.

What is the National Food Security Act (NFSA), 2013?

The **NFSA, 2013** is a rights-based legislation that provides **legal entitlement to subsidised foodgrains** through the Public Distribution System (PDS), aiming to ensure food and nutritional security for vulnerable sections.



Objectives

- **Ensure Food Security as a Legal Right:** Guarantees eligible households a **statutory entitlement to subsidised foodgrains**, making access to food a legal right rather than a welfare scheme.
- **Reduce Hunger and Malnutrition:** Aims to improve nutritional outcomes by ensuring regular access to affordable food for vulnerable populations.
- **Strengthen Targeted Public Distribution:** Enhances the efficiency of the **Targeted Public Distribution System (TPDS)** by delivering subsidised foodgrains to identified beneficiaries.
- **Protect Vulnerable Households through Subsidised Foodgrains:** Provides affordable food support to economically weaker sections, reducing food insecurity and livelihood vulnerability.

Antyodaya Anna Yojana (AAY): Existing Framework and Proposed NFSA Amendment (2026)

- **Antyodaya Anna Yojana (AAY):** Launched in 2000, AAY provides highly subsidised foodgrains to the *poorest of the poor* households, offering higher food security than the Priority Household category under the NFSA.
- **Existing Provision:** Every AAY household receives **35 kg of foodgrains per month**, irrespective of family size.
- **Proposed NFSA Amendment (2026):** Replace the household-based entitlement with **7 kg per person per month**, subject to a maximum of **35 kg per household**.
- **Objective of the Amendment:** Eliminate intra-category inequities, align foodgrain allocation with household size and nutritional needs, ensure equitable distribution among beneficiaries, and improve the efficiency of food subsidy expenditure.

Challenges Associated with the Proposed NFSA Amendment

1. **Reduced Food Security for Small Households:** The shift to a per-capita entitlement may reduce foodgrain allocation for families with fewer than five members, affecting their food security.
2. **Regional Imbalance in Foodgrain Allocation:** States with smaller average family sizes, particularly Tamil Nadu and Kerala, may receive lower allocations, potentially widening regional disparities.
3. **Inadequate Protection for the Poorest:** The amendment may weaken the special protection historically provided to Antyodaya households by replacing a fixed household entitlement with a variable one.
4. **Increased Financial Burden on Poor Families:** Reduced subsidised foodgrain may compel vulnerable households to purchase food from the open market, increasing out-of-pocket expenditure.
5. **Inadequate Stakeholder Consultation:** The proposal has drawn criticism for insufficient consultation with States and other stakeholders before introducing significant changes.
6. **Failure to Address Targeting Errors:** The amendment focuses on changing entitlement norms without adequately addressing inclusion and exclusion errors in beneficiary identification.

Broader Policy Challenges

1. **Balancing Equity with Food Security:** A more equitable per-capita allocation must not compromise the minimum food security guaranteed to the poorest households.
2. **Accommodating Regional Diversity:** A uniform national framework should account for variations in demographic patterns, family structures, and consumption behaviour across States.
4. **Addressing Diverse Nutritional Needs:** Food entitlements should reflect age, gender, occupation, and nutritional requirements rather than relying solely on household size.

5. **Managing Political Economy Concerns:** Food security reforms must balance fiscal efficiency with their social and political implications, particularly in welfare-oriented States.
6. **Enhancing Administrative Capacity:** Effective implementation requires accurate beneficiary databases, periodic verification, and robust digital governance systems.

Global Perspective: Food Security Models Across Countries

Country	Food Security Model	Key Learning for India
Brazil	Fome Zero (Zero Hunger Programme) integrates food subsidies, cash transfers, school meals, and support for small farmers to combat hunger and malnutrition.	Food security should combine food assistance with livelihood and nutrition support rather than relying only on subsidised foodgrains.
United States	Supplemental Nutrition Assistance Program (SNAP) provides electronic food benefits based on household income and family size , ensuring targeted assistance.	A need-based and dynamic entitlement system can improve equity while reducing exclusion and inclusion errors.
Indonesia	Rastra/BPNT (Non-Cash Food Assistance Programme) shifted from physical foodgrain distribution to digital food vouchers , allowing beneficiaries greater choice and improving transparency.	Leveraging digital technology and Direct Benefit Transfer (DBT) can enhance efficiency, reduce leakages, and strengthen beneficiary empowerment.

Way Forward

1. **Build Consensus through Cooperative Federalism:** Institutionalise extensive consultation with States to ensure that food security reforms are participatory, region-sensitive, and enjoy broad political acceptance.
2. **Adopt an Equitable and Flexible Entitlement Framework:** Design a hybrid entitlement model that guarantees a minimum household allocation while incorporating per-capita benefits to balance equity with food security.
3. **Protect the Most Vulnerable:** Ensure that no Antyodaya household experiences a decline in food support below minimum nutritional requirements through appropriate safeguards.
4. **Strengthen Targeting and Digital Governance:** Regularly update beneficiary databases using digital platforms and Aadhaar-enabled verification to minimise inclusion and exclusion errors.
5. **Promote Evidence-Based and Nutrition-Sensitive Policy:** Base foodgrain allocation on demographic patterns, household composition, and nutritional needs rather than relying solely on family size.

Conclusion

The NFSA must evolve to ensure that reforms promote **equity without compromising food security**. A balanced, evidence-based, and cooperative federal approach can strengthen India's food security architecture while safeguarding the interests of its most vulnerable citizens.

ENVIRONMENT AND GEOGRAPHY

4.1. KEN-BETWA RIVER LINKING PROJECT: DEVELOPMENT AND CONSERVATION

Context:

- Recently, tribal villagers, predominantly women, in Madhya Pradesh's Chhatarpur and Panna districts intensified protests against the **Ken–Betwa River Linking Project (KBLP)**, demanding fair compensation and better rehabilitation through a symbolic "**hanging satyagraha**."

Key Facts: Ken-Betwa Link Project (KBLP)

- KBLP is the **first initiative** to be implemented under the **National Perspective Plan (NPP)** for the interlinking of rivers.
- Objective:** It aims to transfer "surplus" water from the Ken River in Madhya Pradesh to the water-deficit Betwa River in Uttar Pradesh to address the chronic drought issues of the **Bundelkhand region**.
- Beneficiary States:** Jointly benefits Madhya Pradesh and Uttar Pradesh.
- Nodal Agency:** Implemented by the **National Water Development Agency (NWDA)** under the **Ministry of Jal Shakti**.
- Core Infrastructure:**
 - Phase I:** Includes the construction of the **Daudhan Dam** complex, a 221-km long link canal, and a low-level tunnel.
 - Phase II:** Includes the Lower Orr Dam (across the Orr River), the Bina Complex project, and the Kotha Barrage.



Geography & Hydrology Related Facts

Attribute	Ken River	Betwa River
Origin	Kaimur Hills (Jabalpur district, Madhya Pradesh)	Vindhya Range (north of Hoshangabad, Madhya Pradesh)
Outflow	Confluence with the Yamuna River at Chilla village, UP	Confluence with the Yamuna River at Hamirpur, UP
Major Tributaries	Bawas, Dewar, Kaith, Baink, Kopra, Bearma	Newan, Orr, Dhasan
Key Highlights	Known for the rare, semi-precious Sajhar stone .	Historically known as the Vetrawati .

Environmental and Ecological Concerns

- Habitat Fragmentation:** Environmentalists warn that the construction of the Daudhan Dam will submerge over 4,000 hectares of forest land inside the Panna Tiger Reserve, impacting critical wildlife corridors for tigers, vultures, and gharials.
- Forest Loss:** The project expects the clearance/felling of over 23 lakh trees, raising major conservation challenges.

- **Clearance Bodies Involved:** The project requires complex statutory clearances from the National Board for Wildlife (NBWL), the National Green Tribunal (NGT), and Forest Advisory Committees.

Institutional & Strategic Framework

1. National Perspective Plan (NPP)

- **Launched:** 1980 by the **Ministry of Irrigation** (now Ministry of Jal Shakti) for inter-basin water transfers.
- **Components:**
 - **Himalayan Component:** 14 river links.
 - **Peninsular Component:** 16 river links, including the **Ken–Betwa River Linking Project (KBLP)**.

2. National Water Development Agency (NWDA)

- **Established:** 1982 as an autonomous society under the **Ministry of Jal Shakti**.
- **Role:** Conducts water balance studies, prepares **Feasibility Reports (FRs)** and **Detailed Project Reports (DPRs)**, and coordinates river-linking projects.

3. Constitutional & Legal Framework

- **Article 262:** Provides for adjudication of inter-state river water disputes.
- **Seventh Schedule:**
 - **Entry 17 (State List):** Water supply, irrigation, canals, and drainage.
 - **Entry 56 (Union List):** Regulation and development of inter-state rivers in the public interest.
- **Key Clearances:** Governed by the **Wildlife (Protection) Act, 1972**, **Environment (Protection) Act, 1986**, and **Forest Rights Act, 2006** (including Gram Sabha consent for forest diversion).

4.2. INDIAN GREY HORNBILL CONSERVATION AND REINTRODUCTION

Context:

- The **Indian Grey Hornbill** has recorded **four consecutive years of successful breeding** in **Gir Forest, Gujarat**, after being reintroduced in **2021**.
- The species had disappeared from Gir during the **1950s–1960s**, making this a significant conservation success.



Recent Conservation Success in Gir Forest

- **Reintroduction:** The Indian Grey Hornbill, locally extinct from Gir since the 1950s–60s, was reintroduced in 2021. A total of 40 birds were released in two phases (28 in 2021–22 and 12 in 2023).
- **Monitoring & Outcome:** 11 male hornbills were satellite-tagged to track movement, habitat use, and breeding. The species has now recorded four consecutive years of successful breeding, indicating a self-sustaining population.

About Indian Grey Hornbill

- **Scientific Name:** *Ocyroceros birostris*
- **IUCN Status:** Least Concern (LC)
- **Habitat:** Open forests, wooded farmlands, and urban parks across the Indian subcontinent.

- **Diet:** Mainly fruits, insects, and small reptiles.

Ecological Importance

- A long-distance seed disperser that promotes forest regeneration.
- Helps maintain forest biodiversity and ecosystem health.



About Gir Forest

Gir Forest, located in **Gujarat**, comprises the **Gir National Park and Wildlife Sanctuary** and is the **only natural habitat of the Asiatic Lion** (*Panthera leo persica*). It is a biodiversity hotspot supporting species such as the Leopard, Striped Hyena, Golden Jackal, Marsh Crocodile, and over 300 species of birds.

Species Reintroduction in India: Other Examples

- **Cheetah** reintroduction in **Kuno National Park (Madhya Pradesh)**.
- **Gharial** reintroduction in selected river systems.
- **Indian Rhino** conservation and translocation under **Indian Rhino Vision (IRV)**.

Conclusion

The successful revival of the Indian Grey Hornbill in Gir highlights the importance of **species reintroduction, scientific monitoring, and habitat conservation**, making it a significant topic for UPSC Prelims in Environment and Ecology.

4.3. MANASBAL LAKE: BIODIVERSITY AND MIGRATORY BIRDS

Context:

- **Recently, Manasbal Lake** in Jammu & Kashmir's Ganderbal district witnessed the return of migratory birds following **ecological restoration measures**, signalling the revival of its biodiversity and ecological health.



Geographical & Physical Features of Mansbal Lake

- **Location:** Ganderbal District, Jammu & Kashmir.
- **Deepest Freshwater Lake:** It is recognized as the deepest freshwater lake in the country, reaching a maximum depth of **43 feet (approx. 13 meters)**.
- **Dimensions:** The lake measures roughly 3.5 km in length and 1.5 km in breadth.
- **Hydrology & Mixing Type:** Classified as a **warm monomictic lake**, it undergoes thermal stratification from March to November and circulates completely once a year. It lacks major surface inlet channels and is primarily sustained by internal springs and precipitation.
- **Drainage:** The surplus water drains out into the **Jhelum River** via an outlet channel.

Historical & Cultural Footprint:

- It features the ruins of **Jharokha Bagh**, a 17th-century Mughal garden built by Empress Nur Jahan.

- o An ancient Hindu temple dating back to the 8th–9th century (Avantivarman era) was unearthed on its shores during restoration.

Avian Diversity & Ecological Recovery

- Often called the "**Supreme Gem of all Kashmir Lakes**" or "**Bird's Paradise**," the lake serves as a critical natural staging ground for aquatic birds.
- **Diverse Inhabitants:** It hosts more than 46 species of birds across 23 families.
- **Key Migratory Species:**
 - o Horned Grebe
 - o Long-Eared Owl
 - o White-Headed Duck
 - o Mallard
 - o Golden Eagle
 - o Eurasian Hoopoe, Lesser Pied Kingfisher, and Grey-Backed Shrike.

Threats & Mitigation Framework

- The lake has historically suffered from extensive **eutrophication** driven by excessive aquatic weeds (*Ceratophyllum demersum*), agricultural runoff, and waste accumulation, which severely impeded water circulation.

Restoration Measures

- **De-weeding & Dredging:** Managed by the **Wular-Manasbal Development Authority (WMDA)**, massive clearing initiatives removed over 7,202 cubic meters of surface weeds and dredged an area of 70,000 square feet to restore depth and flow channels.
- **Water Budgeting:** Spearheaded by the **J&K Water Resources Regulatory Authority** to scientifically monitor carrying capacity, water drawls, and maintain the ecosystem's baseline ecological health.
- **Waste Management:** Adoption of a three-pronged purification approach including a dedicated sewage treatment plant (STP) and an integrated solid waste management facility.

4.4. ARAVALLI HILLS: ECOLOGICAL PROTECTION AND SUSTAINABLE DEVELOPMENT

Context:

- Recently, the Supreme Court constituted a five-member High-Powered Committee (HPC) to conduct a fresh scientific and ecological review of the definition and delineation of the Aravalli Hill Range after staying the October 2025 MoEFCC report over critical ambiguities. The committee has been directed to submit its report by **August 31, 2026**.



The Core Dispute

- **The 500-Metre Paradox:** The previous report limited the definition of the Aravalli range strictly to areas within a **500-metre gap** between two or more qualifying hills. Experts argue this narrows protected boundaries, opening up intervening gaps to rampant commercial mining.

- **The 100-Metre Elevation Criterion:** The prior assessment claimed only 1,048 of Rajasthan's 12,081 hills satisfied the 100-metre elevation mark. The new HPC will check if this factually excludes lower-elevation formations that act as vital ecological buffers.
- **Contiguity vs. Fragmentation:** The committee is evaluating whether hills above 100 metres form a single, **continuous ecological formation** despite larger physical gaps, warranting absolute regulatory protection.

High-Powered Committee (HPC) Architecture

- **Chairmanship:** Chaired ex-officio by the **Director General of the Indian Council of Forestry Research and Education (ICFRE)** (currently Kanchan Devi).
- **Composition:** Comprises multidisciplinary domain experts from geology, soil science, biodiversity, and scientific geo-mapping (including representatives from the Forest Survey of India and Geological Survey of India).
- **Mandate:** Formed under the exercise of the Supreme Court's jurisdiction (**Articles 32 and 142** of the Constitution) to institutionalize participatory deliberation and deliver a fair, independent ecological review.

Current Governance Bottlenecks

Environmental groups and grassroots activists (such as Adivasi Samanvay Manch Bharat and Ridge Bachao Andolan) have flagged severe flaws in the committee's public consultation process:

- **Digital Exclusion:** The committee invited public feedback exclusively via **emails and Google Forms**. Activists argue this structurally excludes the most affected rural and indigenous communities living deep within the Aravalli belt who lack digital literacy.
- **Inadequate Consultation Window:** A strict **21-day timeline** is deemed entirely insufficient for remote communities to comprehend, process, and meaningfully communicate deep-seated environmental grievances.
- **Regulatory Non-Compliance:** Local networks report that licensed mining leases across **Haryana, Rajasthan, and Gujarat** are blatantly flouting environmental norms, causing irreversible health and livelihood damage.
- **Proposed Alternative:** Activists demand that public notices be published in local languages at *Panchayat Bhawans*, schools, and *Anganwadis*, alongside mandatory physical field visits by the committee members.

4.5. SUNDARBANS MANGROVE CONSERVATION AND RESTORATION

Context:

- The West Bengal Government has announced that **mangrove forests lost to encroachments, particularly due to shallow fish ponds (bheries), will be restored** in the Sundarbans. The issue gained attention after large-scale mangrove loss was observed in **Kripakhali Island**, where extensive forest areas have been converted into fisheries.



About the Sundarbans

- **Location:** Ganga-Brahmaputra-Meghna Delta across **India and Bangladesh**.

- **Indian Share:** Located in **West Bengal**.
- **Status:**
 - o UNESCO World Heritage Site (1987)
 - o Ramsar Site
 - o Biosphere Reserve
 - o Tiger Reserve
- **Largest Mangrove Forest** in the world.

About Mangroves

- Mangroves are **salt-tolerant (halophytic) forests** found in tropical and subtropical coastal regions.
- They grow in **intertidal zones**, estuaries, river deltas, lagoons and sheltered coastlines.
- Possess **stilt roots and pneumatophores (breathing roots)** for survival in waterlogged soils.
- Major Indian mangrove states:
 - o **West Bengal (largest share)**
 - o Gujarat
 - o Andaman & Nicobar Islands
 - o Odisha
 - o Andhra Pradesh
 - o Tamil Nadu

Importance of Mangroves

- **Ecological Importance**
 - o Protect coastlines from **cyclones, storm surges and coastal erosion**.
 - o Act as **natural carbon sinks (Blue Carbon Ecosystems)**.
 - o Provide breeding and nursery grounds for fish, crabs and shrimps.
 - o Support rich biodiversity including the **Royal Bengal Tiger**, estuarine crocodile and migratory birds.
- **Economic Importance**
 - o Sustain fisheries and coastal livelihoods.
 - o Promote ecotourism.
 - o Improve water quality by trapping sediments and pollutants.

Threats to Mangroves	Conservation Measures in India
• Conversion into aquaculture (fish/shrimp ponds). • Illegal encroachments and land reclamation. • Coastal infrastructure and urbanisation. • Pollution. • Sea-level rise and climate change. • Cyclones and salinity changes.	• National Mangrove and Coral Reef Committee under the Ministry of Environment, Forest and Climate Change (MoEFCC). • MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes) launched in Budget 2023–24 for mangrove plantation and restoration. • Protection through the Coastal Regulation Zone (CRZ) Notification. • Restoration under CAMPA and State Forest Department initiatives. • Integration with Ramsar Convention, Blue Carbon and climate adaptation efforts.

4.6. INDIA'S DEFENCE AND AEROSPACE SELF-RELIANCE

Context:

- Based on the Prime Minister's *Mann Ki Baat* address the month of June has been designated a landmark period for India's aviation and defence sectors due to key milestones in indigenous manufacturing and flight testing.

1. Defence & Aerospace Manufacturing

C-295 Transport Aircraft Project

- Milestone:** The first made-in-India C-295 transport aircraft completed its maiden flight.
- The Deal:** The Indian Air Force is procuring 56 aircraft under a ₹21,935-crore contract.
- Manufacturing Partnership:** 40 of these aircraft are being manufactured domestically by **Tata Advanced Systems Limited (TASL)** in partnership with **Airbus** at a dedicated facility in **Vadodara, Gujarat**.
- Strategic Impact:** It provides a significant boost to India's MSMEs and domestic aerospace ecosystem.

Long-Range Land-Attack Cruise Missile (LRLACM)

- Development:** Successfully flight-tested by the **Defence Research and Development Organisation (DRDO)**.
- Indigenization:** All major subsystems of the cruise missile have been developed indigenously.

Naval Inductions

- New Warships:** The Indian Navy recently inducted **INS Dunagiri**, **INS Shanshak**, and **INS Agrya**.
- Origin:** These warships were entirely designed and built in India.

2. Environment, Culture, and Biodiversity

Greater Adjutant Stork (*Hargila*)

- Context:** Efforts by biologist **Purnima Devi Barman** were highlighted for changing public perceptions and conserving Assam's **hargila bird** (Greater Adjutant).

About Hargila (Greater Adjutant Stork)

- ❖ **Scientific Name:** *Leptoptilos dubius*; a large **stork species**.
- ❖ **Habitat:** Wetlands, shallow lakes, drying lake beds, and freshwater flooded forests.
- ❖ **Distribution:** Found in Assam and Bihar (India) and Cambodia.
- ❖ **Behaviour:** Usually **solitary or in small groups**; breeds in winter in colonies.
- ❖ **Diet:** Omnivorous—mainly scavenges but also feeds on frogs, insects, birds, reptiles, and rodents.
- ❖ The greater adjutant is listed as Near Threatened on the **IUCN Red List of Threatened Species**.

Living Root Bridges of Meghalaya

- Status:** Indigenous community initiatives continue to preserve these ecological wonders.



- **Global Recognition:** India has formally sought UNESCO World Heritage status for these living root bridges.

Waste Management (Eco-Bricks)

- **Grassroots Initiative:** Women in the **Rajgarh district of Madhya Pradesh** are actively converting plastic waste into "eco-bricks" to beautify local public spaces.

3. Local & Sports Initiatives

- **Nagaland's 'Baby League':** A grassroots grassroots football development initiative specifically designed for young children aged **5 to 12**.

4.7. WHITE-RUMPED VULTURE CONSERVATION AND REINTRODUCTION

Context:

- A captive-bred, radio-tagged White-rumped vulture released in the Mudumalai Tiger Reserve (MTR) of Tamil Nadu was electrocuted after coming into contact with an overhead power line at Ebbanad village.
- The bird, which failed to acclimatise to the local landscape, had embarked on exploratory flights prior to its death, marking an unfortunate end to the first attempted reintroduction of a captive-bred bird of this species into the South Indian landscape.



About Mudumalai Tiger Reserve (MTR)

- **Location:** Situated at the tri-junction of three states—Tamil Nadu, Karnataka, and Kerala—in the Nilgiris district of Tamil Nadu.
- **Ecological Significance:** It forms an integral part of the **Nilgiri Biosphere Reserve** (India's first biosphere reserve, established in 1986).
- **Contiguous Connectivity:** It shares boundaries with the Wayanad Wildlife Sanctuary (Kerala) to the west and the Bandipur Tiger Reserve (Karnataka) to the north, functioning as a vital ecological corridor connecting the Western and Eastern Ghats.
- **Drainage System:** The **Moyar River**, along with its tributaries, flows through the reserve and serves as its primary water source.
- **Flora & Terrain:** The landscape features undulating terrain covered with 'Elephant Grass', giant bamboo, and unique swampy areas locally known as **Vayals**.
- **Fauna:** It serves as a critical habitat for flagship species like the Bengal Tiger and Asian Elephant, alongside Indian Gaurs, Leopards, and globally threatened avian species like the White-rumped Vulture.
- **Significance of Mudumalai:** MTR and the surrounding Sigur plateau are home to the last sizable and viable breeding population of White-rumped vultures in South India. Conservationists hoped the captive-bred bird would associate with resident flocks and seamlessly adapt.

About White-Rumped Vulture (*Gyps bengalensis*)

Basic Profile

- **Scientific Name:** *Gyps bengalensis*. It is also commonly referred to as the Indian White-backed Vulture or Oriental White-backed Vulture.

- **Physical Features:** It is a medium-sized Old World vulture characterized by an unfeathered head and neck, very broad wings, and short tail feathers. Adults sport a distinctive white neck-ruff and a white patch of feathers on the lower back and upper tail (the "white rump").
- **Feeding Habits:** It is primarily a scavenger that feeds on animal carcasses, utilizing thermal currents to soar high and spot other scavengers feeding.

Habitat and Distribution

- **Global Spread:** Native to South and Southeast Asia, including India, Pakistan, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Laos, Cambodia, and southern Vietnam.
- **Favorable Habitat:** Predominantly found in plains and less frequently in hilly terrains. It is highly adapted to living in proximity to human habitation and cultivated villages where livestock carcasses are available.

Conservation Status

- **IUCN Red List:** Classified globally as **Critically Endangered**.
- **Population Crash:** In the 1980s, it was considered the most abundant large bird of prey in the world with millions of individuals. As of 2021, the global population plummeted to fewer than 6,000 mature individuals.

Major Threats to Survival

- **Diclofenac Poisoning:** The most devastating threat is the veterinary non-steroidal anti-inflammatory drug (NSAID) **diclofenac**. Vultures feeding on the carcasses of cattle treated with this drug suffer fatal kidney failure.
- **Power Infrastructure:** Uninsulated power transmission lines pose a severe threat of fatal electrocution or collision for large, wide-winged birds.
- **Secondary Poisoning:** Consumption of poisoned baits meant for feral dogs or wild carnivores.
- **Habitat Degradation:** Loss of safe nesting sites and severe food scarcity due to changing livestock disposal practices.

4.8. NAMERI TIGER RESERVE AND TIGER CONSERVATION

Context:

- According to the State Forest Department's recent data validated by the **Wildlife Institute of India (WII)**, the tiger population at the **Nameri Tiger Reserve** in Assam has quadrupled over a three-year period, rising from just 3 tigers in 2022 to 12 by the end of 2025.



Key Highlights & Data Points

- **Population Growth:** The four-fold increase builds directly upon the baseline of three striped cats recorded during the **All India Tiger Estimation (AITE) of 2022**.
- **Reclamation of Satellite Core:** Tigers have successfully returned to the contiguous **Sonai Rupai Wildlife Sanctuary** (which serves as Nameri's satellite core) after being declared locally extinct there in the early 2000s.
- **Kaziranga status:** Known primarily for its one-horned rhinoceros, Kaziranga also has one of India's highest tiger densities (13.44 tigers per 100 sq. km).

Geographic & Ecological Profile of Nameri

- **Location:** Covers an area of **344 square km** in the **Sonitpur district** of north-central Assam.
- **Inter-State Contiguity:** It shares a continuous northern boundary with the **Pakke Tiger Reserve**, located in Arunachal Pradesh.
- The Jia Bhoroli River flows through the reserve.

Broader Tiger Landscape in Assam

1. **Nameri Tiger Reserve**
2. **Orang Tiger Reserve**
3. **Kaziranga Tiger Reserve** (Also a designated UNESCO World Heritage Site)
4. **Manas Tiger Reserve** (Also a designated UNESCO World Heritage Site).

About the All India Tiger Estimation (AITE)

- **Conducted every four years.**
- Coordinated by the National Tiger Conservation Authority (NTCA) and the Wildlife Institute of India (WII).

About WII

- Established: 1982
- Location: Dehradun, Uttarakhand
- Ministry: Ministry of Environment, Forest and Climate Change (MoEFCC)
- Type: Autonomous institution

4.9. INDIA'S EMERGING MATCHA TEA INDUSTRY

Context:

- An Assam-based tea estate has successfully auctioned India's first batch of commercially produced Matcha tea. This marks a significant milestone in India's agricultural diversification, bridging traditional Assam tea cultivation heritage with fully automated, state-of-the-art Japanese manufacturing expertise.



What is Matcha and How is it Cultivated?

- **Source Plant:** Derived from the exact same plant as regular tea, *Camellia sinensis*.
- **Shade-Grown Technique:** The tea leaves are intentionally shaded to block 90% of sunlight for 3 to 4 weeks prior to harvesting.
- **Chemical Alteration:** This shading process drastically boosts chlorophyll and amino acid levels, imparting a distinct vibrant green color and unique flavor.
- **Processing:** Harvested leaves are finely ground into a vibrant green powder rather than being processed into traditional loose leaves.
- **Method of Consumption:** Unlike conventional green tea where leaves are steeped and discarded, matcha powder is whisked directly into water and consumed entirely.

- **Nutritional Profile:** It yields significantly higher concentrations of natural antioxidants, amino acids, and caffeine compared to regular green tea.

Historical Evolution of Indian Tea

- **1823 (Discovery):** Robert Bruce discovered wild *Camellia sinensis* plants in the Upper Brahmaputra Valley of Assam.
- **1833 (Monopoly Ends):** The Charter Act ended the British East India Company's trade monopoly with China, prompting a shift toward domestic Indian production.
- **1834 (Institutional Push):** A dedicated **Tea Committee** was established under Governor-General William Bentinck.
- **1838 (First Export):** The first batch of Indian tea from Assam was successfully sent to the United Kingdom for public sale.

Types of Tea Produced in India

India produces diverse tea varieties, differentiated primarily by their processing methods and levels of oxidation:

- **Black Tea:** The most widely produced, consumed, and exported tea variety in India, fully oxidized to develop a strong flavor.
- **CTC (Crush, Tear, Curl) Tea:** Machine-processed to create uniform pellets; heavily utilized for mass domestic consumption and standard tea bags.
- **Orthodox Tea:** Handcrafted using traditional processing methods; renowned for its superior quality, complex flavor profiles, and targeted primarily at export markets.
- **Green Tea:** Minimally processed and unoxidized to retain high natural antioxidant levels; witnessing rising domestic demand due to health awareness.
- **Oolong Tea:** A partially oxidized tea, possessing characteristics of both green and black teas; produced in small volumes specifically for niche markets.
- **White Tea:** The least processed of all varieties, made exclusively from young, unopened tea buds; highly rare, delicate, and produced in severely restricted quantities.

Climatic & Geographical Requirements

Tea is a highly climate-sensitive crop that thrives in tropical and sub-tropical regions.

- **Temperature:** Optimal growth requires a range of **15°C to 23°C**.
- **Rainfall:** Requires **150–300 cm** of annual rainfall, which must be evenly distributed throughout the year.
- **Sunlight:** Needs a warm, humid climate with at least 5 hours of daily sunlight.
- **Soil Parameters:** Thrives in slightly **acidic, calcium-free soil** with a porous sub-soil.
- **Topography:** Sloping terrain is strictly mandatory to ensure proper water drainage, as water stagnation destroys the roots.

Major Producing Regions & Global Standing

- **Leading States:** Assam (largest producer; encompasses Assam Valley and Cachar), West Bengal (Darjeeling, Dooars, Terai), and Tamil Nadu (Nilgiri Hills).
- **Minor Producers:** Kerala, Karnataka, and Himachal Pradesh (specifically the Kangra Valley, renowned for green teas).

- **Global Rank:** India is the **second-largest producer and consumer** of tea globally, and the **third-largest exporter** (trailing Kenya, which exports almost its entire yield, and China).

About the Tea Board of India

- **Statutory Status:** Established as a statutory body under the **Tea Act, 1953**.
- **Nodal Ministry:** Functions under the **Ministry of Commerce**.
- **Headquarters:** Located in **Kolkata**, with major overseas offices in Dubai and Moscow.
- **Composition:** Reconstituted every three years, it comprises 31 members representing producers, traders, governments, and plantation workers.
- **Core Functions:** It controls quality certification, promotes exports, provides financial assistance, and protects the global identity of Indian teas.

4.10. FOUR STATES REACH PACT ON NARMADA PROJECT PAYMENTS

Context:

- The States of **Madhya Pradesh, Gujarat, Maharashtra, and Rajasthan** have reached an agreement to settle **pending payments related to the Narmada Water Disputes Tribunal (NWDT) Award**.
- The settlement is expected to improve **inter-state cooperation** in water resource management and ensure uninterrupted water and power benefits from the **Sardar Sarovar Project**.



About Narmada Water Disputes Tribunal (NWDT)

- **Establishment:** The Central Government constituted the NWDT on October 6, 1969, under Section 4 of the Inter-State Water Disputes Act, 1956.
- **The Stakeholders:** The adjudication involved four states: Madhya Pradesh, Gujarat, Maharashtra, and Rajasthan.
- The Tribunal spent a decade deliberating and delivered its final binding Award on December 7, 1979.

About the Narmada River

- **Origin:** The Narmada originates from the **Amarkantak Plateau** in the Anuppur district of Madhya Pradesh. It flows westwards in a **rift valley** between the Satpura in the south and the Vindhyan range in the north.
- **Flow Direction:** It flows westward over a length of approximately **1,312 km** before emptying into the **Gulf of Khambhat** (Arabian Sea) near Bharuch in Gujarat.
- **States Covered:** It flows through **Madhya Pradesh, Maharashtra, and Gujarat**. Madhya Pradesh holds the lion's share of its basin area (nearly 87%).
- **The Narmada basin** extends over MP, Gujarat, Maharashtra, and Chhattisgarh, which is nearly 3% of the country's total geographical area.
- It forms a picturesque gorge in marble rocks and **Dhuandhar waterfall** near **Jabalpur**.

Important Dams on the Narmada

Dam	State	Importance
Sardar Sarovar Dam	Gujarat	Multipurpose project for irrigation, drinking water and hydropower
Indira Sagar Dam	Madhya Pradesh	India's largest reservoir by storage capacity
Omkareshwar Dam	Madhya Pradesh	Hydropower and irrigation
Maheshwar Dam	Madhya Pradesh	Hydroelectric project
Bargi Dam	Madhya Pradesh	First major completed dam on the Narmada

Constitutional & Legal Provisions of Inter- state Rivers

Article 262: Parliament may provide for adjudication of disputes relating to inter-State rivers. Parliament may exclude the jurisdiction of the Supreme Court and other courts in such disputes.

Inter-State River Water Disputes Act, 1956: Provides for establishment of Water Disputes Tribunals. Tribunal awards are binding on the concerned States

4.11. NATIONAL BOARD FOR WILDLIFE AND WILDLIFE GOVERNANCE**Context:**

- Recently, a group of retired forest and wildlife officials and conservationists filed a **Public Interest Litigation (PIL)** before the **Delhi High Court**, alleging that the **National Board for Wildlife (NBWL)** has increasingly prioritized infrastructure and development projects over wildlife conservation.

**Key Highlights**

- The petition alleges that the **National Board for Wildlife (NBWL)** has deviated from its statutory mandate of wildlife conservation and habitat protection.
- According to the petitioners, the Board approved **more than 97% of the proposals** related to infrastructure and development projects between **2014 and 2026**.
- The petition argues that the current approach could adversely affect protected areas, forests, biodiversity, and long-term conservation efforts.
- The petition seeks judicial guidelines on how the NBWL should perform its statutory functions under the **Wildlife (Protection) Act, 1972**.

About National Board for Wildlife (NBWL)

- The NBWL is a **statutory body** constituted under the **Wildlife (Protection) Act, 1972**.
- It is chaired by the **Prime Minister of India**, while the **Union Minister for Environment, Forest and Climate Change** serves as the Vice-Chairperson.
- The Board advises the Central Government on policies and measures for wildlife conservation and protection.

- The NBWL consists of **47 members**, including government officials, Members of Parliament, scientists, environmentalists, and representatives of non-governmental organizations.

Standing Committee of NBWL

- The **Standing Committee of the NBWL** is responsible for considering proposals involving diversion of forest land and activities within or around protected areas.
- Between **2014 and 2026**, the Standing Committee reportedly considered more than **1,100 proposals**.
- It plays an important role in granting clearances for projects located within **National Parks, Wildlife Sanctuaries, Conservation Reserves, and Eco-Sensitive Zones (ESZs)**.

About Wildlife (Protection) Act, 1972

- Enacted in **1972** to provide legal protection to wild animals, birds, and plants.
- Provides for the creation of:
 - o National Parks
 - o Wildlife Sanctuaries
 - o Conservation Reserves
 - o Community Reserves
- The Act establishes various authorities, including the **National Board for Wildlife**.

4.12. TTZ: BALANCING HERITAGE CONSERVATION AND INDUSTRIAL DEVELOPMENT

Context:

- The Supreme Court permitted the **Taj Trapezium Zone (TTZ) Authority** to process around **400** pending applications for the establishment of non-polluting **Micro, Small and Medium Enterprises (MSMEs)** within the ecologically sensitive area surrounding the **Taj Mahal**.



Why did the moratorium exist in the first place?

The TTZ is an ecologically sensitive zone created to shield the Taj Mahal and 40+ other monuments from industrial pollution. The Supreme Court's October 2024 order froze all new approvals because there wasn't a settled, final definition of what counts as a **"non-polluting industry"**-so the Court didn't want the TTZ Authority making case-by-case calls without oversight.

What changed now?

Rather than lifting the freeze outright, the Court carved out a controlled pathway for the ~400 pending applications (mostly MSMEs seeking to set up, expand, or relocate).

About the Taj Trapezium Zone (TTZ) Authority

- **Statutory body** established under the **M.C. Mehta v. Union of India (1996)** Supreme Court judgment to protect the **Taj Mahal** and other monuments within the **10,400 sq. km TTZ**.
- Chaired by the **Commissioner, Agra Division**, assisted by a **Member Secretary (IAS/IFS)**.
- Funded via budgetary provisions from the **State of Uttar Pradesh**.

Core Functions

- Enforces **Supreme Court** directives issued in TTZ-related writ petitions and reports regularly to the Court through an **Amicus Curiae**.
- Reviews **ambient air quality** and emissions data submitted by monitoring agencies such as the **Central Pollution Control Board (CPCB)**.
- Regulates the establishment, expansion, and relocation of industrial units within the TTZ to prevent pollution damage to the **Taj Mahal**.

4.13. KUTKI CULTIVATION AND BIODIVERSITY CONSERVATION**Context:**

- Farmers in **Mandi district of Himachal Pradesh** have successfully adopted the **scientific cultivation of Kutki (*Picrorhiza kurroa*)**, a critically important Himalayan medicinal herb that was once threatened due to overharvesting from the wild. The initiative promotes **biodiversity conservation, sustainable livelihoods, and medicinal plant cultivation**.

**About Kutki (*Picrorhiza kurroa*)**

Particular	Details
Scientific Name	<i>Picrorhiza kurroa</i>
Family	Plantaginaceae (earlier Scrophulariaceae)
Common Name	Kutki
Habitat	Alpine and sub-alpine Himalayas
Altitude	Approximately 2,700–4,500 m above sea level
Plant Type	Small perennial medicinal herb
Medicinal Part Used	Underground rhizomes (stems)
Major Uses	Liver disorders, digestive ailments, fever, and traditional Ayurvedic medicine

Why is Kutki Important?

- One of the **most valuable medicinal herbs** of the Himalayan region.
- Widely used in **Ayurveda, Siddha, and traditional medicine**.
- Known for its **hepatoprotective (liver-protecting), antioxidant, anti-inflammatory, and immunomodulatory properties**.
- High commercial demand has led to excessive harvesting from forests.

Conservation Status

Organisation	Status
IUCN Red List	Vulnerable (VU)
CITES	International trade regulated to prevent overexploitation (where applicable under national export regulations)
India	Listed among priority medicinal plants under various conservation programmes

Sustainable Cultivation Model

Researchers from the **Himalayan Research Group (HRG)** under the **Department of Science and Technology (DST)** developed a community-based cultivation model.

Key Features

- Shifted farmers from **wild collection** to **scientific cultivation**.
- Propagation through **rhizome (stolon) planting**.
- Farmers harvest only the underground stolons while allowing plants to regenerate.
- Reduces pressure on wild populations.
- Generates an additional source of income for mountain farmers.

Scientific Cultivation Method

- Stolons are planted about **4–5 years** after field establishment.
- Underground stem (stolon) is harvested.
- Upper portion with roots is replanted.
- Enables continuous regeneration of the plant.
- Ensures sustainable production without destroying natural populations.

SCIENCE AND TECHNOLOGY

5.1. MISSION DRISHTI AND INDIA'S PRIVATE SPACE SECTOR

Context:

- Bengaluru-based private space company **GalaxEye** has temporarily lost communication with **Mission Drishti**, the world's first **OptoSAR (Optical + Synthetic Aperture Radar)** Earth observation satellite, after it encountered a **geomagnetic storm** during its **Launch and Early Orbit Phase (LEOP)**.



What is Mission Drishti?

- Mission Drishti** is the world's first **OptoSAR satellite**, developed by **GalaxEye Space Solutions**, a Bengaluru-based space-tech startup.
- It is also **India's largest privately developed Earth Observation (EO) satellite**.
- The satellite integrates:
 - Optical imaging sensors
 - Synthetic Aperture Radar (SAR) sensors
- Both sensors operate as a **single integrated payload**, allowing continuous high-resolution Earth observation.
- Launch Details:** The satellite was launched in May 2026 aboard a **Falcon 9 rocket** by SpaceX from Vandenberg, California

Understanding OptoSAR Technology

Traditional Earth observation relies on separate imaging systems, which often creates a trade-off between visual intuition and all-weather dependability. OptoSAR solves this by co-locating two advanced technologies (Optical Imaging and Synthetic Aperture Radar)

- Electro-Optical (EO) / Multispectral Imaging (MSI) Sensors:** Capture high-resolution images in **visible and multiple infrared wavelengths**, but **cannot** effectively operate through clouds, heavy rain, fog, or darkness.
- Synthetic Aperture Radar (SAR) Sensors:** Uses **microwave radar signals** instead of sunlight, offering **all-weather, day-and-night imaging** that can pierce through heavy cloud cover, smoke, or fog.
 - Unlike optical sensors, SAR cannot capture natural colors or detailed visual textures.
- The Advantage:** By housing both systems on a single platform, the satellite produces higher image accuracy, better terrain analysis, continuous monitoring regardless of weather, improved disaster response capabilities.

What is Launch and Early Orbit Phase (LEOP)

- Definition:** LEOP is one of the most critical phases of a space mission, spanning from the moment the spacecraft separates from the launch vehicle until it is safely stabilized in its final intended operational orbit.

- **Operations:** During this phase, engineers perform critical operations like solar panel deployment, attitude control (orientation adjustments), and initial subsystem testing.

Why is LEOP Important?

- It is the **highest-risk phase** of a satellite mission.
- Any failure during LEOP can result in **partial or complete mission loss**.
- Successful completion marks the transition from launch to **normal operational service**.

What is a Geomagnetic Storm?

1. **Definition:** A **geomagnetic storm** is a temporary disturbance in Earth's magnetosphere caused by the interaction of charged particles from the Sun with Earth's magnetic field.
2. **Cause:** It is primarily triggered by **Coronal Mass Ejections (CMEs)** or high-speed **solar wind** emitted during periods of intense solar activity, such as solar flares.
3. **Effects:** Geomagnetic storms can disrupt **satellite operations, GPS navigation, radio communications, and power transmission systems**, and may increase radiation exposure for astronauts and high-altitude flights.
4. **Visible Phenomenon:** Strong geomagnetic storms produce spectacular **auroras (Northern and Southern Lights)**, which can sometimes be seen at lower latitudes than usual.
5. Geomagnetic storms are measured using **the Kp Index**, which ranges from 0 (quiet) to 9 (extreme storm).

5.2. DRONES FOR LAST-MILE HEALTHCARE ACCESS IN INDIA

Context:

- A study under Indian Council of Medical Research (ICMR)'s **i-DRONE initiative**, conducted by AIIMS Bibinagar in Telangana, found that drones can efficiently transport TB sputum samples and improve healthcare access by bridging the last-mile gap in remote areas.



Key Highlights of the Study

- **Dramatic Cost Reduction:** The average out-of-pocket expenditure for patients (which includes medical expenses, travel, food, and wage loss for patients and attendants) plummeted from **₹9,451 to just ₹91 (or ₹90.9)**.
- **Turnaround Time Slashed:** The total time required for diagnosis was reduced significantly from **15 days to just 5 days**.
- **Improved Reporting Efficiency:** Before the intervention, over 92% of patients had to wait more than two days to receive their test results. With the introduction of the drone phase, **76.3% of patients received their results the next day**, and only 16.3% experienced delays beyond two days.
- **Operational Workflow:** Suspected TB patients in remote villages (located 10 km to 30 km from the nearest diagnostic facility) only need to visit their local **Primary Health Centre (PHC)** or subcentre.

About the i-DRONE Initiative

- **Full Form:** Drone Response and Outreach in North East (i-DRONE).
- **Nodal Agency:** Formulated and driven by the **Indian Council of Medical Research (ICMR)**.

- **Evolution:** Originally conceived during the COVID-19 pandemic to deliver vaccines to geographically isolated and challenging terrains (initially rolled out in Manipur, Nagaland, and Andaman & Nicobar Islands).
- **Expanded Horizon:** The platform has since scaled up across the country to transport:
 - o Blood bags and blood-related products under specific low-temperature controls.
 - o Essential medications to high-altitude and sub-zero temperature zones (e.g., Himachal Pradesh).
 - o **Ophthalmic biomaterials** like human corneas and amniotic membrane grafts for time-sensitive transplant surgeries.
 - o **Sputum samples and DOTS medications** supporting the **National TB Elimination Programme (NTEP)**

About Tuberculosis (TB)

- **Causative Agent:** Tuberculosis is caused by the bacterium *Mycobacterium tuberculosis* and primarily affects the lungs.
- **Transmission:** It spreads through the air when an infected person coughs, sneezes, or speaks.
- **Vaccine:** The **BCG vaccine** protects against severe forms of TB, especially in children.
- **National Goal:** India aims to eliminate TB by **2025** under the **National TB Elimination Programme (NTEP)**.

5.3. INDIA'S HYDROGEN-POWERED TRAIN AND GREEN TRANSPORT

Context:

- Recently, Indian Railways inaugurated India's first indigenous hydrogen fuel cell-powered train, marking a major step towards clean and sustainable transportation.
- Scheduled to commence operations on 17 July 2026 on the **Jind–Sonipat section of the Northern Railway**, the train generates electricity onboard using hydrogen and is supported by dedicated storage and refuelling infrastructure



Key Features of the Hydrogen Powered Train

- **10-car** hydrogen fuel cell-based trainset.
- Powered by a **1200 kW** hydrogen fuel cell propulsion system.
- Approved to operate at a maximum speed of 75 kmph with a design speed of 110 kmph.
- Capacity of Around 2,600 Passengers.
- Developed from the design stage through prototype manufacturing.
- It will connect Jind Junction, Gohana Junction and Sonipat while serving intermediate stations.
- Proposed halts include Jind City, Pandu Pindara Junction, Lalit Khera Halt, Bhambhewa, Isapur Kheri Halt, Butane Halt, Khandrai Halt, Rabrah Halt, Lath Halt, Mohana, Barwasni Halt and Sonipat New.

Technology Behind the Train

- **Working Principle:** Hydrogen fuel cell technology generates electricity through a chemical reaction between hydrogen and oxygen.

- **Technology Used:** The train is powered by a **Proton Exchange Membrane Fuel Cell (PEMFC)**.
- **PEMFC Mechanism:** It produces electricity by reacting hydrogen and oxygen across a proton-conducting Perfluorosulfonic Acid (PFSA) polymer membrane.
- **By-products:** The process emits only water vapour and heat, ensuring near-zero emissions.
- **High Energy Density:** Hydrogen has an energy content of 120 MJ/kg, significantly higher than diesel's 43 MJ/kg.
- **Advantages:** It is a low-maintenance technology with a relatively small carbon footprint.
- **Significance:** Hydrogen fuel cells are considered the cleanest propulsion technology currently available for rail transport.
- **Supporting Infrastructure:** Indian Railways has developed dedicated hydrogen storage, refuelling and operational infrastructure to support the technology.

Hydrogen Infrastructure

- The country's largest railway hydrogen storage and refuelling facility has been established at **Jind, Haryana**.
- The indigenous facility can store nearly **3,000 kg of hydrogen** at a time to support hydrogen-powered train operations.
- The required licence for storage and dispensing of compressed hydrogen gas has been granted by the **Petroleum and Explosives Safety Organisation (PESO)**.
- The hydrogen ecosystem has been designed in accordance with international standards, including **NFPA-2** and the **ISO 19880 Series**.
- The entire system has undergone an independent third-party safety assessment by **TÜV SÜD, Germany**.
- The train comprises **two Hydrogen Driving Power Cars (DPCs)** and **eight Trailer Coaches (TCs)**.
- Each DPC houses:
 - o Fuel cells.
 - o Lithium iron phosphate (LFP) batteries.
 - o Hydrogen storage cylinders.
- The supporting infrastructure includes:
 - o A hydrogen compression system for refuelling operations.
 - o Technical support and critical spare parts.
 - o A standby compressor to ensure uninterrupted refuelling.
- The integrated infrastructure ensures safe and efficient hydrogen-powered rail operations.

Safety Measures

- Hydrogen leak detectors have been installed at the production, storage and dispensing facilities.
- Flame detectors have also been installed for continuous monitoring.
- Safety sensors will undergo regular inspection and cleaning.
- Non-stop ventilation keeps air moving through the train at all times.
- If anything unusual is detected, like heat, flame or smoke, the system can automatically cut off the hydrogen supply on its own.

- The Loco Pilot's cabin has been designed with a special mode that allows the train to be moved to safety in an emergency.
- A screen shows the real health of the whole system to the Loco Pilot at all times.
- Inspection and maintenance schedules have been prescribed to ensure safe operations.

5.4. ACC BATTERY MANUFACTURING AND INDIA'S ENERGY TRANSITION

Context:

- **The Ministry of Heavy Industries (MHI)** has invited global bids to select beneficiaries for establishing **10 GWh of giga-scale Advanced Chemistry Cell (ACC) battery manufacturing capacity** in India under the **PLI Scheme for ACC Battery Storage**.
- **The entire 10 GWh capacity** is earmarked for **Grid-Scale Stationary Storage (GSSS)** to store electricity generated from **solar and wind energy** for **grid balancing**.



About the PLI-ACC Scheme

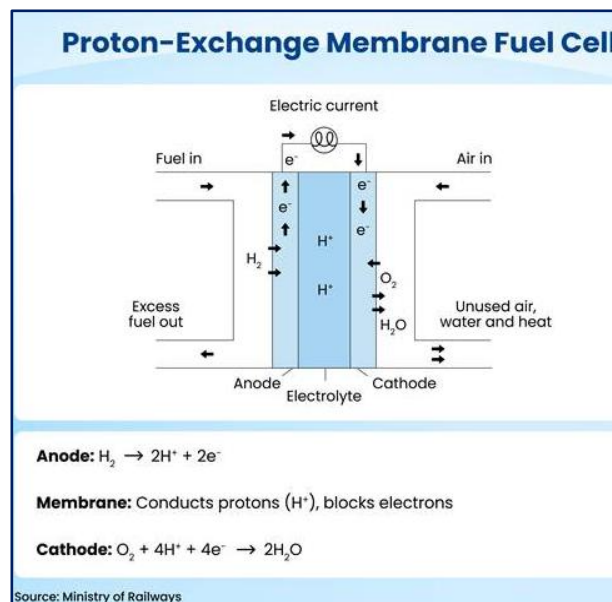
- **Approved by:** Union Cabinet, **May 2021**
- **Full name:** National Programme on Advanced Chemistry Cell (ACC) Battery Storage
- **Nodal Ministry:** Ministry of Heavy Industries (MHI)
- **Total outlay:** ₹18,100 crore
- **Target capacity:** 50 GWh of domestic ACC manufacturing
- **Objective:** Reduce India's dependence on imported ACCs, strengthen domestic manufacturing capability, and build a **globally competitive battery-manufacturing ecosystem**.

Allocation So Far (40 GWh of 50 GWh target)

- **Ola Electric** -20 GWh
- **Reliance New Energy** -15 GWh (5 GWh in the first round + 10 GWh in a later round, after Hyundai Global Motors withdrew its original 20 GWh allocation)
- **Rajesh Exports** -5 GWh
- Balance **10 GWh** now thrown open via the fresh global tender.

Key Features of New Tender

- Beneficiaries for the 10 GWh capacity—reserved exclusively for Grid-Scale Stationary Storage (GSSS) rather than earlier EV battery allocations—will be selected via a global competitive RFP on the CPP Portal using a two-stage QCBS process.



- Key dates include tender document availability on 15 July 2026, a pre-bid conference on 29 July 2026, the bid submission deadline on 13 October 2026, and technical bid openings on 14 October 2026.

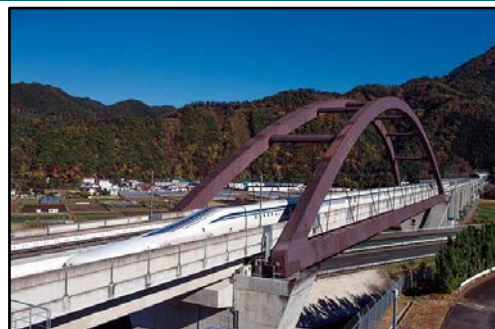
What is an Advanced Chemistry Cell (ACC)?

- ACCs are new-generation energy storage devices that store electric energy either as **electrochemical or chemical energy** and convert it back to electric energy as and when required.
- Includes technologies such as **Lithium-ion** and other advanced battery chemistries used in EVs, consumer electronics, and grid storage.

5.5. THE SCIENCE OF MAGLEV TRAINS

Context:

- Magnetic levitation (maglev) technology is garnering renewed international attention as nations increasingly evaluate high-speed transit systems that utilize magnetic fields for levitation and propulsion, enabling operational speeds in excess of 400 km/hr.



About the Technology

- **Maglev** means "magnetic levitation." These trains float above the track using magnetic force instead of wheels, so there's no rolling friction. This lets them run at speeds over **400 km/hr**. But building and running dedicated magnetic tracks needs precise engineering, making it expensive.
- Two fundamental forces are at play in a maglev system: the **electromagnetic force** and **gravity**; gravity is by far the weaker force, at roughly **10^{39} times weaker** than electromagnetism.

Key Features of Maglev Technology

How is a Train Lifted?

- **EMS (Electromagnetic Suspension):** Electromagnets pull the train up to hover **8–10 mm** above the track; used in **Shanghai Maglev** (~500 km/hr).
- **EDS (Electrodynamic Suspension):** Superconducting magnets induce current in guideway coils, pushing the train up; needs wheels till **100 km/hr**. Japan's **SC Maglev** hit **603 km/hr** in **2015**.

How Does the Train Move Forward?

- Guideway coils carry **AC**, switching poles to pull the train forward and push it from behind.
- Current controls speed; **regenerative braking** slows the train, with **wheels /friction brakes** kept for emergencies.

What are the Downsides of Maglev?

- No rolling friction → high **aerodynamic resistance**, needing costly designs (e.g., bird-beak-shaped front).

Uses of Maglev Technology in Other Sectors

- **Turbines/compressors:** magnetic bearings replace mechanical ones, reducing friction.
- **Aircraft carriers:** linear motor technology launches aircraft off decks.
- **Factory automation:** used in semiconductor manufacturing, CNC machining, and laser/X-ray/DNA-sequencing systems.

- **Scientific research:** magnetic fields levitate biological samples, liquids, metals, and small organisms.

Strategic/Scientific Significance

- Reinforces India's interest in **high-speed rail alternatives** amid rising mobility demand, while showcasing **electromagnetic principles'** cross-sector relevance to manufacturing, aerospace, and precision instrumentation.

About Diamagnetic Levitation

- **Diamagnetic Levitation:** In 1997, **Andre Geim** and **Michael Berry** levitated a live frog using a **10-tesla magnetic field**, earning the **Ig Nobel Prize (2000)**; Geim later won the actual **Nobel Prize in Physics** for unrelated work on **graphene**.

5.6. PRIVATE SPACE LAUNCH VEHICLES AND INDIA'S SPACE ECONOMY

Context:

- **Skyroot Aerospace** is set to launch **Vikram-1**, India's **first privately developed orbital launch vehicle**, from the **Satish Dhawan Space Centre (SDSC)**, **Sriharikota**.
- The maiden mission, named **Mission Aagman**, is scheduled for launch between **July 12 and August 4**, subject to weather, range clearance, and completion of launch preparations.
- The mission follows the successful suborbital test of **Vikram-S** in 2022 and marks a major milestone in India's private space sector.



About Vikram-1 Launch Vehicle

I. Key Features

- **Developer:** Skyroot Aerospace (Hyderabad-based private space startup)
- **Type:** It is a **four-stage**, expendable orbital small-lift launch vehicle, its first three stages are solid stages, while the fourth stage is a liquid stage.
- **Payload Capacity:**
 - o Around **300 kg to Low Earth Orbit (LEO)**.
 - o Suitable for launching small satellites.
- **Mission:** First orbital mission named **Mission Aagman**.
- **Launch Site:** Satish Dhawan Space Centre (SDSC), Sriharikota.

II. Objective

- Demonstrate the capability of India's private sector to independently place satellites into orbit.
- Offer affordable and dedicated launch services for the global small satellite market.
- Strengthen India's commercial space ecosystem.

Mission Aagman

- Marks the **first orbital mission** of Skyroot Aerospace.
- Planned as a **partially commercial mission**.
- Carries customer payloads along with technology demonstration payloads.

- If successful, commercial launches are expected to begin after two demonstration missions.

Technological Features

- Carbon composite structures for reduced weight.
- Extensive use of **3D-printed rocket components**.
- Fully integrated avionics for:
 - o Navigation
 - o Guidance
 - o Flight control
 - o Telemetry
- Designed for rapid production and lower launch costs.

About Skyroot Aerospace

- Founded in **2018**.
- Headquarters: **Hyderabad**.
- First Indian private company to successfully launch a rocket (**Vikram-S**) in **2022**.
- Named its launch vehicles after **Dr. Vikram Sarabhai**, the father of the Indian space programme.

5.7. ISRO TESTS SOLVE PLATFORM FOR GAGANYAAN DECELERATION SYSTEMS

Context:

- The Indian Space Research Organisation (ISRO) successfully conducted the first ground test of the solid motor for its new **Sub-Orbital Launch Vehicle for Experiments (SOLVE)**. The static test was completed at the Static Test Facility located at the Satish Dhawan Space Centre (SDSC) in Sriharikota.



About the SOLVE Platform

- **Core Purpose:** SOLVE is being custom-developed by ISRO as a dedicated experimental test platform to carry out **Integrated Parachute Tests**.
- **Objective:** Its main role is to validate the highly critical **deceleration system** of the Gaganyaan mission's Crew Module (CM) under simulated flight conditions.
- **Test Profile:**
 - o The vehicle will lift the experimental Crew Module to an altitude between **10 km and 17 km**.
 - o At this peak altitude, the Crew Module will separate from the vehicle.
 - o A sequence of **10 parachutes** will then deploy sequentially to reduce the module's terminal velocity before it safely splashes down in the sea.

Key Technical Modifications

Modification Parameter	Engineering Detail
Propellant Type	Development of a slow burn-rate propellant to carefully control the simulated ascent profile.

Nozzle Design	Use of a straight nozzle configuration rather than conventional canted or gimbaled nozzles.
Steering/Control	Implementation of a Secondary Injection Thrust Vector Control (SITVC) system to handle steering changes during flight.

Other Precursor Tests & Human-Centric Developments

To prepare for India's premier human spaceflight mission, ISRO has run several adjacent validation tracks:

- **IADT-02:** The second **Integrated Air Drop Test** was successfully carried out to assess the parachute deployment behavior from aircraft altitudes.
- **Mission MITRA:** Standing for *Mapping of Interoperable Traits and Response Assessment*, this was a behavioral and physiological study conducted in Leh. The four selected Indian astronauts, alongside specialized medical and engineering teams, underwent a week-long trial to gauge crew operational dynamics under challenging environmental stress.

About Gaganyaan Mission

Objective

- Demonstrate India's capability to send **Indian astronauts** into **Low Earth Orbit (LEO)** and bring them back safely.

Key Features

- Mission duration: **Up to 3 days**
- Orbit: **Around 400 km Low Earth Orbit**
- Launch Vehicle: **Human-rated LVM3 (HLVM3)**
- Landing: **Splashdown in the Bay of Bengal/Arabian Sea**

5.8. DRDO SUCCESSFULLY FLIGHT-TESTS PINAKA LONG RANGE GUIDED ROCKET

Context:

- Recently, the **Defence Research and Development Organisation (DRDO)** successfully conducted a flight test of the **Pinaka Long Range Guided Rocket (LRGR)** from the **Integrated Test Range (ITR), Chandipur, Odisha**.

What is the Pinaka Rocket System?

- **Pinaka** is an **indigenously developed Multi-Barrel Rocket Launcher (MBRL)** system.
- Developed by **DRDO** with production support from Indian defence industries.
- Designed to provide **rapid, high-volume artillery fire** against enemy positions.
- Named after "**Pinaka**", the divine bow of **Lord Shiva**.
- Replaces older Soviet-origin **Grad rocket systems** in the Indian Army.



What is the Pinaka Long Range Guided Rocket (LRGR)?

- The **Long Range Guided Rocket (LRGR)** is the latest precision-guided member of the Pinaka family.
- **Features**

- o **Guided artillery rocket** with improved accuracy.
- o Equipped with an advanced **navigation and guidance system**.
- o Capable of **precision strikes** against strategic targets.
- o Can be launched from the **existing Pinaka launcher** without major modifications.
- o Currently tested minimum operational range: **60 km**.
- o Future upgraded version is expected to have a range of **up to 120 km**

Pinaka Variants

Variant	Approximate Range
Pinaka Mk-I	37–40 km
Pinaka Enhanced Range (ER)	~45 km
Guided Pinaka	~75 km
Pinaka LRGR	60 km (minimum tested); future versions up to 120 km

DRDO at a Glance:

- **Full Form:** Defence Research and Development Organisation (DRDO)
- **Established:** 1 January 1958
- **Ministry:** Ministry of Defence
- **Headquarters:** New Delhi
- **Role:** India's premier defence R&D agency, responsible for developing indigenous defence technologies, missiles, weapons systems, combat vehicles, aircraft, naval systems, and electronic warfare technologies.

5.9. INS MAHENDRAGIRI AND INDIA'S NAVAL STEALTH LEAP

Context:

- The Indian Navy is set to commission its sixth indigenous **Project 17A** stealth frigate, **INS Mahendragiri (F38)**, at Visakhapatnam on July 11. Designed to enhance advanced multi-role operational capabilities across the Indo-Pacific, this advanced frigate marks a major milestone in India's indigenous warship-building program and the *Atmanirbhar Bharat* initiative.



What is INS Mahendragiri (F38)?

- **Class :** It is the sixth advanced stealth frigate of the **Nilgiri Class** under Project 17A.
- **About frigate :** A high-speed, maneuverable warship that is smaller than a destroyer but larger than a corvette. It operates as a multi-role combatant designed for anti-air, anti-surface, and anti-submarine warfare while escorting larger fleets.
- **Design Architecture:** The ship was designed entirely by the Indian Navy's in-house **Warship Design Bureau (WDB)**.
- **Shipbuilding Partner:** It was built by the premier defense public sector undertaking, **Mazagon Dock Shipbuilders Limited (MDSL)**, in Mumbai.

- **Geographical Naming:** It is named after a prominent mountain peak in the Eastern Ghats located in Odisha.

What are its Key Features and Core Technologies?

- **Stealth & Automation:** The frigate is structurally engineered with advanced stealth features, a significantly **reduced radar signature**, and a very high degree of operational automation.
- **Propulsion Configuration:** It is equipped with a **Combined Diesel or Gas (CODOG)** propulsion plant configuration. This system comprises a diesel engine and a gas turbine driving a Controllable Pitch Propeller (CPP) on each shaft.
- **Platform Management:** The entire platform architecture is managed by a state-of-the-art **Integrated Platform Management System (IPMS)**.
- **Versatile Operational Spectrum:** It is a multi-mission platform capable of simultaneously undertaking anti-air, anti-surface, and anti-submarine operations. It is equally suited for power projection, Humanitarian Assistance and Disaster Relief (HADR), and Search and Rescue (SAR) missions.

What is Project 17A?

- **The Objective:** Project 17A frigates are a follow-on class of the older Project 17 (Shivalik Class) frigates, designed with better stealth features, advanced weaponry, and high-tech sensors.
- **The Fleet Lineup:** A total of seven ships are being constructed under this project. The five precursors already delivered to the Indian Navy include:
 1. INS Nilgiri
 2. INS Himgiri
 3. INS Udaygiri
 4. INS Taragiri
 5. INS Vindhyagiri
- **Potent Weaponry & Sensors:** P17A vessels are heavily integrated with cutting-edge defense suites, including:
 - o **MF-STAR:** Active phased array radar for tracking multi-domain threats.
 - o **BrahMos:** Supersonic cruise missiles for potent anti-surface warfare.
 - o **Barak-8:** Long-range surface-to-air missiles (LRSAM) for comprehensive anti-air defense.

5.10. E-RICKSHAW BATTERY 'HACKS' AND BLUETOOTH BMS VULNERABILITIES

Context:

- A recent investigation has highlighted **cybersecurity vulnerabilities in imported e-rickshaw battery systems**, particularly in **Battery Management Systems (BMS)** equipped with **Bluetooth connectivity**.
- Security researchers found that these vulnerabilities could allow unauthorized access to battery diagnostics and control functions, raising concerns about the **cybersecurity of India's rapidly expanding Electric Vehicle (EV) ecosystem**.



What is a Battery Management System (BMS)?

A **Battery Management System (BMS)** is an **electronic control system** that monitors, protects, and optimizes the performance of rechargeable batteries, especially in **Electric Vehicles (EVs)**.

Functions of BMS

- Monitors battery voltage, current, and temperature.
- Prevents **overcharging and deep discharge**.
- Balances battery cells to improve efficiency.
- Protects against overheating and short circuits.
- Estimates battery health and remaining charge (State of Charge).

Why are E-rickshaw Batteries Vulnerable?

- Many imported batteries use **Bluetooth-enabled BMS** for diagnostics.
- Some systems have **weak authentication** and poor encryption.
- Users often rely on **third-party mobile applications** for monitoring batteries.
- Imported batteries may not undergo **adequate cybersecurity testing**.
- Lack of standardized cybersecurity protocols increases the risk of exploitation.

Potential Cybersecurity Risks

- Unauthorized access to battery data.
- Manipulation of battery charging or discharging parameters.
- Battery overheating or damage due to malicious control.
- Theft of user or device information.
- Disruption of vehicle operation and public safety concerns.
- Experts emphasize that the vulnerabilities arise primarily from poorly secured hardware and software design, **not from the mobile applications alone**.

Major Government Initiatives for Electric Vehicle (EV) Promotion

1. PM E-DRIVE Scheme (2024–2026)

- o Launched with an outlay of **₹10,900 crore** to accelerate EV adoption.
- o Provides incentives for **electric two-wheelers, three-wheelers, e-buses, e-ambulances, and e-trucks**.
- o Also supports the expansion of **public EV charging infrastructure** across India.

2. PM e-Bus Sewa–Payment Security Mechanism (PSM) Scheme

- o Aims to facilitate the deployment of **over 38,000 electric buses** in urban transport.
- o Provides a **payment security mechanism** to encourage private investment and ensure timely payments to bus operators.
- o Promotes clean, efficient, and sustainable public transport.

3. Production Linked Incentive (PLI) Scheme for Advanced Chemistry Cell (ACC) Batteries

- o Outlay of **₹18,100 crore** to promote domestic manufacturing of advanced battery cells.
- o Reduces dependence on battery imports and strengthens the EV supply chain.

5.11. NAVY ORDERS PROBE INTO CRASH OF DRISHTI-10 UAV NEAR PORBANDAR**Context:**

- Recently, the **Indian Navy** ordered a **Board of Inquiry (BoI)** after a **Drishti-10 Unmanned Aerial Vehicle (UAV)** crashed near **Dharampur village in Porbandar district, Gujarat**, during a routine training sortie.
- This is the **second reported crash** involving the **Hermes-900/Drishti-10 platform** in recent months, raising concerns regarding its reliability during pre-induction trials.

**What is the Drishti-10 UAV?**

- **Drishti-10** is an **Indigenous Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV)**.
- It is manufactured in India by **Adani Defence & Aerospace** under a partnership with **Israel's Elbit Systems**.
- The Indian Navy procured **two Drishti-10 UAVs** under emergency procurement in 2023.
- Approximate cost: **₹140 crore per aircraft**.

Key Features

- Category: **MALE UAV**
- Capable of:
 - Intelligence, Surveillance and Reconnaissance (ISR)
 - Maritime surveillance.
 - Border monitoring.
 - Target tracking.
 - Disaster monitoring.
- Operates beyond visual line of sight.
- Equipped with electro-optical and infrared sensors for day-and-night surveillance.
- Can remain airborne for over **30 hours** (platform capability).
- Suitable for surveillance over the Indian Ocean Region (IOR).

What is a MALE UAV?

MALE (Medium Altitude Long Endurance) UAVs are unmanned aircraft designed to operate for long durations at medium altitudes.

Characteristics

- Altitude: Approximately **10,000–30,000 feet**
- Endurance: More than **24 hours**
- They are primarily utilized for continuous intelligence, surveillance, and reconnaissance (ISR) missions over large geographic areas, allowing militaries to maintain persistent situational awareness.

Examples

- Drishti-10 (India)

- Hermes-900 (Israel)
- MQ-9 Reaper (USA)

Major Indigenous UAVs

UAV	Developed by	Purpose
Drishti-10	Adani Defence & Elbit Systems	Maritime Surveillance
TAPAS BH-201	DRDO	MALE Surveillance UAV
Rustom-I	DRDO	Surveillance
Nishant	DRDO	Battlefield reconnaissance
Archer-NG	HAL	Tactical surveillance

5.12. INDIAN NAVY TO INDUCT INDIGENOUS STEALTH FRIGATE MAHENDRAGIRI

Context:

- The Indian Navy is set to induct **Mahendragiri (F38)**, the sixth Project 17A indigenous stealth frigate, into its Eastern Fleet at Visakhapatnam on 11 July 2026.

About Mahendragiri

- **Mahendragiri (F38)** is the **sixth Project 17A indigenous stealth frigate** of the Indian Navy.
- Named after the majestic **Mahendragiri mountain range** in the Eastern Ghats, the ship symbolises strength, resilience, and steadfast resolve.
- The ship has been designed in-house by the Indian Navy's **Warship Design Bureau (WDB)**.
- It has been built by **Mazagon Dock Shipbuilders Limited (MDL), Mumbai**.
- The frigate represents the latest evolution of India's frontline stealth warships.
- It is equipped with an advanced suite of indigenous and state-of-the-art weapons, sensors, and electronic warfare systems.
- The ship is fully prepared to join the Fleet as a Mission Primed combat platform.
- Guided by its motto, **“Mighty–Majestic–Matchless”**, Mahendragiri is set to serve the nation and further enrich the Indian Navy’s illustrious legacy.
- With over **75% indigenous content**, the ship embodies the success of the Government of India's Aatmanirbhar Bharat initiative.



About Project 17A

- **Project 17A** is the follow-on programme of the **Project 17 (Shivalik-class frigates)**.
- The project envisages the construction of advanced stealth frigates equipped with modern weapons and sensors.
- **Under Project 17A:**
 - o **Mazagon Dock Shipbuilders Limited (MDL), Mumbai** is constructing four frigates.
 - o **Garden Reach Shipbuilders & Engineers (GRSE), Kolkata** is constructing three frigates.

- **Project 17A Frigates**
 - o INS Nilgiri
 - o INS Himgiri
 - o INS Udaygiri
 - o INS Dunagiri
 - o INS Taragiri
 - o **Mahendragiri (F38)**
 - o INS Vindhyagiri

5.13. HELIUM: STRATEGIC SIGNIFICANCE, APPLICATIONS AND GEOPOLITICS

Context:

- China has temporarily suspended helium exports amid fears of global supply disruptions caused by escalating geopolitical tensions in West Asia.
- Despite producing only 1.6% of global helium and importing over 80% of its own requirements, China's ban is seen as a strategic measure to safeguard its domestic semiconductor (chip manufacturing) and medical sectors amidst global supply strains and tit-for-tat geopolitical moves with the U.S.



Why is Helium Considered a Strategic Resource?

Helium is considered a strategic resource due to its critical role in advanced technologies and national security.

- **Semiconductor Industry:** Used for cooling silicon wafers and preventing contamination during chip manufacturing.
- **Medical Sector:** Liquid helium cools superconducting magnets in MRI machines and other cryogenic equipment.
- **Space and Defence:** Essential for rocket propulsion systems, satellites, and missile technologies.
- **Scientific Research:** Used in particle accelerators, quantum computing, and low-temperature experiments.
- **Electronics and Fibre Optics:** Important for manufacturing fibre-optic cables and high-performance electronic devices.

What is Helium?

- Helium (He) is the **second-lightest element** and the second most abundant element in the universe after hydrogen.
- It is a noble gas (Group 18) with atomic number 2.
- It is chemically inert, colourless, odourless, and non-toxic.
- Helium has **the lowest boiling point** among all elements (-268.9°C).
- It remains liquid only at extremely low temperatures.
- Due to its **non-reactive nature**, helium is classified as an **inert gas**.

How is Helium Produced?

- Helium is a non-renewable natural resource and it is primarily extracted from natural gas fields.

- It is produced naturally through the radioactive decay of uranium and thorium deep within the Earth's crust.
- Over millions of years, helium accumulates in natural gas reservoirs.
- It is commercially extracted only when natural gas contains at least 0.3% helium.
- Helium is separated from natural gas **using cryogenic distillation**, exploiting its unique boiling point.
- Commercial helium is typically purified to **99.997% purity**.

Why Is Helium Difficult to Store and Transport?

- Helium liquefies at extremely low temperatures.
- It must be stored in highly specialised cryogenic containers.
- The gas can be stored in underground salt caverns, which reduce leaks significantly.
- The gas can easily leak because helium atoms are extremely small.
- During transportation, some helium evaporates continuously.
- Building helium storage infrastructure requires huge investments.
- Helium **can only be transported in vacuum-jacketed stainless steel vessels** — which are manufactured by relatively few companies worldwide, including several Chinese ones.

Major Global Producers

- **United States:** The largest producer, meeting **43%** of the global supply.
- **Qatar:** Meets **33%** of global demand, acting as a major supplier to Asian markets.
- **Other Key Producers:** Russia, Canada, and Algeria.

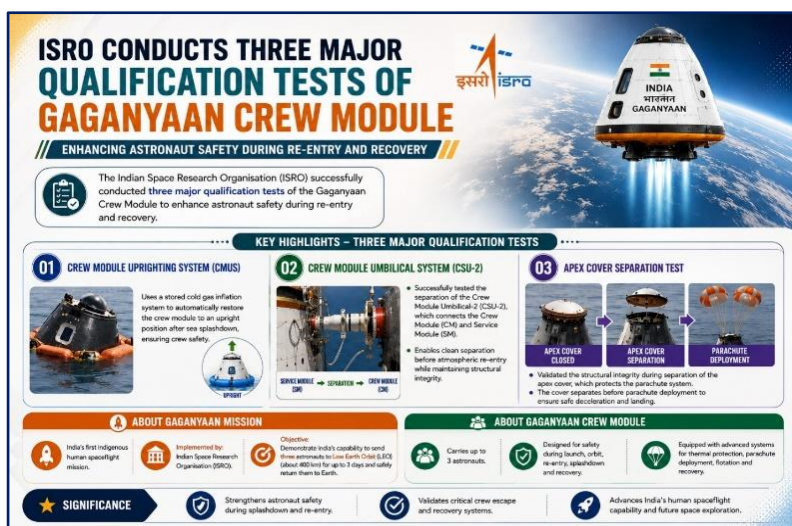
5.14. GAGANYAAN MISSION AND INDIA'S HUMAN SPACEFLIGHT PROGRAMME

Context

- Recently, the **Indian Space Research Organisation (ISRO)** successfully conducted three major qualification tests of the **Gaganyaan Crew Module**, validating critical crew safety, separation, and recovery systems.

About Gaganyaan Mission

- **Gaganyaan** is **India's first indigenous human spaceflight mission**, being implemented by the **Indian Space Research Organisation (ISRO)**.
- **Objective:** To demonstrate India's capability to send **three astronauts to Low Earth Orbit (LEO)** (about **400 km**) for **up to three days** and safely return them to Earth.
- The mission will be launched aboard the **Human-rated LVM3** launch vehicle.
- It represents a major step towards **India's indigenous human spaceflight capability** and future space exploration missions.



Key Qualification Tests of Gaganyaan Mission

1. Crew Module Uprighting System (CMUS)

- The **Crew Module Uprighting System (CMUS)** ensures that the Crew Module returns to an upright position after **sea splashdown**.
- It uses a **stored cold-gas inflation system** to automatically inflate flotation bags and restore the capsule if it lands upside down.
- The system is crucial for **astronaut safety and post-landing recovery operations**.

2. Crew Module Umbilical System (CSU-2)

- The **Crew Module Umbilical-2 (CSU-2)** connects the **Crew Module (CM)** and the **Service Module (SM)** by transmitting **power, data and communication**.
- The qualification test successfully demonstrated the **clean separation** of the Crew Module from the Service Module before atmospheric re-entry.
- It also validated the **structural integrity** of the separation mechanism.

3. Apex Cover Separation Test

- The **Apex Cover** protects the **parachute system** during launch and orbital flight.
- The successful test validated its **safe separation** before parachute deployment.
- This ensures the proper deployment of parachutes for **controlled deceleration and safe splashdown** of the Crew Module.

Significance of the Tests

- They **strengthen astronaut safety** during **re-entry, splashdown, and recovery**.
- They validate **critical crew separation, recovery, and parachute deployment systems**.
- They mark another important step in advancing **India's indigenous human spaceflight capability** and future missions, including the **Bharatiya Antariksh Station**.

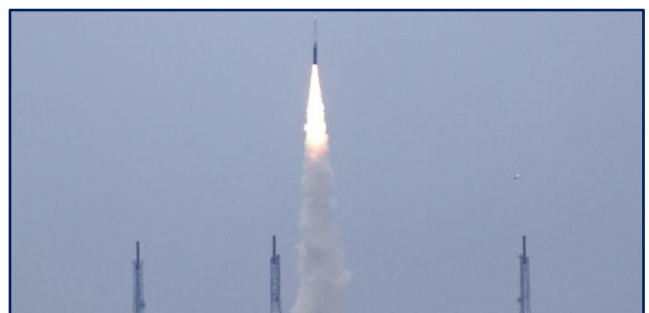
Conclusion

The successful qualification of the **Crew Module Uprighting System, Crew Module Umbilical System, and Apex Cover Separation System** marks a significant milestone in the **Gaganyaan Mission**. These tests reinforce India's readiness for safe human spaceflight and reflect the growing maturity of its indigenous space technology.

5.15. VIKRAM-1 LAUNCH: INDIA'S PRIVATE SPACE SECTOR TAKES FLIGHT

Context:

Skyroot Aerospace successfully launched **Vikram-1**, becoming the **first Indian private company to achieve an orbital launch**, marking a major milestone in India's space sector liberalisation after the **Indian Space Policy, 2023**.



Introduction

The successful launch of **Vikram-1** signifies India's transition from a **state-led space programme** to a **public-private partnership model**. It reflects the government's vision of transforming India into a **global commercial space hub** while allowing ISRO to focus on frontier research and strategic missions.

Why is Vikram-1 Significant?

1. India's First Private Orbital Launch

- **Historic milestone:** Vikram-1 is the first launch vehicle developed by an Indian private company to successfully place a payload into orbit, marking a new chapter in India's space programme.
- **Global recognition:** It makes India one of only a handful of countries where private enterprises have independently demonstrated orbital launch capability, showcasing the maturity of its private space ecosystem.

2. Beginning of a New Space Era

- **From monopoly to competition:** The launch reflects the success of space sector reforms that ended ISRO's exclusive role in launch services and opened the sector to private participation.
- **Innovation-driven ecosystem:** It signals the emergence of Indian space startups capable of designing, manufacturing, and operating end-to-end launch vehicles, strengthening India's commercial space industry.

3. Engineering Achievement

- **Advanced launch vehicle design:** Vikram-1 is a four-stage launch vehicle built using lightweight carbon-composite structures, improving payload efficiency and lowering manufacturing costs.
- **Optimised for small satellites:** The rocket is specifically designed to cater to the rapidly growing small satellite market, offering dedicated and efficient launch solutions.

4. Commercial Innovation

- **Dedicated launch service:** Unlike rideshare missions, Vikram-1 provides exclusive launch opportunities, allowing customers to avoid delays and orbital compromises caused by sharing rockets with multiple payloads.
- **Customer-centric flexibility:** Satellite operators can choose their preferred orbit, launch schedule, and mission profile, making the service similar to booking a "cab" rather than travelling in a shared bus, albeit at a higher cost.

Background: Space Sector Reforms

Before 2020

1. ISRO's Monopoly over Launch Activities

- ISRO exclusively carried out all launch vehicle development and space missions in India.

2. Private Firms as Component Suppliers

- Private companies were limited to manufacturing components and providing technical support to ISRO.

Since 2020: Major Space Sector Reforms

1. Opening Launch Services to Private Players

- Private companies were allowed to develop, own, and operate launch vehicles and satellites.

2. Creation of IN-SPACe

- IN-SPACe was established as the regulator and single-window facilitator for private participation in the space sector.

3. Establishment of NewSpace India Limited (NSIL)

- NSIL was created as ISRO's commercial arm to promote the commercial utilization of space technologies and services.

4. Indian Space Policy, 2023

- The policy provides a clear framework defining the roles of ISRO, NSIL, IN-SPACe, and private entities.

5. 49% FDI under Automatic Route (2024)

- Up to **49% FDI** was permitted under the automatic route to attract foreign investment and technology into the launch vehicle sector.

Challenges Ahead for Vikram-1 and India's Private Space Sector

1. **Commercial Viability:** Skyroot must achieve consistent launches with reliable schedules and competitive pricing to build a sustainable commercial business.
2. **Intense Global Competition:** Established players like **SpaceX, Rocket Lab**, and emerging Chinese companies offer cost-effective launch services, making market penetration difficult.
3. **Limited Dedicated Launch Market:** The demand for premium dedicated launches remains uncertain as many customers prefer cheaper rideshare missions.
4. **Scaling Manufacturing:** Expanding from prototype production to mass manufacturing requires maintaining quality, supply chain efficiency, and production consistency.
5. **Regulatory and Legal Uncertainty:** The absence of a comprehensive **Space Activities Act** creates ambiguity regarding licensing, liability, insurance, and dispute resolution.
6. **High Capital and Technology Requirements:** Developing reusable launch technologies, advanced propulsion systems, and launch infrastructure demands significant long-term investment and continuous innovation.

Way Forward for India's Private Space Sector

1. **Enact a Space Activities Act:** Enact a comprehensive **Space Activities Act** to provide legal clarity on licensing, liability, insurance, and commercial space operations.
2. **Strengthen the Private Space Ecosystem:** Promote private space enterprises through long-term funding, tax incentives, infrastructure access, and government procurement support.
3. **Encourage International Partnerships:** Expand global launch contracts, technology collaborations, and foreign investments to enhance India's competitiveness in the global space market.
4. **Develop Domestic Supply Chains:** Strengthen indigenous capabilities in propulsion systems, advanced materials, and space-grade electronics to reduce import dependence.
5. **Expand the Domestic Space Market:** Increase demand by promoting small satellite manufacturing, defence space programmes, Earth observation services, and satellite constellations.
6. **Foster Innovation and R&D:** Invest in advanced technologies such as reusable launch vehicles, next-generation propulsion systems, and AI-enabled space applications to ensure long-term global leadership.

Conclusion

The successful launch of **Vikram-1** marks the dawn of India's **New Space Age**. Sustained policy support, innovation, and commercial competitiveness will be crucial to making India a **global space launch hub** and achieving its **\$44 billion space economy target by 2033**.

5.16. INDIA'S NUCLEAR DOCTRINE AND EVOLVING NUCLEAR POSTURE**Context:**

- The SIPRI 2026 Yearbook reveals India has operationally deployed 12 of its 190 nuclear warheads for the first time. This shift to active deployment aboard ballistic missile submarines (SSBNs) signals heightened readiness while strictly maintaining the 'No First Use' policy.

Introduction

India is transitioning from a historically de-mated nuclear posture to active sea-based deployment.

Equipping Arihant-class submarines with nuclear warheads mathematically secures India's second-strike capability. This maturation of the nuclear triad practically fortifies the credibility of its deterrence doctrine against expanding regional arsenals.

**What is India's Nuclear Doctrine and its Core Principles?****1. No First Use (NFU) & Credible Minimum Deterrence**

- India commits to never launching a pre-emptive nuclear strike.
- It relies on a limited but highly survivable arsenal to deliver a massive retaliatory response that inflicts unacceptable damage on the adversary.

2. Recessed Deterrent (De-mated Posture)

- A peacetime strategy where nuclear warheads are stored separately from their delivery vehicles.
- This is done under strict civilian oversight to maximize safety, prevent accidental use, and signal global restraint.

3. Operational Deployment & The Nuclear Triad

- Deployment means a weapon has been actively paired with a delivery system (like an SSBN) and positioned in a state of readiness.
- This completes the nuclear triad, solidifying the military capability to deliver atomic weapons via three distinct methods: aircraft, land-based missiles, and sea-based submarines.

Significance of Operational Deployment

- 1. Guaranteed Second-Strike Capability:** Deployment on stealth submarines ensures that a significant portion of the nuclear arsenal survives a disarming first strike. This guarantees the ability to deliver a devastating retaliatory blow, the cornerstone of India's deterrence.
- 2. Reinforcement of 'No First Use':** A doctrine relying on retaliation is only effective if the forces can survive an initial attack. Sea-basing solves this survivability problem, making the NFU commitment strategically credible rather than a liability.
- 3. Closing Land-Based Vulnerabilities:** Land-based missiles sit at known and mappable locations, making them theoretically vulnerable to preemptive strikes. A submerged SSBN conducting a deterrence patrol in the ocean cannot be easily tracked or destroyed, closing this critical gap.

4. **Strategic Counterbalance to China:** China's nuclear arsenal is expanding rapidly, currently estimated at 620 warheads, far outpacing regional neighbors. India's SSBN deployment preserves strategic stability and credible deterrence against this expanding threat.
5. **Maturation of the Nuclear Triad:** The operationalization of tri-SSBNs marks the coming-of-age of India's strategic forces. It confirms that India's long-envisioned deterrent posture is now fully functional across land, air, and sea domains.

Challenges in the Global Strategic Environment

1. **Collapse of Arms-Control Regimes:** The post-Cold War nuclear order is experiencing severe strain globally. Traditional disarmament and arms-control agreements have systematically weakened or collapsed.
2. **Rapid Adversarial Expansion:** China's nuclear arsenal is expanding at a pace unmatched by any other nuclear power. It is simultaneously aggressively expanding its sea-based nuclear deterrent capabilities.
3. **Threat of Emerging Technologies:** Intense global competition in artificial intelligence (AI) enabled decision support systems increases the risk of strategic miscalculation. The development of hypersonic delivery systems heavily compresses response times for national defense systems.
4. **Advancements in Anti-Submarine Warfare (ASW):** Rapid developments in advanced ASW tracking and missile defense systems continue to evolve. These technologies continually threaten to compromise the stealth, secrecy, and survivability of sea-based deterrents.
5. **Reversal of Global Disarmament:** States are increasingly relying on nuclear weapons as active, deployable instruments of national power. This signals a dangerous reversal of decades of gradual global progress in nuclear disarmament.

Current Global Situation

1. **The Expanding Global Arsenal:** As of January 2026, the world's nine nuclear-armed states collectively possess an estimated 12,187 nuclear warheads. This indicates a broader trend of nuclear modernization across all major powers.
2. **China's Modernization Drive:** Beijing is heavily focused on developing long-range delivery systems and sea-based patrols. This unmatched expansion forces shifts in the deterrence postures of neighboring states, including India.

Way Forward

1. **Sustain and Expand the SSBN Fleet:** India must ensure a sufficient fleet size of Arihant-class submarines. This guarantees that at least one nuclear ballistic missile submarine is submerged and on deterrence patrol at all times.
2. **Focus on Long-Range Delivery Systems:** The strategic modernization program should prioritize land and sea-based systems capable of reaching diverse targets. This is essential for maintaining credible deterrence against larger adversarial territories.
3. **Uphold Strict Civilian Oversight:** Robust command and control mechanisms must be rigorously maintained over mated delivery systems. This ensures maximum operational readiness while eliminating the risk of accidental or unauthorized launches.
4. **Invest in Counter-Technologies:** Systematic investments are required in advanced stealth and acoustic countermeasures. This will protect Indian submarines from next-generation anti-submarine warfare tracking systems.

5. **Enhance Strategic Communication:** Policymakers must proactively communicate the defensive nature of these deployments to the international community. It must be clear that increased readiness does not imply a lowering of the threshold for nuclear employment.
6. **Modernize Global Risk Frameworks:** International institutions designed to manage nuclear risk must quickly adapt their frameworks. They need to effectively regulate the unprecedented risks posed by AI and hypersonic weaponry.

Conclusion

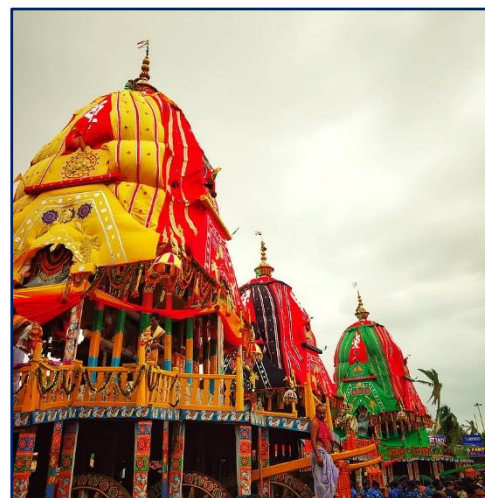
India's deployment of 12 nuclear warheads is a necessary maturation of its credible minimum deterrence posture. By securing a highly robust second-strike capability through its SSBN fleet, India fortifies the practical foundations of its 'No First Use' doctrine, ensuring national sovereignty and strategic stability in an increasingly volatile global environment.

ART AND CULTURE

6.1. RATH YATRA AND ODISHA'S CULTURAL HERITAGE

Context:

- Recently, President **Droupadi Murmu**, ahead of the **Rath Yatra** beginning on **16 July 2026** in Puri, shared her lifelong devotion to **Lord Jagannath**, describing the festival as the most spectacular celebration in Puri. The event has once again brought the **Jagannath tradition and Odisha's cultural heritage** into national focus.



Key Facts

1. The Deities & Cultural Core

- The Triad:** The festival revolves around three deities: **Lord Jagannath** (a form of Lord Vishnu/Krishna), his elder brother **Lord Balabhadra**, and his younger sister **Goddess Subhadra**, along with the weapon **Sudarshana Chakra**.
- Material & Renewal:** Unlike the stone or metal idols typical of most Hindu shrines, these idols are crafted out of sacred neem wood (**Daru Brahma**). They are ceremonially replaced every 12 to 19 years in a ritual known as **Nabakalebara**.
- Anasara Period:** Following the annual ritual bathing festival (**Snana Yatra**), the deities are believed to fall ill and are kept away from public view for 15 days, during which they are represented by traditional Odia cloth paintings called **Anasara Pattis**.

2. The Chariots (Raths)

The three grand wooden chariots are constructed fresh every year starting on *Akshaya Tritiya* without using metal nails, employing ancient joinery techniques instead.

Deity	Chariot Name	Canopy Colours	Number of Wheels
Lord Jagannath	Nandighosa (or Garudadhwaaja)	Red and Yellow	16 wheels
Lord Balabhadra	Taladhwaaja	Red and Bluish-Green/Green	14 wheels
Goddess Subhadra	Darpadalana (or Devadalana)	Red and Black	12 wheels

3. Key Rituals

- Chhera Pahanra:** The Gajapati King of Puri sweeps the floor of the chariots with a golden broom before the procession starts. This ritual signifies absolute equality before the divine, demonstrating that even the highest temporal authority is a humble servant.
- Gundicha Yatra & Return:** The deities travel along the **Bada Danda** (Grand Avenue) to the Gundicha Temple (their aunt's home), staying for nine days before making their return journey, known as the **Bahuda Yatra**.

Shree Jagannath Temple

- **Historical Origin:** Built in the **12th Century CE** by **King Anantavarman Chodaganga Deva** of the Eastern Ganga Dynasty, and completed by Anangabhima Deva III.
- **Style:** A classic example of the **Kalinga style of architecture** (a distinct sub-style of the Northern Nagara style).
- **Temple Layout:** It is a *Pancharatha* plan temple built on an elevated platform. It features four main interconnected axial structures:
 - **Vimana / Deula:** The sanctum sanctorum housing the deities.
 - **Jagamohana:** The assembly hall for devotees.
 - **Natamandira:** The dancing/festival hall.
 - **Bhogamandapa:** The hall for food offerings.
- **Key Identifiers:**
 - Known historically to sailors as the **"White Pagoda"** (while the Konark Sun Temple was called the "Black Pagoda").
 - It is one of the standard **Char Dham** pilgrimage sites (alongside Badrinath, Dwarka, and Rameswaram).
 - The top of the temple is adorned with the **Nilachakra** (an eight-spoked alloy wheel) and the fortifying outer boundary wall is named **Meghanada Pachari**.



6.2. BADAGA COMMUNITY AND CULTURAL HERITAGE OF THE NILGIRIS

Context:

- Members of the **Badaga community** in the Nilgiris, Tamil Nadu, recently celebrated their traditional harvest festival, **Devva Habba**, at a sacred forest temple (*banagudi*) in Udthagamandalam (Ooty).



Who are the Badagas?

- **Location:** They are the largest indigenous ethno-linguistic group residing in the **Nilgiri Hills (Blue Mountains)** of Tamil Nadu, living across nearly 400 distinct hill hamlets known as **Hattis**.
- **Linguistic Profile:** They speak **Badaga (Badugu)**, a distinct Dravidian language closely related to 16th-century Old Kannada. It has no unique script of its own and is typically written using the Kannada script.
- **Socio-Economic Profile:** Traditionally known as the agriculturists of the Nilgiris plateau, they revolutionized small-scale highland tea farming, alongside the cultivation of millets, potatoes, and cabbage.
- **Inter-tribal Relations:** Historically, the Badagas maintained a complex socio-ecological symbiosis with other Nilgiri tribes, including the **Toda** (pastoralists), **Kota** (artisans), and **Kurumba** (forest dwellers/honey-gatherers).

About Devva Habba & Rituals

- Devva Habba is a traditional harvest festival celebrated by the Badaga tribe of the Nilgiri Hills in Tamil Nadu.
- It is observed to express gratitude for a successful harvest and to seek blessings for prosperity and well-being.
- The festival begins with the ritual of Niligolu, in which sacred fire is traditionally produced by friction using wooden sticks or stones (Chikkimukki kallu).
- The sacred fire is then used to boil milk and cook barley (ganje).
- The ritual feast, prepared without salt or sugar, is offered to the ancestors.
- The celebrations are marked by community prayers, folk songs, and traditional dances.
- Members from several Badaga villages participate in the festivities.

Legal & Constitutional Dimension: The ST Status Debate

- **Current Status:** The Badaga community is classified under the **Other Backward Classes (OBC)** category in Tamil Nadu.
- **Historical Classification:** They were designated as an "important primitive tribe" in the 1931 Census during the British Raj and retained the status in the 1951 Census before being de-scheduled.
- **Recent Judicial Ruling (March 2025):** The Madras High Court dismissed a petition seeking a revised proposal for their ST status, noting that the Registrar General of India (RGI) did not concur with their inclusion in the Scheduled Tribes list due to a lack of traditional tribal vulnerability.

6.3. PANDAVANI AND INDIA'S FOLK CULTURAL HERITAGE

Context:

- Legendary artist Teejan Bai, who globally popularized Chhattisgarh's Pandavani folk tradition by breaking male-dominated cultural stereotypes, recently passed away. She was honored with the Padma Vibhushan for her lifelong contributions to Indian folk arts.



What is the Pandavani Tradition?

- **Definition:** Pandavani is a traditional lyrical folk ballad and performance art primarily belonging to **Chhattisgarh**.
- **Core Theme:** The term literally translates to "the story of the Pandavas," as the performance narrates episodes exclusively from the epic **Mahabharata**.
- **Historical Origin:** The tradition evolved between the 16th and 17th centuries as a regional extension of the **Bhakti movement** to make the Sanskrit epic accessible to rural masses.

What are the Key Performance Elements?

- **Performance Format:** It is a solo narrative act that seamlessly combines *gayan* (singing) and *vadan* (playing an instrument), accompanied by supporting musicians.
- **Linguistic Medium:** The narration is delivered in the highly rhythmic and expressive **Chhattisgarhi dialect**.

- **Role of the Tambura:** The lead performer holds a *tambura* (or *ektara*), which provides the musical rhythm and uniquely acts as a **symbolic prop** (transforming into Bhima's mace or Arjuna's bow during the act).

What are the Principal Styles of Narration?

Pandavani is strictly categorized into two distinct performance styles:

- **Vedamati Style:** The traditional, restrained form. The lead artist **sits on the floor** throughout the performance, delivering the story in a composed, devotional manner without theatrical acting.
- **Kapalik Style:** A highly energetic and theatrical form. The performer **stands, moves around the stage**, and actively enacts the dialogues and characters. This lively style, originally restricted to men, became Teejan Bai's signature identity.

Who are the Prominent Exponents?

- **Teejan Bai:** The most celebrated artist who brought the Kapalik form to international fame, winning the Padma Shri, Padma Bhushan, and Padma Vibhushan.
- **Other Notable Artists:** Ritu Verma, Usha Barle, and Shanti Bai continue to preserve and spread the tradition.

Famous Folk Arts of India

State	Famous Folk Art	Key Characteristics
Maharashtra	Tamasha	A vibrant traditional form of Marathi theatre, heavily incorporating singing and spontaneous dancing.
Gujarat	Bhavai	A traditional theatre form that heavily relies on humour, subtle romance, and social commentary.
Uttar Pradesh	Nautanki	Rich musical compositions intertwined with humorous, mythological, and contemporary storytelling.
West Bengal	Jatra	A famous musical theatre traditionally performed on open-air stages without raised platforms.
Karnataka	Yakshagana	A traditional dance-drama combining intricate costumes, vigorous music, and spontaneous spoken dialogue.
Assam	Ankia Nat	Traditional one-act plays focused primarily on Lord Krishna.
Jammu & Kashmir	Bhand Pather	A traditional satirical theatre combining play, dance, and music, often performed by agricultural communities.
Kerala	Mudiyettu	A ritualistic dance-drama based on the mythological tale of a battle between Goddess Kali and Darika.
Tamil Nadu	Therukoothu	A popular form of street theatre performed predominantly during village temple festivals.
Madhya Pradesh	Maach	A traditional lyrical theatre form focused heavily on melodic dialogues rather than acting.

6.4. TAJ MAHAL AND INDIA'S HERITAGE CONSERVATION

Context:

- The **Taj Mahal**, one of India's most celebrated **UNESCO World Heritage** monuments, is back in the news after the **Allahabad High Court** sought a response from the **Centre** and the **Archaeological Survey of India (ASI)** on a plea concerning the monument, renewing public attention on its heritage status and legal protection framework.



About the Case

- A plea before the **Allahabad High Court** has raised questions relating to the Taj Mahal; the court has issued notices to the **Centre** and the **ASI**, seeking their response.

About the Taj Mahal

- Built between **1632 and 1654** by Mughal Emperor **Shah Jahan** in memory of his wife **Mumtaz Mahal**; located in **Agra, Uttar Pradesh**, on the banks of the **Yamuna River**.
- Chief architect traditionally credited: **Ustad Ahmad Lahori**.
- Declared a **UNESCO World Heritage Site in 1983**, recognised for its architectural and artistic universal value.
- Voted one of the **New 7 Wonders of the World in 2007** through global public polling.
- Built of white **marble**, noted for **pietra dura** (inlay work), calligraphy, and a symmetrical Mughal **Charbagh** garden layout.
- Protected as a **centrally protected monument** by the **Archaeological Survey of India (ASI)**, under the **Ministry of Culture**, per the **AMASR Act, 1958**.

Strategic/Cultural Significance

- Reinforces India's standing in global cultural diplomacy and tourism as custodian of a **world heritage icon**.
- Highlights the **ASI's** role in the scientific conservation and statutory protection of monuments of national importance.
- Underlines the **judicial oversight** mechanisms available for matters concerning protected heritage sites.

About the AMASR Act, 1958

- Governs the protection of **monuments and sites of national importance** declared by the Centre, and establishes the **ASI**, under the **Ministry of Culture**, as India's premier body for archaeological research and heritage protection.
- A **2010 amendment** introduced a **100-metre "prohibited area"** and a further **200-metre "regulated area"** around protected monuments, restricting construction and mining activity.

About UNESCO

- Overview:** A specialized UN agency founded in 1945 (succeeding the International Committee on Intellectual Cooperation), headquartered in Paris, France. It Runs the **World Heritage Convention (1972)**, protecting sites of "Outstanding Universal

- **Mission:** To strengthen shared humanity and peace through education, science, culture, and communication.
- **Membership:** 194 member countries and 12 associate members.
- **Focus Areas:** Education, Natural Sciences, Social & Human Sciences, Culture, and Communication & Information.
- **Key Functions:** Eradicates illiteracy, promotes free education, and serves as a global hub for knowledge exchange.
- **Network:** Operates as part of the UN Sustainable Development Group, collaborating closely with NGOs and private companies
- **World Heritage:** Designates and protects global sites of outstanding universal value...
- **India has 44 UNESCO World Heritage Sites** (36 Cultural, 7 Natural, 1 Mixed) — 6th highest globally.
- **Maharashtra** has the maximum UNESCO sites in India.

6.5. PRAMBANAN TEMPLE AND INDIA-INDONESIA CULTURAL RELATIONS

Context:

- Recently, the Prime Minister of India and Indonesian President jointly inaugurated an **India-Indonesia conservation and restoration project** at the **Prambanan Temple Complex** in **Yogyakarta, Indonesia**, a UNESCO World Heritage Site.
- The project highlights the strong cultural and civilizational ties between India and Indonesia.

What is the Prambanan Temple?

- **Prambanan** is the **largest Hindu temple complex in Indonesia** and one of the finest examples of Hindu temple architecture in Southeast Asia.
- It is located near **Yogyakarta** in **Central Java, Indonesia**.
- The temple was built during the **9th century CE** under the **Sanjaya Dynasty** of the **Mataram Kingdom**.
- It is dedicated to the **Trimurti**:
 - o **Lord Shiva** (main temple)
 - o **Lord Vishnu**
 - o **Lord Brahma**
- The central Shiva temple rises to about **47 metres**, making it the tallest structure within the complex.
- The temple walls depict scenes from the **Ramayana** and **Bhagavata Purana**, highlighting the spread of Indian culture across Southeast Asia.
- In **1991**, Prambanan was designated as a **UNESCO World Heritage Site**.
- **Engineering Technique:** Constructed using an indigenous **interlocking stone engineering** method (mortarless dry masonry) that grants flexibility to the spires during seismic activities



India's Role in the Restoration Project

- The conservation project is being undertaken jointly by:
 - o **Archaeological Survey of India (ASI)**
 - o Indonesian conservation authorities.
- The project focuses on:
 - o Structural conservation
 - o Preservation of stone carvings
 - o Restoration using scientific archaeological techniques
 - o Capacity building and exchange of conservation expertise

India–Indonesia Cultural Relations

- Spread of **Hinduism and Buddhism** from India to Southeast Asia.
- Influence of Indian epics such as the **Ramayana** and **Mahabharata**.
- Sanskrit inscriptions found across Indonesia.
- The national airline of Indonesia is named **Garuda**, inspired by Hindu mythology.
- Indonesia's national motto, "**Bhinneka Tunggal Ika**" (**Unity in Diversity**), originates from an Old Javanese text influenced by Indian philosophy.

About Archaeological Survey of India (ASI)

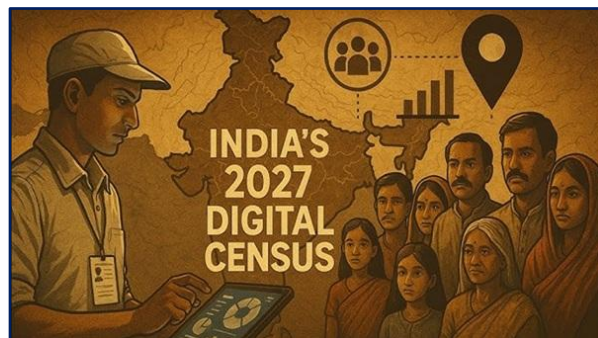
- Established in 1861; founder – **Alexander Cunningham**.
- Functions under the **Ministry of Culture**.
- Conducts archaeological excavations, conservation, and research.

MISCELLANEOUS

7.1. CENSUS 2027: DIGITAL TRANSFORMATION AND CASTE ENUMERATION

Context:

- The upcoming Census 2027 introduces a statutory caste enumeration alongside a fully digital methodology. However, the pre-test phase has highlighted methodological concerns regarding the "open column" self-declaration, necessitating a shift towards a pre-loaded, curated digital taxonomy to ensure the generation of reliable socio-economic data.



Introduction

Census 2027 marks a watershed moment in India's administrative history as the 16th national census and the 8th since independence. Moving beyond traditional paper-based methods, it is the world's first fully digital population census. The inclusion of a statutory caste enumeration aims to generate empirical data for targeted social justice, requiring an infallible digital methodology to prevent the demographic fragmentation seen in past exercises.

What Makes Census 2027 Unique?

- Fully Digital Execution:** Replaces traditional paperwork with mobile applications, a Census Management and Monitoring System (CMMS) portal, and digital Houselisting Block (HLB) mapping.
- Self-Enumeration Facility:** Introduces a citizen-centric online portal allowing individuals to submit household information digitally before field operations begin.
- Statutory Caste Enumeration:** Marks the first comprehensive and legally backed counting of castes in independent India since the 1931 Census.

Phases of the Census

- Phase 1: Houselisting and Housing Census (HLO):** Conducted from April to September 2026. This phase involves geo-tagging buildings and capturing data on housing conditions, amenities, and assets. An optional 15-day self-enumeration period precedes the house-to-house survey in each state.
- Phase 2: Population Enumeration (PE):** Scheduled for February 2027 (with adjusted timelines beginning September 2026 for snow-bound regions like Ladakh, J&K, Himachal Pradesh, and Uttarakhand). This phase collects granular individual-level data, including demographics, migration, and caste details.

Scale of 2027 Census

- Massive Coverage:** The exercise covers over 1.4 billion people across 36 States and Union Territories, including over 6.3 lakh villages and 9,700 towns.
- Extensive Workforce:** It involves the deployment of approximately 3.2 million enumerators, supervisors, and master trainers, making it the largest administrative exercise globally.

About Caste Census: The Methodological Shift

- **The Pitfalls of Open Declaration:** The 2011 Socio-Economic and Caste Census (SECC) utilized an unguided "open column," resulting in over 46 lakh fragmented, unusable caste entries due to phonetic variations, sub-castes, and overlapping clan names.
- **Curated Digital Taxonomy:** To rectify past errors, experts advocate pivoting towards pre-loading enumerators' hand-held devices with a standardized, state-specific directory of recognized castes, ensuring the data collected is coherent and administratively actionable.

Significance of Caste Enumeration

1. **Precision in Affirmative Action:** Replaces outdated 1931 demographic baselines with contemporary empirical data to structurally rationalize reservation quotas.
2. **Equitable Sub-Categorization:** Generates granular data necessary to implement the sub-categorization of backward classes, preventing dominant groups from monopolizing welfare benefits.
3. **Identification of the Creamy Layer:** Supplies multi-dimensional socio-economic indicators required to objectively identify and exclude affluent segments within reserved categories.
4. **Targeted Policy Formulation:** Correlates specific caste identities directly with health, education, and economic deprivations, shifting governance towards evidence-based resource allocation.
5. **Democratic Delimitation:** Provides accurate demographic compositions essential for the rational delimitation of electoral constituencies, ensuring equitable political representation.

Challenges Associated with Caste Enumeration

1. **Risk of Identity Ossification:** Formal enumeration of primordial identities risks solidifying societal fault lines and reinforcing the very hierarchies the Constitution seeks to abolish.
2. **Taxonomical Complexity:** Harmonizing fluid, self-perceived social status and overlapping regional dialects into a rigid national master list presents an immense bureaucratic hurdle.
3. **Politicization of Data:** The revelation of precise demographic proportions may trigger aggressive political mobilization and competitive demands for quota expansions beyond legal caps.
4. **Administrative Burden:** Reconciling localized data entries with conflicting Central and State lists for SCs, STs, and OBCs requires highly complex backend deduplication.
5. **Data Security Risks:** The centralized digital collection of sensitive socio-economic and caste-based identities raises significant privacy and cybersecurity concerns.

Global Best Practices

1. **United States – Census Bureau Framework:** Utilizes a highly structured, self-identified racial and ethnic categorization system coupled with robust digital privacy safeguards, ensuring data is used strictly for civil rights compliance and resource distribution rather than societal stratification.
2. **United Kingdom – ONS Ethnic Group Classifications:** Employs carefully curated, standard drop-down taxonomies that evolve through extensive public consultation, minimizing data fragmentation while accurately capturing diverse demographic shifts.

Way Forward

1. **Mandate Pre-Loaded Digital Registries:** Abandon the "open column" format entirely in Phase 2, deploying standardized, pre-curated drop-down options on enumerators' digital devices.

2. **Implement Robust Deduplication Algorithms:** Utilize advanced backend analytics within the CMMS to automatically resolve phonetic variations and merge identical clan entries in real-time.
3. **Harmonize Central and State Schedules:** Form an expert inter-disciplinary commission to reconcile discrepancies between state-level registries and the central list prior to nationwide enumeration.
4. **Focus on Socio-Economic Correlation:** Strictly link demographic identity mapping with economic and developmental indices to maintain focus on welfare delivery over political categorization.
5. **Ensure Stringent Data Privacy:** Enforce end-to-end encryption, strict access controls, and compliance with the Digital Personal Data Protection (DPDP) Act to prevent the systemic misuse of sensitive population data.
6. **De-Link from Political Mobilization:** Communicate the census objectives explicitly as an economic and developmental mapping project, shifting the public narrative away from competitive backwardness.

Conclusion

The integration of a statutory caste enumeration within India's first digital census is an administrative necessity for actualizing targeted social justice. By abandoning flawed, open-ended methodologies in favor of a scientifically curated digital taxonomy, the state can transform abstract demographic identities into precise, actionable tools for equitable national development.

7.2. INDIA'S HIGHER EDUCATION: GENDER PARITY AND EMPLOYABILITY

Context:

- The AISHE 2023-24 report reveals a record 4.5 crore higher education enrolment, highlighted by a 42% rise in female participation over the last decade. However, this quantitative success is overshadowed by a broken pipeline between campus enrolment and formal employment opportunities.



Introduction

India's higher education sector has achieved unprecedented social inclusion and gender parity. Yet, horizontal segregation in STEM, acute faculty shortages, and a widening skill-to-market mismatch prevent these educational gains from translating into equitable workforce participation.

Key Trends in Higher Education

- **Gross Enrolment Ratio (GER) Surge:** The national GER expanded to 30 in 2023-24, with the female GER (31.2) significantly outpacing the male GER.
- **Social Group Representation:** Hard-won equity gains are visible, with female enrolment rising by 51.4% among Scheduled Castes (SC) and 75.7% among Scheduled Tribes (ST) since 2014-15.
- **The STEM Illusion:** While women represent 44% of STEM students, they are clustered in general sciences (54.6%) and remain severely underrepresented in engineering and technology (31.1%).
- **Patriarchal Faculty Architecture:** Although the student body reflects a near 50-50 gender split, institutional leadership is skewed, with only 82 female teachers for every 100 male teachers.

Significance of the Current Trends

1. **Democratic Transition of Education:** The influx of 2.24 crore women establishes higher education as a deeply democratized space, challenging historical access barriers.
2. **Empowerment of Marginalized Cohorts:** Exponential growth in SC/ST female enrolment triggers a structural shift for rural and semi-urban generational mobility.
3. **Global Edge in STEM Human Resources:** A 44% female share in overall STEM positions India strongly in building a scientifically trained global workforce.
4. **Delayed Demographic Shifts:** Prolonged university stays naturally delay the age of marriage for young women, positively influencing maternal health parameters.
5. **Labor Force Formalization Potential:** A highly educated female student body provides an unparalleled opportunity to rapidly formalize India's knowledge and service sectors.

Persistent Challenges in the Higher Education Sector

1. **Horizontal Segregation and Digital Exclusion:** Clustering in traditional sciences isolates women from future-proof, high-paying sectors like artificial intelligence and software engineering.
2. **Scale vs. Quality Compromise:** The explosive growth of low-tier private colleges, marred by a 28% teaching vacancy rate in central universities, dilutes academic standards.
3. **The Education Debt Trap:** Over 75% of HEIs are privately managed, burdening families with debt for degrees that yield low employability in the formal market.
4. **Stagnant R&D Investment:** India's Gross Expenditure on Research and Development (GERD) remains stagnant at 0.6%–0.7% of GDP, stunting deep-tech innovation on campuses.
5. **Societal and Structural Mobility Barriers:** Severe deficits in safe public transit, rigid domestic expectations, and gender wage gaps restrict women from translating degrees into active careers.

Global Best Practices

1. **Germany – Dual VET System:** Seamlessly integrates classroom higher education with mandatory industry apprenticeships to ensure high employability and skill matching.
2. **United States – Venture-Backed R&D:** Fosters deep integration between university research laboratories and private equity to drive the commercialization of deep-tech innovations.

Way Forward

1. **Operationalize a Targeted "Women-in-Tech" Pipeline:** Introduce corporate-linked scholarships and dedicated incubation quotas explicitly for women in engineering and AI to shatter gender imbalances.
2. **Replace Rigid Oversight with Performance-Linked Autonomy:** Dismantle the "one-size-fits-all" regulatory oversight of UGC/AICTE, allowing top-performing colleges the freedom to design market-responsive curricula.
3. **Transition to Venture-Based R&D Funding:** Shift the Anusandhan National Research Foundation (ANRF) to a strategic equity partner model to back university-led startups and democratize tier-2 funding.
4. **Mandate Industry-Academia Co-Governance:** Enforce the inclusion of active industry practitioners on university governing boards to introduce stackable, modular micro-credentials.
5. **Deploy "AI-First" Localized Knowledge Translation:** Utilize advanced Large Language Models (LLMs) via platforms like SWAYAM to translate cutting-edge global research into 22 Indian languages.

6. **Enact a National Faculty Mobility Architecture:** Address acute teacher shortages by launching a National Faculty Exchange (NFE) program, allowing corporate tech experts to take academic sabbaticals.

Conclusion

India must transition its higher education system from rote compliance to an agile, innovation-driven ecosystem. Bridging the gap between campus enrolment and formal employment is the ultimate prerequisite for realizing the nation's demographic dividend and ensuring inclusive economic growth.

7.3. INTERNET AND THE TRANSFORMATION OF INDIAN SOCIETY

Context:

- The Internet has evolved beyond a communication tool into a **powerful cultural force** that shapes identities, public discourse, political participation, social behaviour, and economic opportunities.
- The rise of **social media, creator economy, memes, and AI-driven algorithms** has transformed the way individuals consume information and interact with society.



How is Internet shaping Culture

1. Democratization of Content Creation and rise of the creator economy

- Traditionally, newspapers, television channels, and publishing houses controlled the production and dissemination of information now internet has removed these barriers by enabling **any individual with a smartphone and internet access to become a content creator**.
- **Internet** encourages **diverse voices, including women, rural communities, and marginalized group**, promotes regional languages and indigenous traditions.

2. Transformation of Communication through Meme Culture

- The Internet has transformed communication from lengthy text-based discussions to **visual, humorous, and symbolic communication** through memes, GIFs, and short videos.
- Memes are no longer merely entertainment; they shape **public opinion, political narratives, and social awareness**.

3. Redefining Identity and Social Relationships

- People increasingly present themselves through **social media profiles, online communities, and digital interactions**, making the distinction between online and offline identities increasingly blurred.
- Encourages self-expression and creativity. Builds virtual communities based on shared interests rather than geography.

4. Algorithm-Driven Culture

- Unlike traditional media, Internet platforms use **Artificial Intelligence and algorithms** to determine what users see recommends videos, news, advertisements, and posts based on users' preferences and online behaviour.
- Personalizes content according to individual interests, increases user engagement, influences purchasing decisions, political opinions, and entertainment preferences.

5. Transformation of Political Culture and Democracy

- The Internet has fundamentally altered the relationship between citizens and the State. Social media has become an important platform for **political participation, public debate, digital activism, and citizen engagement**.
- Enhances citizen participation. Promotes transparency and accountability.
- But scope of spreading Fake news and misinformation, Deepfake technology dampens social harmony

6. Changing Consumer and Economic Culture

- The Internet has transformed consumption patterns through **e-commerce, digital payments, online reviews, and influencer marketing**.

7. AI and the Future of Culture

- Artificial Intelligence is transforming creativity itself through generating articles, music, paintings, videos and educational content.
- Concerns include **Copyright infringement, Ethical use of AI, Authenticity of content, Job displacement, Bias in AI systems**.

8. Social Behaviour and Mental Health

- The Internet has changed everyday behaviour, particularly among youth by giving access to education, social connectivity, mental health awareness, online support communities.
- While issues are arising through **Internet addiction, Reduced attention span, Cyberbullying, Anxiety due to social comparison, Fear of Missing Out (FOMO)**.

Challenges of the Internet in Shaping

1. Misinformation, Disinformation

- **Misinformation:** False information shared without the intention to deceive.
- **Disinformation:** Deliberately fabricated information spread to manipulate public opinion.
- **Malinformation:** Genuine information shared maliciously to cause harm.

2. Echo Chambers and Filter Bubbles

- **Filter Bubble:** Users are exposed primarily to information that aligns with their existing interests.
- **Echo Chamber:** Individuals repeatedly interact with like-minded people, reinforcing existing beliefs.

3. Privacy Violations and Surveillance

- Digital platforms continuously collect personal information, including browsing history, location, purchasing behaviour, and communication patterns.
- Unauthorized collection and misuse of personal data and data breaches exposing sensitive information.

4. Mental Health and Digital Addiction

- Excessive dependence on social media has significantly altered human behaviour.
- Continuous comparison with idealized online lifestyles, addiction to likes, shares, and online validation.

5. Cyberbullying and Online Harassment

- The anonymity provided by digital platforms often encourages abusive behaviour.

- It results Psychological trauma, reduced participation of women and vulnerable groups in online space, threats to freedom of expression.

6. Algorithmic Bias and AI Ethics

- Artificial Intelligence systems learn from historical datasets, which may contain existing biases in form of Gender bias, Racial bias, Language bias, Regional bias.
- Discriminatory outcomes, reduced fairness in automated decision-making.

7. Cybersecurity Threats

- Greater digital dependence increases vulnerability to cyber attacks like Ransomware attacks, Phishing scams, Identity theft, Financial fraud, Critical infrastructure attacks.

Way forward

1. Strengthen Digital Literacy and Media Literacy

- Digital literacy should go beyond teaching people how to use the Internet; it should equip citizens to **identify misinformation, verify sources, understand algorithms, and use digital platforms responsibly.**
- Government Initiatives include
- **Digital India Mission** – Promotes digital empowerment and digital inclusion.
- **PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan)** – Enhances digital literacy in rural areas.

2. Promote Responsible AI and Algorithmic Transparency

- AI-driven platforms should be **transparent, fair, accountable, and free from discrimination.** Algorithms that influence public opinion and access to information must be subject to appropriate oversight.
- Government Initiatives include
- **IndiaAI Mission (2024)** – Promotes ethical AI development, AI innovation, and AI skilling.
- **NITI Aayog's Responsible AI Principles** – Advocate fairness, transparency, privacy, and accountability.
- **Global Partnership on Artificial Intelligence (GPAI)** – India actively contributes to global AI governance.

3. Strengthen Data Privacy and Cybersecurity

- A secure digital ecosystem requires strong protection of personal data and robust cybersecurity mechanisms.
- Government Initiatives
- **Digital Personal Data Protection (DPDP) Act, 2023** – Provides a legal framework for protecting personal data.
- **Indian Computer Emergency Response Team (CERT-In)** – National agency for responding to cybersecurity incidents.
- **National Cyber Security Policy, 2013** and the proposed **National Cyber Security Strategy** – Aim to strengthen cyber resilience.

4. Combat Misinformation and Deepfakes

- Governments, technology companies, media organizations, and civil society must collaborate to curb misinformation while preserving freedom of expression.

- Government Initiatives include
- **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021** – Require intermediaries to exercise due diligence and address unlawful content.
- **PIB Fact Check Unit** – Verifies misinformation relating to government policies and schemes.

5. Bridge the Digital Divide

- Inclusive digital growth requires universal access to affordable internet, devices, and digital skills.
- Government Initiatives **includes**
- **BharatNet Project** – Expands broadband connectivity to Gram Panchayats.
- **Digital India Mission** – Enhances digital infrastructure and public service delivery.
- **PM-WANI (Prime Minister Wi-Fi Access Network Interface)** – Expands affordable public Wi-Fi access.

6. Promote Ethical Digital Citizenship

- Citizens should be encouraged to use digital platforms responsibly while respecting constitutional values.

Conclusion

The Internet shapes identities, governance, education, and democracy in the twenty-first century. India must build a digital ecosystem that is innovative, inclusive, secure, and rooted in constitutional values. Strengthening digital literacy, ethical AI, privacy, indigenous innovation, and responsible digital citizenship will enable the Internet to drive inclusive and sustainable development.

7.4. WAYANAD LANDSLIDES: DEVELOPMENT VS. ECOLOGICAL FRAGILITY

Context:

On July 7, a fatal debris slide at the Kalladi twin-tunnel construction site in Wayanad resulted in six deaths. The Kerala government has suspended the project pending investigations into environmental compliance and the geomorphological triggers of the disaster.



Introduction

Recurring landslides in Wayanad highlight the severe ecological vulnerability of the Western Ghats. Consecutive disasters expose the high risks associated with aggressive infrastructure expansion in fragile terrains, emphasizing the urgent need to balance development with strict climate-resilient planning.

Seismic Zone of Wayanad

- Wayanad falls under **Seismic Zone III** (moderate earthquake risk) according to the Bureau of Indian Standards (BIS) seismic zoning map.
- While earthquakes are not the primary landslide trigger in the region, minor seismic activity combined with heavy rainfall and steep slopes dramatically increases the risk of terrain failure.
- This classification necessitates mandatory earthquake-resistant construction protocols and stringent land-use planning for all infrastructure projects.

What Caused the Wayanad Landslide?

- **Extremely Heavy Rainfall:** Continuous monsoon downpours saturated the soil, significantly increasing pore pressure and triggering slope failure.
- **Fragile Geology & Steep Terrain:** The deeply weathered rocks and steep gradients of the region are naturally predisposed to movement under intense rainfall.
- **Deforestation:** The systematic removal of natural forest cover has severely weakened the soil's binding capacity, leaving slopes highly vulnerable.
- **Unplanned Development:** Anthropogenic interventions, including tunneling, road construction, and unscientific hill cutting, disrupted the natural stability of the terrain.
- **Climate Change:** A rise in short-duration, high-intensity rainfall events acts as a primary trigger multiplier for such geological disasters.
- **Poor Drainage:** Inadequate surface drainage systems allowed rainwater to accumulate, exponentially increasing soil weight and structural instability.

Impacts of the Disaster

- **Loss of Lives and Displacement:** The disaster caused tragic casualties and forced thousands into relief camps as homes were destroyed or declared structurally unsafe.
- **Infrastructure Destruction:** Extensive damage occurred to critical public assets, including roads, bridges, power lines, and water supply networks.
- **Agricultural and Economic Losses:** Mud and debris buried lucrative plantations (coffee, tea, spices), devastating local agrarian economies and tourism revenues.
- **Environmental Degradation:** The landslide led to severe soil erosion, river siltation, destruction of local forest cover, and a localized loss of biodiversity.
- **Disruption of Connectivity:** Collapsed transport networks isolated entire villages, severely delaying emergency rescue and relief operations.

Gadgil and Kasturirangan Committees recommendations:

- **Gadgil Committee (2011):** Recommended classifying the entire Western Ghats into three Ecologically Sensitive Zones (ESZs). It proposed strict bans on mining, quarrying, and large-scale construction, prioritizing decentralized, environmentally sustainable governance.
- **Kasturirangan Committee (2013):** Formed to review the Gadgil report, it adopted a more development-accommodating approach, recommending that only 37% of the Western Ghats be declared as Ecologically Sensitive Areas (ESAs). While prohibiting mining in ESAs, it permitted regulated sustainable agriculture and economic activities in non-sensitive zones.

Way Forward

- **Strengthen Early Warning Systems (EWS):** Deploy hyper-local, real-time alerts utilizing automated rain gauges, inclinometers, and acoustic sensors to predict slope failures.
- **Scientific Land-Use Planning:** Enforce strict zoning regulations to prohibit heavy infrastructure construction and human settlements in highly susceptible landslide zones.
- **Ecological Restoration:** Prioritize the protection of existing forest cover and implement bio-engineering techniques to physically and naturally stabilize vulnerable slopes.
- **Regulate Development:** Enforce absolute restrictions on quarrying and unscientific hill cutting in ecologically sensitive regions, ensuring strict Environmental Impact Assessments (EIAs).

- **Implement Committee Frameworks:** Operationalize the core sustainable development recommendations of the Gadgil and Kasturirangan Committees to protect the broader ecosystem.
- **Enhance Drainage Infrastructure:** Mandate disaster-resilient construction techniques and improve surface drainage on hill slopes to prevent localized water accumulation.

Conclusion

The Wayanad disaster highlights that infrastructure development must respect environmental limits. To protect human lives and the Western Ghats, we must shift from merely reacting to disasters to actively preventing them through scientific, climate-resilient planning.

7.5. TEESTA STAGE-VI AND THE VULNERABILITY OF HIMALAYAN INFRASTRUCTURE

Context:

- A methane gas burst inside the under-construction Teesta Stage-VI Hydroelectric Project tunnel in Sikkim's Namchi district killed several workers.



Introduction

The Teesta Stage-VI tunnel accident is not merely an industrial accident but a reminder of the **complex interaction between development, fragile ecology, geological risks, and worker safety**. It highlights the need to reconcile India's clean energy ambitions with environmental sustainability and disaster resilience.

Why are Himalayan Hydropower Projects the Need of the Hour, Yet Highly Vulnerable?

1. Strategic Energy Potential vs Geological Fragility

The Himalayas possess immense **hydropower potential** essential for India's clean energy transition, but their **young, seismically active geology** makes dams and tunnels highly susceptible to landslides, earthquakes, and structural failures.

2. Infrastructure Expansion vs Hidden Geological Hazards

Rapid development of tunnels, roads, and hydropower projects is crucial for **energy security and regional connectivity**, yet underground excavation may encounter **methane pockets, fault zones, aquifers, and weak rock strata**, posing serious safety risks.

3. Climate Goals vs Climate-Induced Risks

Hydropower supports India's **net-zero and renewable energy ambitions**, but **glacial retreat, GLOFs, extreme rainfall, and flash floods** are increasing the vulnerability of Himalayan infrastructure.

4. Regional Development vs Ecological Fragility

Hydropower drives **economic growth, employment, and energy access** in Himalayan states; however, **multiple dams, tunnelling, deforestation, and unplanned development** can destabilise fragile ecosystems and heighten disaster risks.

Recurring Incidents Highlighting Infrastructure Risks

1. **Teesta Stage-VI Tunnel, Sikkim (2026):** A **methane gas burst** during tunnel excavation killed several workers, highlighting the risks of underground construction in the fragile Himalayas.

2. **Silkyara Tunnel Collapse, Uttarkashi, Uttarakhand (2023):** A tunnel collapse trapped **41 workers for 17 days**, exposing deficiencies in geological assessment, engineering design, and emergency preparedness.
3. **Illegal Coal Mine Explosion, Meghalaya (2026):** A **methane gas explosion** at an illegal coal mine killed around **30 workers**, exposing poor mine safety standards, inadequate gas monitoring, and weak regulatory enforcement.

Challenges Associated with Himalayan Hydropower Projects

1. Geological and Climate Vulnerability

- The young, seismically active Himalayan terrain, coupled with hidden fault lines, methane pockets, and weak rock strata, makes tunnelling and dam construction inherently risky.
- Climate change has intensified hazards through glacial retreat, GLOFs, extreme rainfall, and flash floods, increasing the likelihood of infrastructure failures.

2. Worker Safety and Disaster Preparedness

- Inadequate gas detection systems, ventilation, safety drills, and occupational safety protocols expose workers to fatal risks during underground construction.
- Weak emergency response mechanisms, rescue infrastructure, and real-time monitoring delay disaster mitigation and increase casualties.

3. Environmental and Ecological Degradation

- Hydropower projects fragment river ecosystems, destroy habitats, obstruct fish migration, and reduce ecological connectivity, threatening Himalayan biodiversity.
- Large-scale tunnelling, blasting, and deforestation destabilise mountain slopes, increasing landslides, erosion, and long-term ecological fragility.

4. Weak Environmental Governance

- Poor compliance with Environmental Clearance (EC) conditions, inadequate geological investigations, and limited cumulative impact assessments undermine sustainable project execution.
- Weak post-clearance monitoring, compliance audits, and inter-agency coordination reduce accountability and increase environmental risks.

5. Technical and Project Planning Deficiencies

- Inadequate geological modelling, hazard mapping, and risk assessment often fail to identify subsurface hazards before construction begins.
- Deficiencies in tunnel alignment, engineering design, and construction methodology lead to delays, cost overruns, and increased accident risks.

6. Socio-Economic Challenges

- Hydropower projects often displace local communities, disrupt livelihoods, and increase disaster vulnerability in ecologically sensitive regions.
- Frequent delays, rising construction costs, and financial distress of developers reduce project viability and burden public finances, as seen in the **Teesta Stage-VI** takeover by NHPC.

7. Institutional and Policy Challenges

- Fragmented coordination among agencies such as **MoEFCC, CEA, GSI, NDMA, and State authorities** leads to gaps in planning, monitoring, and disaster management.

- The recurrence of incidents like the **Silkyara Tunnel collapse (2023)**, **Meghalaya mine explosion (2026)**, and **Teesta tunnel accident (2026)** indicates systemic governance failures rather than isolated events.

Committee Recommendations on Himalayan Hydropower Projects

1. Ravi Chopra Committee (2014) – Sustainable Basin-Level Hydropower Development

Recommended basin-level planning, cumulative impact assessments, ecological flow (E-flow) maintenance, and restricting hydropower projects in ecologically fragile Himalayan regions.

2. High Powered Committee (Char Dham) & NDMA – Disaster-Resilient Infrastructure

Emphasised minimising hill cutting and tunnelling, integrating multi-hazard risk assessments, strengthening landslide mitigation, early warning systems, and disaster preparedness.

3. Kasturirangan Committee, NGRBA & GSI – Scientific Environmental Governance

Advocated identifying ecologically sensitive areas, conducting rigorous geological investigations, maintaining environmental flows, and ensuring continuous environmental monitoring before and during project execution.

Way Forward for Sustainable Himalayan Hydropower Development

1. Scientific and Risk-Informed Planning

Undertake **advanced geological mapping, 3D seismic imaging, geophysical surveys, and hazard assessments** before project approval to minimise geological risks.

2. Strengthen Environmental Governance

Ensure **strict compliance with Environmental Clearance (EC) conditions** through independent audits, third-party inspections, and transparent monitoring.

3. Adopt Basin-Level Integrated Planning

Shift from **project-wise approvals** to **Integrated River Basin Management (IRBM)**, Cumulative Environmental Impact Assessment (CEIA), and Strategic Environmental Assessment (SEA).

4. Build Climate-Resilient Infrastructure

Incorporate **GLOF risk assessment, climate projections, and nature-based disaster mitigation measures** into the design and operation of hydropower projects.

5. Enhance Tunnel and Worker Safety

Deploy **continuous gas detection, automated ventilation, real-time monitoring systems, emergency escape infrastructure, and regular safety drills** to protect workers.

6. Strengthen Institutional Coordination and Disaster Preparedness

Improve coordination among **MoEFCC, CEA, GSI, NDMA, and State agencies** with robust early warning systems and comprehensive emergency response plans.

7. Promote Sustainable and Community-Centric Development

Balance energy security with ecological conservation by **protecting biodiversity, ensuring local community participation, fair rehabilitation, and long-term environmental sustainability**.

Conclusion

The Teesta Stage-VI tunnel disaster underscores that **development in the Himalayas must be ecology-led, science-driven, and disaster-resilient rather than engineering-centric**. Achieving India's clean energy goals requires **robust environmental governance, scientific planning, worker safety, climate resilience, and community participation**, ensuring that development remains both **sustainable and safe**.

7.6. DENGUE VACCINE AND PUBLIC HEALTH IN INDIA

Context:

- The **Drugs Controller General of India (DCGI)** has approved **QDENG A (TAK-003)**, developed by **Takeda Biopharmaceuticals**, making it **India's first approved dengue vaccine** for individuals aged **4–60 years**.

About QDENG A (TAK-003)

- Developed by **Takeda Biopharmaceuticals (Japan)**.
- Live-attenuated tetravalent dengue vaccine**.
- Provides protection against **all four dengue virus serotypes (DENV-1, DENV-2, DENV-3, DENV-4)**.
- Approved for individuals aged **4–60 years**.
- Dosage:** Two-dose schedule, administered **3 months apart**.
- Can be given **regardless of previous dengue infection** (no pre-vaccination screening required).



What is a Tetravalent Vaccine?

- A **tetravalent vaccine** protects against **four different strains (serotypes)** of the same pathogen.
- Example:** QDENG A protects against:
 - o DENV-1
 - o DENV-2
 - o DENV-3
 - o DENV-4

About Dengue

- Disease Type:** Viral disease.
- Causative Agent:** Dengue Virus (Flavivirus).
- Vector:** Female *Aedes aegypti* mosquito (primary vector); *Aedes albopictus* is also a vector.
- Transmission:** Bite of infected mosquito (not direct person-to-person).
- Incubation Period:** 4–10 days.
- Symptoms**
 - o High fever
 - o Severe headache
 - o Muscle and joint pain ("Breakbone fever")
 - o Skin rash
 - o Bleeding manifestations in severe cases

About Aedes Mosquito

- Bites mainly during **daytime**.
- Breeds in **clean stagnant water**.
- Common breeding sites:
 - o Water tanks
 - o Coolers
 - o Flower pots
 - o Tyres
 - o Coconut shells

About Drugs Controller General of India (DCGI)

- Head of the **Central Drugs Standard Control Organisation (CDSCO)**.
- Functions under the **Ministry of Health & Family Welfare**.
- Responsible for approval of new drugs, vaccines, and clinical trials in India



Central India's



Educational Group

One World One University

30+

Major & Minor For
Interdisciplinary Learning

60+

Startups Incubated
in Campus

50+

Global Academic
Alliances

20+

Add-on Certifications
Powered by Tech Giants

250+

Recruiters Including Microsoft,
Google, Amazon, & More

38 LPA

Highest Package
by Amazon

15+

Clubs Promoting
Co-Curricular Activities

10+

Scholarship Programmes
For Meritorious Students

6.5 LPA

Average Package

200+

Patents (Filed/Granted)

5 Crores+

Govt. Fund for Research

20,000+

Global Alumni Footprint

15+

Nationalities Represented
On Campus

16+

States Represented
On Campus



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