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WEEKLY 8th Sept - 14th Sept (2025)

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WEEKLY UPDATES

DATE : (8th Sept- 14th Sept)

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POLITY

15th Vice-President: C.P. Radhakrishnan Elected

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity:** Indian Constitution, Parliament, Vice-President of India
✅ **GS Paper II – Governance:** Roles and Responsibilities of Constitutional Authorities

Context

C.P. Radhakrishnan has been elected as the **15th Vice-President of India (2025)**. The office of the Vice-President is the **second-highest constitutional office** in the country and plays a dual role as the **Chairman of the Rajya Sabha** and as the **constitutional successor to the President** in certain circumstances.

Constitutional Provisions

- **Article 63:** *"There shall be a Vice-President of India."*
- **Article 64:** Vice-President is the **ex-officio Chairman of the Rajya Sabha**.
- **Article 65:** Performs the duties of the **President in case of a vacancy** until a new President is elected.
- **Vacancy Note:** Constitution does not explicitly mention who performs VP's duties when the office itself is vacant.

Election Procedure of the Vice-President

1. **Nomination:**
   o Requires **20 proposers and 20 seconders**.
   o Candidate must deposit **₹15,000** and produce a certified entry from the electoral roll.
2. **Electoral College:**
   o Consists of **Lok Sabha + Rajya Sabha members (both elected and nominated)**.
   o Voting is conducted by **proportional representation through single transferable vote**, by **secret ballot**. (Article 66).
   o **Value of each vote = 1** (unlike Presidential election where vote value varies).
3. **No Whip:**
   o The **Anti-Defection Law** does not apply, ensuring freedom of choice to MPs.

Eligibility Criteria
Article 66

- Must be a citizen of India
- Must have completed 35 years of age
- Must be qualified for election as a Rajya Sabha member
- Must not hold any office of profit under Union, State, or local government

Significance of the Office

- **Checks and Balances:** Provides a **constitutional backup for the President**.
- **Legislative Role:** As Rajya Sabha Chairman, maintains order and facilitates debate in the **Upper House**.
- **Neutral Authority:** Ensures independence of proceedings as he is not a member of any ruling party by default.

Policy Dimensions

- **Parliamentary Efficiency:** VP's role as Rajya Sabha Chairman is crucial in times of frequent disruptions.
- **Continuity in Governance:** VP ensures smooth transfer of presidential powers in emergencies.
- **Democratic Representation:** Election by both Houses reflects the **federal nature** of Indian polity.

Mains Practice Question

Q. *"The Vice-President of India occupies a unique constitutional position, balancing both executive succession and legislative responsibilities." Discuss the significance of the office with reference to Articles 63–66 of the Constitution.*

Witness Protection Scheme, 2018: Safeguarding Justice

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity:** Judiciary, Criminal Justice System, Rights of Citizens
✅ **GS Paper II – Governance:** Government Policies and Interventions

Context

The **Supreme Court of India** recently observed that the **Witness Protection Scheme, 2018** cannot be treated as a substitute for cancelling bail when bail conditions are violated. This highlights the crucial role of witness protection in strengthening India's criminal justice system while ensuring that procedural safeguards are not misused.

About the Witness Protection Scheme, 2018

- **Launch:** Approved by the Supreme Court in **2018**, formulated by the **Ministry of Home Affairs**.
- **Objective:**
  - To ensure the **safety of witnesses and their families**, enabling them to **testify without fear, intimidation, or harassment**.
  - To promote the **rule of law** by encouraging citizens to assist in criminal investigations and trials.

Key Features

1. **Scope of Protection**
   - Physical protection, change of identity, relocation, and in-camera trials.
   - Emergency contact numbers and 24x7 security helplines.
2. **Threat Categorisation**
   - **Category A:** Threats to life of witness/family during investigation/trial.
   - **Category B:** Threats to safety, reputation, or property.
   - **Category C:** Harassment or intimidation not amounting to life threat.
3. **Funding**
   - **Witness Protection Fund** created by states with contributions from government and legal aid funds.
4. **Institutional Mechanism**
   - **Witness Protection Cells** in each state/UT to implement orders.
   - Decisions taken by **District Level Committees** headed by District Judges.

Challenges

- **Implementation Gap:** Uneven adoption by states, with limited infrastructure in smaller states.
- **Awareness:** Many witnesses and even lower law enforcement agencies remain unaware of protections.
- **Resource Constraints:** Inadequate funds for relocation, security, or identity change.
- **Delay in Trials:** Even protected witnesses often face long trial durations, weakening confidence.

Significance

- **Rule of Law:** Protecting witnesses is critical to uphold **fair trial principles (Article 21)**.
- **Curbing Hostile Witnesses:** Reduces chances of witnesses turning hostile due to threats or inducements.
- **International Standards:** Brings India closer to **UN standards on witness protection** seen in countries like the US and UK.

Mains Practice Question

Q. *"The effectiveness of the criminal justice system depends heavily on the safety and confidence of witnesses." Critically analyse the Witness Protection Scheme, 2018 in this context, highlighting its significance and implementation challenges.*

France's 5th PM in Two Years: Political Instability

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity: Comparative Constitutions, Indian and Foreign Political Systems**
✅ **GS Paper II – Governance: Parliamentary System, Executive Responsibility**

Context

In a significant political development, the **French Parliament** recently voted to **remove the government and the Prime Minister**, forcing France to appoint its **5th Prime Minister in less than two years**. This recurring instability has reignited debates on the **French semi-presidential system**, and invites comparisons with the **Indian parliamentary model**.

Similarities between Indian and French Systems

- **Republican Government:** Both are republics with **elected heads of state**.
- **Bicameral Legislatures:** India has **Lok Sabha & Rajya Sabha**, France has **National Assembly & Senate**.
- **Democratic Principles:** Both constitutions are rooted in **liberty, equality, and fraternity**, inspired by the French Revolution.

Key Differences between Indian and French Political Systems

Feature	India	France
System of Government	Parliamentary system (Westminster model)	Semi-presidential system
Head of State	President (largely ceremonial; real power with PM & Council of Ministers)	President (directly elected; holds real executive powers)
Head of Government	Prime Minister	Prime Minister (appointed by President; depends on Parliament support)
Cabinet Responsibility	Council of Ministers is collectively responsible to **Lok Sabha**	Government responsible to **National Assembly** but also under President's influence
Dissolution Power	Lok Sabha can be dissolved by President on advice of PM	President can dissolve the National Assembly on his own authority
Political Stability	Generally stable governments with full terms (exceptions exist)	Frequent instability when President and parliamentary majority differ ("cohabitation")

Policy Dimensions

- **India:** Stability comes from a **parliamentary majority system**, where the PM usually enjoys clear support in Lok Sabha.
- **France:** Instability arises from the **dual authority** of the President and Parliament, leading to frequent government collapses in periods of divided mandate.
- **Global Concern:** Frequent changes in France's leadership may affect its **EU policy stance, foreign relations, and commitments** to global issues such as climate change and security.

Mains Practice Question

Q. *The French semi-presidential system has often been described as prone to political instability, unlike India's parliamentary democracy. Compare and contrast the two systems and discuss their implications for executive accountability.*

Aadhaar as 12th Voter ID Document in Bihar Revision

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity: Electoral Reforms, Rights Issues, Judiciary**
✅ **GS Paper II – Governance: Aadhaar, Welfare Delivery, Legal Provisions**

Context

The **Supreme Court** has directed the **Election Commission of India (ECI)** to accept **Aadhaar** as the **12th valid document** during the **Special Intensive Revision (SIR) of electoral rolls in Bihar**. The ruling reinforces Aadhaar's growing role in governance and citizen verification, while balancing concerns over privacy and surveillance.

About Aadhaar

- **Nature:** A **12-digit random number** issued by the **Unique Identification Authority of India (UIDAI)**.
- **Data Components:**
  - **Demographic:** Name, gender, date of birth, address.
  - **Biometric:** Fingerprints, iris scans, facial photograph.

Legal Framework

- **Aadhaar Act, 2016**
  - **Section 7:** Governments may require Aadhaar for beneficiaries to access **benefits or subsidies** under schemes funded from the **Consolidated Fund of India or States**.
- **Aadhaar Metadata Rules:**
  - The **Supreme Court** has mandated that **Aadhaar metadata cannot be stored beyond six months**, ensuring data minimisation.

Justice K.S. Puttaswamy v. Union of India (2018)

- Upheld the constitutional validity of Aadhaar for welfare schemes and government services.
- Struck down mandatory linking with services like bank accounts and mobile phones, citing the Right to Privacy (Article 21).
- Affirmed Aadhaar's limited but legitimate role in targeted subsidy delivery.

Significance of Aadhaar in Governance

1. **Welfare Delivery:** Streamlines **Direct Benefit Transfers (DBT)** and reduces duplication in schemes like **MGNREGA, PDS, LPG subsidy**.
2. **Governance Reforms:** Strengthens **Digital Public Infrastructure (DPI)** alongside UPI, DigiLocker, and Account Aggregator.
3. **Electoral Process:** Potential to improve voter authentication and reduce duplication in electoral rolls.

Concerns & Criticism

- **Privacy & Surveillance:** Risks of mass surveillance and profiling.
- **Exclusion Risks:** Biometric mismatches have led to **exclusion of genuine beneficiaries**.
- **Data Protection:** Absence of a robust **data protection regime** raises security concerns.

Policy Dimensions

- **India's Digital Governance:** Aadhaar is a pillar of **Digital India**, enabling citizen-centric service delivery.
- **Balance Needed:** Courts and policymakers continue to balance **efficiency vs privacy** in Aadhaar's expanding role.
- **Global Context:** Aadhaar is one of the **largest biometric ID systems** in the world, studied as a model for digital identity governance.

Mains Practice Question

Q. *"Aadhaar has emerged as a cornerstone of India's digital governance, but it continues to raise concerns of privacy and exclusion." Critically examine in the light of recent judicial pronouncements.*

Section 29A RPA, 1951: Political Party Registration

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity: Representation of the People Act, Electoral Reforms**
✅ **GS Paper II – Governance: Role of Constitutional Bodies (ECI)**

Context

The **Election Commission of India (ECI)** has announced that it will now **verify the antecedents of founding members** at the **registration stage itself** for associations seeking recognition as political parties under **Section 29A of the Representation of the People Act (RPA), 1951)**. This is intended to prevent misuse of political registration for fraudulent or unlawful activities.

Section 29A of the Representation of the People Act, 1951

- **Application Requirement:**
  - A political party must apply for registration to the **ECI** within **30 days of its formation**.
- **Legal Basis:**
  - Applications are made under **Article 324 of the Constitution** (superintendence of elections by ECI) and **Section 29A of the RPA, 1951**.
- **Mandatory Pledge:**
  - The party must affirm **true faith and allegiance to the Constitution of India**.
  - Must uphold the principles of **socialism, secularism, democracy**, and the **sovereignty, unity, and integrity of India**.
- **Final Authority:**
  - The **decision of the Election Commission** regarding registration is final and binding.

Significance of Section 29A

1. **Ensures Constitutional Commitment**
   - Prevents registration of groups with **anti-constitutional or secessionist ideologies**.
2. **Electoral Transparency**
   - Strengthens democratic accountability at the very **inception stage** of political parties.
3. **Institutional Authority of ECI**
   - Expands the supervisory role of ECI beyond elections into **political party governance**.

Policy Dimensions

- **Electoral Reforms:** Antecedent verification can prevent the rise of **criminalised or fake political outfits**.
- **Political Finance:** Registered parties under Section 29A become eligible for **income tax exemptions and electoral bonds**, making scrutiny even more vital.
- **Judicial Support:** Courts have consistently upheld ECI's **broad powers under Article 324**, reinforcing its autonomy in matters of electoral integrity.

Mains Practice Question

Q. *"Section 29A of the RPA, 1951 ensures that political parties remain aligned with constitutional values. Examine the significance of the ECI's enhanced scrutiny of political party registrations in strengthening Indian democracy."*

Commonwealth Parliamentary Association: 11th India Conference

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity: Parliament & State Legislatures, Role of Presiding Officers**
✅ **GS Paper II – International Relations: India and International Organisations**

Context

The **11th Commonwealth Parliamentary Association (CPA) India Region Conference** was inaugurated in **Bengaluru**by the **Lok Sabha Speaker**. The forum enables legislators to **share best practices, debate democratic challenges, and strengthen parliamentary institutions**.

About the Commonwealth Parliamentary Association (CPA)

- **Genesis**: Established in **1911**, making it one of the **oldest Commonwealth organisations**.
- **Membership**: Includes **over 180 legislatures (Branches)**, covering **national, state, provincial, and territorial parliaments** across the Commonwealth.
- **India's Role**: India is an active member, contributing to democratic dialogue and parliamentary strengthening.
- **Headquarters Secretariat**: Based in the **Houses of Parliament, London (UK)**.
- **Objective**:
    - To provide a **platform for parliamentarians** to collaborate on issues of mutual interest.
    - To share **good practices in law-making, accountability, and representation**.
    - To strengthen **parliamentary democracy** and its institutions across member countries.

Significance of CPA for India

- **Democratic Exchange**: Enhances India's role as the **world's largest democracy** in shaping global parliamentary standards.
- **Capacity Building**: Facilitates training, knowledge-sharing, and exposure for MPs and state legislators.
- **Soft Power Diplomacy**: Projects India's image as a **leader in democratic governance**.
- **Regional Relevance**: CPA India Region Conferences provide a platform to discuss **federal issues, legislative reforms, and cooperative federalism**.

Contemporary Relevance

- Growing global challenges like **climate change, digital regulation, social inequality, and democratic backsliding** make parliamentary collaboration vital.
- The CPA complements other multilateral institutions (e.g., **IPU – Inter-Parliamentary Union**) by focusing on the **Commonwealth framework of shared history, law, and values**.

Conclusion

The **CPA acts as a bridge among Commonwealth legislatures**, promoting **democracy, transparency, and accountability**. For India, participation in such forums **strengthens parliamentary functioning at home** and enhances its **international democratic leadership**.

Mains Practice Question

Q. *"The Commonwealth Parliamentary Association (CPA) enhances both democratic dialogue and India's soft power diplomacy." Discuss the significance of CPA for India in the contemporary era.*

SC's Directions to Safeguard Homebuyers' Interests

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Fundamental Rights, Judicial Activism, Government Policies**
✅ **GS Paper II – Polity: Role of Supreme Court, Article 21**
✅ **GS Paper III – Economy: Real Estate Sector, Housing and Urban Development**

Context

The **Supreme Court (SC)** has urged the **Union Government** to safeguard the interests of **homebuyers**, recommending measures to prevent the **liquidation of viable residential projects**.

The Court reiterated that the **Right to Shelter** is a part of the **Right to Life under Article 21 of the Constitution**, making affordable and secure housing a **fundamental right**.

Challenges in the Housing Sector

1. **Shrinking Affordable Housing**
   - Affordable homes, which comprised **50% of launches in 2018**, now constitute just **17% of supply**.
2. **Stalled Projects & Systemic Issues**
   - Over **5 lakh housing units across 44 cities** remain stalled, mainly due to **financial mismanagement** by real estate developers.
3. **High Land Prices**
   - Top 10 Indian cities occupy only **0.2% of the national land mass**, pushing up costs.
4. **Fragmented Regulatory Framework**
   - Lack of **uniformity in RERA rules** across states creates compliance and enforcement hurdles.

Supreme Court Recommendations

- **Revival Fund under NARCL**
  - Use **National Asset Reconstruction Company Ltd** to create a fund for **reviving stalled projects**.
- **Expansion of SWAMIH Fund**
  - Strengthen the **Special Window for Affordable and Mid-Income Housing (SWAMIH)** to provide liquidity support.
- **Dedicated Corporate Body**
  - Set up a corporate structure similar to **NARCL**, exclusively for stalled housing projects.
- **Uniformity in RERA**
  - Harmonise **Real Estate (Regulation and Development) Act, 2016 (RERA)** rules across states.
- **Judicial Oversight Committee**
  - Constitution of a **committee chaired by a retired High Court Judge** to oversee implementation.

Significance

- **For Homebuyers**: Ensures justice, prevents loss of life savings, and upholds the **fundamental right to shelter**.
- **For the Real Estate Sector**: Stabilises investor confidence, reduces NPAs, and accelerates completion of projects.
- **For Governance**: Strengthens **judicial intervention in policy gaps** and calls for **Centre–State coordination**.

Conclusion

The SC's intervention underscores the urgent need to address the **housing crisis** in India. By linking **housing rights with Article 21**, the Court has widened the ambit of **fundamental rights** and called upon the government to act as a **protector of citizens' economic security and dignity**.

Mains Practice Question

Q. *"The Right to Shelter, as part of Article 21, has been repeatedly upheld by the judiciary. In light of the Supreme Court's recent recommendations, discuss the challenges and potential solutions for India's housing sector."*

Delhi HC Protects Actor's Personality Rights

📌 **Syllabus Mapping:**
✅ **GS Paper II – Polity: Fundamental Rights (Right to Privacy, Article 21)**
✅ **GS Paper III – IPR: Intellectual Property Rights & Emerging Legal Issues**

Context

The **Delhi High Court** has passed an interim order protecting the **personality rights of actor Abhishek Bachchan**, restraining unauthorized use of his **name, image, voice, or persona** for commercial gains.

About Personality Rights

- **Definition**:
  Personality rights grant an individual **exclusive control over the commercial use of their identity**, including:
  - Name
  - Image/Photographs
  - Voice
  - Signature style/behaviour
  - Other unique persona attributes
- **Legal Status in India**:
  - No dedicated statute.
  - Protected under:
    - **Article 21** → Right to Privacy (Justice K.S. Puttaswamy case, 2017).

- **Common Law** → Tort of passing off (misrepresentation).
- **Intellectual Property Laws** → Trademarks, Copyrights.

Judicial Precedents

- **R. Rajagopal v. State of Tamil Nadu (1994)**: SC recognised an individual's right to privacy as part of Article 21.
- **ICC Development v. Arvee Enterprises (2003)**: Recognised publicity rights linked to commercial exploitation of persona.
- **DM Entertainment v. Baby Gift House (2010)**: Protected personality rights of singer Daler Mehndi.
- **Anil Kapoor Case (2023, Delhi HC)**: Recognised AI misuse and "deepfakes" as violations of personality rights.

Significance

- **Commercial Protection**: Prevents unauthorized endorsements, misleading ads, and brand dilution.
- **Moral Right**: Ensures dignity and autonomy over personal identity.
- **Digital Age Relevance**: Addresses misuse in **AI, deepfakes, NFTs, memes, and online ads**.

Challenges

- **No Specific Law**: Personality rights not codified; enforcement remains piecemeal.
- **Balancing Free Speech**: Conflict with Article 19(1)(a) (freedom of expression) when parody or artistic work is involved.
- **Global Trade**: Lack of harmonization with international regimes.

Conclusion

The recognition of **personality rights** reflects India's evolving legal approach to **privacy, dignity, and digital-era exploitation**. With the rise of **AI and deepfake technologies**, codification of a clear legal framework is essential to balance individual rights and public interest.

Mains Practice Question

Q. *Personality rights are an emerging dimension of privacy in the digital era. Discuss their significance and challenges in India, with reference to recent judicial interventions.*

GOVERNANCE

EEPC: Driving India's Global Competitiveness

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies & Interventions, Institutions**
✅ **GS Paper III – Economy: Export Promotion, Trade Policy, MSME Sector**

Context

At the **platinum jubilee celebrations of the Engineering Exports Promotion Council (EEPC)**, its President urged citizens and stakeholders to make India a **global hub of business and knowledge**. The call comes at a time when India is striving to expand its **engineering exports**, which play a pivotal role in industrial growth and global competitiveness.

About EEPC

- **Establishment:** Founded in **1955** under the **Ministry of Commerce & Industry, Government of India**.
- **Membership:** Around **60% of its members are Small and Medium Enterprises (SMEs)**, reflecting India's MSME-driven industrial base.
- **Head & Registered Office: Kolkata**.

Key Activities of EEPC

1. **Trade Facilitation:** Organises **trade fairs, buyer-seller meets, and delegations abroad**.
2. **Market Intelligence:** Conducts **market research** to identify export opportunities.
3. **Advisory Services:** Provides **export advisory and technical support** to members.
4. **Credit Facilitation:** Assists exporters in accessing **financial and credit support**.
5. **Export Promotion:** Works to **diversify export markets** and boost competitiveness in high-value engineering goods.

Role & Significance

- **Engineering Exports Backbone:** Engineering exports constitute a significant share of India's total exports, second only to petroleum products.
- **MSME Empowerment:** By supporting SMEs, EEPC strengthens India's **Make in India and Atmanirbhar Bharat initiatives**.
- **Global Reach:** Promotes India's brand as a reliable **engineering and technology partner** in international markets.
- **Policy Interface:** Acts as a key bridge between industry and government, providing inputs for trade negotiations and policy reforms.

Policy Dimensions

- **India's Export Strategy:**
  - Engineering exports are central to achieving the government's **$2 trillion export target by 2030**.
  - Diversification into **high-tech sectors** (defence equipment, EVs, renewable technologies).
- **Global Competitiveness:**
  - Participation in **Free Trade Agreements (FTAs)** and trade blocs can enhance India's market access.
  - Leveraging initiatives like **Production-Linked Incentive (PLI) schemes** to boost competitiveness.
- **Knowledge Economy Link:**
  - EEPC's vision aligns with India's ambition to be a **knowledge and innovation hub**, integrating engineering with **R&D, digital technologies, and AI applications**.

Mains Practice Question

Q. *"The Engineering Exports Promotion Council (EEPC) plays a pivotal role in strengthening India's global trade competitiveness." Discuss its significance for India's MSME sector and overall export strategy.*

Great Nicobar Project: Tribal Rights Concerns

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Tribal Rights, Government Policies, FRA 2006**
✅ **GS Paper III – Environment: Conservation, Environmental Impact Assessment**
✅ **GS Paper II – International Relations & Security: Strategic Infrastructure in Islands**

Context

The **Centre has sought a report on tribal rights concerns** related to the **Great Nicobar Island Project (GNIP)** after the **Tribal Council raised objections** regarding proper identification and settlement of rights under the **Forest Rights Act (FRA), 2006**. The project, though envisaged as a strategic and economic booster, faces scrutiny over its **social and ecological implications**.

About the Great Nicobar Island Project (GNIP)

- **Clearances:** Granted **in-principle forest clearance and environmental clearance in 2022** under the **Holistic Development of Islands Programme (HDIP)**.
- **Nodal Agency: NITI Aayog**, with implementation by **Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO)**.
- **Land Use:**
  - **130.75 sq. km forest land diverted**.
  - 50% area reserved for **green development (no tree felling)**.
- **Proposed Infrastructure:**
  - **International Container Transshipment Terminal (ICTT)** at Galathea Bay.
  - **Greenfield International Airport**.
  - **Township development**.
  - **450 MVA power plant** (gas + solar-based).

Issues Related to GNIP

1. Tribal Rights

- Home to **Shompens (Particularly Vulnerable Tribal Group – PVTG)** and **Nicobarese**.
- Concerns about **loss of habitat, displacement, and violation of FRA provisions**.
- Fear of cultural erosion and disruption of traditional livelihoods.

2. Biodiversity Concerns

- **Galathea Bay**: Among the world's primary nesting sites for the **Leatherback Turtle (IUCN: Vulnerable, WPA 1972: Schedule I)**.
- Habitat of the **Nicobar Megapode (Schedule I WPA)** – a unique ground-nesting bird.
- Possible ecological imbalance due to large-scale infrastructure.

About the Forest Rights Act (FRA), 2006

- **Full Title:** Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act.
- **Objective:** To **undo historical injustices** to forest-dwelling communities.
- **Types of Rights Recognised:**
  - **Individual Rights:** For livelihood, habitation.
  - **Community Rights:** Over forests, grazing, fishing, minor forest produce.
  - **Habitat Rights for PVTGs:** Include **social, economic, spiritual, and cultural** aspects of their customary territories.
- **Institutional Mechanism:**
  - **Forest Rights Committees** at village level.
  - **District Level Committees** to verify and settle claims.

Policy & Strategic Dimensions

- **Strategic Imperative:** GNIP strengthens India's presence in the **Indian Ocean Region (IOR)** against growing Chinese maritime influence.
- **Development vs Rights:** Balancing **infrastructure development** with **ecological security and tribal rights**.
- **Legal Scrutiny:** Project may face judicial and civil society challenges if **FRA compliance** is not ensured.
- **Sustainable Alternatives:** Incorporating **eco-tourism, renewable energy**, and limited development models.

Mains Practice Question

Q. *"The Great Nicobar Island Project exemplifies the development vs rights dilemma in ecologically fragile and tribal-inhabited regions." Discuss in the context of the Forest Rights Act, 2006.*

India Energy Stack: Digital Public Infra for Power

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Digital Public Infrastructure, e-Governance**
✅ **GS Paper III – Economy: Energy, Infrastructure, Technology in Power Sector**
✅ **GS Paper III – Environment: Sustainable Development, Renewable Energy**

Context

The **Ministry of Power** has initiated a **stakeholder survey** to build the **India Energy Stack (IES)**. The exercise aims to gather inputs on **organizational profiles and readiness** to participate in the upcoming digital ecosystem for the power sector.

About India Energy Stack (IES)

- **Conceptualised by:** Ministry of Power.
- **Nature:** A **Digital Public Infrastructure (DPI)** designed for India's energy sector.
- **Aim:** To build a **connected, intelligent, and interoperable ecosystem** that integrates stakeholders across the energy value chain.
- **Frameworks:**
  - Will define **open standards and interoperability protocols**.
  - Ensures smooth exchange of energy data across utilities, regulators, and consumers.
- **Utility Intelligence Platform:**
  - A key component designed to **unlock data from multiple systems**, enabling **innovation, efficiency, and policy insights**.

Significance of IES

1. **Efficiency in Power Management**
   - Improves **demand forecasting, grid management, and renewable integration**.
2. **Consumer Empowerment**
   - Enables **smart meters, transparent billing, and demand-side management**.
3. **Innovation Ecosystem**
   - Provides a **data backbone** for startups and private players to develop new services in energy analytics, green energy, and storage.
4. **Sustainability Goals**
   - Supports India's **energy transition, renewable adoption, and net-zero 2070 targets**.

Policy Dimensions

- **Digital Governance:** Builds on India's DPI models like **UPI, ONDC, and Account Aggregator**, but applied to the **energy domain**.
- **Energy Security:** Facilitates **real-time data sharing** for better crisis response and grid resilience.
- **Economic Growth:** Strengthens investment climate in the **power and renewable sector**.
- **Global Benchmarking:** Positions India as a **pioneer in digital energy governance**.

Mains Practice Question

Q. *"The India Energy Stack (IES) seeks to replicate the success of India's Digital Public Infrastructure in the power sector. Critically examine its potential in enabling sustainable energy transition."*

National Industrial Classification 2025: Draft Released

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies & Statistical Systems**
✅ **GS Paper III – Economy: Industrial Growth, Economic Reforms**

Context

The **Ministry of Statistics and Programme Implementation (MoSPI)** has unveiled the **draft National Industrial Classification (NIC) 2025**, revising the existing **NIC 2008 framework**. The update is aimed at ensuring **better alignment with global practices** and providing a **robust statistical foundation for policymaking**.

About National Industrial Classification (NIC)

- **Nature:** A **numerical classification system** used to categorise economic activities into distinct sectors.
- **Purpose:**
  - Used in **statistical surveys, censuses, and economic research**.
  - Facilitates **business registration and compliance processes**.
  - Helps **central and state governments** in **policy formulation and monitoring**.
- **History:**
  - India's first **Standard Industrial Classification (SIC)** was issued in **1962**.
  - It has been **revised multiple times** to maintain parity with the **International Standard Industrial Classification (ISIC)** issued by the UN.
  - Current NIC 2008 is being replaced by the upcoming **NIC 2025**.

Significance of NIC

1. **Data Standardisation:** Provides a **uniform framework** for collection, analysis, and comparison of industrial and economic data.
2. **Policy Formulation:** Supports **evidence-based policymaking** across sectors like industry, services, agriculture, etc.
3. **Ease of Doing Business:** NIC codes are required for **business registration, taxation, and regulatory approvals**.
4. **Global Benchmarking:** Maintains alignment with **ISIC**, ensuring comparability of Indian data with international standards.

Policy Dimensions

- **Economic Planning:** Crucial for monitoring structural transformation of the Indian economy.
- **Digital Governance:** Plays a key role in **online business registrations, GST, and company incorporation portals**.
- **Industrial Policy:** Helps track the growth of **new sectors like digital services, green economy, renewable energy**.
- **Global Relevance:** Makes Indian data compatible with **UN and World Bank databases**.

Mains Practice Question

Q. *"The revision of the National Industrial Classification (NIC) is crucial for strengthening India's statistical system and policy planning. Discuss its significance in the context of structural changes in the Indian economy."*

Atal Innovation Mission: Expanding Abroad

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies, Role of NITI Aayog**
✅ **GS Paper III – Economy: Innovation, Startups, MSMEs**
✅ **GS Paper III – Science & Technology: Innovation Ecosystem, R&D**

Context

India's **first overseas Atal Innovation Centre** was inaugurated at the **IIT Delhi–Abu Dhabi campus in the UAE** under the **Atal Innovation Mission (AIM)**. This marks a significant step in **expanding India's innovation ecosystem globally**, strengthening academic and entrepreneurial collaboration between India and its partners.

About Atal Innovation Mission (AIM)

- **Launched by:** Government of India under **NITI Aayog**.
- **Objective:** To promote a **culture of innovation and entrepreneurship** across all levels of society.
- **Vision:** Build an **inclusive ecosystem of innovators, researchers, entrepreneurs, and industry**.

Major Programs under AIM

1. **Atal Tinkering Labs (ATLs):**
   - Innovation spaces in schools (grades 6–12).
   - Encourage **STEM education, problem-solving, and creative thinking**.
2. **Atal Incubation Centres (AICs):**
   - Established in **universities, institutions, and corporates**.
   - Provide infrastructure, mentorship, and funding support to **startups and young entrepreneurs**.
3. **ARISE–ANIC (Applied Research and Innovation for Small Enterprises):**
   - Supports **MSMEs and startups** in creating **market-ready, innovative solutions**.
   - Focus on **problem-solving in priority sectors** like health, agriculture, and energy.

Significance of Overseas Expansion

- **Global Collaboration:** Strengthens **India–UAE educational and entrepreneurial ties**.
- **Knowledge Diplomacy:** Projects India as a **global innovation hub**.
- **Startup Ecosystem Growth:** Provides Indian innovators with **international exposure and markets**.
- **Soft Power Projection:** Enhances India's image as a **leader in innovation-driven development**.

Policy Dimensions

- **Innovation as Growth Driver:** Aligns with **Atmanirbhar Bharat**, **Digital India**, and **Startup India**.
- **Human Capital Development:** Encourages **young innovators and researchers** to become entrepreneurs.
- **SDG Alignment:** Advances **SDG 8 (Decent Work & Economic Growth)** and **SDG 9 (Industry, Innovation, Infrastructure)**.
- **Internationalisation of Education & R&D:** Reinforces India's presence in the **global knowledge economy**.

Mains Practice Question

Q. *"The Atal Innovation Mission (AIM) is central to building India's innovation ecosystem. Discuss its role in fostering entrepreneurship and its significance in projecting India's global innovation leadership."*

Fast Track Immigration (FTI–TTP): Ease of Travel

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies, e-Governance Initiatives**
✅ **GS Paper III – Internal Security: Challenges at Borders, Technology in Security Management**

Context

The **Union Home Minister** virtually inaugurated the **Fast Track Immigration – Trusted Traveller Programme (FTI–TTP)** at **Lucknow, Thiruvananthapuram, Trichy, Kozhikode, and Amritsar airports**, expanding its reach to more Indian cities.

About FTI–TTP

- **Purpose & Benefits**:
   - Aims to **streamline immigration clearance** at Indian airports.
   - Enables registered travellers to complete immigration in **around 30 seconds** using biometric and digital verification.
   - Eliminates long queues and manual document checks.
- **Rollout & Reach**:
   - **Launched in 2024** at Delhi airport.
   - Now operational at **13 major airports** across India.
- **Eligibility**:
   - **Indian Nationals**.
   - **Foreign Nationals holding Overseas Citizen of India (OCI) Cards**.

Significance

- **Ease of Travel**: Enhances passenger convenience and global travel experience.

- **Security with Efficiency**: Balances speed with **biometric-based secure identification**.
- **Global Best Practices**: Aligns India's immigration process with international standards like **US Global Entry** and **EU Registered Traveller Programme**.
- **Boost to Tourism & Investment**: Facilitates smoother entry for investors, tourists, and NRIs.

Contemporary Relevance

- With growing **air passenger traffic in India**, projected to double by 2030, fast-track systems are crucial.
- Supports the **Digital India initiative** by integrating **biometric, digital identity, and e-governance platforms**.
- Reflects India's **global positioning as a business and travel hub**.

Conclusion

The FTI–TTP is a step towards **modernising border management**, combining **efficiency, security, and passenger convenience**. By adopting global best practices, India not only **eases travel** but also strengthens its **internal security architecture**.

Mains Practice Question

Q. *Discuss the significance of the Fast Track Immigration – Trusted Traveller Programme (FTI–TTP) in enhancing both ease of travel and internal security management in India.*

Disaster Risk Index: Fiscal Federalism & Preparedness

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Fiscal Federalism, Inter-State Relations, Disaster Governance**
✅ **GS Paper III – Disaster Management: Disaster Preparedness, Risk Reduction and Mitigation**

Context

In a meeting with the **16th Finance Commission**, the **Chief Minister of Himachal Pradesh** stressed the need to **reframe the Disaster Risk Index (DRI)** to better reflect the vulnerabilities of disaster-prone states.

About the Disaster Risk Index (DRI)

- **Developed by**: The **15th Finance Commission**.
- **Objective**:
  - To **bring objectivity in resource allocation** between states.
  - To account for **disaster risk exposure and vulnerability**, ensuring fiscal transfers are equitable.
- **Parameters Covered**:
  - **14 Hazards** – Earthquake, Cyclone, Flood, Drought, etc.
  - **14 Vulnerabilities** – Rural/urban poor, children, women, etc.
  - **2 Exposures** – **Population** and **GDP** considered as key indicators of exposure.

Significance of DRI

- **Evidence-Based Resource Allocation**: Moves away from ad hoc disaster relief towards **scientific, risk-based funding distribution**.
- **Integration of Risk into Fiscal Federalism**: Recognises disaster-prone states like **Himachal Pradesh, Uttarakhand, Assam, Odisha** for their structural vulnerabilities.
- **Encourages Preparedness**: States are incentivised to strengthen resilience instead of relying solely on post-disaster aid.

Issues with Current Framework

1. **Uniform Weightage Problem**: May not reflect the intensity of state-specific risks (e.g., Himalayan seismic vulnerability vs. coastal cyclone exposure).
2. **Exclusion of Climate Change Factors**: Current index does not fully integrate **emerging climate-induced risks**.
3. **Data Gaps**: Inadequate real-time data on vulnerabilities like **migration, informal housing, or fragile ecosystems**.
4. **Fiscal Stress**: High-risk states argue that central transfers remain **insufficient for preventive resilience measures**.

Way Forward

- **Reframe DRI**: Incorporate **climate change projections, urbanisation patterns, and ecosystem fragility**.
- **Dynamic Indexing**: Update parameters every **3–5 years** based on evolving risks.
- **Integrate Local Data**: Use **district-level vulnerability mapping** for precision in allocations.
- **Link Finance with Resilience Building**: Incentivise states for **investing in disaster preparedness and climate adaptation**.

- **Global Best Practices**: Align with **Sendai Framework for Disaster Risk Reduction (2015–2030)**.

Conclusion

The **Disaster Risk Index (DRI)** marks a paradigm shift from **relief-centric to risk-informed fiscal planning**. Reframing it to reflect **ground realities and climate challenges** will strengthen both **fiscal federalism** and **India's disaster resilience strategy**.

Mains Practice Question

Q. *The Disaster Risk Index (DRI) introduced by the Finance Commission seeks to integrate disaster vulnerability into fiscal federalism. Critically evaluate its significance and suggest reforms to make it more climate-resilient.*

INTERNATIONAL RELATIONS

India Reaffirms WTO-Centred Fair Trade Commitment

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations, Bilateral and Multilateral Institutions**
✅ **GS Paper III – Economy: Trade, Inclusive Growth, Globalisation**

Context

At the **SCO Trade Ministers' Meeting (2025)**, India reiterated its support for an **open, fair, inclusive, and non-discriminatory multilateral trading system** with the **World Trade Organisation (WTO) at its core**. This statement comes at a time when the global trading order is under stress due to protectionism, unilateral tariffs, and rising geopolitical tensions.

About WTO

- **Headquarters:** Geneva, Switzerland
- **Established:** 1995 (post the **Marrakesh Agreement**) as the successor to the **General Agreement on Tariffs and Trade (GATT, 1947)**.
- **Members:** 166 (India a founding member since 1995).
- **Core Principles:**
    o **Non-discrimination** (Most-Favoured Nation, National Treatment)
    o **Freer trade through negotiation**
    o **Fair competition**
    o **Predictability and transparency** in trade rules

Key Issues Facing the WTO

1. Public Stockholding (PSH)

- WTO members differ over whether **food stockholding programmes (like India's MSP system)** distort trade.
- Developing nations demand **permanent solution** for food security concerns.

2. Special & Differential Treatment (S&DT)

- Provides **flexibility to developing and least-developed countries** in implementing WTO agreements.
- Developed nations (e.g., US, EU) argue for **phasing out these privileges**, claiming many emerging economies are now globally competitive.

3. Dispute Settlement Crisis

- The **Appellate Body (AB)** of WTO ceased functioning in **2019** due to the **US blocking appointments**.
- As a result, the **WTO's dispute resolution mechanism**—the backbone of its enforcement system—is paralysed.

4. Geopolitical Shifts

- **US tariff policies**, **China–US trade tensions**, and the **Russia–Ukraine war** have strained multilateralism.
- Protectionism and **regional trade blocs (e.g., RCEP, CPTPP, IPEF)** are challenging the WTO's centrality.

5. Emerging Trade Issues

- **Digital Economy:** Cross-border data flows, privacy, and taxation of digital services.
- **Climate Change:** EU's **Carbon Border Adjustment Mechanism (CBAM)** and green tariffs could disadvantage developing countries.
- **Sustainability:** Calls for integrating climate action into trade rules.

Policy Dimensions

- **India's Position:**
  - Strongly supports **multilateralism under WTO**, particularly for **food security, equitable trade, and developmental concerns**.
  - Advocates **permanent solution on PSH**, continued S&DT provisions, and revival of the dispute settlement system.
- **Reform Agenda:**
  - Revive Appellate Body with consensus.
  - Balance trade liberalisation with **developmental needs**.
  - Address **new-age issues** (digital trade, climate-linked trade barriers).
- **Global Significance:**
  - WTO remains the **only forum with universal membership** capable of setting binding trade rules.
  - Ensuring its effectiveness is crucial for **Global South** countries like India, which rely on predictable rules to safeguard interests.

Mains Practice Question

Q. *"WTO-centered multilateralism is increasingly challenged by protectionism and shifting geopolitics." Discuss India's role in revitalising the WTO and ensuring a fair global trading system.*

OPEC+: Oil Output Dynamics

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: Multilateral Groupings, Global Governance**
✅ **GS Paper III – Economy: Energy Security, International Trade, Resource Mobilisation**

Context

The **Organization of the Petroleum Exporting Countries (OPEC+)** recently agreed to **accelerate oil output**, a move closely watched by global markets due to its impact on **energy prices, inflation, and economic stability**.

About OPEC+

- **OPEC Formation:** Established in **1960** by **Iraq, Iran, Kuwait, Saudi Arabia, and Venezuela** to coordinate oil policies and stabilise markets.
- **Expansion into OPEC+:** In 2016, OPEC signed agreements with **10 other oil-producing countries** (including Russia, Mexico, and Kazakhstan) to form **OPEC+**, expanding its influence.
- **Production Share:** Together, **OPEC and OPEC+ account for ~59% of global oil production**, making them a dominant force in energy geopolitics.
- **Notable Absence:** The **USA**, despite being the world's largest oil producer, is **not a member of OPEC or OPEC+**, and often pursues independent production and pricing strategies.

Global Significance of OPEC+

1. **Energy Prices:**
   - OPEC+ decisions directly impact **global crude prices**, influencing inflation and energy bills worldwide.
2. **Economic Stability:**
   - Oil-exporting nations rely heavily on petroleum revenues, while importing countries like India face **fiscal and current account pressures** when oil prices rise.
3. **Geopolitical Leverage:**
   - Control over output provides member nations with **strategic leverage** in international relations.
   - For example, Russia uses oil output as a bargaining tool amid sanctions.
4. **Climate vs Energy Debate:**
   - While OPEC+ focuses on stable oil markets, the push for **renewables and net-zero goals** challenges its long-term relevance.

India's Concerns

- India imports **over 85% of its crude oil**, making OPEC+ decisions crucial for its **energy security**.
- Rising crude prices affect:
  - **Inflation** (fuel and transport costs).
  - **Fiscal deficit** (higher subsidy burden).
  - **External balance** (increased current account deficit).

Policy Dimensions

- **Strategic Petroleum Reserves (SPR):** India has built reserves to cushion supply shocks.
- **Diversification:** Increasing imports from the **US, Africa, and Latin America** to reduce reliance on OPEC+.
- **Renewable Push:** Expanding **solar, wind, and biofuels** to reduce long-term dependency on fossil fuels.

Mains Practice Question

Q. *OPEC+ plays a critical role in shaping global energy markets. Discuss its significance for India's energy security and the challenges it poses for balancing growth with sustainability.*

Katchatheevu Island: India–Sri Lanka Dispute

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography: Indian and World Geography, Location of Places**
✅ **GS Paper II – International Relations: India and its Neighbourhood, Bilateral Issues**
✅ **GS Paper III – Security: Maritime Security, Border Disputes**

Context

The **President of Sri Lanka** recently visited **Katchatheevu Island**, rekindling political debate in India over its transfer to Sri Lanka in 1974. Several political voices in Tamil Nadu have renewed demands for its **return to India**, citing livelihood and sovereignty concerns.

About Katchatheevu Island

- **Location:**
    - A small, **uninhabited island** in the **Palk Strait**.
    - Lies **northeast of Rameswaram (Tamil Nadu)** and **southwest of Jaffna (Sri Lanka)**.
- **Physical Features:**
    - Barren, no drinking water or sanitation facilities.
    - The only permanent structure is **St. Anthony's Catholic Shrine**, frequented by fishermen and pilgrims from both nations.

Historical and Political Dispute

- The island was a **disputed territory** between **India and Sri Lanka** for decades.
- **1974 Agreement:**
    - Both nations signed an agreement delineating the **International Maritime Boundary Line (IMBL)**.
    - **Katchatheevu was placed under Sri Lankan sovereignty**.
    - In return, **India gained Wadge Bank**, a rich fishing ground near Kanniyakumari.
- Despite the agreement, the **Katchatheevu issue continues to be politically sensitive**, especially in Tamil Nadu, where fishermen's access remains contentious.

Significance of the Issue

1. **Fishermen's Livelihood**
    - Tamil Nadu fishermen often cross into waters near Katchatheevu due to rich fishing grounds.
    - Leads to frequent **arrests by Sri Lankan Navy**, causing diplomatic tensions.
2. **Religious & Cultural Link**
    - The **St. Anthony's Shrine** serves as a symbol of shared heritage, attracting pilgrims from both countries annually.
3. **Geopolitical Angle**
    - Maritime boundary disputes add to the complexity of **India–Sri Lanka relations**, especially amidst growing **Chinese presence in Sri Lanka**.

India's Position

- India officially recognises the **1974 agreement** but political demands for review persist.
- In past parliamentary debates, the government has stated that reclaiming Katchatheevu would require **renegotiation of international treaties**.

Policy Dimensions

- **Bilateral Engagements:** Mechanisms exist between India and Sri Lanka for resolving fishermen-related issues, but incidents recur.
- **Security Concerns:** The island sits in a sensitive location in the Palk Strait, a region of strategic importance for **India's maritime security**.
- **Way Forward:**

- o Strengthen **joint fishing agreements and cooperative management**.
- o Explore **cultural diplomacy** by expanding access to the shrine.
- o Use diplomatic channels to **reduce fishermen arrests** and encourage **sustainable fishing practices**.

Mains Practice Question

Q. *Katchatheevu Island has remained a symbol of unresolved issues in India–Sri Lanka relations. Discuss the historical, political, and livelihood dimensions of this dispute and suggest a way forward.*

India at BRICS: Call for Fair, Transparent Trade

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: Bilateral, Regional and Global Groupings, WTO & Multilateral Institutions**
✅ **GS Paper III – Economy: Globalisation, Trade, External Sector, Inclusive Growth**

Context

At the **virtual BRICS Summit (2025)** convened to address **global trade disruptions**, India's **External Affairs Minister (EAM)** emphasised that **economic practices must be fair, inclusive, and transparent**. The statement comes at a time of rising **protectionism, weakening multilateral institutions, and fragile global supply chains**.

Emerging Challenges for Global Trade

1. **Protectionism & Tariffs**
   - o Example: The **U.S. imposed 50% tariffs on Brazil and India (2025)**, undermining the **WTO's rules-based system**.
   - o Such unilateral actions erode trust in multilateral frameworks.
2. **Weak Multilateralism**
   - o WTO facing institutional paralysis (e.g., stalled **Appellate Body**).
   - o Political gridlocks within the **UN** blocking long-pending reforms.
3. **Supply Chain Fragility**
   - o **COVID-19 disruptions**, **Russia–Ukraine conflict**, and **maritime crises (e.g., Red Sea attacks)** exposed vulnerabilities.
   - o Resulted in **volatility in global trade and energy markets**.
4. **Food, Energy & Fertiliser Insecurity**
   - o Particularly severe in the **Global South**.
   - o Exacerbated by **climate-induced extreme events** and measures like the **EU's Carbon Border Adjustment Mechanism (CBAM)**.

India's Proposed Way Forward

1. **Resilient Supply Chains**
   - o Diversify hubs under **Act East Policy** and initiatives like the **Quad's supply chain resilience framework**.
2. **Reform Multilateralism**
   - o Push for revival of WTO's dispute settlement system.
   - o Strengthen the **UN system** to address economic justice and sustainability.
3. **Refashioning Trade Ties**
   - o Reassess regional trade ties, including **engagement with China** and other neighbours.
4. **Accelerating Aatmanirbhar Bharat**
   - o Reduce bureaucratic costs and simplify trade regulations.
   - o Provide **stable and predictable policy frameworks** to attract investment.
5. **Other Strategies**
   - o **Negotiating Free Trade Agreements (FTAs)** with key partners.
   - o Expanding exports by exploring **new markets** in Africa, Latin America, and Central Asia.
   - o Championing the interests of the **Global South** for equitable trade norms.

Policy Dimensions

- **India's Multilateral Role:** By advocating fairness, India positions itself as a **voice for developing nations**.
- **Strategic Autonomy:** India balances **self-reliance (Aatmanirbhar Bharat)** with **global integration**.
- **Global Trade Reform:** India's stand aligns with the need to **rebuild trust in multilateralism** amidst geopolitical fragmentation.

Mains Practice Question

Q. *"Global trade today faces the dual challenge of protectionism and weakening multilateralism." In this context, discuss India's vision for a fair and transparent trade system as articulated in recent multilateral forums.*

India–Israel: First OECD Bilateral Investment Treaty

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations:** Bilateral Agreements, India and West Asia, Multilateral Partnerships
✅ **GS Paper III – Economy:** Investment, External Sector, FDI Policy

Context

Israel has become the **first OECD member country** to sign a **Bilateral Investment Treaty (BIT)** with India (2025). This marks a milestone in India's **post-2015 investment treaty framework** and strengthens India–Israel economic, strategic, and technological ties. The earlier BIT, signed in **1996**, was terminated in **2017** after India adopted its new **Model BIT (2015)**.

Key Features of India–Israel BIT (2025)

1. **Boost to Investment**
   o   Aims to increase bilateral investments, currently standing at **USD 800 million**.
2. **Investor Protection with State Sovereignty**
   o   Ensures **minimum standard of treatment** for investors.
   o   Balances protection with the **host state's regulatory rights**.
3. **Dispute Resolution Mechanism**
   o   Provides for **arbitration** to resolve investor–state disputes.
   o   Intended to create a **predictable and stable environment** for trade and investment.

Evolving India–Israel Cooperation

- **Economic Engagement**
  o   Bilateral trade stood at **USD 6.53 billion (FY 2023–24)** (excluding defence), with India enjoying a trade surplus.
- **Regional Cooperation**
  o   **I2U2 Grouping (India, Israel, UAE, US):** First summit held in 2022, focusing on food security, energy, and technology.
- **Innovation & Science–Tech**
  o   **India–Israel Industrial R&D and Innovation Fund (I4F):** Supporting joint industrial research for 5 years (2023–27).
- **Defence Cooperation**
  o   Co-development of the **Barak-8 missile system**.
  o   Regular **port calls at Haifa**, reflecting maritime cooperation.
- **Other Areas**
  o   **Cultural exchange programmes**, collaboration in **healthcare, agriculture, and water resource management**.

Bilateral Investment Treaty (BIT): Overview

- **Definition:** A **reciprocal legal agreement** between two states to **promote and protect investments** in each other's territories.
- **International Law Context:** Recognised under **Art. 38(1)(a) of the Statute of the International Court of Justice**as a source of public international law obligations.
- **India's Model BIT (2015):**
  o   Replaced the 1993 model, giving greater emphasis on **state sovereignty and regulatory rights**.
- **Recent BITs signed by India:** Uzbekistan (2024), UAE (2024), Kyrgyzstan (2025).

Policy Dimensions

- **Strategic Significance:** Reinforces India's **West Asia outreach** and adds depth to the **India–Israel strategic partnership**.
- **Economic Implications:** Could boost **startups, high-tech industries, defence, and agriculture investments**.
- **Global Dimension:** Positions India as an attractive investment destination by **aligning BITs with global best practices**.

Mains Practice Question

Q. *The India–Israel Bilateral Investment Treaty marks a new phase in India's investment diplomacy. Discuss its significance in strengthening bilateral ties while balancing investor protection and sovereign regulatory rights.*

UK–India Infra Bridge: Strengthening Investment Ties

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations:** India–UK Relations, Bilateral Cooperation
✅ **GS Paper III – Economy:** Infrastructure, Investment Models, PPPs

Context

The **UK–India Infrastructure Financing Bridge (UKIIFB)** marked its **first anniversary** by releasing a **recommendations report**. The report emphasised the need to **align India's procurement process with global standards** and to address **operational risks and investor concerns** about unpredictability and opacity in infrastructure projects.

About UKIIFB

- **Nature:** A **collaborative initiative** jointly led by **NITI Aayog** (India) and the **City of London** (UK).
- **Objective:** To unlock infrastructure investment in India by leveraging London's expertise in **structuring, financing, and phasing large-scale projects**.
- **Scope:** Supports investment in critical infrastructure sectors such as **transport, renewable energy, urban infrastructure, and digital connectivity**.
- **Strategic Goal:** Securing **long-term capital** and promoting **sustainable and resilient infrastructure development**.

Key Recommendations from Anniversary Report

1. **Procurement Reform:**
   o Align Indian procurement processes with **globally recognised frameworks** to enhance transparency and efficiency.
2. **Risk Management:**
   o Address **operational risks** associated with long-gestation infrastructure projects.
   o Reduce **policy unpredictability and opacity** in approvals and clearances.
3. **Investor Confidence:**
   o Promote **regulatory stability** to attract long-term foreign capital.
   o Foster collaboration between **Indian institutions and UK financial markets**.

Significance of UKIIFB

- **For India:**
  o Mobilises **foreign capital** to meet India's ambitious **$1.4 trillion National Infrastructure Pipeline (NIP)** targets.
  o Enhances India's reputation as a **predictable investment destination**.
- **For the UK:**
  o Strengthens UK's post-Brexit outreach to India.
  o Positions London as a hub for **green and sustainable financing**.
- **For Bilateral Relations:**
  o Builds on the **India–UK Roadmap 2030**, especially in areas of **infrastructure, finance, and climate partnership**.

Policy Dimensions

- **Economic Diplomacy:** Showcases India's use of **bilateral platforms for investment mobilisation**.
- **Global Standards:** Moves India closer to **international best practices** in infrastructure financing.
- **Sustainable Development:** Can boost financing in **renewable energy, smart cities, and climate-resilient infrastructure**.

Mains Practice Question

Q. *"Infrastructure financing remains a key bottleneck for India's development goals. Discuss how bilateral initiatives like the UK–India Infrastructure Financing Bridge can help bridge the gap."*

EU Expands Access for Indian Seafood Exports

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: India–EU Relations, Trade Agreements**
✅ **GS Paper III – Economy: Agriculture & Allied Sectors, Exports, WTO & Global Trade**

Context

The **European Union (EU)** has approved **102 additional Indian fishery establishments** for exporting seafood to its member states. This decision marks a significant boost for India's seafood sector, enhancing its presence in one of the **world's most lucrative markets**.

Significance of the Expansion

1. **Export Growth**
   o Expected to increase India's seafood exports to the EU by **20%**.
   o Strengthens India's share in the **global seafood trade**.

2. **Global Confidence**
   o Reflects growing **international trust in India's food safety and quality assurance systems**.
   o Recognition of India's compliance with **EU sanitary and phytosanitary standards**.
3. **Aquaculture Boost**
   o Benefits exports of **aquaculture shrimps**, a key contributor to India's seafood basket.
   o Also supports trade in **Cephalopods** (squid, cuttlefish, octopus), which are in high demand in European markets.

India's Seafood Sector in Perspective

- **Export Value:** India is among the **top exporters of seafood globally**, with the **EU, US, China, and Japan** as major markets.
- **Key Species:** Frozen shrimp accounts for the largest share of India's seafood exports.
- **Policy Support:** Marine Products Export Development Authority (**MPEDA**) regulates quality standards and export promotion.

Policy & Strategic Dimensions

- **Economic Diplomacy:** Enhances India's trade relations with the EU amidst ongoing negotiations on the **India–EU Free Trade Agreement (FTA)**.
- **Rural & Coastal Development:** Expansion of seafood exports supports **fisherfolk livelihoods** and **coastal economy growth**.
- **Sustainability:** Meeting global standards also pushes India towards **sustainable fishing and aquaculture practices**.

Mains Practice Question

Q. *"Seafood exports are emerging as a major pillar of India's agri-trade strategy. Discuss the significance of the EU's expanded market access for Indian fishery products in this context."*

UN Report: Rising Military Spending Threatens Peace

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: Global Governance, UN, Peace and Security**
✅ **GS Paper II – International Institutions: Role of UN in Global Peace and Development**
✅ **GS Paper III – Economy & Development: Resource Allocation, SDGs, Financing Gaps**

Context

The **UN Secretary-General** released a report titled *"The Security We Need: Rebalancing Military Spending for a Sustainable and Peaceful Future."* The report highlights the **dangers of record-high military expenditure**, its impact on **geopolitical tensions**, and its negative consequences for **sustainable development financing**.

Key Highlights of the Report

- **Global Military Spending:**
  o Reached **$2.7 trillion in 2024–25** (SIPRI estimates).
  o Projected to rise to **$6.6 trillion by 2035** if trends continue.
- **Economic Burden:**
  o Military spending share of global GDP rose from **2.2% (2022) to 2.5% (2025)**.
  o Share of government budgets increased from **6.6% to 7.1%** during the same period.
- **Concentration of Power:**
  o **China, India, Russia, USA, and the European Union** together account for **over 70% of global military expenditure**.
- **Financing Imbalance:**
  o Development financing has stagnated, while the **annual SDG financing gap** has widened to **$4 trillion**.
- **Impact on Global Peace & Development:**
  o Fuels **arms races and geopolitical tensions**.
  o Diverts resources away from **poverty reduction, education, and health**.
  o Worsens **public debt burdens**, especially in fragile and poor states.

UN's Policy Recommendations

1. **Rebalancing Security Approaches**
   o Prioritize **diplomacy, peaceful dispute settlement, and confidence-building measures**.
2. **Integrating Military Spending in Disarmament**
   o Place military expenditure at the **core of disarmament debates**.
   o Strengthen links between **arms control and sustainable development**.
3. **Transparency & Accountability**
   o Improve **reporting of defence budgets** to build global trust.

4. **Financing Development**
   o Reinforce **multilateral financial institutions** for SDG financing.
5. **Human-Centred Security**
   o Shift towards a **people-first security model**, focusing on **basic human needs and sustainable development**.

Policy & Strategic Dimensions

- **UN's Dilemma:** Balancing national sovereignty in defence with collective global responsibility for peace.
- **India's Position:** As one of the top spenders, India faces the challenge of balancing **defence modernisation with social development priorities**.
- **Global South Concerns:** Rising military expenditure worsens debt distress and reduces funds available for **climate action and SDGs**.
- **Ethical Dimension:** Reflects the **guns vs. butter debate**—whether nations should prioritise military power or welfare.

Mains Practice Question

Q. *"The UN has warned that record military spending is crowding out resources for sustainable development. In the context of India, critically examine the trade-offs between defence preparedness and developmental expenditure."*

China's Rare Earth Export Curbs Hit Indian EVs

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: India–China Trade Relations, Strategic Minerals**
✅ **GS Paper III – Economy: Industry, PLI Scheme, Manufacturing Sector**
✅ **GS Paper III – Science & Technology: EVs, Renewable Energy, Critical Minerals**

Context

China's decision to **restrict exports of Rare Earth Magnets (REMs)** has raised concerns for India, particularly in the **automobile and EV industry**. REMs are a **critical component** for electric vehicles, renewable energy, and defence systems. The move could increase **automobile prices** and reduce **domestic value addition**, impacting incentives under the **Production-Linked Incentive (PLI) scheme**.

About Rare Earth Magnets (REMs)

- **Definition:** Strongest type of commercially available **permanent magnets**.
- **Composition:** Alloys containing rare earth elements like **neodymium, praseodymium, and dysprosium**.
- **Applications:**
  o **Electric Vehicles (EVs)** – motors and batteries.
  o **Renewable Energy** – wind turbines, solar technologies.
  o **Defence Systems** – precision-guided missiles, radars, communication systems.
- **Importance:** Their absence can **paralyse global supply chains**.

Challenges for India

1. **Supply Chain Concentration**
   o China controls **~70% of rare earth mining** and **~90% of REM production** globally.
2. **Indian Limitations**
   o Despite holding the **5th-largest rare earth reserves**, India **imports nearly all REMs** due to lack of domestic processing capacity.
3. **Time & Capital Intensive**
   o Establishing a **rare earth supply chain** takes 3–4 years, involving **high investment and risks**.
4. **PLI Scheme Impact**
   o Importing **complete parts** instead of raw REMs reduces **domestic value addition**, disqualifying automakers from **PLI incentives**.

Initiatives Taken

- **National Critical Mineral Mission:** Launched to achieve **self-reliance in critical minerals** and boost **recycling capacity**.
- **Indian Rare Earths Limited (IREL):** Engaged in talks with **Japanese and Korean firms** to begin **commercial REM production** in India.
- **Global Partnerships:** Efforts to diversify supply chain through collaboration with **like-minded countries (Quad, Australia, US)**.

Policy & Strategic Dimensions

- **Economic Security:** Dependence on China poses risks to India's **EV, renewable energy, and defence sectors**.
- **Strategic Autonomy:** Critical minerals form the backbone of **national security and energy transition goals**.
- **Industrial Policy:** REMs are central to India's push for **green mobility, clean energy, and Atmanirbhar Bharat**.
- **Geopolitical Angle:** China's curbs can be seen as **weaponisation of trade**, similar to past curbs on rare earth exports to Japan.

Mains Practice Question

Q. *"Rare Earth Magnets (REMs) are the building blocks of clean energy and advanced defence systems. Examine the implications of China's export curbs on India's EV sector and discuss the policy measures required for self-reliance."*

India–Mauritius: A Steadfast Development Partnership

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: India and its Neighbourhood, Bilateral Relations**
✅ **GS Paper II – Governance: India's Development Cooperation, Diaspora**
✅ **GS Paper III – Security: Maritime Security, Indian Ocean Region**

Context

During his **state visit to India**, the **Prime Minister of Mauritius** reaffirmed that India has been a **time-tested and trusted partner** in the island nation's **socio-economic development**. The relationship reflects deep **historical, cultural, economic, and strategic ties**, making Mauritius one of India's closest partners in the **Indian Ocean Region (IOR)**.

Dimensions of India–Mauritius Relations

1. Economic Ties

- India is among Mauritius' **leading trading partners**.
- Major Indian exports: **pharmaceuticals, cotton, cereals, motor vehicles, mineral fuels**.
- **FDI linkages:** Mauritius accounts for **~25% of cumulative FDI into India** since 2000, owing to favourable tax treaties.
- Indian investments in Mauritius exceeded **USD 200 million in the last five years**.

2. Development Partnership

- India extended **Special Economic Package and Lines of Credit** for key infrastructure projects:
  - **Metro Express**, **Supreme Court building**, **Social Housing**, etc.
- India has acted as a **first responder** during crises:
  - **COVID-19 pandemic support**.
  - **Wakashio oil-spill disaster relief**.

3. Cultural Linkages

- Around **70% of Mauritius' population is of Indian origin**.
- Historical connection of **Girmitiyas** (Indentured Indian labourers), first brought from **Puducherry in 1729**.
- Celebrations of **Indian festivals and cultural exchanges** reinforce people-to-people ties.

4. Strategic & Geopolitical Significance

- Mauritius' location in the **Western Indian Ocean** makes it vital for India's **maritime security**.
- It is central to India's **MAHASAGAR Vision** (Maritime Cooperation in IOR) and **Neighbourhood First Policy**.
- Serves as a **gateway for India's trade and investment in Africa**.

Policy & Strategic Dimensions

- **Maritime Diplomacy:** Mauritius plays a key role in India's **Security and Growth for All in the Region (SAGAR)** doctrine.
- **Diaspora Diplomacy:** Mauritius acts as a bridge between India and the **Indian diaspora worldwide**.
- **Geopolitics:** Strengthens India's influence in IOR, countering China's growing presence.
- **Economic Integration:** Supports India's engagement with **African Continental Free Trade Area (AfCFTA)**.

Mains Practice Question

Q. *"Mauritius is more than just a neighbour; it is a strategic partner in India's Indian Ocean vision. Discuss the multifaceted dimensions of India–Mauritius relations with special reference to maritime security and diaspora linkages."*

Iran–IAEA Agreement: Nuclear Inspections Resume

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: India and its Neighbourhood, West Asia Politics**

✅ **GS Paper II – International Institutions: IAEA, Non-Proliferation Treaty (NPT)**
✅ **GS Paper III – Security: Nuclear Security, Disarmament & Global Peace**

Context

Iran and the **International Atomic Energy Agency (IAEA)** have signed an agreement to **resume cooperation**, including steps towards **relaunching inspections of Iran's nuclear facilities**. This comes after Iran's earlier decision to **suspend cooperation** following tensions with the **United States and Israel**.

About IAEA

- **Nature:** An intergovernmental organisation under the **UN system**.
- **Mandate:**
  - Administers **international safeguards** to verify non-proliferation commitments of **non-nuclear weapon states** under the **NPT**.
  - Promotes the **peaceful use of nuclear energy** in health, agriculture, and energy among member states.
- **Role in Iran Nuclear Issue:**
  - Under the **Joint Comprehensive Plan of Action (JCPOA)** (2015), Iran agreed to **reduce its nuclear activities** and grant **greater access for IAEA inspectors**.

The Iran Nuclear Question

- **JCPOA (2015):** Agreement between Iran and P5+1 (US, UK, France, Russia, China + Germany).
- **US Withdrawal (2018):** The US under Trump exited the deal, leading Iran to gradually roll back compliance.
- **Suspension of Cooperation:** Iran passed a law curtailing IAEA inspections, citing security tensions with Israel and sanctions pressure from the US.
- **Current Agreement:** Represents a step back to **diplomatic engagement and transparency**.

Global and Regional Significance

- **Non-Proliferation:** Restoring inspections strengthens the **NPT regime**.
- **West Asian Security:** Reduces risks of a **nuclear arms race** in an already volatile region.
- **Geopolitics:** A test case for the **US–Iran–Israel triangular rivalry**.
- **India's Interest:**
  - Stability in West Asia critical for **energy security** and **Indian diaspora**.
  - India supports **peaceful nuclear energy use** but opposes proliferation.

Policy & Strategic Dimensions

- **Diplomacy vs Militarisation:** Shows the tension between **peaceful dispute resolution and military posturing**.
- **Energy Transition:** Nuclear energy is seen as a **green option**, but tied with **strategic risks**.
- **Institutional Role:** Reinforces importance of **IAEA and multilateral frameworks** in global security.

Mains Practice Question

Q. *"The Iran nuclear issue reflects the larger challenge of balancing peaceful nuclear energy with non-proliferation commitments. Discuss in light of the IAEA's role and the revival of cooperation under JCPOA."*

New York Declaration: India's Stand on Palestine

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations: India and UN, West Asia Politics**
✅ **GS Paper II – Governance: Multilateralism, Global Peace and Security**

Context

India voted in favour of a **UN General Assembly resolution endorsing the 'New York Declaration'**, which seeks a **peaceful settlement of the Palestine issue** and supports the long-standing **two-state solution**.

About the New York Declaration

- **Ceasefire in Gaza**: Immediate end to hostilities.
- **Two-State Solution**: Calls for the establishment of an **independent, sovereign, and economically viable Palestinian State** alongside Israel.
- **Disarmament of Hamas**: Proposes **removal of Hamas from governance in Gaza** to ensure stability.

- **Regional Normalisation**: Seeks **normalisation of ties between Israel and Arab countries**.
- **Collective Security Guarantees**: Aims to provide regional peace architecture under international supervision.

Significance

- **For Palestine**: Strengthens international legitimacy for **statehood aspirations**.
- **For Israel-Arab Relations**: Encourages regional diplomacy and conflict de-escalation.
- **For Global Peace**: Reinforces multilateralism in conflict resolution.
- **For India**:
    o   Balances its **historic support for Palestine** with **strategic relations with Israel**.

Challenges

- **Geopolitical Polarisation**: Deep divisions between Western powers, Arab states, and Israel may hinder implementation.
- **Ground Realities**: Disarmament of Hamas and governance transition in Gaza remain highly contentious.
- **Trust Deficit**: Long history of failed peace talks between Israel and Palestine.

Conclusion

The **New York Declaration** represents a renewed attempt by the international community to revive the **two-state solution** and secure lasting peace in West Asia. India's vote underscores its policy of supporting **Palestinian statehood** while promoting **balanced diplomacy** in the region.

Mains Practice Question

Q. India has historically supported the Palestinian cause while deepening ties with Israel. In light of the New York Declaration, critically examine India's balancing act in West Asia diplomacy.

SECURITY & DEFENCE

Defence Theaterisation: India's Integration Plan

📌 **Syllabus Mapping:**
✅ GS Paper II – Governance, Role of Executive, Government Policies
✅ GS Paper III – Security Challenges, Defence Reforms, Internal and External Security

Context

At **Ran Samwad 2025**, sharp debates emerged over India's proposed **Defence Theaterisation Plan**, which represents the most ambitious restructuring of India's armed forces since Independence. The plan aims to enhance **jointness, efficiency, and integrated warfare capability** by combining resources of the **Army, Navy, and Air Force** under unified theatre commands.

What is Theaterisation?

- A reform designed to **integrate military assets** of the three services into **geographical theatre commands** led by a single commander.
- Seeks to replace the current system of **17 individual service-specific commands** with fewer integrated commands.
- Mandated under the **Chief of Defence Staff (CDS)** and the **Department of Military Affairs (DMA)**.
- Objective: **Synergy, resource optimisation, and faster decision-making** in multi-domain warfare.

Challenges with Theaterisation

1. Reservations of the Indian Air Force (IAF)

- Concerned that the division of its **limited combat aircraft fleet** could dilute operational flexibility.
- Air power doctrine emphasises **centralised command and flexible employment**, which may clash with theatre-specific distribution.

2. India-Specific Requirements

- Critics warn against "**copy-pasting**" foreign models (like the US or China).
- India's threats are unique: **land borders with Pakistan and China, maritime vulnerabilities in the Indian Ocean, and hybrid warfare challenges**.

- Calls for a model **tailored to India's geography and strategic needs**.

3. Structural Disruption

- Transition from existing **17 commands** to new structures could **temporarily reduce combat readiness**.
- Risk of **bureaucratic overlaps** and resistance within the services.

4. Command and Domain Knowledge

- Question over whether a theatre commander from one service can effectively **lead operations involving another service's specialised assets**.
- Particularly sensitive in case of **air operations**, where domain expertise is crucial.

5. Cost and Industrial Base

- Theaterisation requires **huge expenditure** on infrastructure, logistics, and systems integration.
- Skepticism over whether India's **defence industrial base (still evolving under Atmanirbhar Bharat)** can support such a transformation.

Policy Dimensions

- **Committees & Reforms:**
  - **Kargil Review Committee (1999)** first highlighted lack of jointness.
  - **Naresh Chandra Committee (2012)** recommended integrated commands.
  - Creation of the **CDS in 2019** and DMA in 2020 was a step towards theaterisation.
- **Comparative Models:**
  - **US Unified Combatant Commands** – global presence with land, sea, and air integration.
  - **China's Theater Commands** – five integrated commands for efficient mobilisation.
  - India's approach needs to balance between these and adapt to **South Asian realities**.
- **Government Initiatives:**
  - **Atmanirbhar Bharat in Defence** – push for self-reliance in equipment.
  - **Defence Acquisition Procedure (DAP 2020)** – modernising procurement to support integrated operations.

Mains Practice Question

Q. *Theaterisation has been called India's most ambitious military reform post-Independence. Critically examine the challenges and opportunities it presents in light of India's unique strategic environment.*

Red Sea Cable Attacks: India's Underwater Awareness

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Relations, Regional Security, India & its Neighborhood**
✅ **GS Paper III – Security Challenges, Science & Technology in Defence, Disaster Management**

Context

Recent **attacks on undersea communication cables in the Red Sea** triggered internet disruptions across parts of the **Middle East and Asia, including India**. The incident has highlighted the vulnerability of global digital infrastructure and underlined the importance of **India's Underwater Domain Awareness (UDA)** — the ability to **monitor, detect, and secure activities beneath oceans and seas**.

What is Underwater Domain Awareness (UDA)?

- Refers to the **capacity of a nation or organisation to track, assess, and protect underwater activities and assets**.
- Encompasses **security, economic, environmental, and technological dimensions**.
- Comparable to **Maritime Domain Awareness (MDA)** but focused specifically on **sub-surface challenges**.

Need for UDA in India

1. **National Security & Regional Stability**
   - Rising presence of China in the Indian Ocean (e.g., **"Underwater Great Wall" project**).
   - Frequent **Chinese submarine incursions** near Indian waters.
2. **Protecting Critical Infrastructure**
   - **Submarine fibre-optic cables** carry **over 95% of global internet traffic**.
   - Any disruption affects **financial systems, communications, and national security**.
3. **Technological Dependence**
   - UDA is critical for reducing **import reliance** in undersea technology and equipment.

Challenges for India

1. **Technological Gaps**
   o Development of **Unmanned Underwater Vehicles (UUVs)** still nascent.
   o **DRDO's AIP system** (phosphoric acid fuel cell) less advanced than **lithium-ion based AIP systems** used globally.
   o **BEL's Unmanned Surface Vehicle** has limited capacity (30 kg payload).
2. **Financial Constraints**
   o Lack of **sustained funding** for startups working on underwater technologies.
   o Prototype development suffers from irregular long-term support.
3. **Operational Difficulties**
   o Vast **7,500 km coastline**, **seasonal monsoons**, and **fragmented inter-agency coordination** complicate surveillance.
4. **Geopolitical Threats**
   o Increased Chinese naval presence in the **Indian Ocean Region (IOR)**.
   o Strategic choke points like the **Strait of Malacca** and **Red Sea** add vulnerability.

India's Initiatives in UDA

1. **Indigenous Development**
   o UUVs such as **MAYA, AMOGH, and ADAMYA** developed for naval surveillance.
   o **Matsya 6000** manned submersible under the **Samudrayaan Project**.
2. **Infrastructure & Systems**
   o **Integrated Underwater Harbour Defence and Surveillance System (IUHDSS)** deployed in Port Blair.
3. **International Partnerships**
   o Collaboration with the **US** on co-developing undersea technologies.
   o Equipping **MQ-9B Sea Guardian drones** with sonobuoys for underwater tracking.

Policy Dimensions

- **National Security Strategy:** UDA is central to **blue economy security** and **deterrence against Chinese maritime expansion**.
- **Technological Push:** Alignment with **Atmanirbhar Bharat in Defence** and **Make in India** to strengthen domestic innovation.
- **Global Relevance:** Ensuring cable security is not just a national issue but a **global commons concern**, requiring **international cooperation**.

Mains Practice Question

Q. *The recent disruption of undersea cables in the Red Sea has highlighted the vulnerabilities of digital and maritime infrastructure. Discuss the importance of Underwater Domain Awareness (UDA) for India in strengthening national security and protecting critical infrastructure.*

Two-Factor Authentication: Strengthening Cybersecurity

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Cybersecurity, Government Policies**
✅ **GS Paper III – Security: Internal Security, Cyber Threats, Technology in Security**

Context

Two-Factor Authentication (2FA) has recently been in the news as governments, banks, and tech companies expand its use to counter rising **cyberattacks, phishing scams, and identity thefts**. It is now becoming a **standard security practice** for digital transactions, online platforms, and e-governance.

What is 2FA?

- **Definition:** An **identity and access management security method** that requires **two distinct forms of identification** before granting access to resources or data.
- **Mechanism:** Combines two of the following three security factors:
  1. **Something you know:** Password, PIN.
  2. **Something you have:** Phone, token, smart card.
  3. **Something you are:** Biometrics (fingerprint, iris scan, facial recognition).

Examples of 2FA

- **One-Time Passwords (OTPs):** Sent via SMS/email for online banking and payments.
- **Authenticator Apps:** Google Authenticator, Microsoft Authenticator generate time-based codes.
- **Hardware Security Keys:** USB-based devices for sensitive accounts.
- **Biometric Authentication:** Fingerprint/iris scans used along with PINs in smartphones or Aadhaar-enabled services.

Benefits of 2FA

- **Enhanced Security:** Reduces risk of **account breaches** even if passwords are stolen.
- **Prevents Phishing Attacks:** Hackers require both factors, making compromises harder.
- **Protects Personal Data:** Ensures identity safety for **financial, e-commerce, and government platforms**.
- **Regulatory Compliance:** Many institutions mandate 2FA for transactions above certain thresholds.

Policy Dimensions

- **India's Push:**
  - **RBI guidelines** mandate 2FA for online financial transactions.
  - **CERT-In** emphasises multi-layered security in digital services.
- **Global Adoption:**
  - Increasingly deployed across the **EU, US, and Asia-Pacific** to secure critical infrastructure and personal data.
- **Future Trends:**
  - Move towards **Multi-Factor Authentication (MFA)** integrating 2FA with advanced biometric and behavioural analytics.

Mains Practice Question

Q. *"Passwords alone are no longer sufficient to protect digital identities in the age of cyber threats." Discuss the role of Two-Factor Authentication (2FA) in strengthening India's cybersecurity framework.*

iDEX: Defence–EdTech Innovation Drive

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies, Public–Private Partnerships**
✅ **GS Paper III – Security: Defence Technology, Indigenisation, Self-Reliance in Defence**
✅ **GS Paper III – Economy: Innovation, Startups, MSMEs**

Context

The **Innovations for Defence Excellence – Defence Innovation Organisation (iDEX–DIO)** has signed an **MoU with EdCIL (India) Limited** under the **ASPIRE (Accelerating Strategic Progress in Research and Education) program**. The agreement seeks to **develop dual-use, cutting-edge technologies** by linking **defence expertise with emerging education technology (ed-tech) solutions**.

About iDEX–DIO

- **Launch:** The **iDEX scheme** was launched in **2021** to support innovation in the defence sector.
- **Objective:**
  - Provide **financial support** to startups, MSMEs, and individual innovators.
  - Create an ecosystem for **innovation and technology development in defence and aerospace**.
- **Scope:**
  - Target to fund **~300 Startups/MSMEs/innovators** and support **20 partner incubators**.
  - Promotes **dual-use technologies** with applications in both civilian and defence domains.
- **Management:**
  - Implemented by the **Defence Innovation Organisation (DIO)**.
  - DIO is a **not-for-profit company** under the **Department of Defence Production, Ministry of Defence**.

Significance of the iDEX–EdCIL MoU

- **Defence–Education Synergy:** Brings defence R&D expertise into the **education technology sector**.
- **Innovation Push:** Fosters **dual-use applications** (e.g., AI, cybersecurity, simulation, immersive learning tools).
- **Startup Ecosystem:** Strengthens the **defence innovation pipeline** by integrating academia, startups, and industry.
- **Capacity Building:** Enhances India's **research and education frameworks** in critical technologies.

Policy Dimensions

- **Self-Reliance:** Supports India's **Atmanirbhar Bharat Abhiyan** and **Defence Indigenisation Roadmap**.
- **Public–Private Partnership:** Encourages startups and private sector participation in **high-end defence R&D**.
- **Global Benchmarking:** Positions India alongside countries with strong **innovation-driven defence ecosystems** (e.g., US DARPA, Israel's innovation hubs).
- **Civil–Military Fusion:** Enables the transfer of technologies across **defence, education, and civilian markets**.

Mains Practice Question

Q. *"The Innovations for Defence Excellence (iDEX) scheme is a critical step in promoting self-reliance in defence technology. Discuss its role in fostering dual-use innovations and strengthening India's startup ecosystem."*

Exercise Siyom Prahar: Drone Warfare in Army

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Security and Defence Policies**
✅ **GS Paper III – Internal Security: Modernisation of Armed Forces, Technology in Warfare**
✅ **GS Paper I – Geography: Strategic Significance of North-East India**

Context

The **Indian Army** recently conducted **Exercise Siyom Prahar** in **Arunachal Pradesh**, focusing on validating the **integration of drones into tactical operations** under battlefield-like conditions.

About Exercise Siyom Prahar

- **Objective**: To test and validate how drones can be integrated into **tactical operations**.
- **Location**: Arunachal Pradesh, a strategically sensitive border state.
- **Drone Applications**:
  - **Surveillance**
  - **Battlefield reconnaissance**
  - **Target acquisition**
  - **Precision strikes**

Significance of the Exercise

1. **Tactical Innovation**
   - Developed new **Tactics, Techniques, and Procedures (TTPs)** for real-time drone integration.
   - Enhanced ability to **synchronize drone inputs with conventional firepower**.
2. **Joint Targeting & Rapid Response**
   - Improved **joint targeting mechanisms**.
   - Facilitated **quicker decision-making** in highly dynamic battlefield environments.
3. **Geostrategic Importance**
   - Conducted in Arunachal Pradesh, the exercise underlines India's **operational preparedness along the LAC with China**, where drones have emerged as crucial surveillance and combat tools.

Broader Implications

- **Modernisation of Armed Forces**: Part of India's push for **indigenous drone technology** and **AI-enabled warfare systems**.
- **Asymmetric Advantage**: Drones provide **low-cost, high-precision alternatives** to conventional weapons.
- **Global Context**: Lessons from Ukraine-Russia and Armenia-Azerbaijan conflicts show drones as **decisive factors in modern warfare**.

Conclusion

Exercise **Siyom Prahar** showcases India's effort to build a **technology-driven military doctrine**. By integrating **drones with conventional capabilities**, the Indian Army is preparing for **future warfare** in both high-altitude and contested border regions.

Mains Practice Question

Q. *Drone warfare is reshaping modern military doctrines worldwide. Discuss how exercises like Siyom Prahar reflect India's evolving security strategy in the context of border challenges and technological advancements.*

ECONOMY

GST Reform 2025: Towards a Simplified and Inclusive Tax System

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance, Policy Interventions, Inclusive Growth**
✅ **GS Paper III – Indian Economy: Resource Mobilisation, Taxation, Growth & Development**

Context

From **22nd September 2025**, India will implement its **Next-Generation GST Reforms**, marking the most significant overhaul since the introduction of GST in **2017**. The reform aims to **simplify tax rates, improve compliance, and strengthen social protection** while balancing revenue concerns.

Key Features of GST Reform 2025

- **Simplified 2-Tier Structure:** New rate system of **5% and 18%**, replacing multiple existing slabs.
- **Luxury & Sin Goods:** A new **40% tax rate** on pan masala, cigarettes, and similar goods.
- **Digital Filing & Faster Refunds:** Enhanced digital compliance and refund mechanisms for ease of doing business.

Benefits of the Reform

1. Social Protection

- **Exemption of GST** on insurance and essential medicines.
- Expands **household security** and improves **healthcare access**.

2. Lower Prices, Higher Demand

- Reduction in GST on mass consumption items → **cheaper goods/services**.
- Boosts **household savings and consumption demand**.

3. Support for MSMEs

- Reduced GST on inputs like **cement, auto parts, handicrafts**.
- Enhances **competitiveness** and lowers operating costs.

4. Ease of Living & Compliance

- **Two-rate structure** reduces disputes and litigation.
- Enables **simpler compliance, faster decisions, and reduced bureaucratic hurdles**.

5. Wider Tax Net

- Predictable rates encourage **voluntary compliance**.
- Expands tax base and strengthens revenue mobilisation in the long run.

Key Challenges

1. Revenue Implications

- Finance Ministry estimates **₹48,000 crore annual revenue loss** (based on FY23–24 consumption).

2. Input Tax Credit (ITC) Removal

- Removal of ITC on goods like **insurance and healthcare products** could trigger **cascading taxes**, negating benefits.

3. Uncertainty on Anti-profiteering Mechanism

- The **National Anti-Profiteering Authority (NAA)**, created to ensure tax cuts benefit consumers, faces uncertainty over revival/extension.
- Risk of **businesses not passing benefits** to end-users.

Policy Dimensions

- **Evolution of GST:**
  - **2017:** GST replaced multiple indirect taxes with a unified system.
  - **2025 reform:** Major rationalisation, responding to industry demands for **fewer slabs and simpler compliance**.
- **Centre–State Dynamics:**
  - States concerned about **compensation and fiscal autonomy**.
  - GST Council's consensus-driven role remains central to federal fiscal harmony.
- **Global Comparisons:**
  - Countries like **Australia, Canada** also adopted GST/VAT with fewer slabs.
  - India's challenge: balancing **revenue needs of states** with **ease of living and doing business**.

Mains Practice Question

Q. *"GST Reform 2025 marks a step towards simplification but also raises revenue and compliance challenges." Critically analyse the new GST structure and its implications for inclusive growth and fiscal stability in India.*

Account Aggregator: Expanding Digital Infra

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: E-Governance, Government Policies & Interventions**
✅ **GS Paper III – Economy: Financial Inclusion, Digital Infrastructure, RBI & Financial Systems**

Context

India's **Account Aggregator (AA) system** has reached a milestone of **112 million users (2025)**, making it one of the fastest-growing components of the country's **Digital Public Infrastructure (DPI)**. Launched in **2021**, the AA framework has transformed how financial data is shared and accessed across institutions.

About Account Aggregator

- **Regulation:** Account Aggregators are entities **licensed by the Reserve Bank of India (RBI)**.
- **Function:** They facilitate the **collection, aggregation, and secure sharing of user financial data** across banks, NBFCs, insurers, mutual funds, and other financial institutions.
- **User Consent:** Sharing of data happens only with **explicit consent** from individuals or businesses.
- **Role in DPI:** Acts as a bridge between **data providers** (banks, insurers, mutual funds) and **data users** (lenders, wealth managers, fintechs).

Significance of the AA Framework

1. **Financial Inclusion**
   - Helps individuals and small businesses access **credit and financial products** by securely sharing income and transaction history.
   - Reduces dependence on collateral for loans.
2. **Data Empowerment**
   - Shifts control of financial data from institutions to **citizens themselves**.
   - Empowers users to share data selectively for better financial services.
3. **Digital Public Infrastructure Growth**
   - Complements **UPI (Unified Payments Interface)** and **ONDC (Open Network for Digital Commerce)**.
   - Strengthens India's **data economy** by creating a trusted data-sharing ecosystem.
4. **Efficiency in Financial Services**
   - Enables faster **loan approvals**, personalised insurance products, and improved wealth management.
   - Reduces paperwork and fraud risk.

Challenges

- **Awareness Gap:** Many users remain unaware of AA's benefits.
- **Data Privacy Concerns:** Risk of misuse of financial data if safeguards fail.
- **Institutional Adoption:** Not all banks and financial institutions are fully integrated.
- **Regulatory Oversight:** Ensuring **cybersecurity** and robust grievance redressal is crucial.

Policy Dimensions

- **Part of India Stack:** Alongside Aadhaar, UPI, DigiLocker, and ONDC.
- **RBI & SEBI Role:** Regulatory oversight to ensure secure adoption.
- **International Relevance:** India's AA framework seen as a model for **data empowerment-based finance** globally.

Mains Practice Question

Q. *"The Account Aggregator framework marks a major shift in financial data ownership from institutions to citizens." Discuss its significance for financial inclusion and the challenges in ensuring privacy and security.*

UPU Integration: Boosting Cross-Border Remittances

📌 **Syllabus Mapping:**
✅ **GS Paper II – International Institutions, UN Specialized Agencies**
✅ **GS Paper III – Economy: Remittances, Financial Inclusion, Digital Infrastructure**

Context

The **Union Minister for Communication** has unveiled the **UPI–Universal Postal Union (UPU) integration project**, aimed at transforming **cross-border remittances**. The initiative seeks to leverage India's **digital payment infrastructure (UPI)** with UPU's global postal network, enhancing **ease, speed, and affordability** of remittance flows.

About the Universal Postal Union (UPU)

- **Establishment:** Founded in **1874**, making it the **second-oldest international organisation** after the **International Telecommunication Union (1865)**.
- **UN Agency:** Became a **specialized agency of the United Nations in 1948**.
- **Headquarters:** Berne, Switzerland.
- **Membership: 192 countries**, including India.
- **Function:** Serves as the **primary forum for cooperation in the postal sector**, ensuring a **universal, reliable, and up-to-date network of products and services**.

Significance of UPU for India

1. **Remittance Facilitation**
   o India is the **world's largest recipient of remittances** (over $125 billion annually).
   o UPI–UPU integration will make cross-border transfers **faster, cheaper, and more secure**.
2. **Financial Inclusion**
   o Expands access for citizens in **rural and remote areas**, where post offices remain the **last-mile service provider**.
3. **Digital Diplomacy**
   o Enhances India's global image as a **leader in digital public infrastructure (DPI)**.
   o Extends India's **UPI model** beyond borders.
4. **Strengthening Postal Network**
   o Revitalises the Indian postal system by aligning with **global innovation trends**.

Policy Dimensions

- **Global South Leadership:** India can champion **affordable remittances** in developing countries through postal and fintech collaboration.
- **SDG Alignment:** Supports **SDG 10.c** – reducing remittance transaction costs.
- **Strategic Outreach:** Integration of UPI with UPU strengthens India's **soft power in international institutions**.
- **Digital Transformation:** Reflects synergy between India's **Digital India programme** and multilateral frameworks.

Mains Practice Question

Q. *"India's UPI–UPU integration project marks a significant step in transforming global remittance flows." Discuss the significance of the Universal Postal Union for India's economic diplomacy and financial inclusion.*

Company Mergers: Recent Amendments

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Regulatory Bodies, Transparency & Accountability**
✅ **GS Paper III – Economy: Indian Economy, Business Environment, Ease of Doing Business**

Context

The **merger process for unlisted companies, holding companies, and subsidiary companies** has been recently amended, simplifying compliance requirements and strengthening the framework under the **Companies Act, 2013**.

What is a Merger?

- A **merger** is an agreement where **two or more independent companies combine** to form a **single legal entity**.
- Objective: Achieve operational efficiency, expand market access, reduce costs, or diversify business activities.

Types of Mergers

1. **Horizontal Merger** – Companies in the same industry merge (e.g., two pharmaceutical firms).
2. **Vertical Merger** – Companies in the same supply chain merge (e.g., manufacturer with distributor).
3. **Conglomerate Merger** – Companies from unrelated sectors merge (e.g., FMCG with IT services).

Legal Framework in India

- **Companies Act, 2013** – Provides for mergers and demergers of companies.
- **National Company Law Tribunal (NCLT)** – The **primary authority** for approving mergers/demergers.
- **Recent Amendments** – Focused on:
  - Simplifying the process for **unlisted companies**.
  - Special relaxations for **holding and subsidiary company mergers**.
  - Reducing time taken for approvals and compliance burden.

Significance of Mergers

- **Ease of Doing Business** – Streamlined legal processes encourage corporate restructuring.
- **Efficiency Gains** – Mergers help reduce duplication of efforts and improve resource allocation.
- **Market Competitiveness** – Companies can expand their market share and innovation potential.
- **Investment Climate** – Transparent and simplified processes improve investor confidence.
- **Global Competitiveness** – Helps Indian firms scale up and compete with global multinationals.

Challenges

- **Regulatory Approvals** – Despite simplification, multi-layered clearances (SEBI, CCI, RBI) can delay processes.
- **Minority Shareholder Concerns** – Ensuring protection of investor rights.
- **Post-Merger Integration** – Cultural and operational challenges in aligning merged entities.
- **Taxation Issues** – Interpretation of capital gains and stamp duty provisions.

Conclusion

The amendments to the merger process mark a **progressive step in corporate law reforms**. By balancing **ease of business with regulatory safeguards**, India aims to build a more robust business environment, thereby attracting **domestic and global investments**.

Mains Practice Question

Q. *Discuss the recent amendments in the merger process of companies under the Companies Act, 2013. How do such reforms contribute to India's ease of doing business and economic growth?*

SEBI Reforms: Ease of Doing Business

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Regulatory Bodies, Transparency, Investor Protection**
✅ **GS Paper III – Economy: Capital Markets, Investment Models, Ease of Doing Business**

Context

The **Securities and Exchange Board of India (SEBI)**, in its recent **Board meeting (September 2025)**, approved multiple measures to **simplify regulations, attract foreign investments, and boost ease of doing business** in India's securities market.

Key Decisions

1. SWAGAT-FI Framework

- **Full form**: *Single Window Automatic & Generalised Access for Trusted Foreign Investors*.
- **Objective**: Simplify access for:
  - **Foreign Portfolio Investors (FPIs):** Invest in listed securities (equity, bonds, derivatives).

  o   **Foreign Venture Capital Investors (FVCIs):** Invest in **venture capital funds**.

2. India Market Access Platform

- A **digital gateway** to facilitate **seamless entry, compliance, and operations** for foreign investors in India's securities market.

3. Reclassification of REITs (Real Estate Investment Trusts) as Equity

- Enables **greater mutual fund investment** in REITs.
- **REITs**: Investment vehicles that allow individuals to invest in **large-scale, income-producing real estate**.

4. Relaxed IPO Norms

- **Large issuers**: Relaxation of disclosure and compliance norms.
- **Minimum Public Shareholding**: Extended timelines for issuers to meet SEBI's MPS requirements.
- **IPO Definition**: First sale of shares to the public; prerequisite for stock exchange listing.

5. AI-only AIF Schemes

- Introduction of **Alternative Investment Funds (AIFs)** exclusively for **Accredited Investors (AIs)**.
- **Accredited Investors**: High-net-worth individuals or institutions meeting **income, net worth, or professional criteria**, eligible to invest in complex instruments.

Significance of Measures

- **Ease of Doing Business**: Reduces regulatory complexity and compliance burden.
- **Boost to Foreign Investment**: Simplifies market entry for FPIs/FVCIs, strengthening India's capital inflows.
- **Diversified Investment Options**: Expands role of REITs and AIFs in India's financial ecosystem.
- **Capital Market Deepening**: Strengthens India's position as an **emerging global investment hub**.
- **Digitalisation**: India Market Access Platform reflects SEBI's push towards **technology-enabled regulation**.

Conclusion

SEBI's new measures represent a **strategic push towards investor-friendly reforms**, balancing **market growth with regulatory safeguards**. By **streamlining foreign investor access, deepening real estate and alternative investments, and easing IPO norms**, SEBI is positioning India as a more **competitive and resilient capital market** globally.

Mains Practice Question

Q. *"The recent SEBI reforms, including the SWAGAT-FI framework and easing IPO norms, mark a paradigm shift in India's capital market regulation." Discuss how these measures can enhance ease of doing business and foreign investment while safeguarding market stability.*

WELFARE SCHEMES & POLICIES

PMMSY@5: Transforming India's Fisheries

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Welfare Schemes, Government Policies**
✅ **GS Paper III – Economy: Agriculture & Allied Sectors, Blue Economy**
✅ **GS Paper III – Environment: Sustainable Development, Climate Resilience**

Context

The **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**, launched on **10th September 2020** for five years (2020–21 to 2024–25), has completed its initial phase and has been **extended till 2025–26**. It aims to modernize fisheries, improve income for fisherfolk, and strengthen India's role in the **global blue economy**.

About PMMSY

- **Launched by:** Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying.
- **Duration:** 2020–21 to 2024–25 (extended till 2025–26).

- **Nodal Agency: National Fisheries Development Board (NFDB)** for training, awareness, and capacity building.
- **Nature:** Umbrella scheme with:
  o **Central Sector Components**
  o **Centrally Sponsored Components**

Key Achievements

- **Global Contribution:** India is now the **second-largest fish producer** in the world, contributing ~8% of global fish output.
- **Livelihood Impact:** Over **58 lakh livelihoods created**.
- **Women Empowerment: 99,018 women** directly benefited through capacity-building and financial support.

Strategic Initiatives

1. **Women in Fisheries**
   o Up to **60% financial assistance** for women-led projects.
   o Strengthening **climate-resilient coastal villages**.
2. **Technology Adoption**
   o Promotion of **Biofloc** and **Recirculatory Aquaculture System (RAS)** to boost productivity and sustainability.
3. **Formalization & Digitalization**
   o **Pradhan Mantri Matsya Kisan Samridhi Sah Yojana (PM-MKSSY)** for sector formalization.
   o **National Fisheries Digital Platform (NFDP):** Single-window access for fisherfolk.
4. **Climate Resilience**
   o Development of **100 Climate Resilient Coastal Fishermen Villages (CRCFV)** to prepare coastal communities for climate risks.

Policy Dimensions

- **Economic:** Aligns with **Blue Economy vision** and export promotion.
- **Social:** Provides **livelihood diversification** and strengthens **women's participation**.
- **Environmental:** Integrates **climate resilience and sustainable practices**.
- **Digital Governance:** Ensures efficient delivery through **digital platforms and data-driven planning**.

Mains Practice Question

Q. *"The Pradhan Mantri Matsya Sampada Yojana (PMMSY) is a cornerstone of India's Blue Economy strategy. Critically evaluate its achievements and challenges in fostering sustainable and inclusive fisheries development."*

SOCIETY, SOCIAL JUSTICE AND SOCIAL ISSUES

ULLAS: Himachal Achieves Full Literacy

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies & Interventions, Education**
✅ **GS Paper II – Social Justice: Literacy, Human Development, NEP 2020**

Context

Himachal Pradesh has been declared the **fifth State/UT to achieve full functional literacy** under the **Nav Bharat Saksharta Karyakram**, popularly known as **ULLAS (Understanding of Lifelong Learning for All in Society)**. Earlier achievers include **Tripura, Mizoram, Goa, and Ladakh**.

About ULLAS

- **Background:** Introduced as per recommendations of the **National Education Policy (NEP) 2020**.
- **Nature of Scheme:** Centrally Sponsored Scheme – also known as the **New India Literacy Programme (NILP)**.
- **Ministry:** Ministry of Education.
- **Duration: 2022–2027 (five years)**.
- **Target Group:** Adults aged **15 years and above** who missed the opportunity of formal schooling.

Objectives of ULLAS

1. **Foundational Literacy & Numeracy**
   o Enable adults to acquire **basic reading, writing, and numeracy skills**.
2. **Critical Life Skills**
   o Digital literacy, financial literacy, health awareness, child care, and gender sensitivity.
3. **Vocational and Skill Development**
   o Basic vocational education and skill training for economic empowerment.
4. **Continuing Education**
   o Access to libraries, reading rooms, and lifelong learning opportunities.

Significance

- **Empowerment:** Strengthens individual **agency and dignity** by eradicating illiteracy.
- **Human Development:** Enhances **employment prospects, health outcomes, and social participation**.
- **NEP 2020 Alignment:** Advances the goal of **universal literacy and numeracy** in India.
- **Inclusive Growth:** Addresses marginalised sections, especially **women and rural populations**.

Policy Dimensions

- **Digital Push:** Use of **online platforms and mobile apps** for literacy campaigns.
- **Community Participation:** Involvement of volunteers, panchayats, and civil society organisations.
- **Global Context:** Supports India's commitment to **UN SDG 4 (Quality Education)** – ensuring inclusive and equitable education for all.

Mains Practice Question

Q. *"Functional literacy is a key pillar for inclusive growth and empowerment in India." Discuss the significance of ULLAS (Understanding of Lifelong Learning for All in Society) in achieving the goals of NEP 2020.*

Child Nutrition Report 2025: Double Burden of Malnutrition

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies & Interventions, Health & Nutrition**
✅ **GS Paper II – Social Justice: Issues related to Children, Health, Education**
✅ **GS Paper III – Economy: Agriculture Subsidies, Food Security, Globalisation**

Context

The **UNICEF Child Nutrition Report 2025** has revealed an **alarming global rise in unhealthy diets and childhood obesity**, largely driven by the **proliferation and aggressive marketing of ultra-processed foods (UPFs)**. The findings underscore the urgent need to reform global and national **food environments and policy frameworks**.

Key Findings of the Report

- **Rising Overweight and Obesity:**
  o **5% of children under 5** and **20% of children & adolescents (5–19 years)** are now overweight—**double the number since 2000**.
  o In 2025, **prevalence of obesity** among school-age children and adolescents was **9.4%**, while **underweight** prevalence was **9.2%**, showing the **double burden of malnutrition**.
- **Regional Concentration:**
  o More than **50% of affected children** live in **East Asia & Pacific, Latin America & Caribbean, and South Asia**.
  o In **South Asia**, overweight prevalence in 5–19 year olds has increased **fivefold since 2000**.

Key Drivers of the Crisis

1. **Availability & Affordability of UPFs**
   o Ultra-processed foods are **cheaper** than nutritious alternatives due to subsidies on raw materials (corn, soy, wheat).
   o Their **long shelf-life** makes them accessible even for low-income households.
2. **Aggressive & Unregulated Marketing**
   o Targeted **digital marketing campaigns** aimed at children.
   o Use of **influencers and surrogate advertising**, blurring boundaries between ads and content.
3. **Policy Gaps**
   o Only **7% of countries** mandate **front-of-pack nutrition labelling**.
   o Only **8% provide subsidies** for healthy foods.
   o Weak enforcement of food advertising restrictions.

Key Recommendations

1. **Protect Breastfeeding**
   - Enforce the **International Code of Marketing of Breast-Milk Substitutes**.
   - Ban targeted and digital advertising that undermines breastfeeding.
2. **Transform Food Environments**
   - Restrict marketing and availability of **unhealthy foods & beverages**.
   - Introduce **taxes on UPFs**, mandatory **front-of-pack labelling**, and school-level dietary reforms.
3. **Promote Nutritious Foods**
   - Redirect agricultural **subsidies towards fruits, vegetables, pulses, and millets**.
   - Strengthen **local food systems** to ensure affordable healthy diets.
4. **Social Protection & Behaviour Change**
   - Expand **cash transfers, PDS reforms, and nutrition support schemes** for vulnerable families.
   - Run campaigns to create **public demand for healthier food environments**.

Policy Dimensions

- **India's Context:**
  - India still grapples with **undernutrition (stunting, wasting)** but faces rising **childhood obesity in urban areas**.
  - Schemes like **POSHAN Abhiyaan, Mid-Day Meal (PM-POSHAN), Food Fortification** are critical but need re-alignment with the **UPF challenge**.
- **Global South vs North:**
  - While the North battles obesity, the South faces the **double burden** of malnutrition.
  - Reforms must address both **hidden hunger (micronutrient deficiencies)** and **obesity due to cheap UPFs**.

Mains Practice Question

Q. *"The rise of ultra-processed foods has created a global nutrition paradox where obesity and undernutrition coexist." Critically analyse the findings of UNICEF's Child Nutrition Report 2025 in the context of India's food and nutrition policies.*

NSTFDC: Empowering Tribal Communities

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Welfare Schemes, Role of Government Bodies**
✅ **GS Paper II – Social Justice: Issues Related to Scheduled Tribes, Education & Skill Development**

Context

Coal India Limited (CIL) and the **National Scheduled Tribe Finance and Development Corporation (NSTFDC)** have signed an **MoU** aimed at empowering **tribal students enrolled in Eklavya Model Residential Schools (EMRSs)**. The partnership focuses on enhancing **education, skill development, and livelihood opportunities** for Scheduled Tribes (STs).

About NSTFDC

- **Establishment:** Set up in **2001** under the **Union Ministry of Tribal Affairs**.
- **Objective:**
  - Promote the **socio-economic and educational upliftment of Scheduled Tribes**.
  - Provide **self-employment avenues** to enable STs to become economically independent and self-reliant.
- **Functions:**
  - Extends **financial assistance** for income-generating activities.
  - Provides **grants for training and skill development programs** for tribal youth.
  - Facilitates capacity-building initiatives for entrepreneurship.

Significance of the MoU with CIL

- **Education & Skills:** Supports **tribal students in EMRSs**, integrating education with employability.
- **Livelihood Opportunities:** Focus on preparing tribal youth for **self-employment and modern job markets**.
- **Inclusive Growth:** Contributes to India's broader **tribal empowerment and social justice agenda**.
- **Public–Private Partnership:** Leverages resources of a **PSU (Coal India)** with NSTFDC's welfare mandate.

Policy Dimensions

- **Tribal Welfare Framework:** Complements schemes like **Eklavya Model Residential Schools**, **Vanbandhu Kalyan Yojana**, and **Skill India Mission**.

- **NEP 2020 Linkage:** Aligns with the **National Education Policy's focus on inclusivity and vocational training**.
- **SDG Alignment:** Advances **SDG 4 (Quality Education)** and **SDG 10 (Reduced Inequalities)**.

Mains Practice Question

Q. *"Institutions like the NSTFDC are crucial for ensuring inclusive development among Scheduled Tribes. Discuss how education-linked financial and skill initiatives can transform tribal livelihoods in India."*

Rising NCD Mortality: Lancet's Warning for India

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance, Health, Government Policies & Interventions**
✅ **GS Paper III – Science & Technology, Development, Environment & Health**
✅ **GS Paper I – Society: Issues relating to Health, Lifestyle and Demographics**

Context

A **Lancet study (2010–2019)** tracking 185 countries revealed that while most **high-income Western and East Asian nations** succeeded in reducing mortality from **Non-Communicable Diseases (NCDs)**, **India showed the opposite trend**—with a sharp rise in deaths from heart disease, diabetes, and cancer.

Key Findings Related to India

- **Increased Mortality Risk**: The **probability of dying from an NCD before the age of 80 increased in India**, unlike global declines.
- **Top Risk Factors**: Heart disease and diabetes emerged as the most significant contributors.
- **Global Contrast**: While developed nations benefited from **universal health systems, preventive care, and better lifestyles**, India's mortality curve worsened.

About Non-Communicable Diseases (NCDs)

- **Definition**: Chronic diseases not transmitted from person to person.
- **Major Types**:
  o Cardiovascular Diseases (heart attacks, strokes)
  o Cancers
  o Chronic Respiratory Diseases (COPD, asthma)
  o Diabetes
- **Burden in India**:
  o NCD deaths rose from **37.9% (1990) to 63% (2018)** of total deaths.
  o Expected to rise further with ageing population and urbanization.

Causes of Rising NCD Burden in India

1. **Lifestyle and Preventable Risk Factors**
   o Poor diet (processed foods, high sugar/fat intake)
   o Physical inactivity
   o Substance abuse (alcohol, tobacco)
2. **Societal & Environmental Determinants**
   o Urbanization & sedentary work culture
   o Globalization and westernized dietary patterns
   o Poverty pushing reliance on cheap, unhealthy foods
3. **Other Drivers**
   o **Pollution** (ambient & indoor air) worsening respiratory NCDs
   o **Chronic stress** and poor mental health awareness

Tackling NCDs – The Way Forward

- **Health System Strengthening**:
  o Expand **primary healthcare** and early screening at the community level.
  o Integrate **digital tools & telemedicine** for early detection.
- **Multi-Sectoral Approach**:
  o Urban planning to encourage physical activity.
  o Fiscal measures like **sugar/fat taxes** and subsidies for healthy foods.
- **Policy & Behavioural Reforms**:
  o Awareness campaigns on lifestyle modification.

o   Community participation and public-private partnerships.

Government Initiatives in India

- **Eat Right India (FSSAI):** Promotes healthy eating habits.
- **Fit India Movement (2019):** Encourages active lifestyles.
- **National Programme for Prevention & Control of Non-Communicable Diseases (NP-NCD):** Screening and management of NCDs at grassroots.
- **Ayushman Bharat – PM-JAY:** Expanding access to affordable treatment for chronic diseases.

Broader Implications

- **Economic Costs:** Rising healthcare expenditure and productivity losses.
- **Demographic Challenge:** NCDs are hitting younger populations in India, unlike the elderly-centric burden in the West.
- **Global Health Commitments:** India risks missing **SDG Target 3.4 (reduce premature mortality from NCDs by one-third by 2030)**.

Mains Practice Question

Q. *Despite global progress in reducing NCD mortality, India continues to face rising deaths from heart disease, diabetes, and cancer. Critically examine the reasons behind this trend and suggest a multi-sectoral strategy to address the challenge.*

ART & CULTURE

Adi Sanskriti: Digital Platform for Tribal Artforms

📌 **Syllabus Mapping:**
✅ **GS Paper I – Indian Culture: Art Forms, Literature, Architecture**
✅ **GS Paper II – Governance: Tribal Welfare, Role of Ministry of Tribal Affairs**
✅ **GS Paper III – Economy: Inclusive Growth, Tribal Livelihoods**

Context

The **Ministry of Tribal Affairs** has launched the **beta version of "Adi Sanskriti"**, envisioned as the **world's first digital learning platform for tribal artforms**. The initiative blends **cultural preservation with digital empowerment**, aiming to strengthen both **heritage conservation and livelihood generation** for tribal communities.

Major Components of Adi Sanskriti

1. **Adi Vishwavidyalaya (Digital Tribal Art Academy)**
   o   Offers **45 immersive courses** covering **tribal dance, painting, crafts, music, and folklore**.
   o   Designed to ensure **structured digital learning and certification** in indigenous art forms.
2. **Adi Sampada (Socio-Cultural Repository)**
   o   Digital collection of **5,000+ curated documents**.
   o   Covers **five key themes**: paintings, dance, clothing & textiles, artefacts, and livelihoods.
   o   Serves as an **academic resource for researchers and cultural enthusiasts**.
3. **Adi Haat (Online Marketplace)**
   o   Currently linked to **TRIFED** (Tribal Cooperative Marketing Federation of India).
   o   Will evolve into a **dedicated e-marketplace for tribal artisans**, providing **direct consumer access**.
   o   Promotes **sustainable tribal livelihoods** through digital commerce.

Significance

- **Cultural Preservation:** Safeguards tribal knowledge, art, and traditions in a digital form.
- **Digital Inclusion:** Bridges the gap between **traditional artisans and modern markets**.
- **Women & Youth Empowerment:** Provides new livelihood opportunities via skill-building.
- **Global Outreach:** Positions India as a leader in **digitally preserving indigenous art forms**.

Policy Dimensions

- **Tribal Welfare:** Complements schemes like **TRIFED, Van Dhan Yojana, and Hunar Haat**.

- **Education & Culture:** Aligns with **NEP 2020's emphasis on cultural knowledge**.
- **Digital Economy:** Integrates artisans into **e-commerce ecosystems**.
- **SDGs:** Supports **SDG 1 (No Poverty)**, **SDG 8 (Decent Work & Economic Growth)**, and **SDG 11 (Sustainable Communities)**.

Mains Practice Question

Q. *"Initiatives like Adi Sanskriti not only preserve India's tribal heritage but also integrate communities into the digital economy. Discuss its significance in cultural preservation and livelihood generation."*

Gyan Bharatam Portal: Preserving Manuscripts

📌 **Syllabus Mapping:**
✅ **GS Paper I – Indian Heritage & Culture: Art, Architecture, Manuscripts**
✅ **GS Paper II – Governance: Digital India, E-Governance Initiatives**
✅ **GS Paper III – Science & Tech: Digital Preservation, Knowledge Economy**

Context

The **Prime Minister** launched the **Gyan Bharatam Portal**, a digital platform aimed at **surveying, documenting, conserving, and digitizing India's manuscript heritage**. The initiative aligns with the **Gyan Bharatam Mission**, announced in the **Union Budget 2025–26**.

What is a Manuscript?

- **Definition**: A **handwritten composition** on materials like paper, palm leaf, bark, cloth, or metal, **dating back at least 75 years** and holding **scientific, historical, or aesthetic value**.
- **Exclusions**: Lithographs (stone printing) and printed volumes are **not classified** as manuscripts.
- **India's Manuscript Wealth**:
  - Holds an estimated **10 million manuscripts** in **80 ancient scripts** (Brahmi, Kushan, Gaudi, Lepcha, Maithili, etc.).
  - **~75% in Sanskrit**, **~25% in regional languages**.

Significance of Manuscripts

- **Historical Evidence**: Provide insights into human activities, culture, and governance.
- **Knowledge Systems**: Reflect advances in science, mathematics, medicine, and literature.
- **Civilisational Resilience**: Despite destruction, manuscripts showcase **devotion to knowledge** across centuries.
- **Examples**: *Kautilya's Arthashastra* for economic and political systems.

Gyan Bharatam Portal & Mission

- **Objective**:
  - Digitise manuscripts for **wider access**.
  - Preserve fragile cultural documents.
  - Build a **national repository** of knowledge.
- **Benefits**:
  - Promotes **digital preservation** and e-learning.
  - Enhances **research access** for scholars globally.
  - Strengthens India's **soft power** by showcasing its intellectual legacy.

Other Initiatives for Manuscript Conservation

- **National Manuscripts Mission (NMM), 2003**:
  - Ministry of Tourism & Culture initiative to locate, conserve, and digitise manuscripts.
- **National Library of India, Kolkata**:
  - Holds ~3,600 rare manuscripts of historical importance.
- **Asiatic Society of Bengal (1784)**:
  - Founded by **Sir William Jones**, actively digitising ancient manuscripts.

Conclusion

The **Gyan Bharatam Portal** represents a fusion of **technology and heritage conservation**, ensuring India's **millennia-old manuscripts are preserved digitally**. By making them accessible to scholars and the public, India is safeguarding its **cultural memory** while promoting **global research collaborations**.

Mains Practice Question

Q. *"The digitisation of manuscripts is not only a cultural preservation exercise but also a step towards knowledge-based diplomacy." Discuss in the context of the Gyan Bharatam Mission.*

GEOGRAPHY AND DISASTER

Kamchatka Earthquake: Russia's Seismic Zone

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography: Earthquakes, Physical Geography of the World**
✅ **GS Paper II – International Relations: Russia's Geopolitical Significance**

Context

A **powerful earthquake** struck the **Kamchatka Peninsula** in Russia. The peninsula lies between the **Bering Sea and Pacific Ocean (east)** and the **Sea of Okhotsk (west)**, making it part of the **Pacific "Ring of Fire"**, a highly seismically active zone.

Political Features of Russia

- **Capital**: Moscow
- **Continental Spread**: Russia spans **Europe and Asia**, making it the **largest country in the world** by land area.
- **Bordering Countries**: Azerbaijan, Belarus, China, Estonia, Finland, Georgia, Kazakhstan, North Korea, Latvia, Lithuania, Mongolia, Norway, Poland, and Ukraine.
- **Bordering Water Bodies**: **Pacific Ocean** and **Arctic Ocean**.

Geographical Features

- **Mountain Ranges**: Ural, Altai.
- **Highest Peak**: *Gora El'brus* – highest point in Europe.
- **Major Rivers**: Yenisey–Angara, Amur, Irtysh, Lena.
- **Major Lakes**: Baikal (deepest in the world), Ladoga, Onega, Caspian Sea (largest enclosed inland water body).
- **Siberia**: Covers ~75% of Russia, dominated by **Taiga forests** and permafrost.

About Kamchatka Peninsula

- Located in **Far East Russia**.
- Lies between **Pacific Ocean and Sea of Okhotsk**.
- Part of the **Pacific Ring of Fire**, hence prone to **frequent earthquakes and volcanic activity**.
- Contains over **300 volcanoes**, including 29 active ones (e.g., *Klyuchevskaya Sopka*).

Significance

- **Seismic Hazard**: Earthquake-prone zone critical for global monitoring.
- **Strategic Location**: Overlooks **Arctic routes, Pacific Ocean, and Bering Strait**.
- **Ecological Importance**: Rich in wildlife, UNESCO World Heritage-listed *Volcanoes of Kamchatka*.

Conclusion

The Kamchatka earthquake highlights the **tectonic vulnerability of Pacific Ring of Fire regions**. For UPSC, it reinforces the importance of **physical geography (earthquakes & volcanoes)** along with Russia's **strategic and ecological significance**.

Mains Practice Question

Q. *Discuss the geographical and strategic significance of the Kamchatka Peninsula in Russia. Why is this region highly prone to earthquakes and volcanic activity?*

Sedimentation Crisis: India's Reservoirs Losing Capacity

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography:** Water Resources, Land Degradation
✅ **GS Paper II – Governance:** Infrastructure & Institutional Frameworks
✅ **GS Paper III – Environment:** Disaster Management, Climate Change Adaptation
✅ **GS Paper III – Economy:** Energy Security, Hydropower

Context

A study by **IISER Bhopal** based on government records of over **300 large reservoirs** (>100 million cubic meters capacity) has revealed a **sedimentation crisis** that threatens India's water security, energy generation, and disaster resilience.

Key Findings of the Study

- **Storage Loss:**
  - Dams in India have lost **nearly 50% of their storage capacity** due to sedimentation.
  - This has led to reduced **hydropower generation**, weaker **flood control**, and diminished **drought resilience**.
- **Future Risks:**
  - By **2050**, many more reservoirs are expected to reach similar levels of storage loss, particularly in:
    - **Himalayan region**
    - **Narmada–Tapi basin**
    - **Western Ghats**
    - **Indo-Gangetic Plains**
- **Primary Causes:**
  - **Agriculture-driven soil erosion**
  - **Deforestation**
  - **Flooding and unregulated catchment degradation**

Dams in India: Current Status & Safety Concerns

- **Global Position:** India is the **3rd largest dam-owning nation** after China and USA.
- **Numbers:** Around **5,700 large dams** exist in India.
- **Safety Concerns:**
  1. **Ageing Infrastructure:** 80% of large dams are over **25 years old**.
  2. **Seismic Vulnerability:** Many dams are located in **earthquake-prone regions**.
  3. **Financial Constraints:** Poor funding leads to **irregular maintenance and safety lapses**.

Way Forward: Addressing Sedimentation & Dam Safety

1. **Sedimentation Management**
   - Catchment area treatment, afforestation, and soil conservation.
   - Regular desilting and dredging operations.
2. **Dam Modernisation & Safety**
   - **Decommissioning** of unsafe/obsolete dams.
   - Use of **state-of-the-art monitoring technology** for safety.
   - Explore alternatives like **Japan's sub-surface dams**.
3. **Institutional & Policy Measures**
   - Prioritise reservoirs with **high vulnerability** for urgent interventions.
   - Integrate dam safety with **climate resilience planning**.

Initiatives for Dam Safety in India

- **Dam Safety Act, 2021:** Provides a legal framework for **surveillance, inspection, and maintenance** of specified dams.
- **Dam Rehabilitation and Improvement Project (DRIP):** World Bank-supported initiative to modernise dams.
- **National Centre for Earthquake Safety of Dams:** Enhances structural and seismic safety standards.
- **Digital Tools:**
  - **DHARMA (Dam Health and Rehabilitation Monitoring Application)**.
  - **National Register of Large Dams (NRLD)** for updated data.

Policy Dimensions

- **Water Security:** Sedimentation reduces storage for irrigation, drinking, and industrial use.
- **Energy Security:** Affects hydropower, which contributes to India's **renewable energy mix**.

- **Disaster Management:** Reduced flood cushion raises **urban flood risks**.
- **Climate Change:** Changing rainfall patterns may worsen catchment erosion and reservoir siltation.

Mains Practice Question

Q. *"India's sedimentation crisis is silently eroding its water and energy security. Examine the implications of reservoir sedimentation and suggest measures to strengthen dam safety and sustainability."*

Blood Moons: Total Lunar Eclipse Explained

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography: Celestial Phenomena, Universe and Solar System**
✅ **GS Paper III – Science & Technology: Space Awareness**

Context

A spectacular **total lunar eclipse**, popularly known as a **Blood Moon**, was recently observed across different parts of the world. The phenomenon drew global attention for its striking reddish appearance and for its scientific as well as cultural significance.

What is a Lunar Eclipse?

- An **eclipse** occurs when a celestial body (planet or moon) blocks sunlight from reaching another body.
- In the case of a **lunar eclipse**, the **Sun, Earth, and Moon align**, and the **Earth's shadow falls on the Moon**.
- This can only happen during a **full moon**.

Total Lunar Eclipse (Blood Moon) Explained

1. **Umbra and Penumbra**
   o Earth's shadow has two parts: **penumbra** (partial shadow) and **umbra** (darkest central shadow).
   o During a **total lunar eclipse**, the Moon completely passes into the **umbra**.
2. **Why Red Colour?**
   o As sunlight passes through Earth's atmosphere, shorter wavelengths (blue light) are scattered, while longer wavelengths (red light) bend and fall on the Moon.
   o This process, known as **Rayleigh scattering**, gives the Moon a **reddish glow** — hence called a **Blood Moon**.

Types of Lunar Eclipses

- **Total Lunar Eclipse:** Entire Moon in the umbra (Blood Moon).
- **Partial Lunar Eclipse:** Only a part of the Moon enters Earth's umbra.
- **Penumbral Lunar Eclipse:** Moon passes through Earth's penumbra, causing only a subtle dimming.

Significance

Scientific

- Provides insights into **Earth's atmosphere** and scattering of light.
- Helps astronomers study **orbital mechanics** and refine predictions.

Cultural & Historical

- Blood Moons often associated with myths, prophecies, and folklore in different cultures.
- In India, traditionally linked to **rituals and beliefs** in astrology and religion.

Contemporary Dimension

- With rising interest in **astronomy and space exploration**, such celestial events are widely tracked by institutions like **NASA, ISRO, and global observatories**.

Mains Practice Question

Q. *Explain the phenomenon of a total lunar eclipse (Blood Moon). How does it occur, and why does the Moon appear red during this celestial event?*

CLAMP Method: Fossil Leaves as Climate Fingerprints

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography: Climatic Patterns, Indian Monsoon, Geographical Features**
✅ **GS Paper III – Environment: Climate Change, Scientific Innovations in Climate Studies**

Context

A recent study of **fossil leaves from Nagaland** using the **CLAMP (Climate Leaf Analysis Multivariate Program)** method has revealed new insights into how **Antarctic climatic shifts influenced the evolution of Indian Monsoons**.

About CLAMP

- **Nature:** A paleoclimate analysis tool that uses **fossil leaves as "climate fingerprints"**.
- **Methodology:**
  o Examines the **shape, size, and margins** of fossilized leaves.
  o Correlates leaf physiognomy with climate parameters.
- **Parameters Reconstructed:**
  o **Temperature, rainfall, humidity, and seasonality** of past climates.
- **Applications:**
  o Useful in regions where other climate archives (e.g., ice cores, sediments) are absent.
  o Provides insights into **Earth's past climate responses** to warming and cooling events.
  o Enhances **predictive models for future climate change** by comparing ancient and modern climate systems.

Significance of Recent Findings (Nagaland Study)

- Demonstrates **linkages between Antarctic glacial cycles and Indian monsoon intensity**.
- Establishes Northeast India as a **key paleoclimate archive**.
- Offers valuable input for **understanding monsoon variability** under present-day global warming.

Policy & Academic Dimensions

- **Scientific Relevance:** Strengthens India's role in **global paleoclimate research networks**.
- **Environmental Policy:** Insights can guide **climate adaptation strategies** by understanding long-term monsoon variability.
- **Academic Value:** Useful for **archaeology, earth sciences, and biodiversity evolution studies**.
- **Global Importance:** Comparable to climate reconstructions from **Antarctica, Greenland, and Central Asia**.

Mains Practice Question

Q. *"The CLAMP method provides critical insights into Earth's past climate systems. Discuss its significance in understanding Indian monsoon variability and its role in climate change research."*

Offshore Aquifer Discovery: Freshwater Under the Atlantic

📌 **Syllabus Mapping:**
✅ **GS Paper I – Geography: Distribution of Natural Resources, Oceanography**
✅ **GS Paper II – Governance: Water Security, Resource Management**
✅ **GS Paper III – Environment: Climate Change, Sustainable Development, Disaster Management**

Context

Scientists have confirmed the discovery of a **large offshore aquifer beneath the Atlantic Ocean**, opening new possibilities for addressing **global freshwater scarcity**. Offshore aquifers, similar to their terrestrial counterparts, are **reservoirs of freshwater trapped in rocks and sediments**, but they exist **beneath the sea floor**.

Key Features of Offshore Aquifers

- **Global Distribution:** Documented off the coasts of **Australia, China, North America, and South Africa**.
- **Extent:** May stretch **up to 90 km off the coast**.
- **Volume:** Estimated to contain **~1 million cubic km of freshwater**, about **10% of Earth's terrestrial fresh groundwater**.
- **Freshwater Preservation:** A **cap rock layer of compacted clay-rich sediment** prevents seawater intrusion.

Theories of Formation

1. **Ice Age Hypothesis**
   o During past ice ages, **rainwater seeped into regions** now submerged under oceans.
2. **Connection Hypothesis**
   o Offshore aquifers are linked to **onshore aquifers**, receiving recharge through rainfall infiltration.

Significance

- **Water Security:** Provides a potential **untapped reserve of freshwater**, crucial for **water-stressed regions**.
- **Climate Change Buffer:** Can act as a **strategic reserve** during **droughts and erratic rainfall patterns**.
- **Global Relevance:** As per **UN Report (2023)**, **global freshwater demand will exceed supply by 40% by 2030**, making offshore aquifers a vital resource.

Challenges

- **Economic:** Extraction involves **high costs** and **complex technology**.
- **Ecological:** Risk of **disrupting marine ecosystems and biodiversity**.
- **Technical:** Ensuring sustainable withdrawal without **seawater intrusion**.
- **Governance:** Disputes over **jurisdiction, international law, and shared aquifer management** in oceanic spaces.

Policy Dimensions

- **Global Governance:** Calls for frameworks under **UNCLOS** (United Nations Convention on the Law of the Sea).
- **National Security:** For water-scarce nations, offshore aquifers can become **strategic assets**.
- **Sustainable Development:** Aligns with **SDG 6 (Clean Water & Sanitation)** and supports **climate adaptation goals**.

Mains Practice Question

Q. *"Offshore aquifers have the potential to reshape the geopolitics of water. Discuss their significance and challenges in the context of global freshwater scarcity."*

ENVIRONMENT & ECOLOGY

Green Finance: Backbone of Resilient Economies

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Government Policies, International Agreements on Climate Change**
✅ **GS Paper III – Economy: Infrastructure, Inclusive Growth, Investment Models**
✅ **GS Paper III – Environment: Climate Finance, Sustainable Development, Net Zero Targets**

Context

The **Union Minister for Environment, Forests, and Climate Change** highlighted that **green finance** is central to building **resilient economies** and achieving long-term sustainability. Green financing focuses on channelising **capital flows into renewable energy, sustainable infrastructure, and energy efficiency projects**, ensuring that investments yield both **economic returns and environmental benefits**.

What is Green Finance?

- Financial support for projects that promote **climate resilience and sustainability**.
- Includes **renewable energy, energy-efficient buildings, sustainable transport, green hydrogen, and nature-based solutions**.
- Aims to **restructure capital flows** so that every investment contributes to both **profitability and sustainability**.

Significance of Green Financing

1. **Meeting Emission Targets**
   o India requires **USD 10 trillion by 2070** to meet its **net-zero commitments**.
2. **National Security & Competitiveness**
   o Clean energy reduces **import dependence**.
   o Climate-smart agriculture and resilient infrastructure improve stability.

3. **Leadership in Green Value Chains**
   o Positions India as a hub for **green industries and future technologies**.
4. **Job Creation**
   o Expected to create **7.3 million green jobs by 2027–28**.
   o Could rise to **35 million by 2047**, supporting India's demographic dividend.
5. **Other Benefits**
   o Environmental gains, **just transition**, and **disaster resilience**.

Challenges in Green Financing

- **Regulatory Barriers & Policy Uncertainty**
  o Inconsistent policies across states since **energy is a concurrent subject**.
- **Limited ESG Capacity**
  o Financial institutions lack sufficient **Environmental, Social, and Governance (ESG)** expertise.
- **High Cost of Capital**
  o For a **100 MW solar PV project**, cost of financing is:
    ▪ **India:** 10–11.5%
    ▪ **Germany:** ~2.8%
    ▪ **USA:** ~5.3%
- **Finance Deficit**
  o India's **green bond issuances**: USD 21 billion (till 2023).
  o Renewable energy target: **500 GW by 2030** → funding gap remains huge.

Initiatives Taken for Green Financing

Global

- **Green Climate Fund (GCF):** Developed nations pledged **USD 100 billion annually** (by 2020).
- **Special Climate Change Fund (SCCF):** For adaptation, tech transfer, energy and transport projects.

India

- **Green, Social, Sustainability and Sustainability-linked (GSSS) Bonds** – Includes **green (climate), yellow (solar), blue (marine)** bonds.
- **Climate Change Finance Unit (CCFU):** Nodal agency under **Ministry of Finance** for climate financing matters.

Policy Dimensions

- **Economic:** Green finance can mobilise **long-term capital** for infrastructure and energy transition.
- **Environmental:** Integral to India's **net zero 2070** pathway and **Paris Agreement commitments**.
- **Geopolitical:** Enhances India's global standing in **climate negotiations**.
- **Social:** Creates **inclusive growth** through green jobs and just transition for vulnerable groups.

Mains Practice Question

Q. *"Green finance is the backbone of India's sustainable economic transition. Critically evaluate its role in meeting India's net-zero targets while ensuring inclusive development."*

Climate-Resilient Cities in India

📌 **Syllabus Mapping:**
✅ **GS Paper I – Urbanisation, Population & Settlements**
✅ **GS Paper II – Governance, Institutional Challenges, Citizen Participation**
✅ **GS Paper III – Climate Change, Disaster Management, Infrastructure, Environment**

Context

Recent **urban flooding in Punjab**, triggered by heavy monsoon rains and river overflows, underscores the vulnerability of Indian cities. With **India's urban population projected to rise from 480 million (2020) to nearly 951 million by 2050**, creating **climate-resilient urban spaces** has become a developmental and survival imperative.

Key Challenges for Indian Cities

1. Urban Flooding

- By **2070**, nearly two-thirds of urban residents may face flood risks, causing **economic losses up to $30 billion annually**.
- Past disasters: **Chennai (2015), Mumbai (2005, 2021), Bengaluru (2022)**.

Way Forward:

- Develop **robust drainage systems** and restore wetlands.
- Integrate **nature-based solutions** like mangroves and green buffers.
- Scale **real-time flood forecasting models** (Kolkata example).

2. Extreme Heat and Urban Heat Islands

- Urban heat islands raise temperatures **3–5°C higher** than surrounding areas, impacting health and work productivity.
- **Ahmedabad Heat Action Plan** serves as a model for other cities.

Way Forward:

- Implement **Heat Action Plans** nationwide.
- Encourage **green roofs, reflective building materials, and tree cover**.
- Update **building codes for climate-sensitive designs**.

3. Transport Disruptions

- Even **10–20% road flooding** can paralyse over **50% of city networks**.
- Affects logistics, emergency services, and daily mobility.

Way Forward:

- Undertake **risk mapping of transport corridors**.
- Expand **resilient public transport systems** like the **Delhi Metro**.
- Promote **non-motorised mobility** such as cycling and walking infrastructure.

4. Municipal Services & Waste Management

- Rapid urbanisation has strained **waste disposal, energy recovery, and sewage treatment systems**.
- **Indore's waste management model** demonstrates success in segregation and waste-to-energy initiatives.

Way Forward:

- Upgrade **solid waste management** infrastructure.
- Encourage **circular economy practices**.
- Monitor **environmental quality indicators** for air and water.

5. Governance & Finance Constraints

- **Weak urban institutions**, fragmented governance, and **limited private financing** hinder resilience.

Way Forward:

- Strengthen **urban local bodies** with capacity building.
- Ensure **citizen participation** via digital tools and ward committees.
- Mobilise **green financing, municipal bonds, and PPP partnerships**.

Policy Dimensions

- **National Schemes:**
  - **AMRUT 2.0** – urban water supply and resilience.
  - **Smart Cities Mission** – sustainable and tech-enabled planning.
  - **National Adaptation Fund on Climate Change (NAFCC)** – city-level adaptation.
- **Global Commitments:**
  - **Paris Agreement** – adaptation measures for cities.
  - **SDG 11 (Sustainable Cities and Communities)** – urban inclusivity and resilience.
  - **C40 Cities Network** – Indian cities like Delhi and Mumbai as members.

Mains Practice Question

Q. *"Rapid urbanisation combined with climate change has amplified risks for Indian cities." Critically analyse the challenges in creating climate-resilient cities and suggest integrated strategies for sustainable urban development.*

Carbon Capture & Storage: Promise and Limits

📌 **Syllabus Mapping:**
✅ **GS Paper III – Environment: Climate Change, Pollution & Mitigation Technologies**
✅ **GS Paper III – Economy: Infrastructure, Energy Security, Sustainable Development**

Context

A recent study has raised concerns over the **limitations of Carbon Capture and Storage (CCS)** in addressing the climate crisis. While CCS is projected as a key tool to achieve **net-zero targets**, the study underlines both its **technological constraints and economic challenges**.

What is CCS?

- **Definition:** CCS refers to the process of **capturing CO_2 emissions** from industrial processes, power plants, or other sources, and then **storing it underground** to prevent its release into the atmosphere.
- **Method:**
  1. **Capture** – CO_2 is separated from flue gases or industrial emissions.
  2. **Transport** – CO_2 is compressed and transported via pipelines, ships, or tankers.
  3. **Storage** – Injected into **underground geological formations** such as depleted oil fields or saline aquifers.
- **Goal:** To reduce atmospheric carbon and slow down **global warming**.

Challenges of CCS

1. Commercial & Economic Barriers

- CCS remains **expensive and commercially unviable** for widespread use.
- High **operational and maintenance costs** discourage adoption by industries.

2. Storage Limitations

- Global **storage capacity is limited** — Earth can safely hold only about **1,460 billion tonnes of CO_2 underground**.
- Not all geological sites are **suitable for long-term storage**.

3. Infrastructure Hurdles

- Requires extensive **pipeline networks** for CO_2 transport.
- High capital cost and frequent **public resistance** due to land acquisition and safety concerns.

4. Technical Risks

- Stored CO_2 can cause **corrosion and degradation** of pipelines and wells.
- Possibility of **leakages**, undermining long-term storage reliability.

Policy Dimensions

- **Global Use:**
  - Countries like **Norway and Canada** have pioneered CCS projects, but scalability remains an issue.
- **India's Position:**
  - India prioritises **renewables, energy efficiency, and afforestation** over CCS due to high costs.
  - However, CCS may become relevant in **hard-to-abate sectors** like steel, cement, and fertilisers.
- **IPCC Perspective:**
  - CCS is recognised as part of the climate toolkit but **cannot substitute large-scale emission reductions** through clean energy transition.

Way Forward

- Invest in **R&D** for cheaper CCS technologies.
- Explore **carbon utilisation (CCUS)** – converting captured CO_2 into products like fuels, chemicals, and building materials.
- Integrate CCS with **renewable and hydrogen energy systems**.
- Strengthen **international financing and technology transfer** for developing countries.

Mains Practice Question

Q. Carbon Capture and Storage (CCS) has been hailed as a potential solution for climate change mitigation but also criticised as costly and limited in scope. Evaluate the opportunities and challenges of CCS for India's climate strategy.

Strategic Mineral Mining Exempted from Public Hearing (EIA)

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance:** Environmental Governance, Statutory Bodies, Citizen Participation
✅ **GS Paper III – Economy:** Mining, Critical Minerals, Energy Security
✅ **GS Paper III – Environment:** Conservation, EIA Framework, Sustainable Development
✅ **GS Paper III – Security:** Strategic Resources, Defence and Nuclear Security

Context

The **Ministry of Environment, Forest and Climate Change (MoEFCC)**, on the request of the **Ministry of Defence** and the **Department of Atomic Energy**, has exempted **strategic mineral mining projects** from **public hearings under the Environmental Impact Assessment (EIA) Notification, 2006**.

The exemption applies to mining of:

- **Atomic minerals:** Uranium, Thorium, Monazite, etc.
- **Critical/Strategic minerals:** Lithium, Cobalt, Rare Earth Elements (REEs), etc.

These are notified under the **Mines and Minerals (Development and Regulation) Amendment Act, 2023**.

Rationale for Exemption

1. **National Security & Strategic Concerns**
   - Critical for **defence, nuclear energy, and space technology**.
   - Avoids delays in projects tied to **strategic autonomy**.
2. **Reducing Import Dependence**
   - India is reliant on **China for REEs and cobalt**.
   - Domestic mining will cut foreign dependence and boost **self-reliance**.
3. **Attracting Investment**
   - Simplified clearances will make projects **more predictable** and attract **private and global investors**.

Issues with Exempting Public Consultation

1. **Undermines Legal Mandate**
   - Public consultation is a **statutory requirement under EIA 2006**.
2. **Erosion of Transparency & Accountability**
   - Local communities may remain **uninformed of project impacts**.
3. **Social Conflict Risk**
   - Lack of engagement may **trigger protests, litigation, and unrest**.
4. **Weakens Environmental Governance**
   - Frequent exemptions set a **precedent for dilution of EIA norms**.

Environmental Impact Assessment (EIA)

- **Legal Basis:** Notification 2006 under the **Environment (Protection) Act, 1986**.
- **Objective:** Predict and mitigate environmental and social impacts of proposed projects.
- **Steps Involved:** Screening → Scoping → **Public Consultation** → Appraisal → Clearance.
- **Significance:** Acts as a **decision-making tool** balancing **development, ecology, and community interest**.

Policy Dimensions

- **Security vs Environment Debate:** Reflects the tension between **strategic imperatives and environmental safeguards**.
- **Global Benchmarking:** Other countries (e.g., US, Australia) also fast-track strategic mineral projects but balance with **stringent monitoring**.
- **Sustainable Mining:** India needs a framework to ensure **environmentally safe extraction** while pursuing **critical mineral security**.
- **Community Participation:** Exemptions may undermine **trust between state, corporations, and local communities**.

Mains Practice Question

Q. *"The exemption of strategic mineral projects from public hearings under the EIA 2006 highlights the trade-off between national security and environmental democracy. Critically evaluate."*

Tiger Translocation to Sahyadri Reserve Approved

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Conservation Policies, Wildlife Protection Act**
✅ **GS Paper III – Environment: Biodiversity, Wildlife Conservation, Protected Areas**

Context

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has granted approval for the **translocation of eight tigers (3 males, 5 females)** from **Tadoba-Andhari Tiger Reserve (TATR)** and **Pench Tiger Reserve** to the **Sahyadri Tiger Reserve**, aiming to revive the tiger population in the northern Western Ghats.

Legal Basis

- **Wildlife (Protection) Act, 1972**:
  - **Section 12** – Requires prior permission of the **Central Government for Schedule I animals** (like tigers) before translocation.
  - State Government approval suffices for other wild animals.
  - MoEFCC retains the right to **revoke permits** in case of safety or ecological concerns.
- **National Tiger Conservation Authority (NTCA)**: Already approved the translocation.

Benefits of Translocation

1. **Ecological Balance**: Restores **predator-prey dynamics** in underpopulated reserves.
2. **Conflict Mitigation**: Reduces **human-tiger conflicts** in overpopulated tiger reserves.
3. **Rewilding Landscapes**: Helps revive regions where **tigers were locally extinct**.
4. **Genetic Diversity**: Prevents inbreeding by introducing fresh genetic stock.

Concerns Associated

- **Local Protests**: Resistance from communities living near the reserve.
- **Territorial Disputes**: Possible clashes with resident tigers.
- **Poor Forest Management**: Inadequate **prey base augmentation** may hinder survival.
- **Monitoring Gaps**: Success depends on effective long-term tracking of relocated tigers.

About Sahyadri Tiger Reserve

- **Notified**: 2010 (by merging **Chandoli National Park** and **Koyna Wildlife Sanctuary**).
- **Location**: Northern Western Ghats, Maharashtra.
- **Significance**: **Northernmost tiger habitat** in the Western Ghats.
- **Reservoirs**:
  - *Shivsagar* (Koyna River)
  - *Vasant Sagar* (Warana River)
- **Flora**: Anjani, Jambhul, Pisa.
- **Fauna**:
  - Carnivores: Tiger, Leopard, Wild dog.
  - Herbivores: Gaur, Sambar, Four-horned antelope, Mouse deer.
  - Avifauna: Indian long-billed vulture, endemic hornbills, Indian river tern, giant squirrel.

Conclusion

The tiger translocation project reflects India's commitment to **scientific wildlife management under the NTCA framework**. If implemented with strong **ecological planning, community participation, and monitoring**, it can restore tiger presence in the **Western Ghats** and strengthen India's position as a global leader in big cat conservation.

Mains Practice Question

Q. *"Tiger translocation is a crucial strategy in India's wildlife conservation policy, but it comes with ecological and social challenges." Critically examine in the context of the Sahyadri Tiger Reserve project.*

BIOTECHNOLOGY & HEALTH

Protein Language Models: AI in Protein Research

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Science & Technology, Research and Innovation**
✅ **GS Paper III – Biotechnology: Applications in Health, AI in Drug Development**

Context

Researchers at **MIT** have developed a novel technique to better understand how **language models predict protein structure and function**. This innovation highlights the growing use of **artificial intelligence (AI)** in biotechnology, particularly through **Protein Language Models (PLMs)**, which promise to accelerate **drug and vaccine development**.

What are Protein Language Models (PLMs)?

- **Origin:** Adapted from **Large Language Models (LLMs)** used in **Natural Language Processing (NLP)**.
- **Conceptual Basis:**
  - Just as LLMs treat **words as tokens** and sentences as linguistic structures, PLMs treat **amino acids as tokens** and **protein sequences as sentences**.
  - By training on **millions of protein sequences**, PLMs learn the **grammar of proteins** — patterns that govern protein structure and function.
- **Advantage:** Helps **predict protein folding and interactions** without relying solely on **traditional lab experiments**, which are costly and time-intensive.

Significance of PLMs

1. **Drug Discovery & Vaccines**
   - Enables rapid identification of **protein targets** for new medicines.
   - Speeds up vaccine development by simulating immune responses.
2. **Precision Medicine**
   - PLMs can help in tailoring **treatments based on genetic variations**, leading to more personalised healthcare.
3. **Understanding Diseases**
   - Allows researchers to model how **mutations in proteins cause disorders**, aiding in genetic and cancer research.
4. **Reducing Costs**
   - Cuts down dependence on large-scale **wet lab experiments**, making research more accessible.

Challenges

- **Data Quality:** Biased or incomplete protein datasets may affect accuracy.
- **Computational Intensity:** Requires high-end GPUs and computing power, limiting accessibility.
- **Interpretability:** Like other AI systems, PLMs may make predictions without clear explanations.
- **Ethical Concerns:** Risk of dual use in **bioengineering or synthetic biology** if misapplied.

Policy & Global Dimensions

- **India's Relevance:** Aligns with **National Biotechnology Development Strategy** and **AI Mission**.
- **International Developments:**
  - Google DeepMind's **AlphaFold** revolutionised protein structure prediction.
  - MIT's PLM-based research builds upon this momentum for global health.
- **Future Prospects:** Could transform **pandemic preparedness, cancer therapies, and rare disease treatments**.

Mains Practice Question

Q. *Protein Language Models (PLMs) are a breakthrough at the intersection of biotechnology and artificial intelligence. Discuss their potential in healthcare and drug discovery, along with the challenges of their application.*

Russia's "Enteromix": mRNA Cancer Vaccine

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Health, Government Policies & Interventions**
✅ **GS Paper III – Science & Technology: Biotechnology, Health Innovations**

Context

Russia's **mRNA-based cancer vaccine "Enteromix"** has shown **100% success in preclinical trials (2025)**. Designed to stimulate immune responses against cancer, the vaccine represents a breakthrough in **personalised medicine**. Initially aimed at **colorectal cancer**, each dose is customised to an individual patient's tumour through **mutation profiling**.

About mRNA Vaccines

- **Definition:** Vaccines that use **messenger RNA (mRNA)** to instruct cells to produce a protein specific to a pathogen (or tumour).
- **Mechanism:**
  1. mRNA contains genetic instructions.
  2. Delivered into the body via **lipid nanoparticles**.
  3. Cells use the instructions to produce a protein/antigen.
  4. Immune system recognises the antigen → produces **antibodies and T-cells** → builds immunity.
- **Example:** COVID-19 vaccines (Pfizer-BioNTech, Moderna) which directed cells to produce the **spike protein of SARS-CoV-2**.

Why is "Enteromix" Different?

- **Cancer-focused:** Unlike infectious disease vaccines, Enteromix targets **tumour mutations**.
- **Personalised therapy:** Each dose is **tailored to the genetic profile** of the patient's tumour.
- **Precision medicine:** Reduces the risk of "one-size-fits-all" inefficiencies common in cancer treatment.

Significance

1. **Medical Breakthrough**
   - Could transform treatment of **colorectal cancer**, one of the leading causes of cancer deaths globally.
   - Potential expansion to other cancers in future.
2. **Global Health Innovation**
   - Places Russia in the forefront of **oncology-focused vaccine research**.
   - Adds momentum to the global race for **therapeutic cancer vaccines**.
3. **India's Perspective**
   - India faces a rising cancer burden (especially gastrointestinal cancers).
   - Adoption of such personalised therapies could enhance India's **National Cancer Control Programme** and research ecosystem.

Challenges of mRNA Vaccines

- **Storage & Distribution:** Require **ultra-cold storage**, difficult for mass rollout in low-resource settings.
- **Short-term Side Effects:** Fatigue, fever, and localised pain at injection sites.
- **Long-term Uncertainty:** mRNA vaccines are relatively new; **long-term effects are still under study**.
- **Cost & Accessibility:** Personalised therapies may be prohibitively expensive for large-scale use.

Policy Dimensions

- **Global R&D:** Growing use of AI, genomics, and bioinformatics to enhance **personalised medicine**.
- **India's Preparedness:**
  - Strengthening **biotechnology research hubs**.
  - Expanding **public-private partnerships** in pharma innovation.
  - Integrating precision medicine in **National Health Mission and Ayushman Bharat**.

Mains Practice Question

Q. "mRNA technology is revolutionising vaccine science from infectious diseases to cancer therapies." Examine the potential of mRNA vaccines in personalised medicine, with special reference to their challenges and opportunities for India.

Cholesterol Nanomaterials: Emerging Tech Applications

📌 **Syllabus Mapping:**
✅ **GS Paper III – Science & Technology: Nanotechnology, Emerging Technologies**
✅ **GS Paper III – Science & Technology: Biotechnology, Health & Diseases**

Context

Scientists at the **Institute of Nano Science and Technology (INST), Mohali** have developed **cholesterol-based nanomaterials**, exploring their potential as platforms for **quantum technologies and spintronics**. This research highlights how a biomolecule traditionally linked with health risks is now being reimagined in **cutting-edge material science**.

About Cholesterol

- **Nature:** A **waxy, fat-like lipid** belonging to the **steroid family**.
- **Source:** Produced naturally by the **liver** and also obtained from **animal-based foods**.

Types of Cholesterol

1. **Low-Density Lipoprotein (LDL):**
   - Known as **"bad cholesterol"**.
   - Can accumulate in arteries, causing **atherosclerosis**.
2. **High-Density Lipoprotein (HDL):**
   - Known as **"good cholesterol"**.
   - Removes excess LDL, lowering cardiovascular risk.

Functions

- Essential for **hormone production** (e.g., cortisol, estrogen, testosterone).
- Required for **vitamin D synthesis**.
- Helps build and maintain **cell membranes**.

Health Risks

- **High LDL levels** increase risk of **heart disease, stroke, and hypertension**.

New Scientific Application: Cholesterol-Based Nanomaterials

- **Innovation:** Researchers have engineered cholesterol into **nanomaterials**.
- **Potential Uses:**
  - **Quantum technologies** – enhancing quantum computing and quantum sensing.
  - **Spintronics** – using electron spin instead of charge for next-generation electronics.
- **Significance:** Bridges the gap between **biology and nanotechnology**, offering bio-compatible and sustainable material alternatives.

Policy & Global Dimensions

- **India's R&D Edge:** Aligns with India's emphasis on **nanotechnology research** under national missions.
- **Health-Tech Link:** Breakthrough illustrates how **biological molecules can inspire future technologies**.
- **Strategic Importance:** Quantum and spintronic applications have implications for **defence, computing, and secure communications**.

Mains Practice Question

Q. "Cholesterol, traditionally associated with health risks, is now being explored as a building block for advanced nanomaterials." Discuss the dual significance of cholesterol in health and emerging technologies.

AdFalciVax: India's Indigenous Malaria Vaccine

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Health Policies, Government Schemes**
✅ **GS Paper III – Science & Technology: Biotechnology, Health & Disease Control**
✅ **GS Paper II – International Relations: India's role in Global Health**

Context

The **Government of India** has licensed private firms to produce **AdFalciVax**, the country's **first indigenous multi-stage malaria vaccine**, developed by the **Indian Council of Medical Research (ICMR)**. This marks a major step in India's **public health innovation** and fight against malaria, especially caused by *Plasmodium falciparum*, the deadliest malaria parasite species.

About AdFalciVax

- **Developer**: Indian Council of Medical Research (ICMR).
- **Target**: *Plasmodium falciparum*, responsible for severe malaria and high mortality globally.
- **Mechanism**:
  - Unlike existing vaccines which act at only **one stage**, AdFalciVax targets the parasite at **multiple stages** of its life cycle.
- **Technology**:
  - A **Recombinant Chimeric Vaccine** that combines antigens from different parasite stages into a **single immunogen** using **recombinant DNA technology**.

Advantages of AdFalciVax

- **Dual-Stage Protection**: Shields against both infection and disease progression.
- **Longer Immunity**: Designed for sustained effectiveness compared to earlier malaria vaccines.
- **Cost-Effective Production**: Indigenous development reduces reliance on imported vaccines and lowers costs.
- **Strategic Health Milestone**: Positions India as a leader in **tropical disease research** and vaccine manufacturing.

Malaria Burden and Relevance

- **Global Burden**: WHO estimated **249 million malaria cases worldwide in 2022**, with 608,000 deaths.
- **India's Burden**: Although cases have declined, India still accounts for the **largest number of malaria cases in the WHO South-East Asia Region**.
- **Challenge**: *P. falciparum* is resistant to multiple drugs and poses the greatest risk to human life.

Broader Significance

- **Public Health**: Supports India's goal of **eliminating malaria by 2030** (National Framework for Malaria Elimination).
- **Global Health Diplomacy**: Strengthens India's role as a **vaccine hub** for the Global South.
- **Biotech Capacity**: Showcases India's growing **research and innovation ecosystem** in combating infectious diseases.

Conclusion

The launch of **AdFalciVax** represents a **game-changer in India's malaria control strategy**. By combining **indigenous innovation, biotechnology, and public-private collaboration**, it addresses both national health priorities and contributes to **global malaria eradication efforts**.

Mains Practice Question

Q. *India's development of AdFalciVax highlights the role of indigenous biotechnology in combating infectious diseases. Discuss the significance of this achievement in India's public health and global health leadership.*

Murikooti Pacha: Indigenous Wound-Healing Plant

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Health, Research & Development**
✅ **GS Paper III – Science & Technology: Biotechnology, Traditional Knowledge Systems**
✅ **GS Paper I – Indian Heritage & Culture: Traditional Medicine Systems**

Context

Indian researchers have identified the **wound-healing potential** of **Murikooti Pacha**, also known as the **Red Ivy plant** (*Vranaropani* in Sanskrit). The discovery highlights the significance of **ethnobotanical knowledge** and its integration with **modern biomedical research**.

About Murikooti Pacha

- **Local & Traditional Names**:
  - Commonly called **Red Ivy plant**.
  - In **Sanskrit**: *Vranaropani* ("healer of wounds").
- **Origin & Distribution**:
  - Native to **Southeast Asia**.

- o Found widely across **tropical regions including India**.
- **Botanical Characteristics**:
  - o Small herb with **rooting branches**.
  - o Deep **reddish leaves**.
  - o White flowers.
- **Therapeutic Component**:
  - o The plant contains **Acteoside**, a **natural bioactive molecule** known for:
    - ▪ **Wound healing**.
    - ▪ Anti-inflammatory and antioxidant potential.

Significance

1. **Traditional Knowledge Validation**: Reinforces India's **Ayurveda-based medicinal practices**.
2. **Pharmaceutical Potential**: Could lead to the development of **herbal wound dressings, ointments, and biomedical pads**.
3. **Affordable Healthcare**: Offers cost-effective alternatives to expensive synthetic wound-healing products.
4. **Biotechnology Linkages**: Bridges **traditional medicine and modern drug discovery**.

Broader Context

- **Global Health Trends**: Renewed interest in **plant-based medicines** for sustainability and reduced side effects.
- **India's Advantage**: Rich biodiversity and **traditional medicinal systems (Ayurveda, Siddha, Unani)** provide a vast resource base for bio-discovery.
- **Policy Angle**: Supports the **National AYUSH Mission** and India's vision of becoming a global leader in **herbal medicine exports**.

Conclusion

The study of **Murikooti Pacha** highlights how **traditional plant-based knowledge** can contribute to **modern biomedical innovations**. With proper research and clinical validation, it can emerge as a **natural, affordable, and sustainable solution** in wound management.

Mains Practice Question

Q. *Discuss the significance of integrating traditional medicinal plants like Murikooti Pacha with modern biomedical research in India's healthcare strategy.*

Gold Nanoparticles: Breakthrough in Controlled Aggregation

📌 **Syllabus Mapping:**
✅ **GS Paper III – Science & Technology: Nanotechnology and its applications**
✅ **GS Paper III – Health: Biotechnology, Drug delivery systems**

Context

Scientists at the **S N Bose National Centre for Basic Sciences** have developed a method to control the **aggregation of gold nanoparticles (AuNPs)**, addressing a major limitation in their applications.

About Gold Nanoparticles (AuNPs)

- **Definition**: Nanoparticles of gold, typically **1–100 nm** in size.
- **Properties**:
  - o Photothermal properties (convert light into heat).
  - o Chemical & physical stability.
  - o Low toxicity.
  - o Ease of **surface modification** for targeted uses.

Significance of AuNPs

- **Medical Applications**: Biosensors, imaging, diagnostics, and drug delivery.
- **Nanoscience**: Contributes to **light–matter interaction studies** and advances in fundamental nanotechnology.
- **Challenges**:
  - o Uncontrolled **aggregation** of nanoparticles reduces effectiveness and reliability.
  - o Limits use in precision medical and industrial applications.

Broader Relevance

- **Healthcare**: Targeted cancer therapy, real-time imaging, biosensing.
- **Industrial Use**: Catalysis and electronics.
- **Strategic Technology**: Advances in nanoscience contribute to India's **emerging tech ecosystem** under initiatives like *Make in India* and *Atmanirbhar Bharat*.

Conclusion

The discovery offers a **breakthrough in nanotechnology**, enhancing the **stability and reliability** of gold nanoparticles. This can unlock new pathways in **precision medicine, biosensing, and diagnostics**, positioning India at the forefront of advanced nanotech applications.

Mains Practice Question

Q. *Gold nanoparticles are emerging as a cornerstone of nanomedicine and diagnostics. Discuss their significance and challenges in application, with reference to recent Indian research.*

SCIENCE & TECHNOLOGY

Albania Appoints World's First AI Ministe

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: e-Governance, Role of Technology in Governance, Transparency & Accountability**
✅ **GS Paper III – Science & Tech: Artificial Intelligence, Ethics in Technology, Data Security**
✅ **GS Paper IV – Ethics: Technology, Governance & Public Trust**

Context

In a global first, **Albania has appointed "Diella" – an AI-generated bot – as its Minister** tasked with managing and awarding all **public tenders for government projects**. The step is aimed at **enhancing transparency, reducing corruption, and streamlining governance**. This raises debates on the **role of AI in governance, its benefits, and its democratic limitations**.

Role of AI in Public Service and Governance

1. **Enhanced Decision-Making**
   o AI improves **efficiency in service delivery** – healthcare, urban planning, traffic, disaster management.
   o Example: **RAHAT app in India** optimised relief operations during disasters.
2. **Objectivity and Anti-Corruption**
   o Automated systems reduce **human discretion and bias**.
   o Useful in welfare targeting, tendering, and subsidy distribution.
3. **Public Interaction**
   o AI-based platforms like **UMANG (India)** handle large-scale **citizen queries and grievance redressal**.
4. **Inclusivity and Accessibility**
   o Tools like **Bhashini (India)** enable **multilingual access** to digital services.

Issues and Challenges with AI in Governance

1. **Undermining Democracy**
   o AI may **aid governance**, but cannot replace the **legitimacy and accountability** of elected officials.
2. **Social Justice Concerns**
   o Errors in AI-driven **Direct Benefit Transfers** may wrongly exclude vulnerable groups from welfare and healthcare.
3. **Bias and Discrimination**
   o AI reflects **biases of its training data**.
   o Example: US predictive policing disproportionately targeted minorities.
4. **Transparency and Accountability**
   o Many AI models are **"black boxes"** with non-transparent reasoning.
   o Lack of legal clarity on **liability for AI errors**.
5. **Privacy & Sovereignty Issues**
   o Risks of **data misuse, surveillance, and breaches of citizen privacy**.

Broader Policy Dimensions

- **Global Significance:** Albania's experiment may inspire or caution other nations.

- **India's Relevance:** India is pushing **AI for governance** (e.g., Digital India, National AI Mission) but must balance **efficiency with safeguards**.
- **Ethical Imperative:** AI must operate under **democratic values, human oversight, and legal frameworks**.
- **Future Governance Model:** Likely to be a **human–AI hybrid governance model**, not AI replacing ministers.

Mains Practice Question

Q. *"Artificial Intelligence can enhance efficiency and inclusivity in governance, but its unchecked use risks undermining democracy and accountability. Critically examine with examples."*

India's Space Economy: Fivefold Growth by 2033

📌 **Syllabus Mapping:**
✅ **GS Paper II – Governance: Institutional Reforms, Public–Private Partnerships**
✅ **GS Paper III – Economy: Infrastructure, Investment, Science & Technology**
✅ **GS Paper III – Achievements of Indians in Science & Technology, Space**

Context

According to a **CII–KPMG report (2025)**, India's **space economy** is expected to grow from **USD 8.4 billion (2022)** to **USD 44 billion (2033)**. This projected fivefold growth could raise India's **global space economy share from 2% to 8%**. The expansion will be led by **satellite-enabled services, private sector innovation, and exports**.

Key Trends Identified

1. **Shift in Focus**
   - From building launch vehicles to **monetising downstream services**.
   - Growing applications of **Earth Observation (EO), Satellite Communication, and Navigation**.
2. **Cross-Sector Integration**
   - Space services increasingly used in **telecommunications, agriculture, disaster management, urban planning, and infrastructure monitoring**.
3. **Private Sector Growth**
   - Nearly **200 startups** driving innovations in space-tech.
   - Venture capital and international collaborations adding momentum.
4. **Institutional Reforms**
   - **IN-SPACe (Indian National Space Promotion and Authorization Centre):** Streamlining private participation and consolidating demand.
   - **Bhoonidhi portal:** Linking space-based data with governance.

Key Drivers and Enablers

- **Policy Push: Indian Space Policy 2023** – allows **end-to-end participation of non-governmental entities (NGEs)**.
- **Commercialisation: NewSpace India Limited (NSIL)** as ISRO's commercial arm.
- **Funding Mechanisms:** 100% FDI in space sector, ₹1,000 crore **Venture Capital Fund**.
- **Innovation Ecosystem:** Growing pool of space-tech startups and collaborations.

Challenges for India's Space Economy

1. **Limited Global Reach**
   - **NavIC** navigation system restricted to regional coverage, unlike GPS or Galileo.
2. **Underdeveloped EO Market**
   - Low enterprise awareness, fragmented demand, and weak commercialisation of **Earth Observation data**.
3. **Private Sector Barriers**
   - High **capital requirements**, **long gestation periods**, and **regulatory uncertainty** deter participation.
4. **Skill Shortages**
   - Mismatch in skills, **brain drain**, and inadequate specialised workforce.
5. **Tax and Regulatory Issues**
   - **GST ambiguities**, digital taxation, and PPP revenue-sharing models not fully streamlined.
6. **Strategic & Security Concerns**
   - Growing **space debris**, cybersecurity issues, and risk of **militarisation of space**.

Initiatives Undertaken

- **Indian Space Policy 2023:** Enables NGE participation across all domains.
- **NSIL (NewSpace India Limited):** Facilitates commercialisation of ISRO's products and services.

- **FDI Liberalisation:** 100% FDI permitted in space sector.
- **Venture Capital Fund:** ₹1,000 crore allocated to boost startups.
- **Public–Private Partnerships:** Collaboration on satellite launches, EO services, and space applications.

Policy Dimensions

- **Global Competition:** India aiming to match **US, EU, and China** in the global space economy.
- **Strategic Edge:** Expansion of NavIC and EO services could enhance **maritime security, border management, and disaster resilience**.
- **Innovation for Development:** Leveraging space-tech for **Digital India, Smart Cities, and agricultural modernisation**.

Mains Practice Question

Q. *"India's space economy has the potential to transform from a technology-driven programme to a commercial powerhouse." Discuss the drivers, opportunities, and challenges of India's space economy in light of recent policy reforms.*