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MAPPING

GENERAL STUDIES – 1

Topics: Salient features of Indian Society, Diversity of India.

1. LIVE-IN RELATIONSHIP

Context:

The Nainital High Court recently ruled on the mandatory registration of live-in relationships under the UCC, questioning the infringement of privacy in consensual cohabitation.

Live-In Relationship: Live-in relationships, based on the concept of "Mitru Sambhandh," involve cohabiting and sharing lives without formalizing marriage, promoting a marital-like relationship without legal ties.

Issues Regarding Live-In Relationships:

- **Privacy vs. Regulation:**
  - The central issue is whether mandating the registration of live-in relationships infringes on individual privacy.
  - Critics argue that compulsory registration amounts to undue state interference in personal matters, while proponents claim it provides necessary legal protections.
- **Cultural and Social Norms:**
  - Deep-rooted societal beliefs about marriage and sanctity challenge the acceptance of cohabitation outside of marriage, leading to resistance and controversy.

Various Judgements on Live-In Relationships:

- **Badri Prasad v. Dy. Director of Consolidation (1978):** Held that prolonged cohabitation creates a strong presumption of marriage, placing the onus on disproving its legitimacy.
- **Lata Singh v. State of U.P. (2006):** Emphasized the right of an inter-caste couple to cohabit without harassment, underlining societal acceptance.
- **S. Khushboo v. Kanniammal (2010):** Confirmed that live-in relationships between consenting adults are not illegal.
- **Shafin Jahan v. Asokan K.M. (2018):** Reinforced the right to autonomy in choosing one's partner, irrespective of marital status.
- **Kiran Rawat v. State of U.P. (2023):** Highlighted challenges under Islamic law, questioning how live-in relationships are perceived in inter-religious contexts.

Arguments Supporting Live-In Relationships:

- **Protection of Individual Autonomy:** Upholds the right to personal choice and freedom in matters of intimacy and partnership.
- **Legal Safeguards:** When registered, live-in relationships can provide rights related to property, maintenance, and inheritance similar to those in marriage.
- **Social Modernity:** Recognizes evolving societal norms where marriage is not the only acceptable form of partnership.
- **Reduction of Stigma:** Registration can help destigmatize non-marital cohabitation and offer legal recognition.
- **Inclusive Policies:** Can serve as a protective mechanism for couples, especially in cases of domestic abuse, by ensuring access to legal recourse.

Arguments Against Live-In Relationships:

- **Cultural Opposition:** Traditional views hold marriage as a sacred institution, making non-marital cohabitation socially controversial.
- **Privacy Concerns:** Mandatory registration may be seen as state intrusion into private life, undermining personal freedoms.
- **Potential for Exploitation:** Critics worry that without the formalities of marriage, individuals may face challenges in legal protection and social security.
- **Ambiguity in Definition:** Difficulty in defining and distinguishing live-in relationships from other forms of cohabitation can lead to legal and administrative complications.
- **Moral and Ethical Debates:** Some argue that the lack of a formal commitment undermines the institution of marriage and traditional family values.

Way Ahead:

- **Policy Reforms:** Re-examine the registration requirements under the UCC to ensure they protect rights without compromising privacy.
- **Awareness Campaigns:** Educate the public on the legal rights and responsibilities in live-in relationships to reduce stigma.
- **Legal Clarity:** Formulate clear legal definitions and safeguards that extend to all consenting couples, regardless of marital status.
- **Judicial Oversight:** Encourage judicial review of the registration process to balance state interests and individual freedoms.
- **Inclusive Legislation:** Engage with diverse stakeholders to draft policies that respect both cultural values and modern social realities.

Conclusion:

The debate over live-in relationships reflects the evolving social fabric of India, balancing privacy with legal regulation. Judicial precedents have increasingly recognized the legitimacy of consensual cohabitation, yet societal resistance remains. A thoughtful, inclusive legal framework can protect individual rights while addressing cultural sensitivities, ensuring equitable treatment for all.

PYQ:

1. Discuss the possible factors that inhibit India from enacting for its citizen a uniform civil code as provided for in the Directive Principles of State Policy. (UPSC-2015)

Topics: Social empowerment, communalism, regionalism & secularism.

2. SOCIAL SECURITY COVER FOR GIG WORKERS

Context:

The 2025 Budget introduced health insurance and identity registration for gig workers to improve their social security. While this addresses basic welfare needs, challenges in enforcement and sustainability remain.

The Gig Economy: Growth and Challenges

- **Rapid Expansion:** The gig workforce constitutes 12% of the global labour market (World Bank) and is expected to reach 23.5 million in India by 2029-30 (NITI Aayog).
- **Advantages:**
  - Provides flexible employment and income opportunities, driving economic growth, especially in e-commerce and service industries.
- **Challenges:**
  - Income insecurity due to irregular earnings.
  - Lack of legal protection as gig workers do not fall under traditional labour laws.
  - No employer contributions to pensions, insurance, or other social benefits.

Existing Policy Framework

1. **Code on Social Security, 2020**
   - Recognizes gig workers as a distinct category and provides for insurance, health benefits, pensions, and a Social Security Fund.
2. **Budget 2025 Provisions**
   - **Health Insurance:** Coverage under PM Jan Arogya Yojana.
   - **Identity Registration:** e-Shram portal for tracking and integrating workers into social security schemes.
   - **Aggregator Module:** Launched to streamline registration of workers and platform companies.

Key Challenges in Social Security Implementation

1. **Lack of Employer-Employee Relationship:** Gig workers are independent contractors, making it difficult to enforce labour protections and ensure mandatory contributions.
2. **Irregular Income & Financial Constraints:** Unstable earnings limit workers' ability to contribute to social security funds, making purely contributory schemes impractical.
3. **Gaps in Registration & Compliance:** Many workers remain unregistered on the e-Shram portal, and platform aggregators have no legal obligation to provide social security.
4. **Sustainable Financing Mechanism:** Funding social security requires a balanced approach, involving government sup-

port, platform aggregator contributions, and worker participation.

Global Best Practices for Gig Worker Protection

Country	Social Security Measures
UK	Minimum wage, paid leave, and pension for gig workers.
Singapore	Mandates platform aggregators to contribute to social security.
Oman & Thailand	Co-funded social security models.
Indonesia	Government-subsidized accident and life insurance.

Way Forward: A Sustainable & Inclusive Approach

1. **Multi-Stakeholder Social Security Model**
   - **Government:** Policy framework and partial funding.
   - **Platform Aggregators:** Mandatory contributions to social security funds.
   - **Workers:** Opt-in contributory pension and insurance schemes.
2. **Expanding Benefits Beyond Health Insurance**
   - **Pension & Retirement Plans:** Small contributions pooled for old-age benefits.
   - **Skill Development:** Upskilling for better income stability.
   - **Emergency Assistance:** Financial aid for crisis situations.
3. **Strengthening Implementation & Compliance**
   - **Mandatory Registration:** e-Shram portal integration for better outreach.
   - **Worker Grievance Redressal:** Institutional mechanisms to address concerns.
4. **Leveraging Technology for Social Security**
   - **Digital Payment Integration:** Efficient contribution and benefit disbursal.
   - **AI-driven Monitoring:** Real-time tracking of worker participation and compliance.

Conclusion:

Ensuring long-term success requires strong enforcement, sustainable funding, and aggregator accountability. A multi-stakeholder approach can balance flexibility with essential worker protections.

PYQ:

1. Examine the role of 'Gig Economy' in the process of empowerment of women in India. [UPSC -2021]

GENERAL STUDIES – 2

Topics: Indian Constitution- historical underpinnings, evolution, features, amendments, significant provisions and basic structure; Comparison of the Indian constitutional scheme with that of other countries.

1. CONSTITUTIONAL MORALITY

Context:

The concept of constitutional morality gained prominence following the arrest of a serving Chief Minister, sparking debates on ethical governance.

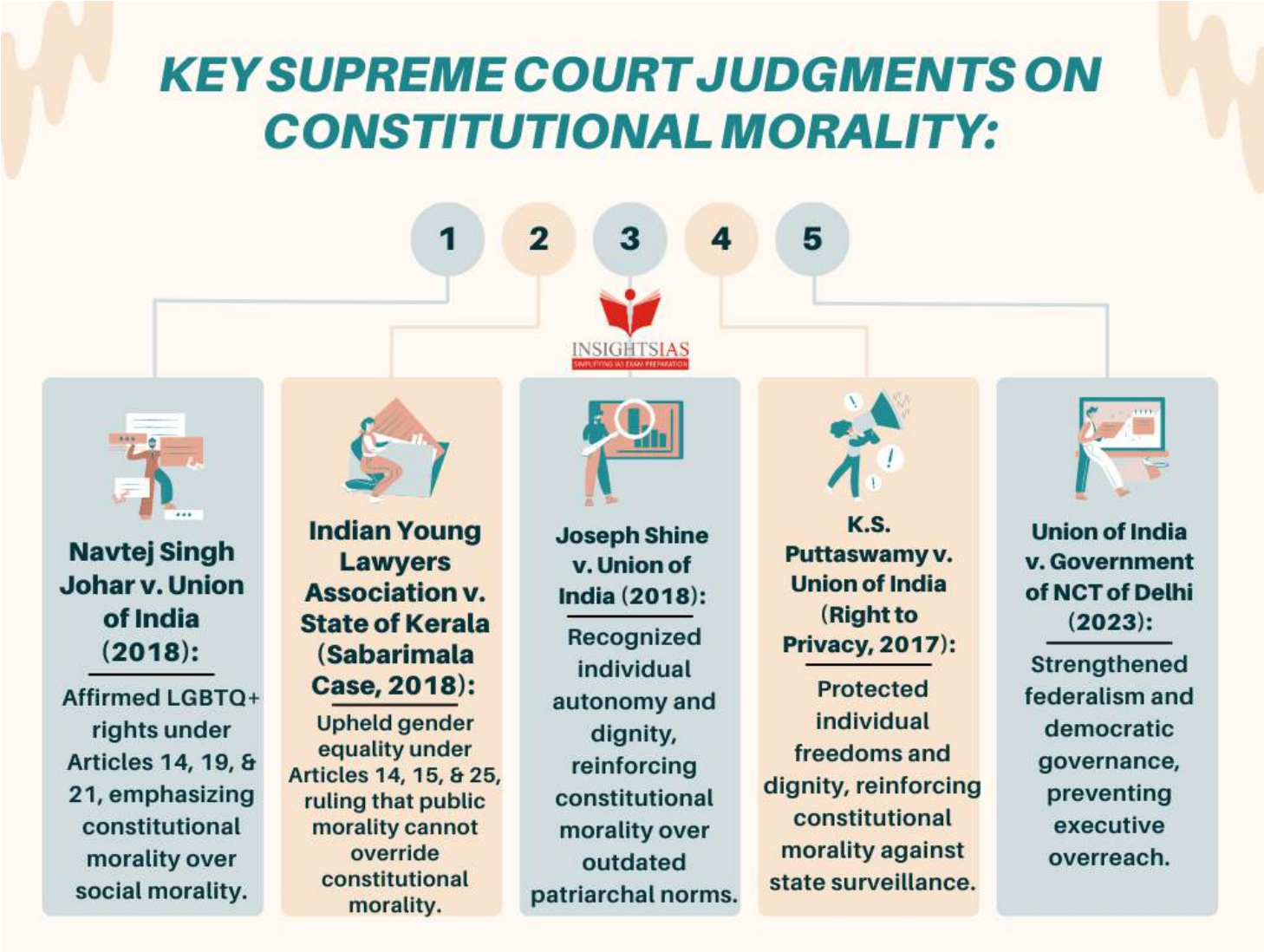
What is Constitutional Morality?

- Constitutional morality refers to the **adherence to constitutional values** beyond mere legal compliance, ensuring justice, equality, and accountability in governance.
- Originating from **George Grote's** study of **Athenian democracy**, it was reinforced by **Dr. B.R. Ambedkar**, emphasizing its necessity in India's democratic framework.

Key Features of Constitutional Morality:

- **Supremacy of Constitutional Law:** Ensures governance aligns with constitutional principles rather than individual or majoritarian will.
- **Freedom with Restraint:** Balances citizen liberties with respect for institutions and lawful conduct.
- **Checks & Balances:** Prevents concentration of power through judicial review, parliamentary oversight, and institutional accountability.

- **Pluralism & Inclusivity:** Protects diverse interests, ensuring social justice, secularism, and individual dignity.
- **Critique within Framework:** Allows questioning of laws and institutions while respecting **constitutional procedures**.



Constitutional Morality in the Indian Constitution:

- **Preamble:** Establishes justice, liberty, equality, and fraternity as the foundation of democracy.
- **Fundamental Rights (Articles 14-21):** Guarantees equality, non-discrimination, and personal freedoms for all citizens.
- **Directive Principles of State Policy (DPSP):** Provides guidelines for social and economic justice to uphold constitutional values.
- **Separation of Powers:** Ensures checks and balances through Articles 50, 121, and 211 to prevent arbitrary governance.
- **Judicial Interpretation:** Supreme Court rulings in Navtej Singh Johar (2018), K.S. Puttaswamy (2018), and Krishnamoorthy (2015) uphold constitutional morality.

Significance of Constitutional Morality:

- **Ensures Rule of Law:** Strengthens constitutional supremacy over arbitrary decision-making.
- **Protects Rights & Freedoms:** Safeguards LGBTQ+ rights, gender equality, and free speech.
- **Democratic Stability:** Prevents majoritarian dominance, ensuring inclusive governance.
- **Ethical Decision-Making:** Encourages state actions based on constitutional values and fairness.
- **Judicial Accountability:** Empowers courts to check unconstitutional laws and executive excesses.

Challenges to Constitutional Morality:

- **Political Manipulation:** Misuse of agencies for political suppression erodes public trust.
- **Majoritarian Influence:** Conflicts between public morality and constitutional rights (e.g., Sabarimala case).
- **Executive Overreach:** Excessive state control weakens judicial independence and autonomy.
- **Lack of Awareness:** Limited constitutional literacy affects both governance and public participation.

- **Weak Institutional Mechanisms:** Ineffective enforcement of constitutional norms in policymaking.

Way Forward:

- **Strengthen Judicial Oversight:** Courts must ensure constitutional morality prevails over political influence.
- **Civic Education:** Introduce constitutional literacy programs in schools and public campaigns.
- **Ethical Governance:** Train officials in constitutional ethics for unbiased decision-making.
- **Institutional Reforms:** Strengthen independent bodies like the Election Commission and CAG.
- **Inclusive Legislation:** Laws should align with constitutional values, ensuring fairness and equality.

Conclusion:

Constitutional morality is the bedrock of India's democratic ethos, ensuring governance upholds justice, equality, and accountability. Strengthening its implementation through judicial activism, civic education, and institutional reforms is crucial to sustaining democracy and the rule of law.

PYQ:

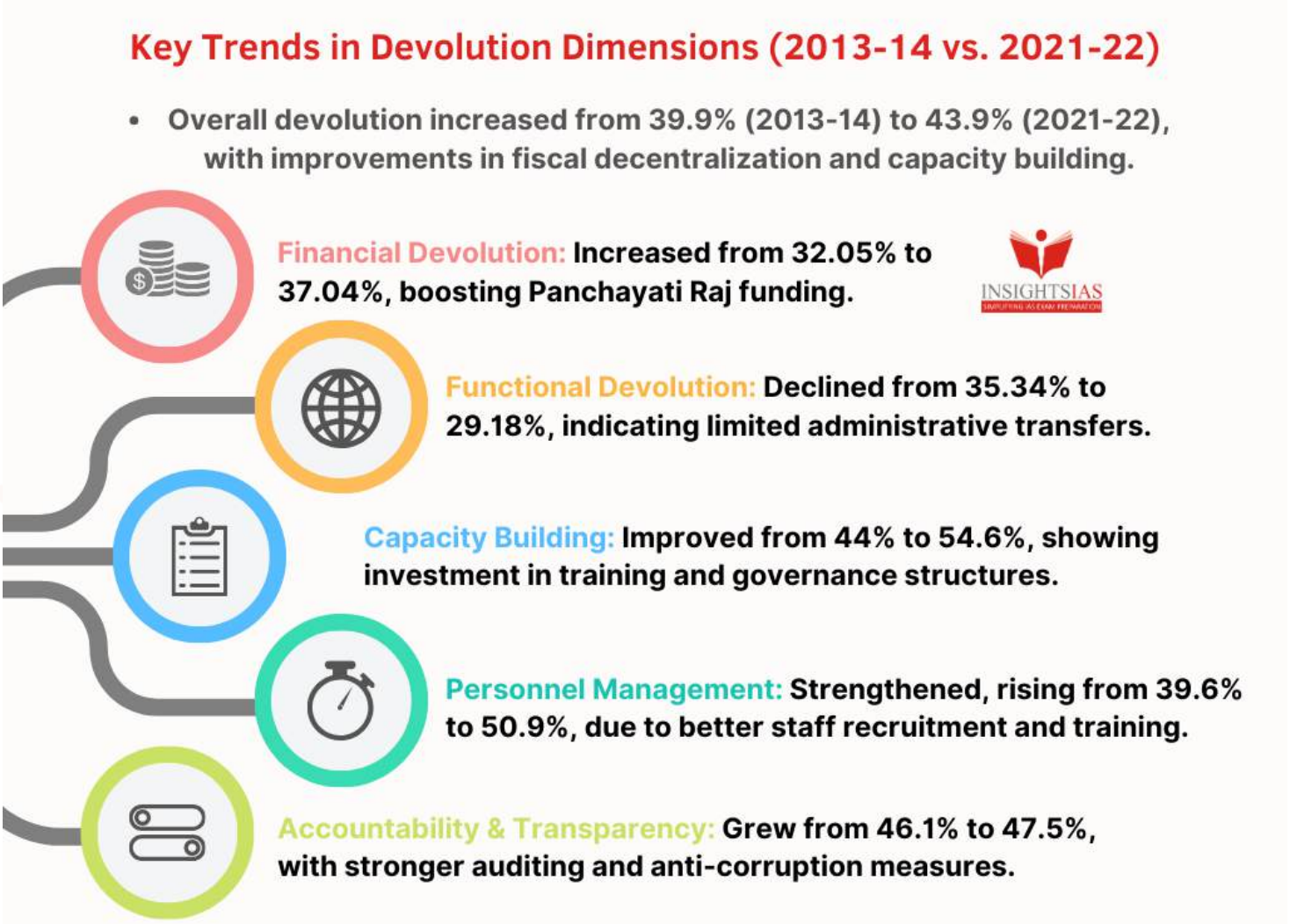
1. Constitutional Morality is rooted in the Constitution itself and is founded on its essential facets. Explain the doctrine of 'Constitutional Morality' with the help of relevant judicial decisions. (UPSC-2021)

Topics: Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and challenges therein.

2. STATUS OF DEVOLUTION TO PANCHAYATS IN STATES

Context:

The Union Minister of State, released the "Status of Devolution to Panchayats in States" report in New Delhi, highlighting an increase in Panchayat devolution from 39.9% to 43.9% (2013-14 to 2021-22).



Key Data Insights on Present Panchayat *Devolution*:

- Karnataka: Highest devolution state with 72.23 score.
- Kerala: Lowest with 70.59 and Tamil Nadu: 68.38.
- High devolution states: Chhattisgarh, Gujarat, Maharashtra, Rajasthan, Telangana, Tripura, Uttar Pradesh, West Bengal.
- Medium devolution states: Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Odisha.
- Moderate devolution progress: Assam, Bihar, Sikkim, Uttarakhand.
- Low-performing states: Jharkhand, Punjab, Goa, Arunachal Pradesh.
- **Financial devolution saw an improvement** from **32.05 (2013-14) to 37.04 (2023-24)**, but **functional devolution declined** from **35.34 to 29.18** in the same period.
- **Capacity enhancement index increased** from **44.01 to 54.63**, indicating a stronger push for training and institutional support.
- **Top Performers in Specific Dimensions**:
    - **Finances & Accountability**: Karnataka
    - **Functions**: Tamil Nadu
    - **Framework & Institutional Setup**: Kerala
    - **Training & Capacity Building**: Telangana
    - **Role in Government Schemes**: Uttar Pradesh

Positives in the Report:

- **Strengthened Financial Support:** Panchayats benefited from **timely 15th Finance Commission grants**, improving fiscal autonomy.
- **Enhanced Panchayat Capacities:** States such as **Telangana, Tamil Nadu, and Gujarat** led in training programs and institutional support for Panchayats.
- **Improved Digital & Administrative Infrastructure:** States like **Chhattisgarh, Gujarat, and Assam** advanced in e-Governance adoption, online audits, and record-keeping.
- **Higher Role in Centrally Sponsored Schemes (CSSs):** Panchayats showed **greater engagement in key schemes** like MGNREGA, PMAY, ICDS, and NHM.
- **Increased Gender & Social Inclusion:** Many states **increased women's reservation to 50%**, fostering better participation in local governance.

Challenges in Panchayat Devolution:

- **Declining Functional Devolution:** States are not transferring sufficient administrative powers to Panchayats despite financial devolution.
- **Weak State Finance Commissions (SFCs):** Several states **delay SFC reports**, affecting timely **fund allocations and fiscal autonomy**.
- **Limited Own Revenue Generation:** Panchayats rely heavily on state and central transfers due to **weak taxation powers** at the local level.
- **Inadequate Human Resources:** Shortage of Panchayat functionaries, with one secretary often managing multiple Panchayats, hinders efficient governance.
- **Parallel Bodies Overlapping Panchayat Functions:** Multiple line departments & parastatal bodies bypass Panchayats, weakening decentralization.
- **Weak Transparency & Accountability:** Inadequate social audits, low RTI compliance, and ineffective grievance redressal mechanisms undermine governance.

Way Forward:

- **Strengthen Functional Devolution:** Ensure **activity mapping** is completed, delegating real decision-making power to Panchayats.
- **Revamp State Finance Commissions (SFCs):** Institutionalize **regular assessments**, ensuring states implement **SFC recommendations** without delay.
- **Enhance Own Revenue Mobilization:** Empower Panchayats with **property tax collection**, ensuring financial self-sufficiency.
- **Address Manpower Shortages:** Establish **Panchayat Service Commissions** for structured hiring of skilled personnel.
- **Improve Digital Infrastructure:** Expand **e-Governance, real-time audits,** and digital public financial management systems (PFMS).
- **Integrate Panchayats into CSSs:** Amend guidelines to **ensure Gram Panchayats** manage and implement key welfare schemes.
- **Strengthen Accountability Measures:** Enhance **RTI implementation, transparency in budgeting,** and social audit mechanisms.

Conclusion:

Panchayat devolution has improved in financial transfers and capacity-building, but functional devolution remains a critical gap. Strengthening autonomy, financial independence, and governance mechanisms will be key to realizing true decentralized democracy. States must expedite structural reforms to ensure Panchayats function as genuine institutions of self-government.

PYQ:

1. To what extent, in your opinion, has the decentralisation of power in India changed the governance landscape at the grassroots? (UPSC-2022)

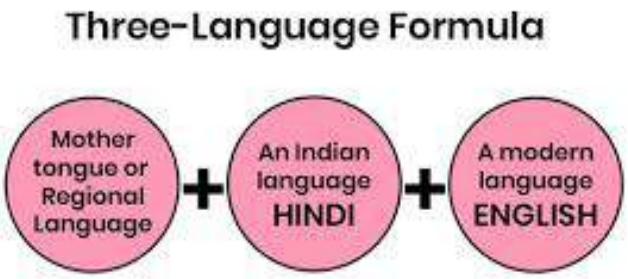
3. THREE-LANGUAGE FORMULA

Context:

The Centre withheld ₹2,152 crore from Tamil Nadu under the Samagra Shiksha scheme due to the State's refusal to implement the three-language formula.

What is the Three-Language Formula?

- **Definition:** A language policy introduced in the National Education Policy (NEP) of 1968 to standardize language education across India.
- **Objective:** To promote multilingualism, national unity, and administrative efficiency.
- **Structure:**
  - **Hindi-speaking States**: Hindi, English, and a modern Indian language (preferably a south Indian language).
  - **Non-Hindi-speaking States**: Regional language, Hindi, and English.



Origin and History of the Three-Language Formula:

- **1968**: Introduced in the first NEP under Prime Minister Indira Gandhi.
- **1986**: Reiterated in the NPE 1986 without significant changes.
- **2020**: Retained in NEP 2020 with greater flexibility, allowing States to choose languages.
- **Tamil Nadu's Resistance:** Adopted a two-language policy (Tamil and English) in 1968, rejecting Hindi imposition.

What Does NEP 2020 Say About the Three-Language Policy?

- **Flexibility:** States and students can choose the three languages, with at least two being native to India.
- **No Imposition:** No specific language is mandated for any State.
- **Emphasis on Mother Tongue:** Encourages teaching in the home language/mother tongue until Grade 5, preferably till Grade 8.
- **Sanskrit:** Promoted as an optional language within the three-language formula.

Significance of the Three-Language Policy:

1. **Multilingualism**: Encourages learning multiple languages for better communication and cultural understanding.
2. **National Integration:** Bridges linguistic divides and fosters unity.
3. **Global Competence:** Retains English as a global link language while promoting Indian languages.
4. **Cognitive Benefits:** Research shows learning in the mother tongue enhances cognitive development.

Issues Surrounding the Three-Language Policy:

1. **Perceived Hindi Imposition:** Non-Hindi-speaking States, especially Tamil Nadu, view it as a covert attempt to impose Hindi.
2. **Resource Constraints:** Lack of teachers and materials for additional languages.
3. **Cultural Resistance:** Seen as a threat to regional languages and identities.
4. **Political Tensions:** Opposition from regional parties fearing erosion of linguistic autonomy.
5. **Implementation Challenges:** Varied adoption across States, with some prioritizing Sanskrit over modern Indian languages.

Way Forward:

1. **Constructive Dialogue**: Centre and States must engage in discussions to address concerns and find common ground.
2. **Flexible Implementation**: Allow States to choose languages based on local preferences and needs.
3. **Resource Allocation**: Provide adequate funding and infrastructure for language teachers and materials.
4. **Focus on Multilingualism**: Promote learning of Indian languages without undermining regional identities.
5. **Decentralized Approach**: Respect State autonomy in education while aligning with national goals.

Conclusion:

A balanced approach, respecting regional identities and ensuring flexibility, is crucial for its successful implementation. Constructive dialogue and resource allocation can help bridge the divide and achieve the policy's objectives without compromising federal principles.

PYQ:

1. Do you agree that regionalism in India appears to be a consequence of rising cultural assertiveness? Argue. (UPSC-2020)

Topics: Parliament and State Legislatures – structure, functioning, conduct of business, powers & privileges and issues arising out of these.

4. BILL PROPOSING 100 DAYS PARLIAMENTARY SITTING

Context:

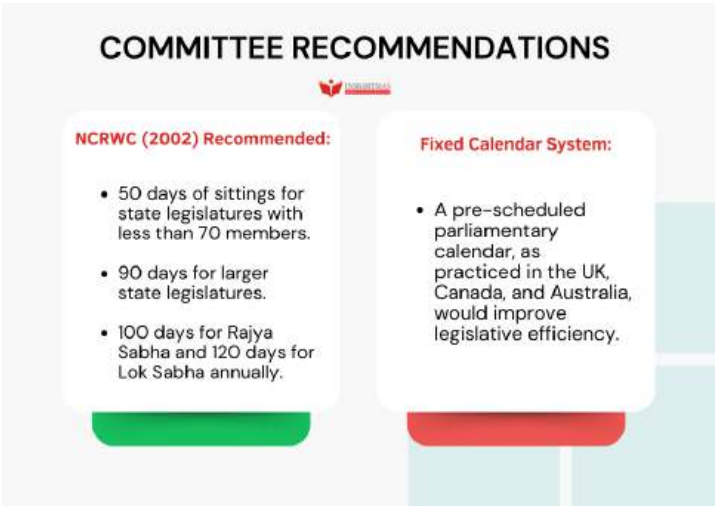
Senior Opposition leaders in the Rajya Sabha have introduced Private Member Bills seeking to mandate a minimum of 100-120 parliamentary sittings per year to enhance legislative accountability and scrutiny.

About Proposed 100 Days Sitting in a Year:

- **Objective of the Proposal:**
  - Seeks to **ensure minimum working days (100-120 days) for Parliament** to strengthen deliberative functions and **improve governance accountability**.
  - Inspired by the **General Purposes Committee (1955) and National Commission to Review the Working of the Constitution (NCRWC, 2002)**.
- **Current Scenario of Parliamentary Sittings:**
  - No constitutional mandate for **minimum sittings**, only **Article 85 and Article 174** mandate that Parliament and state legislatures must meet at least **twice a year**.
  - The **17th Lok Sabha (2019-2024) had the lowest full-term sitting (274 days)** in Indian history.
- **Comparison with Other Democracies:**
  - **United Kingdom (150-160 days), USA (133-140 days), Canada (130-140 days)** have higher parliamentary sittings ensuring **robust debates and scrutiny**.

Legislative Powers with Respect to Sittings:

- **Article 85 & Article 174 of the Constitution**
  - Mandates that the gap between two sessions should **not exceed six months**, but **does not specify a minimum number of sittings**.
- **State Legislature & Governor's Role**
  - **Governor convenes the session on the Cabinet's advice**, leading to the executive's control over legislative sittings.



Need for Such a Move:

- **Enhancing Legislative Scrutiny: 44% of all Bills in 2023 were passed within a day** of introduction, reducing the scope for debate and scrutiny.
- **Strengthening Government Accountability:** Ensures **detailed deliberations on budgetary allocations, policies, and executive actions**, preventing arbitrary decision-making.
- **Mitigating Judicial Overload:** Proper legislative debate **reduces the need for judicial intervention**,

ensuring **constitutional compliance of laws**.

- **Boosting Public Trust in Legislatures:** Declining sittings and disruptions weaken **public confidence in legislative institutions**.
- **Addressing Electoral Pressures:** Frequent elections **divert political attention** from legislative functions, reducing effective policymaking.

Challenges to Implementation:

1. **Executive Dominance Over Legislature: The ruling government controls session schedules**, often curtailing sittings to avoid scrutiny.
2. **Rising Disruptions in Parliament:** Frequent **walkouts, protests, and adjournments** lead to **non-productive hours**, reducing effective discussion time.
3. **Political Fragmentation:** Increased **political polarization and lack of consensus** hinder meaningful deliberation.
4. **Lack of Parliamentary Committees in States:** Unlike **Parliament, most state assemblies lack active committee systems**, reducing independent scrutiny of bills.
5. **Financial and Logistical Constraints:** Extending sittings requires **additional budgetary allocations** for infrastructure, security, and legislative staff.

Way Ahead:

1. **Mandating Minimum Sittings via Constitutional Amendment:** A **constitutionally backed framework** would ensure legislatures meet for adequate days annually.
2. **Introduction of a Fixed Parliamentary Calendar:** A **predetermined session schedule**, similar to the **UK model**, would ensure **regular sittings**.
3. **Strengthening Legislative Committees:** Expanding **standing and select committees** to scrutinize bills before passage.
4. **Reforming Parliamentary Conduct Rules:** Mechanisms to **address frequent disruptions** and ensure productive sessions.
5. **Public Awareness & Civil Society Engagement:** Greater citizen involvement in legislative monitoring through live streaming, transparency, and feedback mechanisms.

Conclusion:

Ensuring 100-120 sittings per year will **strengthen India's democratic process**, improve legislative efficiency, and enhance accountability. With legislatures being the **cornerstone of governance**, adopting such reforms is crucial for a more transparent, deliberative, and responsible parliamentary system.

PYQ:

1. To what extent, in your view, the Parliament is able to ensure accountability of the executive in India? [UPSC-2021]

5. DELHI ASSEMBLY

Context:

The Election Commission declared the 70-member Delhi Assembly Election 2025 results.

About Delhi Assembly:

- **Historical Background:**
  - Delhi's first legislative Assembly was **constituted in 1952**, with limited powers under the **Part-C state** classification.
  - The **Assembly was abolished in 1956**, and Delhi became a Union Territory, remaining without an Assembly for 37 years until 1993.
- **Governance Structure:**
  - From 1956 to 1993, Delhi was governed by a **Metropolitan Council** with recommendatory powers, while the central government retained control over key areas like law and order and land.
  - In 1993, Delhi regained its **legislative Assembly with 70 seats**, but critical functions like police and land remained under central jurisdiction.
- Article 239AA of the Indian Constitution:
  - Insertion and Special Status: Introduced by the 69th Constitutional Amendment Act, 1991, granting special status to Delhi based on the S Balakrishnan Committee (1987) recommendations.
  - Composition and Representation:
    - The Delhi Assembly has 70 elected members, a party **must win 36 seats** to form government.

- The Council of Ministers is limited to 10% of the Assembly's strength, meaning Delhi can have a maximum of 7 Ministers.

- Legislative Powers: The Assembly can make laws on State List and Concurrent List subjects, except for Public Order, Police, Land, and related entries (64, 65, 66) in the State List, which remain under Central control.
- Governance Structure: The Chief Minister is appointed by the President and advises on ministerial appointments. The Lt. Governor (LG) acts as the administrator, with the power to summon, prorogue, and dissolve the Assembly.
- Judicial Interpretations: Two Constitution Benches of the Supreme Court (2018 & 2023) clarified Delhi's governance framework and the extent of its legislative and executive powers.
- Supporting Legislation: The Government of National Capital Territory of Delhi Act, 1991, was enacted to define Delhi's administrative structure and governance framework **post-Article 239AA.**

Topics: Structure, organization and functioning of the Executive and the Judiciary; Ministries and Departments of the Government; pressure groups and formal/informal associations and their role in the Polity.

6. DECRIMINALIZATION OF POLITICS

Context:

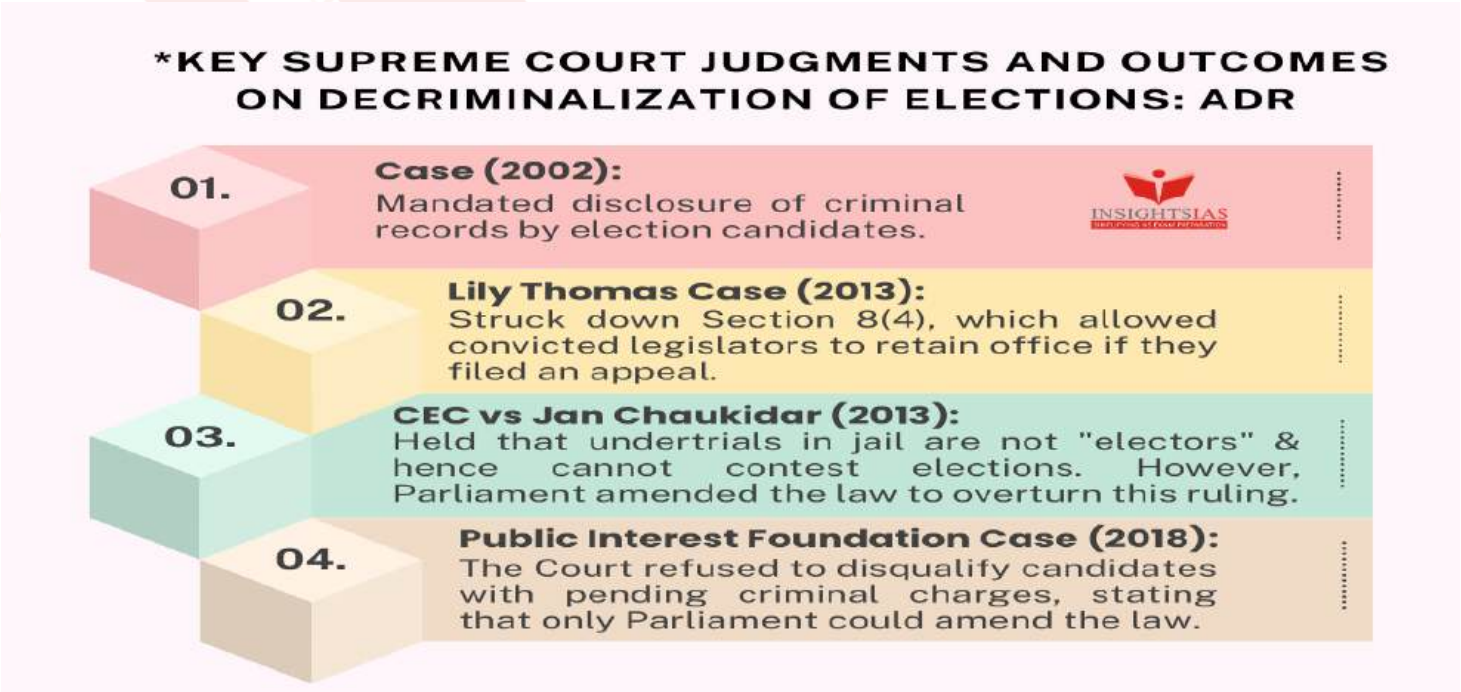
The Supreme Court is hearing petitions seeking a lifetime ban on convicted individuals from contesting elections, reigniting the debate on decriminalizing politics and ensuring probity in public life.

What Does the RPA Act, 1951 Say About Contesting Elections?

- **Section 8(3):** Disqualifies individuals convicted of criminal offenses and sentenced to imprisonment for two years or more. They are barred from contesting elections for six years post-release.
- **Section 8(1):** Disqualifies individuals convicted of heinous crimes (e.g., rape, corruption, UAPA offenses) regardless of sentence length, with a six-year post-release ban.
- **Section 62(5):** Bars imprisoned individuals from voting but allows undertrials to contest elections.
- **Section 11:** Empowers the Election Commission (EC) to reduce or remove disqualification periods, as seen in the case of Sikkim CM Prem Singh Tamang in 2019.

The Issue and Need for Banning Convicted Individuals from Elections:

- **Rising Criminalization of Politics:** 46% of 2024 MPs face criminal charges, 31% serious offenses.
- **Eroding Public Trust**: Convicted individuals erode democratic institutions.
- **Moral Turpitude:** Corruption convictions conflict with public service integrity.
- **Disparate Influence:** Criminal candidates have a 15.4% chance of winning, compared to 4.4% clean records.



Challenges to Banning Convicted Individuals:

- Fear of political parties using criminal charges to target opponents.
- Delays in justice due to prolonged trials.
- Concerns about proportionality of convictions.
- Concerns about EC's discretion in reducing disqualification periods.

Way Forward:

- **Stricter Laws:** Amend the RPA Act to disqualify candidates against whom charges are framed for offenses punishable by five years or more (as recommended by the Law Commission in 1999 and 2014).
- **Fast-Track Courts:** Expedite trials of MPs/MLAs to ensure timely justice (as ordered by the Supreme Court in 2023).
- **EC's Role:** Review the EC's discretionary powers under Section 11 to ensure transparency.
- **Public Awareness:** Encourage voters to reject candidates with criminal backgrounds.
- **Consensus Building:** Engage political parties to build consensus on reforms to curb criminalization.

Conclusion:

The criminalization of politics undermines democracy and public trust. While a lifetime ban for heinous crimes is justified, a balanced approach is needed to address misuse and proportionality. Fast-track courts, stricter laws, and public awareness are key to ensuring clean politics.

PYQ:

1. Discuss the procedures to decide the disputes arising out of the election of a Member of the Parliament or State Legislature under The Representation of the People Act, 1951. What are the grounds on which the election of any returned candidate may be declared void? What remedy is available to the aggrieved party against the decision? Refer to the case laws. (UPSC-2022)

Topics: Appointment to various Constitutional posts, powers, functions and responsibilities of various Constitutional Bodies.

7. ELECTION COMMISSION NEUTRALITY

Context:

The Election Commission of India (ECI) has faced allegations of bias and erosion of neutrality, particularly in handling recent elections like Delhi 2025, raising concerns about its independence and transparency.

About *Election Commission of India* (ECI)

- **Constitutional Basis:** Established under **Article 324** of the Indian Constitution.
- **Composition:** A **three-member body** consisting of the **Chief Election Commissioner (CEC)** and two **Election Commissioners**.
- **Appointment Process:** Previously appointed by the President on the advice of the Prime Minister. Post-2023 Supreme Court ruling (**Anoop Baranwal vs Union of India Case, 2023**), appointments are made by a **selection committee** (PM, Leader of Opposition, and Union Cabinet Minister).
- **Powers and Functions:**
  - Conducts free and fair elections for Lok Sabha, State Assemblies, and President/Vice President.
  - Supervises electoral rolls, voter registration, and model code of conduct.
  - Resolves disputes related to elections.

Key Functions and Duties of the Election Commission of India

- **Electoral Constituency Management:** Defines electoral boundaries under the Delimitation Commission Act to ensure fair representation.
- **Electoral Roll Preparation and Revision:** Updates voter lists to prevent bogus voting and ensure inclusivity.
- **Election Schedule and Nomination Scrutiny:** Announces poll dates, verifies nominations, and ensures eligibility.
- **Political Party Recognition and Symbol Allocation:** Registers parties, assigns election symbols, and resolves disputes.
- **Model Code of Conduct (MCC) Implementation:** Ensures ethical campaigning and prevents government misuse.

Allegations of Bias in ECI:

- **Model Code of Conduct Violations:** The central dominant party promoted **tax exemptions** as an election incentive, violating the **Model Code of Conduct (MCC)**.

E.g. Tax exemptions as a "gift for Delhi" during campaigns.

- **Politically Influenced Appointments:** Since 2010, several **bureaucrats with political links** have been appointed as election commissioners.
  E.g. Ashok Lavasa was sidelined for dissent, and Arun Goel's abrupt resignation fueled speculation of external pressure.
- **Manipulation of Electoral Processes:** Assam delimitation was alleged to have **favored the ruling party** by redrawing constituency boundaries strategically.
  E.g. Surat 2024 election saw an uncontested victory in a non-conflict zone, raising concerns over fair competition.
- **Lack of Transparency:** ECI withheld crucial voter turnout data and weakened **disclosure rules**, affecting public trust.
- **Biased Electoral Calendar:** The four-phase polling schedule in Odisha was allegedly designed to align with the national party's campaign plans.

ECI Has Maintained Neutrality:

- **Constitutional Autonomy and Judicial Oversight**: Operates under Article 324, with Supreme Court checks.
- **Three-Member Decision-Making Mechanism:** Ensures collective decision-making to reduce bias.
- **Voter Awareness and Electoral Reforms:** Implements SVEEP program to boost voter participation.
- **Digital and Technological Advancements:** Introduced EVM tracking and digital voter IDs for transparency.

Way Ahead:

- **Electoral Finance Reforms:** Implement stricter disclosure norms for political donations to enhance transparency and accountability in electoral funding as per **Indrajith Gupta Committee.**
- **Enhanced MCC Enforcement:** Enforce stricter penalties and real-time monitoring to prevent violations of the Model Code of Conduct during elections.
- **Public Engagement & Awareness:** Expand voter education programs to promote informed participation and awareness of electoral rights nationwide.
- **Strengthening EVM Transparency:** Mandate 100% VVPAT verification in disputed constituencies to ensure public trust in electoral outcomes.

Conclusion:

The ECI must uphold its constitutional mandate to ensure free and fair elections. Addressing allegations of bias and enhancing transparency will restore public trust and strengthen India's democratic foundations.

PYQ:

1. Discuss the role of the Election Commission of India in the light of the evolution of the Model Code of Conduct. (UPSC-2022)

Topics: Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.

8. RAGGING COMPLAINTS SURGE

Context:

The University Grants Commission (UGC) Chairman emphasized the persistent regulatory gaps, citing a 208% increase in ragging complaints from 2012 to 2022.

Ragging: It refers to **any act of abuse physical, mental, or psychological by senior students towards juniors** in educational institutions. It aims to assert dominance, instil fear, or humiliate the victim, often disguised as an "initiation ritual."

Forms of Ragging: Can be **verbal** (abuse, threats), **physical** (assault, forced activities), psychological (isolation, humiliation), or cyber-based (online harassment, social media bullying).

Legal Recognition: Defined under **UGC Regulations on Curbing the Menace of Ragging, 2009**, and penalized under **Sections 323, 506, 509 IPC**, and **IT Act, 2000** (for cyberbullying).

Consequences of Ragging:

1. **Impact on Victims:**
   - **Psychological trauma:** Leads to depression, anxiety, PTSD, and suicidal tendencies.
   - **Academic decline:** Fear of harassment causes loss of focus and absenteeism.
   - **Health deterioration:** Stress can trigger insomnia, eating disorders, and substance abuse.

2. **Consequences for Raggers:**
    - **Legal prosecution:** Punishable under Indian Penal Code (IPC) Sections 323, 506, 509.
    - **Academic penalties:** Includes suspension, expulsion, and blacklisting from institutions.
    - **Criminal record:** Can jeopardize career opportunities and future education.
3. **Impact on Institutions:**
    - **Loss of reputation:** Recurring ragging incidents harm an institution's public image and rankings.
    - **UGC action:** Institutions failing to prevent ragging risk funding cuts and de-recognition **(UGC Clause 9.4).**
4. **Impact on Parents & Society:**
    - **Emotional distress:** Parents face mental agony and financial burden due to legal battles and medical costs.
    - **Erosion of trust:** Society loses faith in educational institutions as safe spaces for students.

Countering Ragging Challenges

- **Poor Law Implementation**: UGC Clause 9.4 lacks enforcement, limiting awareness.
- **Lack of Awareness & Reporting Fear**: Students fear retaliation and delay reporting due to institutional inaction.
- **Inadequate Monitoring Mechanisms**: Weak CCTV surveillance and digital complaint tracking hinder accountability.
- **Influence of Senior Students & Peer Pressure**: Cultural normalization of ragging among seniors makes it hard to eliminate.

Way Ahead for UGC:

- **Strengthen Legal & Institutional Framework:** Invoke Clause 9.4 against non-compliant institutions.
- **Implement Technology-Driven Monitoring:** Install AI-based CCTVs in hostels.
- **Introduce Awareness & Behavioural Change:** Introduce mandatory anti-ragging workshops and psychological counselling.
- **Strengthen Reporting Mechanisms:** Improve UGC helpline accessibility and response time. Establish anonymous digital complaint portals with direct police alerts.

Conclusion:

Ragging continues to plague India's higher education system despite strong laws and Supreme Court guidelines. A multi-pronged approach, involving legal action, institutional reforms, technology integration, and cultural change, is essential. Ensuring strict enforcement and fostering student-led initiatives can help create a ragging-free academic environment.

PYQ:

1. How have digital initiatives in India contributed to the functioning of the education system in the country? Elaborate on your answer. (USPC 2020)
2. Discuss the main objectives of Population Education and point out the measures to achieve them in India in detail. (USPC 2021)

Topics: Important aspects of governance, transparency and accountability, e-governance applications, models, successes, limitations, and potential; citizens charters, transparency & accountability and institutional and other measures.

9. MARITAL RAPE

Context:

The Chhattisgarh High Court ruled that the marital rape exemption applies to Section 377 IPC, removing the legal recourse for married women against non-consensual acts.

What is Marital Rape?

- **Definition:** Marital rape refers to **non-consensual sexual intercourse** by a husband with his wife, which remains **exempted from criminal prosecution** under Indian law.
- **Legal Status in India:** Exception 2 to **Section 375 IPC** and **Section 63 of BNS** grants immunity to husbands for non-consensual sex with their wives above 18 years.
- **Global Perspective:** Over **100 countries**, including the U.K., U.S., France, and Nepal, have **criminalized marital rape**, considering it a violation of women's rights.

Chhattisgarh High Court Judgment on Unnatural Sex

- Ruling: Section 377 IPC's criminalization of unnatural sex doesn't apply within marriage, reinforcing marital rape immunity.
- Legal Reason: Section 375 IPC already exempts husbands, Section 377 can't apply for non-consensual unnatural sex.
- Impact: Removes last legal avenue for married women to prosecute husbands for sexual violence.

Arguments in Favor of Criminalizing Marital Rape:

- Violation of Fundamental Rights: Treating married and unmarried women differently violates Articles 14 and 21.
- Consent in Marriage: Marriage doesn't imply permanent consent; bodily autonomy must be upheld.
- Global Legal Standards: Countries like the U.K. and Nepal criminalized marital rape, setting international human rights precedent.
- Underreporting & Justice for Victims: NFHS-5 data shows one-third of married women face violence without legal recourse.
- Judicial Precedents: Karnataka HC (2022) recognizes marital rape as an offence.

Arguments Against Criminalizing Marital Rape:

- Preservation of Marriage: Government argues criminalizing marital rape could undermine marriage and increase divorce rates.
- Risk of False Cases: Concerns over misuse of false allegations to harass husbands.
- Legislative Domain: Centre advocates for policy decision by Parliament, not judiciary.
- Existing Remedies: Domestic violence laws lack criminal deterrence.
- Cultural & Societal Norms: Challenges in implementing criminalizing marital rape due to societal norms.

Way Forward:

- Remove Exception 2 in Section 375 IPC and BNS Section 63 to recognize marital rape as a crime.
- Strike down marital rape exception in Supreme Court for constitutional rights.
- Educate law enforcement, judiciary, and society on women's rights and bodily autonomy.
- Introduce safeguards against misuse to prevent false cases.
- Engage with women's rights groups, legal experts, and stakeholders for balanced law.

Conclusion:

The Chhattisgarh HC ruling further restricts legal avenues for married women facing sexual violence. Criminalizing marital rape is essential for upholding women's constitutional rights, bodily autonomy, and dignity. The judiciary and legislature must work together to bring much-needed legal reforms that align with global human rights standards.

PYQ:

1. We are witnessing increasing instances of sexual violence against women in the country. Despite existing legal provisions against it, the number of such incidences is on the rise. Suggest some innovative measures to tackle this menace. (UPSC-2014)

Topics: India and its neighbourhood- relations.

10. INDIA CHINA MINISTERIAL MEET

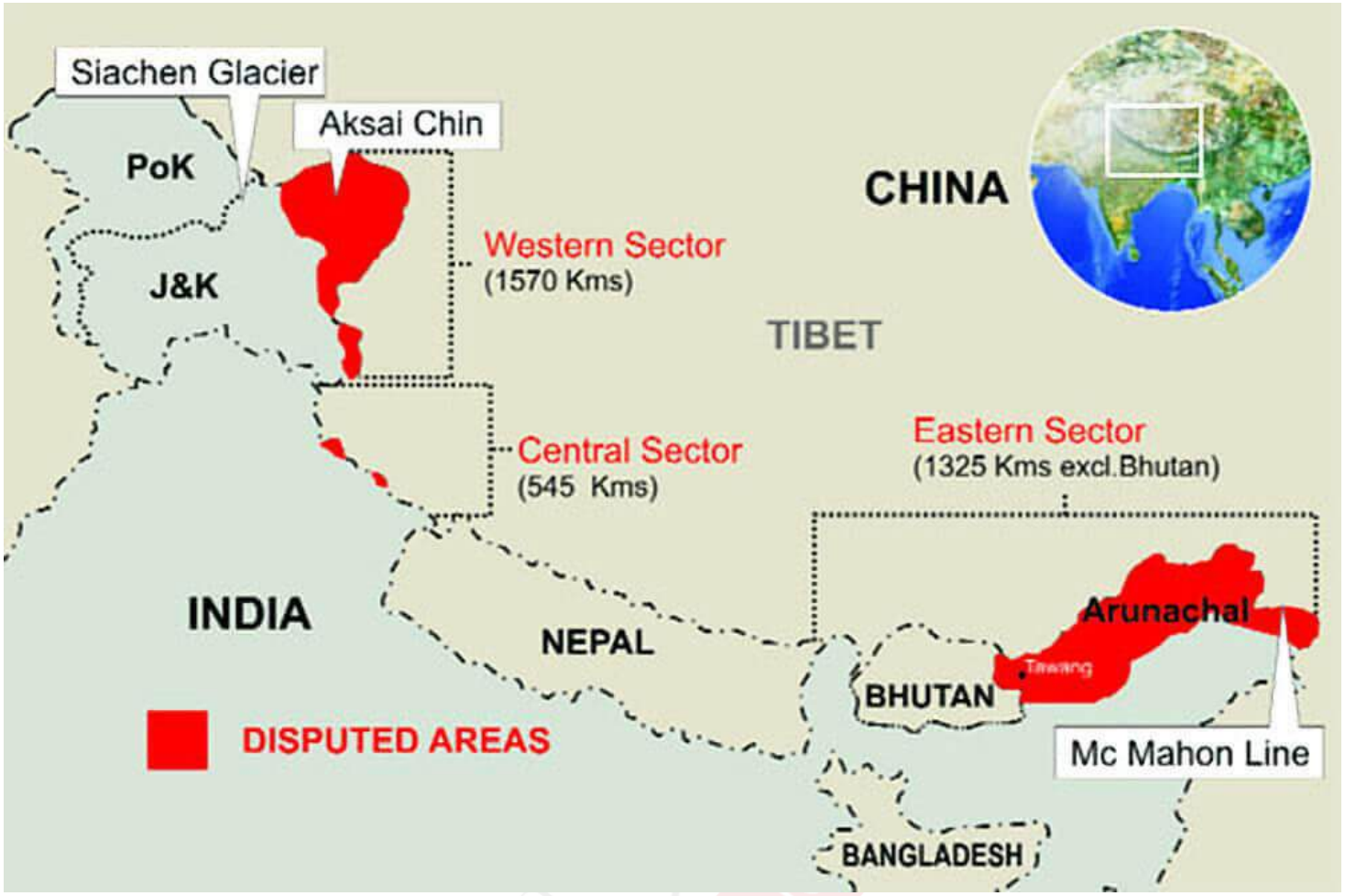
Context:

External Affairs Minister S. Jaishankar met Chinese Foreign Minister Wang Yi on the sidelines of the G-20 Foreign Ministers' meeting in Johannesburg.

About India-China Foreign Ministers Meeting:

Issues Discussed:

1. **Border Management:** Discussions focused on maintaining peace and tranquillity along the Line of Actual Control (LAC). Both sides emphasized the need for stability in border areas.



2. **Kailash Mansarovar Yatra:** Resumption of the pilgrimage was a key agenda item. India sought China's cooperation to facilitate the yatra.
3. **Connectivity:** Talks included improving flight connectivity and travel facilitation. Enhanced connectivity was seen as vital for bilateral ties.
4. **Trans-Border Rivers:** Both sides addressed issues related to shared river waters. India raised concerns over China's dam-building activities.
5. **Multilateral Cooperation:** Emphasis was placed on collaboration in G-20, SCO, and BRICS. Both nations agreed to strengthen multilateral platforms.

Successful Coordination:

1. **G-20 Preservation:** Both nations worked together to protect the G-20 as a key multilateral platform. This highlighted their commitment to global cooperation.
2. **Diplomatic Engagements:** Regular high-level talks, including visits by India's NSA and Foreign Secretary to China, were held. These visits aimed to address bilateral issues.
3. **Disengagement:** Successful troop disengagement in eastern Ladakh in November 2024 was achieved. This marked a significant step toward reducing tensions.
4. **Regional Stability:** Joint efforts were made to address global challenges like climate change and food security. Both nations recognized the need for collective action.
5. **Plurilateralism:** Advocacy for inclusive international cooperation beyond unilateralism was emphasized. This reflected a shared vision for a multipolar world.

India-China Differences:

1. **Border Tensions**: Persistent issues along the LAC, especially post-Galwan clashes in 2020, remain unresolved. These tensions continue to strain bilateral relations.
2. **Strategic Rivalry**: Competing interests in the Indo-Pacific region create friction. Both nations seek to expand their influence in the region.
3. **Trade Imbalance**: India's significant trade deficit with China is a major concern. India seeks to reduce dependency on Chinese imports.
4. **Trust Deficit**: Lack of mutual trust due to China's aggressive posturing hampers relations. Confidence-building mea-

sures are needed to bridge this gap.

5. **Global Influence**: Differing approaches to multilateralism and global governance create divergence. India advocates for inclusive global institutions.

Way Ahead:

1. **Dialogue Continuation:** Regular diplomatic engagements are essential to address bilateral issues. Sustained dialogue can help build mutual understanding.
2. **Confidence-Building Measures:** Strengthening mechanisms to prevent border skirmishes is crucial. These measures can reduce the risk of escalation.
3. **Economic Cooperation:** Addressing trade imbalances and enhancing economic ties is vital. Both nations can benefit from balanced trade relations.
4. **Multilateral Collaboration:** Leveraging platforms like BRICS and SCO for mutual benefits is important. These platforms offer opportunities for cooperation.
5. **Regional Stability:** Joint efforts to ensure peace and stability in Asia are necessary. Collaborative approaches can address regional challenges effectively.

Conclusion:

The India-China meeting in Johannesburg underscored the importance of dialogue in resolving bilateral issues and preserving multilateralism. While challenges like border tensions persist, both nations have shown a commitment to cooperation. Sustained engagement and confidence-building measures are crucial for long-term stability and mutual growth.

PYQ:

1. The China-Pakistan Economic Corridor (CPEC) is viewed as a cardinal subset of China's larger 'One Belt One Road' initiative. Give a brief description of CPEC and enumerate the reasons why India has distanced itself from the same. (UPSC-2018)

Topics: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

11. INDIA-U.S. RELATIONS

Context:

Prime Minister of India met U.S. President during an official working visit to Washington D.C., reaffirming the India-U.S. Comprehensive Global Strategic Partnership.

Key Outcomes of India-U.S. Summit:

Defense & Security Cooperation:

- New 10-Year Framework for Major Defense Partnership.
- Expansion of defense sales including Javelin Anti-Tank Missiles, Stryker Infantry Combat Vehicles, and P-8I maritime patrol aircraft.
- Launch of Autonomous Systems Industry Alliance for AI-based counter-UAS and maritime defense systems.
- Streamlining arms transfer regulations for improved technology exchange and joint production.
- Strengthening military exercises and advancing logistics, intelligence sharing, and humanitarian assistance cooperation.

Trade & Economic Partnership:

- Mission 500: Double bilateral trade to $500 billion by 2030.
- Bilateral Trade Agreement negotiation by late 2025.
- Enhanced market access for U.S. agricultural goods and Indian exports.
- Increased U.S.-India investments in manufacturing, greenfield industries, supply chain diversification.

Energy & Nuclear Cooperation in India

- U.S. expanding energy trade with India (crude oil, LNG, and hydrocarbons)
- Joint development of U.S.-designed nuclear reactors.
- India amending Civil Liability for Nuclear Damage Act (CLNDA).

Technology & Innovation

U.S.-India TRUST Initiative

- Advances AI, semiconductors, quantum computing, space technology.
- Strengthens supply chains for critical minerals, pharmaceuticals, advanced materials.
- Plans for Indian astronaut on ISS and NISAR satellite mission.

U.S-India COMPACT Initiative

The **U.S.-India COMPACT (Catalyzing Opportunities for Military Partnership, Accelerated Commerce & Technology) for the 21st Century** is a strategic framework launched to enhance **defense, trade, and technology cooperation** between India and the United States.

Aim of the Initiative:

- To **strengthen the U.S.-India Comprehensive Global Strategic Partnership** across key sectors.
- To **deepen defense collaboration**, co-production, and technology exchange.
- To **expand bilateral trade**, aiming for **$500 billion by 2030 (Mission-500)**.
- To **advance innovation and technological cooperation**, especially in **AI, cybersecurity, semiconductors, and space exploration**.

Key Features & Functions:

- Establishes 10-year framework for defense procurement, technology transfer, and military exercises.
- Aims to double bilateral trade to $500 billion by 2030.
- Launches TRUST Initiative for AI, space, quantum computing, and semiconductor manufacturing.
- Collaborates in nuclear energy, LNG trade, and clean hydrogen projects.
- Enhances Indo-Pacific security, counterterrorism efforts, and economic corridors like IMEEC.

TRUST Initiative

- **What is the TRUST Initiative?**
  - **Transforming Relationship Utilizing Strategic Technology (TRUST)** is a **bilateral agreement** to enhance cooperation in **critical minerals, pharmaceuticals, and advanced materials**.
  - Builds on India's participation in the **Minerals Security Partnership (MSP)** and the **Minerals Security Finance Network (MSFN)**.
  - Aims to **diversify supply chains**, reduce dependence on China, and facilitate **technology transfer**.

- **How Will the TRUST Initiative Work?**
  - Strengthening Critical Minerals Supply Chains: Focus on lithium, REEs, and advanced materials for defense, semiconductors, and energy storage sectors.
  - Boosting Pharma Sector & API Production: Collaboration to reduce India's dependence on China for APIs and development of alternative supply chains.
  - Reducing Technology Transfer & Export Control: Removing barriers in technology transfer between India and the US and addressing export restrictions on high-tech materials.
  - Innovating Across Strategic Sectors: Catalysing R&D in defense, AI, quantum computing, semiconductors, space, and energy.
- **Significance of the TRUST Initiative:**
  - Reducing Dependence on China: Diversified supply chain for India and US, reducing China's 70% control over REE production.
  - Strengthening Atmanirbhar Bharat: Boost domestic production and recycling of critical minerals, aligning with India's National Critical Minerals Mission.
  - Enhancing Pharma & Defense Sectors: Supporting API self-sufficiency in pharmaceuticals and defense manufacturing.
  - Boosting Clean Energy & EV Manufacturing: Secure lithium and cobalt for EV batteries and expand mineral processing.
  - Expanding High-Tech Trade & Investment: Encouraging US investments in India's mineral and tech sectors.

Multilateral & Strategic Cooperation:

- Strengthened Indo-Pacific and Indian Ocean security through joint patrols, airlifts, and military exercises.
- U.S. approved extradition of Tahawwur Rana and called on Pakistan against terror groups.
- India to lead Arabian Sea security task force.

India-U.S. Summit Significance

- Strengthens India's role as a Major Defense Partner.
- Promotes economic and trade expansion.
- Strengthens energy security via U.S. crude, LNG, and nuclear power.
- Advances AI, semiconductors, space tech, and cybersecurity.
- Counters China's BRI, strengthens Indo-Pacific security, and reinforces counterterrorism efforts against Pakistan.

India-U.S. Relations Challenges:

- Trade Barriers: High tariffs and BTA delays affect market access and expansion.
- Technology Transfer Issues: U.S. export controls limit India's access to advanced defense and AI technologies.
- Nuclear Liability Concerns: CLNDA liability issues slow U.S.-India nuclear reactor collaborations.
- Visa & Mobility Restrictions: Work visa hurdles affect Indian professionals.
- Geopolitical Constraints: U.S.-China tensions and India's strategic autonomy may create diplomatic friction.

Way Forward for Indo-Pacific Security:

- Streamline ITAR regulations for Defense Technology Transfers.
- Finalize BTA by 2025, expand green energy and high-tech manufacturing ties.
- Amend CLNDA for nuclear projects and strengthen oil reserve collaborations.
- Enhance AI, semiconductors, quantum research, and cybersecurity.
- Strengthen Indo-Pacific naval patrols and joint counterterrorism initiatives.

Conclusion:

The India-U.S. Comprehensive Strategic Partnership is evolving with deeper defense, trade, energy, and technology ties. Initiatives like COMPACT, TRUST, and Mission 500 enhance regional security and economic growth. Overcoming trade barriers, tech transfer limits, and visa issues is key to long-term success.

PYQ:

1. How will the I2U2 (India, Israel, UAE and USA) grouping transform India's position in global politics? (UPSC-2022)

12. INDIA-FRANCE RELATIONS

Context:

Prime Minister of India visit to France marked a significant milestone in India-France relations, with agreements on nuclear energy, defense, AI, and Indo-Pacific cooperation, reflecting the deepening strategic partnership between the two nations.

Recent Summit Outcomes:

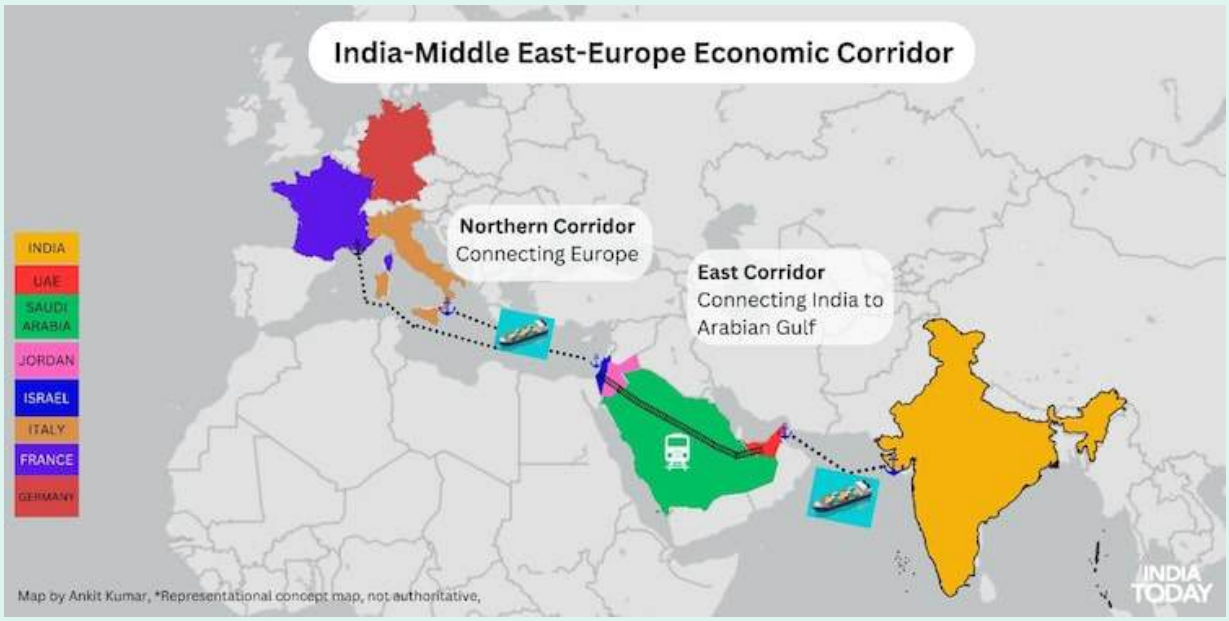
1. **Nuclear Energy Cooperation:**
   - **Small Modular Reactors (SMRs) and Advanced Modular Reactors (AMRs):** Both nations signed a letter of intent to co-design, co-develop, and co-produce SMRs and AMRs, leveraging India's industrial ecosystem and France's expertise.
   - **Jaitapur Nuclear Plant:** Progress on the long-pending Jaitapur project was reviewed, emphasizing its role in India's clean energy transition.
2. **Defense Collaboration:**
   - **Submarines and Missiles:** Continued cooperation on Scorpene submarines, including indigenization and integration of DRDO-developed Air Independent Propulsion (AIP) systems.
   - **Helicopter and Jet Engines:** Discussions on joint production of engines for helicopters and fighter jets.
   - **Pinaka MBRL:** France expressed interest in acquiring India's multi-barrel rocket launcher system, enhancing defense ties.
3. **Artificial Intelligence (AI):**
   - **India-France AI Roadmap:** Focused on developing safe, secure, and trustworthy AI, aligning with both nations' shared values.
   - **AI Action Summit:** India proposed hosting the next AI summit, with 2026 designated as the India-France

Year of Innovation.

4. **Indo-Pacific Cooperation:**
   - **Triangular Development Cooperation:** Joint projects in third countries to support climate and SDG-focused initiatives in the Indo-Pacific region.
   - **Eurodrone MALE Programme:** India's inclusion as an observer in the European drone program.
5. **Economic and Cultural Ties:**
   - **Startup Collaboration:** Inclusion of 10 Indian startups in France's Station F incubator.
   - **UPI in France:** Expansion of India's real-time payment system in France.
   - **Cultural Exchange:** Operationalization of the Young Professional Scheme to promote legal mobility of professionals and students.

India-Middle East-Europe Corridor (IMEEC)

Context: India and France reaffirmed commitment to implementing the India-Middle East-Europe Economic Corridor (IMEC) during Prime Minister visit to France.



- IMEEC is a multimodal connectivity initiative linking India, the Middle East, and Europe, bypassing the Suez Canal and reducing China's Belt and Road Initiative (BRI) dependency.
- **Participating Nations:** India, UAE, Saudi Arabia, Jordan, Israel, France, Germany, Italy, and the European Union.
- Announced during **the G20 Summit in New Delhi** in September, 2023.
- **Aim & Objectives:**
  - **Boost trade efficiency** by reducing transport time between Asia and Europe.
  - **Enhance connectivity** across **key economic hubs in the Middle East and Europe**.
  - **Strengthen supply chain security** by offering an **alternative route to global trade**.
  - **Support clean energy initiatives** by facilitating green hydrogen and renewable energy trade.
  - **Promote digital integration** through **secure high-speed data connectivity**.
- **Key Features & Functions:**
  - **Two Corridors**:
    - **Eastern Corridor:** Connects **India to the Gulf (UAE & Saudi Arabia)** via sea.
    - **Northern Corridor:** Links **the Gulf to Europe (France, Germany, Italy) via rail and sea**.
  - **Digital & Logistics Integration:** A **logistics platform** will manage trade, containers, bulk cargo, and digital transactions.
  - **$600 Billion Mobilization:** Target by **2027** to address infrastructure gaps.
  - **Trade Route Diversification:** Bypasses geopolitical risks, including conflicts affecting the Suez Canal and Red Sea region.

How It Will Boost Bilateral Ties?

- **Strategic Depth:** Enhanced cooperation in defense, nuclear energy, and AI strengthens the strategic partnership.
- **Economic Growth:** Joint projects in third countries and startup collaborations open new avenues for economic engagement.
- **Technological Advancements:** Collaboration in AI and nuclear technology positions both nations as leaders in innovation.
- **Global Influence:** Indo-Pacific cooperation reinforces their roles as key stakeholders in regional stability and development.

Limitations and Challenges:

- **Implementation Delays:** Historical delays in projects like Jaitapur raise concerns about timely execution.
- **Technological Barriers:** Co-development of advanced technologies like SMRs and AI requires significant expertise and investment.
- **Geopolitical Risks:** Differing approaches to global issues, such as China's role in the Indo-Pacific, could strain cooperation.
- **Bureaucratic Hurdles:** Complex regulatory frameworks in both countries may slow down joint initiatives.

Way Forward:

- **Fast-Tracking Projects:** Establish dedicated task forces to monitor and expedite key projects like Jaitapur and SMR development.
- **Skill Development:** Enhance collaboration in training and education to build a skilled workforce for advanced technologies.
- **Private Sector Involvement:** Encourage greater participation from private industries in defense, nuclear, and AI sectors.
- **Regular Dialogues:** Institutionalize frequent high-level meetings to address challenges and explore new opportunities.
- **Public Awareness:** Promote people-to-people ties through cultural exchanges and educational programs.

Conclusion:

The India-France strategic partnership has reached new heights, with significant agreements in nuclear energy, defense, and AI. While challenges remain, a focused approach to implementation and collaboration can further strengthen this relationship, benefiting both nations and contributing to global stability.

PYQ:

1. How will the I2U2 (India, Israel, UAE and USA) grouping transform India's position in global politics? (UPSC-2022)

13. INDIA-QATAR

Context:

India and Qatar have formally partnered in trade, energy, and investments, with a goal to double trade to $30 billion by 2030.

Key Outcomes of India-Qatar Summit 2025:

1. **Strategic Partnership Agreement:** Strengthens ties in **trade, investment, security, and innovation**.
2. **Trade Expansion:** Commitment to **double bilateral trade from $14 billion to $30 billion by 2030**.
3. **Energy Cooperation:** Qatar Energy and Petronet LNG signed a **20-year deal for LNG supply** starting in 2028.
4. **Investment Boost:** Qatar Investment Authority **pledged $10 billion** in Indian infrastructure, startups, and green energy.
5. **Digital & Financial Integration:** **UPI rollout in Qatar** and a revised **Double Taxation Avoidance Agreement** signed.

Key Areas of India-Qatar Cooperation:

1. **Trade & Investment**
   - Qatar is India's largest supplier of **LNG (10.91 MMT) and LPG (4.92 MMT)** (FY 2023-24).
   - New agreements to **boost Indian exports** and **expand Qatar's investments in smart cities, ports, shipbuilding, and technology**.
2. **Energy Security**
   - **Long-term LNG supply deal (2028-2048)** ensures stability in India's energy sector.
   - **Renewable energy cooperation** in **green hydrogen, solar power, and AI-driven energy efficiency**.

3. **Technology & Innovation**
    - Joint initiatives in **AI, semiconductors, IoT, and robotics** for next-gen industrial growth.
    - **Indian startups to participate in Web Summits in Doha (2024-25)**.
4. **Digital Payments & Financial Ties**
    - **Nationwide UPI rollout in Qatar** to facilitate seamless cross-border transactions.
    - Establishment of **Qatar Investment Authority (QIA) office in India** to deepen economic ties.
5. **People-to-People Ties**
    - **830,000 Indians** in Qatar form the **largest expatriate community**, contributing to Qatar's workforce.
    - Strengthened cooperation in **education, youth affairs, culture, and sports** through MoUs.
6. **Security & Counter-Terrorism**
    - **Joint cooperation on intelligence sharing**, countering **cybercrime, anti-money laundering, and transnational crimes**.
    - Commitment to **combating cross-border terrorism** and strengthening security ties.

Challenges & Differences:

1. **Trade Imbalance:** India imports **LNG and LPG worth $12 billion**, while its exports remain **under $2 billion**.
2. **Labor Welfare Issues:** Concerns over **working conditions** of Indian laborers in Qatar, especially in **construction and blue-collar jobs**.
3. **Geopolitical Sensitivities:** Qatar's role in **West Asian conflicts (Israel-Hamas negotiations)** and its diplomatic balancing act.
4. **Judicial & Legal Hurdles:** **600 Indians in Qatari jails**, pending agreement on the **transfer of sentenced persons**.
5. **Naval Veterans Case:** **One Indian Navy officer still detained**, affecting diplomatic relations.

Way Ahead:

1. **Enhancing Indian Exports**: Focus on high-value sectors like IT, pharmaceuticals, and engineering goods to balance trade.
2. **Investment Acceleration:** Expedite India-Qatar Bilateral Investment Treaty to ease FDI flows.
3. **Improving Labor Protections:** Strengthen worker welfare agreements for better employment conditions.
4. **Expanding Energy Partnership:** Collaborate on green hydrogen, carbon capture, and renewable energy initiatives.
5. **Strengthening Diplomatic & Security Ties:** Increase high-level ministerial exchanges for regional cooperation.

Conclusion:

India-Qatar relations have entered a new era of strategic partnership, focusing on energy, trade, and technology. By diversifying economic engagement and addressing challenges, both nations aim to build a mutually beneficial, long-term collaboration that enhances regional stability and economic growth.

PYQ:

1. The question of India's Energy Security constitutes the most important part of India's economic progress. Analyse India's energy policy cooperation with West Asian Countries. (UPSC-2017)

14. JAPAN-INDIA-AFRICA FORUM

Context:

External Affairs Minister emphasized India's commitment to Africa through capacity-building, skill development, and infrastructure investment, unlike extractive economic models.

- **What is the Japan-India-Africa Forum?**
    - A trilateral **economic and strategic platform** promoting **investment, trade, and development projects** across Africa.
    - **Facilitates collaboration** between India, Japan, and African nations to drive **infrastructure, digital transformation, and human capital development**.
- **Established In:**
    - The initiative **evolved from India-Africa Forum Summit (IAFS) and Japan's TICAD (Tokyo International Conference on African Development)**.
    - Gained momentum in **2021** with the **Japan-India-Africa Growth Corridor discussions**.
- **Aim:**
    - Strengthen **economic partnerships** among India, Japan, and Africa.
    - Foster **infrastructure development, digital transformation, and skill-building**.

- Enhance Africa's **global trade integration** through **investment and knowledge transfer**.
- **Key Functions**
  - **Infrastructure & Connectivity**: Investments in railways, ports, and power generation.
  - **Skill Development & Technology Transfer:** Programs like ITEC, e-VidyaBharti, and e-ArogyaBharti.
  - **Sustainable Development & Green Energy:** Support for solar electrification, climate finance, and circular economy.
  - **Economic Growth & Trade Expansion:** Enhancing supply chain resilience and financial inclusion.

Potential of the Forum:

- **Boosts Africa's Industrial Growth:** Promotes manufacturing hubs, special economic zones (SEZs), and digital start-ups.
- **Enhances Strategic Connectivity:** Strengthens infrastructure linkages in East Africa and the Indian Ocean Region.
- **Leverages Japan-India Expertise:** Combines Japan's investment & technology with India's digital ecosystem & industrial strength.
- **Strengthens South-South Cooperation:** Positions Africa as the next economic growth driver, ensuring sustainable partnerships.
- **Counterbalances Chinese Influence:** Provides an alternative to China's Belt & Road Initiative (BRI) with a transparent, non-debt-driven approach.

Issues and Challenges:

- **Geopolitical Competition:** China's dominance in African infrastructure poses economic and strategic challenges.
- **Limited Private Sector Engagement:** Indian and Japanese companies are hesitant to invest due to regulatory risks and uncertain returns.
- **Financing Constraints:** Africa's high debt burden limits its ability to attract large-scale investment.
- **Logistical & Connectivity Barriers:** Inadequate transport infrastructure affects the flow of goods and trade integration.
- **Political Instability & Governance Issues:** Corruption, conflicts, and weak policy frameworks hinder long-term collaboration.

Way Ahead:

- **Expand Institutional & Policy Frameworks:** Establish joint economic councils to streamline investments and policy coordination.
- **Encourage Private Sector Investments:** Provide financial incentives and risk-mitigation tools to attract corporate participation.
- **Strengthen Digital & Green Energy Collaboration:** Enhance Africa's digital economy and renewable energy capacity through joint ventures.
- **Develop Inclusive Trade Partnerships:** Promote local capacity-building to ensure African industries gain long-term benefits.

Conclusion:

Overcoming geopolitical, financial, and policy challenges will be key to realizing its full potential. By leveraging Japan's technology, India's industrial strength, and Africa's growing markets, the trilateral partnership can create a mutually beneficial, resilient economic framework for the future.

PYQ:

1. Economic ties between India and Japan, while growing in recent years, are still far below their potential. Elucidate the policy constraints which are inhibiting this growth. (2013)

15. INDIA – UK FREE TRADE AGREEMENT

Context:

India and the UK have resumed negotiations for a Free Trade Agreement (FTA) after an eight-month gap, with 14 rounds of talks completed since January 2022.

- India has signed **13 FTAs and 6 preferential trade** agreements, with a recent focus on western partners like the UK, EU, and US to expand exports and enhance trade relations.

What is a Free Trade Agreement (FTA)?

- An **FTA is a pact** between two or more countries to **reduce or eliminate import duties** on a majority of traded goods.
- It also aims to **minimize non-tariff barriers**, **facilitate trade in services**, and **enhance bilateral investments**.

Benefits of FTAs:

- **Boosts Exports & Market Access:** Eliminates tariffs, making Indian goods more competitive.
- **Enhances Foreign Investment:** Encourages FDI inflows and technology transfer.
- **Diversifies Trade Relations:** Reduces over-reliance on specific markets.
- **Creates Jobs & Economic Growth:** Expands industries and employment opportunities.
- **Strengthens Strategic Partnerships**: Builds diplomatic and economic cooperation.

India's Signed FTAs:

- **Signed FTAs:** Sri Lanka, Bhutan, Thailand, Singapore, Malaysia, Korea, Japan, Australia, UAE, Mauritius, ASEAN, and EFTA.
- **Upcoming FTAs:** India is **negotiating FTAs with the UK, EU, and US** to strengthen trade with **western economies**.

India-UK Free Trade Agreement (FTA)

- **Aim of the India-UK FTA**
  - Boost trade & investment by reducing tariff and non-tariff barriers.
  - Expand opportunities in technology, healthcare, and education.
  - Facilitate easier movement of students and professionals.
- **India's Gains from the FTA:**
  - **Merchandise Trade:** Exports to the UK were $12.9 billion (FY24), with gains in textiles, apparel, footwear, cars, marine products, grapes, and mangoes.
  - **Tariff Reduction Benefits:** India will gain from duty cuts on $6.1 billion worth of goods.
  - **Market Access in Services:** Indian IT, education, and healthcare sectors will benefit.
  - **Increased Investments:** The Bilateral Investment Treaty (BIT) will promote UK investments in India.
- **UK's Gains from the FTA:**
  - **Tariff Reductions in India:** The UK exports $8.4 billion to India, with 91% of products facing tariffs (e.g., cars - 100%, whisky - 150%).
  - **Better Access to Indian Markets:** UK products such as precious metals, make-up items, machinery, and scotch whisky will benefit from lower duties.

Challenges to the India-UK FTA:

- **Tariff Negotiations:** India is reluctant to reduce tariffs on UK goods like whisky, automobiles, and meat.
- **Visa & Mobility Issues:** India demands greater access for students and professionals, while the UK has tight visa policies.
- **Bilateral Investment Treaty (BIT) Dispute Resolution:** India wants foreign firms to exhaust local remedies before arbitration, which the UK opposes.
- **Regulatory Barriers:** The UK demands liberalization in India's legal and financial sectors, which faces resistance.
- **Geopolitical Factors:** Domestic political changes and economic uncertainties can delay agreements.

Way Ahead:

- **Balanced Tariff Reductions**: Both nations must negotiate fair duty cuts while protecting domestic industries.
- **Enhancing Market Access:** Address visa and mobility concerns for professionals and students.
- **Finalizing Investment Protections:** Ensure a mutually beneficial Bilateral Investment Treaty (BIT).
- **Sector-Specific Cooperation:** Strengthen technology, digital trade, and green energy collaborations.

Conclusion:

The India-UK FTA can be a game-changer for trade and investment, boosting bilateral economic ties. Addressing tariff concerns, investment protection, and market access will be key to finalizing the deal. A balanced agreement will strengthen economic growth for both nations while enhancing India's global trade standing.

PYQ:

1. What does a free trade agreement (FTA) entail, and why are they crucial for India? What complexities arise during the negotiation of FTAs, and how can these challenges be navigated effectively?

Topics: Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora.

16. USAID FREEZE

Context:

Recently, U.S. President Donald Trump, on his first day of his second term, imposed a 90-day freeze on foreign assistance to reassess program efficiency and alignment with U.S. foreign policy.

USAID Overview

• Established in 1961, an independent agency for civilian foreign aid and development assistance.
• Mission: Promote democratic values, advance global peace, and align with U.S. national security interests.
• Key Sectors: Economic development, health, education, food security, humanitarian aid, climate change, governance.
• Global Reach: Operates in over 100 countries, with flagship programs like PEPFAR, Feed the Future, and Power Africa.

Why the Freeze?

- **Executive Order:** On January 20, 2023, President Donald Trump issued a 90-day freeze on foreign assistance to reassess program efficiency and alignment with U.S. foreign policy.
- **Political Motivations:** Critics argue the freeze targets Biden-era programs, driven by political vendetta rather than strategic reassessment.

Statements: Elon Musk (DOGE head) called USAID a "criminal organization," while Secretary of State Marco Rubio emphasized restructuring to serve U.S. national interests.

Impact:

- Global Impact: Potential disruption of critical programs, especially in HIV/AIDS treatment, food security, and disaster relief.
- Affected Countries: Ukraine, Ethiopia, Somalia, and Yemen face setbacks in development and humanitarian projects.
- UN Concerns: Potential over 6 million deaths in the next four years due to halting HIV/AIDS funding.
- Impact on India: Reduced reliance on USAID, funding now constituting only 0.2%-0.4% of its global budget.
- Key Sectors: Health, energy, water, sanitation, and environmental health.

Alternatives and Way Forward:

- **Domestic Funding:** Indian government and state agencies can step in to fund critical projects.
- **Multilateral Partnerships:** Strengthen collaborations with organizations like the World Bank, WHO, and UN agencies.
- **Private Sector Engagement:** Encourage CSR initiatives and public-private partnerships to fill funding gaps.
- **Global Solidarity:** Other donor nations and NGOs can increase contributions to mitigate the impact of USAID's withdrawal.

Conclusion:

The USAID freeze poses challenges to global development and humanitarian efforts, with India potentially surviving due to reduced dependency, requiring diversification of funding sources and international cooperation.

PYQ:

1. What introduces friction into the ties between India and the United States is that Washington is still unable to find for India a position in its global strategy, which would satisfy India's National self-esteem and ambitions'. Explain with suitable examples. (UPSC-2019)

17. DEPORTATION

Context:

The U.S. deported 104 Indian nationals for alleged immigration law violations, with deportees arriving in Amritsar on a U.S. military aircraft in shackles, prompting diplomatic concerns from India over their treatment and human rights violations.

Understanding *Deportation:*

- **What is Deportation?**
    - Deportation is the **forced removal of foreign nationals** from a country due to **visa violations, illegal entry, criminal activity, or threats to public safety**.
    - It is governed by the **U.S. Immigration and Customs Enforcement (ICE)**, which enforces **immigration laws**

and removal processes.

- **Why is Deportation Happening?**
  - **Stricter U.S. Immigration Policies**: Recent **crackdown on illegal migration** under the Trump administration.
  - **Overstay & Visa Violations:** Large numbers of **Indian nationals overstay their visas or enter through unauthorized means**.
  - **Final Removal List:** The **U.S. identified 487 Indians** for deportation, citing national security concerns.
  - **Use of Military Aircraft:** The latest deportation was classified as a **"national security operation"**, unlike previous cases using commercial flights.
- **How Deportations are Carried Out?**
  - **Immigration Detention Centers:** Violators are detained before deportation.

  - **Legal Proceedings:** They may **apply for asylum** or **face expedited removal** if found without proper documentation.
  - **Transport Mechanism:** The **U.S. covers deportation costs**, using commercial or military aircraft in extreme cases.

Issues Surrounding Mass Deportations

- **Human Rights Violations:** Shackling of deportees, including women and children, raised concerns over inhumane treatment.
- **Diplomatic Implications:** India, Brazil, and Colombia raised formal objections over unfair deportation practices.
- **Lack of Legal Assistance & Due Process:** Deportees face limited legal aid, with expedited removals bypassing judicial review.
- **Socioeconomic & Psychological Impact:** Deportees return to economic hardship, social stigma, and financial instability.
- **Rising Trend of Immigration Crackdowns:** Strict U.S. border enforcement threatens 7.25 lakh undocumented Indians with removal.

Way Ahead:

- **Diplomatic Engagement & Bilateral Dialogue:** India must push for humane deportation processes through diplo-

matic negotiations.

- **Rehabilitation & Reintegration Programs:** Employment, legal aid, and psychological support should be provided to deportees.
- **Stronger Immigration Awareness Programs:** Campaigns on legal migration pathways are needed to prevent visa fraud and trafficking.
- **Monitoring of Immigration Agents:** Strict regulations are required to curb fraudulent agents misleading migrants.
- **Global Legal Framework for Ethical Deportations:** India should push for humane deportation protocols at UN forums.

Conclusion:

The **mass deportation of 104 Indians raises serious humanitarian concerns**, demanding a **more structured diplomatic and legal approach**. India must ensure fair treatment of its nationals while strengthening legal migration frameworks to prevent future deportations and safeguard citizen rights.

PYQ:

1. "What introduces friction into the ties between India and the United States is that Washington is still unable to find for India a position in its global strategy, which would satisfy India's National self-esteem and ambitions" Explain with suitable examples. [UPSC-2019]

18. INDIA IN INDIAN OCEAN REGION

Context:

India, along with Singapore and Oman, is hosted the 8th Indian Ocean Conference (IOC) in Muscat, where foreign ministers from 30 nations discussed regional security and economic cooperation.

What is the Indian Ocean Region (IOR)?

- The **third-largest ocean in the world**, covering **70.56 million sq km** and connecting Asia, Africa, and Australia.
- A **natural trade corridor** historically influenced by Indian civilization and maritime networks.

Nations Surrounding IOR:

- **26 coastal nations**, including **India, Sri Lanka, Maldives, Oman, Indonesia, Australia, South Africa, and Somalia**.
- **Landlocked countries like Nepal and Bhutan** also depend on IOR trade routes.

Importance of the Indian Ocean Region (IOR):

- **Global Trade Hub**: Facilitates **70% of global container traffic** and **90% of India's energy imports**, making it a key economic corridor.
- **Maritime Security**: Critical sea lanes like the **Strait of Malacca, Hormuz, and Bab el Mandeb** ensure uninterrupted global trade.
- **Resource-Rich Waters:** Contains vast fisheries, oil, gas, and mineral deposits, crucial for regional economies.
- **Strategic Significance:** Hosts naval bases of **major powers (US, UK, China, France),** influencing global security dynamics.

India's Role in Managing the Indian Ocean Region:

- **SAGAR Initiative (2015)**: Launched by PM Modi to promote Security and Growth for All in the Region, ensuring maritime stability.
- **Naval Capabilities & Regional Security**: Indian Navy conducts joint exercises (MILAN, Malabar, Varuna) to strengthen regional defense cooperation.
- **Economic & Trade Leadership:** India develops ports via Sagarmala and promotes the Blue Economy for sustainable ocean resource utilization.
- **Disaster Relief & Humanitarian Assistance:** Plays a leading role in HADR operations, assisting countries during natural disasters and emergencies.
- **Diplomatic & Strategic Alliances:** Strengthens regional partnerships through IORA, BIMSTEC, and QUAD for collective maritime governance.

Challenges in the Indian Ocean Region:

- **China's Expanding Influence:** String of Pearls strategy and growing naval presence challenge regional stability and India's interests.

- **Piracy & Maritime Crimes:** Somali piracy, illegal fishing, and arms smuggling disrupt trade and security operations.
- **Climate Change & Rising Sea Levels:** Small Island nations face existential threats due to coastal erosion and submergence risks.
- **Undersea Surveillance & Cyber Threats:** Chinese control over subsea cables poses risks to data security and regional communications.
- **Maritime Terrorism & Trafficking:** Drug smuggling, human trafficking, and sea-based terrorism remain persistent security threats.

Way Ahead:

- **Strengthening Maritime Infrastructure:** Invest in port modernization, naval expansion, and undersea surveillance systems.
- **Enhancing Regional Cooperation:** Deepen partnerships with IORA, QUAD, and bilateral maritime security agreements.
- **Boosting Blue Economy & Sustainable Development:** Promote fisheries, ocean industries, and clean energy solutions for long-term sustainability.
- **Countering External Influence:** Protect regional communication networks and prevent foreign dominance in key maritime sectors.
- **Disaster Preparedness & Climate Action:** Develop early warning systems, climate resilience plans, and disaster relief infrastructure.

Conclusion:

The Indian Ocean Region is a vital geopolitical and economic hub, influencing global trade, security, and regional stability. India's proactive leadership **through SAGAR and IORA** is crucial in maintaining peace and prosperity. Strengthening maritime security, infrastructure, and regional alliances will ensure India's prominence in the global maritime order.

PYQ:

1. What is the significance of Indo-US defense deals over Indo-Russian defense deals? Discuss with reference to stability in the Indo-Pacific region. (UPSC- 2020)

GENERAL STUDIES – 3

Topics: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

1. SUMMARY OF ECONOMIC SURVEY 2024-25

Context:

The Economic Survey 2024-25, tabled by Union Finance Minister Nirmala Sitharaman, provides a comprehensive analysis of India's economic performance and outlines key challenges and opportunities for sustainable growth.

Summary and Key Takeaways from Economic Survey 2025:

1. **Global Economic Context:**
   - Global growth slowed to 3.3% in 2023, with IMF projecting an average of 3.2% over the next five years.
   - Rising trade protectionism and China's dominance in global manufacturing (one-third of global output) pose challenges.
   - India's economy remains steady despite global headwinds, with real GDP growth pegged at 6.4% in FY25 and expected to grow between 6.3% and 6.8% in FY26.
2. **Domestic Economic Performance:**
   - **GDP and GVA:** Real GDP growth estimated at 6.4% in FY25, close to the decadal average. Gross Value Added (GVA) grew by 6.4%, driven by strong performance in construction, electricity, and utilities.
   - **Private Consumption:** Private final consumption expenditure grew by 7.3%, supported by a rebound in rural demand.
   - **Inflation:** Retail headline inflation softened to 4.9% (April-December 2024), but food inflation rose to 8.4% due to supply chain disruptions and weather vagaries.
   - **Employment:** Unemployment rate declined to 3.2% in 2023-24, with improved labor force participation and worker-to-population ratios.

3. **Sectoral Growth:**
   - **Agriculture:** Expected to grow at 3.8% in FY25, supported by record Kharif foodgrain production (1647.05 lakh metric tonnes).
   - **Industry:** Estimated to grow by 6.2%, with strong performance in construction and utilities.
   - **Services:** Robust growth of 7.2%, driven by financial, real estate, and professional services. Services exports surged by 12.8% (April-November 2024).
4. **Fiscal Health and Capex:**
   - Capital expenditure grew by 8.2% (July-November 2024), with a focus on infrastructure development.
   - Gross tax revenue increased by 10.7% (April-November 2024), but net tax revenue growth was modest due to higher devolution to states.
   - States' revenue expenditure grew by 12%, with subsidies and committed liabilities driving spending.
5. **External Sector:**
   - Merchandise exports grew by 1.6% (April-December 2024), while imports rose by 5.2%.
   - Services exports and remittances supported a current account deficit (CAD) of 1.2% of GDP in Q2 FY25.
   - Forex reserves stood at $634.6 billion (January 2025), covering 10.9 months of imports and 90% of external debt.
6. **Banking and Financial Stability:**
   - Gross NPAs declined to a 12-year low of 2.6% of gross loans.
   - Capital-to-risk-weighted assets ratio (CRAR) for banks stood at 16.7% (September 2024), well above regulatory norms.
7. **Infrastructure and Renewable Energy:**
   - Railway network expanded by 2031 km (April-November 2024), with 17 new Vande Bharat trains introduced.
   - Renewable energy capacity increased by 15.8% (December 2024), driven by solar and wind power.
   - Port efficiency improved, with average container turnaround time reduced to 30.4 hours (FY25).
8. **Social Sector and Health:**
   - Government health expenditure increased from 29% (FY15) to 48% (FY22), reducing out-of-pocket expenses from 62.6% to 39.4%.
   - Social services expenditure grew at 15% annually (FY21-FY25), with initiatives like Samagra Shiksha Abhiyan and PM POSHAN.
9. **MSME and Deregulation:**
   - The ₹50,000 crore Self-Reliant India Fund launched to support MSMEs.
   - Economic Survey advocates systematic deregulation under Ease of Doing Business 2.0 to boost growth and competitiveness.
10. **AI and Future Workforce:**
    - Collaborative efforts between government, private sector, and academia needed to address AI-driven labor market transformations.
    - Emphasis on education and skill development to prepare the workforce for AI-augmented jobs.

New Concepts Highlighted in the Economic Survey 2024-25:

1. **Systematic Deregulation:**
   - A three-step process for states to review and reduce regulatory burdens:
     - Identify areas for deregulation.
     - Compare regulations with other states and countries.
     - Estimate the cost of regulations on enterprises.
2. **Geo-Economic Fragmentation (GEF):**
   - Acknowledges the impact of global economic fragmentation on trade and investment.
   - Calls for strengthening domestic growth levers to mitigate risks.
3. **AI-Driven Labor Market Transformation:**
   - Emphasizes the need for collaborative efforts between government, private sector, and academia to address AI's societal effects.
   - Focuses on education and skill development to prepare the workforce for AI-augmented jobs.
4. **Mittelstand Concept for India's SME Sector:**
   - Advocates creating a robust SME sector akin to Germany's Mittelstand.
   - Aims to foster innovation, competitiveness, and economic growth through deregulation and policy support.
5. **Risk-Based Regulation:** Proposes a shift towards risk-based regulatory frameworks to reduce compliance costs and improve business efficiency.

2. GLANCE OF UNION BUDGET 2025

Context:

Finance Minister presented the Union Budget 2025 on February 1, 2025, announcing major tax reliefs, infrastructure investments, and employment generation initiatives.

Major Proposals of Union Budget 2025:

1. **Income Tax Exemption Increased:** No **income tax up to ₹12 lakh** under the **new tax regime**, benefiting the middle class.
   E.g. Salaried taxpayers get **₹12.75 lakh exemption** due to standard deduction.
2. **Capital Expenditure Hike:** **₹11.21 lakh crore** allocated for infrastructure, **10% increase** from FY24-25.
   E.g. ₹2.3 lakh crore for railways, ₹1.3 lakh crore for **expressways**.
3. **National Manufacturing Mission:** Aims to **boost 'Make in India'**, reduce **import dependency**, and enhance **industrial production**.
   E.g. Expansion of **PLI schemes** for semiconductors & electronics.
4. **Employment Generation Drive:** **22 lakh jobs** to be created, focusing on **MSMEs, leather, and textile sectors**.
   E.g. ₹4,000 crore allocated for MSME credit expansion.
5. **Agriculture Sector Support:** **Prime Minister Dhan-Dhaanya Krishi Yojana** to boost **100 low-yield districts**, with **₹1.2 lakh crore** rural credit push.
   E.g. KCC loan limit increased to ₹5 lakh.
6. **Nuclear Energy Mission:** **₹20,000 crore allocated** for Small Modular Reactors (SMRs), with **five SMRs operational by 2033**.
   E.g. Strengthening India's **clean energy roadmap**.
7. **Boost to UDAN Scheme:** Expansion of **regional connectivity** to **120 new destinations** under the **modified UDAN scheme**.
   E.g. Target of **4 crore passengers in 10 years**.
8. **Makhana Board in Bihar:** Dedicated board for **Makhana production & export promotion**, enhancing **value chain & marketing support**.
   E.g. ₹500 crore for Makhana farmers' welfare.
9. **Reduction in Fiscal Deficit:** Target reduced to **4.4% of GDP** from **4.8%**, focusing on **fiscal consolidation**.
   E.g. ₹11.54 lakh crore net market borrowings planned.
10. **Green Energy and Climate Push:** **₹10,000 crore for lithium-ion battery recycling** and **solar PV incentives** to strengthen clean energy.
    E.g. Green hydrogen production incentives introduced.

Positives of Indian Budget 2025:

1. **Boost to Middle-Class Consumption:** Tax relief of **₹1 lakh crore** increases disposable income, driving **higher demand in retail, auto, and real estate**.
   E.g. Auto sector expected 15% sales growth due to increased purchasing power.
2. **Strong Fiscal Discipline:** Fiscal deficit target reduced to **4.4% of GDP** from **4.8%**, ensuring **macroeconomic stability**.
   E.g. Revenue growth projected at 11.2%, balancing deficit concerns.
3. **Infrastructure Expansion:** Increased **capital expenditure** to **₹11.21 lakh crore** boosts **logistics, transportation, and energy sectors**.
   E.g. ₹2.3 lakh crore for railway modernization.
4. **Support for MSMEs and Startups:** New credit schemes and relaxed compliance norms for MSMEs.
   E.g. ₹20,000 crore allocated to enhance small business financing.
5. **Thrust on Nuclear Energy & Green Transition:** **₹20,000 crore allocated** for a **Nuclear Energy Mission** and development of **five small modular reactors (SMRs)** by 2033.
   E.g. ₹10,000 crore for lithium-ion battery recycling & solar PV incentives.

Limitations in Budget 2025

1. **Overestimated Revenue Projections:** **Income tax revenue growth target at 14.4%** seems ambitious despite major **tax cuts**.
   E.g. Revenue foregone due to tax exemptions at ₹1 lakh crore.)
2. **Limited Agricultural Reforms:** **No structural reforms** in **MSP mechanism** or **crop diversification incentives**, continuing farmer distress.
   E.g. Wheat & rice stockpile issues remain unaddressed.
3. **Lack of R&D Focus:** India's **R&D spending remains 0.64% of GDP**, far below global standards like **China (2.2%)** or

Germany (3.1%).
E.g. No major funding for industrial R&D innovation.

4. **Subdued Private Investment Boost:** While **capex is increased**, no major incentives for **private sector** to drive investments.
   E.g. PLI schemes need further policy clarity & execution speed.
5. **Missed Opportunity for Export Growth:** While **UDAN Scheme expansion** helps domestic connectivity, **export incentives remain weak**.
   E.g. No major tax rebates for high-value exports like pharmaceuticals & electronics.

Way Forward

1. **Diversify Tax Revenue Sources:** Broaden **GST base** and reduce **dependence on income tax** to sustain revenue growth.
   E.g. Rationalizing GST slabs for better compliance.
2. **Comprehensive Agri-Reforms:** Implement **market-based MSP** and **export-driven** agricultural strategies.
   E.g. Promote millets & organic farming for global markets.
3. **Strengthen Manufacturing & R&D:** Increase **R&D spending to 1.5% of GDP** and encourage **clean-tech industries**.
   E.g. Incentives for AI-driven manufacturing to enhance global competitiveness.
4. **Enhance Private Sector Participation:** Strengthen **PPP models** in **infrastructure, energy, and transport sectors** to reduce **fiscal burden**.
   E.g. Involve private players in smart city projects.
5. **Long-Term Climate Strategy:** Develop **Green Energy Fund** and scale up **solar, wind, and hydrogen investments**.
   E.g. ₹5,000 crore for green hydrogen production targets.

Conclusion:

The **Union Budget 2025** is a **growth-oriented** and **middle-class-friendly** budget with major **tax reliefs, infrastructure expansion, and job creation plans**. While the fiscal discipline and **manufacturing push** are commendable, **agriculture and exports need deeper reforms**. A balanced execution strategy will be key to achieving **Viksit Bharat's long-term** economic goals.

PYQ:

1. Distinguish between capital budget and revenue budget. Explain the components of both these Budgets. (UPSC-2021)

3. HOUSEHOLD CONSUMPTION EXPENDITURE SURVEY (HCES) 2023-24

Context:

The Ministry of Statistics and Programme Implementation (MoSPI) has released the Household Consumption Expenditure Survey (HCES) 2023-24, highlighting increasing MPCE (Monthly Per Capita Expenditure) and declining urban-rural consumption gaps.

About Household Consumption Expenditure Survey (HCES):

What is HCES?

- A **nationwide survey** conducted to assess **household consumption patterns**, living standards, and expenditure trends.
- Provides **essential data** for economic planning, poverty measurement, and updating the **Consumer Price Index (CPI)**.

Survey Details:

- **Conducted by:** National Statistical Office (NSO) under MoSPI.
- **Methodology:** **Multistage stratified sampling**, covering both **rural and urban areas**.
- **Coverage:**
  - **2023-24 Sample:** 2,61,953 households (1,54,357 rural, 1,07,596 urban).
  - Conducted across **all States and Union Territories**, except a few **remote villages in Andaman & Nicobar Islands**.
- **Survey Period:** August 2023 - July 2024.

Key Findings of HCES 2023-24:

1. **Rising Household Consumption Expenditure**

- **MPCE (Monthly Per Capita Expenditure) at Current Prices:**
  - **Rural**: ₹4,122 (2023-24) vs. ₹3,773 (2022-23).
  - **Urban**: ₹6,996 (2023-24) vs. ₹6,459 (2022-23).
- **Urban-Rural Consumption Gap:**
  - Declined to **70% in 2023-24** from **71% in 2022-23** and **84% in 2011-12**.
- **State-wise Trends:**
  - **Odisha (14%)** saw the highest increase in rural MPCE, while **Punjab** (13%) saw the highest rise in urban MPCE.
  - **Kerala recorded the lowest urban-rural MPCE gap (18%)**, while Jharkhand had the highest (83%).

2. **Decline in Consumption Inequality:**
   - **Gini Coefficient** (measure of consumption inequality) declined:
     - **Rural India**: 0.237 (2023-24) vs. 0.266 (2022-23).
     - **Urban India**: 0.284 (2023-24) vs. 0.314 (2022-23).
   - **All 18 major states** recorded a decline in consumption inequality.
3. **Share of Expenditure on Food and Non-Food Items:**
   - **Rural Areas**: **47% of MPCE spent on food**, with highest expenditure on beverages (9.84%), milk (8.44%), and vegetables (6.03%).
   - **Urban Areas**: **40% of MPCE spent on food**, highest on beverages (11.09%), milk (7.19%), and vegetables (4.12%).
   - **Non-food expenditure** dominated by transport, medical expenses, durable goods, and rent.
4. **Variation in MPCE Across Social Groups:**
   - **Highest MPCE among 'Others' category**, followed by OBCs, SCs, and STs.
   - **MPCE for STs increased** from ₹3,016 (rural) and ₹5,414 (urban) in 2022-23 to **₹3,363 (rural) and ₹6,030 (urban) in 2023-24**.
5. **Variation in MPCE Across Occupations:**
   - **Highest MPCE in rural areas**: Salaried non-agricultural households (₹5,005).
   - **Highest MPCE in urban areas**: 'Others' category (₹9,159).

Positive Outcomes from the Report:

- **Rising Consumption Levels:** Increased MPCE in all states, indicating improved living standards and economic activity.
- **Reduction in Consumption Inequality:** Declining Gini coefficient suggests better income distribution.
- **Narrowing Urban-Rural Gap:** Indicates rising rural purchasing power, reducing economic disparity.
- **Stronger Impact of Social Welfare Programs:** Higher imputed MPCE shows better access to subsidized goods and services.
- **Better Policy Insights:** Provides updated data for economic planning, poverty measurement, and CPI computation.

Negative Findings from the Report:

- **Persisting Urban-Rural Gap:** Though declining, rural MPCE remains significantly lower than urban MPCE.
- **High Consumption Disparity Across States:** States like Jharkhand and Chhattisgarh still show large urban-rural divides.
- **Limited Growth in Maharashtra & Karnataka:** Lowest increase in MPCE (rural: 3%, urban: 5%), indicating economic stagnation.
- **High Share of Expenditure on Non-Essential Goods:** Rising spending on processed foods and beverages over essential food grains.
- **Vulnerable Social Groups Still Lagging:** STs and SCs continue to have lower MPCE compared to OBCs and General category.

Way Ahead:

- **Targeted Rural Economic Growth:** Enhance employment opportunities, infrastructure, and digital connectivity to boost rural income.
- **Bridging State-Level Disparities:** State-specific interventions for states with high urban-rural MPCE gaps.
- **Sustainable Consumption Pattern:** Promote balanced spending on essentials, healthcare, and savings.
- **Strengthening Social Welfare Programs:** Expand direct benefit transfers (DBT) and rural livelihood missions to further reduce inequality.
- **Data-Driven Policy Formulation:** Utilize HCES data for poverty alleviation, inflation control, and inclusive economic growth.

Conclusion:

The Household Consumption Expenditure Survey 2023-24 reflects positive economic trends, including rising MPCE, declining consumption inequality, and narrowing urban-rural gaps. However, persistent regional and social disparities high-

light the need for targeted policy interventions. Leveraging HCES insights can drive inclusive growth, ensuring equitable economic prosperity across India.

PYQ:

1. Consider the following statements: (UPSC-2020)
    1. The weightage of food in Consumer Price Index (CPI) is higher than that in Wholesale Price Index (WPI).
    2. The WPI does not capture changes in the prices of services, which CPI does.
    3. The Reserve Bank of India has now adopted WPI as its key measure of inflation and to decide on changing the key policy rates.

    Which of the statements given above is/are correct?
    a) 1 and 2 only
    b) 2 only
    c) 3 only
    d) 1, 2 and 3

    Answer: a)

4. TEXTILE INDUSTRY

Context:

Bharat Tex 2025, India's largest global textile event, showcased country's textile advancements and global trade potential, with the Indian government aiming to triple textile exports by 2030.

Overview of India's Textile Sector:

- **6th Largest Exporter:** India holds **8.21% share in global textile trade** (2023-24).
- **Employment Generator:** Provides **direct jobs to 45 million people** and **indirect livelihood to over 100 million**, including rural and women workers.
- **Export Markets:** USA and EU account for **47% of India's textile exports**.
- **Government Initiatives:** ₹10,683 crore allocated under **Production Linked Incentive (PLI) Scheme** to boost manufacturing.

Booming Categories in the Textile Industry:

1. **Technical Textiles:**
    - High-performance textiles used in **aerospace, medical, and infrastructure**.
    - Projected to reach **$300 billion by 2047**.
2. **Sustainable & Organic Textiles:** Rising demand for **eco-friendly fabrics** like organic cotton, bamboo textiles, and biodegradable materials.
3. **Digital & Smart Textiles: AI-driven manufacturing, IoT-based quality control**, and 3D weaving revolutionizing production.
4. **Handloom & Artisanal Textiles:** Government promoting handloom clusters to preserve India's rich **weaving heritage**.
5. **Man-Made Fibre (MMF) and Apparel:** Government focus on **synthetic textiles, MMF apparel, and high-value garments**.

Key Government Schemes Supporting the Textile Sector:

1. **PM MITRA (Mega Integrated Textile Region & Apparel Parks):** 7 mega parks with world-class infrastructure and $10 billion expected investment.
2. **Production Linked Incentive (PLI) Scheme:** ₹10,683 crore incentive for MMF fabrics, technical textiles, and high-value apparel.
3. **Samarth Scheme:** Skilling 10 lakh artisans and textile workers to bridge skill gaps.
4. **Integrated Processing Development Scheme (IPDS):** Support for eco-friendly processing units to meet global environmental standards.
5. **National Handloom Development Programme (NHDP):** Support for handloom weavers, market linkages, and financial assistance.
6. **Raw Material Support Schemes:** Cotton, jute, silk, and wool promotion initiatives to enhance quality and yield.

Challenges Facing India's Textile Industry:

1. **Trade Deficit & Competition:** India faces high import costs of synthetic fibres and tough competition from China, Bangladesh, and Vietnam.

2. **Lack of Technology & Automation:** Slow adoption of AI, robotics, and smart textiles limits productivity.
3. **Environmental Concerns:** Water-intensive production and pollution from dyeing units affect sustainability goals.
4. **Infrastructure Gaps:** Need for modern textile parks, better logistics, and export-oriented clusters.
5. **Skilled Workforce Shortage:** Limited technical training in high-value textiles like technical and MMF-based fabrics.

Way Ahead:

1. **Boosting Export Competitiveness:** Strengthen free trade agreements (FTAs) with key markets like the EU and USA.
2. **Investment in Technology & Automation:** Encourage AI-driven textile manufacturing, automated weaving, and sustainable practices.
3. **Expanding Technical Textiles & MMF Production:** Achieve global leadership in technical textiles through R&D incentives.
4. **Sustainable and Green Manufacturing:** Increase adoption of zero-liquid discharge (ZLD) systems and renewable energy in textile units.
5. **Infrastructure & Policy Reforms:** Accelerate PM MITRA parks, textile hubs, and streamlined regulatory approvals.

Conclusion:

India's textile industry is on the cusp of transformational growth, driven by government support, innovation, and sustainability. Bharat Tex 2025 has reinforced India's position as a global textile hub, with a clear roadmap to achieve ₹9 lakh crore in exports by 2030. With strong policy backing, technological advancements, and skilled workforce development, India is set to redefine the global textile landscape.

PYQ:

1. Analyse the factors for highly decentralised cotton textile industry in India. (UPSC-2013)

5. BIOTECHNOLOGY IN NORTH EAST INDIA

Context:

The Department of Biotechnology (DBT) is driving bioeconomic transformation in North East India through innovation and research.

What is Biotechnology?

- Biotechnology involves **using biological systems, organisms, or derivatives to develop new technologies and products**.
- It enhances **healthcare, agriculture, industrial processes, and environmental sustainability**.

Types of Biotechnology:

- **Medical Biotechnology:** Develops vaccines, gene therapy, and regenerative medicine.
- **Agricultural Biotechnology:** Improves crop yields, pest resistance, and soil health.
- **Industrial Biotechnology:** Creates biofuels, biodegradable plastics, and bio-based chemicals.
- **Environmental Biotechnology:** Focuses on waste management, pollution control, and bioremediation.

Potential of North East India in Harnessing Biotechnology:

- **Rich Biodiversity:** Home to 8,000+ plant species, 850+ medicinal plants, and vast agro-climatic diversity.
- **Indigenous Knowledge:** Tribal communities possess traditional expertise in herbal medicine and organic farming.
- **Agri-Biotech Growth:** Suitable for high-value medicinal crops, organic farming, and sustainable agriculture.
- **Biotech-Based Industry:** Potential for biofuels, essential oils, pharmaceuticals, and processed food industries.

Government Initiatives Driving Biotech Growth in North East India:

- **DBT North Eastern Programme**: Allocates 10% of DBT's budget to the region for biotech development.
- **Twinning R&D Programme**: Established 65+ collaborations benefiting 450+ researchers & 2000+ students.
- **Biotech Hubs:** Set up 126 Biotech Hubs in universities to promote research and training.
- **BLiSS (Biotech Labs in Schools):** Introduced biotechnology education at the secondary level since 2014.
- **Agri-Biotech & Citrus Research:** Developing disease-free crops, medicinal plants, and sustainable farming models.
- **Mobile App for Livestock Management**: Pig Disease Diagnosis Expert System (PDDES) launched for disease detection.
- **Genomics Research in Human Health**: Training scientists in genetics-based disease analysis.

Challenges in Implementing Biotechnology in North East:

- **Limited Infrastructure**: Insufficient biotech labs, R&D facilities, and industrial support.
- **Funding Constraints**: High costs of biotech research and commercial-scale production.
- **Skilled Workforce Shortage**: Lack of trained personnel in cutting-edge biotech fields.
- **Climate Sensitivity**: Erratic weather & environmental factors affect agricultural biotechnology projects.
- **Connectivity Issues**: Remote location hinders market access and tech adoption.

Way Forward for Biotech Growth in North East:

- **Strengthen Research Infrastructure** – Establish advanced biotech parks, incubators, and R&D centers.
- **Enhance Skill Development** – Train local researchers, students, and farmers in biotech applications.
- **Public-Private Partnerships (PPP)** – Encourage industry investment in biotech-based startups and innovation.
- **Focus on Sustainable Biotech** – Promote eco-friendly bio-based industries and conservation projects.
- **Leverage Digital Platforms** – Utilize AI and data-driven solutions for biotech advancements.

Conclusion:

With sustained government support, research collaborations, and skill-building programs, the region can emerge as a leading bioeconomy hub. By bridging the gap between tradition and technology, North East India is setting a model for sustainable and inclusive development.

PYQ:

1. How can biotechnology help to improve the living standards of farmers? (UPSC 2019)

6. QUALITY OF PUBLIC EXPENDITURE

Context:

The Reserve Bank of India (RBI) recently released a study on the "Quality of Public Expenditure" (QPE) index, highlighting improvements in government spending efficiency since 1991.

- The report underscores the positive impact of fiscal discipline and increased capital expenditure on India's economic growth and social development.

What is Socio-Economic Expenditure?

Socio-economic expenditure refers to government spending aimed at improving social and economic outcomes, such as education, healthcare, infrastructure, and welfare schemes. It includes:

1. **Capital Expenditure (Capex):** Investments in infrastructure like roads, railways, and ports.
2. **Revenue Expenditure:** Day-to-day spending on salaries, subsidies, and welfare programs.
3. **Development Expenditure:** Long-term investments in education, healthcare, and R&D.
4. **Interest Payments:** Costs incurred due to past borrowings.
5. **Subsidies:** Financial support for essential goods and services like food and fuel.

Data and Trends in India's Socio-Economic Expenditure:

1. **Capital Outlay to GDP Ratio:** Increased from 1.5% in 2000 to 2.5% in 2023, reflecting higher infrastructure spending.
2. **Revenue Expenditure to Capital Outlay Ratio:** Declined from 8:1 in 2000 to 5:1 in 2023, indicating better spending quality.
3. **Development Expenditure to GDP Ratio:** Rose from 6% in 2000 to 8% in 2023, driven by investments in health and education.
4. **Interest Payments to Total Expenditure Ratio:** Fell from 25% in 2000 to 20% in 2023 due to fiscal consolidation.
5. **State-Level Spending:** States' development expenditure increased post-14th Finance Commission recommendations, with higher fiscal devolution.

Analysis: Positive Outcomes:

1. **Economic Growth**: Higher capex boosted GDP growth, averaging 6.5% annually since 2000.
2. **Infrastructure Development:** Improved road, rail, and port connectivity enhanced trade and mobility.
3. **Social Indicators:** Increased spending on health and education improved literacy (77.7% in 2023) and life expectancy (70 years).
4. **Fiscal Discipline:** FRBM Act (2003) reduced fiscal deficits, stabilizing debt-to-GDP ratios.
5. **Crisis Management:** Counter-cyclical spending during the 2008 Global Financial Crisis and COVID-19 mitigated economic shocks.

Challenges to Quality of Public Expenditure:

1. **Revenue Deficit:** Persistent revenue deficits (3.3% of GDP in 2023) limit funds for capex.
2. **Freebies and Subsidies:** Rising populist measures strain fiscal resources.
3. **Inefficient Spending:** Leakages in welfare schemes like MGNREGA and PDS reduce effectiveness.
4. **Debt Burden:** High interest payments (20% of total expenditure) constrain developmental spending.
5. **State-Level Disparities:** Uneven fiscal capacity among states affects equitable development.

Way Ahead:

1. **Boost Capex:** Increase capital expenditure to 3% of GDP to sustain infrastructure growth.
2. **Rationalize Subsidies:** Implement direct benefit transfers (DBT) to reduce leakages.
3. **Fiscal Federalism:** Strengthen state finances through higher devolution and grants.
4. **Monitor Spending:** Use technology for real-time tracking of expenditure outcomes.
5. **Reform FRBM Act:** Focus on debt-to-GDP targets and flexible deficit limits during crises.

Conclusion:

India's quality of public expenditure has improved significantly since 1991, driven by fiscal discipline and higher capex. However, challenges like revenue deficits and inefficient spending persist. By rationalizing subsidies, boosting capex, and strengthening fiscal federalism, India can ensure sustainable and inclusive growth.

PYQ:

1. What is the meaning of the term 'tax expenditure'? Taking housing sector as an example, discuss how it influences the budgetary policies of the government. (10 M) [UPSC 2013]

7. SURVEILLANCE CAPITALISM

Context:

Surveillance capitalism is reshaping digital economies, with big tech companies like Google, Meta, and Amazon monetizing user data, raising concerns over privacy, autonomy, and state surveillance.

What is Surveillance Capitalism?

- An economic model where tech corporations collect, analyze, and monetize personal data to influence behaviour.
- Described by **Shoshana Zuboff (2018)** as a **new economic order** that **extracts human experience for profit**.

How It Works & Characteristics:

- **Behavioral Data Extraction:** Companies track every click, search, and purchase, creating detailed digital profiles.
- **Predictive Analytics:** AI-driven algorithms forecast user actions and modify behaviors for commercial gain.
- **Instrumentarian Power: Data**-driven control mechanisms subtly shape choices, rather than using force or coercion.
- **Social Physics Model:** Analyses massive datasets to predict and influence collective behaviours
- **State-Corporate Alliance:** Governments rely on private tech giants for intelligence gathering and surveillance, reducing public accountability.

How It Differs from Traditional Capitalism?

- **Focus Shift:**
  - **Industrial Capitalism:** Depended on **physical labor & material production**.
  - **Surveillance Capitalism:** Profits from **behavioral data mining**.
- **Monetization of Human Experience:** Unlike goods & services-based models, this system commodifies personal data.
- **Behavioral Control:** Algorithms subtly nudge users toward decisions benefiting corporations.
- **Economic & Political Influence:** Unlike traditional models, corporate interests are closely linked with state policies.
- **Continuous Data Harvesting:** Personal data is collected 24/7, affecting consumer choices, elections, and policymaking.

Negative Impacts of Surveillance Capitalism:

- **Erosion of Privacy:** Companies track and monetize personal data without user consent (e.g., Cambridge Analytica Scandal, 2014).
- **Manipulation & Loss of Autonomy:** AI algorithms influence choices in shopping, voting, and opinions, limiting individual freedom.
- **Threat to Democracy:** Targeted political ads influence elections, undermining democratic integrity (e.g., 2016 U.S. Presidential Elections).

- **Cybersecurity Risks & Data Breaches:** Large-scale data breaches expose users to identity theft & financial fraud.
- **State Surveillance & Civil Liberties:** Governments use tech firms' data for mass surveillance, limiting free speech and suppressing dissent.

Measures to Counter Surveillance Capitalism:

- **Strengthening Data Protection Laws:** EU's GDPR & India's Digital Personal Data Protection Act (DPDPA, 2023) ensure user control over personal data.
- **Regulating Big Tech:** Governments must implement antitrust laws to curb monopolistic data exploitation.
- **Enhancing Public Awareness:** Digital literacy programs can help users understand privacy settings and data usage policies.
- **Tech Accountability & Algorithm Transparency:** Companies should be mandated to disclose data collection and AI decision-making processes.
- **Banning Data Commodification:** Prohibit business models that rely on selling behavioural data, similar to restrictions on child data usage (COPPA, U.S.).

Conclusion:

Surveillance capitalism is shaping economies, politics, and personal freedoms, making privacy a global concern. Governments must enforce strict regulations, promote ethical AI, and educate users about data privacy rights. Only a global framework on digital rights can ensure autonomy and safeguard democracy in the digital age.

PYQ:

1. How has the development of Global Capitalism changed the nature of Socialist economies and developing societies? (UPSC-2017)

8. TIME USE SURVEY (TUS) 2024

Context:

The Time Use Survey (TUS) 2024, conducted by the Ministry of Statistics & Programme Implementation (MoSPI), revealed a rise in women's participation in paid employment and caregiving activities.

About *Time Use Survey (TUS) 2024*:

Key Data Insights & Important Findings from TUS 2024:

1. **Women's Participation in Employment & Unpaid Work:**
   - **25% of women** aged **15-59 years** participated in employment-related activities (up from **21.8% in 2019**).
   - **Men spent 132 minutes more than women** on employment activities (473 minutes vs. 341 minutes).
   - **Women spent 201 minutes more than men** in unpaid domestic services (289 minutes vs. 88 minutes).
2. **Caregiving & Domestic Work:**
   - **41% of women** participated in caregiving (vs. **21.4% of men**).
   - Women spent **137 minutes/day** on caregiving (men: **75 minutes/day**).
   - Time spent on **unpaid domestic work for women reduced** from **315 minutes in 2019 to 305 minutes in 2024**.
3. **Learning & Skill Development:**
   - **89.3% of children (6-14 years)** participated in learning activities, spending **413 minutes/day**.
   - Time spent on learning activities **declined for both genders** (males: **415 minutes**, females: **413 minutes**).
4. **Leisure, Mass Media & Social Activities:**
   - **11% of daily time** was spent on **culture, leisure, mass media, and sports** (up from **9.9% in 2019**).
   - Time spent on **socializing and communication** remained **constant for women** (139 minutes), while men's participation **decreased from 147 minutes to 138 minutes**.
5. **Self-Care & Maintenance:**
   - Individuals aged **6+ years** spent **708 minutes/day** on self-care activities.
   - Women spent **706 minutes/day**, while men spent **710 minutes/day** on self-care.

ABOUT TIME USE SURVEY (TUS):

WHAT IS THE TIME USE SURVEY (TUS)?

- The Time Use Survey (TUS) is a national-level survey that measures how people allocate their time across various daily activities, including paid, unpaid, and social activities.
- It provides comprehensive data on time spent in employment, unpaid caregiving, domestic work, learning, leisure, and self-care activities.

RELEASED BY:

- Conducted by the National Statistics Office (NSO) under the Ministry of Statistics & Programme Implementation (MoSPI).

PERIOD OF SURVEY:

- First TUS (2019): Conducted between January – December 2019.
- Second TUS (2024): Conducted between January – December 2024

AIM OF THE SURVEY:

- Measure the participation of men and women in paid and unpaid activities.
- Analyze time spent on unpaid caregiving, domestic services, and voluntary work.
- Provide insights into learning, socializing, leisure, and self-care activities.
- Support policy formulation by capturing gender disparities and time allocation patterns.

·KEY FEATURES & UNIQUENESS

Captures unpaid work: Measures time spent on unpaid household chores, caregiving, and volunteer work, which is often overlooked in traditional surveys.	**Gender-specific analysis:** Highlights differences in time use patterns between men and women.	**Detailed time tracking:** Uses 30-minute time slots to record multiple activities in a day.	**International Standards:** Aligns with global best practices followed by Australia, Japan, USA, China, South Korea, and New Zealand.	**Large sample size:** Covers 1,39,487 households and 4,54,192 individuals aged 6 years and above across rural and urban India.	**Data Collection via CAPI:** Uses Computer-Assisted Personal Interviews (CAPI) for accurate data recording.

Analysis of the Report:

A. Positive Trends in the Report:

- **Increase in Women's Workforce Participation:** Women's employment rate **rose to 25%** from **21.8% in 2019**, showing a shift towards **paid work**.
- **Reduction in Unpaid Domestic Work for Women:** Women's **unpaid domestic workload decreased by 10 minutes/day**, indicating **progress towards gender balance**.
- **More Recognition of Caregiving Responsibilities: Both men and women** saw **higher participation in caregiving activities**, acknowledging its **importance within families**.
- **Rise in Cultural & Leisure Activities:** Time spent on **culture, mass media, and sports rose to 11%** of daily time from **9.9% in 2019**, improving **work-life balance**.
- **Higher Participation in Learning Activities Among Children: 89.3% of children (6-14 years)** engaged in **learning activities**, spending **413 minutes/day**, showing **strong educational engagement**.

B. Negative Aspects & Challenges in the Report:

- **Persistent Gender Disparity in Household Work:** Women still spent **201 minutes more than men** on unpaid domestic work, reflecting **deep-rooted gender roles**.
- **Decline in Learning Time for Youth:** Both men and women **spent less time on learning activities** (males: **-11 minutes**, females: **-10 minutes**), indicating **possible educational setbacks**.
- **Limited Male Participation in Caregiving:** Only **21.4% of men** participated in caregiving (vs. **41% of women**), reinforcing the **burden of care on women**.
- **Rural-Urban Divide in Employment & Domestic Work: 16.8% of people in rural areas** engaged in self-production activities (vs. 6.2% in urban areas), highlighting economic inequalities.
- **Increase in Employment Not Equal to Gender Parity:** Despite **higher workforce participation**, women still spent **132 minutes less than men** in employment-related activities.

Way Ahead:

1. **Promoting Gender Equality in Domestic Responsibilities:** Encourage equal sharing of unpaid work through policy interventions and awareness programs.
2. **Enhancing Women's Workforce Participation:** Introduce flexible work policies, childcare support, and skill development programs to increase women's employment rate.
3. **Revitalizing Learning & Skill Development:** Strengthen educational infrastructure, promote vocational training, and boost digital learning to improve learning time.
4. **Reducing Rural-Urban Economic Disparities:** Implement rural employment schemes, digital literacy programs, and financial inclusion initiatives to bridge the economic gap.

Conclusion:

While women's workforce participation has improved, gender disparities in unpaid domestic work and caregiving remain a concern. Addressing these inequalities through policy interventions and social awareness will be key to achieving inclusive development and gender parity.

PYQ:

2. Distinguish between 'care economy' and 'monetized economy'. How can the care economy be brought into a monetized economy through women empowerment? (UPSC-2023)

Topics: Major crops cropping patterns in various parts of the country, different types of irrigation and irrigation systems storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers.

9. REDUCING INDIA'S FERTILIZER DEPENDENCE

Context:

The Indian government is strategizing to reduce the consumption of high-analysis fertilizers like Urea, Di-Ammonium Phosphate (DAP), and Muriate of Potash (MOP) due to their heavy import dependence and economic burden.

Status of Urea, DAP, and Potash in India:

1. **Urea:**
   - **Production Capacity:** India produces 31.4 million tonnes (MT) of Urea (2023-24), up from 22 MT in 2011-12.
   - **Import Dependency:** Imports have declined from 9.8 MT (2020-21) to 7 MT (2023-24) due to increased domestic production.
   - Economic Survey 2023-24 highlights that energy-efficient urea plants have improved productivity.
2. **DAP:**
   - **Import Dependence:** India imports both finished DAP and raw materials from Saudi Arabia, Morocco, Jordan, and China.
   - **High Cost:** The import cost of DAP is $636 (₹55,150) per tonne, while production costs exceed ₹65,000 per tonne.
   - **Subsidy Burden:** Government caps DAP price at ₹27,000 per tonne, but the subsidy needed to cover costs is high.
3. **Muriate of Potash (MOP):**
   - **100% Imported:** India lacks mineable potash reserves, relying on Canada, Russia, and Jordan for supply.
   - **Import Costs:** Rising global potash prices have inflated import bills, increasing the need for alternatives.

Consequences of Urea, DAP, and Potash Overuse:

- **Economic Impact:**
  - **Rising Import Bill:** Fertilizer imports put a heavy burden on foreign exchange reserves, with **₹1.75 lakh crore spent on fertilizer subsidies (2023-24)**.
  - **Subsidy Drain:** The government **spends ₹1,500 per bag of Urea**, making it unsustainably cheap for farmers.
  - **Price Volatility:** India is vulnerable to international fertilizer price fluctuations, affecting affordability.
- **Environmental Impact:**
  - **Soil Degradation:** Overuse of Urea and DAP lowers organic carbon content, reducing soil fertility.
  - **Groundwater Contamination:** Excess nitrogen from Urea leaches into water bodies, leading to nitrate pollution.
  - **Crop Imbalance:** Continuous use affects microbial diversity, leading to low productivity over time.

- **Governance Challenges:**
  - **Subsidy Burden:** Rising fiscal costs make it difficult for the government to sustain high subsidies.
  - **Policy Gaps:** The absence of strict regulations on nutrient application causes imbalanced soil nutrition.
  - **Black Marketing:** Cheap subsidized fertilizers are diverted to non-agricultural use, increasing shortages.

Potential Substitutes for Urea, DAP, and MOP:

1. **Ammonium Phosphate Sulphate (APS - 20:20:0:13):**
   - **Better Alternative: Provides nitrogen (N), phosphorus (P), and sulphur (S),** unlike DAP, which lacks sulphur.
   - **Reduces Dependence:** Requires **less phosphoric acid**, **cutting import costs** significantly.
   - **Market Growth:** APS sales **rose by 32.4%**, replacing DAP in several regions.
2. **Nano Urea & Nano DAP:**
   - **Increases Nutrient Efficiency:** More effective nutrient absorption than traditional Urea.
   - **Cost-Effective:** Requires lower application rates, reducing fertilizer consumption.
   - **Trials & Adoption:** Indian Farmers Fertiliser Cooperative (IFFCO) introduced Nano Urea, showing 15-20% yield improvement.
3. **Single Super Phosphate (SSP - 16% P, 11% S):**
   - **Sulphur-Rich Alternative:** Helps in oilseed, pulse, and vegetable production.
   - **Low Cost:** More affordable than DAP, boosting adoption among small farmers.
4. **Biofertilizers & Organic Manure:**
   - **Reduces Chemical Usage:** Improves soil health without harming the environment.
   - **Government Promotion:** PM-PRANAM scheme promotes alternative fertilizers.
5. **NPKS Complex Fertilizers (10:26:26:0, 12:32:16:0):**
   - **Balanced Nutrient Composition:** Meets crop-specific needs while reducing MOP & DAP dependence.
   - **Market Growth:** Sales of NPKS fertilizers increased to 14 MT in 2024-25 from 7.3 MT in 2013-14.

Effectiveness of Substitutes:

- **Reduces Import Costs:** Substitutes like APS and Nano Urea cut foreign exchange outflows.
- **Improves Soil Health:** Balanced fertilizers prevent soil degradation and enhance productivity.
- **Promotes Sustainability:** Organic and biofertilizers improve ecological balance.
- **Enhances Crop Yield:** Trials show better absorption rates, improving efficiency.
- **Government Policy Support:** Initiatives like PM-PRANAM and Nutrient-Based Subsidy (NBS) promote alternatives.

Way Ahead:

- **Balanced Fertilization Awareness:** Conduct soil health campaigns to educate farmers on nutrient efficiency.
- **Subsidy Reforms:** Shift subsidy focus to APS, Nano Urea, and complex fertilizers instead of DAP/Urea.
- **Technology-Driven Agriculture:** Encourage AI-based fertilizer application using Microsoft FarmVibes AI.
- **Strengthening Domestic Production:** Invest in indigenous fertilizer R&D and biofertilizer manufacturing.
- **Policy Integration:** Align fertilizer policy with agriculture and climate policies to achieve long-term sustainability.

Conclusion:

India's dependence on imported Urea, DAP, and Potash is unsustainable, both economically and environmentally. Shifting towards balanced fertilizers like APS, Nano Urea, and organic alternatives is critical for long-term agricultural sustainability. Government initiatives, policy support, and farmer awareness will play a crucial role in this transition.

PYQ:

1. How do subsidies affect the cropping pattern, crop diversity and the economy of farmers? What is the significance of crop insurance, minimum support price and food processing for small and marginal farmers? (UPSC-2017)

Topics: Land reforms in India.

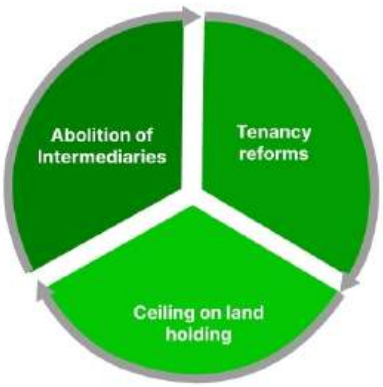
10. ZAMINDARI ABOLITION

Context:

The article discusses the legal and political challenges surrounding the abolition of the Zamindari system in independent India, particularly the landmark Supreme Court case of **Sankari Prasad vs. Union of India (1951)** that upheld the First Constitutional Amendment enabling land reforms.

About Zamindari System:

What was the Zamindari System?



- **Introduction**: Introduced by **Lord Cornwallis in 1793 under the Permanent Settlement Act**, the Zamindari system made landlords (zamindars) **intermediaries** responsible for collecting land revenue from peasants and paying it to the British government.
- **Revenue Collection: 89%** of collected revenue went to the British, and zamindars retained **11%**.
- **Ownership Rights:** Zamindars had absolute control over the land and could lease, sell, or transfer it.
- **States Practicing Zamindari:** The system was prevalent in **West Bengal, Bihar, Uttar Pradesh, Madhya Pradesh, Odisha**, and parts of **Tamil Nadu and Andhra Pradesh**.
- **Social Impact:** Peasants were subjected to **high rents, forced labor (begar), and frequent evictions**, creating widespread rural distress.

Issues Surrounding the Zamindari System:

1. **Exploitation of Peasants:** Peasants had **no ownership rights** and were forced to pay exorbitant rents, often falling into a cycle of debt.
2. **Agricultural Decline:** Zamindars focused on revenue collection rather than agricultural productivity, leading to **stagnation in farm output**.
3. **Social Disparities:** The system widened the gap between **landed elites and landless laborers**, fueling class conflicts.
4. **Legal Challenges to Abolition:** Zamindars contested the **Zamindari Abolition Acts** in court, citing violations of fundamental rights **(Right to Property under Article 19 and 31)**.

Major Court Cases Related to Land Reforms in India:

- **Sankari Prasad vs. Union of India (1951)**
  - **Issue:** Challenged the First Constitutional Amendment that placed Zamindari Abolition Acts under the **Ninth Schedule** to **protect them from judicial review**.
  - **Outcome:** Supreme Court **upheld** the amendment, ruling that **Parliament had the power to amend the Constitution, including Fundamental Rights**.
- **Kameshwar Singh vs. State of Bihar (1952)**
  - **Issue:** Bihar Zamindari Abolition Act challenged on the grounds of **inadequate compensation** for landlords.
  - **Outcome:** Patna High Court **struck down the law**, but later amendments allowed land reforms to proceed.
- **Sajjan Singh vs. State of Rajasthan (1965)**
  - **Issue:** Questioned the validity of placing land reform laws under the **Ninth Schedule** to escape judicial review.
  - **Outcome:** Supreme Court ruled that Parliament had the power to amend Fundamental Rights.
- **I.C. Golaknath vs. State of Punjab (1967)**
  - **Issue:** Whether Parliament could amend Fundamental Rights, including the **Right to Property**.
  - **Outcome:** Supreme Court **reversed its earlier stance**, ruling that Fundamental Rights **could not be amended**.
- **Kesavananda Bharati vs. State of Kerala (1973)**
  - **Issue:** Whether Parliament's power to amend the Constitution was **absolute**.
  - **Outcome:** Supreme Court introduced the **Basic Structure Doctrine**, stating that **amendments cannot violate the fundamental framework of the Constitution**. However, the Right to Property was later removed as a fundamental right.

Impact of Zamindari Abolition in India:

- **Ownership to Tenants:** Over **20 million peasants** became landowners, leading to **rural empowerment**.
- **End of Feudal Exploitation:** Reduced arbitrary evictions and excessive rents.
- **Increased Agricultural Productivity:** Farmers had greater incentives to invest in **modern techniques** and improve yield.
- **Reduced Bonded Labor**: The practice of **forced labor (begar)** significantly declined.
- **Social Justice & Economic Equity**: Helped bridge the gap between the **landed elite and landless farmers**, aligning with **Directive Principles of State Policy (DPSP)**.

Challenges & Limitations:

- **Evasion by Zamindars:** Many landlords distributed land among **family members** or created **religious trusts** to avoid

state acquisition.

- **Rise of New Intermediaries:** Wealthy farmers subleased land to poorer tenants, creating **new hierarchies** in land-holding.
- **Poor Implementation:** Many states, including **Bihar and Uttar Pradesh**, failed to fully enforce land redistribution due to **political and bureaucratic resistance**.
- **Legal Loopholes:** Judicial interventions often **diluted** land reform efforts by favouring landlords.

Conclusion:

The abolition of the Zamindari system was a landmark step in post-independence agrarian reforms, promoting social justice and economic equity. However, challenges in implementation and judicial roadblocks hindered full realization of its objectives. While land reforms empowered millions of farmers, loopholes in execution allowed vested interests to retain land, necessitating stronger legal enforcement to ensure true agrarian justice.

PYQ:

1. Establish relationship between land reforms, agricultural productivity and elimination of poverty in the Indian economy. Discuss the difficulties in designing and implementation of agriculture – friendly land reforms in India. (UPSC-2013)

Topics: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

11. NUCLEAR FUSION REACTOR

Context:

China's Experimental Advanced Superconducting Tokamak (EAST) achieved a record 1,066 seconds of sustained plasma operation at nearly 70 million degrees Celsius.

What is the EAST Reactor?

- **EAST (Experimental Advanced Superconducting Tokamak)** is a nuclear fusion research reactor designed to test and improve **magnetic confinement** for controlled fusion.
- It serves as a **testbed for ITER**, helping scientists develop technologies for **sustained plasma stability**.

Key Features of EAST Reactor:

- **Superconducting Magnets:** Uses both toroidal and poloidal magnetic fields to confine plasma efficiently.
- **High-Temperature Plasma:** Achieves temperatures over 100 million degrees Celsius to facilitate fusion reactions.
- **Longer Plasma Confinement:** Designed to sustain steady-state high-confinement plasma for extended durations.
- **Supports Global Fusion Research:** Functions as an open testing platform for international collaboration in fusion technology.
- **Integration with ITER:** Provides crucial data for ITER's upcoming fusion reactor development.

Recent Achievements of EAST Reactor:

- **Set a world record** by sustaining **plasma for 1,066 seconds** (January 2025), improving upon the **403 seconds achieved in 2023**.
- **Doubled heating system power output**, ensuring stable plasma operation for extended periods.
- **Demonstrated improvements in superconducting magnet efficiency**, a critical step toward achieving self-sustaining nuclear fusion.

ITER and EAST's Impact on It:

- **ITER (International Thermonuclear Experimental Reactor)** is a **multinational fusion project** aiming to create a self-sustaining fusion reaction.
- EAST's advancements in **plasma confinement, superconducting magnet technology, and extended operational stability** directly contribute to ITER's progress.
- **China contributes 9% of ITER's construction and operation**, leveraging EAST's findings to refine ITER's reactor design.
- Delays and cost overruns at ITER highlight the **importance of EAST's ongoing success** in accelerating fusion energy research.

Challenges to Nuclear Fusion Development:

- **High Energy Consumption:** Fusion requires extreme temperatures and massive energy input to sustain plasma

reactions.

- **Tritium Scarcity:** The lack of natural tritium deposits poses challenges for large-scale fusion fuel supply.
- **Technological Complexities:** Maintaining plasma stability and preventing heat loss remains a significant hurdle.
- **Financial Constraints:** Projects like ITER face budget overruns (over €18 billion spent) and delayed timelines (first plasma expected in 2033).
- **Infrastructure Requirements:** Building and maintaining a fusion reactor requires cutting-edge facilities and highly specialized materials.

Way Ahead for Fusion Energy:

- **Enhancing Magnetic Confinement:** Further research into tokamak optimization for improved plasma stability.
- **Developing Alternative Fuels:** Exploring helium-3 and boron fusion to reduce dependence on tritium.
- **Advancing Stellarators & Laser Fusion:** Investigating stellarators and inertial confinement fusion as potential alternatives.
- **International Collaboration:** Strengthening global partnerships in fusion research, particularly between China, EU, India, and the US.
- **Accelerating Commercialization:** Encouraging private sector investment to bring fusion technology to practical use faster.

Conclusion:

EAST's success marks a critical breakthrough in nuclear fusion research, bringing the world closer to a sustainable energy future. While ITER faces challenges, EAST's advancements provide valuable insights for developing a self-sustaining fusion reactor. Continued global collaboration, technological innovation, and funding support will determine the future of fusion energy.

PYQ:

1. With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy. (UPSC-2018)

Topics: Awareness in the fields of IT, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

12. AI-DRIVEN GENETIC TESTING

Context:

AI-driven genetic testing is revolutionizing genomic research and precision medicine, enabling rapid analysis of vast genetic datasets.

1. **AI-Powered Genome Sequencing:** Machine Learning (ML) deciphers **DNA patterns**, identifying **mutations,** genetic disorders, and disease risks.
   E.g. John's Hopkins researchers identified **1,200 junk DNA elements** linked to tumors using AI in 2024.
2. **Deep Learning for Mutation Detection:** AI models analyze **gene variations** to detect potential **cancerous mutations** and **hereditary diseases**.
   E.g. Gene Box AI predicts genetic predispositions with 98% accuracy.
3. **Personalized Genetic Profiling:** AI integrates **gene-environment interactions**, offering **tailored health recommendations** based on **genetic traits**.
   E.g. AI-driven reports in consumer genetic testing services.
4. **CRISPR Gene Editing Optimization:** AI assists **CRISPR-Cas9** precision editing by predicting off-target effects, improving **gene therapy success rates**.
   E.g. AI models enhance CRISPR accuracy in genetic disorder treatments.
5. **Predictive Genetic Risk Analysis:** AI forecasts **disease risks** (e.g., Alzheimer's, diabetes) based on **genetic markers**, guiding **early prevention strategies**.
   E.g. 80 genes linked to Alzheimer's identified using AI.

Significance of AI in Genetic Testing:

1. **Faster and Cost-Effective Analysis:** AI reduces **genome sequencing time** from weeks to hours, cutting costs by 50%.
2. **Enhanced Diagnostic Accuracy:** AI improves **mutation detection** by analyzing **large** genomic datasets, increasing early disease identification.
3. **Advancement in Drug Discovery:** AI accelerates **precision medicine** by identifying gene-drug interactions, leading

to personalized treatments.

4. **Expansion of Preventive Healthcare:** AI aids in **early genetic screening**, reducing lifestyle disease burdens through targeted interventions.
5. **Integration with Digital Health Platforms:** AI-driven **genetic reports** integrate with wearable **tech & electronic health records (EHRs)** for real-time monitoring.

Limitations of AI-Driven Genetic Testing:

1. **Data Privacy and Security Risks:** Genetic data breaches, like **23andMe (2023)**, expose **sensitive patient information** to cyber threats.
   E.g. 6.9 million genetic profiles leaked, leading to **identity theft risks**.
2. **Ethical and Psychological Concerns:** AI predictions on **mental health or genetic predispositions** may cause **anxiety and discrimination**.
   E.g. Genetic tests for depression lack clear clinical guidelines.
3. **Risk of Algorithmic Bias:** AI models trained on **limited ethnic/genetic datasets** may yield **inaccurate predictions for diverse populations**.
   E.g. AI-based genetic studies are **90% Euro-centric**, limiting global applicability.
4. **Uncertainty in Clinical Relevance:** AI identifies **genetic variations**, but not all **mutations lead to diseases**, causing **misinterpretations**.
   E.g. 40% of genetic markers for Alzheimer's are still under research.
5. **Regulatory and Compliance Gaps:** AI in genetics lacks **strict regulations** under **HIPAA laws**, leading to **unmonitored data usage**.
   E.g. Genetic startups operate in **legal grey zones** regarding **data ownership**.

Way Forward for AI in Genetic Testing:

1. **Strengthening Data Protection Laws:** Governments must enforce **strict regulations** on genetic data security to prevent **breaches and misuse**.
   E.g. EU's GDPR mandates explicit consent for genetic data processing.
2. **Developing Inclusive AI Models:** Expanding **genetic datasets** to **diverse populations** ensures **fair and accurate predictions**.
   E.g. Global Genome Initiative aims to include genetic diversity from all continents.
3. **Enhancing AI Transparency and Explainability:** AI models must be **interpretable**, allowing **clinicians & patients** to understand **genetic insights clearly**.
   E.g. Explainable AI frameworks help in validating genetic test results.
4. **Public Awareness and Genetic Literacy:** Educating users on **genetic testing limitations**, **ethical concerns**, and **data risks** promotes **informed decision-making**.
   E.g. Government-backed genetic awareness programs to debunk myths.
5. **Robust Clinical Validation Before Adoption:** AI-driven genetic findings should undergo **rigorous clinical trials** before integration into **mainstream medicine**.
   E.g. AI-based cancer mutation tests require FDA approvals before usage.

Conclusion:

AI-driven genetic testing **e**nhances diagnostic precision, speeds up genome analysis, and supports **preventive healthcare**. However, **privacy risks, ethical concerns, and regulatory gaps** remain major hurdles. By **enforcing stricter data security measures and improving AI inclusivity**, genetic AI can be a transformative force in medicine while ensuring ethical and safe implementation.

PYQ:

1. What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of the society? (UPSC-2021)

13. INDIA'S AI INDEPENDENCE: SHOULD WE BUILD OUR OWN FOUNDATIONAL MODEL?

Context:

As AI becomes a strategic and economic driver, India must decide whether to build its own foundational AI model or rely on foreign ones.

Why is a Sovereign Foundational AI Model Needed?

1. **Technological Sovereignty**: AI models are primarily controlled by U.S. firms like OpenAI, Google, and Meta. Future sanctions, similar to U.S. restrictions on Huawei's AI chips, could limit India's access.
2. **Dependence on Foreign AI**: Proprietary models like GPT-4 require licensing, making India reliant on external pricing and policy changes, potentially increasing costs for businesses and governance.
3. **India-Specific AI Applications**: A sovereign model can cater to India's diverse linguistic needs (22 official languages, 121 spoken by over 10,000 people).
   E.g. AI for Bharat is already developing Indic language AI tools.
4. **Strategic Economic Growth**: AI is projected to contribute **$500 billion to India's GDP by 2025**. Developing a sovereign model ensures India captures a larger share of this value instead of relying on foreign providers.

Advantages of a Sovereign AI Model

1. **Control Over AI Ethics and Regulations**: India can ensure AI aligns with national interests and cultural values, avoiding biased datasets from Western-trained models.
   E.g. Facial recognition biases in Western AI models often fail to recognize Indian faces accurately.
2. **Long-Term Cost Savings**: Developing a model is expensive, but licensing foreign AI repeatedly costs more in the long run.
   E.g. OpenAI's GPT-4 API charges businesses for every query, making large-scale adoption expensive.
3. **Innovation and Job Creation**: Building AI models can create high-value jobs in machine learning, data science, and chip manufacturing, helping retain talent within India.
   Eg: The AI industry in India is expected to create **2 million jobs by 2030**.
4. **Resilience in Global AI Competition**: Countries like China (Baidu's ERNIE) and the EU (Aleph Alpha) are developing their own AI models to reduce dependency on U.S. firms. India risks falling behind if it does not act.

Challenges in Building a Foundational AI Model

1. **High Costs of Development**: Training a foundational model costs hundreds of millions of dollars.
   E.g. DeepSeek V3's training cost was $5.6 million per run, and Meta's LLaMA-4 is expected to cost **$1 billion**.
2. **Lack of AI-Specific Hardware**: India does not manufacture advanced GPUs like Nvidia H100, essential for AI training.
   E.g. DeepSeek relies on Huawei's Ascend 910C chips, which India currently cannot produce.
3. **Limited AI Research Infrastructure**: India's **R&D spending is 0.7% of GDP**, far lower than the U.S. (3%) and China (2.4%). A lack of high-end research institutes delays AI innovation.
4. **Small Domestic AI Market**: AI automation is not as cost-effective in India due to lower labor costs.
   E.g. In the U.S., AI can replace a $4000/month employee, whereas in India, that cost is only $200/month.
5. **Government Procurement Bottlenecks**: AI research requires risk-taking and iteration, but India's bureaucratic public funding process is slow and risk-averse.
   E.g. Unlike the U.S., where DARPA funds cutting-edge research with high failure rates, India lacks similar mechanisms.

Way Forward

1. **Focus on Applied AI Solutions**: Instead of competing with OpenAI's GPT-4, India should focus on AI for governance, healthcare, and Indic languages.
   E.g. AI for Bharat's IndicTrans2 for local language translation.
2. **Public-Private Collaboration**: Encouraging startups and universities to build on open-weight models can accelerate innovation.
   E.g. DeepSeek modified Meta's LLaMA model instead of building from scratch.
3. **Investment in AI Chip Manufacturing**: Partnering with **TSMC or Samsung** for semiconductor manufacturing and developing **indigenous chip capabilities** will ensure long-term AI independence.
4. **AI-Specific Policy Reforms**: Increasing AI R&D funding and creating a flexible public funding model can encourage innovation.
   E.g. The IndiaAI Mission's **GPU cluster subsidies** are a step in the right direction.
5. **Targeted GPU Resource Allocation**: Government-backed GPUs should be used for high-impact research areas.
   E.g. AI for Bharat's text-to-speech system for Indian languages needs only 500–1000 GPUs for effective results.

Conclusion:

Building a sovereign AI model can strengthen India's technological and economic position, but financial and infrastructural constraints require a strategic approach. Instead of directly competing with U.S. AI giants, India should prioritize applied AI solutions, invest in AI hardware, and foster a strong R&D ecosystem to ensure long-term AI self-reliance.

14. PARIS AI SUMMIT 2025

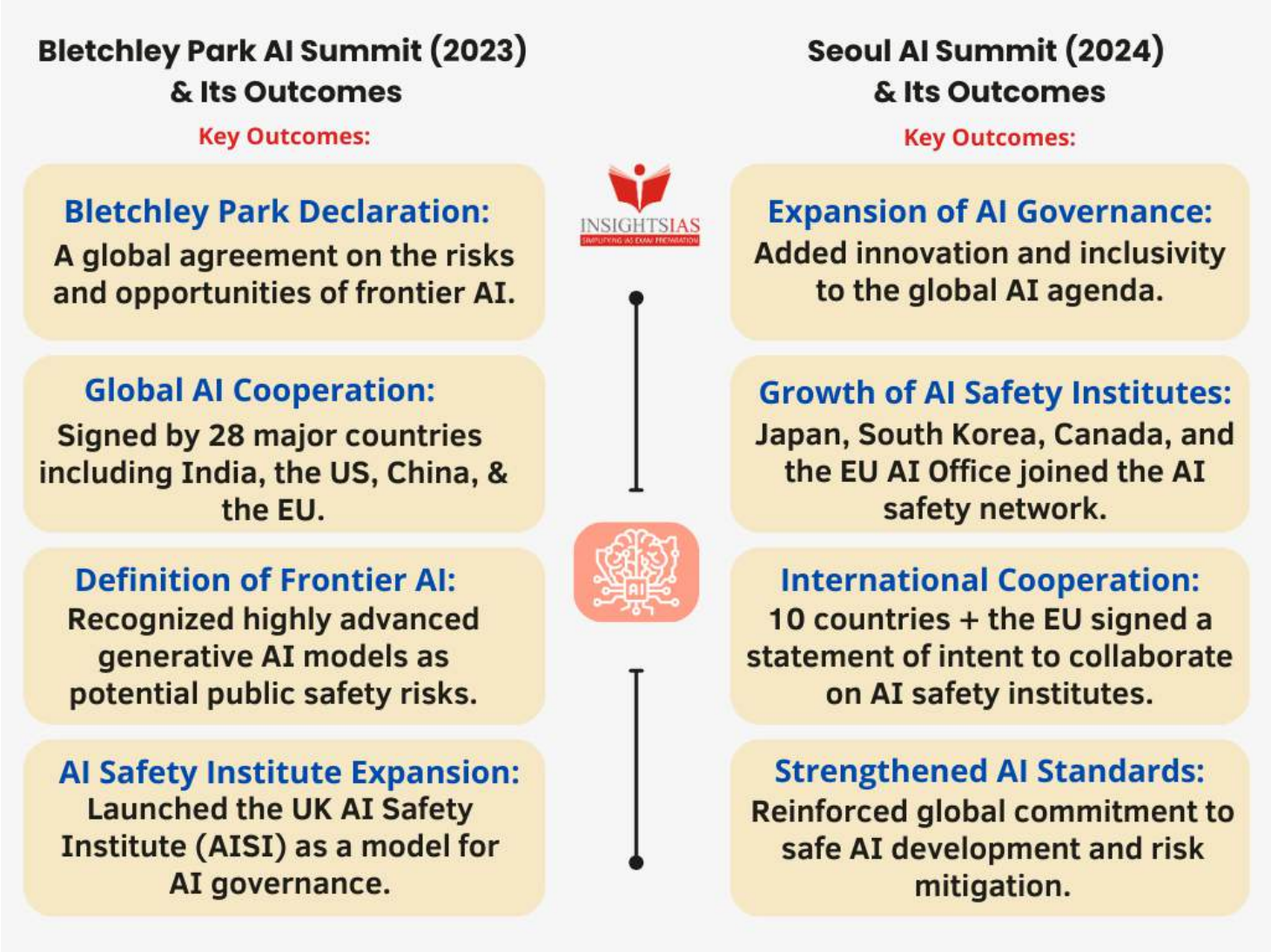
Context:

India, co-chairing the Paris AI Action Summit, seeks to amplify the Global South's voice on AI governance, innovation, and equitable AI access.

About *Paris AI Summit*:

What is the Paris AI Summit?

- The **third global AI safety summit**, following **UK (2023) and South Korea (2024)** meetings.



- Organized by **France**, focusing on AI **safety, ethics, governance, innovation, and economic impact**.
- Attended by **world leaders (US, EU, China, Germany), tech CEOs (OpenAI, Google), and policymakers**.

Significance of the Summit:

- **AI Safety & Governance:** Establishes **norms and risk management** frameworks for AI development.
- **Equitable AI Access:** Addresses **global AI divide**, advocating for **open-source AI** and cross-border collaboration.
- **Economic & Strategic Impact:** Shapes **future of AI-driven industries**, trade policies, and international regulations.
- **Geopolitical Balancing:** Counterbalances **US-China AI dominance**, promoting multilateral cooperation.

***Challenges in Global AI Governance*:**

- **Corporate Monopoly:** AI development remains concentrated in a few **tech giants** (OpenAI, Google, DeepSeek).
- **Regulatory Divergence:** The **US, EU, and China** have **conflicting AI policies**, delaying a unified framework.
- **Ethical Concerns:** AI models risk **cultural biases**, misinformation, and economic displacement.
- **Security & Deepfakes:** AI misuse in **cyber warfare, deepfake propaganda, and** surveillance raises global concerns.

Opportunities for India at the AI Summit:

- **Advocacy for Global South:** Push for AI democratization, equitable data access, and AI infrastructure support.

- **Building AI Partnerships:** Expand **tech collaboration with EU, France, and** emerging AI economies.
- **Strategic Leadership:** Strengthen India's role as a **bridge between AI superpowers (US-China)** and developing nations.
- **AI Research & Innovation:** Promote **India's AI Safety Institute**, indigenous AI models, and **public-interest AI**.

Conclusion:

India's co-chairing of the Paris AI Summit is a strategic opportunity to shape global AI governance, foster innovation, and secure AI leadership for the Global South. By advocating for equitable AI access and regulatory frameworks, India strengthens its global AI diplomacy while preparing to host future AI summits.

PYQ:

1. The emergence of the Fourth Industrial Revolution (Digital Revolution) has initiated e-Governance as an integral part of government". Discuss.

Topics: Conservation related issues, environmental pollution and degradation, environmental impact assessment.

15. SACRED GROVES

Context:

The Supreme Court's December 18, 2024 ruling directs Rajasthan to map and classify sacred groves as forests under the Wildlife Protection Act (WLPA), 1972. This contradicts the Forest Rights Act (FRA), 2006, which upholds community ownership over forest lands instead of government control.

What are Sacred Groves?

- **Community-protected Forest patches** with cultural and ecological significance, conserved through **traditional customs and religious beliefs**.
- Found across **India**, these groves serve as **biodiversity hotspots and water recharge zones**.

The Supreme Court Case:

- **T.N. Godavarman v. Union of India (1996)** established that any land with forest characteristics should be considered forest land.
- Rajasthan's **expert committee (2004)** identified sacred groves as **forests only if they met specific criteria** (e.g., 5 hectares with 200+ trees per hectare).
- The **SC's December 18 ruling** overrides this, directing that all sacred groves be mapped, classified as forests, and declared as community reserves.

The Issue:

- **Conflict between WLPA and FRA:**
  - The **FRA, 2006**, recognizes **community forest resources under gram sabhas**, while the **SC directive places them under government control**.
  - This could disrupt traditional conservation practices and weaken community rights over these forests.

Distribution of Sacred Groves in India

- Sacred groves exist across **all states**, with the **highest concentration** in:
  - **Western Ghats & Central Plateau:** Kerala, Karnataka, Maharashtra, Chhattisgarh.
  - **Northeastern States:** Meghalaya, Assam, Arunachal Pradesh.
  - **Tribal Belts:** Odisha, Jharkhand, Madhya Pradesh.
- Estimated **100,000 to 150,000** sacred groves exist in India, making it the **highest globally**.

Significance of Sacred Groves:

- **Biodiversity Conservation:** Home to rare and endemic species, acting as genetic reservoirs.
- **Water Conservation:** Many groves are associated with springs, ponds, and rivers, ensuring aquifer recharge.
  E.g. Sarpa Kavu groves in Kerala are crucial for maintaining local water tables and streamflow.
- **Soil Conservation & Climate Regulation**: Dense vegetation prevents soil erosion and stabilizes ecosystems.
  E.g. Sarna forests in Jharkhand, conserved by tribal communities, prevent land degradation and desertification.
- **Cultural & Religious Importance:** Integral to local traditions, rituals, and spiritual beliefs across tribal and rural communities.
  E.g. Mawphlang sacred forest in Meghalaya is central to Khasi tribal rituals and remains untouched for centuries
- **Disaster Mitigation:** Helps prevent floods, landslides, and droughts, supporting climate resilience.

Challenges to Sacred Groves:

- **Urbanization & Encroachment:** Rapid development, land conversion, and infrastructure projects threaten sacred groves.
  E.g. Sacred groves in Gujarat's Dahod region are shrinking due to road expansion and real estate projects.
- **Decline in Traditional Beliefs:** Modernization and loss of indigenous knowledge weaken community-driven conservation.
- **Sanskritization & Religious Conversion:** Replacement of nature worship with temple-centric rituals affects grove preservation.
- **Invasive Species:** Exotic species like Lantana camara, Eupatorium odoratum, and Prosopis juliflora degrade native flora.
  E.g. Lantana invasion in Madhya Pradesh's sacred groves has displaced indigenous medicinal plants.
- **Government Policies & Legal Conflicts:** The WLPA's community reserve framework contradicts FRA's recognition of community forest rights, causing administrative conflicts.
  E.g. Tamil Nadu's temple-controlled groves face excessive regulation, restricting community involvement.

Way Forward:

- **Recognition Under Forest Rights Act (FRA):** Sacred groves must be recognized as community forest resources under gram sabhas.
- **Inventorization & Mapping:** Conduct a nationwide survey to document sacred groves and their ecological significance.
- **Strengthen Community-Based Conservation:** Empower local communities, elders, and tribal groups in grove management.
- **Regulating Urban Expansion**: Implement buffer zones to protect groves from infrastructure projects and deforestation.
- **Reviving Indigenous Practices:** Promote traditional ecological knowledge and involve youth in conservation initiatives.

Conclusion:

While the SC directive aims at conservation, it risks disrupting community rights and customs. A balanced approach that respects indigenous traditions while ensuring ecological protection is essential for the sustainable preservation of sacred groves.

PYQ:

1. At the national level, which ministry is the nodal agency to ensure effective implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006?
   a) Ministry of Environment, Forest and Climate Change
   b) Ministry of Panchayati Raj
   c) Ministry of Rural Development
   d) Ministry of Tribal Affairs

   Answer: d)

Topics: Role of external state and non-state actors in creating challenges to internal security.

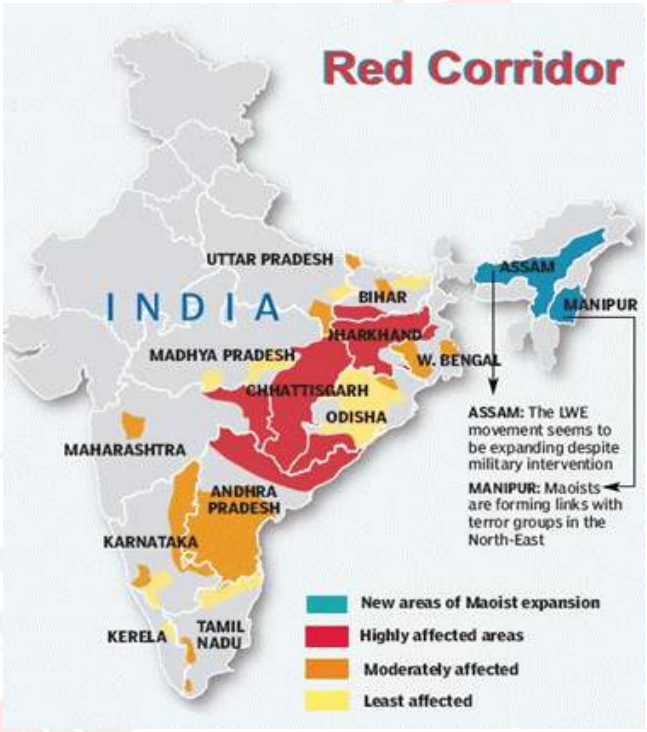
16. NAXALISM

Context:

Security forces eliminated 31 Naxalites in Bijapur, Chhattisgarh, marking a major success in the government's mission to make India Naxal-free by March 31, 2026.

Understanding Naxalism:

- **Definition:** Naxalism refers to **Left-Wing Extremist (LWE) movements** inspired by Maoist ideology, advocating armed rebellion against the state.
- **Reasons Behind Naxalism:**
  - **Land Disputes & Exploitation:** Marginalized tribal communities face displacement due to mining, industrialization, and lack of land rights.
  - **Economic Inequality:** Lack of **basic infrastructure, employment, and access to education** fuels discontent.
  - **Political Alienation:** Weak governance and failure to integrate tribal areas into mainstream development policies.
  - **Weak Law Enforcement:** Poor police presence in remote areas allows Naxals to establish control.
  - **External Support:** Naxalite groups receive **funding, arms, and training** from sympathizers within and outside India.



Key Security Measures Taken So Far: (Source: Ministry of Home Affairs Annual Report)

1. **Administrative Actions**
   - **Ban on CPI (Maoist)** under the **Unlawful Activities (Prevention) Act (UAPA), 1967**, restricting its operations and funding.
   - **Creation of NIA LWE Division** to fast-track prosecution of Naxal cases.
   - **Strengthening Inter-State Coordination** for intelligence sharing and joint operations.
2. **Welfare & Development Initiatives**
   - **Special Central Assistance (SCA):** ₹3,450 crore allocated to develop **critical infrastructure in 25 most-affected LWE districts**.
   - **Road Connectivity Projects:** Over **5,148 km of roads** built to improve access to remote areas.
   - **Skill Development & Employment:** Establishment of **48 Industrial Training Institutes (ITIs)** and **68 Skill Development Centers (SDCs)**.
   - **Financial Inclusion:** Opening of **2,796 bank branches** and **4,903 post offices** in LWE-affected districts.
3. **Military & Strategic Countermeasures**
   - **Deployment of Central Armed Police Forces (CAPFs)** in high-risk zones.
   - **Fortification of 250 Police Stations** in LWE-affected states to ensure better security.
   - **Counter-IED Operations** to tackle landmine threats, reducing security force casualties.
   - **Use of UAVs and Helicopters** to track and neutralize Maoist strongholds.

Progress and Impact

- **Sharp Decline in Naxal Incidents:** **48% reduction** in violent incidents (from **1,136 in 2013** to **594 in 2023**).
- **Fewer Casualties:** **65% decline** in deaths (from **397 in 2013** to **138 in 2023**).
- **Shrinking Naxal Influence:** Maoist violence is now **limited to 25 districts**, down from **76 districts in 2013**.
- **Increased Surrenders:** A large number of Maoist cadres **abandoning violence and reintegrating into society**.

Challenges in Eliminating Naxalism:

- **Guerrilla Warfare Tactics:** Naxalites **use forests, landmines, and surprise attacks**, making counterinsurgency diffi-

cult.

- **Tribal Distrust of Authorities:** Decades of neglect have led to **deep-rooted resentment**, which Maoists exploit.
- **Political & Ideological Support:** Urban sympathizers continue to **fund and justify** the movement.
- **Infrastructure Sabotage:** Maoists **target schools, roads, telecom towers,** and other government projects to halt development.
- **Limited Economic Alternatives:** Lack of **sustainable employment and education** keeps Naxal ideology alive in affected regions.

Way Forward:

- **Sustained Military Action:** Security forces must continue **targeted operations** while improving intelligence networks.
- **Community Engagement:** Tribal populations should be involved in governance to **build trust and cooperation**.
- **Focused Development Initiatives:** Government should **accelerate road, telecom, and employment projects** to integrate remote areas.
- **De-radicalization Programs:** **Skill training and education campaigns** should be launched to prevent youth recruitment.
- **Political Will & Coordination:** Stronger **inter-state and central-state collaboration** will ensure a **unified approach** against LWE.

Conclusion:

A **balanced approach of military action and socio-economic upliftment** is necessary to **completely eradicate Naxalism by 2026**. The recent success in **Bijapur, Chhattisgarh**, signals a step closer to achieving a **Naxal-free India** while ensuring peace, security, and prosperity in the affected regions.

PYQ:

1. What are the determinants of left-wing extremism in Eastern part of India? What strategy should the Government of India, civil administration and security forces adopt to counter the threat in the affected areas? (UPSC-2020)
2. Left Wing Extremism (LWE) is showing a downward trend, but still affects many parts of the country. Briefly explain the Government of India's approach to counter the challenges posed by LWE. (UPSC-2018)

GENERAL STUDIES – 4

1. DIVERSITY, EQUITY, AND INCLUSION (DEI) POLICIES

Context:

The U.S. President Donald Trump revoked Diversity, Equity, and Inclusion (DEI) policies implemented under the Biden administration, citing them as discriminatory.

What Are DEI Policies?

Diversity, Equity, and Inclusion (DEI) policies refer to workplace and institutional measures aimed at **ensuring fair representation and equal opportunities** across race, gender, ethnicity, and socio-economic backgrounds.

Key Features of DEI Policies:

- **Diversity:** Encourages representation of different races, ethnicities, abilities, and cultural backgrounds.
- **Equity:** Ensures fair treatment, access, and opportunities for historically disadvantaged groups.
- **Inclusion:** Promotes a workplace environment where diverse individuals feel respected and valued.
- **Accessibility:** Ensures that workplaces, technology, and resources are available to people with disabilities.

Need for DEI Policies: Ethical & Non-Ethical Aspects

- **Ethical Justifications:**
  - **Correcting Historical Injustices:** Ensures fair opportunities for marginalized communities.
  - **Relational Ethics:** Encourages workplaces to foster mutual respect, empathy, and inclusivity (Ethics of Care).
  - **Moral Virtue of Justice:** Promotes fairness and ethical responsibility in corporate and social structures (Virtue Ethics).
- **Non-Ethical Aspects:**
  - **Reverse Discrimination:** Critics argue DEI creates bias against majority groups.
  - **Merit-Based Concerns:** Some view DEI as prioritizing identity over merit in hiring and promotions.
  - **Financial Burden:** High compliance costs for corporations and government agencies.

Why Did the U.S. Remove DEI Policies?

- **Conservative Backlash:** DEI was perceived as discriminatory against white Americans.
- **Legal Challenges:** The Supreme Court struck down affirmative action in college admissions.
- **Economic Pressures:** Companies faced shareholder scrutiny over the financial viability of DEI programs.
- **Political Stance:** Trump positioned DEI as **"wasteful and radical"**, linking it to leftist ideology.

Potential Impact of DEI Rollback: Ethical & Non-Ethical Aspects

- **Ethical Impact:**
  - **Reduced Workplace Diversity (Theory of Justice – John Rawls)**
    - **Principle of Fairness:** Undermines Rawls' distributive justice, reducing opportunities for marginalized groups.
    - **Difference Principal Violation:** Reverses progress in social equity by removing policies benefiting the least advantaged.
  - **Social Repercussions (Ethics of Care – Carol Gilligan & Social Contract Theory – Rousseau)**
    - **Loss of Moral Obligation:** Weakens corporate responsibility toward underrepresented communities (Ethics of Care).
    - **Erosion of Social Contract:** Undermines governmental duty to protect disadvantaged groups, leading to greater inequality (Rousseau's Social Contract).
- **Non-Ethical Impact:**
  - **Corporate Realignment:** Businesses may modify DEI branding to avoid political controversy.
  - **Cost Savings:** Reducing DEI programs may lower corporate expenses.
  - **Merit-BasedHiring:** Proponents argue that hiring will now be strictly performance-based.

India's Status on DEI Policies:

- **No direct DEI framework**, but India has long-standing **affirmative action policies** under the Constitution.
- **Reservation System:** SCs, STs, and OBCs benefit from **educational and job quotas**.
- **Article 16:** Guarantees **equal employment opportunities** regardless of caste, religion, gender, or birthplace.
- **Private Sector Approach:** Indian companies increasingly implement **diversity hiring programs**, especially for women and marginalized communities.

Conclusion:

The U.S. rollback may influence global corporate strategies, but India continues its social justice policies through reservations rather than direct DEI initiatives. The debate over balancing equity with meritocracy will shape future diversity policies worldwide.

PYQ:

1. Women empowerment in India needs gender budgeting. What are the requirements and status of gender budgeting in the Indian context? (UPSC-2016)

2. CODE OF ETHICS ON OTT PLATFORM

Context:

The Indian government has issued an advisory requiring OTT platforms to adhere to a strict Code of Ethics under IT Rules, 2021 to combat obscene content.

Code of Ethics for OTT Platforms?

- A set of self-regulatory guidelines aimed at ensuring responsible content dissemination on digital platforms.
- It mandates age-based content classification, access control for 'A' rated content, and adherence to applicable laws to prevent the transmission of prohibited material.

Relevant Laws in India:

- **Indian Laws:**
  - **IT Rules, 2021:** Prescribes obligations for online publishers, including content classification and self-regulation under a Code of Ethics.
  - **Information Technology Act, 2000:** Governs the transmission of digital content and prescribes penalties for prohibited content.
  - **Guidelines from the Ministry of Information and Broadcasting:** Enforce standards for acceptable content on OTT platforms.
- **Best Practices Worldwide:**
  - **Ofcom Guidelines (UK):** Emphasize content classification, age restrictions, and proactive monitoring to protect minors.
  - **European Audiovisual Observatory's Framework:** Advocates for transparency, self-regulation, and regular audits of content to maintain high ethical standards.

Need for a Code of Ethics in OTT:

- **Protecting Minors:** Ensures that children are shielded from harmful, explicit, or inappropriate content.
- **Maintaining Public Decency:** Upholds societal standards by preventing the spread of obscene and pornographic material.
- **Enhancing Trust:** Builds consumer confidence in digital platforms by fostering transparency and accountability in content curation.

Challenges to Effective Implementation:

- **Enforcement Gaps:** Despite clear regulations, inconsistent enforcement and lack of uniform standards across platforms hinder compliance.
- **Ambiguous Definitions:** Vague terminologies in the rules can lead to varied interpretations, making it difficult to uniformly apply the Code of Ethics.
- **Rapid Content Evolution:** The fast-paced nature of digital content creation often outstrips regulatory updates, complicating oversight.
- **Resistance from Platforms:** Some OTT services may view strict regulation as an impediment to creative freedom and business growth.
- **Technological Limitations:** Inadequate age verification and content filtering mechanisms can make it challenging to enforce guidelines effectively.

Way Ahead:

- **Strengthening Oversight:** Establish independent regulatory bodies for continuous monitoring and transparent reporting of content standards.
- **Enhanced Collaboration:** Foster stronger partnerships between the government, industry stakeholders, and international bodies to share best practices and update guidelines.
- **Regular Audits and Reviews:** Implement periodic audits of OTT platforms to ensure adherence to ethical guidelines and revise regulations in line with technological advancements.
- **Public Awareness Campaigns:** Educate consumers about content ratings and their rights, thereby promoting informed viewing habits.
- **Incentivize Compliance:** Introduce incentives for platforms that consistently meet high ethical standards, such as certification or public endorsements.

Conclusion:

With controversies like the Ranveer Allahbadia remark row, enforcing a robust Code of Ethics is essential to safeguard minors and uphold societal values. A balanced approach combining strict oversight with industry self-regulation will pave the way for a safer, more responsible digital ecosystem.

PYQ:

1. "The 'Code of Conduct' and 'Code of Ethics' are the sources of guidance in public administration. There is code of conduct already in operation, whereas code of ethics is not yet put in place. Suggest a suitable model for code of ethics to maintain integrity, probity and transparency in governance. (2024)

FACTS FOR PRELIMS

GS-1

Art & Culture

1. GYAN BHARATAM MISSION

Context:
The Union Budget 2025-26 introduced the Gyan Bharatam Mission, a special initiative for the survey, documentation, and conservation of India's manuscript heritage.

About Gyan Bharatam Mission:

- **What is Gyan Bharatam Mission?**
  - A national initiative launched to **survey, document, and conserve** India's rich manuscript heritage.
  - Focuses on manuscripts held by academic institutions, museums, libraries, and private collectors.
- **Ministry:** Ministry of Culture.
- **Budget Allocation:**
  - **National Mission for Manuscripts (NMM):** Allocation increased from **₹3.5 crore** to **₹60 crore**.
- **Aim:**
  - To identify, document, and conserve India's manuscript heritage.
  - To make manuscripts accessible to researchers, scholars, and the public.
  - To preserve the wisdom and knowledge contained in ancient texts for future generations.
- **Features:**
  - **Survey and Documentation:** Comprehensive survey of over one crore manuscripts across India.
  - **Conservation:** Advanced techniques to preserve fragile and ancient manuscripts.
  - **Digitization:** Digitizing manuscripts to ensure wider accessibility and prevent physical degradation.
  - **Autonomous Body:** Plans to establish an autonomous body for better implementation and management of the mission.
  - **Collaboration:** Partnerships with academic institutions, museums, and private collectors for effective execution.

2. DORKA METAL CRAFT

Context:
Prime Minister of India gifted a Dokra artwork to French President Emmanuel Macron during the AI Summit in Paris, showcasing India's rich handicraft traditions.

About Dokra Metal Craft:

- Found in Jharkhand, Chhattisgarh, Odisha, West Bengal, Telangana, Madhya Pradesh, Rajasthan, Tamil Nadu.
- Adilabad Dokra (Telangana) received Geographical Indicator (GI) in 2018.
- Features handcrafted metalwork from brass and copper-based alloys.
- Intricate designs include elephants, horses, religious deities, lamps, jewellery, and tribal motifs.
- Casting methods include solid casting (South India) and hollow casting (Central and Eastern India).
- No reproduction as mould is destroyed.
- Origins date back to Indus Valley Civilization.
- Traditional practitioners include Dhokra Damar tribes from Odisha and West Bengal.

3. SHIVAJI'S FORTS (MARATHA MILITARY LANDSCAPE OF INDIA)

Context:
A high-level delegation led by Maharashtra Cultural Affairs is in Paris to seek UNESCO World Heritage status for 12 forts under 'Maratha Military Landscape of India'.

Shivaji's Forts (Maratha Military Landscape of India):

- **What is it?**
  - The **Maratha Military Landscape** refers to **fortifications and strategic defense systems** built by Chhatrapati Shivaji Maharaj and later Maratha rulers between the **17th and 19th centuries**.
  - These forts showcase **advanced military architecture, strategic positioning, and adaptation to diverse terrains** across India.
- **Time Period:**
  - **Began in the 1670s under Chhatrapati Shivaji Maharaj**.
  - Continued through **subsequent Maratha rulers and Peshwa rule till 1818 CE**.
- **12 Forts Nominated for UNESCO Status:** Raigad, Rajgad, Pratapgad, Panhala, Shivneri, Lohagad, Salher, Sindhudurg, Suvarnadurg, Vijaydurg, Khanderi, and Gingee (Tamil Nadu).
- **Unique Features of These Forts:**
  - **Diverse Typology:**
    - **Hill Forts:** Shivneri, Lohagad, Raigad, Rajgad, Salher, Gingee.
    - **Hill-Forest Fort:** Pratapgad.
    - **Hill-Plateau Fort:** Panhala.
    - **Coastal Fort:** Vijaydurg.
    - **Island Forts:** Khanderi, Suvarnadurg, Sindhudurg.
  - **Integration with Terrain:** Built across the Sahyadri Mountains, Konkan Coast, Deccan Plateau, and Eastern Ghats.
  - **Military Innovations:** Included multi-tiered defenses, secret escape routes, and rainwater harvesting systems.
  - **Symbol of Maratha Power:** Represented Shivaji's guerrilla warfare tactics and administrative strength.
- **UNESCO Sites in Maharashtra**
  1. **Ajanta Caves (1983) –** Cultural
  2. **Ellora Caves (1983) –** Cultural
  3. **Elephanta Caves (1987) –** Cultural
  4. **Chhatrapati Shivaji Maharaj Terminus (2004) –** Cultural
  5. **Victorian Gothic and Art Deco Ensembles of Mumbai (2018) –** Cultural
  6. **Western Ghats (2012) –** Natural
- The **Maratha Military Landscape** nomination, which was included in **UNESCO's Tentative List in 2021**, is the **sixth cultural heritage site proposed from Maharashtra**.

4. JHUMOIR BINANDINI

Context:
Prime Minister attended the largest-ever Jhumoir Binandini event in Guwahati, Assam, celebrating the 200th anniversary of Assam's tea industry.

- **What is Jhumoir Binandini?**
  - A **traditional folk dance** performed primarily by Assam's **tea garden communities**.
  - Celebrates **agricultural festivals** and the **cultural heritage** of migrant tea workers.
- **Region of Origin:**
  - Predominantly performed in **Assam**, especially in districts with a high concentration of tea estates.
  - Associated with **festivals and social gatherings** in tea garden areas.
- **Theme & Cultural Significance:**
  - Represents the **struggles and aspirations** of the **tea-tribe community**.
  - Songs reflect themes of **migration, labor exploitation, and resilience**.
- **Key Features of Jhumoir Dance:**
  - **Performed by women** in **red and white sarees**, while **men play instruments** like madal, dhol, dhak, cymbals, and flutes.
  - **Dancers hold hands in a synchronized manner**, moving gracefully in a circular formation.
  - **Lyrics borrow from Nagpuri, Khortha, Kurmali, and Assamese languages**.

- **Tribes Associated with Jhumoir Dance:**
  - The dance is famous among **Assam's tea-tribe community**, which includes the **Santhal, Munda, Kurukh, Oraon, and Kharia tribes**.
- **Historical Background:**
  - Originated with the **tea-tribe community**, who were **migrants from Jharkhand, Odisha, Chhattisgarh, and West Bengal**.
  - The British **brought these workers to Assam** for labor in tea plantations under harsh conditions.
  - Jhumoir became a **symbol of cultural preservation** and **social unity** among displaced communities.

History

5. FORT WILLIAM

Context:
Fort William, the historic British-era military fortification in Kolkata, has been renamed "Vijay Durg" as part of the Indian government's efforts to shed colonial legacies and promote indigenous traditions.

- **Located in:** Fort William is situated in Kolkata, West Bengal, on the eastern banks of the Hooghly River, a major distributary of the Ganga.
- **Built in:** The original Fort William was **constructed in 1696** and completed in 1706. The current fort **was rebuilt between 1758 and 1781** after the Battle of Plassey.
- **Built by:**
  - The original fort was built by the British East India Company under Sir John Goldsborough.
  - The current fort was reconstructed under the supervision of Robert Clive after the British regained control of Kolkata following the Battle of Plassey (1757).
- **History:**
  - **Original Fort (1696-1706):**
    - Constructed during the early years of British rule in Bengal.
    - Named after King William III of England.
    - Captured and destroyed by Siraj-ud-Daulah, the Nawab of Bengal, in 1756 during the Siege of Calcutta.
  - **Rebuilt Fort (1758-1781):**
    - Reconstructed by the British after their victory in the Battle of Plassey (1757).
    - Designed as a massive military fortification to prevent future attacks.
- **Features:**
  - **Architecture:**
    - Spread over 70 hectares, the fort is one of the largest British-era military structures in India.
    - Designed in a star-shaped layout for enhanced defense capabilities.
  - **Current Use:**
    - Headquarters of the Indian Army's Eastern Command.
  - **Historical Significance:**
    - The site of the infamous "Black Hole of Calcutta" incident in 1756.
    - Home to the first Indian Masonic lodge, established in 1730.
  - **Cultural and Military Heritage:**
    - Houses a war memorial and museum showcasing artifacts from the 1971 Indo-Pakistani War and the Bangladesh Liberation War.
  - **Recent Changes:**
    - Along with it, Kitchener House renamed Manekshaw House, and St. George's Gate renamed Shivaji Gate as part of the "Indianisation" of military traditions.

6. TAMIL CIVILIZATION

Context:
The report Antiquity of Iron: Recent Radiometric Dates from Tamil Nadu states that the Iron Age began in Tamil Nadu, dating iron usage to the first quarter of the 4th millennium BCE.

- **What is Tamil Civilization?**
  - One of the **oldest known civilizations**, with evidence of advanced urban life, trade, and metallurgy dating

back over 5,300 years.
    - Flourished along major rivers like Thamirabarani, Vaigai, and Noyyal, forming a continuous cultural and economic network.
- ***Major Archaeological Sites* & Their Significance:**
    - **Sivagalai:**
      Year: 2953 BCE - 3345 BCE
      Significance: Iron Age site with evidence of **paddy cultivation (1155 BCE), skeletal remains, and iron tools**, confirming early metallurgy in Tamil Nadu.
    - **Keeladi:**
      Year: 6th Century BCE
      Significance: Urban settlement with **Tamil-Brahmi inscriptions, a flourishing weaving industry, and advanced craftsmanship**, highlighting early Tamil urban culture.
    - **Adichanallur:**
      Year: 3rd Millennium BCE
      Significance: Oldest known **burial site** with **gold diadems, microlithic tools, and Tamil-Brahmi potsherds**, indicating a highly sophisticated ancient civilization.
    - **Korkai:**
      Year: 785 BCE
      Significance: Once the **capital of Pandya kings**, excavation revealed a **shell bangle-making industry** and trade links with the **Gangetic plains**, confirming maritime trade.
    - **Mayiladumparai:**
      Year: 4,200 Years Ago.
      Significance: Confirms the **early Iron Age presence in Tamil Nadu** with discoveries of **memorial stones, Tamil-Brahmi potsherds, and Neolithic tools**.
    - **Kodumanal:**
      Year: 2,000 Years Ago
      Significance: A **major industrial hub** known for **carnelian beads, inscribed potsherds, and Sangam-era trade**, proving its role in ancient Tamil commerce.
    - **Gangaikondacholapuram:**
      Year: 11th Century CE
      Significance: Former **Chola capital**, excavation revealed **palace ruins, copper bracelets, and medieval city structures**, showcasing Tamil architectural grandeur.
    - **Porpanaikottai:**
      Year: Sangam Age
      Significance: Excavations revealed **Sangam-age fort ruins, iron nails, glass beads, and terracotta artifacts**, signifying an advanced defense and trade network.
    - **Pallavaram:**
      Year: Paleolithic Age, 1863 Discovery
      Significance: One of the **oldest inhabited places** with evidence of **prehistoric human settlement, hand axes, and terracotta sarcophagi**, proving early human occupation.

7. THE KALYANI CHALUKYA

Context:
Archaeologists have discovered 900-year-old Kannada inscriptions from the Kalyani Chalukya era in Kankal village, Vikarabad district, Telangana.

- These inscriptions, dating back to **1129-1132 CE**, detail temple construction and land donations during the reign of **Emperor Someswara III Bhulokamalladeva**.

***Kalyani Chalukyas* (Western Chalukyas):**

- **Period & Dynastic Lineage:**
    - Ruled **Western Deccan** between the **10th and 12th centuries CE**.
    - One of the three Chalukyan dynasties:
        - **Chalukyas of Badami (6th-8th century CE)**.
        - **Eastern Chalukyas of Vengi (7th-12th century CE)**.
        - **Western Chalukyas (Kalyani Chalukyas) (10th-12th century CE)**.
- **Founder:** Founded by **Tailapa II** after defeating the **Rashtrakutas**.
- **Capital:** Kalyani (modern-day Bidar, Karnataka).

- Controlled **Deccan Plateau**, including present-day **Karnataka, Maharashtra, Andhra Pradesh, and Telangana**.

- **Significant Kings:**
  - **Vikramaditya VI (1076-1126 CE):** Most powerful ruler, known for the Chalukya Vikrama era.
  - **Someswara I & Someswara III:** Expanded **territory and cultural influence**.
  - **Jayasimha II:** Stabilized the empire post-Rashtrakuta downfall.
- **Religious Policy:** Patronized Shaivism, Vaishnavism, and Jainism.
- **Contributions to Art & Architecture:**
  - Developed the **Western Chalukya (Kalyani Chalukya) style** of architecture.
  - Known for **Vesara or Karnata-Dravida temple architecture**.
  - Introduced **intricate carvings, stepped wells,** and ornate sculptures.
  - Their style influenced **later Vijayanagara and Hoysala architecture**.
- **Major temples include:**
  - **Mahadeva Temple (Itagi, Koppal):** Finest example of their craftsmanship and known as **"Emperor among temples"**
  - **Kasivisvesvara Temple (Lakkundi, Gadag):** Ornate carvings and symmetrical designs.
  - Sarasvati Temple (Gadag) & **Dodda Basappa Temple (Dambal, Gadag)**.

8. RATNAGIRI BUDDHIST HERITAGE SITE

Context:
Archaeologists discovered a 1.4-meter-tall Buddha head and 1,500-year-old tablets and stupas in Ratnagiri, Odisha, confirming its historical significance as a significant Vajrayana centre.

Ratnagiri Buddhist *Heritage Site*:

- **Location:**
  - Situated in **Jajpur district, Odisha**, Ratnagiri is part of the **Diamond Triangle** of Buddhist heritage, along with **Lalitgiri and Udayagiri**.
  - The site is surrounded by the **Brahmani, Kimiria, and Birupa rivers**, providing a secluded and strategic location for Buddhist scholars.
- **Time period associated:**
  - The **earliest Buddhist settlement dates back to the 5th century AD** and flourished until the **13th century**.
  - Vajrayana Buddhist activities continued at Ratnagiri till the **16th century**.
- **Excavation Timeline & Key Findings:**
  - **First Discovery (1906):** Buddhist relics reported by Manmohan Chakravarti.
  - **Systematic Excavation (1958-1961):** Led by Debala Mitra, the first woman Director General of ASI.
  - **Recent Excavation (December 2024 - March 2025):** Approved by ASI Director General, aiming to uncover partially visible structures and a possible shrine complex.
- **Relics Excavated:**
  - **Buddha Head (1.4 meters tall):** Largest ever found in Odisha, possibly India.
  - **Votive Stupas:** Arranged in sequence, indicating spiritual offerings and pilgrimage site.
  - **Monasteries & Shrine Complex:** Evidence of **two monasteries** and a **central stupa** used for veneration.
  - **Stone Tablets & Inscriptions: Sanskrit text in Kutila script (Siddhamatrika)**, confirming Buddhist influence.
  - **Buddhist Deities & Symbols:** Includes sculptures of **Amoghasiddhi, Ratnasambhava, Akshobhya, Amitabha, Tara, and Marici**.
  - **Brick and Stone Structures:** Suggest **advanced masonry techniques** that have withstood time.

9. TEA HORSE ROAD

Context:
China's Ambassador to India, highlighted the historical significance of the Tea Horse Road, which facilitated the significant tea trade between China and India via Tibet.

- **What is it?**
  - The **Tea Horse Road**, also called **Chamadao**, was an **ancient trade route** connecting **China, Tibet, and India**.
  - It was a **major commercial network** used for **trading tea from China and horses from Tibet**.
- **Connection Between Regions:**
  - Originated in **southwest China (Yunnan & Sichuan)** and passed through **Tibet, Nepal, and India**.
  - Reached **Kolkata**, from where **tea was shipped to Europe and other Asian markets**.

- **How it worked:**
  - **Trade Goods:**
  - China exported tea, textiles, rice noodles, and sugar.
  - Tibet supplied horses, gold, saffron, leather, and medicinal herbs.
- **Dynastic and Historical Importance: 20th Century:** Used in **World War II** for supply transportation but declined after Mao Zedong's land reforms (1949).
- **Significance of the Tea Horse Road:**
  - **Facilitated Economic Exchange:** Enabled cultural and commercial ties between India, Tibet, and China.
  - **Boosted Military Strength:** Supplied Tibetan war horses for China's military campaigns.
  - **Cultural Exchange:** Helped spread Buddhism, medicinal herbs, and textiles across the Himalayan region.
  - **Historical Tourism Today:** Parts of the route are being promoted as UNESCO heritage and tourism sites.

Society

10. TRIBES IN NEWS

Context:
Recently these tribes (Soliga Tribe, Pardhi Tribe, Irula tribe) were in news.

About Tribes in News:

1. **Soliga Tribe:**
   Context: Prime Minister praised the Soliga tribe for their role in increasing the tiger population in BRT Tiger Reserve, Karnataka.
   - **Located in:** Biligiri Rangana Hills (BRT Tiger Reserve) and Male Mahadeshwara Hills, Karnataka.
   - **Cultural Aspects**: Speak Sholaga (Dravidian language), worship Biligiri Ranganatha Swamy (Vishnu), and practice nature-based spiritual traditions.
   - **Livelihood:** Depend on shifting agriculture, foraging, honey collection, and engage in minor forest produce trade and ecotourism.
2. **Pardhi Tribe:**
   Context: Activists and lawyers opposed the Madhya Pradesh government's order for search and surveillance of nomadic tribes, including the Pardhi community.
   - **Located in:** Maharashtra, Madhya Pradesh, Gujarat, and Andhra Pradesh.
   - **Cultural Aspects:** Divided into subgroups (Vaghri Pardhi, Phase Pardhi, Pal Pardhi, Gav Pardhi, Takankar, Takari), follow Hindu traditions, and worship nature-linked deities.
   - **Livelihood:** Traditionally hunted, but now engaged in agriculture, handicrafts, and small-scale trading, facing discrimination and poverty.
3. **Irula tribe:**
   Context: A nine-day workshop in Attappady aims to revive Ramar Koothu, a traditional dance-drama of the Irula tribe, which is on the verge of extinction.
   - **Located in:** Tamil Nadu (Nilgiris, Coimbatore, Dharmapuri), Kerala (Palakkad, Attappady), Karnataka (Bengaluru Rural, Chikkaballapur).
   - **Cultural Aspects:** Speak Irula (Dravidian language), **perform Ramar Koothu** (Ramayana-based dance-drama), and follow animistic traditions blended with Hindu beliefs.
   - **Livelihood:** Known for snake-catching and herbal medicine, depend on minor forest produce, honey collection, and small-scale farming, with many now working in plantations and construction.

Geography

11. MANIKARAN

Context:
The proposal to transfer hot spring water from Manikaran to Kasol for a tourism project has sparked protests among locals and religious groups in Himachal Pradesh.

About *Manikaran:*

- **Location:** Situated in **Parvati Valley** along the Parvati River in Kullu district, Himachal Pradesh.
- **Historical Significance:**
  - A **pilgrimage site for Hindus and Sikhs**.
  - Hindus believe **Manu recreated human life** here after the Great Flood.

- Guru Nanak visited Manikaran during his **third Udasi (spiritual journey)** in 1574 Bikrami, making it sacred for Sikhs.

- **Geographical Features:**
  - Located in the **Parvati Valley**, known for its **hot springs and geothermal activity**.
  - Surrounded by **Himalayan mountains**, offering a **picturesque landscape**.
  - Connected via **important mountain passes**, including: **Pin Parvati Pass** (to Spiti Valley), **Sara Umga La Pass** (to Lahaul), **Debsa Pass** (discovered in 1995).

About *Parvati River:*

- The Parvati River, also **known as the Parbati River,** is located in the Parvati Valley of Himachal Pradesh.
- **Source:** Originates from the **Man Talai Glacier**, below the **Pin Parvati Pass** in Himachal Pradesh.
- **Tributary:** A **tributary of the Beas River**, joining it at **Bhuntar**.
- **State Flow Through: Flows entirely through Himachal Pradesh**, running from north-northwest to west-southwest.

12. RECLASSIFICATION OF MAJOR MINERALS

Context:

The Ministry of Mines, through a gazette notification, reclassified Barytes, Feldspar, Mica, and Quartz as major minerals from their previous minor mineral status.

What are Major Minerals?

- Major minerals are those regulated by the Central Government under the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act, 1957)**.
- They include minerals with high economic and strategic significance, such as iron ore, coal, bauxite, gold, and now, Barytes, Feldspar, Mica, and Quartz.

Rules Governing Major Minerals:

DIFFERENCE BETWEEN MAJOR AND MINOR MINERALS:

CRITERIA	MAJOR MINERALS	MINOR MINERALS
Definition	Minerals with high economic, strategic, and industrial significance.	Minerals with lower economic value and localized use.
Regulatory Authority	Indian Bureau of Mines (IBM), Ministry of Mines.	State Governments.
Examples	Iron ore, coal, bauxite, gold, barytes, feldspar, mica, quartz.	Sand, gravel, marble, limestone, clay, granite.
Governing Law	Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act, 1957).	MMDR Act, 1957, but regulated by State Governments.
Lease Period	Up to 50 years under Section 8A of the MMDR Act, 1957.	Typically shorter lease durations, decided by State Governments.
Revenue Collection	Earnings go to State Governments but regulated by the Central Government.	Revenue goes directly to State Governments.
Strategic Importance	Critical for energy, defense, aerospace, and industrial sectors	Mainly used for construction and local industries.

Regulated by: The Indian Bureau of Mines (IBM).

- **Lease Period:** Up to **50 years**, as per Section 8A of the MMDR Act, 1957.
- **Revenue Collection:** Earnings from these minerals accrue to **state governments**.
- **Auction Process:** Major minerals are allocated through a **competitive bidding process**.

Minerals Reclassified as Major Minerals:

- **Barytes:** Used in oil drilling, electronics, radiation shielding, and medical applications.
- **Feldspar:** Essential for ceramics, glass, and paints.
- **Mica:** Key for electrical insulation, cosmetics, and the aerospace industry.
- **Quartz:** Critical for semiconductors, optics, and industrial applications.

Reasons Behind Reclassification:

- **Enhancing Critical Mineral Exploration:** Quartz, Feldspar, and Mica contain Beryl, Lithium, Niobium, and Tantalum, vital for energy, aerospace, and healthcare.
- **Preventing Resource Misuse:** Previously, minor mineral leases restricted the extraction of associated critical minerals.
- **Boosting Scientific Mining:** Barytes mining often results in the simultaneous extraction of Antimony, Cobalt, and Silver, requiring advanced mining techniques.
- **Reducing Import Dependence:** Strengthening domestic mineral supply for industries and national security.

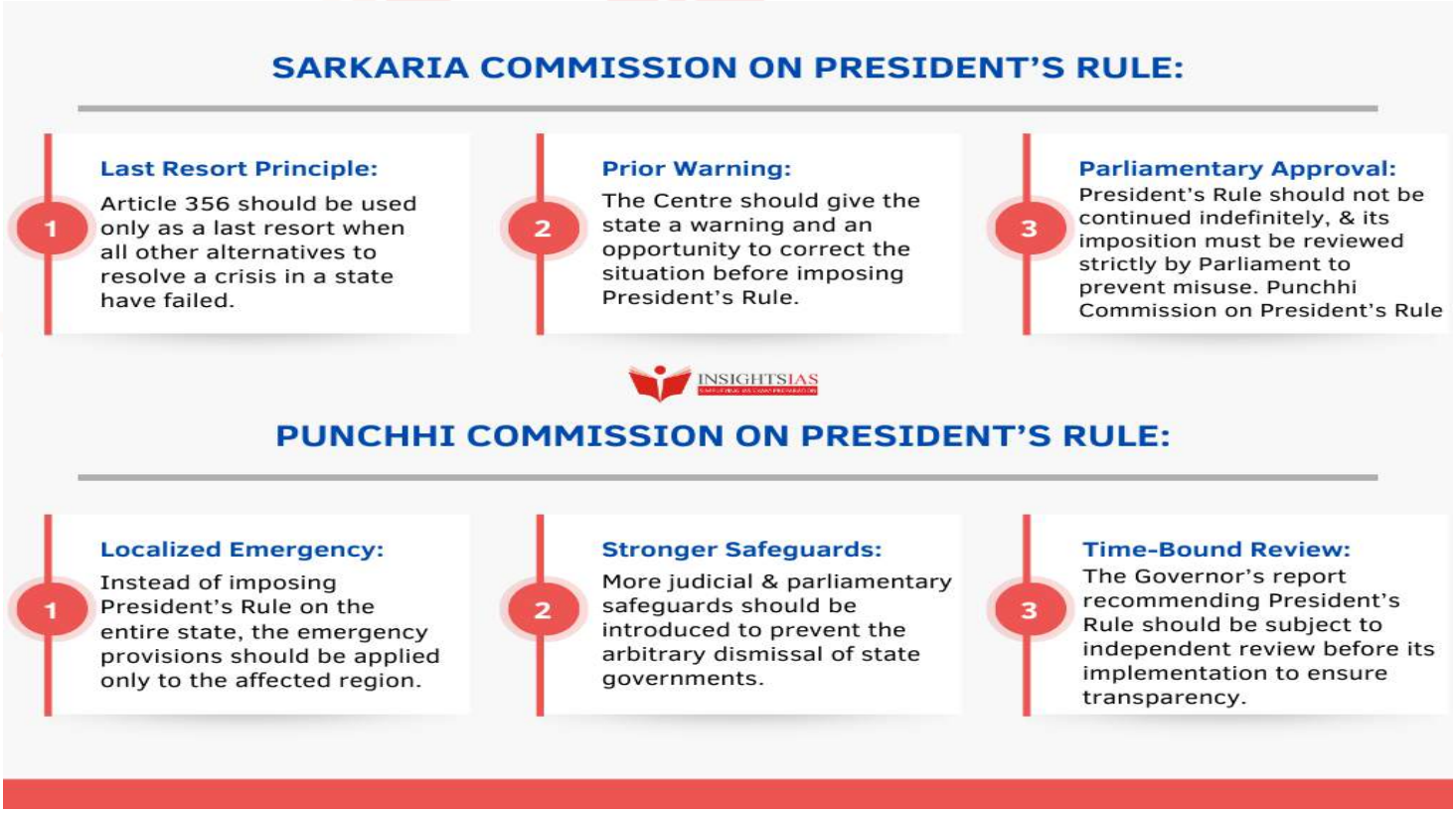
Consequences of Classifying These as Major Minerals:

- **Stronger Regulatory Oversight:** Mining will now be under IBM supervision, ensuring scientific and sustainable practices.
- **Increased Exploration and Investment:** Encourages private investment in mineral extraction.
- **Longer Lease Periods:** Extended lease duration of 50 years, improving stability in mining operations.
- **Higher Revenue for States:** States will continue receiving mining royalties while ensuring better resource utilization.

GS-2

Functioning of Parliament and State Legislatures

1. PRESIDENT'S RULE



Context:

Manipur is facing a potential imposition of President's Rule following the resignation of Chief Minister N. Biren Singh, as BJP struggles to find a consensus candidate.

- **What is President's Rule?**
  - President's Rule refers to the **suspension of a state government** and the imposition of **direct central administration** when a state government fails to function as per the Constitution.
  - It is **invoked under Article 356** of the **Indian Constitution** when the President is satisfied that governance in a **state cannot** be carried out per constitutional provisions.
- **Constitutional Provisions**
  - **Article 356:** Grants the **President the power to impose President's Rule** in case of failure of constitutional machinery in a state.
  - **Article 365:** If a state government fails to comply with the Centre's directives, the President can assume that the state government cannot function per the Constitution.
- **Criteria for Imposing President's Rule**
  - **Breakdown of Constitutional Machinery:** If the state government fails to function in accordance with the Constitution.
  - **Failure to Comply with Central Directives:** If the state does not follow instructions issued by the Union government under Article 256.
  - **Governor's Report:** If the **Governor recommends** the imposition of President's Rule, citing political instability or law-and-order issues.
  - **Other Justifications:** Political crisis, loss of majority, or inability to conduct elections.
- **Procedure for Imposing President's Rule:**
  - **Governor's Report:** The Governor submits a report to the President stating that governance in the state has broken down.
  - **President's Proclamation:** The President **issues a proclamation** imposing President's Rule, initially for **two months**.
  - **Parliamentary Approval:** Both **Lok Sabha and Rajya Sabha must approve** the proclamation within **two months** for it to continue.
  - **Duration:** Initially imposed for **six months**, extendable **up to three years** with **parliamentary approval every six months**.
  - **Extension Beyond One Year:** Allowed only if:
    - **National Emergency** is in force, or
    - **The Election Commission certifies** that elections in the state **cannot be conducted**.
- ***Impact of President's Rule*:**
  - **On State Executive:**
    - The **Governor assumes all executive powers**, acting on behalf of the President.
    - The **Chief Minister and Council of Ministers are removed**.
    - The state administration is run by **bureaucrats under the Centre's control**.
  - **On State Legislature:**
    - The **State Legislative Assembly is either dissolved or suspended**.
    - **Parliament assumes legislative powers** and can **pass laws for the state**.
    - The **President can issue ordinances** if Parliament is not in session.
  - **On Judiciary**
    - The **High Court continues to function independently**.
    - **Judicial powers remain unaffected**, ensuring the rule of law.
  - **On Fundamental Rights of Citizens**
    - No **direct impact on fundamental rights**.
    - The state administration must function **under constitutional safeguards**.
    - In extreme cases, **civil liberties may be restricted** if law-and-order deteriorates.

2. OBSCENITY LAWS IN INDIA

Context:

YouTuber Ranveer Allahbadia and comedian Samay Raina are under police investigation for alleged obscene remarks on the YouTube show India's Got Latent.

About *Obscenity Laws in India*:

- **Issue of Obscenity:**

- Obscenity laws in India aim to **balance free speech with moral standards** and **prevent explicit content that corrupts public morality**.
- With the rise of **digital platforms**, defining **what constitutes obscenity online** has become more complex.

- **Laws Governing Obscenity in India:**
  - **Section 294 of the Bharatiya Nyaya Sanhita (BNS), 2023:**
    - Criminalizes the **sale, import, export, or display of obscene material** in any form, including **electronic content**.
    - Defines obscenity as material **appealing to prurient interests** or that **depraves and corrupts viewers**.
    - **Punishment**: Up to **two years imprisonment** and **₹5,000 fine** for first-time offenders.
  - **Section 67 of the Information Technology Act, 2000:**
    - Punishes **publishing/transmitting obscene material online**.
    - **First-time offence:** Up to 3 years imprisonment and ₹5 lakh fine.
  - **Indecent Representation of Women (Prohibition) Act, 1986:**
    - Bans indecent portrayal of **women in any media.**
- **Key Supreme Court Judgments on Obscenity:**
  - **Ranjit Udeshi v. State of Maharashtra (1964):**
    - Applied the **Hicklin Test**, ruling Lady Chatterley's Lover obscene.
    - **Obscenity was judged by its potential to corrupt impressionable minds**.
  - **Aveek Sarkar v. State of West Bengal (2014):**
    - **Shifted from the Hicklin Test to the Community Standards Test**.
    - Held that **nudity alone does not make content obscene** if it does not promote sexual depravity.
  - **Supreme Court on College Romance Web Series (2024):**
    - Quashed **obscenity charges against YouTube creators**.
    - Stated that **vulgar language does not necessarily amount to obscenity** unless it **arouses sexual and lustful thoughts**.

3. ARTICLE 101(4)

Context:
Amritpal Singh, an Independent MP, filed a petition with the Punjab & Haryana HC, citing concerns about losing his Lok Sabha seat due to prolonged absence.

- **What is Article 101(4)?**
  - States that an MP's seat **may be declared vacant** if absent for **60 consecutive sittings** without permission.
  - The **House must formally declare** the seat vacant; it is not an automatic process.
- **Constitutional Provisions & Governing Law:**
  - **Article 101 of the Indian Constitution** deals with **vacation of seats, disqualifications, and dual membership**.
  - **Rules of Procedure and Conduct of Business** in Parliament regulate MP attendance.
  - **Committee on Members' Absence** reviews requests and recommends action.
- **Procedure for Seeking Leave:**
  - MPs must **write to the Committee on Members' Absence** requesting permission.
  - The **committee evaluates reasons** (illness, detention, emergencies) and sends a report to the House.
  - The **House votes to approve or reject the request** based on the report.
- **Limitations on Leave Approval:**
  - The committee **grants leave for a maximum of 59 days** at a time.
  - If an MP **needs additional leave**, they must **submit a fresh request**.
- **Power to Expel MPs for Absence:**
  - If an MP **fails to seek permission** or is **denied leave**, the House **may declare the seat vacant**.
  - The decision must be **approved by a majority vote in the House**.

4. DELIMITATION EXERCISE

Context:
Union Home Minister assured that no parliamentary seats will be reduced in South Indian states after the proposed delimitation exercise, countering Tamil Nadu CM concerns.

What is Delimitation?

- **Delimitation** refers to **fixing the number of seats and defining the boundaries** of parliamentary and legislative as-

sembly constituencies in each state.
- It ensures **proportional representation** based on population while determining **reserved seats** for **Scheduled Castes (SCs) and Scheduled Tribes (STs)**.

Who Conducts Delimitation?
- **Delimitation Commission** is established under an **act of Parliament**.
- It is a **high-powered body**, whose **orders cannot be challenged in any court**.
- The **Election Commission assists in the process**.

Delimitation Commission Members:
- A **retired Supreme Court judge (Chairperson)**.
- The **Chief Election Commissioner** (CEC) or an **Election Commissioner** nominated by the CEC.
- The **State Election Commissioners** of the respective states.

Constitutional Provisions on Delimitation
- **Article 82:** After every Census, Parliament enacts a Delimitation Act to redefine constituency boundaries.
- **Article 170:** States are divided into territorial constituencies as per the Delimitation Act after each Census.
- **42nd Amendment Act (1976):** Froze the number of Lok Sabha seats for each state at 1971 census levels to encourage population control measures.
- **84th Amendment Act (2001):** Allowed territorial adjustments based on the 1991 census without changing the number of seats.
- **87th Amendment Act (2003):** Mandated delimitation based on the 2001 Census, keeping the existing seat allocation unchanged.

Delimitation in India So Far:
- **Conducted four times:** 1952, 1963, 1973, and 2002.
- The **first exercise (1950-51)** was done by the **President with the help of the Election Commission**.
- The **last full delimitation** that changed state-wise seat composition was in **1976**, based on the **1971 Census**.

Functions and Powers of the Delimitation Commission:
- **Redrawing Constituency Boundaries:** Ensures equal representation by adjusting seats based on population shifts.
- **Reservation of Seats:** Identifies and allocates seats for SC/ST candidates as per constitutional provisions.
- **Final Authority on Delimitation:** Its decisions are legally binding and cannot be challenged in any court.
- **Ensuring Electoral Equality:** Maintains uniform voter-to-representative ratio across constituencies.
- **Improving Electoral Participation:** Adjusts boundaries to avoid voter disparity and ensure fair elections.

Constitutional & Non- Constitutional Bodies

5. NATIONAL COMMISSION FOR SAFAI KARAMCHARIS (NCSK)

Context:

The Cabinet has extended the **National Commission for Safai Karamcharis (NCSK)** for three more years, till **March 31, 2028**. The extension aims to improve the working conditions of sanitation workers and eliminate manual scavenging.

About National Commission for Safai Karamcharis (NCSK):
- **What it is:** A government body working for the welfare of Safai Karamcharis (sanitation workers)
- **Established in:** 1994 under the National Commission for Safai Karamcharis Act, 1993
- **Headquarters:** New Delhi, India
- **Ministry Under:** Ministry of Social Justice and Empowerment
- **Aim:** Ensure the social, economic, and working condition improvement of sanitation workers and eliminate manual scavenging
- **Headed by:** Chairperson (Rank: Minister of State), Vice-Chairperson, and five members
- **Powers & Functions of NCSK:**
    - Recommends welfare programs **to eliminate inequalities** for Safai Karamcharis
    - Monitors the implementation of social and economic rehabilitation schemes.
    - Investigates complaints of **scheme violations, unsafe working conditions**, or discrimination.
    - Evaluates safety standards in sanitation work and makes recommendations.
    - Takes suo motu action on issues affecting Safai Karamcharis.

- Advises governments on policy and legal measures to safeguard sanitation workers.
- Oversees compliance with the **Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013.**
- Monitors Supreme Court directives, including compensation for sewer deaths (₹30 lakh per fatality).

- **How the Commission Works?**
  - **Field Visits:** Members travel across the country to assess the living and working conditions of Safai Karamcharis.
  - **Grievance Redressal:** Receives complaints and works with authorities for resolution.
  - **Proactive Monitoring:** Takes **Suo motu action** based on media reports or petitions.
  - **Policy Recommendations:** Suggests welfare measures and rehabilitation plans to the government.

Judiciary

6. RAREST OF RARE DOCTRINE

Context:

The Kolkata R.G. Kar Medical College case and the Sharon murder case led to contrasting judgments on the death penalty, reigniting debates on the application of the 'rarest of rare' doctrine in India.

- **What is the 'Rarest of Rare' Doctrine?**
  - The **'rarest of rare' doctrine** governs the **imposition of the death penalty** in India.
  - It mandates that **capital punishment** should only be awarded in **exceptional cases** where the crime shocks the collective conscience of society.
  - The doctrine ensures that the **death penalty remains the exception** rather than the rule, upholding **constitutional safeguards**.
- **Origin of the Doctrine:**
  - **Jagmohan Singh vs. State of Uttar Pradesh (1972):**
    - Supreme Court upheld the **constitutionality of the death penalty**, stating it does not violate **Articles 14, 19, and 21**.
    - No clear guidelines on when the **death penalty should be applied**, leaving it to **judicial discretion**.
  - **Bachan Singh vs. State of Punjab (1980):**
    - Established the **'rarest of rare' doctrine**, stating that **capital punishment should be given only in exceptional cases**.
    - The Court **did not define 'rarest of rare'**, leading to ambiguity.
- **Supreme Court's Framework on 'Rarest of Rare':**
  - **Machhi Singh vs. State of Punjab (1983):** The Court provided **five broad categories** where the **death penalty** may be justified:
    - **Manner of Crime:** Brutal, gruesome, or exceptionally heinous killings.
    - **Motive of Crime:** When the motive reveals **extreme moral depravity** or inhumanity.
    - **Impact on Society:** Murders that create **widespread social outrage**, such as hate crimes.
    - **Magnitude of the Crime:** Multiple murders or mass killings.
    - **Victim's Vulnerability:** When the victim is **a child, woman, elderly, or disabled person**.
- **Mithu vs. State of Punjab (1983):**
  - **Struck down Section 303 IPC**, which prescribed a **mandatory death penalty** for convicts already serving a life sentence.
  - Ruled that the **death penalty must always be discretionary**.

7. REMISSION

Context:

The Supreme Court directed states to consider the premature release of eligible prisoners without requiring an application.

- **What is Remission?**
  - **Remission is the reduction of a convict's sentence** before the completion of the full term.
  - It does not **erase the conviction** but shortens the **duration of imprisonment**.
- **Laws Governing Remission:**
  - **Section 473 of BNSS, 2023 & Section 432 of CrPC, 1973** empower state governments to grant remission.
  - **Articles 72 & 161 of the Constitution** allow the **President & Governor** to remit sentences.
  - **Section 475 of BNSS & Section 433A of CrPC** impose a **14-year minimum term** for life convicts.
- **Procedure for Granting Remission:**
  - **Prison authorities review cases** and recommend eligible convicts.

- **State governments consider applications** and grant remission based on predefined policies.
- If conditions are violated, **remission can be revoked**, and the convict can be re-arrested.

- **Past SC Judgments on Remission:**
  - **Sangeet & Anr. v State of Haryana (2013):** SC ruled that remission cannot be suo motu, requiring an application from the convict.
  - **Mohinder Singh v State of Punjab (2013):** Reaffirmed that remission must be initiated through an application, not by courts or the government automatically.
  - **Mafabhai Motibhai Sagar v. State of Gujarat (2024):** Held that remission conditions must be reasonable and cannot be arbitrarily stringent or vague.
- **Supreme Court's 2025 Judgment & Guidelines**
  - **Suo motu remission allowed:** If a remission policy exists, states must proactively consider eligible convicts without waiting for applications.
  - **Mandatory remission policy:** States without a remission policy must formulate one within two months.
  - **Conditions for remission:** Must be based on crime motive, criminal record, and public safety, ensuring rehabilitation.
  - **Protection against arbitrary cancellation:** Remission cannot be revoked for minor breaches, and convicts must get a notice and a chance to respond before cancellation.
  - **Transparency in remission decisions:** Legal aid authorities must track remission cases and maintain real-time data on a digital portal.

Governance

8. PRIME MINISTER DHAN-DHAANYA KRISHI YOJANA

Context:

Finance Minister announced the Prime Minister Dhan-Dhaanya Krishi Yojana in the Union Budget 2025-26, targeting 100 districts with low agricultural productivity.

About PM's Dhan-Dhaanya Krishi Yojana:

- **Ministry:** Ministry of Agriculture and Farmers' Welfare.
- **Outlay:** No separate allocation, but Rs 1,000 crore allocated for pulses, Rs 500 crore for fruits and vegetables, and Rs 100 crore for hybrid seeds.
- **Aim:** To boost agricultural productivity, crop diversification, post-harvest storage, irrigation facilities, and credit access in 100 low-productivity districts.
- **Features:**
  - Convergence of existing schemes and specialized measures.
  - Focus on sustainable agriculture and crop diversification.
  - Improved post-harvest storage at panchayat and block levels.
  - Enhanced irrigation and credit facilities.
  - Targets small and marginal farmers, rural women, and landless families.

9. NAKSHA PROJECT

Context:

The National Geospatial Knowledge-based Land Survey of Urban Habitations (NAKSHA) pilot project is set to launch in 152 Urban Local Bodies (ULBs) across 26 States and 3 Union Territories (UTs).

- **NAKSHA:** NAKSHA (National Geospatial Knowledge-based Land Survey of Urban Habitations) is a **geospatial technology-driven land survey initiative** aimed at **creating and updating land records in urban areas** to ensure transparency, efficiency, and accuracy in property ownership documentation.
- **Nodal Ministry:** Ministry of Rural Development, Government of India
- **Implemented by:** Department of Land Resources, in collaboration with Survey of India, and National Informatics Centre Services Inc. (NICSI).
- **Aims & Objectives:**
  - **Modernize Urban Land Records:** Ensure accurate, updated, and digitalized land ownership records.
  - **Enhance Urban Planning:** Facilitate smart city development and infrastructure planning.
  - **Reduce Land Disputes:** Minimize property disputes through **clear, verifiable records**.
  - **Foster Transparency:** Establish a **Web-GIS-based IT system** for land record management.
  - **Support Sustainable Development:** Improve **urban governance and land resource management**.

- **Key Features:**
  - **Drone-Based Land Survey:** High-precision aerial surveys for accurate mapping.
  - **Web-GIS Platform:** End-to-end IT-based land record management system.
  - **Public Accessibility:** Citizens can access digital land records for ease of living.
  - **Pilot Launch in 152 ULBs:** Across 26 States and 3 Union Territories (UTs).
  - **Estimated Cost:** ₹194 crore (100% funded by the Government of India).

10. DIGITAL BRAND IDENTITY MANUAL (DBIM)

Context:

The Government of India launched the **Digital Brand Identity Manual (DBIM)** and hosted the **First CIO Conference 2025** under the Gov.in: Harmonisation of Digital Footprint initiative.

- ***Gov.in: Harmonisation of Government of India's Digital Footprint Initiative*:** This initiative is aimed at **standardizing and integrating** all government digital platforms under a **single, cohesive digital identity** to enhance service delivery and citizen engagement.
- **Aim:**
  - **Ensure consistency in design, accessibility, and governance** across digital platforms.
  - **Improve efficiency and transparency** in e-governance.
  - Enable secure and **future-ready** digital infrastructure.
- **Features:**
  - **Unified Interface:** Establishes a **common digital framework** across government websites.
  - **User-Centric Design:** Makes platforms **accessible, mobile-friendly, and easy to navigate**.
  - **Seamless Integration:** Ensures **all government services are available under one digital umbrella**.
  - **Performance Optimization:** Enhances website **speed, security, and usability**.
  - Compliance with **Guidelines for Indian Government Websites and Apps (GIGW)** and **STQC Certification** for quality assurance.

Digital Brand Identity Manual (DBIM): The **Digital Brand Identity Manual (DBIM)** is a **framework for standardizing the digital identity** of government websites, portals, and social media platforms. It ensures **a unified, accessible, and citizen-centric digital experience** across ministries and departments.

- **Aim:**
  - **Create a cohesive digital presence** for all government platforms.
  - **Enhance transparency, accessibility, and efficiency** in digital governance.
  - **Align government websites with private sector** usability standards.
- **Features:**
  - **DBIM Toolkit:** Provides guidelines for digital branding, typography, and iconography.
  - **Gov.In CMS Platform:** Enables centralized management of government websites for consistency.
  - **Central Content Publishing System (CCPS):** Ensures uniform messaging and policy dissemination.
  - **Social Media Guidelines:** Standardizes government communication across digital platforms.
  - **Security & Innovation:** Integrates AI-driven tools and cybersecurity measures for a future-ready ecosystem.

11. BHARAT TECH TRIUMPH PROGRAM (TTP)

Context:

Bharat Tech Triumph Program (TTP) launched under the Create in India Challenge Season 1 to showcase India's gaming talent globally.

- Winners will present their innovations at the **Game Developers Conference (GDC) 2025 in San Francisco** and **WAVES Summit** in India.
- **What is the Bharat Tech Triumph Program?**
  - A national initiative to **promote India's gaming industry, innovation**, and interactive entertainment sector.
  - Provides global exposure to Indian game developers, startups, and tech companies.
- **Ministry & Organizers:**
  - **Ministry of Information & Broadcasting (MIB)** – Government body overseeing the initiative.
  - **Interactive Entertainment and Innovation Council (IEIC)** – Organizing partner.
- **Aim of the Program:**
  - Identify and promote Indian gaming talent on global platforms.
  - Support innovation in gaming, animation, and immersive technologies (Artificial Reality, Virtual Reality, Metaverse).
  - Encourage startups and studios to develop world-class games under the 'Create in India' initiative.

- **Key Features of Bharat Tech Triumph Program:**
  - Open to developers, studios, startups, and tech firms with a working prototype.
  - 3-stage selection process: Game submission, expert evaluation, and final showcase.
  - Winners get fully sponsored opportunities to present at GDC 2025 and WAVES.
  - Encourages cross-border collaborations, with 1,078 total registrations, including 12 international entries.

12. EX-GRATIA PAYMENT

Context:

The Ministry of Railways provided Rs 10 lakh ex-gratia to families of 18 deceased in the New Delhi Railway Station stampede, distributing it entirely in cash.

- **What is Ex-Gratia?**
  - **Ex-gratia** refers to **a payment made as a goodwill gesture**, not a legal obligation.
  - The government provides **ex-gratia relief** in cases like **accidents, natural disasters, and tragedies**.
- **Legal Framework Governing Ex-Gratia:**
  - No specific **statutory law** governs ex-gratia payments.
  - The **concerned ministry or department** determines the **amount and mode of disbursal**.
  - Railway ex-gratia payments follow the **Railway Accidents and Untoward Incidents (Compensation) Rules, 1990**.
- **Procedure for Ex-Gratia Payments:**
  - **Verification of Identity:** Aadhaar, legal heir certificate, and death certificate.
  - **Approval by Authorities:** Competent authority sanctions the amount.
  - **Disbursal of Funds:** Either **cash (immediate relief)** or **bank transfer (final payment)**.
- **Modes of Payment:**
  - **Cash:** Immediate assistance for initial expenses (Railway guidelines permit up to Rs 50,000 in cash).
  - **Bank Transfer:** Aadhaar-linked Direct Benefit Transfer (DBT) for full compensation.
  - **Cheque/NEFT:** Preferred for large amounts, ensuring accountability and transparency.
- **Difference Between Ex-Gratia and Compensation:**

Aspect	Ex-Gratia	Compensation
Nature	Voluntary, goodwill-based	Legal obligation
Purpose	Immediate relief	Compensation for loss or damage
Legal Basis	No legal requirement	Defined under law
Approval	By government/officials	Decided by courts or statutes

13. INTERNET SHUTDOWN IN INDIA

Context:

India experienced the highest number of internet shutdowns in 2024, surpassing Myanmar's 85, marking the first time in six years that India did not top the global list.

- **What is an Internet Shutdown?**
  - A government-imposed disruption of internet services to restrict access to online communication platforms.
  - Often used during protests, communal violence, exams, elections, and security operations.
- **Laws Governing Internet Shutdowns in India:**
  - **Indian Telegraph Act (1885):** Allows shutdowns in cases of "public emergency" or "public safety," but lacks clear definitions.
  - **Section 144 of CrPC (Pre-2017):** Used to impose internet bans under public safety concerns.
  - **Temporary Suspension of Telecom Services (2017):** Requires approval from a review committee within 48 hours and mandates transparency in shutdowns.
- **State-wise Internet Shutdowns in India (2024)**
  - **Manipur -** 21 shutdowns (Highest)
  - **Haryana -** 12 shutdowns
  - **Jammu & Kashmir -** 12 shutdowns
- **Reasons for Internet Shutdowns in India (2024)**
  - **Protests** - 41 shutdowns
  - **Communal violence** - 23 shutdowns
  - **Government job exams** - 5 shutdowns

14. SWAYATT INITIATIVE

Context:
The SWAYATT initiative on the Government e-Marketplace (GeM) has boosted participation in public procurement, with women entrepreneurs now comprising 8% of registered sellers.

- **What is SWAYATT?**
  - **Full Form**: Startups, Women & Youth Advantage Through e-Transactions.
  - **Launched On**: 19th February 2019.
  - **Ministry**: Ministry of Commerce and Industry, Government of India.
  - **Platform**: Integrated with the Government e-Marketplace (GeM).
- **Aim of SWAYATT:**
  - **Promote Inclusion:** Enhance participation of women-led enterprises, startups, and youth in public procurement.
  - **Empower Marginalized Groups:** Focus on Micro & Small Enterprises (MSEs), Self-Help Groups (SHGs), and backward sections of society.
  - **Facilitate Market Access:** Provide direct market linkages to government buyers without intermediaries.
  - **Boost Economic Growth:** Encourage hyper-local job creation and inclusive economic development.
- **Key Features:**
  - **Dedicated Storefronts:** Includes "Startup Runway" and "Womaniya" for startups and women entrepreneurs.
  - **Training and Onboarding:** Focuses on capacity-building for last-mile sellers and women entrepreneurs.
  - **MoU with FICCI-FLO:** Collaboration to empower 9,500+ women entrepreneurs through advocacy and training.
  - **Udyam-Verified Sellers:** Over 1,77,786 women-led MSEs registered on GeM, fulfilling orders worth ₹46,615 crore.
  - **Startup Ecosystem:** Supports 29,000+ startups, with cumulative orders worth ₹35,950 crore.

15. ONE NATION-ONE PORT (ONOP) INITIATIVE

Context:
Union Minister Sarbananda Sonowal launched the One Nation-One Port (ONOP) initiative to standardize and streamline port operations across India.

- **What is it?** A nationwide port standardization initiative designed to unify port documentation, streamline operations, and enhance global trade efficiency in India.

OTHER INITIATIVES LAUNCHED BY MINISTRY OF SHIPPING ARE:

1. SAGAR ANKALAN – LOGISTICS PORT PERFORMANCE INDEX (LPPI) 2023-24

Objective: Enhances port efficiency and **benchmarks performance** for operational excellence.
Key Features:
- Evaluates **cargo handling, turnaround time, berth idle time, and ship berth-day output.**
- Supports **PM Gati Shakti and National Logistics Policy.**
- Helps India move towards **globally competitive port infrastructure.**

2.BHARAT PORTS GLOBAL CONSORTIUM:

Objective: Expands **India's maritime reach** and strengthens the **global supply chain.**
Key Features:
- Integrates **IPGL (operations), SDCL (finance), and IPRCL (infrastructure development).**
- Supports **Make in India** by improving logistics and boosting exports.
- Strengthens **trade resilience and economic footprint** globally.

3. MAITRI (MASTER APPLICATION FOR INTERNATIONAL TRADE AND REGULATORY INTERFACE) & VIRTUAL TRADE CORRIDOR (VTC):

Objective: Enhances **global trade efficiency** through **AI and Blockchain integration.**
Key Features:
- Standardizes **trade documentation** and reduces processing time.
- Facilitates seamless trade between **India and UAE,** expanding to **BIMSTEC and ASEAN nations.**
- Strengthens **India's position as a leader in digital trade facilitation.**

- **Ministry:** Ministry of Ports, Shipping, and Waterways (MoPSW)
- **Aim:**
  - **Remove inconsistencies** in port documentation and processes.
  - **Enhance ease of doing business** by reducing delays and inefficiencies.
  - **Improve global trade competitiveness** by standardizing logistics.
  - **Reduce carbon footprint** through efficient port operations.
- **Key Features:**
  - **Standardized Port Documentation**: Reduces paperwork, bringing **container operation documents down by 33% (143 to 96)** and **bulk cargo documents by 29% (150 to 106)**.
  - **Sagar Ankalan LPPI Index**: Introduced to **benchmark port performance** and **drive operational excellence**.
  - **Integration with Digital Trade**: Supports the **MAITRI initiative** for AI and blockchain-based trade facilitation.
  - **Bharat Ports Global Consortium:** Strengthens **global supply chains** and expands India's maritime footprint.
  - **Aligned with PM Gati Shakti and National Logistics Policy**: Supports India's **economic growth strategy** through **seamless logistics and trade infrastructure**.

International Relations

16. THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)

Context:
The closure of the United States Agency for International Development (USAID) under the Trump administration has raised concerns about setbacks in health, climate, and development programmes in India.

About *United States Agency for International Development* (USAID):
- It is an **independent US government agency** responsible for **civilian foreign aid** and development assistance.
- It is one of the **largest aid agencies in the world**, accounting for over half of all US foreign assistance.
- **Headquarters:** Washington, D.C., USA.
- **Established:** 1961 via an executive order by **President John F. Kennedy** under the Foreign Assistance Act.
- **Aim of USAID:**
  - To **alleviate poverty**, promote education and healthcare, and strengthen democracy and governance in developing nations.
  - To provide **humanitarian assistance**, disaster relief, and support for climate resilience and economic development.
- **Key Functions of USAID:**
  - **Funding NGOs, foreign governments, and international organizations** for development projects.
  - Supporting **economic growth, food security, and climate action**.
  - Providing **emergency humanitarian relief** in crisis-affected countries.
  - Promoting **human rights, democracy, and governance reforms**.
- **Contribution to India:**
  - **Healthcare Initiatives:** Helped reduce maternal and child mortality, tackled tuberculosis (TB), HIV, and sanitation issues.
  - **Water & Sanitation (WASH):** Played a key role in making 1,000 cities open-defecation-free and reducing diarrheal deaths.
  - **Clean Energy & Climate Resilience:** Supported solar energy deployment, green bonds, and sustainable forestry projects.

17. BEGGAR-THY-NEIGHBOUR POLICIES

Context:
The concept of beggar-thy-neighbour policies has gained renewed attention due to rising protectionism and trade wars, particularly under populist regimes like the Trump administration in the U.S.

- **What is Beggar-Thy-Neighbour Policy?**
  - Economic policies aimed at benefiting a country's economy at the expense of others, often through **protectionist measures** like tariffs, quotas, or currency devaluation.
  - Coined by **Adam Smith** in his 1776 book, "***The Wealth of Nations***", to critique mercantilist trade practices.

- **Features:**
  - **Tariffs and Quotas:** Imposing high tariffs or strict import quotas to protect domestic industries.
  - **Currency Wars:** Deliberate devaluation of the domestic currency to boost exports and reduce imports.
  - **Trade Surplus Focus:** Aimed at achieving a trade surplus by increasing exports and decreasing imports.
- **Significance:**
  - **Short-Term Gains:** Protects domestic industries, preserves jobs, and supports national security.
  - **Global Trade Disruptions:** Can lead to retaliatory measures, causing a decline in global trade and investment.
  - **Historical Impact:** Contributed to the **Great Depression** in the 1930s due to retaliatory tariffs and competitive devaluations.
  - **Pros:**
    - Protects nascent industries and ensures national security.
    - Boosts domestic demand by making exports cheaper and imports costlier.
  - **Cons:**
    - Leads to **global trade wars**, harming all economies involved.
    - Harms domestic consumers by increasing prices and reducing purchasing power.
    - Retaliatory measures can exacerbate economic downturns, as seen during the Great Depression.

18. DONKEY ROUTE

Context:
Delhi has emerged as a major transit hub for illegal immigration through Donkey Routes to the US, with a 100% surge in arrests of agents and facilitators in 2024.

About the 'Donkey Route':

- **What it is:** The ‹Donkey Route› refers to an illegal immigration method where individuals take circuitous routes through multiple countries to avoid detection while attempting to reach the US.
- **Features:**
  - **Indirect Travel:** Avoids direct flights to the US, instead using pit-stops in random countries to evade suspicion.
  - **Fake Documents:** Relies on counterfeit visas, forged immigration stamps, and fabricated travel histories.
  - **Syndicate Networks:** Operated by organized networks of agents and facilitators across India and abroad.

- **Impacts:**
  - **Exploitation of Migrants:** Desperate individuals are often misled, financially exploited, and left stranded in foreign countries.
  - **Security Risks:** Poses challenges to national and international security by enabling illegal entry.
  - **Economic Burden:** Strains resources of both origin and transit countries due to increased enforcement and deportation costs.

19. AFRICAN-ASIAN RURAL DEVELOPMENT ORGANIZATION (AARDO)

Context:

The 21st African-Asian Rural Development Organization (AARDO) conference concluded in New Delhi, reaffirming commitment to community-driven rural development and South-South cooperation.

- **What is AARDO?**
  - **AARDO (African-Asian Rural Development Organization)** is an intergovernmental organization promoting **rural development cooperation** between **Asia and Africa**.
- **Established in: March 31, 1962**, with the adoption of its **Constitution in Cairo, Egypt**.
- **History & Evolution:**
  - Originated from the **1955 East Asian Rural Reconstruction Conference** in Tokyo.
  - Officially formed after the **1961 Afro-Asian Conference on Rural Reconstruction in New Delhi**.
  - Permanent **headquarters established in New Delhi, India**, in **1966**.
- **Headquarters:** New Delhi, India
- **Members:** Currently includes **33 member countries** from **Asia and Africa**.
- **Aims of AARDO:**
  - **Foster South-South Cooperation:** Strengthen economic and technical collaboration for rural development.
  - **Enhance Agricultural & Rural Policies:** Promote sustainable agricultural growth, poverty alleviation, and food security.
  - **Knowledge Exchange:** Facilitate training programs, research, and expertise-sharing between member nations.
- **Functions and Powers:**
  - **Policy Coordination:** Acts as a forum for policy dialogues among Asian and African nations.
  - **Capacity Building:** Organizes seminars, workshops, and training programs for rural development.
  - **Technical Assistance:** Provides advisory services, financial aid, and technology transfer to member countries.
  - **International Collaboration:** Works with UN agencies (FAO, IFAD, UNESCO, UNDP, ICA) for rural development projects.
  - **Promotes Sustainable Agriculture:** Focuses on climate-resilient farming, rural infrastructure, and agri-tech innovations.

20. GOLD CARD VISA

Context:

The US is set to reintroduce its EB-5 visa program as the "Gold Card" visa, requiring a $5 million investment for a green card and path to citizenship.

- **What is an Investment Visa?**
  - An **investment visa** allows individuals to obtain **residency or citizenship** in a foreign country by making **financial investments**.
  - These visas are commonly referred to as **Golden Visas**, offering **long-term residency, tax benefits, and business opportunities**.
- **Eligibility Criteria:**
  - **Minimum Investment Requirement:** Varies by country, typically ranging from **$200,000 to $5 million**.
  - **Type of Investment:** Real estate, busi-

ness capital, government bonds, or economic development funds.
    - **Minimum Stay Requirement:** Some countries mandate **a specific number of days of residence per year**.
- **Countries Offering Golden Visas:**
    - **UAE**: Requires an **AED 2 million** investment for **10-year residency**.
    - **Portugal**: Investment in **funds (€500,000) or job creation** (real estate option removed).
    - **New Zealand**: Relaxed requirements to **attract wealthy investors** post-recession.
- **Procedure & How It Works:**
    - **Application Submission:** Investor submits financial documents, proof of funds, and investment plans.
    - **Background Check:** Government conducts **due diligence** and verifies source of funds.
    - **Investment Confirmation:** Investor **transfers the required funds** into an approved investment channel.
    - **Residency Approval:** If all conditions are met, a **residency permit is granted**.
    - **Path to Citizenship:** Some countries offer **citizenship after 5-10 years** of continuous residency.

GS-3

Indian Economy

21. FINANCIALISATION

Context:

The Economic Survey 2025 cautions against excessive financialisation in India, warning that it could harm the economy by increasing inequality, debt levels, and over-reliance on asset prices for growth.

- Financialisation refers to the growing dominance of financial markets, institutions, and motives in shaping economic policies and outcomes.
- **Factors leading to it:**
    - Increased household savings flowing into stock markets.
    - Rising participation of retail investors in financial markets.
    - Over-reliance on asset prices to offset leverage.
    - Policy and regulatory frameworks influenced by financial market considerations.
- **Implications:**
    - Rising public and private sector debt.
    - Exacerbation of economic inequality.
    - Over-dependence on financial markets for economic growth.

22. PRESUMPTIVE TAXATION

Context:

Finance Minister introduced a presumptive taxation regime for non-residents in the Union Budget 2025-26, specifically targeting those providing services in India's electronics manufacturing sector.

Presumptive Taxation:

A simplified tax scheme where income is calculated based on a **presumed rate of profit rather than actual income.** Designed to reduce compliance burden and simplify tax filing for small businesses and professionals.

- **Eligibility:**
    - Non-residents providing services or technology to Indian companies setting up or operating electronics manufacturing facilities.
    - Excludes businesses like **goods carriage, agency work, and professions** requiring detailed bookkeeping.
- **Why Imposed?**
    - To attract foreign technicians and companies to India's electronics and semiconductor sectors.
    - To provide tax certainty and reduce compliance burdens for non-residents.
    - To align with India's goal of becoming a global manufacturing hub under initiatives like **Make in India**.
- **Impacts on Economy:**
    - **Boost to Electronics Manufacturing:** Encourages foreign investment and technology transfer in critical sectors like semiconductors.
    - **Job Creation:** Increased foreign presence will create skilled and semi-skilled jobs.
    - **Reduced Compliance Burden:** Simplifies tax filing for non-residents, making India a more attractive destination for business.

- **Global Competitiveness:** Enhances India's position as a preferred manufacturing base for electronics and semiconductors.

Key Highlights of Presumptive Taxation in Budget 2025

1. **New Section 44BBD:**
   - Introduced in the Income Tax Act for non-residents in electronics manufacturing.
   - 25% of gross receipts deemed as income, taxed at 35%, resulting in an effective tax rate of less than 10%.
2. **Exclusion from Significant Economic Presence (SEP):**
   - Non-residents purchasing goods in India for export will not be considered to have a significant economic presence in India.
   - Provides clarity and reduces tax liability for export-oriented activities.
3. **Effective Date:**
   - Applicable from **April 1, 2026**, for the assessment year 2026-27 and subsequent years.

23. INSURANCE SECTOR AND FDI LIMIT

Context:

The Union Budget 2025-26 proposed raising the FDI limit in the insurance sector from 74% to 100%, aiming to attract global investments and achieve the goal of 'Insurance for All by 2047'.

- **Insurance Sector -** A critical component of the financial services industry, providing risk protection through life, health, and general insurance products. Plays a vital role in economic stability by offering financial security against unforeseen events.
- India is the **10th largest insurance market** globally and the **2nd largest** among emerging markets.
- The market is projected to reach **USD 222 billion by 2026**.
- **Insurance Density:**
  - It is the ratio of premiums collected by insurance companies to the country's population
  - Increased from **USD 11.1 in 2001 to USD 95 in 2023-24**.
    - **Life Insurance Density:** Stable at **USD 70**.
    - **Non-Life Insurance Density:** Rose from **USD 22 to USD 25**.
- **Insurance Penetration:**
  - It is the percentage of a country's insurance premiums to its gross domestic product (GDP).
  - It's a measure of how developed a country's insurance sector is.
  - Declined from **4% in 2022-23 to 3.7% in 2023-24**.
    - **Life Insurance Penetration:** Fell from **3% to 2.8%**.
    - **General Insurance Penetration:** Remained at **1%**.
- **LIC and Market Composition:**
  - **Life Insurance Corporation (LIC):** Holds **62.58% market share** in new business premiums (FY23).
  - **Private Sector:** Market share in general and health insurance rose from **48.03% in FY20 to 62.5% in FY23**.

Key Reforms in Budget 2025-26:

1. **FDI Limit Increased to 100%:**
   - Aimed at attracting global investors and fostering innovation.
   - **Condition:** Companies must invest the entire premium in India.
2. **GST Rationalization:** Current GST rate of **18%** on insurance premiums remains unchanged, but discussions are ongoing for potential reductions.

24. JEVONS PARADOX

Context:

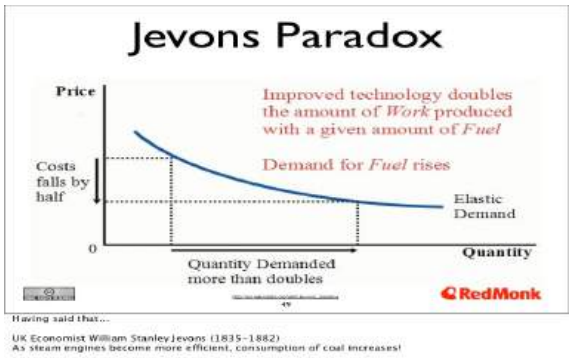
The Jevons Paradox has resurfaced in economic discussions after the DeepSeek AI launch led to a selloff in global tech stocks, raising concerns over AI chip demand.

About *Jevons Paradox*:

- **What is Jevons Paradox?**
  - It states that when a resource becomes more **efficient** and **cheaper** to use, **overall consumption increases** instead of decreasing.
- **Theory & Origin:**
  - Proposed by **William Stanley Jevons** in 1865, observing that **improved coal efficiency** led to higher coal

consumption instead of savings.

- **Factors Influencing Jevons Paradox:**
  - **Cost Reduction:** Lower usage costs drive higher demand.
  - **Increased Accessibility:** Efficiency makes resources more widespread.
  - **Economic Growth:** Higher productivity spurs industrial expansion.
  - **Elastic Demand:** When demand is highly responsive to price changes, consumption rises sharply.
- **Significance in AI & Energy:**
  - **Artificial Intelligence:** Efficient AI chips may increase AI model adoption instead of reducing chip demand.
  - **Energy Efficiency:** More efficient technologies can lead to higher total energy consumption due to increased use.
  - **Policy Implications:** Governments must combine efficiency with regulatory measures (taxes, quotas) to avoid resource overuse.



25. DEBT-TO-GDP RATIO

Context:

The Union Government has announced a shift from fiscal deficit to debt-to-GDP ratio as the primary fiscal anchor from **FY 2026-27, targeting a 50±1% ratio by 2031**.

About *Debt-to-GDP Ratio:*

- It represents the proportion of a country's total debt to its GDP, indicating economic stability and repayment capacity.
- **Formula:**

$$\text{Debt-to-GDP Ratio} = \frac{\text{Total National Debt}}{\text{Total GDP}} \times 100$$

What it represents?

- A **higher ratio** signals increased risk of **default and financial instability**.
- A **lower ratio** indicates better **fiscal health and investor confidence**.
- Debt sustainability depends on **growth rates, fiscal deficit trends,** and interest payments.

Limitations of Debt-to-GDP Ratio

- **Does Not Reflect Debt Composition:** Ignores internal vs. external debt dynamics.
- **Fails to Consider Fiscal Policy:** Does not capture spending efficiency or investments.
- **No Direct Correlation with Default Risk:** Some high-debt countries remain solvent due to economic strength.

Need for India's Shift to a New Fiscal Anchor

- **Long-term Fiscal Stability:** Debt-based targets ensure sustainable government borrowing.
- **Greater Policy Flexibility:** Reduces reliance on annual fiscal deficit limits.
- **Transparency & Accountability:** Addresses off-budget borrowings and improves public finance management.
- **Global Alignment:** Aligns India's fiscal strategy with international best practices.
- **Growth-Enhancing Expenditure:** Ensures public spending focuses on productive sectors without excessive debt accumulation.

26. GRAMEEN CREDIT SCORE

Context:

The Grameen Credit Score, introduced in the Union Budget 2025 by Finance Minister, aims to enhance financial inclusion for rural women entrepreneurs and Self-Help Groups (SHGs).

About *Grameen Credit Score:*

- **What it is:**
  - The Grameen Credit Score is a digital framework designed to assess the creditworthiness of rural women

entrepreneurs and Self-Help Groups (SHGs). It aims to bridge the gap between informal rural economies and formal financial systems.

- **Aim:**
  - To promote financial inclusion for rural women and SHGs.
  - To formalize SHG transactions and integrate them into India's central credit system.
  - To empower rural women entrepreneurs by providing them access to credit, loans, and financial products.
- **How it works:**
  - **Credit Assessment:**
    - The score evaluates the creditworthiness of SHGs and rural women based on their financial transactions, repayment history, and business activities.
    - It uses a digital framework to analyze data, ensuring transparency and accuracy.
  - **Integration with Financial Institutions:**
    - Public sector banks are primarily responsible for developing and implementing the scheme.
    - Financial institutions use the score to offer tailored financial products, such as loans and credit cards, to SHGs and rural women.
- **Institutions Covered:** Public sector banks, Regional Rural Banks (RRBs), Microfinance institutions (MFIs), Other financial institutions involved in rural credit.
- **Features:**
  - **Enhanced Financial Access:**
    - Enables rural women to access credit cards, loans, and other financial products.
    - Introduces concepts like EMIs, creditworthiness, and loan repayment to SHGs.
  - **Customized Financial Products:**
    - Offers tailored credit cards for micro-enterprises with limits up to ₹5 lakh.
    - Provides flexible loan options to support business expansion.
  - **Improved Credit Assessment:**
    - Addresses gaps in the current credit bureau system, which often overlooks SHG members.
    - Ensures a fair and transparent evaluation of creditworthiness.
  - **Economic Stability:**
    - Empowers rural women to contribute more effectively to their households and communities.
    - Promotes sustainable development and poverty alleviation.
  - **Digital Framework:**
    - Leverages technology to create a seamless and efficient credit assessment system.
    - Ensures easy access to credit scores and financial products for rural women.

27. 'BANK.IN' DOMAIN

Context:

The Reserve Bank of India (RBI) introduced the exclusive 'bank.in' domain for Indian banks to tackle financial fraud, enhance cybersecurity, and ensure safer digital transactions.

About *'bank.in':*

- **Definition & Purpose:**
  - **'bank.in' is an exclusive internet domain** for all registered Indian banks.
  - It aims to **differentiate legitimate banking websites from fraudulent ones**, reducing cyber threats.
- **How It Works?**
  - Starting **April 2025, all Indian banks must operate under 'bank.in'**, ensuring a secure and verified online presence.
  - Customers can **easily identify genuine banking platforms**, preventing phishing and financial fraud.
- **Key Features & Functions:**
  - **Fraud Prevention:** Eliminates fake banking sites that deceive customers.
  - **Regulatory Compliance:** Mandatory for all Indian banks, ensuring a standardized domain structure.
  - **Customer Protection:** Enhances public trust by providing **a verified and secure banking domain**.
  - **Cybersecurity Enhancement:** Reduces risks from **phishing attacks, cyber frauds, and identity theft**.
  - **Financial Sector Expansion:** RBI plans to **introduce 'fin.in' for broader financial services** beyond banking.
- **Additional Cybersecurity Measures:**
  - **Additional Factor of Authentication (AFA)** extended to international digital transactions.
  - **NBFCs and banks required to enhance cyber risk detection** and incident response strategies.

28. 'TAX YEAR' CONCEPT

Context:

The Income-Tax Bill, 2025, introduced a new 'Tax Year' concept, replacing the existing Assessment Year, aiming to simplify tax reporting.

- **What is the 'Tax Year' Concept?**
  - The Tax Year refers to a **12-month period** starting from April 1, during which income will be assessed and taxed in the same financial year.
  - It replaces the **Assessment Year system**, where income was taxed in the year following the financial year in which it was earned.
- **Key Differences from the Old Regime:**

Feature	Old Regime (Assessment Year)	New Regime (Tax Year)
Definition	Income taxed in the following year	Income taxed in the same year
Reporting System	Delayed assessment process	Real-time tax reporting
Flexibility	Rigid compliance structure	More adaptable tax reporting
Clarity	Complex cross-referencing	Simplified, structured taxation

Features of the 'Tax Year' Concept:

  - **Synchronizes Income & Taxation:** Ensures taxes are paid in the **same year** income is earned.
  - **Simplifies Compliance:** Reduces confusion regarding **financial year and assessment year**.
  - **Modernized Tax Framework:** Makes **tax filing more transparent and efficient**.
  - **Enhances Revenue Collection:** Reduces tax evasion by enabling **real-time assessment**.
  - **Improves Clarity:** Tax deductions, rates, and exemptions presented in a **tabular format** for better understanding.
- **Significance of the New Tax Year System:**
  - **Aligns with Global Practices:** Brings India closer to international taxation standards.
  - **Eases Taxpayer Burden:** Simplifies tax filing and assessment for individuals and businesses.
  - **Reduces Litigation & Disputes:** Transparent assessment minimizes **errors and delays in tax processing**.
  - **Enhances Government Efficiency:** Streamlines tax administration for **faster refunds and revenue collection**.
  - **Facilitates Digital Taxation:** Encourages smoother **e-filing and digital tax compliance**.

29. TOBIN TAX

Context:

U.S. President Donald Trump's administration is considering imposing a Tobin Tax on capital flows, a move that could disrupt global financial markets.

About *Tobin Tax*:

- **What is Tobin Tax?**
  - The Tobin Tax is a tax on **foreign exchange transactions** aimed at discouraging short-term speculative trading.
  - It is a **small levy (0.1%-0.5%)** on currency conversions to reduce volatility in financial markets.
- **Origin and Economic Theory:**
  - Proposed in **1972 by James Tobin**, a Nobel Prize-winning economist, in response to currency market fluctuations after the collapse of the Bretton Woods system.
  - Aimed at **"throwing sand in the wheels"** of currency speculation to stabilize exchange rates.
- **Features of Tobin Tax:**
  - Applied on **currency transactions** to deter short-term speculation.
  - **Low tax rate** to prevent market disruption.
  - Revenue generated can be used **for public welfare** or development projects.
- **Positives and Negatives of Tobin Tax:**

Aspect	Advantages	Disadvantages
Market Stability	Reduces speculative trading and volatility.	May lower market liquidity.
Revenue Generation	Can generate significant revenue for governments.	Difficult to implement uniformly across nations.

Currency Protection	Helps protect weaker currencies from speculative attacks.	May increase transaction costs for businesses and investors.
Fairer Global Economy	Limits financial power of hedge funds and big investors.	May push financial transactions to tax-free zones (offshore havens).

- **Does India Have a Tobin Tax?**
  - India **does not directly** impose a Tobin Tax on currency transactions.
  - However, **Securities Transaction Tax (STT), introduced in 2004,** acts as a Tobin-like tax on stock market transactions.
  - **Foreign Portfolio Investments (FPIs)** are also subject to taxation, indirectly influencing capital flows.

30. RECIPROCAL TARIFFS

Context:

US President Donald Trump announced "reciprocal tariffs" on all trading partners, including allies, signalling a shift away from WTO trade norms.

- **What is a Reciprocal Tariff?**
  - A **tax on imports** that mirrors the tariff charged by a country on **US exports**.
  - **Objective:** To create a **"fair" trading system** by equalizing tariffs globally.
- **How Do Reciprocal Tariffs Work?**
  - **Tariff Matching:** US will impose the **same tariff rates** that other countries apply to US goods.
  - **Subsidy Consideration:** The US will factor in **export subsidies and incentives** given by countries like **India** before deciding the final tariff.
  - **Elimination of Differential Treatment:** Developing nations, including India, will no longer get tariff relaxations, unlike in the past under WTO rules.
- **How Will Reciprocal Tariffs Be Calculated?**
  - **Comprehensive Assessment:** The **US Trade Department** will evaluate **all direct and indirect support** (e.g., tax breaks, subsidies) that other countries offer to their exporters.
  - **Expected Tariff Rise:** India, being a **subsidy-driven economy**, could face **higher tariff barriers** for exports like textiles, pharmaceuticals, and automobiles.
  - **Deadline:** Final tariff rates will be determined by **April 2025**.
- **Impact on India**
  - **Exports Will Become Costlier:** US may increase tariffs on Indian goods, making textiles, pharmaceuticals, and auto parts less competitive.
  - **Trade Deficit Will Shrink:** India may import more from the US (like defense equipment, oil, and gas) to balance trade, reducing its $38 billion trade surplus with the US.
  - **Rupee May Weaken:** More imports mean higher demand for US dollars, leading to a weaker rupee, increasing India's import bill.
  - **Atmanirbhar Bharat May Suffer:** India's self-reliance push may slow down if the US pressures India to buy American goods.
  - **Impact on Foreign Investments:** US firms may push for local production in India to avoid high tariffs, boosting FDI (Foreign Direct Investment).

31. DEPOSIT INSURANCE AND CREDIT GUARANTEE CORPORATION (DICGC)

Context:

The Finance Ministry is considering increasing the deposit insurance limit, which currently stands at ₹5 lakh under the Deposit Insurance and Credit Guarantee Corporation (DICGC) Act, 1961.

- **What it is?**
  - DICGC is a subsidiary of the Reserve Bank of India (RBI) that provides deposit insurance to bank depositors, ensuring the safety of their money in case of bank failures.
- **History:**
  - First considered in **1948** after banking crises in Bengal and revisited in 1960 after the collapse of Palai Central Bank & Laxmi Bank.
  - The **Deposit Insurance Corporation Act, 1961,** came into force on January 1, 1962.
  - Merged with the Credit Guarantee Corporation in 1978 to form DICGC under the Ministry of Finance.

- **Ministry:** Operates under the Department of Financial Services, Ministry of Finance.
- **Aim:** To protect depositors' funds and maintain public confidence in the banking system.
- **Functions:**
  - Insures deposits of banks against failure.
  - Provides credit guarantees to priority sector lending institutions.
  - Monitors bank financial health and steps in when required.
- **Features of Deposit Insurance:**
  - **Existing Limit:** Each depositor insured up to ₹5 lakh (including principal and interest) per bank, per depositor.
  - **Coverage:** Includes commercial banks, regional rural banks, foreign banks operating in India, and cooperative banks.
  - **What is Covered?**
    - Savings accounts, fixed deposits, current accounts, and recurring deposits.
  - **What is NOT Covered?**
    - Deposits of foreign governments, central/state governments, and inter-bank deposits.
    - Deposits with State Land Development Banks.
    - Deposits outside India and exempted by RBI approval.
  - **Multiple Branches in Same Bank?**
    - Deposits across different branches of the same bank are clubbed under one insurance cover.

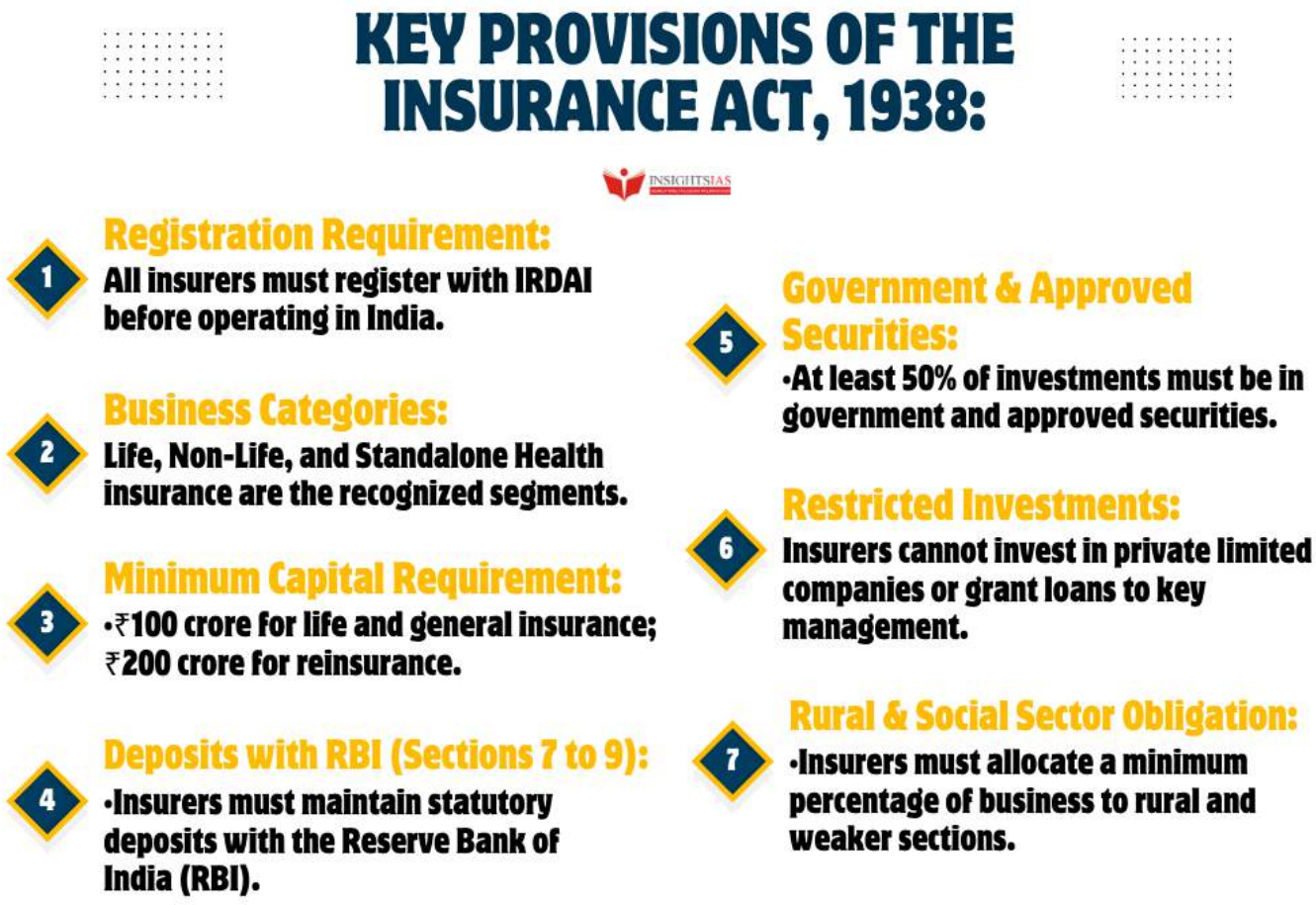
32. DINESH KHARA COMMITTEE

Context:

The Insurance Regulatory and Development Authority of India (IRDAI) has formed a high-powered committee, led by former SBI chairman **Dinesh Khara**, to review key provisions of the **Insurance Act, 1938.**

Purpose:

- **Review and update** the **Insurance Act, 1938** to align with modern needs.



- Assess the feasibility of **100% FDI in the insurance sector**.
- Facilitate the introduction of **composite insurance companies** (offering life, non-life, and health insurance under one entity).
- Strengthen **policyholder protections** and ensure **revenue retention within India**.
- Propose amendments to be forwarded to the **Union Finance Ministry** for legislative action.

33. RUPEE & DOLLAR SWAP AUCTIONS

Context:
RBI announced a $10 billion USD/INR buy/sell swap auction to inject ₹86,000 crore into the banking system.

Rupee & Dollar Swap *Auctions:*

- It is a tool used by **RBI** to **manage liquidity** in the economy and **stabilize currency volatility**.
- Banks **sell US dollars** to RBI in exchange for rupees in the first leg and agree to **repurchase dollars at a future date**.
- **Who Conducts It?**
  - The **Reserve Bank of India (RBI)**, as part of its monetary policy interventions, executes the **swap auctions**.
- **How It Works?**
  - **First Leg (Buy Phase):** Banks **sell USD** to RBI and receive **Indian Rupees** (INR).
  - **Reverse Leg (Sell Phase):** Banks **buy back USD** from RBI at a pre-determined price at the end of the swap period.
- **Key Features of the Swap:**
  - **Tenor:** Can be **short-term (6 months)** or **long-term (3 years or more)**.
  - **Liquidity Management:** Used to **infuse or absorb rupee liquidity** in the system.
  - **Forex Reserve Utilization:** RBI uses its **forex reserves** to regulate currency flows.
  - **Impact on Exchange Rate:** Helps stabilize **rupee fluctuations** against the dollar.
- **Impact on the Indian Economy:**
  - **Improves Banking Liquidity:** Injects Rs 86,000 crore into the banking system, addressing the current liquidity shortfall of Rs 1.7 lakh crore.
  - **Enhances Monetary Policy Transmission:** Ensures that interest rates in money markets align with RBI's policy stance.
  - **Strengthens the Rupee:** Reduces depreciation pressure on INR due to forex market fluctuations.
  - **Supports Economic Growth:** Enables banks to lend more to businesses and industries, promoting investment and consumption.
  - **Controls Inflation Risks:** Provides liquidity without increasing inflationary pressures, as money is infused against future forex obligations.

Agriculture

34. CARDAMOM

Context:
An international research team has identified **two new species of cardamom** in Kerala's Western Ghats, expanding the genus *Elettaria* to seven species.

About Cardamom:

- **What is Cardamom?**
  - Known as the **"Queen of Spices,"** cardamom (*Elettaria cardamomum*) is a highly aromatic spice belonging to the Zingiberaceae (ginger) family.
  - Native to the **evergreen rainforests of the Western Ghats** in South India, it is primarily cultivated in **Kerala, Karnataka, and Tamil Nadu**.
- **Climatic Conditions for Growth:**
  - **Rainfall:** 1500–4000 mm annually.
  - **Temperature:** 10°C to 35°C.
  - **Altitude:** 600–1500 meters above sea level.
  - **Soil:** Acidic, loamy, and humus-rich forest soils with a pH of 5.0–6.5.
- **State-wise Production:**
  - **Kerala:** Contributes **58%** of India's cardamom production, primarily in **Idukki district**.

- **Karnataka:** Major production in **Kodagu and Chikmagalur districts**.
- **Tamil Nadu:** Cultivated in the **Nilgiri hills**.

- **Newly Identified Cardamom Species:**
  - **Elettaria facifera:** Found in **Periyar Tiger Reserve, Idukki**.
  - **Elettaria tulipifera:** Discovered in **Agasthyamalai hills (Thiruvananthapuram)** and **Munnar (Idukki)**.
  - These species were previously misclassified under the genus *Alpinia* and have now been reclassified under *Elettaria*.
- **Significance of the Discovery:**
  - **Biodiversity Conservation:** Highlights the rich flora of the Western Ghats, a global biodiversity hotspot.
  - **Genetic Resources:** Offers potential for developing new cardamom varieties with enhanced traits like disease resistance and higher yield.
  - **Economic Impact:** Strengthens India's position as a leading cardamom producer and exporter, second only to Guatemala globally.

35. EXTRA-LONG STAPLE (ELS) COTTON

Context:

Union Finance Minister announced a five-year mission to boost the productivity and sustainability of Extra-Long Staple (ELS) cotton farming in India during the Union Budget 2025-26.

- **What is ELS Cotton?**
  - ELS cotton refers to cotton varieties with **fibre lengths of 30 mm and above**, known for their **superior quality, softness, and durability**.
  - Primarily derived from the **Gossypium barbadense** species, also known as **Egyptian or Pima cotton**.
- **Features:**
  - **Longer Fibres:** Fibre length exceeds 30 mm, making it ideal for premium textiles.
  - **High Quality:** Produces finer, stronger, and smoother yarns, used in luxury fabrics.
  - **Durability:** Resistant to wear and tear, suitable for high-end clothing and home textiles.
- **Regions Grown In:**
  - **Global:** Mainly grown in **Egypt, China, Australia, and Peru**.
  - **India:** Cultivated in **Atpadi taluka (Maharashtra)**, **Coimbatore (Tamil Nadu)**, and parts of **Karnataka** and **Madhya Pradesh**.
- **Difference Between Short, Medium, and Long Staple Cotton**:

Parameter	Short Staple	Medium Staple	Long Staple (ELS)
Fibre Length	Below 25 mm	25-28.6 mm	30 mm and above
Species	Gossypium hirsutum	Gossypium hirsutum	Gossypium barbadense
Quality	Coarser, less durable	Moderate quality	Superior quality
Uses	Low-cost textiles	Everyday fabrics	Luxury textiles
Yield per Acre	High	Moderate	Low (7-8 quintals)

Issues with ELS Cotton in India:

- **Low Yield:** ELS cotton yields **7-8 quintals per acre**, significantly lower than medium staple varieties (10-12 quintals).
- **Lack of Market Linkages:** Farmers struggle to secure premium prices for ELS cotton due to inadequate market access and infrastructure.
- **Technological Gaps:** Limited access to advanced seeds, agronomic practices, and pest-resistant technologies like **HtBT cotton**.
- **Import Dependency:** India imports **90% of its ELS cotton** (20-25 lakh bales annually) to meet textile industry demands.

36. REVISED MARKET INTERVENTION SCHEME (MIS) GUIDELINES

Context:

The Government has revised the Market Intervention Scheme (MIS) guidelines, increasing the procurement limit from 20% to 25% and expanding procurement agencies.

About *Market Intervention Scheme (MIS)*:

- **What is Market Intervention Scheme (MIS)?**
  - A **price support scheme** under the **Department of Agriculture & Farmers' Welfare**.
  - Part of the **PM-AASHA scheme**, ensuring **remunerative prices** for farmers.
  - Covers **perishable crops (horticultural & agricultural commodities)** that do not have **Minimum Support Price (MSP)**.
  - Implemented **on request of State/UT Governments** when market prices drop **by at least 10% compared to the previous season**.
- **Key Features of MIS:**
  - **Ad-hoc Scheme:** Applied during **market price crashes**.
  - **State-Central Cost Sharing:** 50:50 (75:25 for North-Eastern States).
  - **Operational by NAFED, NCCF & State Agencies.**
- ***Revised Market Intervention Scheme* (MIS):**
  - **Increased Procurement Limit:** Procurement coverage **raised from 20% to 25%** of total production.
  - **Direct Benefit Transfer (DBT) Option:** States can now **pay farmers directly** for the price difference between the Market Intervention Price (MIP) and market price.
  - **Expanded Procurement Agencies:**
    - **Farmer Producer Organizations (FPOs), Farmer Producer Companies (FPCs), State-nominated agencies**, and **Central Nodal Agencies (NAFED, NCCF)** will procure TOP (Tomato, Onion, Potato) crops.
  - **Reimbursement of Storage & Transport Costs:**
    - **Central Nodal Agencies (CNA)** will reimburse costs for transporting crops **from producing to consuming States**.

PM-AASHA Scheme

- **What it is:** An umbrella scheme aimed at ensuring remunerative prices to farmers through effective procurement operations and price support mechanisms.
- **Ministry:** Administered by the Ministry of Agriculture & Farmers' Welfare.
- **Implementing Agency:** Implemented through Central Nodal Agencies (NAFED, NCCF) along with State Governments.
- **Components:**
  - **Price Support Scheme (PSS):** Govt. procures pulses, oilseeds, and copra at MSP through NAFED & NCCF, covering 25% of national production.
  - **Price Stabilization Fund (PSF):** Maintains buffer stock of pulses and onions to stabilize prices, prevent hoarding, and ensure affordable supply to consumers.
  - **Price Deficit Payment Scheme (PDPS):** Farmers receive direct compensation for the difference between MSP & market price, with coverage extended to 40% of oilseed production for four months.
  - **Market Intervention Scheme (MIS):** Provides remunerative prices for perishable horticulture crops, covering 25% of production, with direct payment to farmers instead of physical procurement.
- **Key Features:**
  - **Procurement at MSP:** Ensures farmers receive fair prices for their produce.
  - **Self-Sufficiency in Pulses:** Govt. commits 100% procurement of Tur, Urad, and Masur for the next four years.
  - **Reduction in Import Dependence:** Enhances domestic production and minimizes reliance on pulses imports.
  - **Direct Farmer Registration:** Pre-registered farmers sell directly at mandated procurement centres.
  - **Market Price Stabilization:** Prevents price volatility and ensures affordable prices for consumers.

37. AGRICULTURAL AND PROCESSED FOOD PRODUCTS EXPORT DEVELOPMENT AUTHORITY (APEDA)

Context:

APEDA in collaboration with AgroStar and Kay Bee Exports successfully completed India›s first-ever commercial trial shipments of premium **Sangola and Bhagwa** pomegranates respectively to Australia via sea.

About Pomegranate Variety in News:

- **What it is?**
  - **Sangola and Bhagwa** are premium pomegranate varieties known for their high sugar content, deep red arils, and long shelf life.
- **Region grown in:** Maharashtra (Solapur region) is the key hub for these varieties due to its ideal agro-climatic conditions.
- **Features:** Bright red color, soft seeds, high antioxidant levels, and rich taste, making them highly preferred in global markets.

About Agricultural and Processed Food Products Export Development Authority (APEDA):

- **Origin:** Established in 1986 under the APEDA Act to promote agricultural exports.
- **Ministry:** Functions under the Ministry of Commerce and Industry, Government of India.
- **Aim:** Enhance India's agricultural exports, improve market access, and ensure quality standards in global trade.
- **Functions and Powers:**
  - **Market Development:** Expands market access for Indian agri-products globally.
  - **Export Promotion:** Facilitates agricultural trade through initiatives like ANARNET (traceability system).
  - **Infrastructure Expansion:** Supports post-harvest infrastructure, cold chain logistics, and quality control.
  - **Policy Implementation:** Implements government schemes to boost farmer income and reduce post-harvest losses.

Energy and Infrastructure

38. INDIA HAS ACHIEVED THE MILESTONE OF 100 GW SOLAR ENERGY CAPACITY

Context:
India has achieved the milestone of 100 GW solar energy capacity, reinforcing its global leadership in renewable energy and progress toward a 500 GW non-fossil fuel target by 2030.

About *Recent Achievements of India in Solar Energy:*

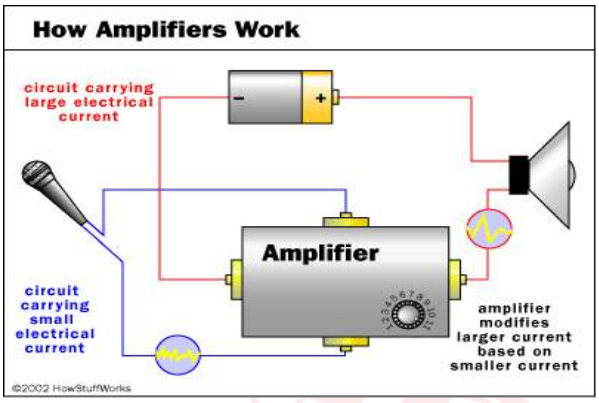
- **Solar Energy Target and Capacity Expansion:**
  - India **achieved 100 GW of solar capacity** as of **January 2025**, aiming for **500 GW of renewable energy** by 2030.
  - Solar energy now contributes **47% of total installed renewable capacity**, showing its dominance in clean energy.
- **Rapid Growth Trends in Solar Installations:**
  - A **3,450% increase** in solar capacity from **2.82 GW in 2014 to 100 GW in 2025**.
  - **2024 saw record-breaking 24.5 GW solar additions**, doubling from 2023, with **18.5 GW utility-scale installations**.
  - **Rajasthan, Gujarat, Tamil Nadu, Maharashtra, and Madhya Pradesh** lead in large-scale solar deployment.
- **Key Government Schemes Driving Solar Growth:**
  - **PM Surya Ghar Muft Bijli Yojana (2024):** Boosting rooftop solar adoption, nearing 9 lakh installations.
  - **Solar Parks Scheme:** Developing large-scale solar clusters across states.
  - **PLI Scheme for Solar Manufacturing:** India's solar module production surged from 2 GW (2014) to 60 GW (2024), targeting **100 GW by 2030**.

Science & Technology

39. AMPLIFIERS

Context: The role of amplifiers in transforming communication, entertainment, and technology has been highlighted, focusing on their working principles, types, and applications.

- **What is an Amplifier?**
  - An **electronic device** that enhances the amplitude of an **electrical signal** without altering its original characteristics.
  - Used in **audio systems, telecommunications, medical devices, and scientific instruments**.
- **How Does an Amplifier Work?**
  - **Signal Input:** A weak electrical signal from a source (e.g., microphone, sensor).



- **Pre-amplification:** Initial **boosting of signal** with minimal noise using a **preamp circuit**.
- **Voltage Amplification:** A **transistor-based circuit** increases voltage by controlling **collector current**.
- **Current & Power Boosting: Driver and power stages** ensure stable voltage and increased current.
- **Output Stage:** The amplified signal is **delivered to a speaker, antenna, or recording device**.

- **Types of Amplifiers:**
  - **Class A:** High fidelity, used in **audio equipment** but low efficiency.
  - **Class B:** More efficient but introduces **signal distortion**, used in **basic sound systems**.
  - **Class AB:** A mix of **Class A & B**, preferred in **home theatres and professional audio**.
  - **Class C:** Highly efficient but distorted, used in **radio frequency transmitters**.
  - **Class D: Digital switching amplifiers**, highly efficient, used in **public address systems**.
- **Applications of Amplifiers:**
  - **Audio Systems:** Enhances sound in **speakers, microphones, and PA systems**.
  - **Telecommunication:** Used in **radio transmitters, mobile networks, and fiber optics**.
  - **Medical Devices:** Found in **ECG, ultrasound, and hearing aids** for signal processing.
  - **Scientific Research:** Used in **astronomy, particle physics, and seismology**.
  - **Industrial & Military:** Radar, sonar, and electronic warfare applications.

40. QUANTUM TELEPORTATION

Context:

Scientists at the University of Oxford have achieved a breakthrough in distributed quantum computing, successfully linking quantum computers via quantum teleportation for the first time, paving the way for large-scale networked quantum computing.

About *Quantum Teleportation*:

- **What is Quantum Teleportation?**
  - A quantum phenomenon where the **state of a particle is transmitted instantly to another** distant particle using **quantum entanglement**, without physical transfer.
  - Used in **quantum computing and secure quantum communication**.
- **How It Works?**
  - **Quantum Entanglement:** Two particles become **interlinked**, so changes in one **instantly reflect in the other,** even at large distances.
  - **Quantum State Transfer:** Instead of moving physical qubits, their state is transferred across a network link, enabling **distributed computing.**
  - **Logical Gate Teleportation:** Researchers teleported **quantum gates** (fundamental computational components) **instead of individual qubits**, enhancing scalability.
- **Key Features of Quantum Teleportation:**
  - **Instantaneous State Transfer:** Allows faster, more secure quantum communication.
  - **No Physical Movement Required:** Eliminates information loss or decoherence during transfer.
  - **Enhances Distributed Computing:** Enables linking small quantum processors into large-scale quantum networks.
  - **High Computational Speed:** Reduces bottlenecks, making quantum computing scalable and efficient.
  - **Potential for Quantum Internet:** Opens pathways for **global quantum networks** with ultra-secure data transmission.
- **Scientific & Technological Significance:**
  - **Advances Quantum Computing Scalability:** Overcomes challenges in expanding quantum processors.
  - **Boosts Cryptographic Security:** Enables **unbreakable encryption** for cybersecurity.
  - **Revolutionizes Data Transmission:** Supports **high-speed, lossless quantum communication**.
  - **Bridges the Gap Between Theory and Practical Application:** Shows **real-world feasibility** of large-scale quantum computing.
  - **Foundation for Future Quantum Networks:** Can lead to the development of global quantum internet.

41. SRY GENE

Context:
Recent studies from **Italy and the USA** report rare cases where **biological females carried the SRY gene**, challenging conventional understanding of sex determination.

About Baby Sex Determination:

- **What is Sex Determination?**
  - Sex determination is the **biological process** that decides whether a baby develops as a **male or female**, influenced by **genetic and hormonal factors**.
- **Role of Chromosomes in Sex Determination:**
  - **Humans have 23 pairs of chromosomes**, including one pair of sex chromosomes: **XX (female) or XY (male)**.
  - **Egg cells always carry an X chromosome**, while **sperm cells carry either X or Y**.
  - **If a sperm with an X chromosome fertilizes an egg, the baby is female (XX)**; if a **Y-carrying sperm fertilizes the egg, the baby is male (XY)**.

About SRY Gene:

- **What is the SRY Gene?**
  - The **SRY (Sex-determining Region Y) gene** is found on the **Y chromosome** and acts as the **master switch** for male development.
  - **Function:** It activates a cascade of genes that trigger the formation of **testes** in the embryo, which then produce **testosterone**, promoting male characteristics.
  - **SRY Absence:** If the **SRY gene is missing or non-functional**, the embryo develops **female reproductive structures** by default.
- **How SRY Gene Influences Sex Determination?**
  - **Normal Process:** If the **SRY gene is present and functional**, the embryo develops into a **male**; if absent, it follows the **female pathway**.
  - **Rare Exceptions:** Sometimes, the SRY gene **translocates** (moves) from the **Y chromosome to the X chromosome** due to mutation. This can lead to:
    - **SRY-Positive Males (XX):** Individuals with an **SRY-bearing X chromosome develop as males but remain sterile**.
    - **SRY-Positive Females (XX):** In exceptional cases, females carrying the **SRY gene** develop normally due to **biased X chromosome inactivation**, preventing the gene's function.

42. SHAKTI SEMI-CONDUCTOR CHIPS

Context:
India's first indigenous aerospace-grade semiconductor chip, 'Shakti', has been developed by IIT Madras and ISRO under the Digital India RISC-V initiative (DIRV) to strengthen India's semiconductor ecosystem and strategic autonomy.

- **What is it?**
  - **Shakti** is an **indigenous microprocessor** based on the **RISC-V open-source Instruction Set Architecture (ISA)**.
  - It is designed to meet the **high-reliability and security** needs of India's **space, defense, and computing industries**.
- **Developed by:**
  - **IIT Madras** in collaboration with **ISRO**, supported by the **Ministry of Electronics and Information Technology (MeitY)** under the **Digital India RISC-V (DIRV) initiative**.
- **Key Features:**
  - **End-to-End Indigenous:** Fully developed, fabricated, and tested in India.
  - **Fault-Tolerant Design:** Enhanced reliability for aerospace and defense applications.
  - **RISC-V Architecture:** Uses an open-source **64-bit processor** for flexibility and customization.
  - **High-Performance Computing:** Supports **command and control systems,** sensor integration, and AI-based applications.
  - **Advanced Security:** Designed for **strategic sectors requiring robust cybersecurity measures**.
  - **Multiple Boot Modes:** Expandable for future space missions and secure computing requirements.
- **Applications:**
  - **Space Missions:** Used in **satellites, avionics, and embedded controllers** for ISRO applications.
  - **Defense & Aerospace:** Strengthens India's **self-reliance in military-grade electronics**.
  - **IoT & AI Applications:** Supports **high-performance computing for smart systems**.

- **Command & Control Systems:** Critical for **real-time operations and automation**.
- **R&D in Semiconductor Industry:** Advances India's position in **indigenous chip fabrication**.

What is the Digital India RISC-V (DIR-V) Program?

- **Launched In:** April 2022
- **Ministry:** Ministry of Electronics and Information Technology (MeitY).
- **Aim:** To strengthen India's semiconductor ecosystem by developing indigenous RISC-V-based microprocessors for self-reliance in the digital sector.
- **Key Features of the DIR-V Program:**
  - **Indigenous Innovation & Self-Reliance:** Promotes the development of domestic microprocessor technology to reduce dependency on foreign semiconductor solutions.
  - **High-Performance Computing:** Focuses on cloud services, IoT, AI, sensors, and advanced computing, ensuring India's presence in next-generation digital infrastructure.
  - **Collaboration with Industry & Academia:** Works closely with C-DAC, IITs, ISRO, and private industry partners to develop scalable RISC-V microprocessor solutions.
  - **Applications in Emerging Technologies:** Supports 5G/6G, AI, and automation, creating a foundation for future technology advancements.

43. MRNA-BASED CANCER VACCINE

Context:

Russia has developed an mRNA-based personalized cancer vaccine, which will be available for free to patients by early 2025.

- **What is an mRNA-Based Cancer Vaccine?**
  - An **mRNA (messenger RNA) vaccine** provides **genetic instructions** to the body's cells, enabling them to produce **antigens** that trigger an immune response.
  - Unlike traditional vaccines, these are **not preventive** but are used to **treat existing cancer patients** by targeting tumor-specific antigens.
- **How Does it Work?**
  - **Trains the Immune System:** The vaccine delivers genetic instructions to produce proteins resembling tumor antigens, prompting the immune system to attack cancer cells.
  - **Personalized Treatment:** Designed to target specific cancer markers in individual patients, improving precision and effectiveness.
  - **Lower Side Effects:** Unlike chemotherapy, it kills only cancer cells, reducing damage to healthy tissues.
  - **Potential Multi-Antigen Targeting**: Unlike the COVID-19 mRNA vaccine, which targets one antigen, cancer mRNA vaccines can target multiple tumor markers.
- **Other mRNA Vaccines for Cancer:**
  - **UK's Cancer Vaccine Launch Pad (2023)**: Aims to accelerate clinical trials for personalized cancer immunotherapy.
  - **CureVac's CVGBM Vaccine (USA, 2023)**: Shows promising immune response in glioblastoma (brain cancer) patients.
- **Significance of mRNA-Based Cancer Vaccine:**
  - **Breakthrough in Cancer Treatment:** Represents a new era of immunotherapy, offering a targeted and personalized approach to cancer treatment.
  - **Precision Medicine Advancement:** Unlike conventional chemotherapy, mRNA vaccines are tailored to individual patients, enhancing effectiveness and reducing side effects.
  - **Potential for Multi-Cancer Application:** Can be adapted to various cancer types by targeting multiple tumor antigens, making it a versatile treatment option.
  - **Improved Immune Response:** Boosts the body's natural defense mechanism, helping it recognize and destroy cancer cells more effectively.

44. MICROSOFT MAJORANA 1

Context:

Microsoft has unveiled Majorana 1, its first quantum computing chip, designed to make quantum computing more stable, faster, and practical.

- **What is Majorana 1?**
  - A **quantum computing chip** developed by **Microsoft** to enhance the stability and reliability of quantum processors.

- Uses **Majorana particles**, a type of exotic quantum state, to minimize computational errors.

- **Developed By:**
  - **Microsoft**, with validation from **DARPA (U.S. Defense Advanced Research Projects Agency)**.
  - A finalist in **DARPA's US2QC program**, which aims to build the first large-scale quantum computer.
- **How It Works?**
  - **Topoconductors:** Uses a new material called topological superconductors (topoconductors) to control Majorana particles.
  - **Error-Resistant Qubits:** Majorana-based qubits are more stable and less prone to information loss than traditional qubits.
  - **Scalability:** Designed to enable quantum computers to scale up to one million qubits, making real-world applications possible.
- **Significance of Majorana 1**
  - **Enhanced Stability:** Reduces computational errors, a major challenge in quantum computing.
  - **Faster Problem-Solving:** Capable of handling complex calculations exponentially faster than classical computers.
  - **Revolutionizing Industries:** Can accelerate drug discovery, optimize energy grids, and develop self-repairing materials.
  - **Breakthrough in Quantum Research:** Paves the way for practical quantum computing applications in AI, cybersecurity, and materials science.
  - **Global Leadership in Quantum Computing:** Strengthens Microsoft's position in the global quantum race, competing with tech giants like Google and IBM.

About Topoconductors:

- **What are Topoconductors?**

  Topoconductors are a new class of materials used to create stable and scalable qubits for quantum computing. These materials exhibit topological superconductivity, allowing them to support Majorana particles, which help reduce computational errors in quantum processors.
- **Material Composition of Topoconductors:**
  - **Superconducting Materials:** Composed of topological superconductors, which exhibit resistance-free current flow.
  - **Exotic Quantum States:** Supports Majorana fermions, a unique quantum state that enhances qubit stability.
  - **Engineered Nanowires & Semiconductor Layers:** Designed to trap and manipulate quantum information efficiently.
- **Superiority of Topoconductors:**
  - **Error-Resistant Qubits:** Enables more stable qubits with fewer computational errors compared to traditional superconducting qubits.
  - **Enhanced Quantum Stability:** Protects quantum information from environmental disturbances like temperature fluctuations and noise.
  - **Scalability for Quantum Processors:** Helps scale quantum computers to **millions of qubits**, a critical step toward practical applications.
  - **Faster Computation:** Improves quantum coherence, allowing for faster and more efficient quantum operations.
  - **Smaller and More Efficient Chips:** Qubits created with topoconductors are 1/100th of a millimetre, making them highly compact and efficient.

45. OCELOT

Context:

Amazon Web Services (AWS) unveiled 'Ocelot', a new quantum computing chip, which aims to significantly accelerate the development of commercially viable quantum computers.

- **What is it?**
  - A **prototype quantum computing chip** designed to improve **error correction** and accelerate the scalability of quantum computers.
- **Developed by:** Amazon Web Services (AWS), the cloud computing division of Amazon.com.
- **Key Features:**
  - Uses **"cat" qubits** inspired by **Schrödinger's cat** experiment to improve **error correction**.
  - Requires **only nine physical qubits** to form **one logical qubit**, reducing hardware requirements.

- Developed using **standard chip industry techniques** and a **tantalum-based material**.
- Aims to build **a practical quantum computer with 100,000 qubits**, rather than the industry estimate of **1 million qubits**.

- **Significance:**
  - Reduces the **error rate** in quantum computations, making machines more reliable.
  - Could **accelerate drug discovery, material science innovations, and financial modeling**.
  - Uses a **scalable approach**, which may cut **development time by five years**.
  - Strengthens **Amazon's position** in the competitive **quantum computing race**.
- **What Are Quantum Chips?**
  - **Quantum chips** are **processors designed to execute quantum computations** by leveraging quantum mechanics principles like **superposition and entanglement**.
  - Unlike classical chips that use **binary bits (0 or 1)**, quantum chips use **qubits**, which can exist in multiple states simultaneously.
- **How Do Quantum Chips Work?**
  - **Qubits & Superposition:**
    - **Qubits can be both 0 and 1 simultaneously**, allowing quantum chips to **perform many calculations at once**.
    - This enhances computing power for **complex simulations and optimizations**.
  - **Quantum Entanglement:**
    - **Qubits can be entangled**, meaning their states are **interdependent**, even if physically separated.
    - This allows for **instantaneous data transfer and highly efficient processing**.
  - **Quantum Gates & Algorithms:**
    - Similar to logic gates in classical computers, **quantum gates manipulate qubits** to perform operations.
    - **Hadamard, CNOT, and Pauli gates** are common quantum gates used in computations.
  - **Error Correction & Stability:**
    - Qubits are **prone to decoherence**, which causes errors in computations.
    - **AWS's Ocelot chip uses "cat" qubits to improve error correction efficiency**.
  - **Measurement & Output:**
    - When qubits are measured, they collapse into a definite state (0 or 1).
    - The output is interpreted through **classical computing systems** for real-world applications.

46. ZERO BACTERIA TECHNOLOGY

Context:

Bangalore Water Supply and Sewerage Board (BWSSB) is considering implementing Zero Bacteria technology in apartment Sewage Treatment Plants (STPs) to improve water quality.

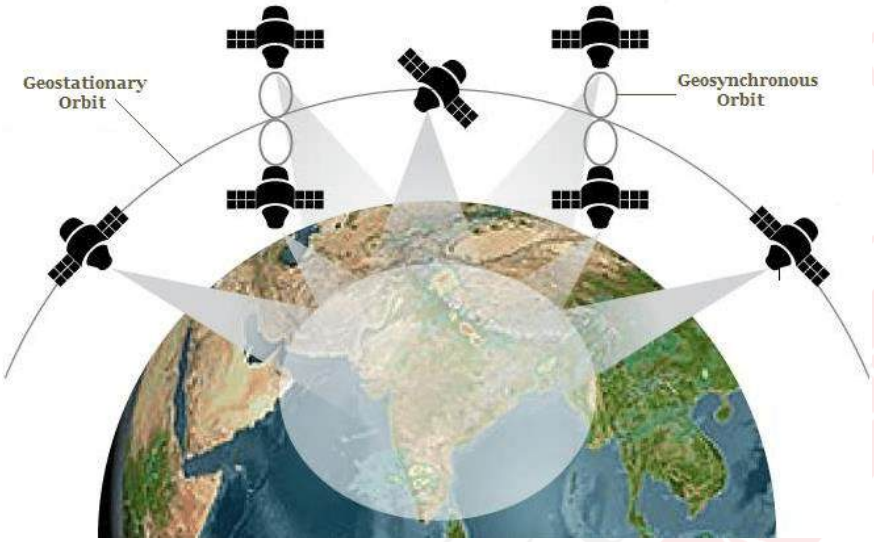
- **What is Zero Bacteria Technology?**
  - A **water purification technology** that eliminates **bacterial contamination** from water sources.
  - Uses **nanoparticle coatings, ultraviolet (UV) irradiation, electrostatic filtration, and specialized filtration systems**.
- **Developed by:** Indian Institute of Science (IISc), Bengaluru.
- **How It Works?**
  - **Nanoparticle Coatings:** Silver nanoparticles disrupt bacterial cell membranes, causing cell death.
  - **UV Light Irradiation:** Destroys bacterial DNA, preventing replication.
  - **Electrostatic Filtration:** High-voltage filters attract and trap bacteria.
  - **Specialized Filtration Systems:** Removes bacteria using fine-pore filters, sometimes infused with antimicrobial agents.
- **Key Features:**
  - **Advanced bacterial elimination** for high-quality treated water.
  - **Energy-efficient and sustainable** solution for wastewater treatment.
  - **Reduces environmental contamination** and enhances water reuse.
  - **Non-toxic and safe** when used in controlled applications.

Space

47. NAVIGATION WITH INDIAN CONSTELLATION (NAVIC) SYSTEM

Context:

The partial failure of the NVS-02 navigation satellite marks another setback for India's indigenous Navigation with Indian Constellation (NavIC) system, highlighting challenges in maintaining a fully operational satellite navigation network.



About *NavIC (Navigation with Indian Constellation):*

- **What is NavIC?**
  - NavIC, formerly known as the Indian Regional Navigation Satellite System (IRNSS), is India's indigenous satellite navigation system designed to provide accurate positioning, navigation, and timing services over India and its surrounding regions.
- **Organization:** Indian Space Research Organisation (ISRO).
- **Aim:** NavIC aims to reduce India's dependence on foreign navigation systems like GPS (USA), GLONASS (Russia), and Galileo (Europe) by providing a reliable and autonomous positioning system for both civilian and strategic applications.
- **How it Works:**
  - NavIC operates through a **constellation of seven satellites**: three in geostationary orbit (GEO) and four in geosynchronous orbit (GSO).
  - The system uses **dual-frequency signals (L5 and S bands)** to provide accurate positioning data.
  - Ground stations, including control centers and monitoring stations, ensure seamless operation and signal integrity.
- **Features:**
  - **Coverage:** Provides services over India and a region extending up to 1,500 km beyond its borders.
  - **Accuracy:** Offers position accuracy better than 20 meters and timing accuracy better than 50 nanoseconds.
  - **Dual Services:**
    1. **Standard Positioning Service (SPS):** For civilian use, including transportation, disaster management, and personal navigation.
    2. **Restricted Service (RS):** Encrypted service for strategic and military applications.
  - **Interoperability:** NavIC signals are compatible with other global navigation systems like GPS, GLONASS, and Galileo.
  - **New Developments:** Introduction of L1 band signals (1575.42 MHz) for enhanced civilian use, starting from 2023.
- **Applications:**
  - Transportation (land, air, and marine navigation).
  - Disaster management and resource monitoring.
  - Scientific research and surveying.
  - Time synchronization for critical infrastructure.
  - Strategic and defense applications.

48. EINSTEIN RING

Context:

The European Space Agency's (ESA) Euclid space telescope has discovered a rare Einstein ring around galaxy NGC 6505, located 590 million light-years away from Earth.

About Einstein Ring:

- **What is an Einstein Ring?**
  - An **Einstein ring** is a **gravitational lensing phenomenon** where light from a distant galaxy bends around a massive celestial object, forming a ring-like structure.
  - It was **theoretically predicted by Albert Einstein's General Theory of Relativity** (1915).
- **Features of Einstein Rings:**
  - **Caused by Gravitational Lensing:** A **massive foreground galaxy** distorts light from a background galaxy, creating a **circular image**.
  - **Highly Rare Phenomenon:** Less than **1% of galaxies exhibit Einstein rings**.
  - **Requires Precise Alignment:** The observer, the lensing object, and the background source must be **perfectly aligned**.
  - **Not Visible to Naked Eye:** Detected using **high-powered telescopes** like ESA's Euclid or NASA's Hubble Space Telescope.
- **Significance of Einstein Rings:**
  - **Studies Dark Matter:** Since **dark matter does not emit light**, gravitational lensing offers an **indirect way to detect and map it**.
  - **Enhances Understanding of Distant Galaxies:** Einstein rings **magnify and brighten faraway galaxies**, revealing details that would otherwise be undetectable.
  - **Helps Measure Cosmic Expansion:** Provides insights into **how fast the universe is expanding** and the distribution of matter across the cosmos.

49. VERTICAL PLANETARY MIXER

Context:

ISRO successfully developed a 10-tonne vertical planetary mixer, the largest solid propellant mixing equipment globally, in collaboration with CMTI, Bengaluru.

- **Vertical Planetary Mixer:** A high-capacity mixing system is utilized for processing solid propellants in rocket motors, ensuring precise blending of hazardous and sensitive ingredients for rocket motor efficiency.
- **Developed by: Satish Dhawan Space Centre (SDSC), ISRO**, in collaboration with Central Manufacturing Technology Institute (CMTI), Bengaluru. Part of the **'Atmanirbhar Bharat'** initiative to enhance indigenous space capabilities.
- **How It Works?**
  - Uses **multiple hydrostatic-driven agitators** for uniform mixing of solid propellant components.
  - Operated remotely via a **PLC-based control system with SCADA stations** for **precision and safety**.
    - SCADA (Supervisory Control and Data Acquisition) stations are control systems that monitor and manage physical processes in real time.
- **Key Features:**
  - **Largest Capacity:** Mixes 10 tonnes of propellant in a single batch.
  - **High Precision:** Ensures uniform composition for better rocket performance.
  - **Safety & Reliability:** Designed for hazardous materials handling with strict quality control.
  - **Automation:** Remotely controlled system enhances safety and efficiency.
  - **Massive Structure:** Weighs 150 tonnes; dimensions: 5.4m (L) × 3.3m (B) × 8.7m (H).
- **Significance of the Mixer:**
  - **Enhances Rocket Motor Production:** Increases productivity, throughput, and quality in solid propulsion systems.
  - **Boosts Indigenous Capability:** Reduces dependency on foreign technology, aligning with India's self-reliance goals.
  - **Supports Future Space Missions:** Strengthens ISRO's launch vehicle programs, including PSLV, GSLV, and future heavy-lift rockets.
  - **Collaboration with Academia & Industry:** Promotes innovation in advanced space manufacturing.

50. TECHNOLOGY ADOPTION FUND (TAF)

Context:

IN-SPACe, India's space regulator, launched the Technology Adoption Fund (TAF) to accelerate the growth of space startups and MSMEs by providing financial support for the commercialization of early-stage space technologies.

- **What is TAF?**
  - A financial initiative by IN-SPACe to support the transition of early-stage space technologies into market-ready products.
  - Aims to reduce India's reliance on imported space solutions and boost domestic innovation.
- **Department:** Operated under the Indian National Space Promotion and Authorization Centre (IN-SPACe), an autonomous body under the Department of Space (DOS).
- **Aim:**
  - To nurture and commercialize innovative space technologies developed by Indian startups, MSMEs, and larger industries.
  - To strengthen India's position as a global leader in the space sector.
- **Key Features:**
  - **Funding:** Up to 60% of project costs for startups/MSMEs and 40% for larger industries, capped at Rs 25 crore per project.
  - **Eligibility:** Open to all non-government entities (NGEs) with commercially viable space technologies.
  - **Focus Areas:** Supports a wide range of space technologies, including launch vehicles, satellites, and space-based services.
  - **Outcomes:** Development of new products, intellectual property creation, and enhanced production processes.

About IN-SPACe:

- **Established in:** 2020, as part of India's space sector reforms.
- **Ministry:** Department of Space (DOS), Government of India.
- **Headquarters:** Bopal, Ahmedabad, Gujarat.
- **Aim:**
  - To promote, authorize, and supervise private sector participation in India's space activities.
  - To act as a single-window interface between ISRO and non-governmental entities (NGEs).
- **Functions:**
  - Facilitates private players in building launch vehicles, satellites, and space-based services.
  - Enables sharing of ISRO's infrastructure and premises with private entities.
  - Assesses and accommodates the needs of private players, educational institutions, and research organizations.
  - Collaborates with ISRO, academia, and industry to maximize the impact of space initiatives.

51. IMPACT OF SPACE TRAVEL ON ASTRONAUT HEALTH

Context:

NASA astronauts Sunita Williams and Butch Wilmore have been stranded on the International Space Station for over nine months due to spacecraft issues, highlighting health risks of prolonged space missions as they prepare to return to Earth.

Impact on Body Organs:

- **Brain & Nervous System:**
  - **Increased intracranial pressure** affects vision (Spaceflight-Associated Neuro-Ocular Syndrome - SANS).
  - **Expansion of cerebral ventricles**, leading to cognitive decline.
  - Higher risk of **neurodegenerative diseases** due to radiation exposure.
- **Cardiovascular System:**
  - **Weakened heart muscles**, increasing post-flight blood pressure regulation issues.
  - Greater risk of **cardiovascular diseases** due to microgravity and radiation.
- **Bones & Muscles:**
  - **Bone density loss (osteopenia) and muscle atrophy**, making astronauts prone to fractures.
  - **Reduced bone mineral density by 2.1%** after long missions, with some never recovering fully.
- **Immune System:**
  - **Increased vulnerability to infections** due to immune dysregulation.
  - Elevated stress hormone levels **suppress immune** responses.

- **Vision & Vestibular Function:**
  - Fluids shift toward the head, leading to **optic nerve swelling** and vision impairment.
  - Balance and coordination issues post-flight due to **vestibular dysfunction**.
- **Psychological Health:**
  - Isolation, confinement, and **lack of natural stimuli** contribute to depression and mood disorders.
  - Sleep disturbances due to disrupted **circadian rhythms**.

Reasons Behind These Health Impacts:

- **Microgravity Exposure:** Lack of gravity affects bone density, muscle strength, and fluid distribution.
- **Space Radiation:** No atmospheric protection, exposing astronauts to high-energy cosmic radiation, increasing cancer risks.
- **Enclosed & Isolated Environments:** Confinement and lack of social interactions impact mental well-being.
- **Limited Medical Support:** No immediate access to specialized medical care, making health management challenging.

Does Space Travel Cause Permanent Changes?

- **Short-Term Missions (Few Days):** 95% of physiological effects reverse after return to Earth.
- **Long-Duration Missions (Months to Years):** Recovery **proportional to time spent in space** however, some effects like **bone loss, neuro-ocular syndrome, and cardiovascular changes** can be **permanent**.

Health & Diseases

52. FENTANYL CRISIS

Context:
US President has imposed **25% tariffs** on China, Mexico, and Canada over fentanyl trafficking, linking the opioid crisis to trade policies.

About Fentanyl:

- **What is Fentanyl?**
  - **Fentanyl** is a **potent synthetic opioid** approved for **pain relief and anesthesia**, nearly **100 times stronger than morphine**.
  - It is commonly used in **medical settings** for treating **severe pain**, but illicitly produced versions contribute to the **opioid epidemic**.
- **Why is Fentanyl a Crisis in North America?**
  - **Highly Addictive:** It **mimics opioid effects**, causing **euphoria and dependence**, leading to abuse.
  - **Illicit Supply Chain:** China supplies **precursor chemicals**, which are processed in Mexico and smuggled into the US.
  - **Overdose Deaths:** In **2021, over 75% of 107,000 US drug overdose deaths** involved opioids, mainly fentanyl.
  - **Policy Challenge:** Strained **US-China relations** hinder cooperation on **drug control measures**.
  - **Stealth Distribution:** Often **laced into other drugs**, leading to unintentional overdoses.

53. LYMPHATIC FILARIASIS (LF)

Context: India has launched a nationwide Mass Drug Administration (MDA) campaign covering 111 endemic districts across 13 states, with the goal of eliminating Lymphatic Filariasis (LF) by 2027.

- Lymphatic Filariasis (LF), also known as Elephantiasis, is a parasitic disease caused by filarial worms.
- India is a high-burden country for LF, with Bihar, Uttar Pradesh, and Odisha having the highest cases.
- The government aims to eliminate LF by 2027 through mass drug administration, morbidity management, and vector control strategies.
- Causes and transmission are Wuchereria bancrofti, Brugia malayi, and Brugia timori parasites, transmitted through mosquito bites.
- Symptoms include lymphedema, elephantiasis, hydrocephalus swelling, and recurrent infections due to weakened immunity.
- Prevention and treatment include annual distribution of anti-filarial drugs, triple drug therapy, MMDP, surgical intervention, and vector control strategies.

54. BOMBAY BLOOD GROUP

Context:
India has successfully performed its first-ever cross-blood kidney transplant for a patient with the rare Bombay (hh) blood group.

- **What is the Bombay Blood Group?**

Blood group	Antibody	Antigen	Compatibility
A	B	A	Blood group A and O
B	A	B	Blood group B and O
AB	Nil	AB	Blood group A, B, AB and O
O	AB	Nil	Only group O
HH	ABH	Nil	HH

  - **A rare blood type (hh phenotype)** first discovered in **Mumbai (Bombay) in 1952** by **Dr. Y.M. Bhende**.
  - Lacks the **H antigen**, which is the base structure for **A and B antigens** in the ABO blood group system.
- **Unique Characteristics**
  - Individuals with this blood type **cannot receive blood from any ABO group, including O-negative**, as it contains the H antigen.
  - Can **only receive blood from another Bombay blood group donor**, making transfusions highly difficult.
  - **Prevalence:** 1 in 10,000 in India, 1 in 1 million globally.
- **Challenges in Blood Transfusion:**
  - Routine blood tests often misidentify **Bombay blood group as O-type**, leading to **misdiagnosis and transfusion complications**.
  - Receiving blood with the **H antigen can trigger an acute hemolytic transfusion reaction**, causing **severe immune responses**.
- **Recent Medical Significance:**
  - In **mid-2024**, Chennai doctors at MIOT International successfully performed a **cross-blood kidney transplant** using a special **plasmapheresis technique** to remove antibodies.
  - **India's first successful Bombay blood group kidney transplant** was also reported at Jaslok Hospital, Mumbai, in **February 2025**, setting a medical precedent.

55. BIRD FLU

Context:
The Jharkhand health department has issued an alert on bird flu (H5N1) outbreak after its detection at Birsa Agricultural University, Ranchi.

- **Bird Flu (Avian Influenza)** is an infectious disease caused by **Influenza A viruses**, primarily affecting birds but capable of spreading to humans.
- It has high **zoonotic potential**, meaning it can transfer from animals to humans, posing a **pandemic risk** if mutations enable human-to-human transmission.

- **Causes of Bird Flu:**
  - **Influenza A viruses** (H5N1, H7N9, H5N6, H9N2) are the primary causes.
  - Human infections occur due to **direct contact with infected birds, contaminated environments, or poultry products**.
  - Rare cases of human-to-human transmission have been reported but are **not widespread**.

56. SUDAN VIRUS OUTBREAK

Context:
The World Health Organization (WHO) and Ugandan authorities have confirmed a new Sudan virus outbreak, with cases linked to family and hospital clusters in Kampala.

- **Origin:**
  - First identified in **1976** during an outbreak in **southern Sudan (now South Sudan)**.
  - Belongs to the **Orthoebolavirus genus**, the same family as the **Ebola virus**.
- **Where is it Found?**
  - Predominantly found in **sub-Saharan Africa**, with previous outbreaks in **Sudan and Uganda**.
  - Spread through **direct contact with infected bodily fluids, contaminated objects, or infected animals**.
- **Features of Sudan Virus**
  - **Highly Fatal:** Fatality rate ranges from **40% to 60%**, with the 2022 Uganda outbreak recording a 47% death rate.
  - **No Approved Vaccine or Treatment:** Unlike Ebola, Sudan virus lacks an effective vaccine or antiviral treatment.
  - **Transmission through Body Fluids:** Spread through **human-to-human contact**, contaminated surfaces, or zoonotic spillovers.
  - **Severe Symptoms:** Initial **fever, body aches, fatigue**, progressing to diarrhea, vomiting, and internal bleeding.
  - **Requires Isolation & Contact Tracing:** Laboratory testing is **crucial for diagnosis**, and **strict containment** is essential to prevent outbreaks.
- **How is it Similar to Ebola?**
  - Both **Sudan virus and Ebola** belong to the **Orthoebolavirus family**, causing **severe hemorrhagic fever**.
  - Symptoms **overlap**, including **fever, body aches, organ failure, and internal bleeding**.
  - Laboratory testing is **required to differentiate** between Sudan virus and Ebola infections.
  - Both diseases **spread through direct contact** and require **urgent containment measures**.
- Currently, **there are no approved vaccines** or antiviral treatments for Sudan Virus Disease (SVD).

57. FAECAL COLIFORM

Context:

High levels of faecal coliform bacteria were detected in the Ganga and Yamuna rivers at Prayagraj during Maha Kumbh, as per a CPCB report submitted to NGT.

- **What it is?**
  - A subgroup of coliform bacteria that primarily originate from the **intestinal tracts of warm-blooded animals**, including humans.
- **Limit:** The Central Pollution Control Board (CPCB) standards have set a **permissible limit of 2,500 units** of faecal coliform per 100 ml of water, while for drinking water, E. coli must be absent.
- **Types of Bacteria:** Includes **Escherichia coli (E. coli)**, with certain strains like **E. coli O157:H7** being harmful and capable of causing intestinal infections.
- **What its Presence Indicates?**
  - **Sewage contamination** of water sources.
  - Potential presence of **disease-causing pathogens** such as those responsible for **typhoid, hepatitis A, and gastroenteritis**.
  - **Poor waste management**, leakage from **septic systems**, or **agricultural runoff** polluting water bodies.
- **Impacts of Fecal coliform on BOD and COD:**
  - **BOD Increase:** Fecal coliform bacteria decompose organic waste, consuming dissolved oxygen and raising Biochemical Oxygen Demand (BOD), leading to oxygen depletion and aquatic life suffocation.
  - **COD Increase:** Contaminants from sewage and industrial discharge raise Chemical Oxygen Demand (COD), indicating non-biodegradable pollutants, lowering water quality and harming ecosystems.

58. NEW RAMSAR SITES

Context:

India has added four new Ramsar sites, taking the total to **89**. Tamil Nadu leads with 20 wetlands, while **Sikkim and Jharkhand added their first Ramsar sites**, marking a significant step in wetland conservation.

Site Name	State	Features
Therthangal Bird Sanctuary	Tamil Nadu	✓ Established on December 15, 2010, to conserve avian species and wetland habitats. ✓ Covers 29.29 hectares, home to diverse flora like Aponogeton nutans, Hydrilla verticillata, and Tamarindus indica. ✓ Popular among birdwatchers during the migratory season (October to March).
Sakkarakottai Bird Sanctuary	Tamil Nadu	✓ Established on April 17, 2012, to protect avifauna and wetland ecosystems. ✓ Spreads over 230.490 hectares, hosting flora like Neem, Palmyra Palm, and Gloriosa superba. ✓ Home to diverse fauna, including Lion-tailed Macaque, Giant Squirrel, and migratory birds.
Khecheopalri Wetland	Sikkim	✓ Sacred for both Buddhists and Hindus, believed to be a wish-fulfilling lake. ✓ **Local name:** Sho Dzo Sho ('Oh Lady, Sit Here'). ✓ Part of the revered **Demazong valley** and Buddhist pilgrimage circuit. ✓ **Unique feature:** Birds prevent leaves from floating on the lake by picking them up. ✓ Home to diverse bird species like house swifts, fishing eagles, and Brahminy kites. ✓ Integral to ecotourism and biodiversity conservation efforts in Sikkim.
Udhwa Lake	Jharkhand	✓ Comprises two large water bodies: **Pataura Jheel** (155 ha) and Brahma **Jamalpur Jheel** (410 ha). ✓ Notified as a bird sanctuary in 1991 due to its rich avian biodiversity. ✓ Attracts migratory birds during winter, starting as early as September. ✓ Located near the **sacred Ganga River** stream, enhancing its scenic beauty and ecological significance. ✓ Provides an ideal habitat for nesting, roosting, and survival of resident and migratory birds.

59. INTERNATIONAL BIG CAT ALLIANCE (IBCA)

Context:

The International Big Cat Alliance (IBCA) has officially come into force as a treaty-based intergovernmental organization with its headquarters in India.

- The alliance has received ratifications from **India, Nicaragua, Eswatini, Somalia, and Liberia**.

About International Big Cat Alliance (IBCA):

- **Launched:** April 9, 2023, by Prime Minister of India during Project Tiger's 50th anniversary.
- **Headquarters:** India (National Tiger Conservation Authority, MoEFCC).
- **Aim & Objectives:**
  - **Global Conservation** of seven big cats – Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma.
  - **Prevent Illegal Wildlife Trade** by strengthening anti-poaching laws and enforcement.
  - **Financial & Technical Support** for conservation efforts in **range and non-range countries**.
  - **Climate Change Mitigation** by integrating conservation with sustainability initiatives.

- **Species Covered:**
  - **Seven Big Cats:** Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, Puma.
  - **India hosts five** of these: **Tiger, Lion, Leopard, Snow Leopard, and Cheetah** (excluding **Jaguar and Puma**).
- **Functions & Operations:**
  - **Collaborative Platform** to share best conservation practices globally.
  - **Research & Monitoring** through data sharing and ecological studies.
  - **Funding & Resource Mobilization** for conservation projects and habitat protection.
  - **Policy Advocacy** to align conservation strategies with the **UN Sustainable Development Goals (SDGs)**.
- **Funding & Governance:**
  - **Budget Allocation: ₹150 crore** (2023-28) by the Union Cabinet.
  - **Inspired by International Solar Alliance (ISA)** with a **Director-General** appointed by MoEFCC.

60. MORAND-GANJAL IRRIGATION PROJECT

Context:

The National Tiger Conservation Authority (NTCA) has warned that the Morand-Ganjal Irrigation Project in Madhya Pradesh will submerge vital tiger habitats Satpura and Melghat Tiger Reserves.

Dam-based irrigation project aimed at improving agricultural productivity in Madhya Pradesh.

• Involves Morand and Ganjal rivers, major tributaries of the Narmada River.

• Covers Hoshangabad, Betul, Harda, and Khandwa districts.

Wildlife Sanctuaries in News

• Satpura Wildlife Sanctuary (WLS): Home to Bengal tigers, leopards, sloth bears, Indian bison, and rich flora.

• Melghat Wildlife Sanctuary (WLS): Established in 1985, later merged into Melghat Tiger Reserve.

• Provides rich habitat for tigers, Indian gaurs, wild dogs, and giant squirrels.

61. CLIMATE RISK INDEX (CRI) 2025

Context:

The Climate Risk Index (CRI) 2025 was released, highlighting the increasing global impact of extreme weather events and the need for stronger climate action.

- **India ranked sixth among the most affected countries (1993-2022)** due to extreme weather events, despite improving its short-term ranking to 49th in 2022.
- **What is the Climate Risk Index?**
  - The **Climate Risk Index (CRI)** ranks countries based on their vulnerability to extreme weather events.
  - It **assesses the human and economic losses** due to climate-induced disasters.
- **Released by and Frequency:**
  - **Published by Germanwatch**, an environmental think tank.
  - **Annual publication since 2006**, with data covering the past 30 years.
- **Aim of CRI:**
  - To provide **a comparative analysis** of the impact of extreme weather events.
  - To guide **global climate policies and risk mitigation efforts**.
  - To highlight the **most affected nations** and emphasize the urgency of climate resilience.
- **CRI Methodology and Criteria:**
  The CRI ranks countries based on:
  - **Fatalities** (direct and indirect deaths due to extreme weather).
  - **Affected population** (injured, displaced, and impacted people).
  - **Economic losses** (damage to infrastructure, agriculture, and GDP).
  - **Number of extreme weather events** (floods, storms, heatwaves, droughts, wildfires, etc.).
  - **Long-term impact assessment (1993-2022)** and **short-term impact (2022 alone)**.
- Key data insights from report:
  - Most Affected Countries (1993-2022):
    - Dominica, China, and Honduras ranked as the worst-affected nations.
    - India, Myanmar, Italy, and Vanuatu also feature among the top 10.
  - Most Affected Countries in 2022:
    - Pakistan, Belize, and Italy suffered the most damage.
    - Heatwaves, storms, and floods were the primary causes of destruction.

- Top Disasters by Impact (1993-2022):
  - Storms (35%) caused the highest economic losses (~$2.33 trillion).
  - Heatwaves (30%) caused significant fatalities.
  - Floods (27%) affected the most people.

- ***India's Performance in*** **CRI 2025:**
  - **Long-term ranking (1993-2022):**
    - India **ranked 6th globally** among the worst-affected nations.
    - Over 400 extreme weather events reported in 30 years.
    - 80,000+ deaths and $180 billion in losses due to climate disasters.
  - **Short-term ranking (2022):**
    - **India ranked 49th in 2022**, showing improvement from 7th in 2019.
    - Severe floods, cyclones, and heatwaves remained major climate threats.

62. TRAILGUARD AI

Context:

The Similipal Tiger Reserve in Odisha has successfully implemented AI-enabled TrailGuard cameras, significantly reducing poaching incidents by 80%.

- **What is TrailGuard AI?**
  - TrailGuard AI is an **AI-powered surveillance system** designed to combat **poaching and illegal wildlife trade** by providing **real-time monitoring** in protected forests.
- **Developed by:** Created by **Nightjar Technologies**, a Gurgaon-based social impact enterprise specializing in remote conservation surveillance.
- **How It Works?**
  - **Movement Detection:** AI-powered cameras remain in low-power mode and activate when they detect movement.
  - **Object Classification:** A built-in AI chip analyzes the image and categorizes it as 'animal,' 'human,' or 'vehicle.'
  - **Instant Alert System:** If a threat is detected, the camera transmits the image within 40 seconds to a control room.
  - **Rapid Response:** Officials share information via WhatsApp and Very High Frequency (VHF) radio to mobilize forest rangers quickly.
  - **Identification & Arrest:** Intelligence teams analyze the images, identify poachers, conduct house raids, and forward cases for prosecution.
- **Key Features & Functions:**
  - **Compact Design:** Small camera unit (pen-sized) and battery unit (notepad-sized) connected via a 2-meter cable, making it easy to conceal.
  - **Long Battery Life:** Operates for 6 months to 1 year without requiring frequent maintenance.
  - **High-Speed Transmission:** Images sent to authorities in 30-40 seconds using a cellular network.
  - **Cost-Effective:** Priced at ₹50,000–53,000 per unit, making it affordable for large-scale deployment.
  - **Wide Adoption:** Currently deployed in **5 states across 14 locations**, including Kanha Tiger Reserve (Madhya Pradesh) and Dudhwa National Park (Uttar Pradesh).

63. SIMILIPAL TIGER RESERVE (STR)

Context:

Munda tribals of Similipal Tiger Reserve (STR), Odisha, protested against being denied access to their sacred groves, which have been turned into a tiger enclosure for translocated tigress Zeenat.

Similipal Tiger Reserve:

- **Location:** Situated in Mayurbhanj district, Odisha.
- Declared a Tiger Reserve under **Project Tiger in 1973** and a wildlife sanctuary in 1979.
  - Designated as a **UNESCO Biosphere Reserve in 2009** under the Global Network of Biosphere Reserves.
- **Flora & Fauna:**
  - Dominated by **tropical moist deciduous forests** with semi-evergreen patches.

- Hosts **the highest tiger population in Odisha** along with elephants and hill mynahs.

- **Unique Features:**
  - **High Peaks:** Khairiburu and Meghashini (1515m above sea level) are the highest peaks.
  - **Part of Mayurbhanj Elephant Reserve:** Connected with Hadgarh & Kuldiha Wildlife Sanctuaries.
  - **Conservation Legacy:** Known for **Padma Shri Saroj Raj Chowdhury**, its founder, and his fostered tigress **Khairi**.

Munda Tribe:

- **Habitat:** Primarily found in Chotanagpur Plateau covering Jharkhand, Bihar, Odisha, West Bengal, Madhya Pradesh, Tripura, and Bangladesh.
  - Additionally, Similipal Tiger Reserve is home to two indigenous tribes, the **Erenga Kharias and Mankirdias**, who practice traditional agriculture.
- One of the **largest Scheduled Tribes in India**, with significant populations in Similipal Tiger Reserve.
- **Historical Significance:**
  - **Ancient Presence:** Munda languages arrived in India **4,000 years ago from Southeast Asia**.
  - **British Resistance:** Munda freedom fighter **Birsa Munda** led anti-British revolts, advocating for Munda Raj.
- **Culture & Traditions:**
  - **Clan System:** Patrilineal clans (Killi), believed to descend from a common ancestor.
  - **Traditional Occupation:** Hunter-gatherers turned farmers, skilled in weaving & basket-making.
  - **Sacred Groves & Rituals:** Worship nature, practice animism, and conduct sacred rites at burial sites.
  - **Folk Music & Dance:** Known for Sarhul festival, Karam festival, and indigenous songs & dance.
  - **Totemic Beliefs:** Each clan has a totemic animal or plant, symbolizing its identity.

64. BLACK PLASTIC

Context:

A recent study on black plastic found that it contains toxic flame retardants, raising concerns over food contamination and health risks.

- **What is Black Plastic?**
  - A type of **plastic material** often produced from **recycled electronic waste** like TVs, computers, and appliances.
  - Commonly used in **kitchen utensils, takeout containers, packaging, and toys**.
- **Composition of Black Plastic:**
  - Made from **polypropylene (PP), polystyrene (PS), and polyethylene (PE)**.
  - Contains **flame retardants** such as **bromine, decabromodiphenyl ether (BDE-209), and heavy metals** like **lead, mercury, and cadmium**.
- **Production Process:**
  - Derived from **recycled electronic waste**, often including **banned toxic materials**.
  - Difficult to **sort and recycle**, as black pigments **absorb infrared sorting rays**, making **recycling inefficient**.
- **Applications of Black Plastic:**
  - **Kitchen utensils**: Spatulas, peelers, and food containers.
  - **Electronics:** Housings for TVs, cables, and chargers.
  - **Automobile industry:** Dashboards and interiors.
  - **Consumer goods:** Toys, cosmetics packaging, and furniture.
- **Is Black Plastic Safe to Use?**
  - Studies suggest **trace amounts of toxic chemicals** may **leach into food** when exposed to heat.
  - Despite low contamination risks, the **long-term effects** of these chemicals remain **uncertain**.
- **Harmful Effects of Black Plastic:**
  - **Health Risks:** Contains neurotoxic heavy metals and carcinogenic compounds.
  - **Food Contamination:** Heat exposure may cause chemical leaching into food.
  - **Environmental Hazard:** Difficult to recycle, leading to increased plastic pollution.

Species in News

65. GAMBUSIA AFFINIS (MOSQUITOFISH) AND POECILIA RETICULATA (GUPPY)

Context:

The National Green Tribunal is requesting a response from the Centre regarding the use of Gambusia Affinis and Poecilia Reticulata as biological mosquito control agents.

Gambusia Affinis (Mosquitofish):

- **What is it?**
  - A **small freshwater fish** native to **North America**, widely introduced for **mosquito control**.
  - Recognized as one of the **100 worst invasive alien species** globally.
- **Habitat & Distribution:**
  - Thrives in **freshwater bodies** like **ponds, lakes, and slow-moving rivers**.
  - Found in **temperate and tropical regions** due to its adaptability.
- **Characteristics:**
  - **Size:** Males grow up to **4 cm**, females up to **7 cm**.
  - **Diet:** Eats **zooplankton, insects, and mosquito larvae** but only in small proportions.
  - **Impact:** Outcompetes **native fish species**, leading to **biodiversity loss**.

Poecilia Reticulata (Guppy):

- **What is it?**
  - A **live-bearing freshwater fish**, native to **northeast South America**, commonly known as **millionfish or rainbow fish**.
  - One of the **most widely distributed aquarium fish**.
- **Habitat & Distribution:**
  - Found in **tropical and subtropical freshwater bodies** globally.
  - Adaptable to **varied ecological conditions**.
- **Characteristics:**
  - **Size:** Males are **smaller** than females but have **ornamental fins**.

Diet: Consumes **algae, aquatic insect larvae, and organic matter**.

Contribution to Mosquito Control:

- **Predatory Behaviour:** Both species consume **mosquito larvae**, reducing populations in water bodies.
- **Biological Control Agents:** Introduced in many countries to **combat vector-borne** diseases like malaria and dengue.
- **Efficiency Debate:** While effective in **mosquito suppression**, they also **disrupt native aquatic ecosystems**, leading to food scarcity for indigenous fish species.

66. OLIVE RIDLEY SEA TURTLE

Context:

A surge in Olive Ridley Sea turtle deaths has been reported along the Chennai and Chengalpattu coasts of Tamil Nadu, with over 1,200 carcasses found in January 2025.

About Olive Ridley Sea Turtle:

- **Scientific Classification:**
  - **Scientific Name:** *Lepidochelys olivacea*
  - **IUCN Status:** Vulnerable.
- **Physical & Biological Features:**
  - Smallest **sea turtle species**, weighing up to **45 kg**, with a **heart-shaped olive-green carapace**.
  - **Omnivorous diet**, feeding on crustaceans, algae, mollusks, and jellyfish.
  - Unique **arribada (mass nesting) behavior**, with thousands nesting simultaneously on select beaches.
  - The **mating season** of Olive Ridley turtles occurs between **November and April**, leading to mass nesting (arribada) on select beaches.
- **Habitat & Distribution:**
  - Found in **tropical waters of the Pacific, Indian, and Atlantic Oceans**.
  - **Nesting sites** in India include Odisha (Gahirmatha, Devi, Rushikulya), Tamil Nadu, Andhra Pradesh, and Andaman & Nicobar Islands.
- **Recent Mortality Along Indian Coast:**
  - **Tamil Nadu (Chennai, Chengalpattu)**: **1,200+ carcasses** found, three times the annual average.
  - **Andhra Pradesh (Tirupati, Nellore, Visakhapatnam)**: Over **2,000 deaths** reported in January 2025.
- **Reasons for Mass Deaths:**
  - **Illegal bottom trawling & gill nets:** Turtles drown after getting entangled in fishing gear.
  - **Lack of Turtle Excluder Devices (TEDs):** Many **trawl boats violate marine** regulations.
  - **Plastic Pollution & Habitat Destruction:** Polluted beaches and **coastal infrastructure (groynes, seawalls)** obstruct nesting.

- **Climate Change & Rough Sea Conditions:** **Extended monsoons & strong currents** disrupt turtle migration patterns.
- **Poaching & Egg Harvesting:** Though illegal, **turtle eggs** are still collected in some regions.

67. ELEPHANT TRUMPETING

Context:

A new study published in Mammalian Biology reveals that Asian elephants use trumpeting sounds in diverse social interactions, contrary to previous beliefs that they only trumpet in response to disturbances.

Elephant Trumpeting Overview

- A loud, high-frequency sound produced by elephants for communication with herd members.
- Serves multiple functions: alerting, expressing excitement, play, and signaling danger.
- Formed by sudden air blowing through elephant trunks.
- Features include high-frequency communication, multi-contextual use, and species-specific variations.

Differences Between African & Asian Elephant Trumpeting:

Feature	African Elephant (Loxodonta)	Asian Elephant (Elephas maximus)
Primary Context	Used mainly for distress and alarm	Used for social interactions, play, and group coordination
Vocal Mechanism	Typically combines trunk bursts with vocal cord activation	Often produced without vocal cord involvement
Acoustic Frequency	Broader range, with some lower-pitched trumpets	More consistent duration, higher frequency calls
Combination Calls	Rarely recorded in African elephants	First documented case of roar-rumble combination in Asian elephants
Environmental Adaptation	Used in savanna landscapes where sound needs to travel far	Used in dense forests where high-pitched calls are more effective

68. ONGOLE BREED CATTLE

Context:

Viatina-19, an Ongole breed cow, recently set a world record by selling for $4.82 million (~₹41 crore) in Brazil, surpassing Japan's Wagyu and India's Brahman breeds.

About Ongole Breed:

- Native to Prakasam district, Andhra Pradesh, India.
- Found in villages around Guntur, Vinukonda, Narasaraopet, Ongole, Kandukur, and along the Gundlakamma and Alluru rivers.
- Also known as the Nellore breed due to its historical association with Nellore district.
- **Key Features**: Large, muscular build, distinct hump in males, mostly white or gray coat color, short, stumpy, thick horns, and fleshy dewlaps.
- Known for its high heat resistance, strong immune system, and low disease susceptibility.
- Globally recognized for crossbreeding and dairy farming in Brazil, USA, and Australia.
- Historical significance: Traces of Zebu (Bos Indicus) cattle, including Ongole breed, date back to Indus Valley Civilization (3000 BC).

69. HANGUL DEER

Context:

Scientists at CSIR-Centre for Cellular & Molecular Biology (CCMB) have found that human disturbances during mating and birthing seasons are increasing stress levels in Hangul deer, affecting their reproduction.

- A subspecies of the Central Asian red deer, endemic to Kashmir and northern Himachal Pradesh.
- State animal of Jammu and Kashmir and the only surviving Asiatic subspecies of the Red Deer family.

- Found in dense riverine forests, valleys, and mountainous regions.
- Key protected areas include Dachigam National Park and Tral Wildlife Sanctuary.
- Listed as Critically Endangered (CR) on the IUCN Red List due to rapid population decline.
- Key features include large antlers, seasonal mating and birth patterns, and a herbivorous diet.
- Population decline due to habitat destruction, overgrazing, human disturbance, and climate change.

70. HUMPBACK WHALE

Context:

A 23-year-old Venezuelan kayaker, was briefly swallowed by a humpback whale while kayaking in the Strait of Magellan, Chile.

- The whale **mistook the kayak for prey**, engulfed Simancas, and released him unharmed within seconds.
- **What is a Humpback Whale?**
  - **Scientific Name**: *Megaptera novaeangliae*
  - A **baleen whale** known for its **acrobatic breaches, complex songs, and long migrations**.
  - One of the **largest whale species**, reaching lengths of **12–16 meters (39–52 feet)** and weighing **up to 36 metric tons**.
- **Types of Whales:**
  - Whales are classified into two major families:
  - **Baleen Whales (Mysticeti)**:
    - Includes **humpback whales, blue whales, and grey whales**.
    - Have **baleen plates** instead of teeth, used for **filter-feeding plankton and krill**.
  - **Toothed Whales (Odontoceti)**:
    - Includes **sperm whales, beaked whales, killer whales, and dolphins**.
    - Have **teeth** and hunt **larger prey like fish and squid**.
- **Food Habits:** Primarily consists of **krill, plankton, and small fish**.
- **Feeding Technique**:
  - Uses **baleen plates** to filter food from seawater.
  - Unique **bubble-net feeding** traps prey in spirals of air bubbles before consumption.
- **Distribution & Habitat:**
  - Found in **all major oceans**, from **polar feeding grounds** to **tropical breeding areas**.
  - **Migrates thousands of kilometres** annually between feeding and breeding zones.
- **Behavior & Communication:**
  - **Breaching:** Jumps out of water and slaps back down, possibly for communication or parasite removal.
  - **Songs:**
    - Males **sing long, complex songs** to attract mates.
    - Songs vary among **populations and evolve yearly**.
- **IUCN Conservation Status:** It is listed as "Vulnerable" on the IUCN Red List.

71. NORTHERN WHITE RHINO

Context:

The northern white rhino, with only two individuals left, is on the brink of extinction. However, a breakthrough in in-vitro fertilisation (IVF) offers hope for the subspecies' survival, with 36 embryos ready for implantation.

- **What is a White Rhino?**
  - The white rhino, also known as the square-lipped rhinoceros, is one of the five rhino species.
  - Its name originates from the Afrikaans word "weit," meaning "wide," referring to its broad muzzle.
- **Habitat:**
  - Found in long and short grass savannahs.
  - Southern white rhinos are primarily located in South Africa, with smaller populations in Kenya, Namibia, and Zimbabwe.
  - Northern white rhinos are critically endangered, with only two individuals remaining at the **Ol Pejeta Conservancy in Kenya**.
- **Types:**
  - **Southern White Rhino (*Ceratotherium simum simum*):** Near Threatened.
  - **Northern White Rhino (*Ceratotherium simum cottoni*):** Critically Endangered.
- **Features:**

- **Food Habits**: Exclusive grazers, feeding almost entirely on short grasses.
- **Biological:**
  - Second-largest land mammal after elephants.
  - Two horns on the nose, with the front horn being significantly larger.
- **Physical:**
  - Square upper lip adapted for grazing.
  - No difference in skin colour between white and black rhinos.

72. GHARIAL

Context:
Madhya Pradesh Chief Minister releases 10 gharials into Chambal River, boosting conservation efforts, hosting 80% of India's gharial population, reaffirming leadership in gharial conservation.

- **What is a Gharial?**
  - A **critically endangered** species of crocodilian (Gavialis gangeticus) with a long, narrow snout adapted for catching fish.
  - The name **"gharial"** comes from the Hindi word **"ghara"**, referring to the **bulbous snout tip** seen in males.
- **Locations in India:**
  - Found in **major river systems**:
  - **Chambal River** (Madhya Pradesh, Uttar Pradesh, Rajasthan) – Largest population.
  - **Ganges, Yamuna, Son, Gandak, Mahanadi, and Brahmaputra Rivers** – Scattered populations.
- **IUCN Status & Conservation Status:**
  - **Critically Endangered** on the **IUCN Red List**.
  - Included in **Schedule I of the Wildlife Protection Act, 1972**, granting it the highest legal protection in India.
- **Biological & Physical Features:**
  - **Size**: Males grow **up to 6 meters**, females **2.6 to 4.5 meters**.
  - **Diet**: Primarily **fish**, using its slender snout and interlocking teeth for efficient hunting.
  - **Reproduction**: Mates during **November–January**, nests on **sandbanks and islands**, and lays eggs **March–May**.
- **Major Threats**
  - **Habitat destruction**: Dams, embankments, irrigation canals, and sand mining disrupt nesting areas.
  - **Overfishing & Bycatch**: Gharials get trapped in fishing nets (gillnets), leading to accidental deaths.
  - **Pollution**: Industrial waste and pesticides poison river ecosystems.
  - **Historical Exploitation**: Once hunted for skin, trophies, and traditional medicine.
- **Chambal River Conservation Efforts:**
  - **National Chambal Sanctuary (435 km stretch)**: Protects one of India's cleanest rivers.
  - **Captive Breeding & Release**: Since 1975, hatchlings are raised in centers and released into rivers.
  - **Restoring Sandbanks**: Ensures safe **nesting sites**.
  - **Community Involvement**: Engaging **locals in conservation** efforts to protect riverine ecosystems.

Internal Security

73. DISTRIBUTED DENIAL OF SERVICE (DDOS) ATTACK

Context:
Karnataka's property registration portal, Kaveri 2.0, faced severe disruptions due to a Distributed Denial of Service (DDoS) attack, impacting operations.

- **What is a DDoS Attack?**
  - A **Distributed Denial of Service (DDoS) attack** floods a server or network with excessive traffic, causing service disruptions.
  - It leverages a **botnet** a network of compromised devices—to send overwhelming requests to the target system.
- **How Does a DDoS Attack Work?**
  - **Botnet Formation:** Hackers infect multiple devices with malware, converting them into bots.
  - **Traffic Overload:** The botnet directs massive fake requests to the target, exhausting bandwidth or processing power.
  - **Service Disruption:** Legitimate users experience slowdowns or complete service failure.
  - **Diversion Tactic:** Attackers may use DDoS as a smokescreen for data breaches or malware deployment.

- **How to Counter a DDoS Attack?**
  - **Traffic Filtering:** Identify and block malicious requests using AI-based monitoring.
  - **Rate Limiting:** Restrict the number of requests per user to prevent overload.
  - **Bot Detection Tools:** Use CAPTCHA and behavioral analysis to block automated attacks.
  - **Robust Authentication:** Strengthen login security to prevent unauthorized access.
  - **Incident Response Teams:** Establish cybersecurity teams to monitor, detect, and mitigate threats.

74. PIG BUTCHERING SCAM

Context:

The government has issued an alert about the 'Pig Butchering Scam', a cyber fraud targeting unemployed youth, students, and vulnerable individuals.

- The **Indian Cyber Crime Coordination Centre (I4C) and Google** are collaborating to combat this scam, which involves money laundering and cyber slavery.
- **What is the Pig Butchering Scam?**
  - A **fraudulent online scheme** where **scammers build trust with victims before stealing their money**.
  - Originated in **China (2016)** and has now spread globally.
  - Involves **large-scale financial fraud, cryptocurrency scams, and forced cyber labor**.
- **How Does It Work?**
  - **Targeting Victims:** Scammers contact individuals via social media, dating apps, or investment platforms.
  - **Building Trust:** They gain confidence over time, often posing as wealthy investors or advisors.
  - **Fake Investment Opportunities:** Victims are encouraged to invest in crypto, forex trading, or high-return schemes.
  - **Money Theft:** Once victims deposit funds, scammers disappear or show fake profits to lure in more investments.
  - **Cyber Slavery:** Some victims are coerced into working for cybercriminals, engaging in fraudulent activities under duress.
- **Key Features of the Scam:**
  - **Psychological Manipulation:** Uses trust-building techniques to deceive victims.
  - **Cryptocurrency & Online Trading:** Fraudsters leverage digital investments for large-scale laundering.
  - **Cross-Border Operations:** Uses Google Ads, Facebook, and online platforms for targeted scams.

Defence

75. MAN PORTABLE AIR DEFENCE SYSTEM (MANPAD)

Context:

The Defence Research and Development Organisation (DRDO) successfully conducted three flight trials of the indigenously developed Very Short-Range Air Defence System (VSHORADS), a Man Portable Air Defence System (MANPAD).

- **What is MANPAD?**
  - A lightweight, shoulder-fired missile system designed to target low-altitude aerial threats like drones, helicopters, and aircraft.
  - Provides mobility and flexibility to ground forces for air defence in combat zones.
- **Developed By:**
  - Designed and developed by **DRDO's Research Centre Imarat (RCI)**, Hyderabad.
- **Aim:**
  - To provide the Indian armed forces with an **indigenous, advanced air defence system** capable of neutralizing modern aerial threats.
  - To replace ageing systems like the Russian Igla MANPADS.
- **Features:**
  - **Portability:** Weighs **20.5 kg** and can be shoulder-fired or mounted on a tripod.
  - **Range:** Effective range of **250 meters to 6 kilometres**.
  - **Speed:** Maximum speed of **Mach 1.5 (1,850 km/h)**.
  - **Warhead:** Equipped with a **2 kg adaptive proximity fuze** for precise target destruction.
  - **Target Engagement:** Capable of intercepting low-flying drones and aircraft with reduced thermal signatures.
  - **Operational Flexibility:** Can be deployed in various combat scenarios, including mountainous and urban terrains.

76. STRYKER INFANTRY COMBAT VEHICLE

Context:
India-U.S. defence cooperation advances with progress in the Stryker Infantry Combat Vehicle (ICV) deal, with a plan for co-production in India.

About Stryker Infantry Combat Vehicle (ICV):

- **What is Stryker?**
  - **Eight-wheeled armoured infantry combat vehicle** (ICV) designed for rapid deployment and enhanced battlefield mobility.
  - Developed by **General Dynamics Land Systems (GDLS) Canada and U.S.**
- **Purpose of Stryker ICV:**
  - Designed for **quick response in counter-insurgency and war-like situations**.
  - Provides **better survivability against IEDs** compared to other light-armoured vehicles.
  - Supports **infantry squads with firepower, protection, and mobility** in high-threat environments.
- **Features of Stryker ICV:**
  - **V-hull structure** for enhanced **mine and blast protection**.
  - Equipped with **30 mm cannon and 105 mm mobile gun** for combat effectiveness.
  - **Composite armour with ceramic tiles** for enhanced protection.
  - **Manned by two crew members** and **carries a nine-member infantry squad.**
  - **Top speed:** 100 km/h, **Range:** 483 km.
  - Can be **airlifted by Chinook helicopters**, improving mobility in difficult terrains.
- **Significance for India:**
  - Enhances infantry mobility and **firepower in high-altitude** warfare.
  - Provides better protection for troops against IEDs and small arms fire.
  - Strengthens **India's border security** in sensitive regions like **Ladakh and Arunachal Pradesh**.
  - Supports **'Make in India' initiative** with a potential **co-production agreement** involving Bharat Earth Movers Limited (BEML).
  - Boosts **India-U.S. defence ties**, expanding military collaboration beyond aircraft and missile systems.

77. SU-57 FIGHTER JET

Context:
Russia has offered India a partnership for the joint production of the Su-57 fighter jet at Hindustan Aeronautics Limited (HAL), aiming to localize fifth-generation fighter aircraft (FGFA) technology.

About Su-57 Fighter Jet:

- **What is Su-57?**
  - A **fifth-generation stealth fighter** developed by **Russia's United Aircraft Corporation (UAC)**.
  - Designed for **air superiority and ground attack roles** with advanced stealth, agility, and multi-role combat capabilities.
- **Nation of Origin:**
  - Developed by **Russia**, primarily for the **Russian Air Force**.
- **Key Features of Su-57:**
  - **Stealth Design:** Low radar cross-section (RCS) with composite materials and radar-absorbing coating.
  - **AESA Radar:** Multi-band active electronically scanned array (AESA) radar for enhanced situational awareness.
  - **Supermaneuverability:** Thrust-vectoring engines allow superior dogfight agility.
  - **Supersonic Cruising (Supercruise):** Can sustain supersonic speeds without afterburners.
  - **AI-Integrated Systems:** AI-assisted avionics for advanced combat decision-making.
  - **Advanced Weaponry:** Carries hypersonic missiles, air-to-air and air-to-ground precision-guided weapons.

Differences Between Su-57 and F-35:

Feature	Su-57 (Russia)	F-35 (USA)
Design Objective	Air superiority & interception with ground attack capability	Multi-role strike fighter with advanced stealth

Stealth Capability	Front-aspect stealth, moderate all-round stealth	Full-spectrum stealth, ultra-low radar signature
Radar & Sensors	AESA multi-band radar with additional L-band radars (better for stealth detection)	Advanced AESA radar optimized for electronic warfare & precision strikes
Manoeuvrability	**Highly manoeuvrable** (thrust-vectoring engines)	Less agile, optimized for stealth penetration
Speed & Range	**Max Speed:** Mach 2	**Max Speed:** Mach 1.6
Super cruise	Yes (can cruise at supersonic speeds without afterburners)	Limited (requires afterburners)
Weapons Load	**Larger payload**, internal & external weapons bay	Smaller internal payload (due to stealth), larger payload in non-stealth mode
Production Cost	**Lower cost** (~$70 million per unit)	**Expensive** (~$100-110 million per unit)
Operational Cost	Lower maintenance and operating cost	Higher sustainment costs due to stealth coating and advanced avionics
Strategic Suitability for India	Ideal for **border defense and air superiority**	Best for **precision strikes & offensive penetration**

78. MATSYA 6000

Context:

India's first manned submersible, Matsya 6000, is set to be launched by 2026 under the Deep Ocean Mission, as confirmed by Union Minister.

- Only **five nations** (**US, France, China, Russia, Japan**) have developed manned deep-sea submersibles.
- **What is Matsya 6000?**
  - **Matsya 6000** is a **deep-sea manned submersible** designed for underwater exploration.
  - Developed under the **Samudrayaan Project**, part of the **Deep Ocean Mission (DOM)**.
  - Built by the **National Institute of Ocean Technology (NIOT), Chennai**.
- **Ministry and Budget:**
  - Implemented by the **Ministry of Earth Sciences**.
  - Part of the **₹4,077 crore Deep Ocean Mission** aimed at deep-sea exploration.
- **Aim and Objectives:**
  - **Explore deep-sea biodiversity** and marine ecosystems.
  - **Survey mineral resources** such as **cobalt, manganese, and copper**.
  - **Support oceanic research** and promote **marine tourism and literacy**.
  - Enhance **India's technological capabilities** in **manned deep-sea exploration**.
- **Key Features of Matsya 6000:**
  - **Deep-sea Capability**:
    - Designed to operate at **6,000 meters depth** for up to **12-16 hours**.
    - Emergency endurance of **96 hours** for crew safety.
  - **Structural Design**:
    - **2.1m diameter titanium sphere** to house three crew members.
    - Constructed from **80mm thick titanium alloy** for high-pressure resistance.
  - **Advanced Navigation & Communication Systems**:
    - Equipped with **Ultra-Short Baseline (USBL) Acoustic Positioning System** for real-time tracking.
    - **Voice and data communication systems** to stay connected with the surface ship.
  - **Safety and Redundancy**:
    - Triple redundancy in **buoyancy, power, and life support systems**.
    - **Syntactic foam flotation device** ensures automatic resurfacing.
- **Functions of Matsya 6000:**
  - **Deep-sea Exploration**:
    - Survey **hydrothermal vents** and **methane seeps** for chemosynthetic biodiversity.
    - Investigate **seafloor composition** and **marine ecosystem health**.
  - **Resource Assessment:**
    - Identify deep-sea mineral resources like **cobalt, manganese, and rare earth elements**.
    - Assess the feasibility of **deep-sea mining and sustainable extraction**.

- **Scientific Research and Technological Advancement:**
  - Aid in **marine archaeology** and **underwater engineering innovations**.
  - Provide insights into **climate change impact on marine biodiversity**.

79. AERO INDIA 2025

Context:

Aero India 2025, Asia's largest biennial airshow, is being held in Bengaluru, showcasing advanced military aviation, defense technologies, and global aerospace collaborations.

- **What is Aero India?**
  - A premier aerospace and defense exhibition showcasing military aviation, advanced defense technologies, and global partnerships.
- **Origin & Host City:**
  - **First held in 1993** as **Avia India**, rebranded to **Aero India in 1996**.
  - Hosted at **Air Force Station, Yelahanka, Bengaluru**.
- **Frequency & Organizers**
  - **Biennial event** (held every **two years**).
  - Organized by **Ministry of Defence (MoD),** Government of India, with support from Hindustan Aeronautics Limited (HAL), DRDO, and Indian Air Force (IAF).
- **Aim & Significance:**
  - **Strengthen India's Aerospace & Defense Industry:** Encourages Make in India and Atmanirbhar Bharat in defense manufacturing.
  - **Global Defense Cooperation:** Attracts major defense firms for joint ventures, contracts, and technology transfers.
  - **Showcase Advanced Aircraft:** Demonstrates fighter jets, helicopters, UAVs, and next-gen aviation technologies.
  - **Boost Foreign Investment:** Facilitates collaborations between Indian and international defense companies.
- **Key Features of Aero India:**
  - **Live Aerial Displays:** Features combat aircraft, helicopters, and aerobatic teams like Surya Kiran.
  - **Defense Tech Exhibitions:** Showcases cutting-edge radar systems, drones, and AI-driven defense solutions.
  - **Business & Military Delegations:** Participation from global defense ministers, military officials, and aerospace CEOs.
  - **Platform for MMRCA Deals:** Previous editions played a key role in India's Medium Multi-Role Combat Aircraft procurement.
- **Aero India 2025 Theme:** "The Runway to a Billion Opportunities"

80. MAN-IN-LOOP ANTI-SHIP MISSILE

Context:

DRDO and the Indian Navy successfully tested the indigenous Naval Anti-Ship Missile – Short Range (NASM-SR) with a 'Man-in-Loop' capability from a Seaking 42B helicopter at ITR, Chandipur.

- **What is a Man-in-Loop Missile?**
  - A **missile that allows real-time human intervention during flight** for decision-making.
  - Enables **in-flight retargeting** based on **live seeker images** sent to the pilot.
- **Developed by:** Defence Research and Development Organisation (DRDO) in collaboration with the Indian Navy.
- **How It Works?**
  - **Bearing-Only Lock-On Mode:** The missile is launched with a broad direction of the target.
  - **Live Seeker Image Transmission:** The **high-bandwidth two-way data link** sends real-time target images to the pilot.
  - **In-Flight Retargeting:** The pilot can **redirect the missile to a specific target** based on new information.
  - **Sea-Skimming Mode:** The missile flies **low over the sea surface** to avoid radar detection.
  - **Terminal Phase Guidance:** Uses an **Indigenous Imaging Infra-Red Seeker (IIR)** for precision strikes.
- **Key Features:**
  - **Indigenous Fiber Optic Gyroscope-based Inertial Navigation System (INS)** for accurate mid-course guidance.
  - **Electro-Mechanical Actuators & Jet Vane Control** for superior maneuverability.
  - **Radio Altimeter** for low-altitude, terrain-following flight.
  - **Pinpoint accuracy** with a **range of over 50 km**.

MAPPING

INTERNATIONAL

1. KARA SEA

Context:

A Russian nuclear-powered icebreaker, *50 Let Pobedy*, collided with a cargo vessel in the Kara Sea, raising concerns about Arctic navigation safety.

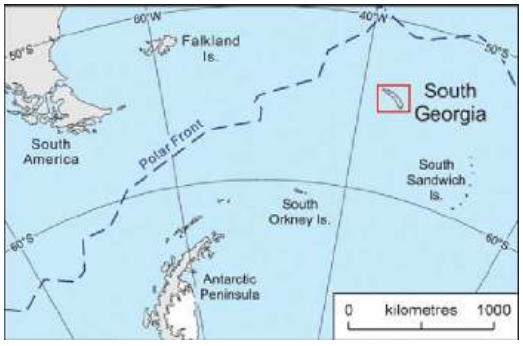
- **Located in:** A marginal sea of the Arctic Ocean, north of Siberia, Russia.
- **Nations Bordering:** Russia (exclusively).
- **Rivers Draining Into:** Kara, Ob, Pyasina, and Yenisei rivers.
- **Unique Features:**
  - One of the **world's coldest seas**, ice-covered from September to May.
  - Home to significant islands like **Bely, Dikson, and Taymyr**, and the Nordenskiold Archipelago (90+ islands).
  - Strategically important for the **Northern Sea Route (NSR)**, crucial for Arctic shipping.
  - **Kara Strait:** Separates the Kara Sea from the Barents Sea in the west.

Vilkitsky Strait: Connects the Kara Sea to the Laptev Sea in the east.

2. SOUTH GEORGIA ISLAND

Context:

The world's largest iceberg, A-23-A, is drifting toward South Georgia Island, raising concerns about potential threats to local wildlife and ecosystems.



- Part of South Georgia and South Sandwich Islands, British Overseas Territory.
- Capital: King Edward Point.
- No indigenous population due to harsh climate and remoteness.
- Controlled by the UK.
- Features include Allardyce Range, numerous small rivers, coastal bays, and glaciers.

3. SOUTH SUDAN

Context:

The Sudan People's Liberation Movement-North (SPLM-N) has declared a famine in its controlled territories, including the Nuba Mountains and parts of Blue Nile State.

About South Sudan:

Landlocked Landlocked Country in East Africa

- Capital: Juba
- Bordered by Sudan, Ethiopia, Kenya, Uganda, Democratic Republic of the Congo, and Central African Republic
- Geography: Nile River, Sudd, Imatong Mountains, Mount Kinyeti
- Landscape: Widespread plains, tropical savannahs, floodplains, forested mountains.

About Sudan People's Liberation Movement-North (SPLM-N)

- Emerged as a breakaway faction of the **Sudan People's Liberation Movement (SPLM)** after South Sudan's independence in 2011.
- Primarily represents the interests of the **Nuba** and **Blue Nile** regions in Sudan.
- Advocates for **greater autonomy, political representation**, and resource sharing for marginalized regions in Sudan.

4. SANTORINI ISLAND

Context: Santorini, a popular Greek island, has been placed on high alert after experiencing over 200 undersea earthquakes in four days, with magnitudes up to 4.6.

Located in Greece's Cyclades archipelago.

- Controlled by Greece (part of the Thira regional unit).
- Home to Santorini Caldera, one of the most active volcanoes in the South Aegean Volcanic Arc.
- Nearby volcanoes: **Nea Kameni and Palaia Kameni.**
- Historical site of the Minoan eruption, one of the largest in recorded history.
- Tectonic Plates: Convergence of African and Aegean Sea Plates.
- Frequent seismic activity due to subduction and tectonic movements.

5. COOK ISLANDS

Context: New Zealand has raised "significant concern" over the Cook Islands' plan to sign a strategic partnership deal with China, citing a lack of prior consultation.

- Located in Polynesia, South Pacific Ocean.
- Mix of volcanic islands and coral atolls.
- Capital: Avarua, on Rarotonga Island.
- Highest Point: Te Manga (652m), steep volcanic slopes and dense vegetation.
- Political Status: Self-governing, in free association with New Zealand.
- Citizenship: All Cook Islanders hold New Zealand citizenship.
- Support from New Zealand: Financial aid, defense help, and foreign affairs management.

6. NAMIBIA

Context:

Sam Nujoma, Namibia's first democratically elected president and a key figure in the country's independence struggle, passed away at age 95.

Located in Southern Africa, bordered by the Atlantic Ocean.

- Capital: Windhoek.
- Neighbouring countries: South Africa, Botswana, Zimbabwe & Zambia, Angola, and Atlantic Ocean.
- Geographic features: Namib Desert and Kalahari Desert.
- Mountains: Brandberg Mountain, Namibia's highest peak.
- Rivers: Kunene, Okavango, Mashi, Zambezi, and Orange River.

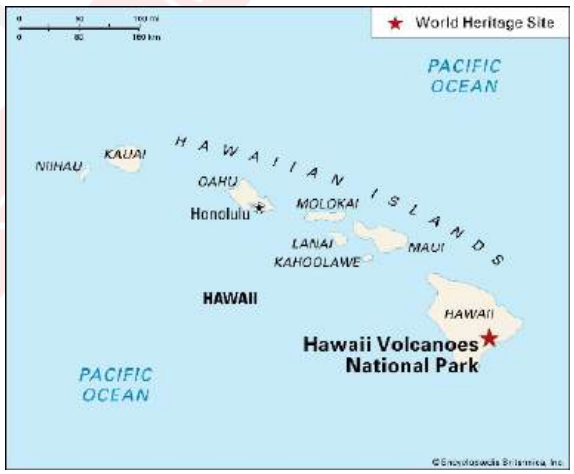
7. BALTIC SEA

Context: Security analysts warn of a high risk of an oil spill in the Baltic Sea due to Russia's "shadow fleet" of old and technically deficient oil tankers operating without Western insurance.

• Semi-enclosed inland sea in Northern Europe, separates Scandinavian Peninsula from continental Europe.
• Connected to Atlantic Ocean via Danish Straits.
• Neighboring countries: Denmark, Germany, Poland, Lithuania, Latvia, Estonia, Russia, Finland, and Sweden.
• Major rivers: Over 250, with Neva River (Russia) being the largest.
• Key Gulfs: Gulf of Bothnia, Gulf of Finland, Gulf of Riga.
• Features: Covers 377,000 sq. km, 1,600 km long, 193 km wide.
• Connected to White Sea and North Sea's German Bight via White Sea Canal and Kiel Canal.

8. HAWAII'S KILAUEA VOLCANO

Context:
Hawaii's Kilauea volcano erupted again, sending lava over 300 feet high into the air, marking its ninth eruption episode since December 2024.



Kilauea Volcano Overview
• Located on the southeastern shore of Hawaii's Big Island, 200 miles southeast of Honolulu.
• Part of the Hawaiian–Emperor seamount chain.
• Shield volcano known for effusive lava flows.
• Age estimated to be 210,000 to 280,000 years old.
• Structure features a large caldera (Halema'uma'u Crater) at its summit.

Other Major Volcanoes in the Hawaiian Region
• Mauna Loa: Largest active volcano on Earth by volume.
• Mauna Kea: Tallest mountain in the world, considered dormant.
• Halalālai: Third most active volcano on Hawaiian Big Island.
• Lo'ihi Seamount: Underwater volcano southeast of Big Island.

9. GULF OF EILAT

Context:
A new study has revealed that coral reefs in the Gulf of Eilat experienced a 3,000-year growth shutdown due to global cooling, but later recovered naturally from deeper waters.

• Northern extension of the Red Sea, east of Sinai Peninsula and west of Arabian Peninsula.
• Shares coastline with Egypt, Israel, Jordan, and Saudi Arabia.
• Key cities: Taba (Egypt), Eilat (Israel), and Aqaba (Jordan).
• Maximum depth: 1,850 meters, deeper than Gulf of Suez.
• Forms southern end of Dead Sea Transform, a major tectonic fault zone.
• Home to world's northernmost coral reefs.

10. MALDIVES

Context:

The International Monetary Fund (IMF) has issued a warning to the Maldives, emphasizing the urgent need for stronger fiscal consolidation to address the nation's economic challenges.

- An archipelagic nation in the Indian Ocean, southwest of Sri Lanka and India.
- Capital: Malé, known as the "King's Island" for its central governance role.
- Composed of 1,190 coral islands in 27 atolls in the Indian Ocean.
- Unique island: Addu Atoll, located south of the equator.
- Divided by natural channels, "Kandu," facilitating oceanic flow.

- **Military Exercise with India:** "Exercise Ekuverin", "Exercise Dosti", "Exercise Ekatha" and "Operation Shield".
- Maldives is largely flat and has no land features such as hills or rivers, but some islands have dunes such as that found in **Hithadhoo island** of Addu Atoll.
- **Official language:** The official language of the Maldives is Dhivehi, which is a unique language spoken only by the people of Maldives.
- The **Equator passes through the Maldives**, with **Ihavandhippolhu Atoll** as the **northernmost atoll** and **Addu Atoll** marking the **southernmost point** of the archipelago.

11. MOUNT DUKONO (INDONESIA)

Context:

Mount Dukono (Indonesia) erupted, emitting a 2,000-metre ash cloud, prompting an aviation warning and public safety advisory.

- **Location:** Halmahera Island, North Maluku, Indonesia
- **Type:** Active stratovolcano (1,087 m).
- **Features:**
  - **Persistent eruptions**, producing **frequent ash clouds**.
  - **Current eruption** spewed a **2,000-metre ash column**.
  - Volcanic ash **poses risks to aviation**, leading to an **orange-level aviation warning** (VONA).
- **Impact:**
  - **Flights restricted** within a **5 km radius** of the volcano.
  - **Residents advised** to avoid a **4 km danger zone** near the **Malupang Warirang crater**.

12. GULF OF TONKIN

Context:

Vietnam's foreign ministry has released a map defining its baseline claim in the Gulf of Tonkin, aligning with UNCLOS 1982 and the Vietnam-China Gulf of Tonkin Delimitation Agreement (2000).

Gulf of Tonkin's Historical Significance

- **Location:** Northwestern South China Sea.

- **Borders:** Vietnam (West & Northwest) and China (North & East).
- **River Inflow:** Red River (Vietnam) and other tributaries.
- **Historical Significance:** Vietnam War (1964) led to U.S. intervention.
- **Maritime Agreements:** Vietnam-China Agreement (2000) defined Gulf of Tonkin's EEZ boundaries.
- **UNCLOS 1982 Compliance:** Both nations established baselines and EEZs.
- **Territorial Dispute:** Vietnam vs. China, China's baseline in March 2023.

13. HONDURAS

Context:

India dispatched 26 tons of humanitarian aid to Honduras following the devastation caused by Tropical Storm SARA.

- Located in **Central America, with Tegucigalpa as its capital.**
- **Neighbouring countries** include **Guatemala, El Salvador, Nicaragua, and the Caribbean Sea & Pacific Ocean.**
- **Major valleys** include the highly populated and fertile **Sula Valley and the UNESCO site Río Plátano Biosphere Reserve in La Mosquitia.**
- **The Coco River forms the border with Nicaragua.**
- **Key exports include coffee, tropical fruits, sugarcane, textiles, and minerals.**
- **Tropical Storm SARA originated in the Atlantic Ocean off Honduras coast.**
- **Landfall occurred near Nicaraguan-Honduran border, causing heavy rainfall and strong winds.**

14. MOUNT FENTALE

Context:

Ethiopia's Mount Fentale volcano has emitted massive methane plumes, an unprecedented natural event with potential climate change implications.

- **What Happened?**
  - **Mount Fentale**, located in **northern Ethiopia**, released **large amounts of methane** into the atmosphere starting **January 31, 2025**.
  - The event was described as a **"burp"**, with huge plumes of **methane escaping from underground gas deposits**.
  - This phenomenon was first detected via **satellite monitoring** and later confirmed by **GHGSat**.
- **Why Is This Unusual?**
  - **Volcanic activity typically emits carbon dioxide (CO_2) and sulphur dioxide (SO_2), not methane (CH_4)**.
  - Methane is **28 times more effective** at trapping heat than carbon dioxide over a **100-year period**.
  - The emission **surpasses typical volcanic gas output**, raising concerns over **climate impact and greenhouse gas monitoring**.
- **Scientific Explanations:**
  - The methane release is likely due to **magma movements opening underground gas pockets**, rather than a **surface eruption**.
  - **Thermal anomalies detected via satellite in January** suggest **deep-seated geological activity**.
- **Climate and Environmental Concerns**
  - Methane is the **second-largest contributor to global warming** (11% of total greenhouse gases).
  - Even **short-term spikes in methane** levels can **intensify climate change effects**.
  - Highlights the **need for improved global methane tracking**, both from **natural sources** and **human activities**.

INDIAN

15. KOLLERU LAKE

Context: The National Green Tribunal (NGT) has restrained the Andhra Pradesh government from proceeding with six infrastructure projects in the Kolleru wetland area.

- **Location:** Andhra Pradesh, between the **Krishna and Godavari River** deltas.
- **States:** Andhra Pradesh.
- **Rivers:** Fed by the Budameru and Tammileru rivers.
- **Features:**
  - One of India's largest freshwater lakes.
  - Declared a Ramsar site in 2002 for its ecological importance.
  - A key hotspot for the Central Asian Flyway, a major bird migratory route.
  - Supports diverse aquatic and bird species, making it a critical wetland ecosystem.

About Kolleru Bird Sanctuary:

- **Located in:** Andhra Pradesh, within the Kolleru Lake region.
- **Features:**
  - Home to the **Grey Pelican**, an indicator species of the sanctuary.
  - Wetland marsh habitat supporting migratory birds like Glossy Ibis, Open-billed Stork, Purple Moorhen, and Painted Storks.
  - Declared a wildlife sanctuary to protect its rich biodiversity and aquatic habitats.

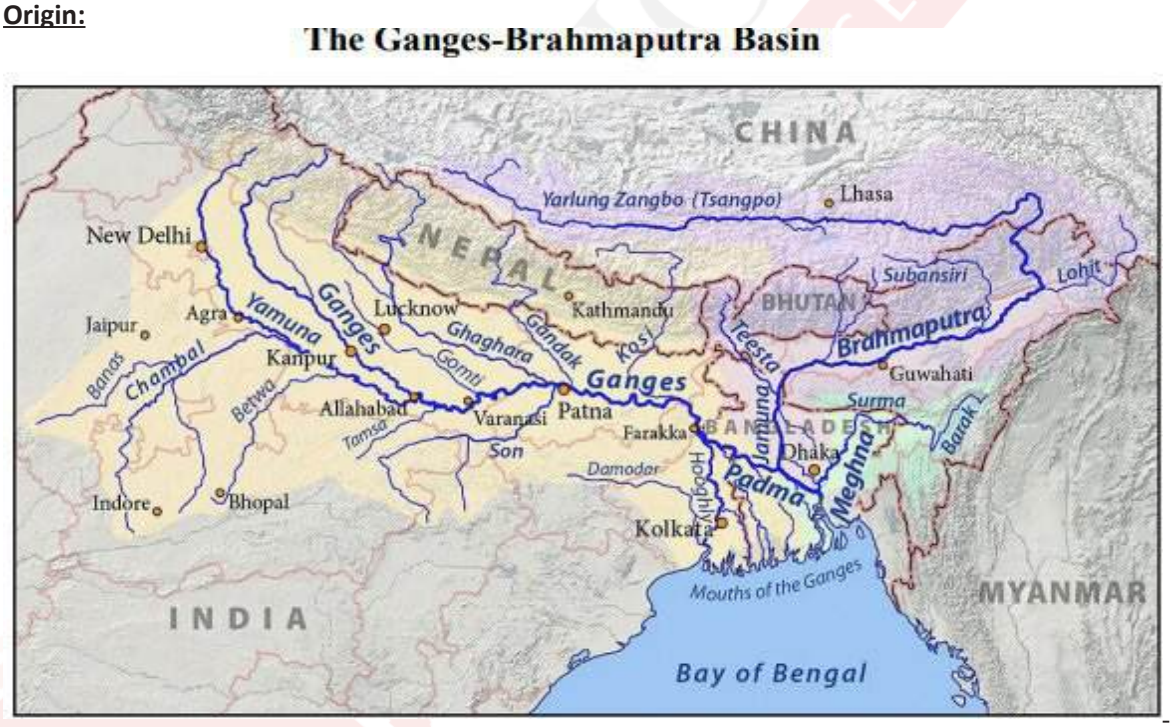
16. TEESTA RIVER

Context:

The Environment Appraisal Committee (EAC) has approved the reconstruction of the Teesta-3 dam in Sikkim, despite concerns over environmental safety and disaster risks.

About *Teesta River*:

- **Origin:**



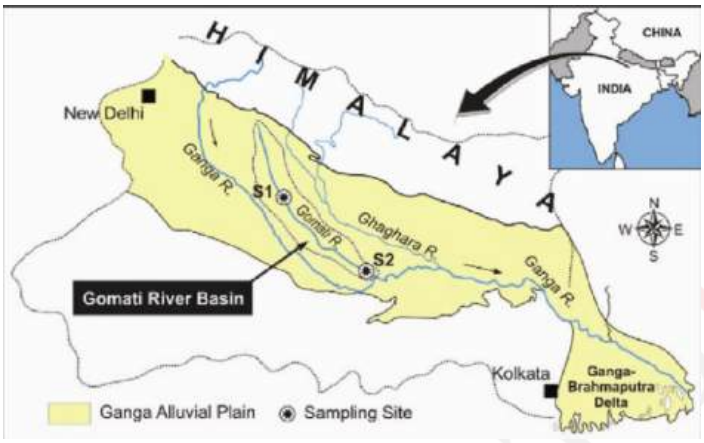
- The **Teesta River** originates from **Tso Lhamo Lake** in the Himalayas, near the Khangse glaciers in Sikkim.
- **States it pass through:** Sikkim and West Bengal.
- **Tributaries: Left-bank Tributaries:** Lachung Chhu, Chakung Chhu, Dik Chhu, Rani Khola, Rangpo Chhu. **Right-bank Tributaries:** Zemu Chhu, Rangyong Chhu, Rangit River.
- **End Point:** The river merges with the **Brahmaputra (Jamuna) in Bangladesh**.
- **Unique Features**
  - **Vital for Agriculture & Hydropower**: Teesta's waters are crucial for irrigation and hydroelectric projects in India and Bangladesh.
  - **Glacial Lake Outburst Flood (GLOF) Risks**: The river is vulnerable to flash floods from glacial lakes, as seen in the 2023 Sikkim disaster.
  - **Disputed Water Sharing**: India and Bangladesh have long debated the Teesta water-sharing treaty, affecting bilateral relations.

17. GOMTI RIVER

Context:

Lucknow is set to launch cruise services on the Gomti River, enhancing tourism and offering a scenic view of the city's skyline.

About *Gomti River*:



Originated from Gomat Taal in Pilibhit district, Uttar Pradesh.

- Flows entirely within Uttar Pradesh, passing through Lucknow, Barabanki, Sultanpur, Faizabad, and Jaunpur.
- Major tributaries include Sai River, Kathina River, Chowka River, and Saryu River.
- Key urban centers include Lucknow, Jaunpur, Sultanpur, and Barabanki.
- Tributary of the Ganges (Ganga) River.
- Perennial river with sluggish flow, except during monsoon season.
- Environmentally polluted due to urban waste and industrial discharge.

18. RAMAKRISHNA BEACH (RK BEACH)

Context:

The sand at Ramakrishna Beach (RK Beach) in Visakhapatnam has turned black, raising concerns over sewage pollution, as locals suspect contamination from drainage canals.

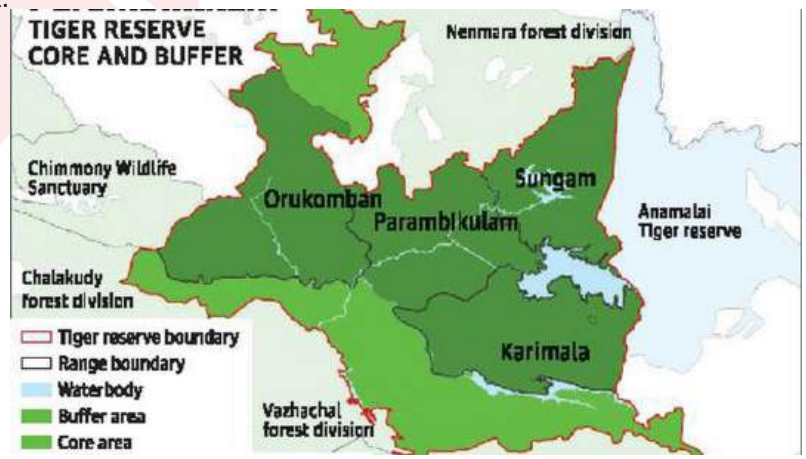
Located on the east coast of the Bay of Bengal.

- Near Dolphin's Nose and INS Kursura Submarine Museum.
- Named after Ramakrishna Mission Ashram.
- Features sculptures and art installations.
- Maintained by Visakhapatnam Urban Development Authority.
- Reason behind sand pollution: suspected sewage discharge from drainage canals.
- Experts rule out mineral deposits.
- GVMC is implementing sewage divert measures.

19. PARAMBIKULAM TIGER RESERVE

Context:

A faunal survey in Parambikulam Tiger Reserve recorded 15 new species, including birds, butterflies, and odonates, increasing its biodiversity checklist.



- **Located in Palakkad and Thrissur districts, between Anamalai Hills and Nelliampathy Hills.**
- **Covers 643.66 sq. km, including Parambikulam Wildlife Sanctuary.**
- Home to endangered **medicinal plants like Coscinium fenestratum and Utleria salicifolia.**
- Home to a variety of mammals **and endemic species like Tomopterna parambikulamana and Garra surendranathanii.**
- **Home to indigenous tribes in six colonies: Kadar, Malasar, Muduvar, and Mala Malasar**
- A UNESCO World Heritage Site and Project Tiger under the National Tiger Conservation Authority.

20. PIR PANJAL RANGE

Context:

Amid rising Line of Control skirmishes in Jammu, India-Pakistan brigade commanders met at Chakkan-Da-Bagh (Poonch District), in Pir Panjal Valley to ease tensions and reaffirm the ceasefire.

- **Part of the Lesser Himalayas, spanning India and Pakistan-administered Kashmir.**
- **Covers Himachal Pradesh and Jammu & Kashmir in India.**
- **Key features include Deo Tibba and Indrasan mountain peak.**
- **Major rivers include Beas and Ravi, Jhelum, and Indus.**
- **Strategic connectivity includes Mughal Road and Jawhar Tunnel.**
- **Home to Gulmarg hill resort and Pir Panjal as ancient trade route with India.**

21. GULF OF MANNAR

Context:

The Ministry of Petroleum and Natural Gas has identified a deep-sea region in the Gulf of Mannar for hydrocarbon exploration under the 10th round of the Open Acreage Licensing Policy.

- **Situated between India's southeastern coast and Sri Lanka's west coast.**
- Forms **part of the Laccadive Sea in the Indian Ocean.**
- **Separated from Palk Bay by Adam's Bridge.**
- **Major rivers draining into the Gulf:** Thamirabarani River, Vaippar River, Malvathu Oya.
- **Unique geological** structure facilitates coral reef formation.
- **Found minerals:** Limestone, gypsum, ilmenite, rutile, garnet, zircon.
- **Potential hydrocarbon deposits identified.**
- **Biodiversity:** Frequent visitors include dolphins, sharks, dugongs, and sea turtles.
- **Features Gulf of Mannar Marine National Park (1986) and Gulf of Mannar Biosphere Reserve (1989).**