AUGUST 2025

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PRELIMS

POLITY & GOVERNANCE

TENTH SCHEDULE

Context: The Supreme Court has strongly criticized the Telangana Assembly Speaker for delaying the decision on disqualification petitions.

About the Judgement:

- A Bench led by Chief Justice B.R. Gavai stated that anti-defection cases must be resolved within three months to uphold the dignity of the Speaker's office and prevent political defection from going unpunished.
- The Court noted that such proceedings often die a "natural death" due to intentional delays by Speakers, making a mockery of the Tenth Schedule (anti-defection law). Chief Justice Gavai emphasized that no constitutional immunity protects the Speaker from judicial review when acting under the Tenth Schedule, and questioned whether the Speaker acted in an expeditious manner as expected by Parliament.

About 52nd Amendment Act and Anti-Defection Law:

52nd Amendment Act, 1985:

- Added the Tenth Schedule to the Indian Constitution.
- Aimed at curbing political defections by legislators.
- Enacted during Rajiv Gandhi's tenure as Prime Minister.
- Came into effect on 1 March 1985.

Anti-Defection Law (Tenth Schedule):

- Provides for disqualification of legislators (MPs/MLAs) on grounds of:
  - Voluntarily giving up membership of their party.
  - Voting/abstaining against party directives (whip) without permission.
- Exceptions:
  - Merger provision: If 2/3rd members of a party merge with another, disqualification does not apply.
- Decision Authority:
  - The Speaker/Chairman of the House decides disqualification petitions.

LINGUISTIC REORGANIZATION OF STATES

Context: Tamil Nadu Governor R.N. Ravi criticized the linguistic reorganization of states, claiming it created "second-class citizens" by dividing people based on language.

Background: India Post-Independence (1950)

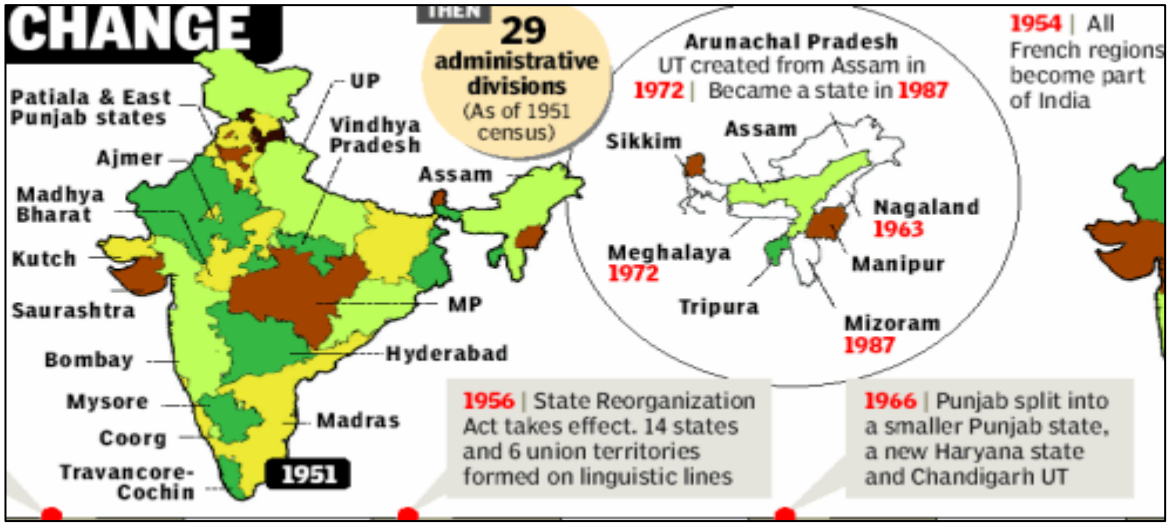
- After the Constitution came into effect in **1950**, Indian territory was categorized into:
  - Part A States: Former British provinces (e.g., Bombay, Madras)
  - Part B States: Former princely states (e.g., Hyderabad, Mysore)
  - Part C States: Chief Commissioner's provinces (e.g., Delhi, Himachal Pradesh)

- Part D State: Andaman & Nicobar Islands

This structure was temporary and inefficient, prompting demands for reorganization, especially on linguistic lines.

Major Movements and the First Linguistic State (1953)

- Demand for linguistic states gained momentum, especially among Telugu, Marathi, Tamil, and Kannada speakers.
- The death of Potti Sriramulu after a hunger strike led to the formation of Andhra State (1953) from the Telugu-speaking areas of Madras.



Key Committees on Reorganization

Committee	Year	Members	Key Recommendations
Dhar Commission	1948	S.K. Dhar (Chairman)	Opposed reorganization solely on linguistic lines; favored administrative convenience.
JVP Committee	1949	Jawaharlal Nehru, Vallabhbhai Patel, Pattabhi Sitaramayya	Rejected linguistic states initially; favored national unity over linguistic aspirations.
States Reorganisation Commission (SRC)	1953	Fazl Ali (Chairman), K.M. Panikkar, H.N. Kunzru	Recommended reorganization primarily on linguistic lines, with a focus on administrative viability and national integration.

States Reorganisation Act, 1956

- Based on SRC recommendations:
  - Abolished the A/B/C/D classification.
  - Created 14 states and 6 Union Territories.
  - Realigned boundaries largely on linguistic basis.

Subsequent State Formations and Changes

Year	Reorganization
1960	Bombay split into Maharashtra (Marathi) and Gujarat (Gujarati).
1966	Punjab reorganized to form Haryana (Hindi), with Chandigarh as UT.
1971-72	Manipur, Tripura, and Meghalaya became full-fledged states.
1987	Goa, Arunachal Pradesh, Mizoram became states.
2000	Creation of Chhattisgarh (from MP), Uttarakhand (from UP), Jharkhand (from Bihar).
2014	Telangana formed as India's 29th state, bifurcated from Andhra Pradesh.

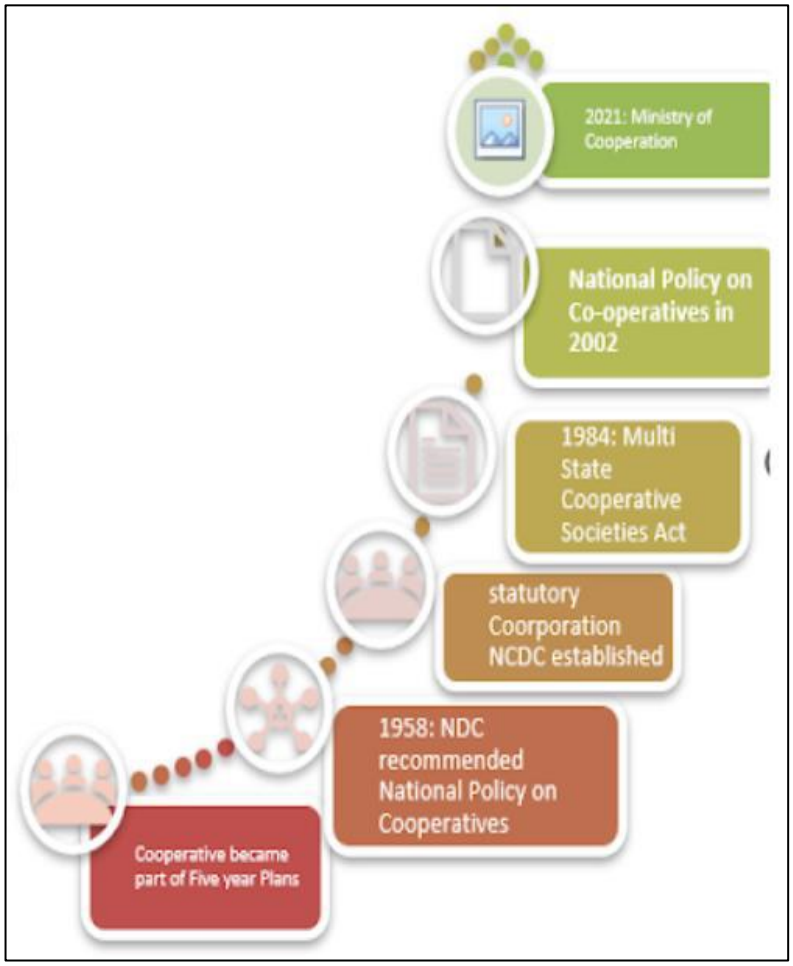
NATIONAL COOPERATIVE DEVELOPMENT CORPORATION (NCDC)

Context : The Union Cabinet, has approved a Central Sector Scheme titled "Grant in aid to National Cooperative Development Corporation (NCDC)".

About National Cooperative Development Corporation (NCDC):

Established:

- **1963**, by an Act of Parliament: *National Cooperative Development Corporation Act, 1962*.



Objective:

- To plan, promote, and finance programs for the production, processing, marketing, storage, export, and import of agricultural produce, foodstuffs, industrial goods, and livestock based on cooperative principles.

Key Functions:

- Provides financial assistance to cooperatives for:
  - Agro-processing and marketing projects
  - Storage and cold chain facilities
  - Dairy, poultry, fishery, and livestock development
  - Rural sanitation, healthcare, and infrastructure projects
- Promotes integrated cooperative development projects in rural areas.

- Facilitates capacity building and skill development of cooperative members.

Organizational Structure:

- Headquartered in New Delhi with 18 regional and state directorates.
- Operates under the administrative control of the Ministry of Cooperation, Government of India.

Key Initiatives:

- Sahakar Mitra: Internship programme for young professionals in the cooperative sector.
- Yuva Sahakar Scheme: Promotes startup ventures in cooperatives for youth.
- NCDC Ayushman Sahakar: Provides financial assistance for healthcare infrastructure in the cooperative sector.

NECROPOLITICS

Context : Keyword can be directly asked in prelims

Key points include:

- Necropolitics and Biopolitics: The theory, coined by Achille Mbembe, builds on Michel Foucault's biopolitics, focusing on how states manage populations through surveillance, control, and exclusion. Biopolitics concerns itself with preserving life, while necropolitics focuses on deciding who is allowed to live and who is abandoned, neglected, or sacrificed.
- The State of Exception: Drawing on Giorgio Agamben's work, the article discusses how states use exceptional laws to protect life in certain spaces while excluding others. This creates zones where death is treated as normal, and people are left to suffer or die in conditions of neglect.
- The Living Dead: Mbembe introduces the concept of the "living dead" to describe those who are biologically alive but deprived of social, political, and moral recognition. This was seen during the COVID-19 lockdown when migrant workers were left without food, shelter, or transportation and many died from neglect.
- Gaza as a Case Study: The article points to the situation in Gaza, where civilians face violence and systematic neglect. The deaths of children and civilians are framed as collateral damage in the name of national security.
- In Everyday Life: Necropolitics also manifests in everyday life, particularly in regions with ongoing violence or war. Disposability of life is evident in the treatment of marginalized communities and individuals subjected to violence, state neglect, or abandoned in disaster zones.

REMOVAL OF MINISTER

Context : On the first day of Karnataka's Monsoon Assembly Session, Cooperation Minister K.N. Rajanna was removed from the Cabinet.

Removal of a Minister in State Legislature

In India's parliamentary form of government, both at the Union and State levels, the Council of Ministers holds office collectively responsible to the Legislative Assembly (Article 164).

Salient Features of Parliamentary Democracy

1. Supremacy of the Legislature
    - The Parliament (or State Legislature) is the supreme law-making body within the constitutional framework.

- Executive is responsible to the legislature.

2. Collective Responsibility of the Executive
   - The Council of Ministers, headed by the Prime Minister (or Chief Minister at state level), is collectively responsible to the Lower House (Lok Sabha/State Assembly).
   - Loss of confidence in the House mandates resignation.
3. Bicameral Legislature *(at the Union level)*
   - Lok Sabha (House of the People) and Rajya Sabha (Council of States).
   - Provides representation to both the people and the states.
4. Majority Rule
   - The political party/coalition with majority support in the Lower House forms the government.
   - Opposition plays a vital role in scrutiny.
5. Separation of Head of State and Head of Government
   - Head of State (President/Governor) is largely ceremonial.
   - Head of Government (Prime Minister/Chief Minister) exercises real executive power.
6. Fusion of Executive and Legislature
   - Ministers are members of the legislature, unlike in the presidential system where the separation is strict.
7. Free, Fair, and Periodic Elections
   - Conducted by an independent Election Commission.
   - Universal adult suffrage ensures equal participation.
8. Rule of Law & Constitutional Supremacy
   - All organs function within the limits set by the Constitution.
   - Judiciary ensures checks and balances.
9. Opposition and Accountability Mechanisms
   - Question Hour, Zero Hour, Parliamentary Committees, and debates ensure government accountability.
10. Cabinet System of Government
    - Real executive authority lies with the cabinet headed by the Prime Minister.

POWERS OF GOVERNOR

Context: The Supreme Court is hearing a Presidential Reference on whether timelines can be imposed on Governors/President for acting on State Bills

Constitutional Position

- The Governor is the constitutional head of the state, appointed by the President (Article 155).
- Acts as a link between the Union and the State, ensuring federal balance.

Powers & Functions of a Governor

1. Executive Powers
   - Appoints the Chief Minister, other ministers, and the Advocate General.
   - Appoints the State Election Commissioner, Chairman & members of State Public Service Commission (on President's advice).
   - All executive actions of the State are taken in his/her name.
   - Can recommend President's Rule under Article 356 if State Government fails.
2. Legislative Powers
   - Summons, prorogues, and dissolves the State Legislature.
   - Addresses the first session after elections and at the start of each year.

- Gives assent to Bills (Article 200) – may assent, withhold, reserve for President, or return (once) for reconsideration.
- Nominates 1 member from the Anglo-Indian community (till 2020, now abolished by 104th Amendment).
- Nominates 1/6th of the members to the Legislative Council (if bicameral).

3. Financial Powers
   - Ensures the State Budget is laid before the legislature.
   - No money bill can be introduced without the Governor's recommendation.
   - Administers the Contingency Fund of the State.
4. Judicial Powers
   - Can grant pardons, reprieves, commutations, and remissions for offences against state laws (Article 161).
   - Consulted in the appointment of judges of the State High Court.
5. Discretionary Powers
   - Reserving a Bill for the consideration of the President.
   - Recommendation for President's Rule (Article 356).
   - Deciding on appointment of CM in a hung assembly.
   - When no party commands majority or when confidence of House is in doubt.

Governor (Part - III)

President - **Article 52 -78 in (Part V)**; Governor - **Article 153 -167 (Part VI)**

Governor and President - Similarities

Point of Similarity	Characteristics
Head	• Both are **nominal executive heads** (constitutional/ titular heads) at their level
Promulgating Ordinances	• Both are empowered (under **Article 123/213 - President/Governor**)
Civil and Criminal Proceedings	• Both are **immune from any criminal proceedings during tenure**; cannot be arrested or imprisoned • **Civil proceedings can be instituted** after giving a 2-months' notice
Re-appointment/Re-election	• Both are **eligible for reappointment/re-election** to the same office
Appointing Officers	• What President appoints at National level, Governor appoints at state level (members of Public Service Commission, Judges of courts, Election Commissioners etc.)
Role in Legislature	• Power to **summon or prorogue the State/Union Legislature** and **dissolve the State LA/Lok Sabha**
Financial Powers	• Constituting **Finance Commission** at State/Union level
Situational Discretionary Power	• **Appointing PM/CM** (in case of PM/CM's death or when no party has clear majority) • **Dismissal of Council of Ministers** • **Dissolution of Lok Sabha/ State LA**

Governor v/s President - Differences

Point of Difference	President	Governor
Election	Indirectly elected	**Appointed** by President
Pleasure Doctrine	No concept of Pleasure doctrine	Serves at the **Pleasure of the President**
Declaring Scheduled Area	Can declare any area as scheduled area	Role is **limited to consultation**
Amending Constitution	His assent to the bill is required	**No role** in a Constitutional Amendment Bill
Pardoning Power	Can pardon a death sentence/punishment by a court-martial	**Can't pardon** a death sentence, no role in affairs of military
Constitutional Discretionary Power	No Constitutional Discretion	Constitutional Discretion in **reserving a bill**, imposition of **President's rule** & **administrating an adjoining UT**
Condition of Impeachment	Violation of the Constitution	**No grounds laid**

CONSTITUTION (ONE HUNDRED AND THIRTIETH AMENDMENT) BILL, 2025

Context: Home Minister Amit Shah introduced the Constitution (One Hundred and Thirtieth Amendment) Bill, 2025 in Lok Sabha. It proposes changes to Articles 75, 164, and 239AA, dealing with removal of Ministers in Union, State, and UT governments.

Key Proposals:

- A Minister detained in custody for 30 consecutive days or more on charges punishable with ≥ 5 years imprisonment (including corruption/serious offences) shall be removed from office by the President/Governor/LG on advice of the PM/CM.
- If released, they can return to office.

Rationale

- Ministers hold higher responsibilities than legislators.
- Presently, RPA, 1951 disqualifies legislators only after conviction (≥2 years imprisonment).
- But for Ministers, mere prolonged detention in serious cases can create a governance vacuum.

Legal & Constitutional Issues

- Presumption of innocence vs. governance integrity:
  - Police must file a charge sheet within 60/90 days → court decides on bail or trial.
  - Critics argue "being in custody for 30+ days" is not proof of guilt.
- Supreme Court precedents:
  - Manoj Narula v. Union of India (2014): No bar on appointing persons with criminal cases, but PM/CM expected to act with constitutional morality.
  - Lily Thomas (2013): Disqualification of legislators on conviction cannot be delayed.

Earlier Recommendations

- Law Commission (1999, 2004, 2014): Suggested disqualification at framing of charges for heinous/serious crimes to curb criminalisation of politics.
- But Parliament has not acted yet.

About Removal of a Minister:

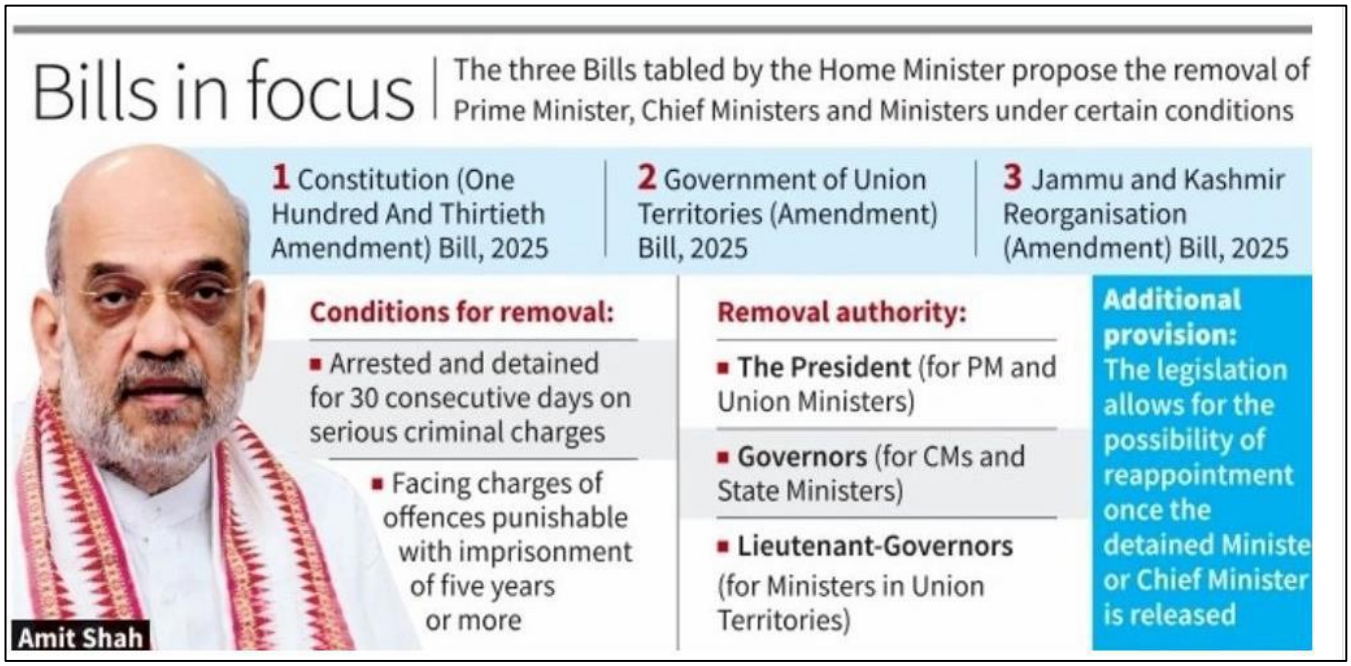
Constitutional Provisions

1. Article 75(2) & Article 164(2):
   - A Minister holds office during the pleasure of the President (Union) or Governor (State).
   - In practice, this means the Prime Minister/Chief Minister decides who stays in office.
2. Collective Responsibility (Art. 75(3) & 164(2)):
   - The entire Council of Ministers is collectively responsible to the Lok Sabha/State Assembly.
   - A Minister must resign if they lose the confidence of the House.
3. Disqualification by Constitution (Articles 102 & 191):
   - Minister ceases to be a member of Parliament/State Legislature if disqualified (on grounds like holding office of profit, unsound mind, insolvency, or allegiance to foreign state).
   - If a Minister is not an MP/MLA for 6 consecutive months, he/she cannot continue as a Minister.

Representation of the People Act (RPA), 1951

- Section 8 (Disqualification on conviction):
  - Conviction for certain offences (e.g., corruption, terrorism, heinous crimes) → disqualification from being MP/MLA.
  - Period: imprisonment of 2 years or more → disqualification during imprisonment + 6 years after release.
  - Supreme Court in Lily Thomas v. Union of India (2013) held that disqualification takes effect immediately upon conviction.
- Difference from Minister Removal:
  - RPA deals with disqualification as legislator, not directly as minister.

- But since a Minister must be an MP/MLA (or get elected within 6 months), conviction under RPA indirectly leads to removal from ministership.



NATIONAL ORGAN AND TISSUE TRANSPLANT ORGANISATION (NOTTO)

Context: The National Organ and Tissue Transplant Organisation (NOTTO) has directed that priority be given to women patients and relatives of deceased donors.

National Organ and Tissue Transplant Organisation (NOTTO)

- Established: Under the Directorate General of Health Services (DGHS), Ministry of Health & Family Welfare, Government of India.
- Legal Basis: Functions under the Transplantation of Human Organs and Tissues Act, 1994 (amended in 2011).
- Headquarters: Safdarjung Hospital, New Delhi.

Structure:

- NOTTO (National Level) – Apex body for organ donation and transplantation.
- ROTTOs (Regional Organ & Tissue Transplant Organisations) – 5 regional centers.
- SOTTOs (State Organ & Tissue Transplant Organisations) – State-level bodies.

Functions:

1. Policy & Coordination: Frame policies, coordinate between states/regions, and maintain uniformity in organ allocation.
2. National Registry: Maintain data on organ/tissue donation and transplantation.
3. Allocation System: Operates an online network for fair allocation of organs.
4. Awareness & Training: Conduct campaigns, capacity building, and training of transplant coordinators and medical staff.
5. Monitoring & Standards: Ensures adherence to legal-ethical standards; regulates retrieval and transplantation facilities.

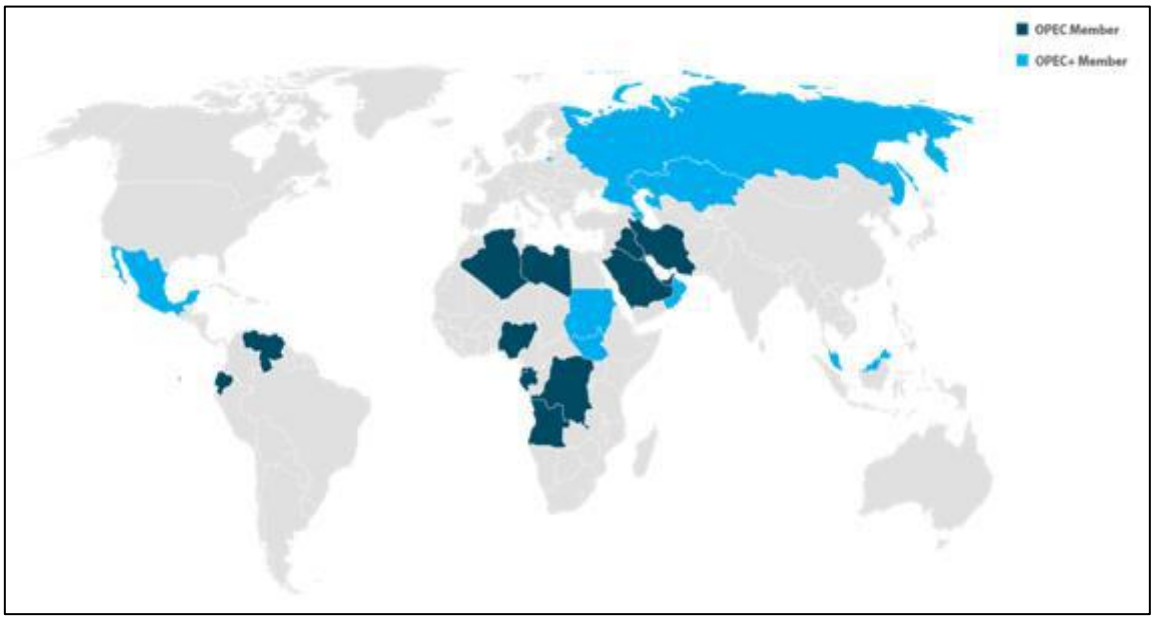
INTERNATIONAL RELATIONS

OPEC PLUS

Context : OPEC+ has agreed to significantly increase oil production by 547,000 barrels per day (bpd) starting September 2025.

About OPEC (Organization of the Petroleum Exporting Countries):

- Established: 1960
- Headquarters: Vienna, Austria
- Founding Members: Iran, Iraq, Kuwait, Saudi Arabia, Venezuela
- Current Members (13 countries) include:
  Saudi Arabia, Iraq, Iran, Kuwait, UAE, Venezuela, Nigeria, Libya, Algeria, Angola, Congo, Equatorial Guinea, and Gabon.
- Objectives: Coordinate and unify petroleum policies among member countries and ensure stable oil markets and fair prices for producers and consumers



About OPEC Plus:

- Formed: 2016 (informal coalition)
- Members: All 13 OPEC members + 10 non-OPEC oil-producing countries
- Key non-OPEC members: Russia, Kazakhstan, Mexico, Oman, Azerbaijan, etc.
- Purpose: Cooperate on oil production decisions to stabilize global oil markets and respond jointly to market crises (e.g., COVID-19 demand collapse, Russia-Ukraine conflict)

Key Differences:

Feature	OPEC	OPEC+
Members	13 (Only OPEC countries)	23 (OPEC + 10 non-OPEC countries)
Formation Year	1960	2016 (as a coordinated alliance)

Main Driver	Long-term oil policy coordination	Short-term cooperation on production levels

INTERNATIONAL POTATO CENTER

Context: The International Potato Center (CIP), based in Peru, is introducing bio-fortified potatoes enriched with iron to Indian markets, aiming to combat malnutrition and improve farmer livelihoods.

About International Potato Center (CIP):

- Established: 1971
- Headquarters: Lima, Peru
- Affiliation: A part of the CGIAR (Consultative Group on International Agricultural Research), a global research partnership for food security.

Primary Objectives:

- Conduct research and development on potatoes, sweet potatoes, and other Andean roots and tubers.
- Enhance food and nutrition security, especially in developing countries.
- Promote climate-resilient and bio-fortified crop varieties (e.g., iron-rich potatoes, vitamin A-rich sweet potatoes).

Key Functions:

- Develop disease-resistant, high-yielding, and nutrient-enriched varieties.
- Work with national governments, NGOs, and private sector for seed multiplication and distribution.
- Support farmers through capacity building, training, and better market integration.
- Address malnutrition via biofortification (e.g., vitamin A in sweet potatoes, iron in regular potatoes).

Role in India:

- Recently partnered with the Government of India to establish a South Asia Regional Centre near Agra, Uttar Pradesh.
- Already introduced bio-fortified sweet potatoes in states like Karnataka, Assam, West Bengal, and Odisha.
- Working closely with ICAR-Central Potato Research Institute and the Union Agriculture Ministry.

TARIFF WAR

Context: US President Donald Trump announced an extra 25% tariff on Indian imports as a penalty for buying Russian energy, adding to an existing 25% tariff. This makes Indian goods face a 50% tariff in the US.

About World Trade Organization (WTO) :

The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. It aims to ensure that international trade flows as smoothly, predictably, and freely as possible.

Historical Background

- 1944 – At the Bretton Woods Conference, there was an initial idea for an International Trade Organization (ITO) to complement the IMF and World Bank, but it never came into existence due to lack of ratification by the US Congress.
- 1947 – General Agreement on Tariffs and Trade (GATT) signed as a temporary arrangement to regulate international trade.
- 1948–1994 – GATT evolved through various negotiation rounds (notably the Uruguay Round).
- 1 January 1995 – WTO formally established, replacing GATT, as an outcome of the Uruguay Round (1986–94) negotiations.

Key functions

1. Administering WTO Agreements – Includes:
    - GATT 1994 – Trade in goods.
    - GATS – Trade in services.
    - TRIPS – Intellectual property rights.
2. Forum for Negotiations – Trade liberalization and new agreements.
3. Dispute Settlement Mechanism (DSM) – Through the Dispute Settlement Body (DSB), ensures prompt resolution of conflicts.
4. Monitoring and Review – Trade Policy Review Mechanism (TPRM) checks transparency of member states' policies.
5. Capacity Building – Technical assistance for developing and least-developed countries (LDCs).

Structure of WTO

- Ministerial Conference – Apex decision-making body, meets at least once every 2 years.
- General Council – Day-to-day decision-making; also acts as DSB and TPRB.
- Secretariat – Headquartered in Geneva, led by the Director-General.
- Specialized Councils & Committees – For goods, services, intellectual property, etc.

Membership

- 164 members (as of 2025) + observer nations.
- Decisions are generally by consensus (one member = one vote).

Dispute Settlement Mechanism (DSM)

- Unique, binding dispute settlement process.
- Steps: Consultations → Panel → Appellate Body → Implementation.
- Crisis – Appellate Body has been non-functional since Dec 2019 due to US blocking judge appointments.

Role for Developing Countries

- Special and Differential Treatment (S&DT) provisions: Longer time frames, lower commitments.
- Technical assistance & capacity building.
- However, developing countries (including India) have raised concerns over imbalance in negotiations, especially in agriculture and TRIPS.

Most-Favoured-Nation (MFN) Concept

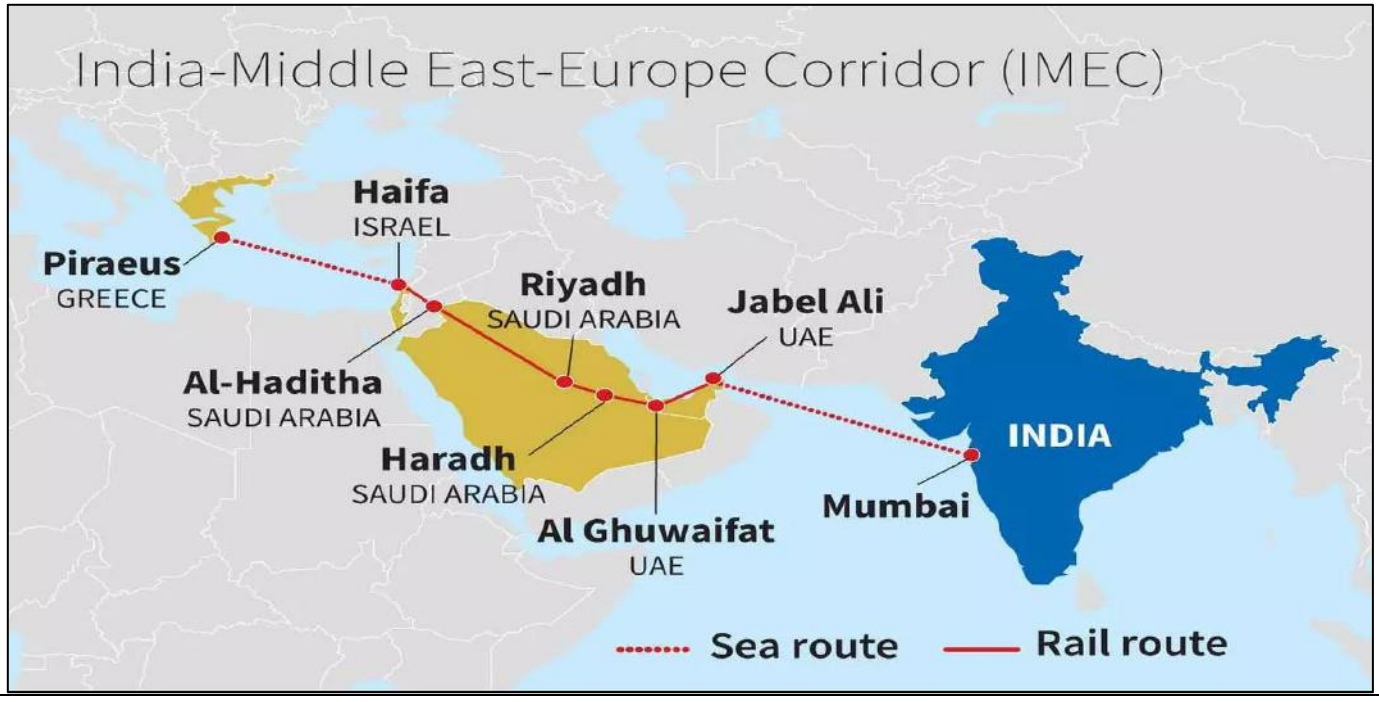
- Definition: Under the *Most-Favoured-Nation* principle of the WTO (Article I of GATT 1994), a member country must extend to all other members the same trade advantages (like reduced tariffs or improved market access) that it gives to its "most-favoured" trading partner.
- Core Idea: Non-discrimination in trade — no WTO member can be treated less favourably than another.
- Scope: Applies to trade in goods, services, and intellectual property.
- Exceptions:
  - Regional trade agreements (e.g., EU, ASEAN) under Article XXIV of GATT.
  - Special treatment for developing and least developed countries under the *Enabling Clause*.
  - Temporary measures for balance-of-payments protection or security concerns.
- Significance: Promotes fairness, prevents trade distortions, and creates a predictable multilateral trading environment.

INDIA–MIDDLE EAST–EUROPE ECONOMIC CORRIDOR (IMEC)

Context : Gaza War Delayed IMEC.

About India–Middle East–Europe Economic Corridor (IMEC):

- Announcement – Launched at the G20 Summit, New Delhi, September 2023 as part of the Partnership for Global Infrastructure and Investment (PGII).
- Members – India, Saudi Arabia, UAE, Jordan, Israel, European Union, USA.
- Structure – Two corridors:
  1. Eastern Corridor – Connects India to the Arabian Gulf.
  2. Northern Corridor – Connects the Arabian Gulf to Europe.
- Mode of Transport – Multimodal: rail, road, and shipping links.
- Key Aim – To boost trade, digital connectivity, clean energy transfer (green hydrogen), and supply chain resilience.
- Significance for India –
  - Strategic alternative to China's Belt and Road Initiative (BRI).
  - Enhances connectivity with Europe via Middle East bypassing Pakistan.
  - Strengthens ties with Gulf nations and EU.
- Challenges – Geopolitical tensions in West Asia, Israel–Palestine conflict, and funding issues.



INTERNATIONAL CRIMINAL COURT

Context : The United States, under President Donald Trump, imposed sanctions on two judges and two prosecutors of the International Criminal Court (ICC) for pursuing investigations against Israeli leaders and U.S. officials over alleged war crimes.

About International Criminal Court (ICC):

- Establishment: Created under the Rome Statute (1998); came into force in 2002. Headquartered at The Hague, Netherlands.
- Mandate: Prosecutes individuals (not states) for genocide, crimes against humanity, war crimes, and crime of aggression.
- Membership: 124 countries are parties; notable non-members include the U.S., China, Russia, and India.
- Jurisdiction: Acts only when national courts are unwilling or unable to prosecute. Can investigate crimes committed:
    1. In the territory of a member state, or
    2. By nationals of a member state, or
    3. Through UN Security Council referral.
- Structure: Composed of the Presidency, Judicial Divisions, Office of the Prosecutor, and Registry.
- Significance: Provides a permanent global mechanism for accountability in cases of mass atrocities; strengthens international justice.
- Criticism: Accused of political bias, selective justice (focus on African nations), lack of enforcement power, and non-universal acceptance.

Economy

THE BANKING LAWS (AMENDMENT) ACT, 2025

Context The Banking Laws (Amendment) Act, 2025 modernizes India's banking framework with key reforms in governance, compliance, audit, and investor protection.

Key Provisions:

1. Substantial Interest Threshold Revised:
    - Increased from ₹5 lakh to ₹2 crore or 10% of paid-up capital (whichever is lower).
    - Enhances transparency and updates disclosure norms.
2. Director Tenure in Cooperative Banks:
    - Maximum tenure (excluding chairpersons/full-time directors) raised from 8 years to 10 years.
    - Aligns with the 97th Constitutional Amendment for cooperative governance.
3. Unclaimed Assets to IEPF:
    - PSBs and SBI must now transfer unclaimed dividends, shares, and bond amounts to the Investor Education and Protection Fund (IEPF) after 7 years.
4. Audit Reforms in PSBs:
    - PSBs can now fix auditor remuneration independently.
    - Aims to strengthen audit independence and attract top-tier professionals.
5. Modernized Reporting to RBI:
    - Shifts from weekly (Friday) reporting to fortnightly/monthly/quarterly basis.
    - Reduces compliance burden and aligns with global norms.
6. Minimum Capital Requirement Raised:
    - Paid-up capital for new banking companies increased from ₹5 lakh to ₹2 crore.
7. Legal Coverage:
    - Amendments made to:
        - RBI Act, 1934
        - Banking Regulation Act, 1949
        - SBI Act, 1955
        - Banking Companies Acts of 1970 and 1980

Major Committees on Banking Reforms in India

Narasimham Committee I (1991) – Committee on Financial System

- Purpose: To reform the financial system post-liberalization.
- Key Recommendations:
    - Reduce Statutory Liquidity Ratio (SLR) and Cash Reserve Ratio (CRR).
    - Phase out priority sector lending gradually.
    - Recapitalize public sector banks (PSBs).
    - Set up Asset Reconstruction Funds.
- Impact: Initiated major banking sector liberalization and autonomy for RBI.

Narasimham Committee II (1998) – Committee on Banking Sector Reforms

- Purpose: To strengthen the banking system further.
- Key Recommendations:

    - Creation of stronger banks through mergers.
    - NPA management: Set up Asset Reconstruction Companies (ARCs).
    - Reduce government ownership in PSBs to under 33%.
    - Professionalize bank boards.
- Impact: Paved the way for Basel norms and banking consolidation.

Verma Committee (1999) – Committee on Weak Public Sector Banks

- Chairperson: M. S. Verma
- Purpose: Revive weak PSBs.
- Recommendations:
    - Clear performance benchmarks.
    - Incentivize performing employees.
    - Strengthen internal controls and MIS systems.

Tarapore Committee (1997 & 2006) – Capital Account Convertibility

- Purpose: Examine the feasibility of full capital account convertibility.
- Key Recommendations:
    - Fiscal consolidation, inflation targeting, and strong financial institutions as prerequisites.
    - Gradual liberalization of capital flows.
- Impact: Guided India's cautious approach to capital account openness.

Raghuram Rajan Committee (2008) – Financial Sector Reforms

- Official Name: Committee on Financial Sector Reforms
- Purpose: Propose a comprehensive roadmap for inclusive financial growth.
- Recommendations:
    - Open up banking licenses to private players.
    - Encourage financial inclusion and small banks.
    - Strengthen financial literacy.
- Impact: Influenced new bank licensing policy and payments banks framework.

Nachiket Mor Committee (2013) – Financial Inclusion

- Purpose: Promote financial access for the underserved.
- Key Recommendations:
    - Establish Payments Banks and Wholesale Banks.
    - Universal access to bank accounts by 2016.
- Impact: Led to RBI issuing licenses for Payments Banks.

P. J. Nayak Committee (2014) – Governance of Bank Boards

- Purpose: Improve governance in PSBs.
- Recommendations:
    - Set up Bank Investment Company (BIC) as a holding company for PSBs.
    - Reduce government interference in appointments and operations.
    - Board-level reforms and enhanced autonomy.
- Impact: Influenced discussions on PSB privatization and governance reforms.

INITIAL PUBLIC OFFERING (IPO)

Context : Lenskart, a major eyewear unicorn, is preparing for a ₹2,150 crore IPO after becoming profitable in FY25.

Key Trends:

- Worsening Eye Health:
  Refractive errors among children have surged (from 21% in FY20 to 39% in FY25 for under-19s). For all ages, it's expected to hit 62% by FY30.
- Causes:
  Excessive screen time, reduced outdoor play, poor lighting, and incorrect posture are primary contributors.

Key Terminologies:

- IPO (Initial Public Offering): The process by which a private company offers its shares to the public for the first time and becomes a publicly listed company on a stock exchange.
- DRHP (Draft Red Herring Prospectus): A preliminary document submitted to SEBI (Securities and Exchange Board of India) containing details about the company's business, financials, risks, and purpose of the IPO. It invites public feedback before the final prospectus.
- Red Herring Prospectus (RHP): The final version of the DRHP that includes the issue price and other final details. It is filed before the IPO opens for subscription.
- Fresh Issue: New shares issued by the company to raise capital. The money goes directly to the company and is often used for expansion, debt repayment, etc.
- Offer for Sale (OFS): Shares sold by existing shareholders (e.g. promoters, venture capitalists) as part of the IPO. The proceeds go to the selling shareholders, not the company.
- Book Building: A price discovery mechanism where investors bid within a price band, and the final issue price is decided based on demand.
- Price Band: The range within which investors can place their bids. The upper and lower limits are set by the issuer.
- Lot Size: The minimum number of shares that can be applied for in an IPO. Investors must bid in multiples of the lot size.
- Underwriters: Financial institutions that manage the IPO process, ensure regulatory compliance, and often guarantee the sale of a certain number of shares.
- Listing: The process of getting the company's shares admitted to trade on a stock exchange (like NSE or BSE in India) after the IPO is complete.

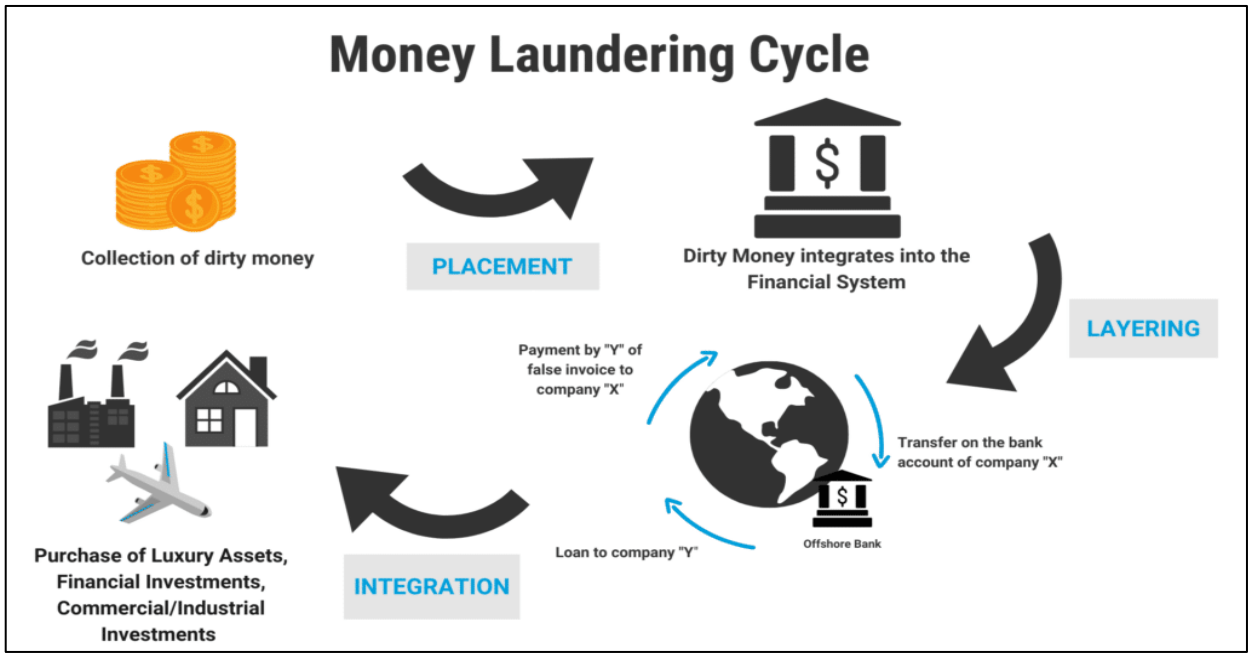
MONEY LAUNDERING

Context: Since 2015, 5,892 cases under the Prevention of Money Laundering Act (PMLA) have been reported, but only 15 convictions have occurred.

About Money Laundering:

- Definition: Money laundering refers to the process of disguising illicitly obtained money through financial systems to make it appear legitimate. It is often done by organized crime syndicates.
- Challenges in Enforcement: The lack of convictions and slow enforcement suggest issues with the legal framework. The government has struggled to implement stringent measures, with some areas being overlooked, such as the proper registration of cases and investigations into suspicious financial activities.

- Double Taxation Avoidance Agreement (DTAA): India has signed DTAA with over 80 countries, which helps track illicit financial flows, although it has not fully addressed money laundering concerns. The framework needs stronger enforcement, particularly in combating terror financing and other financial crimes.
- Court Ruling: A 2022 ruling emphasized that property registration under Section 3 of PMLA is necessary for the prosecution of money laundering cases.



Prevention of Money Laundering Act (PMLA), 2002

The Prevention of Money Laundering Act (PMLA) was enacted by the Government of India in 2002 to combat money laundering and related crimes. The primary objective of the PMLA is to prevent money laundering, track illicit financial flows, and seize assets acquired through illegal means.

Key Provisions:

1. Money Laundering Definition: The act defines money laundering as the process of concealing the origins of illegally obtained money, typically through complex financial transactions to make it appear legitimate.
2. Enforcement Directorate (ED): The Enforcement Directorate, a government agency, is tasked with investigating offenses related to money laundering under PMLA. It can attach properties derived from proceeds of crime.
3. Attachment and Confiscation of Property: The PMLA allows authorities to attach properties linked to criminal activities and, after investigation, confiscate them if the accused is found guilty of money laundering.
4. Proceeds of Crime: The act defines 'proceeds of crime' as any property derived from criminal activities, such as corruption, tax evasion, drug trafficking, and terrorism financing.
5. Prevention and Investigation: PMLA mandates financial institutions and professionals to report suspicious transactions, which aids in the prevention of laundering activities. The act empowers investigative agencies to conduct searches, seize assets, and arrest individuals involved in money laundering.

6. Punishment: Money laundering is a serious offense, with penalties including imprisonment for up to seven years and substantial fines. If proven, the maximum punishment can be extended based on the severity of the crime.

Recent Amendments:

- The act was amended in 2019 to widen the scope of money laundering offenses and enhance the powers of investigating agencies. These amendments include the provision of faster attachment of properties and stricter punishments for economic offenses.

SMALL FINANCE BANKS

Context : The Reserve Bank of India has given in-principle approval for AU Small Finance Bank (AU SFB) to transition into a universal bank.

Small Finance Bank (SFB) – Brief Note

- Origin & Recommendation – The idea of SFBs was recommended by the Usha Thorat Committee (2014), constituted by the RBI to explore new models of financial inclusion. It suggested creating niche banks to serve small business units, small and marginal farmers, micro and small industries, and other unorganised sector entities.
- Related Committees –
  - Usha Thorat Committee (2014) – Recommended SFBs.
  - Nachiket Mor Committee (2013) – Recommended differentiated banking structure, including Payments Banks.
- Purpose – To provide credit and savings facilities to underserved and unbanked sections, with a focus on priority sector lending.
- Key Features –
  - Minimum 75% of Adjusted Net Bank Credit (ANBC) must be given to the priority sector.
  - At least 50% of loans should be up to ₹25 lakh.
  - Must be registered as a public limited company under the Companies Act, 2013 and licensed under Section 22 of the Banking Regulation Act, 1949.
  - Minimum paid-up equity capital: ₹200 crore.
- Examples – AU Small Finance Bank, Equitas Small Finance Bank, Ujjivan Small Finance Bank, Jana Small Finance Bank.

Universal Bank:

- Purpose: Offer a full range of banking and financial services — retail, corporate, investment banking, insurance, mutual funds — under one roof without many of the restrictions applicable to niche banks.
- Regulation: Licensed under RBI's universal bank guidelines.
- Scope: Broader operational freedom, larger customer base, and wider product portfolio compared to SFBs.
- Example: State Bank of India, HDFC Bank, ICICI Bank.

Key Difference:

- SFBs are targeted, inclusion-driven banks with lending restrictions and high priority sector requirements.

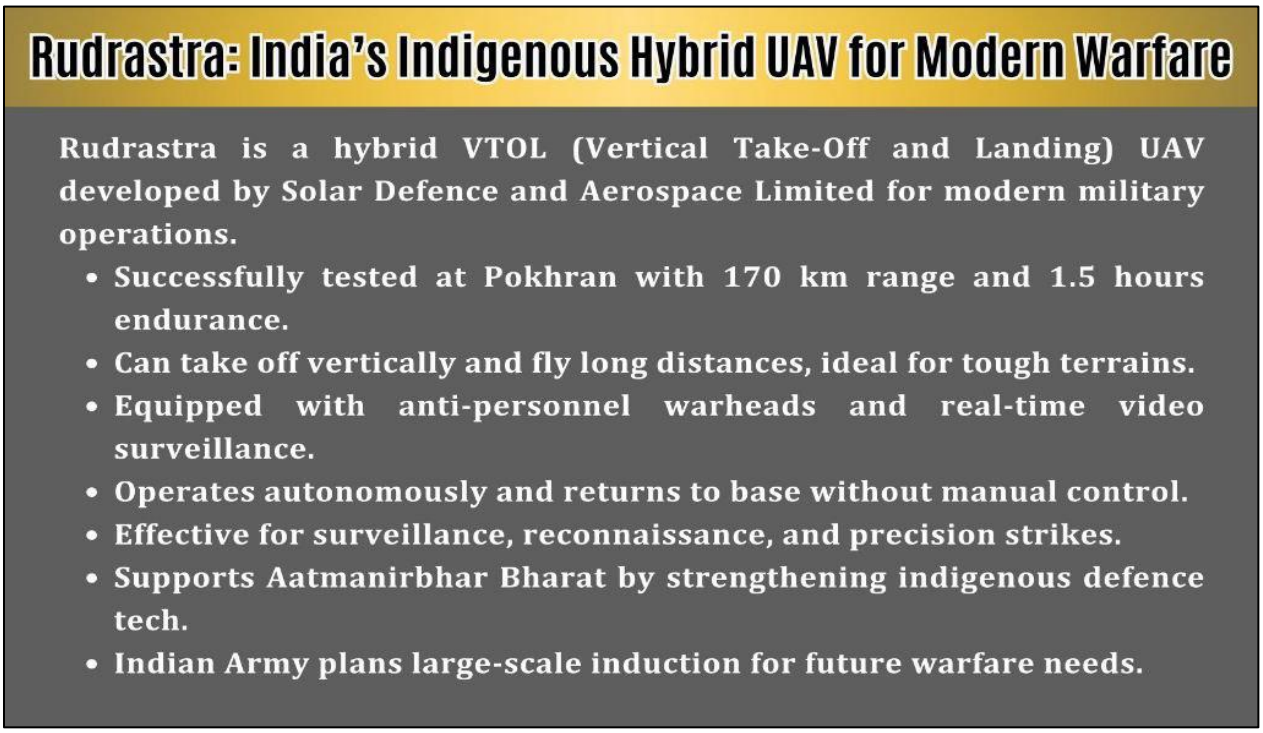
- Universal banks have diversified operations and fewer restrictions, enabling them to serve all segments extensively.

RUDRASTRA

Context: Indian Railways has successfully conducted a trial run of Asia's longest freight train, 'Rudrastra', measuring 4.5 km in length with 345–354 wagons.

Key features:

- Length: 4.5 km
- Wagons: 345–354, each carrying 72 tonnes
- Engines: 7 in total—two at the front and one after every 59 wagons
- Formation: Multiple long-haul rakes coupled end-to-end
- Route: Pandit Deendayal Upadhyaya Division to Dhanbad Division



Significance:
The experiment aims to boost freight efficiency by moving massive cargo volumes in one journey, reducing fuel use per tonne, easing rail congestion, and lowering bulk transport costs—marking a major step in India's freight logistics capacity.

Major New Train Categories

Vande Bharat Express (Semi-High-Speed)

- Speed: Up to 160 km/h.
- Features: Fully air-conditioned, GPS-based passenger information, automatic doors, bio-vacuum toilets, and improved seating comfort.
- Recent Expansions: New routes have been launched across states including the North-East, coastal regions, and major pilgrimage circuits.
- Variants:
    - Vande Bharat Sleeper: For overnight journeys.

- Mini Vande Bharat: 8-coach configuration for low-demand routes.

Amrit Bharat Express *(Economical Yet Modern)*

- Purpose: Affordable travel with improved speed and comfort for common passengers.
- Features: Push-pull locomotion for faster acceleration, cushioned seats, improved luggage racks, bio-toilets, and automatic sliding doors.
- Speed: 130 km/h.
- Target Audience: Long-distance budget travelers in both reserved and unreserved classes.

Vande Metro *(Regional & Suburban Connectivity)*

- Purpose: High-frequency short-distance travel between cities (within 100–250 km).
- Features: Quick acceleration, multiple daily trips, modern interiors, and standing passenger space.
- Status: First services expected between major metro-adjacent cities like Delhi–Meerut, Mumbai–Pune, and Chennai–Bengaluru suburbs.

Bharat Gaurav Tourist Trains *(Theme-Based Tourism)*

- Objective: Promote cultural and heritage tourism.
- Themes: Ramayana Circuit, Buddhist Circuit, North-East Discovery, Desert Circuit, etc.
- Features: Onboard catering, guided tours, and accommodation packages.

Technological & Safety Improvements

- Kavach: Indigenous train collision avoidance system.
- Energy Efficiency: Shift to electric traction on more routes to reduce emissions.
- Passenger Comfort: Ergonomic seating, automatic lighting, and mobile charging points at every seat.

STAGFLATION

Context : U.S. stagflation fears (slow growth + high inflation) are unnerving global markets as 70% of global investors (BofA Global Research, August survey) expect stagflation in the next 12 months.

Global Impact

1. Bonds
   - Persistent inflation erodes value of long-dated bonds.
   - If U.S. stagflation persists, G7 bond markets will be correlated → global sell-off in bonds.
   - Pension funds and insurers especially vulnerable to inflation.
2. Wall Street
   - Investors expect U.S. growth to slow.
   - Stagflation is now one of the two main concerns for global asset managers.
   - Tech stocks remain strong, but small-cap indices are vulnerable.
3. Currencies
   - Stagflation → weaker U.S. dollar due to slower growth + higher inflation.
   - Could benefit euro in relative terms.
4. Global Spillover
   - Since 1990, world stocks fell by ~15% whenever U.S. manufacturing data showed contraction + high prices.

- Even if stagflation is U.S.-centric, ripple effects will hit global portfolios.

Concepts of Inflation

Concept	Key Feature	Example
Demand-Pull Inflation	Excess demand pushes prices up ("too much money chasing too few goods")	Festive season demand in India
Cost-Push Inflation	Higher production costs passed to consumers	Oil price hike → transport cost rise
Stagflation	Stagnant growth + high unemployment + high inflation	U.S. in 1970s oil crisis
Core Inflation	Excludes food & fuel (volatile items)	RBI tracks for monetary policy
Headline Inflation	Overall CPI including all items	Retail inflation data released monthly
Creeping Inflation	Slow rise (1–3% annually)	Normal inflation in stable economies
Walking/Mild Inflation	Moderate rise (3–10% annually)	Growing economy with healthy demand
Galloping/Hyperinflation	Very high inflation (triple digits)	Zimbabwe in 2000s, Germany in 1920s
Disinflation	Decline in *rate* of inflation (prices still rise but slower)	CPI falling from 6% → 4%
Deflation	Fall in general price levels (negative inflation)	Great Depression (1930s)
Reflation	Policy-driven inflation to boost demand	Fiscal stimulus packages
Imported Inflation	Inflation caused by global price rise in imports	India's fuel-driven inflation

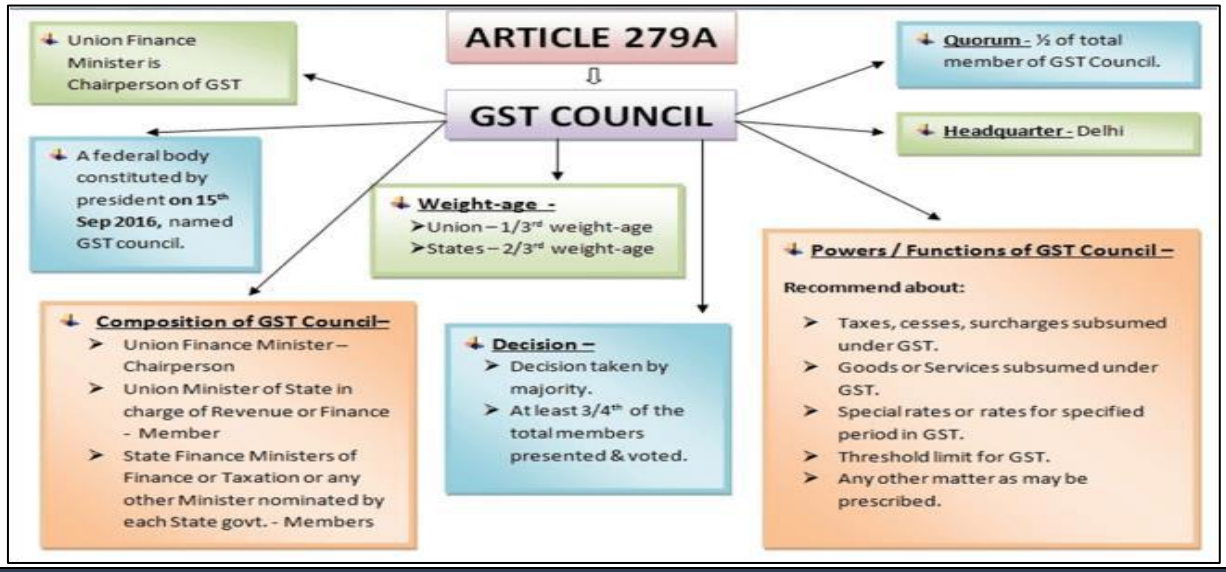
GST REFORMS

Context : S&P Global Ratings has noted that India's planned GST reforms, despite lowering tax rates and causing an initial revenue loss, are expected to boost long-term revenues by driving higher consumption.

About GST Council:

- Constitutional Body: Established under Article 279A of the Constitution (via the 101st Constitutional Amendment Act, 2016).
- Composition:
  - Chairperson: Union Finance Minister

  - Members: Union Minister of State (Finance/Revenue) + Finance Ministers of all States & UTs with legislatures.
- Decision-Making:
  - Decisions taken by 75% majority of weighted votes:
    - Centre: 1/3rd weightage
    - States: 2/3rd weightage
- Functions:
  - Recommend GST rates, exemptions, thresholds, model laws, and special provisions for states.
  - Decide on revenue sharing, dispute resolution, and simplification of compliance.
- Importance:
  - Acts as a federal forum of cooperative federalism, ensuring consensus between Centre and States on indirect taxation.
  - Key in GST rationalization, rate cuts, and reforms like e-way bills and e-invoicing.



GREENFIELD AIRPORTS

Context:

- The Andhra Pradesh government has drawn up plans to develop greenfield airports at Srikakulam, Bhogapuram, Tuni–Annavaram, Tadepalligudem, Ongole, Dagadarthi, Kuppam, etc.

About Greenfield Projects:

- A greenfield airport is a new aviation facility built from scratch on previously undeveloped land.
- India's first Greenfield airport built in the northeastern region is Pakyong Airport, located in Sikkim.
- The development of Greenfield airports is regulated by the Greenfield Airports (GFA) Policy, 2008.
- As per the Policy, a State Government or an Airport Developer, willing to establish an airport is required to send a proposal to the Ministry of Civil Aviation (MoCA) for 2-stage approval i.e. 'Site-Clearance' followed by 'In-Principle' approval.

Advantages of Greenfield Projects:

- Engineers do not have to spend time tearing down old buildings, making the construction process faster and more efficient.
- Enhances regional and international air travel.
- Helps decongest existing airports in urban areas.
- Encourages investment and trade in surrounding regions.
- Can be planned with eco-friendly measures like green energy and sustainable construction.

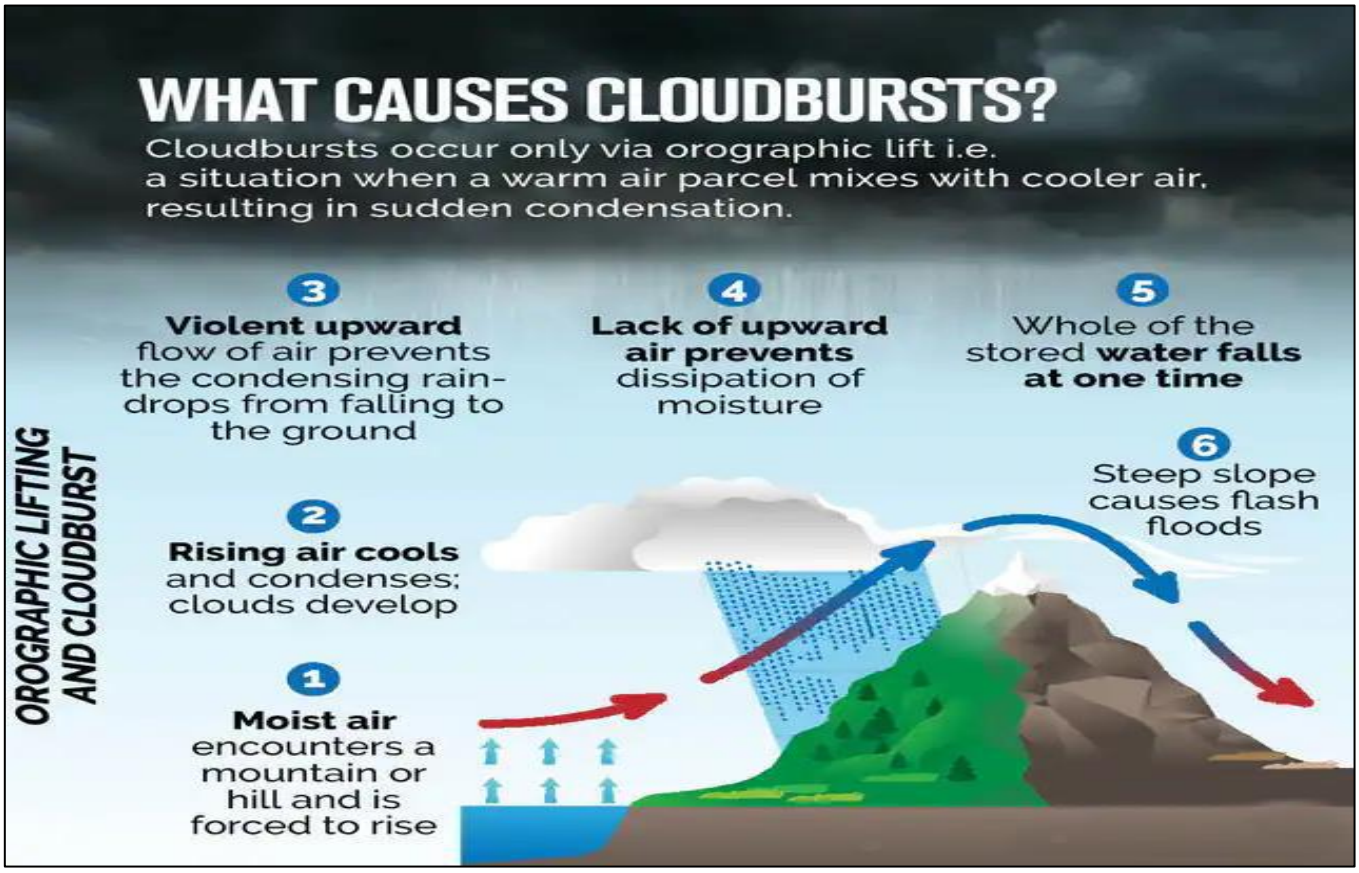
GEOGRAPHY

CLOUDBURST

Context: The Uttarkashi flash flood site in Dharasu-Gangotri stretch lies in the Bhagirathi Eco-Sensitive Zone (ESZ), a protected area established in 2012 to safeguard the Ganga river's ecology. Experts believe unregulated construction, especially on river floodplains, worsened the disaster's impact. Over 600 people are reported missing.

About Cloudburst:

"A cloudburst is an extreme weather event in which very heavy rainfall occurs over a localized area in a very short duration, typically at a rate of 100 mm per hour or more."



Key Features as per NDMA:

- High Intensity: ≥ 100 mm of rainfall in an hour.
- Localized Area: Usually within a few square kilometers.
- Short Duration: Often less than an hour.
- Common in Mountains: Especially in the Himalayas due to orographic lifting.
- Potential Impacts: Flash floods, landslides, debris flows, and severe damage to life and infrastructure.

Mechanism of cloudburst:

- During the monsoon, the ground—especially in the plains and foothills—heats up quickly. This causes the warm, moisture-laden air to rise rapidly into the atmosphere. As the air ascends, it cools and the moisture begins to condense into clouds.
- In hilly terrains such as the Himalayas or the Western Ghats, rising air is further forced upwards when it encounters steep mountain slopes.
- This phenomenon is known as orographic lifting, and it accelerates the cooling and condensation process, forming dense clouds saturated with moisture.
- Once the clouds become too heavy with condensed water droplets, and the upward-moving air currents (called updrafts) can no longer support them, the water is released suddenly.
- This results in intense rainfall within minutes, which distinguishes cloudbursts from normal rain.

Reasons for frequent climate disasters in Himalayas:

- The Hindu Kush Himalayas, known as the "Water Tower of Asia", are highly sensitive to climate fluctuations.
- Rising temperatures cause glaciers to melt and increase the amount of atmospheric moisture.
- Warmer air holds more water vapour approximately 7 per cent more for every degree Celsius of warming. This extra moisture often results in intense, localised rainfall events, like cloudbursts, which are sudden, intense downpours over small areas.
- Recent studies have shown that cloudburst incidents in the Hindu Kush Himalayas have increased in frequency and intensity over the past few decades.
- The changing climate has destabilised weather patterns, making monsoon rains more erratic.
- The terrain also amplifies these effects, as steep slopes and loose soil make landslides more likely, while narrow valleys funnel floodwaters into villages, causing sudden and severe damage.

Way forward:

- Strengthen Early Warning System: Use AWS and advanced weather models to predict extreme weather in advance.
- Restore natural vegetation: India must embrace ecological solutions such as restoring wetlands, mangroves, and natural sponge zones that absorb floodwaters and reduce runoff.
- Reforestation in areas that are already facing soil erosion or have lost greenery need urgent attention.
- Empowering Local Communities: by training locals in disaster preparedness, especially in hill and rural areas.

PERITO MORENO GLACIER

Context: The Perito Moreno Glacier in Argentina, long known for its stability, is now thinning rapidly since 2019, raising fears of irreversible retreat.

Major Glaciers of the World

Glacier	Location	Notable Facts
Lambert Glacier	East Antarctica	World's largest glacier (~400 km long, ~100 km wide).
Pine Island & Thwaites Glacier	West Antarctica	Rapidly melting, major contributors to sea-level rise.

Hubbard Glacier	Alaska, USA	North America's largest tidewater glacier (~122 km long).
Baltoro Glacier	Pakistan (Karakoram)	~63 km long, near K2; important for Indus basin.
Siachen Glacier	India/Pakistan (Karakoram)	Highest battlefield in the world (~76 km² under Indian control).
Perito Moreno Glacier	Argentina (Patagonia)	Famous for stability; now thinning rapidly.
Fedchenko Glacier	Tajikistan (Pamir Mountains)	Largest in the world outside polar regions (~77 km long).
Jakobshavn Glacier	Greenland	Fastest-moving glacier; major iceberg producer.

Major Glaciers in India

Glacier	Location	Notable Facts
Siachen Glacier	Ladakh (Karakoram)	Strategic location; source of Nubra River.
Gangotri Glacier	Uttarakhand (Garhwal Himalaya)	Source of Bhagirathi River, major Ganga tributary.
Zemu Glacier	Sikkim (Kangchenjunga region)	Largest in Eastern Himalayas.
Dokriani Glacier	Uttarakhand	Monitored for climate change impacts.
Pindari Glacier	Uttarakhand (Kumaon Himalaya)	Popular trekking destination; source of Pindar River.
Milam Glacier	Uttarakhand	Source of Goriganga River.
Chhota Shigri Glacier	Himachal Pradesh (Lahaul Valley)	Well-studied for glacial retreat trends.
Kolhai Glacier	Jammu & Kashmir (Lidder Valley)	Largest in Kashmir Himalaya.
Drang-Drung Glacier	Ladakh (Zanskar)	Source of Stod River.

Prelims Pointers

- Longest glacier in the world: Lambert Glacier (Antarctica).
- Longest glacier outside polar regions: Fedchenko Glacier (Tajikistan).
- Largest glacier in India: Siachen Glacier (~76 km).
- Climate change impact: Himalayan glaciers retreating faster than global average (WMO reports).

Environment and Ecology

POLLUTION CONTROL BOARDS

Context: The Supreme Court has ruled that Pollution Control Boards (PCBs) have the authority to impose and collect restitutionary and compensatory damages to restore polluted air and waterbodies to their original state. This power is derived from Sections 33A and 31A of the Water and Air Acts, respectively.

Pollution Control Boards (PCBs):

Pollution Control Boards (PCBs) are statutory bodies established under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 to prevent, control, and abate pollution in India. There are two main types:

- Central Pollution Control Board (CPCB) – Functions at the national level under the Ministry of Environment, Forest, and Climate Change.
- State Pollution Control Boards (SPCBs) – Function at the state level.

Key Functions:

- Monitor and regulate pollution levels in air and water.
- Grant or revoke consent to industries for discharge of pollutants.
- Enforce environmental laws and standards.
- Promote pollution abatement technologies.
- Advise governments on environmental matters.

RHISOTOPE PROJECT

Context: To combat rhino poaching, scientists in South Africa have begun injecting radioactive isotopes into rhino horns as part of the Rhisotope Project. Developed by the University of the Witwatersrand and supported by the IAEA, this method makes horns detectable at borders and toxic for human use without harming the animals.

About Rhinos:

Rhinoceroses (Rhinos) are large, herbivorous mammals known for their thick skin and prominent horns. They are native to parts of Africa and Asia and are among the world's most endangered animals due to habitat loss and poaching for their horns, which are falsely believed to have medicinal value.

Key Species:

1. **African Rhinos:**
    - White Rhino (Ceratotherium simum) – Larger, with a broad mouth for grazing.
    - Black Rhino (Diceros bicornis) – Smaller, hook-lipped for browsing shrubs.
2. **Asian Rhinos:**
    - Indian Rhino (Rhinoceros unicornis) – Also called the Great One-Horned Rhino, mostly found in Kaziranga National Park, Assam.
    - Javan Rhino – Critically endangered, found in Indonesia.

- Sumatran Rhino – Smallest and most endangered, with only a few dozen individuals left.

Conservation Status:

- Most species are endangered or critically endangered (IUCN Red List).
- Protected under CITES Appendix I, banning international trade in rhino horns.
- Conservation efforts include habitat protection, anti-poaching laws, and rhino translocation programs.

Threats:

- Poaching for horns, primarily driven by demand in Asia.
- Loss of habitat due to agriculture and urban development.
- Weak law enforcement and illegal wildlife trade networks.

GLOBAL PLASTICS TREATY

Context: Over 190 countries are meeting in Geneva, Switzerland, for the 5th round of talks (INC-5) under the UN Intergovernmental Negotiating Committee to finalize a legally binding Global Plastics Treaty.

About Global Plastics Treaty:

The Global Plastics Treaty is a proposed legally binding international agreement under negotiation by the United Nations Intergovernmental Negotiating Committee (INC) to address the full lifecycle of plastics—from production to disposal.

Background:

- Initiated by a resolution at the UN Environment Assembly in Nairobi (2022).
- Aims to tackle the growing plastic pollution crisis, which threatens ecosystems, human health, and economies.
- The process is being coordinated through a series of negotiation rounds called INC-1 to INC-5.

Objectives:

- To cap and reduce plastic production.
- Eliminate harmful chemicals in plastic products.
- Strengthen recycling and waste management systems.
- Promote a circular economy and sustainable alternatives.
- Hold producers accountable through extended producer responsibility (EPR).

Global Significance:

- Plastic waste has more than doubled in two decades.
- Production is projected to triple by 2060 under a business-as-usual scenario (OECD).
- The treaty is considered as significant as the 2015 Paris Climate Agreement for its potential environmental impact.

Challenges:

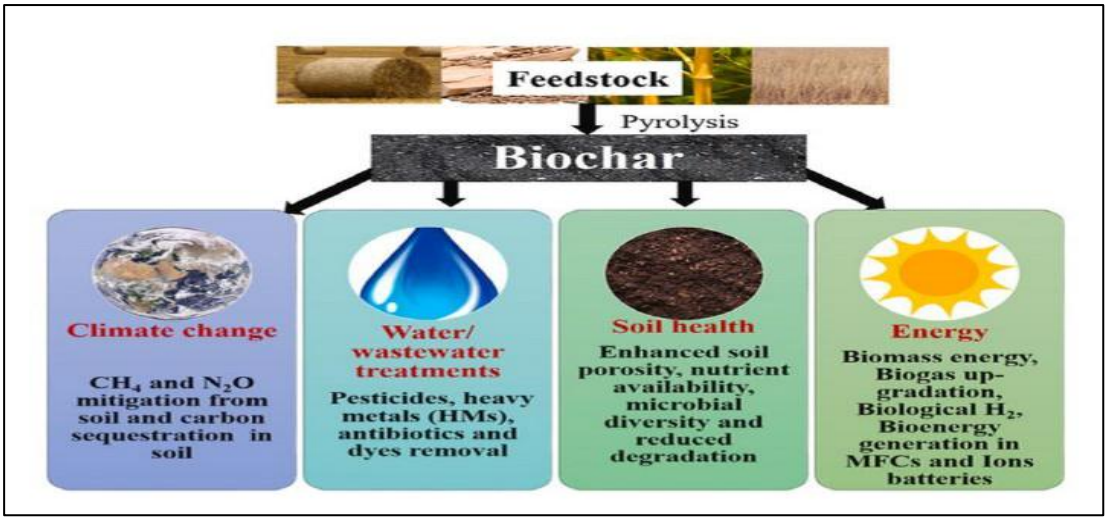
- Disagreements on binding commitments, especially production caps.
- Divergence between developed and developing countries on responsibility and financing.
- Influence of the petrochemical and plastics industry.

BIOCHAR

Context : With the upcoming Indian carbon market in 2026, biochar — a carbon-rich product made from agricultural and municipal waste — is gaining importance. When used effectively, biochar can sequester carbon for 100–1,000 years, improve soil fertility, and serve as a long-term carbon sink.

Biochar:

Biochar is a carbon-rich material produced by the pyrolysis (heating in low oxygen) of organic waste like crop residues, wood chips, and municipal waste. It is used primarily as a soil amendment and has significant climate mitigation potential.



Key Benefits:

- Sequesters carbon for hundreds to thousands of years, acting as a long-term carbon sink.
- Improves soil fertility, water retention, and microbial activity.
- Reduces methane and nitrous oxide emissions from soils.

- Can be used in wastewater treatment, construction materials, and energy generation (via byproducts like syngas and bio-oil).

Biochar's Potential in India:

- India produces 600+ million metric tonnes of agricultural waste and 60+ million tonnes of municipal solid waste annually.
- Using just 30–50% of surplus waste could yield 15–26 million tonnes of biochar, removing up to 0.91 gigatonnes of CO_2 equivalent annually.
- Byproducts like syngas and bio-oil can be used for electricity and fuel.
- Biochar can treat wastewater, reduce pollution, and be used in construction and agriculture.

Challenges to Large-Scale Adoption:

- Limited resources, technological barriers, market uncertainties, and weak policy support.
- Lack of awareness, monitoring, and verification frameworks.
- Underrepresentation in carbon credit systems.

SUNFLOWER SEA STAR

Context: Mystery of 5 billion Starfish Deaths Solved.

Key Highlights:

Over 12 years, more than 5 billion starfish along the Pacific coast of North America died from sea star wasting disease (SSWD), marked by lesions, limb loss, and body disintegration. The worst hit was the sunflower sea star, with population losses of up to 90%. As a keystone predator, its disappearance triggered sea urchin population booms, devastating kelp forests.

Discovery Journey

- Early studies suspected a virus (*densovirus*), but it proved unrelated.
- Researchers shifted focus to the coelomic fluid of starfish instead of tissue samples.
- Experiments showed that boiling the infected fluid removed the disease-causing agent, indicating a bacterium.

About Sunflower Sea Star (Pycnopodia helianthoides):

- Description: One of the largest and fastest-moving sea stars found along the Pacific coast of North America, with up to 24 arms resembling sunflower petals.
- Ecological Role: A keystone predator that regulates sea urchin populations, helping maintain the health of kelp forest ecosystems.
- Significance: Its predation controls sea urchin overgrazing, which otherwise devastates kelp habitats vital for marine biodiversity.
- Threats: Severely impacted by Sea Star Wasting Disease (SSWD) since 2013, with population declines exceeding 90% in some areas.
- Conservation Status: Considered critically endangered in several regions due to disease and environmental stressors.
- Recovery Efforts: Ongoing research focuses on disease mitigation, captive breeding, and habitat restoration to revive populations and preserve ecosystem balance.

CAFE NORMS

Context: The government has drafted rules to penalise automakers exceeding fleet-level emission norms under the Energy Conservation (Amendment) Act, 2022.

Key Features

- Authority: Bureau of Energy Efficiency (BEE) to monitor compliance with Corporate Average Fuel Efficiency (CAFE) norms and report violations to State Electricity Regulatory Commissions (SERCs) for adjudication.
- Penalties:
  - Excess of 0–4.7g/km CO_2: ₹25,000 per vehicle sold.
  - Excess above 4.7g/km CO_2: ₹50,000 per vehicle sold.
  - Base penalty: ₹10 lakh for administrative breaches.
- Funds: 90% of penalties go to states via the Energy Conservation Fund.
- Dispute Resolution: SERC where automaker's registered office is located.

Policy Context

Previously, no clear penalty process existed. New rules, effective January 2023, replace earlier lighter fines. Industry seeks non-retroactive application and broader recognition of hybrid, ethanol, and CNG vehicles.

Significance

The framework strengthens enforcement, accelerates cleaner vehicle adoption, and aligns with India's emission-reduction goals, while sparking debate over competitiveness and transition timelines.

Schemes to Prevent Automotive Emissions in India

Bharat Stage Emission Standards (BS Norms)

- India's emission standards modeled after European norms.
- Currently at BS VI (since April 2020), drastically reducing pollutants like NOx, PM, and hydrocarbons.
- Mandates cleaner fuels and advanced vehicle technologies.

Faster Adoption and Manufacturing of Hybrid & Electric Vehicles (FAME)

- Promotes adoption of electric and hybrid vehicles via subsidies, incentives, and infrastructure development.
- FAME-II (since 2019) focuses on demand creation, charging infrastructure, and supporting EV manufacturing.

Energy Conservation (Compliance Enforcement) Rules, 2025

- Empowers Bureau of Energy Efficiency (BEE) to monitor and penalize automakers exceeding emission norms.
- Penalties imposed based on carbon emission excess per vehicle.

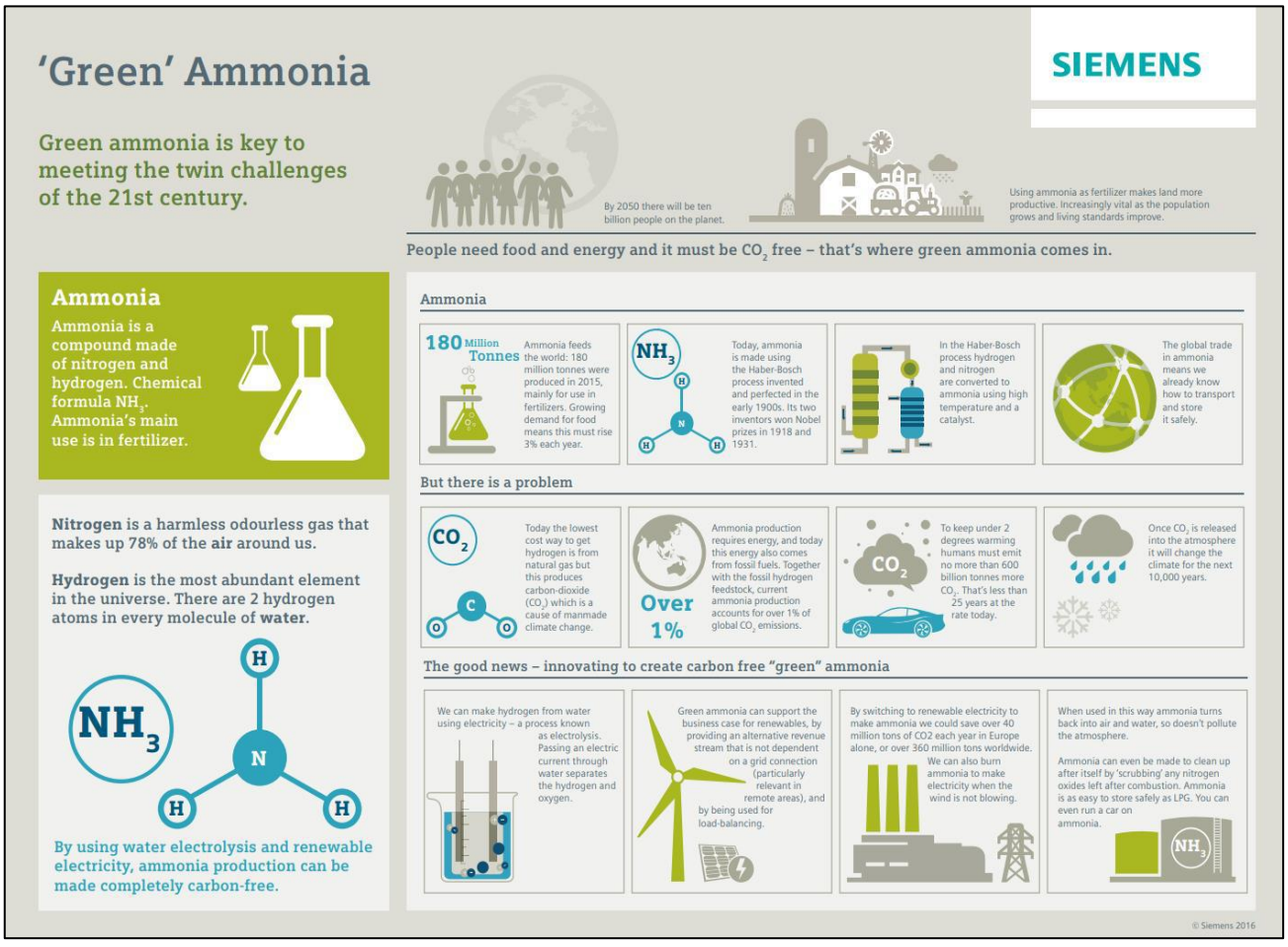
GREEN AMMONIA

Context: The Solar Energy Corporation of India (SECI) held its first auction for Green Ammonia under the SIGHT Scheme (Mode-2A) of the National Green Hydrogen Mission (NGHM).

About Green Ammonia:

Definition: Green ammonia is ammonia (NH_3) produced using renewable energy sources instead of fossil fuels. The key difference lies in the hydrogen source:

- In conventional (grey) ammonia, hydrogen is derived from natural gas via steam methane reforming (SMR), emitting CO_2.
- In green ammonia, hydrogen is produced via electrolysis of water using renewable electricity (solar, wind, hydro), and then combined with nitrogen from the air through the Haber–Bosch process.
- For green ammonia, H_2 comes from renewable-powered electrolysis.



Why Green Ammonia is Important

1. Climate Goals:
    - Ammonia production accounts for ~1-2% of global CO_2 emissions (due to fossil-based hydrogen).
    - Green ammonia production can be nearly carbon-free.
2. Energy Transition:
    - Supports decarbonisation in hard-to-abate sectors like shipping and fertilizers.
3. Energy Storage & Transport:
    - Easier to store and transport than hydrogen gas.

- Can be shipped in liquid form at moderate pressures and temperatures.

Production Pathway

1. Electrolysis: Renewable power splits water into hydrogen and oxygen.
2. Air Separation: Nitrogen extracted from air.
3. Haber–Bosch Process: Hydrogen and nitrogen react under high temperature and pressure with an iron-based catalyst to form ammonia.

Challenges

- Cost: Currently more expensive (~2–4x) than grey ammonia, but falling rapidly.
- Infrastructure: Requires retrofitting of fertilizer plants and bunkering facilities.
- Energy Intensity: Haber–Bosch process is energy-intensive, even with green inputs.
- Safety: Ammonia is toxic and requires careful handling.

Table comparing Grey, Blue, and Green Ammonia

Type of Ammonia	Production Method	Feedstock	Carbon Emissions	Carbon Mitigation	Approx. Cost (2024)	Major Applications
Grey Ammonia	Haber–Bosch process using hydrogen from steam methane reforming (SMR) or coal gasification	Natural gas (CH_4) or coal	High (≈ 2.6 tonnes CO_2 per tonne ammonia)	None	~USD 450–550/MT	Fertilizers (urea, DAP), explosives, chemicals
Blue Ammonia	Same as Grey, but with carbon capture, utilisation, and storage (CCUS)	Natural gas/coal	Moderate (≈ 90% CO_2 captured)	CCUS technology applied	~USD 600–750/MT	Low-carbon fertilizers, fuel for shipping, hydrogen carrier
Green Ammonia	Haber–Bosch process using hydrogen from electrolysis powered by renewables, nitrogen from air separation	Water (H_2 source) + Air (N_2 source)	Zero direct CO_2 emissions	Uses 100% renewable energy	~USD 600–900/MT (falling with scale)	Green fertilizers, clean marine fuel, hydrogen storage & transport, energy export

WORLD LION DAY

Context: On 10th August, the World Lion Day 2025, the Union Environment Minister announced that the Asiatic lion population has risen from 674 in 2020 to 891 in 2025—a 32% increase in five years and over 70% growth in the past decade.

Asiatic Lion vs African Lion:

Feature	Asiatic Lion (*Panthera leo persica*)	African Lion (*Panthera leo leo*)
Distribution	Single wild population in Gir Forest, Gujarat, India	Widely distributed in Sub-Saharan Africa
Population	~675 (2024 census)	~20,000 (fragmented populations)
IUCN Status	Endangered	Vulnerable
Physical Build	Smaller, less muscular; prominent skin fold along belly	Larger, more muscular; no belly fold
Mane	Shorter, sparser mane — ears visible	Fuller, bushier mane — ears often hidden
Social Structure	Smaller prides (2–5 females)	Larger prides (10–15+ females)
Conservation Challenges	Restricted habitat, human–wildlife conflict, disease risk due to single population	Habitat loss, poaching, human–wildlife conflict
Special Notes	Only wild lions outside Africa; part of India's wildlife heritage	Key apex predator in African savannah ecosystems

TATO-II

Context Cabinet Approves 700 MW Tato-II Hydro Electric Project in Arunachal Pradesh

Project Highlights:

- Capacity: 700 MW (4 units of 175 MW each)
- Annual Energy Output: Approximately 2,738 million units
- Implementing Agency: Joint venture between North Eastern Electric Power Corporation Ltd. (NEEPCO) and the Government of Arunachal Pradesh
- Budget Support: Funds allocated for infrastructure including roads, bridges, transmission lines, and local area development
- Completion Timeline: 6 years

Benefits and Impact:

- Strengthens power supply in Arunachal Pradesh and contributes to national grid stability
- Arunachal Pradesh receives 12% free power and 1% for Local Area Development Fund (LADF)
- Infrastructure development including 33 km of roads and bridges, and support for local hospitals, schools, and markets
- Promotes socio-economic growth via job creation, compensation, CSR activities, and support for local suppliers and MSMEs

Major Hydroelectric Projects:

1. Bhakra Nangal Project (Himachal Pradesh/Punjab): One of the earliest and largest multipurpose projects with a capacity of about 1,325 MW, it provides irrigation, power, and flood control.

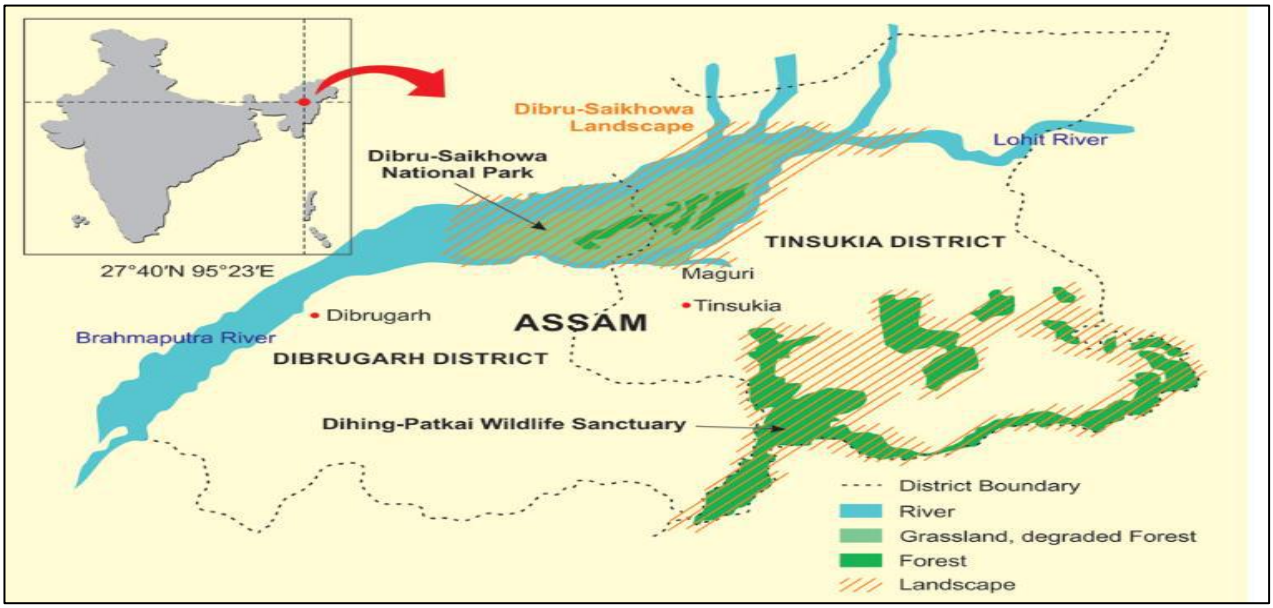
2. Tehri Dam (Uttarakhand): With a capacity of 1,000 MW, it is among the tallest dams in India and serves hydroelectric, irrigation, and water supply needs.
3. Sardar Sarovar Project (Narmada River, Gujarat/Madhya Pradesh): Known for irrigation and power generation (around 1,450 MW capacity), it supports water supply in drought-prone areas.
4. Koyna Hydroelectric Project (Maharashtra): A major power station with over 1,960 MW capacity, critical for Maharashtra's electricity needs.
5. Nathpa Jhakri Project (Himachal Pradesh): India's largest underground hydroelectric project with 1,500 MW capacity, utilizing the Satluj river.
6. Tawang Hydro Project (Arunachal Pradesh): Part of India's Northeast hydropower development, aiming to harness abundant water resources.
7. Teesta Hydro Projects (Sikkim & West Bengal): Several projects on the Teesta river contributing significant power to the grid.
8. Dhauliganga Hydroelectric Project (Uttarakhand): Medium-sized project supporting local power requirements.
9. Tato-II Hydro Electric Project (Arunachal Pradesh): Newly approved 700 MW project aiming at boosting energy supply and regional development.

DIBRU-SAIKHOWA NATIONAL PARK

Context: A new peer-reviewed study found that native and invasive plants are altering grasslands in Assam's Dibru–Saikhowa National Park.

About Dibru–Saikhowa National Park:

- Location: Tinsukia & Dibrugarh districts, Assam.
- Lies in the floodplains of the Brahmaputra and Lohit rivers.
- Declared National Park in 1999; earlier a Wildlife Sanctuary (1986).
- Part of the Brahmaputra floodplain ecosystem; also a Biosphere Reserve (1997).



Ecological Significance

- Known for wetlands, grasslands, and swamp forests.
- Identified as an Important Bird Area (IBA) by BirdLife International.
- Houses both terrestrial and aquatic biodiversity.

Flora

- Semi-evergreen forests, deciduous forests, grasslands, and wetlands.
- Dominant species: *Dillenia indica*, *Bombax ceiba*, and tall grasses.

Fauna

- Mammals:
  - Feral horses (unique to the park).
  - Tiger, leopard, wild boar, Asiatic water buffalo.
- Primates: Hoolock gibbon, capped langur.
- Birds: Over 350 species (White-winged wood duck, Bengal florican, Greater adjutant stork).
- Aquatic: Rich fish diversity; occasional sightings of the Gangetic river dolphin.

Threats

- Oil exploration & accidental oil blowouts (notably Baghjan blowout, 2020).
- Encroachment and habitat fragmentation.
- Frequent floods altering park ecology.

Conservation Importance

- Acts as a carbon sink through swamp forests.
- Supports endangered bird species and unique feral horse population.
- Crucial for maintaining floodplain ecology of Brahmaputra.

ENVIRONMENT PROTECTION (MANAGEMENT OF CONTAMINATED SITES) RULES, 2025

Context: Issued under the Environment Protection Act, 1986 on 24 July 2025; placed before Parliament for oversight.

Environment Protection (Management of Contaminated Sites) Rules, 2025 vs Previous Rules:

Feature	2025 Rules	Previous Rules (2007/2016 Hazardous Waste Rules)
Scope	Chemical contamination of landfills, spill sites, hazardous dumps	Focused on generation, storage, handling, and disposal of hazardous waste
Systematic Assessment	Mandatory preliminary assessment within 90 days; detailed assessment within 3 months for sites exceeding limits	No structured assessment timelines or comprehensive remediation framework
Identification & Transparency	Local bodies identify sites; published on public portal within 60 days; public consultation mandated	Limited transparency; reporting mainly to SPCBs/PCCs; no public consultation requirement
Remediation	Plans prepared by expert organizations; costs borne by polluter or shared by Centre & State if polluter absent	Emphasis on proper waste disposal; remediation less clearly defined; polluter-pays principle applied inconsistently

Liability	Criminal liability under Bharatiya Nyaya Sanhita, 2023 for damage or loss of life	Primarily civil/penal fines; no explicit criminal liability
Exclusions	Radioactive waste, mining, marine oil pollution, municipal solid waste dumps	Similar exclusions; focus mainly on industrial hazardous waste
Significance	Strengthens environmental governance, accountability, and remediation; formalizes timelines	Regulatory focus on handling and disposal; limited remediation and accountability mechanisms

SALTWATER CROCODILE

Context: The saltwater crocodile population in Bengal's Sundarban Biosphere Reserve has increased significantly compared to 2024, with the latest survey.

About Saltwater Crocodile (Crocodylus porosus):

- Distribution: Found in India, Southeast Asia, Northern Australia; in India mainly in Sundarbans (West Bengal), Bhitarkanika (Odisha), Andaman & Nicobar Islands.
- Habitat: Estuaries, tidal rivers, mangroves, coastal wetlands, and even open seas (excellent swimmers).
- Ecological Role: Apex predator, regulates prey populations, maintains food web stability in mangroves and estuarine ecosystems.
- Conservation Status:
  - *IUCN Red List:* Least Concern (but locally threatened).
  - *Wildlife (Protection) Act, 1972:* Schedule I (highest protection).
  - *CITES:* Appendix I (trade prohibited).
- Threats: Habitat loss (shrinking mangroves), climate change, poaching, human-crocodile conflict.
- Conservation Efforts: Breeding programs (e.g., Bhagabatpur Crocodile Project, Odisha's Bhitarkanika Sanctuary), habitat protection, systematic surveys, GPS mapping.

About Sundarban Biosphere Reserve:

- Location: Covers parts of West Bengal in the delta of the Ganga, Brahmaputra, and Meghna rivers.
- Area: ~9,630 sq. km (includes core, buffer, and transition zones).
- UNESCO Status: Recognized as a UNESCO Biosphere Reserve (1989) and World Heritage Site (1987).
- Unique Feature: World's largest mangrove forest and the only mangrove habitat of the Royal Bengal Tiger.
- Flora & Fauna:
  - Mangrove species like Sundari (Heritiera fomes), gewa, keora.
  - Fauna includes Royal Bengal Tiger, saltwater crocodile, fishing cat, estuarine crocodiles, olive ridley turtles, spotted deer, Gangetic dolphins, horseshoe crabs.
- Zonation:
  - *Core Area:* Sundarban National Park (tiger reserve & critical habitat).
  - *Buffer Zone:* Sajnekhali Wildlife Sanctuary and adjoining forests.
- Ecological Role: Protects inland areas from cyclones and tidal surges, acts as a carbon sink, and supports coastal biodiversity.

- Threats: Rising sea levels, climate change, frequent cyclones, human encroachment, and salinity intrusion.
- Conservation Initiatives: Project Tiger, crocodile breeding at Bhagabatpur, mangrove afforestation, community-based eco-development.

NATIONAL TIGER CONSERVATION AUTHORITY (NTCA)

Context: NTCA Limits Tiger Corridors to 2014 "Least Cost" Pathways.

About National Tiger Conservation Authority (NTCA):

- Establishment: 2005, under the Wildlife (Protection) Act, 1972, following the recommendations of the Tiger Task Force.
- Status: A statutory body under the Ministry of Environment, Forest and Climate Change (MoEFCC).

Composition

- Headed by the Minister of Environment, Forest and Climate Change (Chairperson).
- Includes experts, NGOs, and representatives from states with tiger reserves.

Functions

- Implement the Project Tiger scheme across India.
- Approve tiger conservation plans prepared by states.
- Lay down standards for tiger reserve management including tourism, infrastructure, and anti-poaching.
- Provide funding and technical support to tiger reserves.
- Ensure tiger corridors and habitat connectivity are maintained for long-term survival.
- Conduct monitoring using technologies like M-STrIPES (Monitoring System for Tigers – Intensive Protection and Ecological Status).

Importance

- Central authority for India’s tiger conservation strategy.
- Plays a key role in balancing conservation with developmental pressures in tiger landscapes.

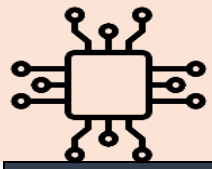
ADI KARMAYOGI INITIATIVE

Context: It aims to train 20 lakh tribal “change leaders” through activities like role-play, cognitive tasks, and fish bowl exercises to build problem-solving and motivation.

About Adi Karmayogi Initiative:

- A government programme under Dharti Aba Janjatiya Gram Utkarsh Abhiyaan to strengthen last-mile delivery of schemes in tribal areas.
- Seeks to train 20 lakh tribal “change leaders” through participatory methods like role-play, candle-lighting, cognitive tasks, and fish bowl exercises.
- Multi-tier trainer structure: 240 State-level, 2,750 district-level, and 15,000+ block-level trainers covering 324 districts.

- Each village session involves 15 volunteers to build problem-solving and community leadership.
- Villagers prepare “Vision 2030” documents, visualized through public murals as aspirational governance blueprints.
- Adi Seva Kendras will serve as single-window centers for scheme saturation.
- Focus: community-driven development, participatory governance, and improved scheme utilization in tribal regions.



SCIENCE & TECHNOLOGY

SPACE TECHNOLOGY IN AGRICULTURE

Context: Space technology is revolutionizing agriculture by enabling precision farming, improving yield estimation, optimizing resource use, and strengthening food security.

Key Applications:

- Precision Agriculture: Satellite imagery and remote sensing help monitor crop health, soil moisture, and nutrients in real-time, enabling targeted irrigation and fertilizer use for better yields and reduced waste.
- Weather and Climate Monitoring: Space-based data improves weather forecasting and helps farmers plan agricultural activities and adapt to climate change.
- Resource Management: Satellites assist in managing water resources, monitoring drought, mapping soil, and preventing land degradation and deforestation.
- Yield Estimation & Insurance: Programs like FASAL and KISAN use remote sensing for accurate yield forecasts, aiding insurance schemes and disaster planning.
- Pest & Disease Detection: Hyperspectral and multispectral data can detect early signs of pest infestation or disease, reducing crop loss and excessive chemical use.
- Livestock and Land Monitoring: Satellite integration supports sustainable grazing, animal tracking, and land-use planning.
- Research & Crop Improvement: Space-based plant experiments enhance knowledge of plant biology and aid in developing resilient, high-yield crop varieties.
- Digital Decision Support: Platforms like Krishi-DSS combine geospatial data and AI to guide farmers and policy decisions in real-time.
- Food Security & Sustainability: Space technology helps track global agricultural trends, anticipate shortages, and promote sustainable farming.

India's Initiatives:

India has led the way with programs such as FASAL, CHAMAN, NADAMS, and the Mahalanobis National Crop Forecast Centre to operationalize space-based agricultural services.

FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land-based observations)

- Launched by: Ministry of Agriculture & Farmers' Welfare
- Implemented by: Mahalanobis National Crop Forecast Centre (MNCFC)
- Objective: Pre-harvest crop production forecasting for major crops using remote sensing, weather data, and field observations.
- Significance: Helps in accurate planning of food grain procurement, supply chain management, and agricultural policy decisions.

CHAMAN (Coordinated Horticulture Assessment and Management using Geo-informatics)

- Launched by: Department of Agriculture & Farmers' Welfare
- Implemented by: MNCFC in collaboration with ISRO and state horticulture departments
- Objective: Mapping and assessing horticulture crops using satellite data and GIS tools.

- Significance: Supports area estimation, crop condition monitoring, and planning for fruits and vegetables, aiding better management of horticulture sector.

NADAMS (National Agricultural Drought Assessment and Monitoring System)

- Developed by: ISRO and Department of Agriculture
- Objective: Real-time monitoring and assessment of drought using satellite-based indicators like vegetation index, rainfall, and soil moisture.
- Significance: Assists in drought declaration, contingency planning, and timely allocation of relief resources.

BHASKAR

Context: The BHASKAR (Bharat Startup Knowledge Access Registry) platform is a comprehensive digital ecosystem designed to strengthen collaboration and innovation across India's startup landscape.

Key Features of Bhaskar:

- Centralized Networking: Connects startups, investors, mentors, service providers, and policymakers on a single platform, enabling seamless collaboration across sectors and regions.
- Personalized BHASKAR ID: Users receive a unique ID linked to verified, complete profiles—enhancing credibility, searchability, and secure interaction.
- Multi-Stakeholder Access: Open to diverse roles including entrepreneurs, investors, mentors, and support organizations, ensuring inclusivity.
- Enhanced Discoverability: Advanced search tools help users find partners, funding opportunities, programs, and schemes quickly and efficiently.
- Resource Hub: Offers centralized access to startup-related resources, events, and knowledge-sharing tools, eliminating system fragmentation.
- Digital & On-Ground Engagement: Facilitates both online collaboration and physical events to build relationships and market presence.
- Large-Scale Reach: With around 200,000 startups registered as of August 2025, BHASKAR is among the largest startup registries in the country.

Initiatives to Develop Startup Ecosystem in India

India has emerged as the third-largest startup ecosystem in the world. To encourage innovation, job creation, and entrepreneurship, the government and associated bodies have launched several initiatives:

Startup India Initiative (2016)

- Launched by: Government of India
- Objective: Promote entrepreneurship, simplify regulatory processes, and provide funding support.
- Key features:
    - Tax exemption for 3 years
    - Self-certification for compliance
    - Fund of Funds for Startups (FFS) with ₹10,000 crore corpus
    - Startup India Hub for single-window support

Atal Innovation Mission (AIM)

- Launched by: NITI Aayog
- Components:

- Atal Tinkering Labs (ATL): Foster creativity among school students
- Atal Incubation Centres (AIC): Support early-stage startups with infrastructure and mentoring
- ARISE: Promote innovation in MSMEs and public systems

BLUEBIRD

Context: ISRO is set to launch the BlueBird Block 2 communications satellite, developed by U.S.-based AST SpaceMobile, using its LVM3 (GSLV Mk III) launch vehicle.

Key Highlights:

- Objective: To provide direct mobile voice and internet services to smartphones, even in areas without terrestrial networks.
- Technology: Equipped with a large antenna (approx. 64 sq. meters) to offer near-total geographic coverage, including remote areas.
- Impact: Enhances global connectivity, especially useful for disaster response, remote education, and rural healthcare.
- Strategic Value: Strengthens India–U.S. space cooperation and positions ISRO as a major player in global commercial satellite launches.

GSAT Series (Geostationary Satellites)

India's GSAT (Geo-Stationary Satellite) series is the backbone of Indian communications from space, developed by ISRO for telecommunication, television broadcasting, internet services, secure communication, and disaster management support.

Recent GSAT Missions:

- GSAT-24 (Launched: June 2022 by Arianespace):
  - Fully commercial satellite, leased by Tata Play.
  - Provides DTH services with 24 Ku-band transponders.
- GSAT-20 (GSAT-N1) – *Upcoming*:
  - Will use High Throughput Satellite (HTS) technology.
  - Ka-band satellite designed for pan-India broadband coverage, especially in rural areas.
  - Expected launch via Arianespace or LVM3.
- GSAT-19 & GSAT-29:
  - These acted as technology demonstrators for high throughput satellite tech.
  - Carried advanced payloads like ion propulsion and optical communication experiments.

PROPHYLAXIS

Context: Understanding prophylaxis: the 'gold standard treatment' in haemophilia care.

About Prophylaxis:

Meaning:
Prophylaxis refers to preventive treatment or actions taken to protect against a disease before it occurs. The term comes from the Greek *prophylaktikos*, meaning "to guard beforehand."

Types:

1. Primary Prophylaxis – Preventing the onset of disease in healthy individuals (e.g., vaccination against measles).
2. Secondary Prophylaxis – Preventing recurrence or worsening of a disease in already exposed or at-risk individuals (e.g., giving antibiotics to prevent rheumatic fever in patients with prior strep throat).
3. Post-exposure Prophylaxis (PEP) – Measures taken after potential exposure to prevent infection (e.g., rabies vaccination after a dog bite).

Examples:

- Vaccines (measles, polio, COVID-19) – primary prophylaxis.
- Antimalarial drugs before travel to endemic areas.
- HIV post-exposure prophylaxis for healthcare workers after needle-stick injury.
- Use of fluoride toothpaste to prevent dental caries.

Importance:

- Reduces incidence of disease.
- Minimizes healthcare burden and costs.
- Protects vulnerable populations.

ENVELOPE DIMER EPITOPE (EDE)

Context: Researchers from the US and the Philippines has identified envelope dimer epitope (EDE)-like antibodies as a key factor in building strong, broad, cross-serotype immunity against dengue virus.

Envelope Dimer Epitope (EDE)

- Definition: A specific site found on the *envelope (E) protein dimer* of flaviviruses such as dengue virus.
- Structure: The E protein on the virus surface forms *dimers* (pairs) in its mature form. The EDE is located at the interface between the two E monomers in the dimer.
- Immunological Significance:
    - Recognized by *broadly neutralizing antibodies* that can target multiple dengue virus serotypes.
    - Blocking EDE can prevent the virus from attaching to and entering host cells.
- Role in Vaccine Development:
    - A key target for next-generation dengue vaccines because antibodies to EDE show *cross-serotype protection*.
    - Reduces risk of *antibody-dependent enhancement (ADE)* by producing antibodies that neutralize all four dengue serotypes effectively.
- Research Use**: Helps scientists** understand how to design monoclonal antibodies or immunogens with broad protective potential.

Dengue is a mosquito-borne viral disease caused by *Dengue virus* (DENV), a *Flavivirus* with four distinct serotypes (DENV-1, DENV-2, DENV-3, DENV-4).

- Transmitted mainly by Aedes aegypti and, to a lesser extent, Aedes albopictus mosquitoes.
- Clinical spectrum ranges from mild dengue fever to severe dengue (dengue hemorrhagic fever/shock syndrome).

- No specific antiviral treatment exists; management is supportive.

Global Presence

- Endemic in over 100 countries, mainly in tropical and subtropical regions of Southeast Asia, Western Pacific, the Americas, Africa, and Eastern Mediterranean.
- WHO estimates: ~390 million dengue infections annually worldwide; ~96 million manifest clinically.
- Urbanization, climate change, and global travel have expanded dengue's reach to newer regions, including southern Europe and the USA (Florida, Texas).
- Major outbreaks often follow rainy seasons in endemic areas.

SLEEPING SICKNESS

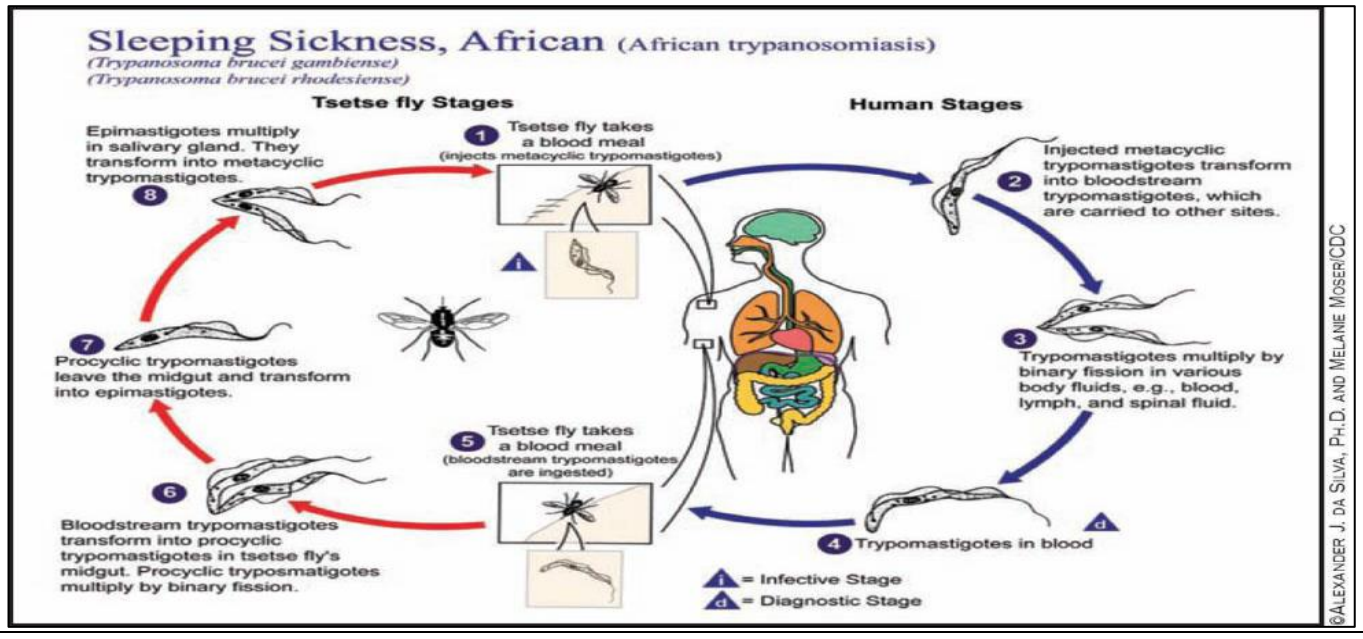
Context : The World Health Organization (WHO) has officially declared Kenya free of human African trypanosomiasis (HAT), or sleeping sickness.

About Sleeping Sickness:

Sleeping sickness, medically known as Human African Trypanosomiasis (HAT), is a parasitic disease caused by protozoan parasites of the genus *Trypanosoma*. It is transmitted to humans through the bite of an infected tsetse fly found in sub-Saharan Africa.

Key Points:

- Types: Two forms exist—*Trypanosoma brucei gambiense* (chronic form, West and Central Africa) and *Trypanosoma brucei rhodesiense* (acute form, East and Southern Africa).
- Symptoms: Early symptoms include fever, headaches, joint pains, and itching. If untreated, it progresses to neurological symptoms like confusion, disrupted sleep cycles, and can lead to coma and death.
- Transmission: The tsetse fly bites humans and animals, transferring parasites into the bloodstream.
- Diagnosis and Treatment: Diagnosis requires blood tests and sometimes examination of cerebrospinal fluid. Treatment depends on disease stage and may involve drugs like pentamidine or melarsoprol.
- Control Measures: Include vector control (reducing tsetse fly populations), active surveillance, prompt diagnosis, and treatment.



INDIA'S FIRST PRIVATE EARTH OBSERVATION SATELLITE CONSTELLATION

Context: India is set to launch its first private Earth Observation (EO) satellite constellation under a Public-Private Partnership (PPP) model, announced by IN-SPACe.

Key Details:

- Lead & Partners: Led by Bengaluru-based PixxelSpace India with Piersight Space, Satsure Analytics India, and Dhruva Space.
- Investment: ₹1,200 crore over five years; zero cost to the government, with private sector fully funding the project.
- Constellation: 12 advanced EO satellites with panchromatic, multispectral, hyperspectral, and Synthetic Aperture Radar (SAR) sensors.
- Timeline: Phased deployment over 4–5 years.
- Government Role: Strategic, technical, and policy support; all satellites to be built, launched, and operated in India to ensure data sovereignty.

Strategic Importance:

- Applications: Climate change monitoring, disaster management, precision agriculture, urban planning, marine surveillance, national security, and water quality monitoring.
- Global Reach: Aims to supply high-quality EO data for domestic and international markets.
- Economic Impact: Boost to private space industry, projected to grow from $8.4 billion (2022) to $44 billion (2033).

SAMUDRAYAAN MISSION

Context : Two Indian aquanauts — Cdr (Retd) Jatinder Pal Singh and R. Ramesh (scientists at NIOT) — undertook deep-sea dives in the Atlantic Ocean from the French vessel *Nautile*.

- They reached depths of 5,002 metres and 4,025 metres, setting new records for Indian deep-sea missions.
- Earlier Indian submarine dives were limited to 500 metres, with the deepest being 670 metres.
- This marks a significant step in preparations for India's Samudrayaan Mission (2027), aimed at exploring deep-sea resources and technologies.
- The Indian flag was unfurled underwater alongside the French flag, symbolizing international collaboration.

Samudrayaan Mission – India's Deep Ocean Mission

Introduction

- Samudrayaan is India's first manned deep-ocean mission, launched under the Deep Ocean Mission (DOM) by the Ministry of Earth Sciences.
- It aims to send aquanauts up to 6,000 metres into the ocean in a submersible vehicle named MATSYA 6000.

Objectives

- Exploration of polymetallic nodules and mineral resources like nickel, cobalt, copper, and manganese in the Central Indian Ocean Basin.
- Development of deep-sea technologies: submersibles, mining systems, sensors, and underwater robotics.

- Understanding deep-sea biodiversity, ecosystems, and climate interactions.
- Strengthening India's role in the Blue Economy and energy security.

CONNEXIN PROTEINS

Context : The term can directly asked in Prelims.

About Connexin Proteins:

- Connexins are a family of membrane proteins that form gap junction channels between adjacent cells.
- Each gap junction is made of two hemichannels (connexons), and each connexon consists of six connexin subunits.
- These channels allow direct intercellular communication by permitting the passage of ions, metabolites, and signaling molecules.
- More than 20 types of connexins are identified in humans (e.g., Connexin43, Connexin26).

Functions

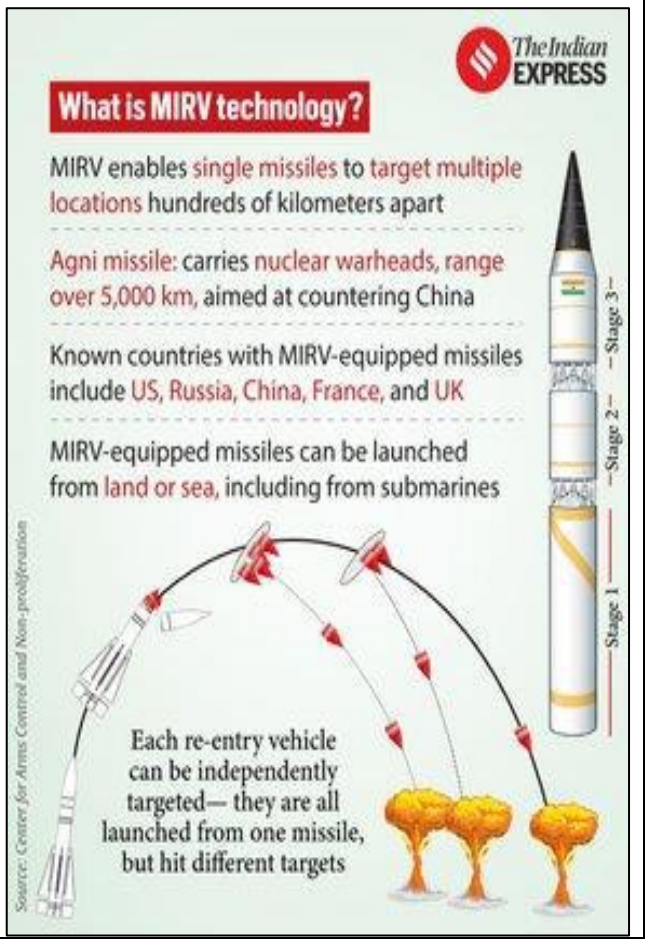
1. Cell–cell communication: Essential for coordination of cellular activities.
2. Electrical coupling: Maintains synchronized contraction in cardiac and smooth muscle.
3. Developmental regulation: Plays roles in embryonic growth, tissue differentiation.
4. Metabolic cooperation: Enables nutrient and signal sharing between cells.

AGNI-5 MISSILE

Context: India successfully test-fired its Agni-5 missile from the Integrated Test Range at Chandipur, Odisha. The Defence Ministry confirmed that the launch validated all operational and technical parameters.

About Agni-5 Missile:

- Type: Intercontinental Ballistic Missile (ICBM) developed by DRDO.
- Range: Around 5,000 km (can cover entire Asia and parts of Europe & Africa).
- Stages: Three-stage, solid-fueled missile with road and rail mobility (canisterized for quick launch).
- Warhead Capability: Nuclear-capable; latest variant tested with MIRV (Multiple Independently Targetable Re-entry Vehicle) technology (March 2024) for striking multiple targets.
- Significance:
    - Strengthens India's credible minimum deterrence and No First Use (NFU) doctrine.
    - Enhances second-strike capability under India's nuclear triad.
    - Boosts strategic security vis-à-vis China and beyond South Asia.

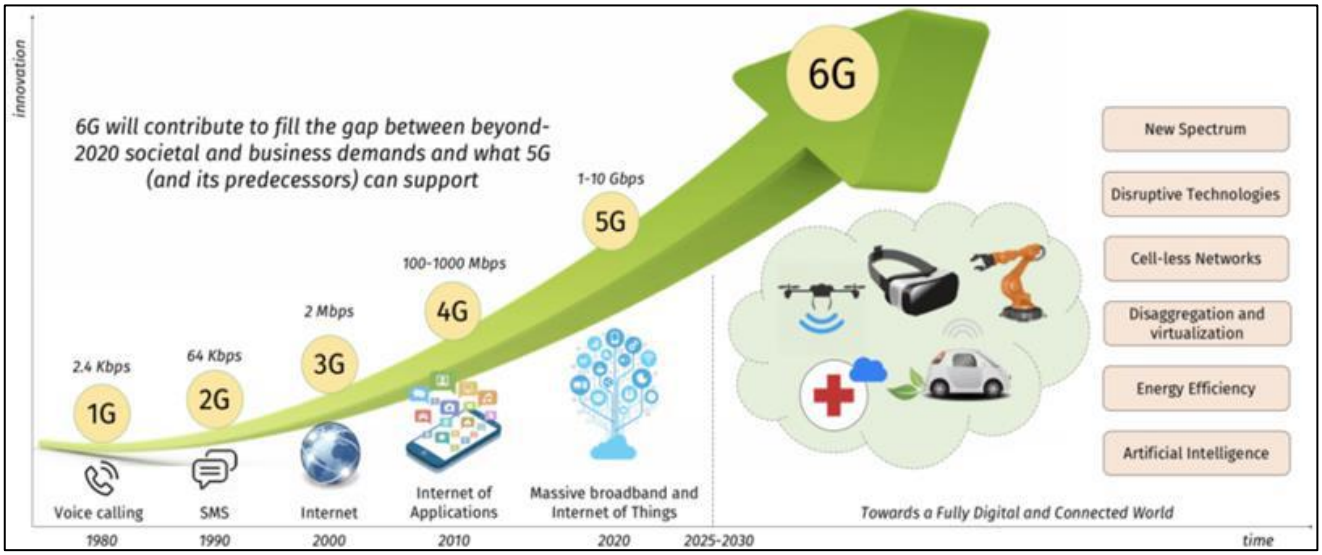


6G TECHNOLOGY

Context: Roadmap to 6G.

Bharat 6G Vision

- Launched in March 2023.
- Goal: Position India as a global leader in 6G by 2030.
- Principles: Affordability, sustainability, ubiquity.
- Builds on India's strong 5G foundation.



Key Initiatives

- Bharat 6G Alliance: Collaboration among academia, startups, industry, and government.
- 100 5G Labs: Training and capacity building for 6G skills.
- R&D Support: 100+ projects funded under government schemes.

Global Alignment

- Aligned with ITU's IMT-2030 framework.
- Target: At least 10% of global 6G intellectual property.

Key Features of 6G

- Ultra-high data speeds, very low latency.
- Communication + sensing integration.
- Terrestrial and non-terrestrial seamless coverage.
- AI-native, energy-efficient networks.

Upcoming Milestones

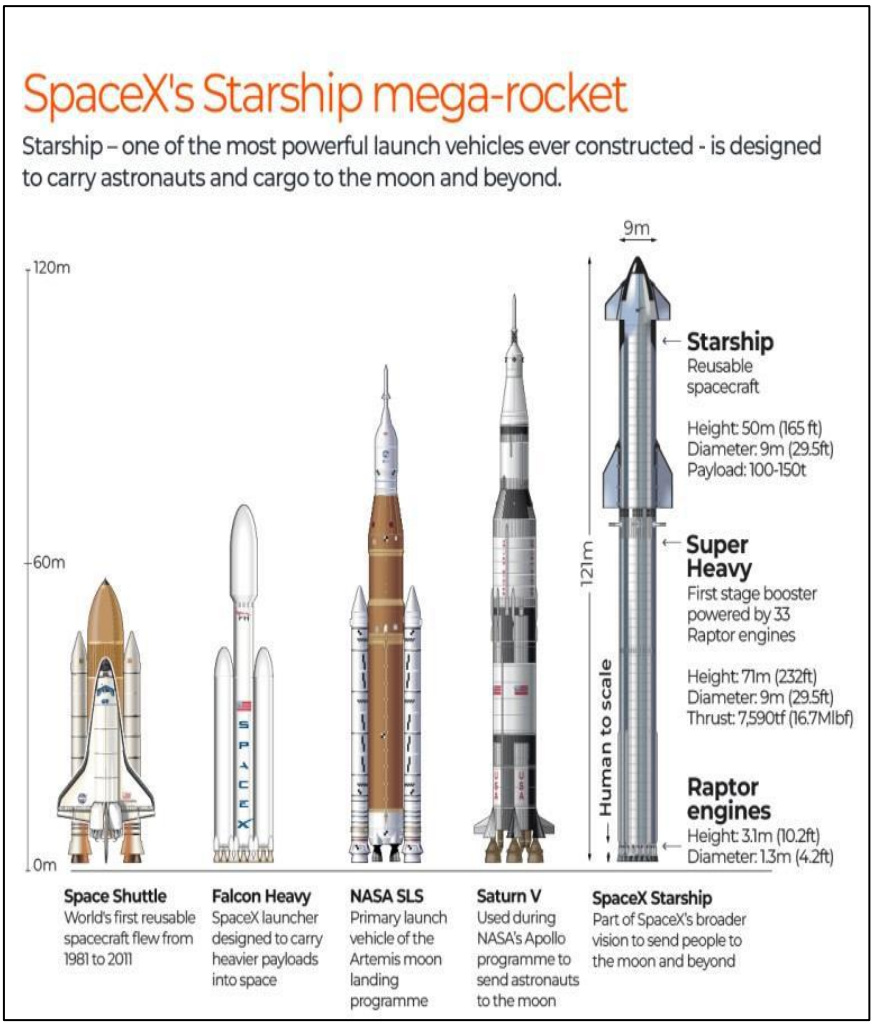
- WRC 2027: Final spectrum decisions.
- Commercial launch target: 2030, with domestic trials and global contributions in 2025–2030.

Technical Details of 6G

- Frequency Bands: Operates in sub-THz (100 GHz – 1 THz) and mmWave spectrum, enabling ultra-high capacity.
- Speed & Latency: Expected peak data rates up to 1 Tbps with latency as low as ~1 microsecond (compared to 1 ms in 5G).
- Network Architecture:
  - AI-native networks for self-optimization, resource allocation, and predictive maintenance.
  - Terrestrial + Non-Terrestrial Integration: Seamless connectivity through satellites, drones, HAPS (High Altitude Platform Stations).
  - Cell-less Architecture: Users connect dynamically to multiple nodes instead of fixed base stations.
- New Features:
  - Joint Communication & Sensing (JCAS): Networks can sense environment while transmitting data (useful for autonomous mobility, disaster management).
  - Holographic Beamforming: Advanced antenna technologies for high-directional, energy-efficient transmission.
  - Quantum Communication & Security: Quantum key distribution for ultra-secure links.
- Energy Efficiency: Designed to be 100x more energy-efficient than 5G, using intelligent sleep modes and green hardware.
- Applications: Holographic telepresence, immersive XR (extended reality), autonomous transport, precision healthcare, smart industries.

STARSHIP

Context: SpaceX's Starship successfully completed a critical test flight, marking a major step toward Moon and Mars missions.



Test Flight Highlights

- The 10th flight launched from Starbase, Texas, after three failed attempts.
- The Super Heavy booster made a controlled splashdown in the Gulf of Mexico, while Starship splashed down in the Indian Ocean after deploying eight mock Starlink satellites.
- Key milestones included in-orbit engine re-ignition and a reusable heat shield stress test.

Features

- Height: 120 m – taller than Saturn V.
- Engines: 33 Raptor engines with ~74 meganewtons thrust, nearly twice Saturn V.
- Payload: 100–150 tons to LEO; up to 100 astronauts in crew configuration.
- Fuel: Liquid methane + oxygen.

- Design: Fully reusable two-stage system with largest payload volume in history.

Significance

The success restores confidence in Starship for NASA's Artemis Moon mission and future Mars plans. It demonstrates reusability, massive payload capacity, and cost-effectiveness—potentially revolutionizing space access and exploration.

SpaceX's Starship

- **World's largest rocket:** At 120 meters tall, Starship is bigger than the Saturn V and designed for deep-space missions.
- **Structure:** Two-stage system — *Super Heavy booster* and the *Starship spacecraft*.
- **Power:** Powered by 33 Raptor engines using liquid methane and liquid oxygen, generating ~74 meganewtons of thrust.
- **Capacity:** Can carry 100–150 tons to low Earth orbit and up to 100 astronauts in crew configuration — the largest payload capacity ever.
- **Reusability:** Both stages are fully reusable, aiming to drastically cut launch costs and enable frequent missions.
- **Heat shield:** Equipped with a reusable heat shield to withstand re-entry from the Moon or Mars.
- **Purpose:** Developed to support NASA's Artemis missions, future Mars colonization, and revolutionize space access through cost-effective, high-capacity launches.

HISTORY AND ART & CULTURE

ARYA SAMAJ

Context: The Allahabad High Court recently directed the Uttar Pradesh government to investigate the rise of "fake Arya Samaj societies"

Key Points:

- Arya Samaj Marriages: Based on reformist Hindu values, they are quick, paperwork-light, and popular among interfaith or eloping couples. Established in 1875, Arya Samaj promotes "shuddhi" or reconversion to Hinduism.
- Legal Framework: The Arya Marriage Validation Act, 1937, protects such marriages even across castes and sub-castes. However, it does not bypass procedures under state anti-conversion laws or marriage registration rules.
- Concerns Raised: Courts and governments have flagged cases where Arya Samaj weddings were used to:
    - Avoid scrutiny under Special Marriage Act (SMA), which mandates a 30-day public notice.
    - Circumvent anti-conversion laws, especially when conversion rituals are incomplete or rushed.
    - Marry minors or without valid consent, especially in interfaith cases.

About Arya Samaj:

The Arya Samaj was a Hindu reform movement founded by Swami Dayananda Saraswati in 1875 in Bombay (now Mumbai). It aimed to revive the Vedic way of life, rejecting superstitions, caste discrimination, and idol worship, and promoting rationalism, equality, and education.

Key Objectives:

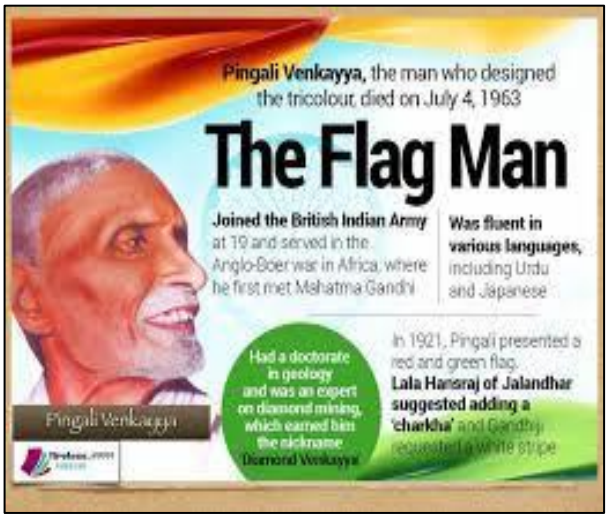
- Return to the Vedas: Emphasized the authority of the four Vedas as the true source of knowledge.
- Opposition to orthodoxy: Rejected rituals, priestcraft, and idol worship.
- Promotion of social reforms:
    - Women's education and widow remarriage
    - Abolition of child marriage and untouchability
- National awakening: Encouraged self-reliance, swadeshi, and national pride.
- Shuddhi Movement: Re-conversion of non-Hindus back to Hinduism.

Key Contributions:

- Established Dayanand Anglo-Vedic (DAV) schools and colleges to combine Vedic values with Western education.
- Promoted Hindi in Devanagari script as a unifying national language.
- Influenced leaders like Lala Lajpat Rai and played a role in freedom struggle.

PINGALI VENKAYYA

Context: Prime Minister Narendra Modi paid tribute to Pingali Venkayya on his 149th birth anniversary, lauding his significant role in designing India's national flag, the Tricolour.



Brief Note on Pingali Venkayya

- Born: 2 August 1876, near Machilipatnam, Andhra Pradesh
- Died: 4 July 1963

Background:

- A freedom fighter, Gandhian, and a polymath with interests in geology, agriculture, languages, and history.
- Also worked as a lecturer and served in the British Indian Army during the Boer War in South Africa.

Key Contribution:

- Designer of the Indian National Flag (Tricolour).
- Presented the first version of the flag to Mahatma Gandhi in 1921 at the Indian National Congress session in Bezwada (now Vijayawada).
- The original design had two colors (red and green) representing Hindus and Muslims; Gandhi suggested adding white (for other communities) and the spinning wheel (charkha) as a symbol of self-reliance.

KAKORI TRAIN ACTION

Context: On August 9, 2025, Prime Minister Narendra Modi paid tribute to the heroes of the Kakori Train Action, marking its 100th anniversary.

Conspiracy Case	Year	Prominent Leaders Involved	Objectives
Alipore Bomb Case	1908	Aurobindo Ghosh, Barindra Kumar Ghosh	To assassinate British officials and incite armed rebellion against colonial rule
Kakori Conspiracy Case	1925	Ram Prasad Bismil, Ashfaqullah Khan, Roshan Singh	To loot government treasury from a train to fund revolutionary activities
Meerut Conspiracy Case	1929	Shaukat Usmani, S.A. Dange, S.V. Ghate	To organize a communist-led uprising and overthrow British government through strikes and mutiny
Lahore Conspiracy Case	1930	Bhagat Singh, Rajguru, Sukhdev	To avenge the death of Lala Lajpat Rai and to inspire mass revolution against British rule

Peshawar Conspiracy Case	1922	Ghadar Party leaders (e.g., Kartar Singh Sarabha)	To incite mutiny among Indian soldiers and spark a pan-Indian revolt against British rule

DHIRIO

Context: Goa's traditional bullfighting, and recent demands by MLAs across party lines to legalise it.

Traditional Bullfighting in India:

- Jallikattu (Tamil Nadu): Bull-taming sport held during *Pongal* festival; participants attempt to grab a bull's hump and hold on.
- Dhirio (Goa): Bull-versus-bull fights, banned under the *Prevention of Cruelty to Animals Act, 1960*; proponents seek regulated revival.
- Kambala (Karnataka): Though not bullfighting, involves buffalo races in waterlogged fields during the harvest season.

Traditional Sports in India:

- Mallakhamba (Maharashtra & MP): Gymnastics and wrestling techniques performed on a wooden pole or rope.
- Thang-ta (Manipur): Martial art combining armed combat with sword and spear.
- Vallam Kali (Kerala): Snake boat races during *Onam*.
- Silambam (Tamil Nadu): Weapon-based martial art using bamboo staffs.
- Mukna (Manipur): Indigenous form of wrestling.
- Gatka (Punjab): Sikh martial art involving swords and sticks.

GURU TEGH BAHADUR

Context: Union Home Minister Amit Shah will participate in the 350th martyrdom anniversary celebrations of Sri Guru Tegh Bahadur Sahib.

About Guru Tegh Bahadur (1621–1675):

- Ninth Sikh Guru: Youngest son of Guru Hargobind; became Guru in 1665.
- Teachings: Advocated courage, humility, equality, compassion, and devotion to God. Emphasized protection of human rights, religious freedom, and dignity of life.
- Contributions:
  - Founded Anandpur Sahib (1665), which later became a Sikh religious and political center.
  - Composed hymns (116 shabads) later included in the Guru Granth Sahib.
  - Traveled extensively to spread Sikh teachings across North India.
- Martyrdom (1675):
  - Opposed forced conversions under the Mughal Emperor Aurangzeb.
  - Publicly defended the right of Kashmiri Pandits and others to practice their faith.
  - Executed in Delhi, earning him the title "Hind di Chadar" (Shield of India).
- Legacy:
  - Symbol of religious freedom, pluralism, and resistance against tyranny.
  - His sacrifice laid foundations for Guru Gobind Singh's later creation of the Khalsa.
  - Remembered through Gurdwara Sis Ganj Sahib in Delhi and commemorative events worldwide.

BUDDHIST RELICS

Context: The Piprahwa gems, sacred relics linked to Lord Buddha and discovered in 1898 at the Piprahwa stupa in Uttar Pradesh, were repatriated from Hong Kong to India in July 2025. These treasures include bone fragments, gem-inlaid reliquaries, gold ornaments, and ritual offerings enshrined by the Buddha's Sakya clan.

About Piprahwa Gems:

- These are sacred Buddhist relics discovered in 1898 at the Piprahwa stupa in Siddharthnagar, Uttar Pradesh. They include bone fragments, gem-studded reliquaries, gold ornaments, and ritual offerings, believed to have been enshrined by the Sakya clan of Lord Buddha.
- Discovery: Unearthed by British civil officer W.C. Peppé during colonial-era excavations.
- Heritage Journey: While most relics were deposited in the Indian Museum, Kolkata in 1899, some gems remained with the Peppé family and later surfaced in international auctions.

Important Buddhist Relics in India

- Vaishali (Bihar):
  - Excavations uncovered a relic casket of Buddha from a stupa, associated with the *second Buddhist Council*.
- Rajgir (Bihar):
  - Relics related to *King Bimbisara* and association with Buddha's preaching.
- Sarnath (Uttar Pradesh):
  - Famous Dhamek Stupa and Ashokan pillar, with relic caskets in surrounding stupas.
- Kapilvastu & Kushinagar (U.P.):
  - Kushinagar – Buddha's Mahaparinirvana site; stupas here yielded relic caskets of Buddha's ashes.
  - Piprahwa linked to distribution of relics among Shakyas.
- Sanchi (Madhya Pradesh):
  - Stupas housed relics of Buddha's chief disciples, Sariputta and Mahamoggallana.
  - These relics were taken to England during colonial times, but later returned to India.
- Bodh Gaya (Bihar):
  - No physical relics of Buddha's body but the Mahabodhi Temple is central as the site of Enlightenment.

MAHATMA AYYANKALI

Context: Prime Minister Narendra Modi paid tribute to Mahatma Ayyankali on his Jayanti, honoring his legacy as a pioneering social reformer who fought caste-based discrimination and worked for the upliftment of marginalized communities in Kerala.

Legacy of Ayyankali

- Born in 1863, he led movements like the *Villuvandi (cart) journey* and *Kallumala struggle*, challenging social inequalities.
- Advocated education, access to public spaces, and basic rights for Dalits, reshaping Kerala's social fabric.

Mahatma Ayyankali (1863–1941)

- Ayyankali was a prominent social reformer from Kerala, known for challenging caste oppression and working for the upliftment of Dalits.

- He fought for education rights, access to public spaces, and basic dignity for oppressed communities.
- His famous struggles include the Villuvandi (bullock cart) movement, asserting the right of Dalits to use public roads, and the Kallumala agitation, demanding social equality and dignity for Dalit women.
- He also organized agricultural labourers to fight for better wages and working conditions.
- Ayyankali's efforts laid the foundation for Kerala's later progress in social justice and equality, earning him the title *Mahatma*.

DEFENCE & SECURITY

PROJECT 17A

Context: The Indian Navy received INS Himgiri, an advanced stealth frigate and the third ship under Project 17A, on 31 July 2025 at GRSE, Kolkata.

Major Defence Projects in India

India has undertaken several key defence projects to boost indigenous capabilities under the *Atmanirbhar Bharat* initiative. Below are some important defence projects across the Army, Navy, and Air Force:

Project 75 (Submarine Development – Navy)

- Objective: Build six Scorpene-class diesel-electric submarines at Mazagon Dock Shipbuilders Limited (MDL), Mumbai.
- Status: Five commissioned (INS Kalvari, Khanderi, Karanj, Vela, Vagir); the sixth (INS Vagsheer) is under sea trials.
- Collaboration: With Naval Group, France.

Project 75I (Submarine Development – Navy)

- Objective: Build six advanced submarines with air-independent propulsion (AIP) under the Strategic Partnership model.
- Status: In the bidding stage; L&T and MDL shortlisted as builders.
- Goal: Strengthen underwater warfare capability.

Project 17A (Frigate Construction – Navy)

- Objective: Build seven stealth frigates (Nilgiri-class).
- Builders: MDL (4 ships) and GRSE (3 ships).
- Features: Stealth, indigenous sensors and weapons, modular design.
- Status: INS Nilgiri and INS Udaygiri (MDL), INS Himgiri (GRSE) delivered.

Project 18 (Next-Gen Destroyers – Navy)

- Objective: Design and build future-ready stealth destroyers with cutting-edge technology.
- Status: In preliminary design phase by the Warship Design Bureau.
- Planned tonnage: ~13,000 tonnes.

Light Combat Aircraft (LCA) Tejas – Air Force

- Objective: Indigenous fighter aircraft for IAF.
- Developer: HAL and ADA.
- Variants: Mk1 (in service), Mk1A (in production), Mk2 (development stage).
- Tejas Mk1A: 83 units ordered for delivery from 2024.

Advanced Medium Combat Aircraft (AMCA) – Air Force

- Objective: Fifth-generation stealth fighter.

- Developer: DRDO + HAL.
- Status: Final design approved, prototype development expected soon.
- Twin-engine, stealth, with internal weapons bay.

K-15 and K-4 Missile Projects (SLBMs – Navy)

- Part of the Strategic Forces Command.
- K-15: Short-range SLBM (~750 km).
- K-4: Intermediate-range SLBM (~3,500 km), tested from INS Arihant-class submarines.

Arjun Main Battle Tank (Army)

- Indigenous third-generation tank developed by DRDO.
- Arjun Mk1A: Enhanced variant with 72 upgrades.
- Inducted into the Indian Army in limited numbers.

Future Infantry Combat Vehicle (FICV) – Army

- Goal: Replace ageing BMP-2 vehicles.
- Indigenous design under procurement with participation from private sector.
- Features: Armored mobility, modular weapons, night vision.

Akash, Astra, and Pralay Missiles

- Akash: Surface-to-air missile system (SAM).
- Astra: Beyond Visual Range air-to-air missile (AAM) for fighter jets.
- Pralay: Surface-to-surface tactical ballistic missile with high-precision strike.

AGNISHODH

Context: General Upendra Dwivedi, Chief of the Army Staff, inaugurated AGNISHODH, the Indian Army Research Cell (IARC) at IIT Madras.

Indian Army Research Cells

Indian Army Research Cells are collaborative initiatives between the Army and premier academic institutions to foster indigenous defense innovation and technology development. These cells bridge the gap between academic research and military applications, enabling rapid deployment of cutting-edge technologies.

Key Cells:

1. AGNISHODH (IIT Madras): Focuses on additive manufacturing, cybersecurity, quantum computing, unmanned aerial systems, and wireless communication. It aids in modernizing defense and facilitating technology infusion.
2. IIT Delhi: Focuses on cybersecurity, AI, and data analytics, enhancing military communications, surveillance, and data protection.
3. IIT Kanpur: Specializes in robotics, AI, and autonomous systems for next-gen military operations like unmanned vehicles and surveillance.
4. IISc Bengaluru: Works on defense materials, nanotechnology, and advanced sensors for applications such as body armor, propulsion, and threat detection.

5. MCTE, Mhow: Focuses on military communications, enhancing secure communication systems and encryption technologies.

Objectives:

- Indigenous Development: Reducing dependency on foreign technologies.
- Academic Collaboration: Turning academic research into deployable military technologies.
- Technology Transition: Rapid integration of new technologies into Army operations.

These cells support India's defense modernization and self-reliance goals, strengthening technological capabilities for modern warfare.

IKSHAK

Context: The Indian Navy received Ikshak, the third of four Survey Vessel (Large) (SVL) ships.

Key Highlights

- Purpose: Coastal and deep-water hydrographic surveys; oceanographic and geophysical data collection for defence and civil applications
- Specifications: 3,400-ton displacement, 110 meters long, speed over 18 knots; equipped with advanced hydrographic equipment including data acquisition systems, autonomous underwater vehicle, DGPS, and digital side-scan sonar
- Indigenous Content: Over 80% by cost
- First SVL with Women's Accommodation: Accommodates women officers and sailors
- Significance: Enhances India's survey capabilities, supports Aatmanirbhar Bharat initiative

Survey Vessel (Large) (SVL) Ships

- Definition & Purpose: SVL ships are naval vessels designed for hydrographic surveys, oceanographic research, and geophysical data collection. They support both defence operations and civil applications such as charting, seabed mapping, and port development.
- Builders & Design:
    - Built indigenously by Garden Reach Shipbuilders & Engineers (GRSE), Kolkata.
    - Designed by the Indian Navy's Warship Design Bureau.
    - High indigenous content (over 80% by cost).
- Specifications (Typical for SVL Ships like Ikshak):
    - Displacement: ~3,400 tons
    - Length: ~110 meters
    - Speed: Over 18 knots
    - Equipped with advanced hydrographic equipment:
        - Data Acquisition and Processing System (DAPS)
        - Autonomous Underwater Vehicle (AUV)
        - DGPS, multi-beam echo sounders, digital side-scan sonar
- Operational Significance:
    - Conduct coastal and deep-water hydrographic surveys.
    - Aid in oceanographic, geophysical, and cartographic research.
    - Enhance India's maritime domain awareness and naval operational capabilities.
- Special Features:
    - First SVL ships like Ikshak include accommodation for women officers and sailors, promoting inclusivity.
- Fleet:

- Current SVL ships include INS Sandhayak, INS Nirdeshak, Ikshak, and one more under construction.

INTEGRATED AIR DEFENCE WEAPON SYSTEM

Context: The Defence Research and Development Organisation (DRDO) has successfully conducted the first flight tests of the Indigenous Integrated Air Defence Weapon System (IADWS) off the coast of Odisha.

Key Points

- **Purpose**: Enhances India's multi-layered air defense against aerial threats and protects strategic facilities.
- **Components**: Includes Quick Reaction Surface-to-Air Missiles (QRSAM), Very Short-Range Air Defense System (VSHORADS), and a high-power laser-based Directed Energy Weapon, all managed via a central command system.
- **Testing**: Successfully destroyed three aerial targets—two high-speed UAVs and a drone—using QRSAM, VSHORADS, and the laser weapon.
- **Performance**: All elements including radars, missiles, communication, and command systems functioned flawlessly.

India's Multi-Layered Air Defence System

India has developed a multi-tiered air defence shield to neutralize threats from long-range ballistic missiles to low-flying drones. The system integrates indigenous and imported platforms under centralized command and control.

1. Long-Range / Outer Layer

- S-400 Triumf (Russia) – Range up to 400 km, counters stealth aircraft, cruise and ballistic missiles.
- Ballistic Missile Defence (BMD) Program – Includes Prithvi Air Defence (PAD) and Advanced Air Defence (AAD) interceptors for high and low-altitude ballistic missile interception.

2. Medium-Range Layer

- MR-SAM (Medium Range Surface-to-Air Missile) – Jointly by DRDO & Israel; ~70 km range; used by Air Force, Army, and Navy.
- Akash & Akash-NG – Indigenous, ~25–70 km; protects air bases and strategic assets.

3. Short-Range / Tactical Layer

- QRSAM (Quick Reaction SAM) – 25–30 km range, mobile and radar-guided.
- SPYDER (Israel) – 15–35 km range, counters aircraft, UAVs, and precision-guided munitions.

4. Very Short Range / Point Defence

- Igla (Russia) and Indigenous VSHORADS – Man-portable missiles for last-mile defence against low-flying targets.
- Anti-Drone Systems – DRDO and private-sector developed, deployed at borders and sensitive installations.

5. Directed Energy Weapons (Emerging Layer)

- High-Power Laser Systems (DEW) under DRDO's Integrated Air Defence Weapon System (IADWS) – tested for drone and UAV neutralization.

6. Integrated Command & Control

- Integrated Air Command and Control System (IACCS) – Nationwide radar and sensor network linking all layers for real-time surveillance, detection, and interception.

Important Air Defence Systems of the World

United States

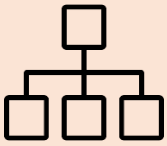
- Patriot PAC-3: Combat-proven, medium-to-long range system against aircraft and tactical ballistic missiles.
- THAAD (Terminal High Altitude Area Defense): Intercepts ballistic missiles in the upper atmosphere.
- Aegis Combat System (Navy): Uses SM-2/SM-3/SM-6 missiles for layered defence at sea and on Aegis Ashore sites.
- Iron Dome (co-developed with Israel): Short-range, highly effective against rockets and UAVs.

Russia

- S-400 Triumf: Long-range system (up to 400 km), counters stealth aircraft and ballistic missiles.
- S-500 Prometey: Next-generation system with anti-ballistic and anti-satellite capability.
- Pantsir-S1: Short-range point defence with missiles and guns, effective against drones and low-flying aircraft.

Israel

- Iron Dome: Famous short-range system for rockets, artillery, and drones.
- David's Sling: Medium-range defence against cruise missiles and tactical ballistic missiles.
- Arrow-2 & Arrow-3: Long-range interceptors developed with the US to counter ballistic missiles.



GOVT. INITIATIVES, SCHEMES AND POLICIES, ORGANISATION

MERITE SCHEME

Context: The Union Cabinet has approved the Multidisciplinary Education and Research Improvement in Technical Education (MERITE) Scheme.

Key Features

- Central Sector Scheme to upgrade quality, equity, and governance in technical education, aligned with NEP 2020.
- Funding: ₹2,100 crore loan from the World Bank and ₹2,100 crore from the Central Government.
- Coverage: 275 government and government-aided technical institutions, including 175 engineering colleges and 100 polytechnics.
- Beneficiaries: Around 7.5 lakh students to benefit from better infrastructure, digital access, and skill development.

Objectives & Benefits

- Quality Enhancement: Improve teaching, research, governance, and industry relevance.
- Equity & Inclusion: Focus on women faculty, diverse student groups, and regional balance.
- Research & Innovation: Boost institutional autonomy, innovation culture, and R&D.
- Skills & Employability: Promote curriculum reform, internships, and blended learning.
- Governance Support: Capacity-building for state/UT technical education departments.
- Digital Transformation: Expand use of digital tools and e-learning platforms.

Implementation

Administered by a central nodal agency under the Ministry of Education in collaboration with states/UTs, AICTE, NBA, IITs, and IIMs.

Schemes on Higher Education – India

Scheme / Initiative	Ministry / Body	Objective	Key Features
Rashtriya Uchchatar Shiksha Abhiyan (RUSA)	Ministry of Education	Improve quality, access, and equity in State higher education	Funding for infrastructure, faculty development, accreditation, and innovation. Centrally Sponsored Scheme (CSS).
Institutions of Eminence (IoE)	Ministry of Education & UGC	Develop world-class teaching & research institutions	10 public (funded) & 10 private (no funding) institutions given greater autonomy.
National Institutional Ranking Framework (NIRF)	Ministry of Education	Rank institutions based on performance	Annual rankings based on parameters like teaching, research, outreach.

Impacting Research Innovation and Technology (IMPRINT)	MoE & DST	Address engineering & technology challenges	Joint research projects across higher institutions.
Global Initiative for Academic Networks (GIAN)	MoE	Bring foreign faculty to teach in Indian institutions	Short-term courses, knowledge exchange.
Scheme for Promotion of Academic and Research Collaboration (SPARC)	MoE	International research collaboration	Partnerships with top global universities.
Unnat Bharat Abhiyan	MoE & IITs	Link higher education to rural development	Faculty & students work on local challenges.
National Apprenticeship Training Scheme (NATS)	MoE	Provide skill training to graduates/diploma holders	Industry-linked apprenticeships with stipends.
PM Research Fellowship (PMRF)	MoE	Attract talent for PhD in IITs/IISc/NITs	High-value fellowships for research excellence.

CATCH GRANT PROGRAM

Context : IndiaAI (MeitY) and the National Cancer Grid (NCG) have launched the Cancer AI & Technology Challenge (CATCH) Grant Program to boost AI-based innovations in cancer screening, diagnosis, and treatment across India.

Key Highlights

- Funding: Up to ₹50 lakh per project; successful pilots may receive scale-up grants up to ₹1 crore.
- Focus Areas: AI solutions for screening, diagnostics, clinical decision support, patient engagement, operational efficiency, research, and data curation.
- Eligibility: Open to startups, health tech firms, academic/research institutions, hospitals, and non-profits in India. Joint clinical–tech applications encouraged.
- Deployment: Uses NCG's 300+ cancer center network for validation, pilot testing, and nationwide scaling.

Timeline

- Launch: 2 Aug 2025
- Application deadline: 2 Sep 2025
- Review & matchmaking: Sep–Oct 2025
- Final approval: Oct–Nov 2025
- First grant disbursement: Feb 2026 onwards

Features

- Mentorship, regulatory guidance, and clinical support.
- Focus on ethical, clinically validated, and India-specific AI solutions.
- Large-scale impact via NCG and IndiaAI's networks.

Artificial Intelligence (AI) in the Medical Field

Use of algorithms, machine learning (ML), and deep learning (DL) to analyze medical data, assist diagnosis, predict disease progression, personalize treatment, and improve healthcare delivery.

Key Applications & Examples

Application Area	Role of AI	Specific Examples
Medical Imaging & Diagnostics	AI algorithms detect abnormalities in X-rays, MRIs, CT scans faster and often more accurately than humans.	Google's DeepMind – detects eye diseases from retinal scans; IBM Watson Health – cancer diagnosis support; Qure.ai – TB & stroke detection from imaging in India.
Predictive Analytics & Disease Outbreaks	Predict patient deterioration or epidemic spread using large datasets.	BlueDot – predicted COVID-19 spread before WHO alert; AI-based sepsis prediction tools in ICUs.
Drug Discovery & Development	AI accelerates drug molecule screening & clinical trial design.	BenevolentAI – repurposed drugs for rare diseases; Insilico Medicine – AI-designed drug candidates for fibrosis.
Personalized Medicine	Tailors treatment based on patient's genetic and lifestyle data.	Tempus – uses AI for cancer genomics to personalize therapy.
Surgical Assistance & Robotics	AI-powered robots improve precision and reduce recovery time.	Da Vinci Surgical System – minimally invasive surgeries with AI guidance; Versius – robotic-assisted laparoscopic surgeries in India.
Virtual Health Assistants	AI chatbots & voice assistants provide basic medical advice and reminders.	Babylon Health – symptom checker; Practo AI – appointment and teleconsultation in India.
Administrative Automation	Reduces time spent on paperwork, billing, and patient records.	AI-based Electronic Health Record (EHR) automation tools like Epic Systems.

SHRESTH FRAMEWORK

Context: The Union Health Ministry launched SHRESTH as India's first national framework to benchmark and strengthen state drug regulatory systems.

Objectives:

- Evaluate, rank, and guide improvement of state drug regulators.
- Align with global standards like WHO ML3 for vaccine regulation.
- Ensure uniform quality and safety of medicines nationwide.

Framework:

- Developed by CDSCO.
- Manufacturing States: 27 indices under five themes — Human Resources, Infrastructure, Licensing, Surveillance, and Responsiveness.
- Distribution States/UTs: 23 indices under similar themes.
- Monthly data submission and scoring; rankings shared for transparency and cross-learning.
- Capacity building via workshops, joint audits, and training.

Central Drugs Standard Control Organization (CDSCO)

The Central Drugs Standard Control Organization (CDSCO) is India's national regulatory authority for drugs and medical devices, functioning under the Ministry of Health and Family Welfare. It operates under the Drugs and Cosmetics Act, 1940 and its rules.

Key Functions:

- Approval of New Drugs & Clinical Trials – Ensures safety, efficacy, and quality before market entry.
- Regulation of Medical Devices – Oversees standards, licensing, and post-market surveillance.
- Licensing Authority – Issues licenses for import of drugs, medical devices, and cosmetics.
- Coordination with State Authorities – Works with State Drug Control Departments to maintain uniform drug quality across India.
- Pharmacovigilance – Monitors adverse drug reactions to enhance drug safety.
- Standard Setting – Frames guidelines and standards for manufacturing, labelling, and distribution.

Structure:

- Headed by the Drugs Controller General of India (DCGI).
- Functions through zonal, sub-zonal, port, and central laboratories across India.

PRADHAN MANTRI VIKSIT BHARAT ROZGAR YOJANA (PM-VBRY)

Context: Announced on 15th August 2025, the scheme aims to generate 3.5 crore new jobs between August 2025 and July 2027 with an outlay of ₹1 lakh crore.

Key Features of PM-VBRY:

- Eligibility: Youth entering their first private sector job (salary up to ₹1 lakh/month) in firms registered with EPFO.
- Incentives for Youth: ₹15,000 financial support in two installments—after 6 months of service and after 1 year along with a financial literacy program.
- Incentives for Employers: Up to ₹3,000/month per eligible employee for two years (extendable to four years for sustained jobs), with a focus on manufacturing and MSMEs.
- Application Process: Registration through EPFO, generation of UAN, face authentication, and minimum 6 months EPF contribution.
- Special Focus: Promotes financial literacy, savings, job creation in manufacturing, services, and technology sectors.

PRADHAN MANTRI DAKSHTA AUR KUSHALTA SAMPANN HITGRAHI YOJANA (PM-DAKSH)

Context: Aims to provide skill training, upskilling, and entrepreneurship support to marginalized groups like SCs, OBCs, EBCs, DNTs, sanitation workers, waste pickers, artisans, persons with disabilities, and their dependents.

Key Features:

- Training Types: Short-term/long-term training, reskilling, Recognition of Prior Learning (RPL), and entrepreneurial development.
- Curriculum: Based on NSQF standards, covering trades like tailoring, food processing, carpentry, digital literacy, and financial literacy.
- Artisan Support: Upskilling of traditional artisans with modern techniques and designs.
- Training Institutes: Empanelled centres with biometric attendance, placement tie-ups, and strict monitoring.
- Placement Benchmark: At least 70% of trainees must be employed or self-employed.
- Online Access: Registration and course selection via PM-DAKSH portal and app.

Impact:

- Over 1.8 lakh individuals trained so far, with significant employment/self-employment outcomes.
- Helps in socio-economic empowerment of disadvantaged communities through wage employment and entrepreneurship.

Other Targeted Programs

- UDAAN: For youth of Jammu & Kashmir (special employment-linked skill scheme).
- Nai Manzil: For minority youth (bridging education + skill training).
- Seekho aur Kamao: Skill development for minority youth with placement assistance.
- Vocationalization of School Education: Integrating skills into school curriculum under Samagra Shiksha Abhiyan and NEP 2020.

NATIONAL POLICY TO PROMOTE GIAHS SITES IN INDIA

Context: Union government is planning to formulate National Policy to Promote GIAHS.

India has three Globally Important Agricultural Heritage Systems (GIAHS) recognized by FAO:

- Koraput region (Odisha)
- Kuttanad below-sea-level farming system (Kerala)
- Saffron Heritage of Kashmir

These sites preserve unique farming traditions that integrate biodiversity, community participation, and eco-friendly practices for food security and cultural heritage.

About Globally Important Agricultural Heritage Systems (GIAHS):

- Concept: An FAO initiative (2002) to recognize and safeguard traditional agricultural systems that combine biodiversity conservation, resilient ecosystems, and cultural heritage.
- Features:
  - Conservation of unique crop varieties and indigenous knowledge.
  - Community participation in sustainable farming.
  - Integration of food security, ecology, and culture.
- Significance:
  - Preserves traditional knowledge and agrobiodiversity.
  - Strengthens climate resilience and rural livelihoods.
  - Promotes eco-tourism and market access for local produce.

MISCELLANEOUS

71ST NATIONAL FILM AWARDS

Context : 71st National Film Awards honoured films certified between January 1 and December 31, 2023. The awards celebrated excellence in Indian cinema across mainstream and regional films.

Major Awards:

- Best Feature Film: *12th Fail*
- Best Actor: Shah Rukh Khan (*Jawan*) & Vikrant Massey (*12th Fail*)
- Best Actress: Rani Mukerji (*Mrs Chatterjee vs Norway*)
- Best Director: Sudipto Sen (*The Kerala Story*)
- Best Hindi Film: *Kathal: A Jackfruit Mystery*
- Best Popular Film Providing Wholesome Entertainment: *Rocky Aur Rani Ki Prem Kahaani*
- Best Film on National/Social Values: *Sam Bahadur*

History of National Film Awards in India:

The National Film Awards were established in 1954 by the Government of India to honor artistic and technical excellence in Indian cinema. Instituted under the Ministry of Information and Broadcasting, the awards aim to encourage the production of films of aesthetic, cultural, and educational value.

Key Milestones:

- 1954: First National Film Awards presented; initially known as the "State Awards for Films." Only a few categories existed, and "Shyamchi Aai" (Marathi) was the first winner of the President's Gold Medal for the All India Best Feature Film.
- 1967: The awards were renamed as National Film Awards, and regional films were officially included in competitive categories.
- 1973: The Directorate of Film Festivals (DFF) was established to organize the National Film Awards and the International Film Festival of India.
- Awards are given by the President of India at a formal ceremony in New Delhi, and they hold the highest prestige among Indian film honors.

Present Structure:

- Divided into three sections: Feature Films, Non-Feature Films, and Writing on Cinema.
- Includes Golden Lotus (Swarna Kamal) and Silver Lotus (Rajat Kamal) trophies with cash prizes.
- Open to films certified by the Central Board of Film Certification (CBFC) in the previous calendar year.

MIRZAKHANI NEW FRONTIERS PRIZE

Context: Rajula Srivastava, a mathematician originally from India, has won the Maryam Mirzakhani New Frontiers Prize for her groundbreaking work in harmonic analysis and analytic number theory.

Research Focus:

- Works on harmonic analysis: breaking down complex functions into simpler frequencies (like Fourier analysis).
- Explores how these patterns extend into higher dimensions and number theory, including lattice points and wave geometry.
- Uses geometry, patterns, and logic to tackle fundamental math problems with elegant simplicity.

Maryam Mirzakhani New Frontiers Prize:

The Maryam Mirzakhani New Frontiers Prize is an international mathematics award presented annually as part of the Breakthrough Prizes. It honors early-career women mathematicians who have completed their PhDs within the past two years and have made significant contributions to the field of mathematics.

Key Features:

- Named after Maryam Mirzakhani, the first and only woman to win the Fields Medal.
- Purpose: To recognize and encourage young women pursuing careers in mathematics.
- Eligibility: Female mathematicians within two years of receiving their PhD.
- Awarded for: Outstanding contributions in any area of mathematics.
- It aims to promote gender equity in mathematical sciences and highlight the achievements of women in a traditionally male-dominated field.

M. S. SWAMINATHAN

Context: 100th birth anniversary of M. S. Swaminathan.

Early Life & Education

- Full Name: Monkombu Sambasivan Swaminathan
- Born: 7 August 1925, Kumbakonam, Tamil Nadu
- Background: Came from a family of farmers and physicians, which shaped his interest in agriculture and rural welfare.
- Education: Studied zoology and agricultural science in India, pursued further studies in plant genetics in the Netherlands and at the University of Cambridge, UK.
- Postdoctoral research in the USA at the University of Wisconsin exposed him to Norman Borlaug's work on high-yielding wheat.

Key Contributions

1. Green Revolution in India

- Context: In the 1960s, India faced acute food shortages, relying heavily on wheat imports under the PL-480 agreement from the USA.
- Role: As a geneticist at the Indian Agricultural Research Institute (IARI), Swaminathan:
  - Introduced high-yielding, disease-resistant wheat and rice varieties.
  - Advocated package technology: improved seeds, irrigation, fertilizers, pesticides, and supportive policies.
  - Worked closely with Norman Borlaug to adapt Mexican dwarf wheat to Indian conditions.
- Result: India achieved self-sufficiency in food grains by the 1970s, shifting from "ship-to-mouth" dependence to buffer stock surpluses.

2. Institution Building

- Director General, Indian Council of Agricultural Research (ICAR) (1972–1979).
- Principal Secretary, Ministry of Agriculture (1979–1980).
- Head, International Rice Research Institute (IRRI) in the Philippines.
- Founder Chairman, M. S. Swaminathan Research Foundation (MSSRF) in Chennai (1990) – focuses on sustainable agriculture, biodiversity conservation, and rural empowerment.

3. Policy Interventions

- Championed evergreen revolution – improving productivity without ecological harm.
- Advocated for gene banks and conservation of crop genetic diversity.
- Supported women in agriculture and ICT for rural knowledge dissemination.

Major Reports & Commissions

- Chaired the National Commission on Farmers (2004–2006):
  - Recommended Minimum Support Price (MSP) = Cost of production (C2) + 50%.
  - Focus on farmer-centric policies, risk management, irrigation access, and sustainable technology adoption.

Awards & Honours

- Padma Shri (1967), Padma Bhushan (1972), Padma Vibhushan (1989).
- First World Food Prize laureate (1987).
- UNESCO Gandhi Gold Medal for contributions to science and innovation in agriculture.

KALESHWARAM PROJECT

Context: One-man judicial commission to investigate corruption in KLIP.

Lift Irrigation Projects in India

Major Operational Lift Irrigation Projects

Project	State	Source of Water	Key Points
Kaleshwaram Lift Irrigation Project (KLIP)	Telangana	Godavari River	World's largest multi-stage lift irrigation; lifts water up to ~600 m; designed for irrigation, drinking water, and industrial use.
Handri-Neeva Sujala Sravanthi (HNSS)	Andhra Pradesh	Krishna River	Multi-phase; lifts water to drought-prone Rayalaseema.
Indira Gandhi Canal Lift Scheme	Rajasthan	IG Canal (from Sutlej-Beas)	Supplies water to higher elevation areas of Thar Desert.
Ganga Canal Lift Scheme	Uttar Pradesh	Ganga River	Provides irrigation in western UP; supplement to main Ganga canal.

Sardar Sarovar Lift Irrigation Schemes	Gujarat	Narmada River	Feeds command areas outside gravity reach; also provides drinking water.
Goura Lift Irrigation Project	Odisha	Mahanadi River	Supports agriculture in highland tribal areas.
Kundalia Lift Irrigation Scheme	Madhya Pradesh	Narmada River	Recently commissioned; aims to irrigate drought-prone areas of Rajgarh and Agar-Malwa.

Major Upcoming / Under-Construction Lift Irrigation Projects

Project	State	Source	Status & Significance
Palamuru–Rangareddy Lift Irrigation Scheme	Telangana	Krishna River	Under construction; to supply irrigation and drinking water to south Telangana.
Devadula Lift Irrigation Scheme	Telangana	Godavari River	India's highest capacity lift scheme in terms of discharge; several phases under execution.
Mekedatu Balancing Reservoir with Lift Component	Karnataka	Cauvery River	Proposed; controversy with Tamil Nadu over water-sharing.
Pattiseema Lift Irrigation Project (expansion)	Andhra Pradesh	Godavari River	Existing Godavari–Krishna interlinking; future expansion to improve drought proofing.
Upper Bhadra Project (Lift Component)	Karnataka	Tunga–Bhadra River	Declared National Project (2023); part of water distribution to drought-prone central Karnataka.

KHELO INDIA WATER SPORTS FESTIVAL (KIWSF)

Context: Dal Lake in Srinagar hosted the first-ever Khelo India Water Sports Festival (KIWSF). Over 400 athletes from across India competed for 24 gold medals in Olympic-class events like rowing, canoeing, and kayaking.

About Dal Lake:

Dal Lake is a famous urban lake located in Srinagar, Jammu & Kashmir, often called the “Jewel of Srinagar.” It is the second-largest lake in the Union Territory and is renowned for its houseboats, shikaras (traditional boats), and floating gardens.

- Geography: Spread over nearly 22 sq. km, the lake is fed by several mountain streams and is connected to other water bodies through canals.
- Tourism: It is one of India’s most iconic tourist attractions, offering houseboat stays, shikara rides, and views of the surrounding Himalayas.
- Economy: Supports livelihoods through fishing, tourism, and horticulture (floating vegetable gardens).

- Culture: Has deep cultural and historical significance, often featured in Kashmiri art, poetry, and films.
- Sports & Events: Recently transformed into a venue for water sports, including the Khelo India Water Sports Festival 2025, boosting its profile as a sports and adventure destination.

NATIONAL SPACE DAY

Context: National Space Day is being celebrated across India on August 23, 2025.

Key Highlights

- Theme 2025: *"Aryabhatta to Gaganyaan: Ancient Wisdom to Infinite Possibilities"*, celebrating India's journey from ancient astronomy to modern space exploration.
- Student Engagement: ISRO is conducting competitions and educational programs to inspire the next generation.
- Significance: Showcases India's rising leadership and commitment in space.

National Space Day

- Origin: National Space Day in India was first celebrated on August 23, 2024, to mark the successful soft landing of Chandrayaan-3 near the Moon's south pole on August 23, 2023.
- Significance of Chandrayaan-3: This mission made India the fourth country to achieve a lunar landing (after USA, USSR, China) and the first to land near the lunar south pole.
- Declaration: Prime Minister Narendra Modi announced August 23 as "National Space Day" during his visit to ISRO after the Chandrayaan-3 success.
- First Celebration (2024): Focused on showcasing India's space achievements and inspiring youth through ISRO exhibitions, competitions, and outreach programs.
- Theme (2025): *"Aryabhatta to Gaganyaan: Ancient Wisdom to Infinite Possibilities"* – linking India's ancient astronomical tradition to modern missions like Gaganyaan (human spaceflight) and the proposed Indian Space Station.
- Purpose:
    - To commemorate India's space achievements.
    - To inspire students and young scientists toward careers in STEM.

MAINS

PAPER 1

WITCH-HUNTING IN INDIA

Context: According to the National Crime Records Bureau of India, since 2000 more than 2,500 women have been killed after being branded as a witch. This number is estimated to be even higher, as many cases go unreported.

What is witch hunting?

Witch-hunting refers to the practice of accusing individuals mostly women of practicing witchcraft. Women accused of practicing witchcraft face various forms of physical and mental torture as well as execution. Severe violence is commonly use to punish accused witches and can include rape, beating, flogging and severing of limbs.

Data

- Over 663 were killed for allegedly practising witchcraft during 2015 and 2021 according to the National Crime Research Bureau (NCRB).
- The state of Jharkhand has recorded the highest total number of murders where the motive was witchcraft, with 593 women being killed on the grounds of witchcraft between 2001 and 2021 according to the National Crime Records Bureau.
- The states of Assam, Bihar, Chhattisgarh, Madhya Pradesh and Odisha also have recorded many cases of witch branding.

Why is Witch Hunting Still Thriving?

- Superstitious beliefs - People believe that witches have magical powers which they use to attack humans, destroy crops, harm animals, influence others' bodies and minds, or gain control in ways beyond medical explanation.
- Lack of knowledge - In remote, isolated areas with limited or no educational facilities, or among older illiterate people, women are often blamed for bad events when others cannot explain the cause.
- Lack of resources and poverty - Women are targeted due to poverty, refusal to engage in sexual relations, and other vulnerabilities.
- Other reasons include a gullible, conservative society, patriarchy, financial disputes, personal and social conflicts, jealousy, property disputes, lack of medical facilities, and ignorance.

Disturbing trends

- Accusations of witchcraft are systematically targeted on Widowed, elderly, or single women which are seen as obstacles to male inheritance or land ownership.
- Witch-branding functions as a tool of patriarchal control.
- Witchcraft accusations are common in areas where poverty, illiteracy, and poor health facilities are prevalent. In such cases supernatural effects are used to justify the unexplained deaths of livestock, illness or natural events.

- Accusations often arise from land disputes, caste conflicts, or community tensions, especially involving dominant caste men seeking to maintain social hierarchies.

Laws related to witch hunting:

- IPC Sections 302 (murder), 323 (voluntarily causing hurt), 506 (criminal intimidation) are invoked in cases of witch-hunting.
- Many states such as Assam, Jharkhand, Orissa, Chattisgarh, Bihar, Rajasthan have enacted Anti-Witch-Hunting Laws. These provide stringent punishment to perpetrators of a witch hunt but these state-level legislations are not sufficient to eradicate the atrocious act of witch-hunting.
- Witch-hunting and related superstitious beliefs lead to crimes that violate the fundamental articles such as Article 14, Articles 15(3) and 21 of the Indian Constitution and simultaneously violate several provisions of international legislations to which India is a signatory, like the Universal Declaration of Human Rights, 1948, Convention on the Elimination of All Forms of Discrimination against women, 1979 and International Covenant on civil and political rights, 1966.
- UN Human Rights Council adopted the resolution titled: "Elimination of Harmful Practices Related to Accusations of Witchcraft and Ritual Attacks (HPAWR)" in July 2021. It calls for Criminalisation of harmful practices related to witchcraft accusations, Awareness campaigns and community sensitisation and tackle root causes such as poverty, superstition, illiteracy, and gender inequality.

Need for Central Legislation:

- Current laws focus on punishment mechanisms and do not address the need to eradicate superstitious beliefs.
- Cases often treated as "local cultural matters" rather than gender-based violence.
- Low conviction rates, poor victim rehabilitation, and community complicity remain challenges.
- Reporting methods are limited, and victims often avoid reporting witch hunting due to fear or acceptance.
- The Prevention of Witch Hunting Bill was introduced in 2016 but never passed.

The Indian Government must make a universal law banning the practice of witch-hunting which is the need of the hour and must set up organizations to deal with such acts expeditiously as a matter of concern to eradicate the exploitation at large of women.

Other steps needed:

- Strengthen enforcement of anti-witch hunting laws.
- Fast-track courts and mandatory FIR registration in such cases.
- Spread scientific temper, especially in tribal and rural areas.
- Ensure last-mile delivery of healthcare and public health literacy to reduce fear-based belief systems.
- Train police, judiciary, and local administrators.
- Empower School Management Committees (SMCs), Panchayats, and self-help groups to counter superstition.
- Create safe shelters, medical and psychological support, and economic rehabilitation schemes for survivors.
- Encourage testimonies and survivor-led campaigns to break stigma.

HIROSHIMA AND NUCLEAR DISARMAMENT

Context: On August 6, 1945, a nuclear bomb exploded just above Hiroshima, instantly killing at least 70,000 people. Another 70,000 died of injuries and radiation sickness before the year ended. Three days later, a second weapon exploded over Nagasaki, killing 40,000 on the day.

Why was the bomb dropped?

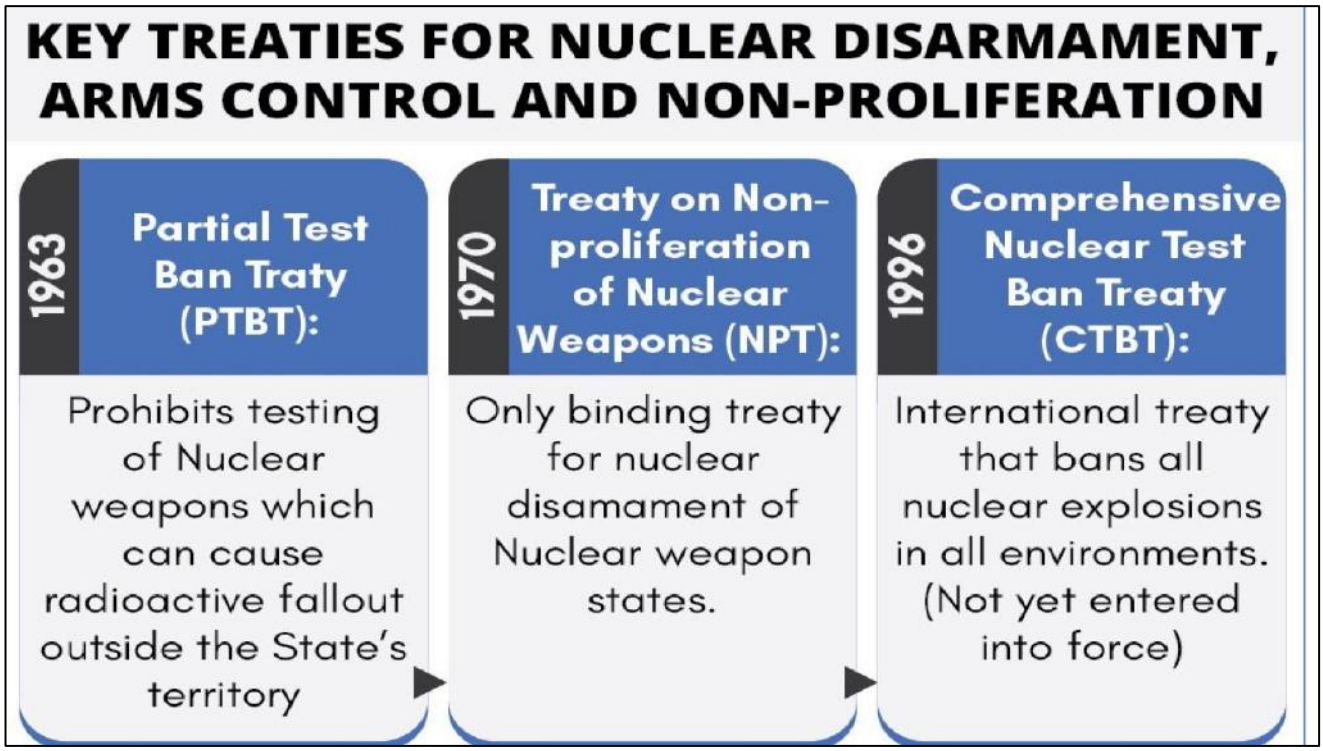
The primary reason for dropping the atomic bombs was to bring a swift end to World War II. By August 1945, Japan showed no signs of surrendering, and U.S. military leaders estimated that an invasion of Japan would result in significant American and Japanese casualties. President Harry Truman and his advisors believed that using the atomic bomb would force Japan to surrender unconditionally, thus avoiding a prolonged and bloody ground invasion.

Another critical factor was the geopolitical landscape at the time. The U.S. aimed to demonstrate its military might, particularly to the Soviet Union, which had just declared war on Japan.

Global Nuclear order post Hiroshima

In the decades after Hiroshima, the nuclear order took shape.

- After World War II and the bombing of Hiroshima and Nagasaki, the world realized the need to control nuclear weapons.
- The United Nations (UN) was created in 1945 to promote peace.
- In 1968, countries signed the Nuclear Non-Proliferation Treaty (NPT) to stop the spread of nuclear weapons.
- The United States, Soviet Union, Britain, France, and China became the five officially recognised nuclear powers.
- Others like India, Pakistan, and North Korea built their arsenals outside this system.



India supports universal nuclear disarmament, but refuses to join treaties like NPT and CTBT unless they are non-discriminatory and equitable. Advocates for a step-by-step approach under a global framework, not through biased treaties.

International Court of Justice (ICJ) Opinion:

- In 1996, the ICJ said using nuclear weapons would generally go against humanitarian law, but it didn't make a final judgment on legality.
- This created a moral pressure to avoid using nuclear weapons, even if not legally banned.

Conclusion:

- The legacy of Hiroshima continues to hold profound relevance in contemporary global discourse on war, peace, and international security. As the world grapples with emerging threats, resurgent rivalries, and advances in military technology, the Hiroshima experience must inform efforts to promote disarmament, foster mutual trust, and strengthen multilateral commitments to shared security.

WHY RURAL INDIA IS MISSING OUT ON MENSTRUAL HEALTH PROGRESS

Context: Urban India has witnessed growing awareness and accessibility of menstrual hygiene products, rural India continues to lag behind.

Status of Menstrual Hygiene in Rural India

According to the National Family Health Survey - 5 (NFHS-%)

- Only 42% of adolescent women in India exclusively used hygienic methods during menstruation
- Variation: 23% in Uttar Pradesh to 85% in Tamil Nadu.
- In Bihar, where over 88% of the population lives in rural areas, according to the Census of India 2011, uptake remains low: around 56% of rural women in Bihar use hygienic methods compared to 74.7% in urban areas.

These disparities heighten vulnerability to a range of health risks.

Causes of Urban–Rural Gap

- In rural households with limited resources, sanitary products are considered a *non-essential luxury*. The choice often comes down to buying food, milk, or other essentials versus sanitary pads.
- Many rural women do not have direct control over finances and must depend on male family members, making it harder to purchase pads regularly.
- Tribal and remote areas, women often have to travel long distances to access sanitary products, which discourages consistent use.
- Even when pads are available under government schemes, irregular supply and poor last-mile delivery prevent sustained access in rural communities.
- Many girls are unaware of hygienic alternatives due to absence of formal education on menstrual health in schools.
- Menstruation is still considered a taboo subject in many communities. Girls and women are discouraged from talking openly, which perpetuates misinformation and prevents behavioural change.

Impact of Poor Menstrual Hygiene

- Use of unhygienic materials like old rags or damp cloth increases exposure to bacterial and fungal infections.
- According to Dasra NGO, **23% of girls drop out after menarche** due to lack of toilets, sanitary products, and fear of stigma. Girls who miss **4–5 days of school per month** fall behind academically by nearly 25%, increasing chances of permanent dropout.

- Large-scale exclusion of women from education and workforce participation reduces India's **human capital productivity and GDP growth potential**.

Example: Case of Juangs communities (Odisha)

- 85% women use old cloth during menstruation.
- 71% reported menstrual health problems.
- Only one-third seek medical help.
- Women excluded from religious and social activities during periods.

Government Initiative – Menstrual Hygiene Scheme (2011):

- Launched to provide free sanitary pad distribution, awareness programmes, and safe disposal systems.
- However, the scheme faced serious disruptions during the COVID-19 pandemic, affecting access and continuity.
- **Evaluation in Assam and Tripura (2017–2021):** Consistent supply of pads improved hygienic practices. Among girls aged 15–19, sanitary pad usage rose by 10.6 percentage points, and overall adoption increased by 13.8 percentage points.

Steps needed

- Menstrual health should be a part of adolescent health education to ensure girls and boys both learn about it in a scientific and stigma-free manner.
- Local NGOs, ASHA workers, and women's groups can lead discussions to break cultural taboos and normalise conversations on menstruation.
- Government and private players should make pads, menstrual cups, and reusable cloth pads affordable, especially for rural and tribal women.
- Partnerships with self-help groups, women entrepreneurs, and rural cooperatives can ensure regular supply in remote areas.
- Separate, safe toilets with water supply and disposal bins in schools and workplaces are crucial for menstrual hygiene.
- Menstrual health should be treated as part of public health, gender equality, and poverty reduction policies, not just a welfare add-on.

Conclusion

- Menstrual health is not just a women's health issue but a human rights, education, and economic development concern. Bridging the rural-urban divide requires a multi-pronged approach combining affordability, awareness, infrastructure, and empowerment.

PAPER 2

KERALA'S LITERACY AND UNEMPLOYMENT PARADOX

Introduction (Context)

Kerala has long stood out as a success story with near-universal literacy, strong gender parity in education, and robust public schooling systems, it is often held as a model State in India's educational discourse.

According to the Periodic Labour Force Survey (PLFS) 2022-23, Kerala reports a graduate unemployment rate of 42.3%, one of the highest in the country.

Issues in higher education system:

1. Elite Capture of Higher Education

- Access to quality higher education in India remains limited to a privileged few, often determined by socio-economic background, not merit.
- Elite institutions (IITs, IIMs, top central universities) are disproportionately accessed by students with better schooling, coaching, and financial support.
- Reservation and scholarships offer limited symbolic inclusion but fail to significantly alter structural inequalities.

2. Inequality Between Institutions

- A large quality gap exists between elite and non-elite colleges.
- Students from top institutions secure high-paying jobs, while those from others face low employability and stagnant wages.
- This has created an educational hierarchy that favors institutional brand over individual potential.

3. Mass Enrolment, Minimal Gain

- Over 90% of students attend non-elite institutions with poor teaching quality and weak industry links.
- Underemployment is widespread even among graduates, especially in general and arts streams.
- Additional years in college are no longer a guarantee of employment or upward mobility.

4. Growing Skills-Job Mismatch

- According to the Graduate Skill Index 2025 Employability fell from 44.3% in 2023 to 42.6% in 2024. This reflects a growing disconnect between curriculum and market needs.

5. Persistent Social Inequities

- Despite growth in overall enrolment, caste-based disparities in participation remain.

- Female enrolment now exceeds male, but it's unclear whether this will lead to equitable employment and empowerment.
- Marginalized groups still face significant barriers to access and success.

6. Unregulated Privatisation and Declining Quality

- Rapid expansion of private colleges without oversight has led to low teaching standards, high costs, and poor placement outcomes.
- The growth has been quantitative, not qualitative.

7. Parallel Education Industry

- The coaching and private tutoring ecosystem has grown alongside formal institutions.
- It further commercializes education and reinforces the divide between the well-prepared elite and the rest.

Key Issues with respect to Kerala

- Kerala's educational model has traditionally emphasized formal academic pathways with relatively less focus on vocational or skill-based education.
- As per the Kerala State Planning Board's Economic Review 2023, while higher education enrolment is robust, nearly 70% of courses offered are in general streams like humanities and pure sciences, with minimal alignment to industry-specific or emerging sectors.
- Colleges and universities in Kerala are not linked with industries or job markets. Unlike Germany (with its dual vocational education system), Kerala does not have enough practical training during studies.
- Most courses are not updated to include new technologies or current job trends (like AI, data, green energy).
- According to the Kerala Economic Review (2023), less than 10% of state-funded higher education institutions offer STEM-oriented vocational programs, despite rising job demand in such sectors.
- The Centre for Development Studies reports that over 2.1 million Keralites live and work abroad, primarily in the Gulf, many of whom are graduates unable to find appropriate jobs at home. While remittances help the State's economy, they also reflect a failure of domestic job creation and talent retention.

Examples from other states

- Tamil Nadu has built a relatively stronger network of polytechnic institutions and vocational training centers. As per NSDC's Tamil Nadu Skill Gap Report, the state's industrial linkages and sector-focused skilling have helped reduce the incidence of graduate unemployment to 23.4% (NSDC, 2022).
- Karnataka, with its growing tech ecosystem, has similarly diversified its post-secondary offerings through public-private training collaborations that provide students with both soft and hard skills.
- In Bihar, the graduate unemployment rate stands at 33.9% (PLFS 2022-23), while only 25.7% of youth aged 18–23 are enrolled in any form of higher education (AISHE, 2021-22). The challenge here is dual: improving access to quality education while ensuring it meets market relevance.

Key reforms needed

- A robust career guidance system must be introduced in secondary schools. Lack of guidance leads students to choose degrees without understanding job prospects or industry relevance.
- Vocational education should be treated as equal to academic education, not inferior.
- Kerala can draw from Germany's Berufsschule model or Singapore's Institute of Technical Education, which blend classroom learning with real-world apprenticeships.
- States must establish employment-linked metrics in evaluating higher education institutions. Tamil Nadu's recent move to integrate placement statistics into college rankings could be adapted across States.
- National bodies like NSDC and the Ministry of Education must work together to ensure skilling programs are not isolated from formal education.

Conclusion

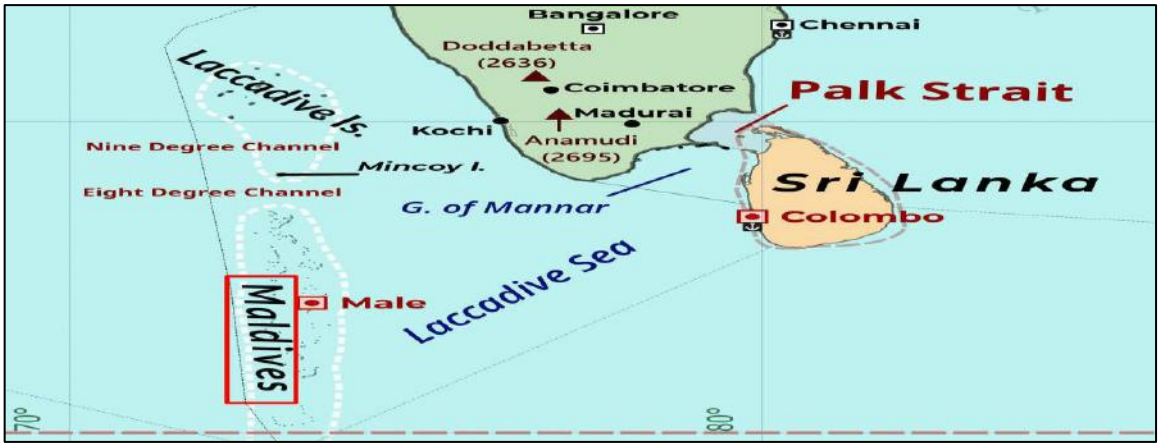
In sum, Kerala's graduate unemployment is not merely a state-specific problem; it is a mirror reflecting the structural inefficiencies in India's education-employment continuum. The nation must move beyond celebrating enrolment numbers and focus instead on educational utility.

INDIA-MALDIVES RELATIONS

Context: Prime Minister Narendra Modi recently concluded a two-day state visit to the Maldives, signalling a reset in ties between the countries, after a period of strain following the election of President Mohamed Muizzu in November 2023.

History of India-Maldives Relations:

- India and the Maldives have shared a historically friendly and strategic partnership based on geographical proximity, cultural ties, economic interdependence, and security cooperation.
- India and Maldives established diplomatic relations on November 1, 1965, soon after the latter gained Independence from the British.
- It was the third nation to do so, after the United Kingdom and Sri Lanka.
- The first resident mission of the Maldives in India was established in 2004, with a consulate established in Thiruvananthapuram in 2005.



Signicance of Maldives for India

- Maldives lies near crucial International Sea Lanes (ISLs) between the Gulf of Aden, Strait of Hormuz, and Strait of Malacca. Over 80% of India's trade by volume and energy supplies pass through these waters.

- Maldives helps India monitor the chokepoints in the Indian Ocean, essential for anti-piracy and maritime surveillance.
- Cooperation in intelligence sharing and joint naval exercises (like Exercise Ekatha) boosts regional stability.
- Indian professionals (teachers, doctors, engineers) contribute to Maldives' public services. Cultural and religious similarities foster soft power diplomacy.
- Maldives is a partner in SAARC, IORA, SASEC, Colombo Security Conclave and supports India's position in forums like the UN Security Council

India-Maldives Strategic and Diplomatic Ties:

- The two nations have engaged in peaceful bilateral co-operation and trade
- Conducted bilateral defence exercises such as:

➔ Bi-annual series of Coast Guard maritime joint training exercises, launched in 1991, codenamed DOSTI.

➔ The two nations have held joint army training exercises titled Ekuverin.

- Maldives and India are both members of the South Asian Association for Regional Co-operation (SAARC), and have been aligned on issues of regional security.
- Maldives has reportedly supported India's bid to become a permanent member of the United Nations Security Council.
- India has also offered humanitarian assistance to Maldives, such as in the aftermath of the devastating 2004 tsunami in the Indian Ocean.
- India has also contributed to infrastructure projects in the area, including the Greater Male Connectivity Project.

Reasons for recent constraints

- Post-Muizzu's election (Nov 2023), Maldives adopted an India-Out stance.
- The inking of several agreements with China also deepened the Indian government's concerns about growing Chinese influence in the region.
- Established INS Jatayu naval base in Minicoy (Lakshadweep) to enhance maritime surveillance near Maldives.

Way forward

- Reduce visible military footprint; focus more on capacity-building, education, health, and green technology.
- Use platforms like SAARC, IORA, and Colombo Security Conclave to align mutual interests.
- Establish long-term MoUs, FTA, and track-2 dialogues to deepen ties beyond short-term politics.

CHINA EXTENDING POLICING NETWORK OVERSEAS

Context: China is expanding its overseas policing presence through formal agreements and informal networks across Europe and beyond. Under the guise of protecting Chinese citizens and tourists abroad, China's Ministry of Public Security (MPS) has deployed personnel for joint patrols and established alleged "service centres," raising concerns over surveillance, repression of dissidents, and breach of host country sovereignty.

Presence of China's Joint Patrols

- In July 2024, China sent an eight-member police team to Croatia for joint patrols under a 2017 China-Croatia Agreement on Police Cooperation.
- The patrols are formed to address the "safety-related concerns" of not just Chinese tourists, but also Chinese citizens and overseas Chinese people in Croatia.
- They operated in Croatian cities such as Zagreb, Dubrovnik, Zadar etc.
- Under the operation 'Sky Net', joint police patrolling initiatives have been launched with Serbia, Italy and Hungary.
- Three month-long patrols have already been conducted in Serbia in 2019, 2023, and 2024.
- In Hungary, the Qingtian County Public Security Bureau has gone as far as creating 'police service centres' in the country.

Concerns

- Surveillance and harassment of political dissidents, ethnic minorities (e.g., Uyghurs, Tibetans), and human rights activists living abroad.
- Operation of "informal police stations" or "service centres" that conduct law enforcement activities outside the framework of formal diplomatic protocols or international law.

Conclusion

The phenomenon of informal overseas policing and surveillance highlights the need for strict adherence to international norms and robust legal frameworks to protect the rights and freedoms of diaspora communities.

NEP: TRANSFORMING SCHOOL EDUCATION IN INDIA

Context: The National Education Policy (NEP) 2020 has replaced the 10+2 system with a 5+3+3+4 school structure, aligning education stages with a child's cognitive development.

Objective of NEP 2020

- NEP 2020 emphasizes on ensuring universal access to school education at all levels- pre-school to secondary.
- To increase the Gross Enrolment Ratio in higher education including vocational education from 26.3% (2018) to 50% by 2035.
- 3.5 Crore new seats will be added to Higher education institutions.
- The Centre and the States will work together to increase the public investment in Education sector to reach 6% of GDP at the earliest.

Overview of the 5+3+3+4 Structure

The 5+3+3+4 model replaces the traditional 10+2 system and divides the educational journey into four stages based on the cognitive and developmental needs of children:

1. Foundational Stage (5 years):

- Age Group: 3 to 8 years
- Components: This stage includes 3 years of preschool (Anganwadi or nursery) followed by 2 years of primary education (Classes 1 and 2).
- Focus: Emphasizes play-based and activity-driven learning to develop essential skills such as social interaction, language, and basic numeracy.

2. Preparatory Stage (3 years):

- Age Group: 8 to 11 years
- Components: Covers Classes 3 to 5.

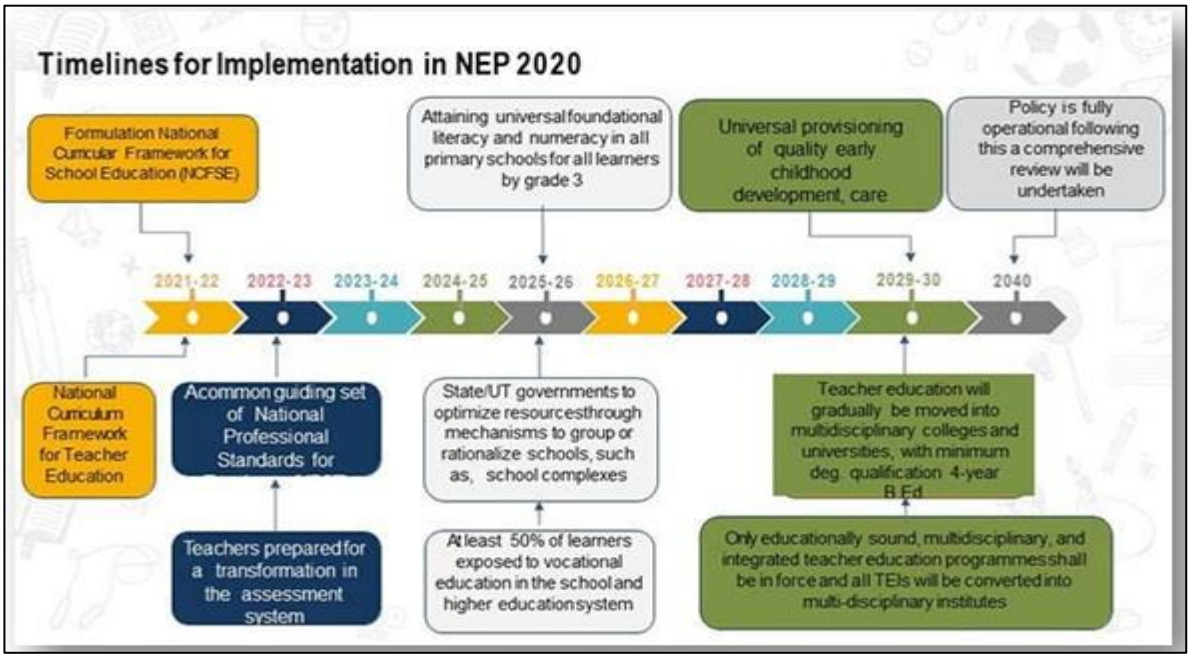
- Focus: Introduces subjects like reading, writing, science, and mathematics, with a discovery-oriented approach to foster curiosity and critical thinking.

3. Middle Stage (3 years):

- Age Group: 11 to 14 years
- Components: Encompasses Classes 6 to 8.
- Focus: Aims to deepen knowledge in various subjects while encouraging students to explore their interests and develop skills in a more structured environment.

4. Secondary Stage (4 years):

- Age Group: 14 to 18 years
- Components: Includes Classes 9 to 12.
- Focus: Prepares students for higher education and vocational training, allowing them to choose subjects based on their interests and career aspirations.



Key Gaps in Implementing NEP's 5+3+3+4 Model

1. Infrastructure Gaps

- Many private urban schools have started using NEP methods like play-based learning and soft-skill evaluation.
- Most government and rural schools still lack basic facilities such as:
  - Toilets and clean drinking water.
  - Proper classrooms many anganwadis run in single rooms.
  - Pre-primary classes, which are the starting point of the foundational stage.
  - Adequate teaching-learning materials.

2. Teacher Preparedness

- NEP's success depends on well-trained teachers, however, challenges include:
  - Limited exposure to activity-based and competency-based teaching.
  - Outdated B.Ed. courses still designed for the old 10+2 system.
  - Need for continuous mentoring and hands-on classroom support.

3. Curriculum & Textbook Changes

- States are rolling out NEP-aligned syllabi at different speeds.
- Issues faced:
    - Some states like Karnataka and Maharashtra have started updates, but others are lagging.
    - Textbooks often arrive late; in some cases, mid-year.
    - Teachers have to rely on outdated books, leading to inconsistent learning quality.
    - No uniform standard across states, which goes against NEP's aim of equal education access.

4. Parental Awareness & Support

- Many parents, especially in semi-urban and rural areas, are not aware of NEP's new approach.
- Common issues:
    - Parents still measure learning through high marks and rote memorisation.
    - They often doubt the value of play-based learning, projects, and portfolio assessments.
    - Building trust and understanding takes time and regular interaction.

Recent Initiatives for NEP implementation

- PM SHRI Schools initiative aims to upgrade over 14,000 government schools. These schools will act as model NEP schools with modern infrastructure, experiential learning, and digital classrooms.
- Delhi, Maharashtra, and Odisha have started testing new foundational and preparatory stage curricula.
- Platforms like NISHTHA and DIKSHA provide online training and resources for teachers.

What needs to be done?

For the NEP and its 5+3+3+4 model to succeed, we must:

- Strengthen foundational infrastructure – especially in anganwadis and primary schools.
- Revamp teacher education both pre-service and in-service.
- Ensure timely rollout of updated curriculum and materials.
- Engage parents and communities to build awareness and trust.
- Monitor progress transparently and support schools in the transition.

Conclusion

The 5+3+3+4 model is not just a structural reform but a shift in mindset about what education should achieve. Its success depends on collective action by policymakers, educators, parents, and communities. With sustained investment in infrastructure, teacher capacity, and community awareness, India can turn this policy into a global benchmark for school education reform.

ANTI-CRUELTY LAW AND SUPREME COURT JUDGMENT

Context: In Shivangi Bansal vs Sahib Bansal (July 2025), the Supreme Court upheld the Allahabad High Court's directive suspending arrest or coercive action for two months in cases under Section 498-A IPC (now Section 85, Bharatiya Nyaya Sanhita), pending review by family welfare committees.

About Section 498-A IPC

- In many marriages, women face serious inequality. They may be Discriminated against in daily life or harassed or tortured physically, mentally, or emotionally.
- To address this concern, Section 498-A IPC was inserted in 1983 to address cruelty by a husband or his relatives towards a woman, including dowry harassment and acts driving her to suicide or serious injury.
- It may lead to Imprisonment up to 3 years and a fine.

Ruling of the Court

- Allahabad High Court directed that no arrest or coercive action must be taken against the accused persons for a 'cool-off' period of two months from the complaint.
- It also directed the district-level constitution of family welfare committees, to which cases are directed to be transferred to.
- SC has approved these directions without in-depth analysis of the wider socio-political consequences.
- Implications:
- ✓ Even with strong evidence, police cannot arrest for two months.
- ✓ Complainants face a cool-off period that may deter them from filing cases.
- ✓ Safety risks increase for victims, especially in hostile domestic environments.
- ✓ Legitimises police inaction in serious allegations of domestic violence.

Issue of Misuse of law

Although, Section 498-A IPC was enacted as a safeguard to protect married women from cruelty. While it has helped many women, there are also concerns about its misuse in some cases.

Forms of misuse:

- False or exaggerated allegations of cruelty are made against husband and relatives.
- To seek revenge after failed marriage or relationship, the wife or her family makes complain

Due to this, in most cases complaint is generally followed by the demand of a huge amount of money to settle the case outside the court.

Further, the vagueness of the law makes it easier for false claims to be made and law enforcement officers often act arbitrarily. Make indiscriminate arrests without proper investigation.

Supreme Court's Attempt to Stop Misuse

- In Arnesh Kumar vs State of Bihar (2014), the Supreme Court gave strict instructions:
- ✓ Police should not automatically arrest when a 498-A complaint is filed.
- ✓ They must first check if arrest is necessary under Section 41 of the Criminal Procedure Code (CrPC).

These guidelines were meant to make the law more strict against false arrests.

Ground Reality – Data & Surveys

- NCRB 2022: 1,34,506 cases registered under Section 498-A.
- NFHS-5: High prevalence of under-reporting of domestic violence in several States.
- Humsafar Report: Rise in cases reflects greater awareness, not necessarily misuse.

Hence, to draw conclusions of widespread misuse from individual cases "reflect institutional bias that exists within the criminal justice system"

The ruling removes urgent legal protection during the most dangerous period after filing a complaint which may have serious implications on the victim.

Way Forward

- Address misuse concerns without diluting core protections for victims.
- Ensure prompt, time-bound inquiries rather than blanket suspension of arrests.
- Use mediation for matrimonial disputes but keep penal provisions fully available for violence cases.
- Prioritise safety of complainants through protection orders, shelters, and immediate police intervention where needed.

Conclusion

The Supreme Court's ruling, while aimed at preventing alleged misuse, risks weakening vital protections for victims of domestic cruelty. A victim-centric approach that safeguards rights without undermining due process is essential to uphold both justice and gender equality.

ISSUE OF STRAY DOGS

Introduction:

Stray-dog bites in Delhi-NCR are a critical public health concern—evidenced by tens of thousands of bites annually and rising rabies cases. The Supreme Court directed municipal authorities to house stray dogs in shelters, highlighting urgent legal and humanitarian dimensions of this issue.

Problems & Challenges

1. Public Health Crisis
    - Delhi records over 68,000 dog-bite cases in 2024, with 49 recorded human rabies deaths by July 2025.
    - Human rabies remains nearly 100% fatal—prompt and effective animal and human interventions are urgent.
2. Infrastructure & Institutional Gaps
    - Municipal capacities are severely overstretched; NCR-wide dog populations run into tens of thousands, but shelter infrastructure is grossly inadequate.
    - Financial resources, skilled personnel (veterinarians, handlers), and land for humane shelters are lacking.
3. Urban Drivers Sustaining Stray Populations
    - Open garbage, wet-waste mismanagement, offal from slaughterhouses, construction waste, and irresponsible pet abandonment create feeding grounds that support and sustain the stray dog population.
4. Policy–Operational Disconnect
    - The Animal Birth Control (ABC) Rules, 2023, mandate catch–neuter–vaccinate–return-to-locality (CNVR), whereas the recent SC order urges detention in shelters. This conflict threatens implementation.
5. Data and Coordination Deficits
    - No comprehensive dog census or microchipping system exists; bite and rabies case reporting is patchy; coordination between health, municipal, and animal welfare departments is weak.

Supreme Court Judgments & Legal Context

1. Supreme Court Principles
    - In *A. Nagaraja* (2014), the SC affirmed animals' dignity, and under Articles 51A(g),(h), upheld citizens' and the State's duty to practice compassion and scientific temper in animal management.
2. Recent SC Direction (Aug 2025)
    - A Bench ordered authorities to pick up stray dogs and house them in shelters, addressing public safety imperatives.

Way Forward (Reforms & Actions)

1. Mass Vaccination & Targeted CNVR
    - Achieve >70% dog vaccination (WHO benchmark) combined with behaviour-based release; unadoptable or aggressive dogs to humane shelters.

2. Sacrificial Infrastructure—Shelters with Standards
    - Modular, sanitary shelters with capacity for quarantine, veterinary care, behavioural assessment, and adoption programs.
    - Build through PPPs/NGOs under service-level agreements for sustainability.
3. Waste & Environmental Management
    - Enforce wet-waste segregation and manage offal; clamp down on illegal dumping; regulate pet-living areas and pet-food waste.
4. Pet Ownership Regulations
    - Mandatory pet registration and microchipping; licensing for breeders and pet shops; enforce anti-abandonment fines.
5. Bite-Response & Human Health Protocols
    - Ensure steady ARV/HRIG supply; train healthcare staff in bite management; conduct awareness drives in schools and communities.
6. One Health Coordination
    - Create inter-departmental Task Forces combining health, veterinary, municipal, education, and NGOs to drive integrated interventions.

Case Studies

1. ABC Programme – Jaipur Model (Rajasthan)
    - NGO Help in Suffering (HIS) partnered with Jaipur Municipal Corporation in the 1990s.
    - Sterilized over 80% of stray dogs within a decade → sharp decline in dog bites and zero rabies deaths reported.
2. Sikkim (SARAH programme):
    - state-wide CNVR + vaccination + humane education; dramatic fall in human rabies and bites; strong inter-departmental coordination.
3. Chennai's Blue Cross of India Initiative
    - Set up designated feeding points for strays while keeping residential areas safer.
4. International Example – Bhutan's Nationwide Sterilization Drive
    - Bhutan implemented 100% sterilization coverage in urban centers with help from Humane Society International.
    - Rabies eliminated in key cities; humane treatment became a public value.

Conclusion

The issue of dog bites in NCR demands a balanced One Health approach—one that ensures public safety without compromising animal dignity. Ethics demands that India treat even its stray dogs with compassion and scientific rationality—reflecting both constitutional duty and public health necessity.

DETOXIFYING INDIA'S ENTRANCE EXAMINATION SYSTEM

Context: Every year, nearly 70 lakh students in India compete for limited undergraduate seats through entrance examinations such as JEE, NEET, CUET, and CLAT.

Coaching industry and pressure

- Over 15 lakh students prepare for JEE alone.
- Coaching centres charge exorbitant fees (₹6–7 lakh for two years).
- Students as young as 14 enter a treadmill of problem-solving with advanced texts, leading to alienation, stress, and depression.
- Some governments have enacted laws to regulate coaching centres. Yet, the root issue lies in an entrance examination system that overqualifies students and distorts merit.

Issues with Current Entrance Examination System

- Around 15 lakh students compete for just 18,000+ IIT seats, making the competition extremely intense.
- The system tries to differentiate between students scoring 91% vs 97% in Class 12 or 99.5 vs 99.9 percentile in JEE, which is an unrealistic distinction.
- For pursuing a B.Tech degree, a decent Class 12 score of 70–80% in PCM subjects is already sufficient.
- Due to limited seats and uneven quality of colleges, students are forced to aim for extraordinary scores, creating a false sense of hierarchy.

Psychological and Social Consequences

- Psychologically, students suffer immense stress, depression, and burnout.
- Socially, the system benefits wealthier families who can afford elite coaching centres, giving an illusion of "merit."

Philosopher Michael Sandel argues that this kind of meritocracy is toxic, as it ignores the role of luck and privilege. To address such flaws, Sandel even suggests lotteries for admissions in top universities like Harvard and Stanford.

Global Inspirations

- **Dutch Lottery Model**

✓ Weighted lottery in medical admissions (since 1972, reinstated in 2023).
✓ Students above a threshold enter a lottery; higher grades improve odds.
✓ Promotes diversity, reduces bias, and lessens pressure.

- **China's "Double Reduction" Policy (2021)**

✓ Banned for-profit tutoring in school subjects.
✓ Nationalised coaching to cut financial burden and protect youth well-being.
✓ Directly addressed issues of overgrowth and disorder in private coaching.

Steps needed

- Admissions should be simplified by trusting Class 12 board exams instead of multiple entrance tests.
- An eligibility threshold (e.g., 80% in Physics, Chemistry, and Mathematics) can be set for B.Tech admissions.
- Seats can be distributed through a weighted lottery system, where higher marks increase chances but all eligible students have a fair opportunity.
- To promote social mobility, 50% of IIT seats can be reserved for students from rural areas and government schools.
- Professors should be rotated across IITs to maintain uniform standards and dismantle hierarchies among campuses.

Conclusion

India stands at a crossroads either to continue with a toxic, high-pressure race that scars students and society or adopt a fair, equitable, and student-centric system. Moving towards a lottery-cum-threshold model, inspired by global practices, can democratise access, reduce coaching dependence, and restore balance in education.

PAPER 3

THE 'RIGHT TO REPAIR' MUST INCLUDE THE 'RIGHT TO REMEMBER'

Context: In May 2025, the Indian government the Repairability Index for mobile phones and appliances, ranking products based on ease of repair, spare part access, and software support.

What is Right to Repair?

Right to Repair refers to the legal right of consumers to repair and modify their own consumer products, especially electronics and appliances, without relying solely on the manufacturer.

It includes access to:

- Spare parts and manuals
- Diagnostic tools
- Software updates
- Information on disassembly and repair

Significance

- Reduces e-waste by extending the life of products.
- Prevents monopolies by large manufacturers.
- Supports small-scale technicians and informal repair sectors.
- Promotes reuse, recycling, and resource conservation.
- Encourages frugal innovation and local adaptability.

Human side of Right to repair

- Right to Repair depends on human skills. It's not just about fixing gadgets it's about the ability and experience of people who repair them.
- In India, most repair workers learn by doing through observation, practice, and hands-on work, not formal training.
- This knowledge is called tacit knowledge. It means skills that are hard to put into words or write down, like identifying problems just by listening to a machine.

- This kind of knowledge is key to keeping products working and reducing waste. It helps build material resilience, especially in a country like India.

Blind Spots in Digital and Skill Policy

- E-Waste Rules 2022 emphasise recycling, with little focus on repair as a preventive solution.
- PMKVY & Skill India emphasise formal certification; do not accommodate informal diagnostic repair work.
- National Education Policy 2020 celebrates experiential learning but lacks provisions to preserve indigenous technical knowledge.
- Mission LiFE promotes sustainable consumption but does not adequately integrate repairers into the policy ecosystem.

Steps needed

- Redesign products for easy repair:
✓ Most gadgets today are not made to be fixed, they are compact and sealed.
✓ A 2023 report by iFixit found that only 23% of smartphones in Asia are easy to repair.
✓ To change this, design norms and procurement policies must include repairability from the start.
- Adopt the Idea of "Unmaking"
✓ Concepts like “unmaking” (disassembly and repurposing) enable learning from breakdowns."
✓ The electronic box should inform both hardware standards and AI-integrated systems.
- Institutional Integration:
✓ The Ministry of Electronics and Information Technology can embed repairability criteria into AI and procurement policies.
✓ The Department of Consumer Affairs could expand the Right to Repair framework to include product classification and community involvement.
✓ Platforms such as e-Shram, under the Ministry of Labour and Employment, can formally recognise informal repairers and connect them to social protection and skill-building schemes.
- Use of AI tools
✓ AI tools such as decision trees can help codify typical repair pathways, while Large Language Models can capture, summarise, and translate tacit repair narratives into structured, shareable knowledge, enabling broader learning without stripping local context or expertise.
- Social Protection and Incentives:
✓ Provide micro-credit, insurance, and upskilling support to informal repairers.
✓ Offer repair vouchers to incentivise local repair usage over new purchases.

Conclusion

The Right to Repair must expand beyond product access to include the right to remember, to value, and to integrate centuries-old knowledge systems into modern policy. To build a truly repair-ready and just technological future, India must redesign not only its devices but its governance frameworks — with repairers at the centre, not the periphery.

BATTERY WASTE MANAGEMENT

Context: India, with its focus on decarbonisation, has witnessed rapid electrification, particularly in the realm of electric vehicle (EV) adoption. There are projections that India’s EV lithium battery demand may skyrocket to nearly 139 gigawatt-hours (GWh) by 2035 from 4 GWh in 2023.

Battery Waste Management Rules (BWMR) in 2022

In 2022, Lithium batteries alone accounting for 7,00,000 of the 1.6 million metric tonnes of e-waste generated

Recognising these risks, the government notified the Battery Waste Management Rules (BWMR) in 2022 to ensure sustainable management and recycling.

Salient provisions of Battery Waste Management Rules (BWMR) in 2022 are:

- Comprehensive Coverage:
- ✓ The rules cover all types of batteries, viz. Electric Vehicle batteries, portable batteries, automotive batteries and industrial batteries.
- Extended Producer Responsibility (EPR):
- ✓ The rules are based on the EPR framework, where producers, including importers, are responsible for the collection, recycling/refurbishment, and incorporation of recovered materials into the production of new batteries.
- ✓ Producers must ensure 100% collection of waste batteries and their proper processing.
- ✓ Disposal of batteries in landfills or incineration is strictly prohibited.
- Flexibility in Compliance:
- ✓ To meet their EPR obligations, producers may either set up their own recycling/refurbishment mechanisms or authorize third parties (recyclers, refurbishers, or collection agencies).
- EPR Certificate Mechanism:
- ✓ A centralized online portal will be established for seamless registration, tracking, and exchange of EPR certificates between producers and recyclers/refurbishers to ensure accountability and transparency.
- Boost to Recycling Industry and Innovation:
- ✓ The rules encourage the creation of new industries and entrepreneurship in battery collection and recycling.
- ✓ Mandated recovery targets for valuable materials (like lithium, cobalt, and nickel) will promote technological innovation and investment in the recycling ecosystem.
- Use of Recycled Content:
- ✓ Producers are required to use a minimum percentage of recycled materials in manufacturing new batteries, reducing dependency on virgin raw materials and conserving natural resources.
- Monitoring and Enforcement Mechanisms:
- ✓ A dedicated monitoring committee to oversee implementation and address grievances or bottlenecks.
- Environmental Compensation (Polluter Pays Principle):
- ✓ Financial penalties (environmental compensation) will be levied for failure to meet EPR targets or comply with responsibilities.

Issues

- Skewed EPR Floor Price
- ✓ India's Battery Waste Management Rules, 2022 introduced Extended Producer Responsibility (EPR) to make producers responsible for battery recycling.
- ✓ However, the EPR floor price — the minimum price recyclers should receive to process waste — is too low to support safe, high-quality recycling.

- ✓ Proper disposal of lithium battery waste is expensive, requiring advanced processing technologies, safe transportation, and skilled labour to prevent hazardous materials from leaching into ecosystems.
- ✓ Without viable pricing, legitimate recyclers struggle, while informal and fraudulent operators thrive, issuing fake certificates and dumping toxic waste.
- ✓ Further, Lithium-ion batteries contain valuable minerals (lithium, cobalt, nickel). Efficient recycling can reduce India's dependence on imports and support energy security and green tech

- Resistance to compliance

- ✓ Large multinational producers often follow double standards, complying in developed nations but neglecting environmental responsibilities in developing countries like India.
- ✓ This trend risks undermining the establishment of resilient and sustainable battery ecosystems across the global south.

- Informal sector

- ✓ Informal recyclers lack capacity and regulation, yet handle a bulk of the battery waste.
- ✓ Weak enforcement, lack of audits, and manual certificate tracking lead to rampant malpractice in the recycling value chain.

Steps Needed:

- India must consider adopting a fair and globally comparable EPR floor price that reflects the real costs of recycling and industry building
- Policymakers, industry and recyclers should establish a viable pricing structure after analysing global pricing structures and best practices.
- The EPR floor price for recycling battery waste should cover the full spectrum of recycling expenses, from collection to material recovery, ensuring that recyclers can operate sustainably without resorting to shortcuts.
- Digitise the EPR certificate system to prevent fraud.
- Impose strict audits and penalties for non-compliance.
- Encourage producers to verify recyclers' actions through independent audits.
- Train and certify informal recyclers to follow environmental safety norms.
- Offer technical and financial support to integrate them into the formal recycling economy.
- Policy design must involve recyclers, producers, and regulators to ensure practicality.
- Study international benchmarks and best practices for price-setting and enforcement.

Key Terminologies:

- Extended Producer Responsibility (EPR): A policy tool where producers are held responsible for the treatment and disposal of post-consumer products (e.g., batteries), including collection, recycling, and safe disposal.
- EPR Floor Price: The minimum rate recyclers should receive from producers for every kg of battery waste recycled — ensures recycling remains financially viable and sustainable.
- Circular Economy: An economic model focused on reducing waste by reusing, recycling, and regenerating products and materials, thereby minimising resource extraction and environmental impact.

- Battery Energy Storage Systems (BESS): Systems that store energy using rechargeable batteries, crucial for renewable energy integration and grid stability.

Conclusion:

Battery waste is a growing environmental and economic challenge for India. A weak recycling structure, low EPR pricing, and unregulated informal practices pose significant threats. What's needed is a fair pricing framework, digitised enforcement, and formalisation of recyclers to transform battery waste from a liability into a strategic asset. India cannot afford to miss this opportunity on its path to Net Zero.

GROUNDWATER POLLUTION

Context: India extracts 25% of the world's groundwater, more than any other country, for agriculture, industry, and drinking water. Over 85% of rural drinking water and 65% of irrigation water come from below the surface. But overuse, pollution, and climate change are depleting reserves fast.

Groundwater status

National Groundwater Atlas offers a comprehensive assessment of groundwater availability and usage patterns across India.

The Atlas highlights regional disparities in groundwater levels and recharge potential.

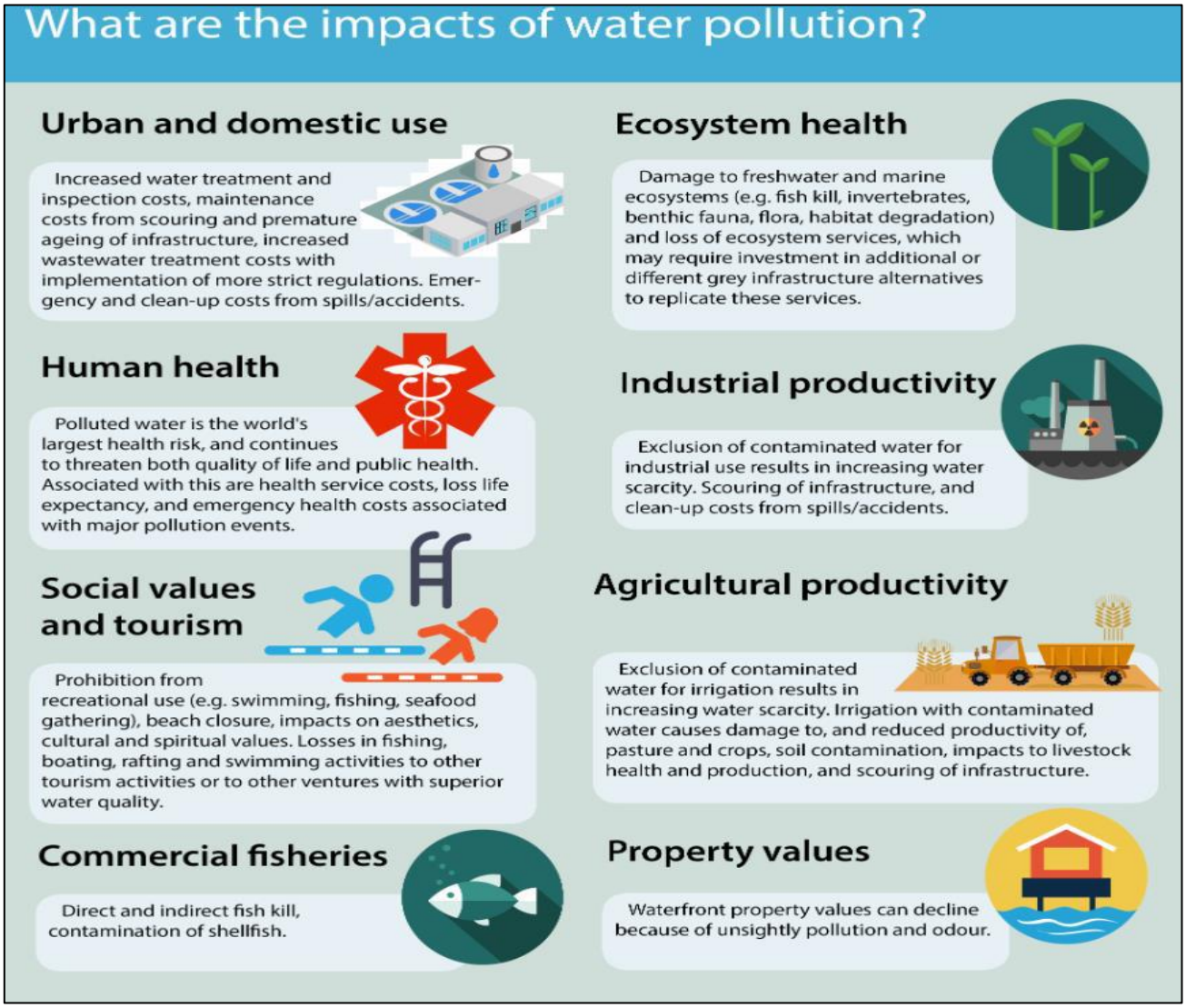
- West Bengal and Bihar benefit from fertile alluvial aquifers and river-fed reserves
- Excessive withdrawal especially in Punjab for water-intensive crops like rice has led to significant depletion.
- Rajasthan and Tamil Nadu face severe water stress due to low rainfall, hard rock aquifers, and slow recharge rates.
- Gujarat presents a mixed picture, with some regions experiencing acute shortages while others benefit from river-fed reserves.

Health consequences

According to Indian Council of Medical Research (ICMR) and WHO:

- Fluoride contamination:
  - ✓ It affects 230 districts across 20 states. Around 66 million people suffer from skeletal fluorosis that causes joint pain, bone deformities, and stunted growth, particularly in children.
  - ✓ Steps needed: Effective interventions include defluoridation, improved nutrition, and provision of safe drinking water.
- Arsenic:
  - ✓ Concentrated in the Gangetic belt West Bengal, Bihar, U.P., Jharkhand, Assam.
  - ✓ Health impacts: Skin lesions, gangrene, respiratory issues, and internal cancers (skin, kidney, liver, bladder, lungs).
- Nitrate contamination:
  - ✓ Very common in Northern India, especially in states like Punjab, Haryana, and Karnataka.
  - ✓ Causes "Blue Baby Syndrome" (Methemoglobinemia) when baby formula is mixed with nitrate-contaminated water. Reduces oxygen in the blood of infants, which can be life-threatening.
  - ✓ 56% of Indian districts now have unsafe nitrate levels in groundwater.
- Uranium contamination:
  - ✓ Earlier limited to specific geological zones, now spreading due to excessive extraction of groundwater and use of phosphate-based fertilisers

- ✓ Malwa Region Study (Punjab) by Central University found uranium levels above WHO's safe limit of 30 µg/L.
- ✓ Can cause chronic kidney damage (nephrotoxicity) and harm other organs.
- Heavy metals:
- ✓ Heavy metals lead, cadmium, chromium, mercury enter groundwater from unchecked industrial discharges, causing developmental delays, anaemia, immune system issues, and neurological damage.
- ✓ The ICMR-National Institute for Research in Environmental Health (NIREH) found dangerously high blood lead levels among children near industrial clusters in Kanpur (U.P.) and Vapi (Gujarat).



Reasons

Key structural issues include:

- Institutional fragmentation: Agencies such as CGWB, CPCB, SPCBs, and the Ministry of Jal Shakti operate in silos, often duplicating efforts and lacking coordination for integrated, science-based interventions.
- Weak legal enforcement: While the Water Act exists, its enforcement—especially on groundwater discharge—is inadequate. Regulatory loopholes and lax compliance embolden polluters.

- Lack of real-rime, publicly-accessible data: Monitoring is infrequent and poorly disseminated. Without early warning systems or integration with public health surveillance, contamination often goes undetected until after serious health outcomes emerge.
- Over-extraction: Excessive pumping lowers water tables and concentrates pollutants, making aquifers more vulnerable to geogenic toxins and salinity intrusion.

Steps needed

India's groundwater crisis calls for a bold, coordinated, and multi-dimensional strategy that integrates regulation, technology, health, and public participation.

Key reforms include:

- A National Groundwater Pollution Control Framework: Clearly define responsibilities across agencies and empower the CGWB with regulatory authority.
- Modernized monitoring infrastructure: Use real-time sensors, remote sensing, and open-access platforms. Integrate water quality data with health surveillance systems like HMIS for early detection.
- Targeted remediation and health interventions: Install community-level arsenic and fluoride removal systems, especially in high-risk regions.
- Urban and industrial waste reforms: Mandate Zero Liquid Discharge (ZLD), regulate landfills strictly, and enforce penalties for illegal discharges.
- Agrochemical reform: Promote organic farming, regulate fertiliser and pesticide use, and encourage balanced nutrient management.
- Citizen-Centric groundwater governance: Strengthen the role of panchayats, water user groups, and school programmes in water testing, monitoring, and advocacy.

Conclusion

- Groundwater contamination in India is a silent, slow, and invisible emergency with irreversible consequences. It is no longer just an environmental issue—it is a national public health crisis. With over 600 million lives dependent on this resource, urgent institutional, legal, and technological reforms are non-negotiable. As India envisions a $5 trillion economy, access to safe and clean water must become the foundation of its growth and social equity agenda.

HOW INDIA'S NUCLEAR VISION SUPPORTS A SUSTAINABLE TOMORROW

Context: India's renewable energy capacity crossed the 200 GW milestone as of October 2024, representing a 13.5 per cent year-on-year increase. This includes 92 GW of solar power, 52 GW of Hydro power, 48 GW of wind energy and 11 GW of bio-energy.

India's Nuclear Journey

- India started its nuclear journey with peaceful goals to use nuclear energy for development and self-reliance, not for weapons.
- 1945: Tata Institute of Fundamental Research (TIFR) was set up to begin nuclear research.
- 1954: Department of Atomic Energy (DAE) and Bhabha Atomic Research Centre (BARC) were created to expand nuclear development.
- However, after 1962 Sino-Indian War, followed by China's testing of its first atomic bomb in 1964, India was prompted to shift its nuclear policy.
- In 1968, India refused to sign the Nuclear Non-Proliferation Treaty (NPT).

- A change of leadership in the 1960s (with the death of PM Nehru and his successor Morarji Desai), a war with China in 1962 that India lost, and wars with Pakistan in 1965 and 1971, both won by India, changed the direction of India's nuclear policy.

Pokhran I – India's First Nuclear Test

- India conducted its first nuclear test in 1974 in the Pokhran desert in Rajasthan called as "Smiling Buddha".
- It marked a turning point in India's nuclear journey, showing that India could build and test a nuclear bomb.
- After the 1974 test, many countries criticized India. In response, 48 countries formed a group called the Nuclear Suppliers Group (NSG).
  (NSG is a group of countries that controls the export of nuclear materials and technology. It made rules that countries like India (not signing NPT) cannot easily buy nuclear technology.)
- Despite restrictions, India focused on building its own nuclear technology (indigenous development).
- In 1996, India refused to sign the Comprehensive Nuclear-Test-Ban Treaty (CTBT) on the grounds that its being largely focused on horizontal non-proliferation rather than on disarmament.

Post Pokharan II

After Pokhran II, India declared its 'No-First-Use' policy along with Non-Use against Non-Nuclear Weapons States and Minimum Nuclear Deterrence.
India also established the Nuclear Command Authority and the Strategic Forces Command, which institutionalised nuclear control in India.
This helped India to build trust in its nuclear policy and diplomacy.

India-US Civil Nuclear Agreement

- A major turning point in India's nuclear journey came with the India-US Civil Nuclear Agreement, also known as the 123 Agreement, signed in 2005.
- This agreement allowed India and the United States to cooperate in the field of civil nuclear energy that is, using nuclear power for peaceful purposes like electricity generation. (without India being member of NPT)
- As a result of this, the Nuclear Suppliers Group (NSG) gave India a special waiver in 2008, allowing it to trade in nuclear technology and fuel globally.

To fulfil the conditions for this waiver, India took some important steps.

- It voluntarily separated its civilian and military nuclear programmes. This means India clearly marked which nuclear reactors would be used for peaceful purposes (like producing electricity) and which would be for defence.
- India also signed an agreement with the International Atomic Energy Agency (IAEA) to bring its civilian nuclear reactors (those using imported uranium) under international safeguards. This means IAEA inspectors can check these facilities to make sure the nuclear material is not being used for weapons.
- After this, India was accepted into three major international export control groups—Missile Technology Control Regime (MTCR), the Australia Group, and the Wassenaar Arrangement. These groups help control the spread of weapons, chemicals, and sensitive technology.

Important Agreements:

- Missile Technology Control Regime (MTCR): An international partnership that aims to prevent the spread of missiles and related technology capable of carrying weapons of mass destruction.
- Australia Group: A group of countries working to stop the spread of chemical and biological weapons by controlling the export of related materials and technologies.
- Wassenaar Arrangement: A multilateral export control regime that promotes transparency and responsibility in transfers of conventional arms and dual-use goods and technologies.

Present nuclear capacity and future targets

- India currently has 24 working nuclear power reactors, most of which follow a design called Pressurised Heavy Water Reactors (PHWR).
- These reactors together generate about 8180 megawatts of electricity.
- The entire nuclear power setup is mainly operated by a government-owned company called Nuclear Power Corporation of India Limited (NPCIL).

Budget 2025-26

- Government has introduced 'Nuclear Energy Mission (NEM) to build up 100 GW of nuclear power capacity by 2047.
- This mission focuses on making India self-reliant in nuclear technology, encouraging both public and private partnerships, and developing Small Modular Reactors (SMRs) — a new and safer type of nuclear reactor.
- The government has set aside Rs 20,000 crores to develop these SMRs.

Challenges

- At the international level, India still does not have membership in the Nuclear Suppliers Group (NSG), which limits access to advanced nuclear technologies.
- India's Atomic Energy Act of 1962 gives full control of nuclear energy to the government. This means private or foreign companies cannot participate in setting up nuclear plants.
- Civil Liability for Nuclear Damage Act, 2010, which holds the supplier responsible in case of a nuclear accident. This is different from the global norm where the operator, not the supplier, is usually held liable. Because of this, foreign companies hesitate to invest in India's nuclear projects. The government is now planning to change the nuclear laws to make them more investment-friendly.

Steps Needed to Strengthen India's Nuclear Energy Future

- Develop more *indigenous* (locally made) Pressurised Heavy Water Reactors (PHWRs) and Fast Breeder Reactors.
- Invest in research and innovation for cost-effective and safe reactor designs.
- Revise the *Atomic Energy Act, 1962* to allow private and foreign companies to participate in nuclear energy production.
- Modify the *Civil Liability for Nuclear Damage Act, 2010* to align with global norms and reduce supplier liability fears.
- Strengthen nuclear safety frameworks and emergency response systems.

- Develop training programs for engineers, scientists, and technicians in nuclear technology.

NAXALISM IN INDIA

Context: Left Wing Extremism (LWE) has shrunk dramatically: affected districts have reduced from 126 (2013) to 38 (2024)

Current trends in Naxalism

- From movement to fragments: A once pan-India, ideology-heavy insurgency has splintered into regional, tactically violent cells with weakened political messaging.
- Security dominance + governance entry: Forward operating bases, road opening, and grid-based policing are enabling civil administration, welfare outreach and market access.
- Leadership attrition & surrenders: Continuous decapitation, better incentives for surrender/rehabilitation, and reduced recruitment pools.
- Tech creep at the margins: Persistent use of IEDs, occasional drones/encrypted comms, and financial dispersal through informal channels.
- Narrative contestation: Mislabelling ("urban Naxal") risks chilling legitimate **dissent**, harming community intelligence flows.

Challenges

- Governance deficits in tribal/forest belts: land/forest rights pending, slow justice delivery, weak last-mile services
- Resource conflicts: mining, land acquisition, displacement without genuine consent/benefit-sharing.
- Inter-state seams: insurgent mobility across borders; patchy coordination. *(*
- Cadre sustenance through levies/extortion on local contractors/transporters.
- Technology diffusion: better IED design, commercial drones, encrypted apps, digital/hawala finance.
- Micro-cells & urban facilitators: small, autonomous units; limited but potent urban logistics/intel support.
- Perception & rights risks: heavy-handed ops or wrongful labelling can erode legitimacy, fuel grievance cycles.
- Post-clear vacuum: "clear" not followed by durable hold-build, causing reversion in remote pockets.

Way forward

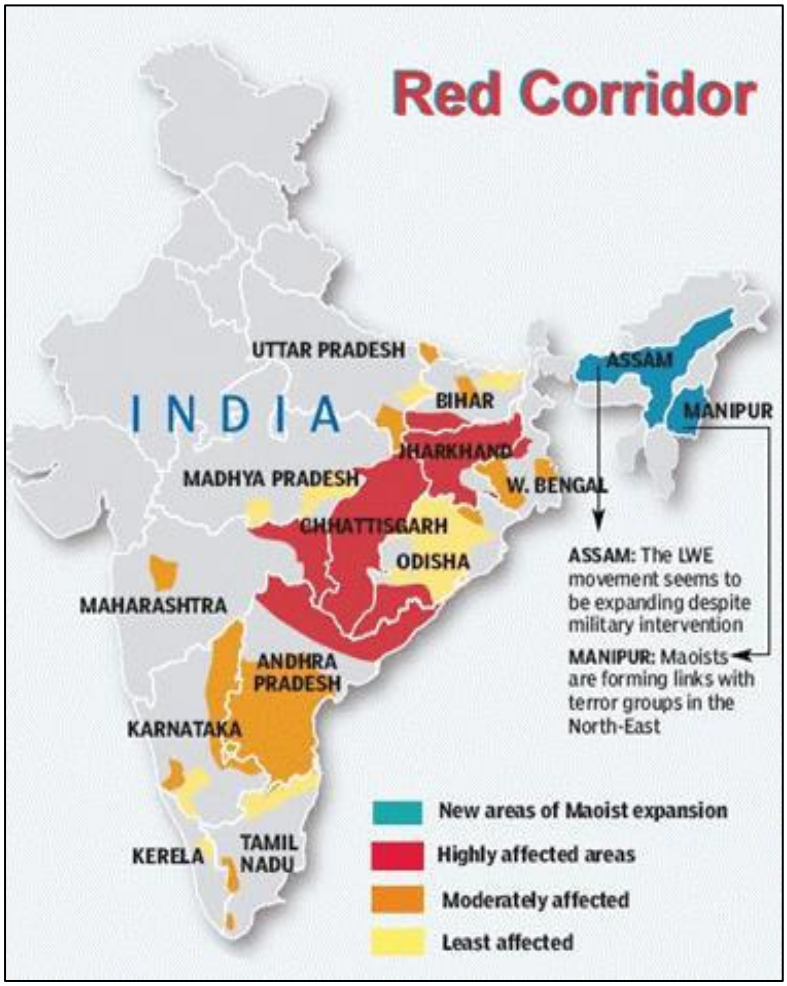
Security (Clear → Hold → Build)

- Expand specialised, small-team units (Greyhounds/CoBRA model), night-ops, long-range patrols; strengthen IED forensics, counter-drone, SIGINT.
- Seam-management: joint commands, shared ISR, common case databases, synchronized operations calendars.
- Targeted finance choke: map extortion chains, contractor audits, trade-route checks, aggressive follow-the-money with FIU/PMLA tools.

Governance & Rights

- Fast-track FRA title settlements; community forest produce value chains (MSP, processing, logistics).

- Benefit-sharing in extractives: District Mineral Foundation (DMF) transparency, social impact assessments, consent-based acquisition, time-bound R&R with independent audits.
- Last-mile state capacity: guaranteed road maintenance, telecom uptime, banking/PDS reliability; track with dashboards/KPIs at district level.
- Justice & accountability: mobile courts, time-bound disposal of petty cases; SOP-driven operations with body-cam/forensic documentation to prevent excesses.



Socio-economic & Youth Diversion

- Scale residential schooling, hostels, skill centres, sports/culture programs, Tribal Youth Exchanges; link surrenderers to jobs via credit + market mentors.

Narrative & Legal Clarity

- Draw a bright line between lawful dissent and unlawful facilitation; protect civil society space to sustain community intelligence & trust.
- Proactive communication: post-operation disclosures, grievance redressal, and social audit of development funds.

Conclusion

India's LWE fight has moved into a terminal-shrink phase—from a mass ideological insurgency to isolated, tech-aided micro-violence in difficult terrain. Security primacy must continue, but decisive victory depends on rights-anchored development, clean resource governance, precision policing with accountability, and interstate seam management.

Value-addition

- Greyhounds (AP/Telangana): Deep-penetration jungle ops dismantled southern strongholds; set best-practice template for small, agile units.
- SAMADHAN doctrine (2017→): Smart leadership, Aggressive ops, Motivation & training, Actionable intel, Dashboards/tech, Home-grown capacity, Alleviation of grievances, No financial access—linked to sustained decline in incidents/fatalities.

INDIA'S PATENT LANDSCAPE

Context: Patents are a crucial indicator of a nation's innovation ecosystem, reflecting its transition from being a consumer of global technology to a producer of indigenous solutions. India's push for "Make in India" and the strengthening of *R&D and innovation capabilities* has significantly reshaped the patent filing landscape.

Current Trends in Patent Filing

- In early 2000s, global majors (US, Japan, Germany, South Korea) dominated Indian filings. Indian share was <20%.
- Post-2013, Indian-origin filings surged, crossing 43% in recent years
- Sectoral trends:
  - Computer science patents rose from 11.27% (2000) → 26.5% (2023).
  - Electronics: 8.27% → 16.41%.
  - Physics-related patents fell from 26% → 9%.
- Universities like IITs and IISc are major contributors. Eg: IIT Madras doubled patents (2022–2023), IIT Bombay topped in 2023–24.

Government Initiatives

- KAPILA (2020) – IP literacy and awareness in higher education.
- Atal Innovation Mission (2016) – fosters problem-solving and entrepreneurship.
- Patent Reforms – expedited examination, reduced fees (esp. for MSMEs & education sector), digitalization of filings.
- National IPR Policy (2016) – comprehensive framework for innovation ecosystem.
- Incubation & Funding – support for startups, linkages between industry and academia.

Challenges in Patent Filing

- Delays: Average time to grant a patent in India is ~5 years, impacting innovation cycles.
- Low R&D expenditure: ~0.6–0.7% of GDP vs. >2% in advanced economies.
- Brain Drain: Many talented Indian researchers migrate abroad, contributing to foreign patents instead of domestic filings.
- Awareness gap: Limited knowledge of IP rights among MSMEs, startups, and educational institutions.
- Funding constraints: Inadequate venture capital and early-stage innovation support.

Brain Drain and Patent Filing

- A significant proportion of top AI, computer science, and biotechnology researchers of Indian origin work in the U.S./Europe.
- Their patents are filed abroad, leading to loss of IP ownership for India.
- Reverse brain drain through initiatives like VAJRA Faculty Scheme and collaborative R&D is critical.

R&D and Innovation Linkage

- Investment in R&D directly correlates with patent output.
- India's GERD (Gross Expenditure on R&D) is <1% of GDP; major economies like U.S., China spend >2–3%.
- Stronger academia–industry linkages, more public–private partnerships, and dedicated funding are required.

Way Forward

- Time-bound grants: Introduce service-level agreements and expand expedited routes.
- Strengthen TTOs: Professionalize and fund tech transfer offices in universities.
- Boost R&D: Raise expenditure to 2% of GDP, crowd-in private funding, and set up mission-mode R&D consortia.
- MSME enablement: Subsidized IP vouchers, pooled IP for clusters, and simplified enforcement.

Global Best Practices India Can Adapt

- Bayh-Dole Act (USA): Gives universities rights over publicly funded research, spurring technology transfer offices and startups.
- USPTO Track One: Guarantees patent decisions within 12 months, ensuring predictability.
- EU Unitary Patent & Unified Patent Court: Lowers costs, simplifies enforcement, and gives SMEs easier access to IP protection.
- Patent Prosecution Highway (Japan, US, EU): Enables work-sharing across patent offices to reduce pendency.
- China's resident-driven filings: Huge scale of filings driven by industrial policy and domestic R&D, though with quality concerns.

Conclusion

India's patent ecosystem is at an inflection point. Universities are acting as changemakers, but sustaining this momentum requires higher R&D investment, stronger IP infrastructure, and retention of talent. As India aspires to be a global innovation hub, patents will remain central to its journey from *'Make in India'* to *'Invent in India'*.