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CURRENT AFFAIRS

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Current Affairs

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HISTORY & CULTURE

1. Ustad Zakir Hussain

Context: Ustad Zakir Hussain, the globally celebrated tabla maestro, passed away in San Francisco due to Idiopathic Pulmonary Fibrosis (IPF).

About Zakir Hussain:

- Birth: Born on March 9, 1951, in Mumbai, India.
- Family & Roots: Son of legendary tabla player Ustad Alla Rakha; trained in the Punjab Gharana tradition.
- Music Legacy: A pioneer in Indian classical and fusion music, blending tabla with jazz, film, and world music.
- Achievements & Awards:
  - Winner of five Grammy Awards, including one for the fusion group Shakti.
  - Awarded Padma Shri (1988), Padma Bhushan (2002), and Padma Vibhushan (2023).
  - Collaborated with artists like John McLaughlin, Pandit Ravi Shankar, and Ali Akbar Khan.
- Global Influence: Popularized the tabla globally through concerts, commercials, and innovative collaborations.

About Idiopathic Pulmonary Fibrosis (IPF):

- What it is: A chronic, progressive lung disease causing scarring (fibrosis) of lung tissue, making breathing difficult.
- Causes:
  - Exact cause unknown (idiopathic).
  - Triggered by environmental factors (smoke, dust, pollution), genetic predisposition, and chronic inflammation.
- Symptoms:
  - Shortness of breath (dyspnea)
  - Dry cough
  - Fatigue and unintended weight loss
  - Low oxygen levels leading to complications like pulmonary hypertension and respiratory failure.
- Diagnosis: Confirmed via high-resolution CT scans, pulmonary function tests, and occasionally lung biopsy.
- Treatment:
  - Antifibrotic medications: Pirfenidone, Nintedanib (slows progression).
  - Oxygen therapy and lung exercises.
  - Lung transplantation for advanced cases.

2. Durgadi Fort

Context: The Durgadi Fort in Kalyan, Maharashtra, has become a focal point of communal and legal disputes over its ownership, with historical significance to both Hindu and Muslim communities.

About Durgadi Fort:

- Built In: The fort was constructed during the reign of Shah Jahan and completed under Aurangzeb in 1694 AD.
- Location: Situated in Kalyan, Maharashtra, near the Ulhas River,

about 50 km northeast of Mumbai.

- Built By: Initially constructed by the Adil Shahi Sultanate and later modified by the Marathas.
- History of Fort:
  - Captured by Shivaji in 1654, who transformed it into a naval dock for Hindavi Swarajya.
  - Marathas added a temple for Goddess Durga and renamed it Durgadi Killa.
  - Changed hands multiple times between the Mughals and Marathas.
  - Used as a source of building material during British rule for the Kalyan and Thane piers.
- Architectural Features:
  - Spread over 70 acres on elevated ground.
  - Features include an Idgah (prayer wall), mosque, deep stone well, and a small Durga temple.
  - Marathas built an additional gate and garden, enhancing the fort's accessibility.

3. Subramania Bharati

Context: Prime Minister released the complete works of the eminent Tamil poet and freedom fighter Subramania Bharati.

About Subramania Bharati:

- Birth and Early Life:
- Born: December 11, 1882.
- Location: Ettayapuram, Tamil Nadu.
- Literary Contributions:
- Revolutionized Tamil literature with his innovative style and social themes.
- Translated the Bhagavad Gita into
- Promoted themes of equality, women's empowerment, and freedom through his poetry.
- Major Works:
  - Kuyil Pattu: A poem celebrating the simplicity of nature.
  - Kannan Pattu: Depicts divine love and spirituality.
  - Panchali Sabatham: A poetic re-telling of the Mahabharata's Draupadi episode with a focus on justice and valor.
  - India Weekly (1906): First Tamil newspaper to include political cartoons.
- Significance:
- Infused patriotism and cultural pride among Indians during the freedom struggle.
- Advocated for women's rights and education, breaking societal barriers.
- His vision for a united and progressive India continues to inspire generations.

4. Rajagopalachari

Context: On Shri C. Rajagopalachari's birth anniversary, PM Modi honored his multifaceted contributions to governance, literature, and social empowerment.

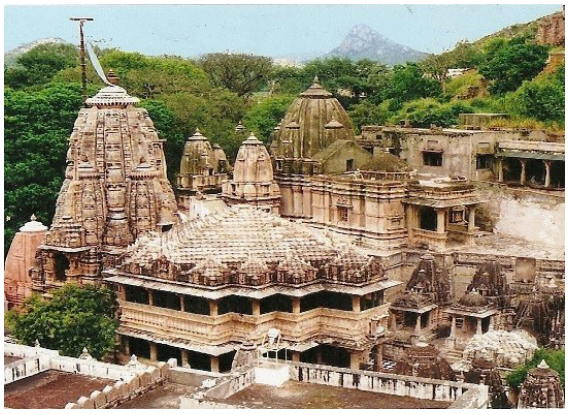
About C. Rajagopalachari:

- Born: December 10, 1878, in Thorapalli, Madras Presidency (now Tamil Nadu, India).
- Family: Belonged to a Tamil-speaking Iyengar Brahmin family; father was a lawyer.
- Contribution to the Freedom Movement:
  - Indian National Congress (INC): Served as a legal advisor and General Secretary.
  - Non-Cooperation Movement: Promoted boycotts of British goods and institutions.
  - Civil Disobedience Movement: Led Salt Satyagraha in Madras Presiden-

cy.
  - Rajaji Formula (1944): Proposed a framework to resolve conflicts between INC and the Muslim League on partition.
  - Diplomatic Efforts: Represented Indian National Congress (INC) in Round Table Conferences and advocated peaceful negotiations for independence.
- Post-Independence Contributions:
  - Governor-General of India (1948–1950): Last Governor-General; oversaw the transition to the Republic of India.
  - Chief Minister of Madras State (1952–1954): Introduced reforms in education, agriculture, and rural development.
  - Founder of Swatantra Party (1959): Advocated free-market principles and economic liberalization.
- Literary Works:
  - Translations:
- Mahabharata and Ramayana (English).
- Tamil translation of Ramayana (Chakravarthi Thirumagan), which won the Sahitya Akademi Award in 1958.
  - Hinduism: Doctrine and Way of Life: Explored Hindu scriptures and philosophy.
  - Autobiography: Rajaji: A Life.
- Awards and Recognitions:
  - Bharat Ratna (1954): For contributions to politics, literature, and public service.
  - Ramon Magsaysay Award (1958): For leadership during his tenure as Madras Chief Minister.
  - Sahitya Akademi Fellowship: Honored for contributions to literature.
  - Ramanujan Award (1962): For translating Thirukkural into English.
- Death: December 25, 1972, in Chennai, Tamil Nadu, at age 94.

5. Eklingji Temple

Context: The iconic Eklingji Temple in Udaipur has introduced new regulations, including a dress code and a mobile phone ban, to preserve its sanctity.



About Eklingji Temple:

- Built in: Originally constructed in the 8th century.
- Built by: Bappa Rawal, the 8th-century ruler of Mewar.
- Location: Situated in Kailashpuri village, Udaipur District, Rajasthan.
- Historical Timeline:
  - 8th Century: Constructed by Bappa Rawal.
  - 14th Century: Hamir Singh renovated and reinstalled the idol after destruction by invaders.
  - 15th Century: Rana Kumbha rebuilt the temple and added a Vishnu temple.
  - Late 15th Century: Reconstructed by Rana Raimal after attacks by Malwa Sultanate's Ghiyath Shah.
- Architectural Features:
  - Temple Complex: Made of marble and granite, the complex has a central Shiva lingam representing Lord Ekling Nath.
  - Intricate Carvings: Features elaborate sculptures and ornamental pillars, showcasing Mewar's architectural style.
  - Main Idol: A four-faced Shiva lingam symbolizing creation, preservation, and destruction.
  - Sect Associations: Originally linked to the Pashupata sect, then Nath sect, and later to Ramanandis.

Chapter-
2

POLITY

Judicial Accountability

Context:

Recent instances of judicial misconduct in India have reignited the debate on the mechanisms to hold judges accountable, emphasizing the need for transparency and responsibility in judicial actions.

- A speech delivered by Justice Shekhar Kumar Yadav, that made apparent his biases against the Muslim community, has once again spotlighted the difficulty in India's review mechanism to hold judges of the higher judiciary accountable.

What is Judicial Accountability?

Judicial accountability refers to the principle that judges must take responsibility for their decisions and actions. It ensures transparency in decision-making and mandates judges to act within the framework of the law, upholding the trust vested in them by society.

Provisions for Judicial Accountability:

- **Constitutional Provisions:**
  - Article 124(4) and 124(5): Allows impeachment of Supreme Court judges for proven misbehavior or incapacity.
  - Article 217: Impeachment of High Court judges based on similar grounds.
  - Article 235: Empowers High Courts to control and supervise subordinate courts.
  - Restatement of Judicial Values (1997): Acts as a code of conduct for higher judiciary members.
- **Legal Provisions:**
  - Judges (Inquiry) Act, 1968: Establishes a mechanism to investigate misconduct through a three-member panel.
  - Contempt of Courts Act, 1971: Ensures that judicial functions independently without undue influence.
  - Judicial Standards and Accountability Bill (pending): Aims to enhance transparency in judicial conduct and strengthen oversight mechanisms.

Need for Judicial Accountability:

- Ensuring Public Trust: Upholding the credibility of the judiciary and maintaining citizens' confidence in the legal system.
- Preventing Misconduct: Ensures that judges adhere to ethical standards and constitutional principles.
- Enhancing Transparency: Judicial decisions should be open to scrutiny to promote fairness.
- Balancing Independence and Responsibility: Prevents misuse of judicial independence for personal or political interests.
- Promoting Rule of Law: Ensures decisions are unbiased, equitable, and in line with constitutional mandates.

Examples of Judicial Accountability:

1. Justice Soumitra Sen's Impeachment (2011): Found guilty of financial misconduct as a court-appointed receiver, showcasing accountability through parliamentary processes.
2. Justice P.D. Dinakaran's Resignation (2011): Resigned amid allegations of land grabbing and corruption, highlighting the role of public scrutiny in judicial conduct.
3. RTI and Judiciary (2020): Supreme Court upheld the applicability of RTI to itself, ensuring transparency and accountability in judicial appointments and decisions.

Challenges to Judicial Accountability:

- Impeachment Complexity: The current impeachment process is cumbersome, requiring a two-thirds majority in Parliament.

- Limited Oversight Mechanisms: Lack of robust external mechanisms to monitor judicial behaviour.
- Independence Concerns: Excessive accountability measures may threaten judicial independence.
- Resignations Before Proceedings: Judges resigning to avoid inquiries hinder the accountability process.
- Lack of Transparency: Closed-door deliberations reduce public trust in judicial proceedings.

Way Ahead:

- Legislative Reforms: Expedite the passage of the Judicial Standards and Accountability Bill for structured oversight.
- Strengthening Internal Mechanisms: Develop independent judicial review bodies to monitor conduct.
- Codifying Ethical Guidelines: Expand and enforce the Restatement of Judicial Values.
- Public Scrutiny: Enhance transparency through regular publication of judgments and judicial activities.
- Training and Awareness: Conduct regular ethical training for judges to ensure adherence to constitutional principles.

Conclusion:

Judicial accountability is pivotal for preserving the judiciary's independence and integrity. Transparent mechanisms and institutional reforms are vital to reinforce public trust and ensure that justice delivery aligns with democratic principles.

PM CARES Fund

Context:

The Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund (PM CARES Fund) received Rs 912 crore in contributions during the financial year 2022-23.

About PM CARES Fund:

- Established in: March 27, 2020, registered under the Registration Act, 1908.
- Under ministry: Administered directly by the Prime Minister's Office (PMO).
- Administered by: Managed by honorary officials including Additional Secretary/Joint Secretary in charge of the PM CARES Fund.
- **Trustees:**
  - Ex-Officio Trustees: Prime Minister (Chairman), Minister of Defence, Minister of Home Affairs, and Minister of Finance.
  - Nominated Trustees: Justice K.T. Thomas (Retd.), Kariya Munda.
  - Advisory Board Members: Rajiv Mehrishi, Sudha Murthy, Anand Shah.
  - Aim: To address public health emergencies, natural disasters, and calamities by providing financial assistance, creating infrastructure, and funding research for relief efforts.
- **Features:**
  - Entirely funded through voluntary contributions from individuals and organizations (domestic and foreign).
  - Exempt from FCRA and eligible for 80G benefits under the Income Tax Act, 1961.
  - Qualifies as CSR expenditure under the Companies Act, 2013.
  - Focuses on relief activities like healthcare infrastructure, assistance for affected individuals, and upgradation of emergency services.
  - Managed without direct budgetary support from the government.

No-Detention Policy

Context:

The Central Government has recently amended the Right to Education Act, 2009, scrapping the no-detention policy in schools governed by it.

- It includes Kendriya Vidyalayas, Jawahar Navodaya Vidyalayas, and other institutions under the Ministry of Defence and Tribal Affairs.

About No Detention Policy (NDP):

- **What is the No-Detention Policy?**

- Introduced under Section 16 of the Right to Education Act, 2009 to prohibit the detention of students until Class 8.

- Aimed to ensure minimum education levels for all children by promoting automatic promotion.
- **Key Clause in RTE Act, 2009:**
  - Section 16: No child shall be detained in any class until the completion of elementary education (Classes 1-8).
  - Amended in 2019: Allowed States to hold back students in Classes 5 and 8 based on academic performance.
  - At present, 14 states and UTs are continuing the no-detention policy.
- **Reasons for Removal:**
  - Declining Learning Outcomes: Students reportedly lacked seriousness about studies due to assured promotions.
  - Accountability: Schools failed to focus on learning, as emphasized by the HRD Ministry.
  - States' Feedback: Many states demanded policy removal to improve quality and accountability in elementary education.
  - National Alignment: Linked with the goals of the National Education Policy (NEP) 2020 for holistic education.

Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024

Context:

The Indian government notified the Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024.

About Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024:

- **Key Features**
- **Competent Authority:**
  - Union Home Secretary and State Home Secretaries are designated as the competent authorities to authorize interception.
  - Joint Secretary-level officers can authorize interception in "unavoidable circumstances."
- **Agency Authorization:**
  - The Central Government can authorize law enforcement or security agencies for interception under Section 20(2) of the Telecommunications Act, 2023.
- **Emergency Provisions:**
  - In "remote areas" or "operational reasons," heads or second senior-most officers of authorized agencies can issue interception orders, subject to confirmation within seven working days.
- **Data Retention and Destruction:**
  - Interception records must be destroyed every six months unless required for functional or legal reasons.

New Features:

- **Expanded Grounds:**
  - Interception can now occur in "remote areas or for operational reasons," not limited to "emergent cases."
- **Limits on Officers:**
  - Only the head and one additional senior-most officer (IGP rank or above) at the state level can authorize interception.
- **Accountability for non-confirmation:**
  - Interception orders not confirmed within seven days cannot be used for any purpose, including as evidence in court.
- **Relaxed Procedure for Agencies:**
  - Greater flexibility for agencies to issue interception orders without immediate approval, subject to post-facto confirmation.

Declining Legislative Productivity

Context:

The recent Winter Session of Parliament was marked by significant disruptions, leading to a substantial reduction in legislative productivity.

Ineffectiveness of Winter Session 2024:

1. Low Functioning Hours: Lok Sabha functioned for only 52% of its scheduled time, while Rajya Sabha operated at 39%, with both houses frequently disrupted.
2. Question Hour Impacted: Question Hour did not function for 15 out of 19 days in Rajya Sabha and for more than 10 minutes on 12 out of 20 days in Lok Sabha, undermining legislative scrutiny.
3. Legislation Backlog: Only one bill, the Bharatiya Vayuyan Vidheyak, 2024, was passed, marking the lowest legislative productivity in the last six Lok Sabha terms.
4. No Private Members' Business: Lok Sabha conducted no private members' business due to disruptions and a discussion on the Constitution, while Rajya Sabha managed to discuss only one resolution.
5. Deputy Speaker Vacancy: The 18th Lok Sabha continued without electing a Deputy Speaker since 2019, violating constitutional mandates for timely appointments.

Reasons behind the disruptions:

1. Political Polarization: Deepening ideological divides between the ruling party and the opposition have led to confrontational politics, resulting in frequent disruptions.
2. Contentious Legislation: The introduction of controversial bills without adequate pre-legislative consultations has sparked resistance and protests within the Parliament.
3. Unaddressed Opposition Demands: The government's reluctance to address pressing issues raised by the opposition has led to protests and walkouts.
4. Procedural Violations: Instances of unparliamentary behaviour, such as sloganeering and rushing to the well of the house, have disrupted proceedings.
5. External Events Influencing Proceedings: External controversies and scandals have spilled over into parliamentary sessions, causing further disruptions.

Consequences of disruptions:

1. Legislative Delays: Important bills face delays, hindering policy implementation and governance.
2. Resource Wastage: Disruptions lead to the wastage of public funds allocated for parliamentary sessions.
3. Erosion of Public Trust: Frequent disruptions diminish public confidence in democratic institutions.
4. Missed Debates: Crucial discussions on socio-economic challenges are often sidelined.
5. International Image: Persistent disruptions can tarnish India's reputation as a functioning democracy.

Way ahead:

1. Strengthening Parliamentary Procedures: Implementing stricter rules to curb unruly behaviour and ensuring adherence to parliamentary decorum.
2. Promoting Bipartisan Dialogue: Encouraging constructive dialogue between the ruling party and the opposition to address contentious issues amicably.
3. Ensuring Pre-Legislative Consultations: Engaging stakeholders in discussions before introducing significant legislation to build consensus.
4. Enhancing Disciplinary Measures: Empowering parliamentary authorities to take prompt action against members violating decorum.
5. Public Awareness and Accountability: Increasing transparency and making MPs accountable to the public for their conduct in the house.

Conclusion:

Addressing the root causes of parliamentary disruptions is essential to uphold the sanctity of democratic institutions.

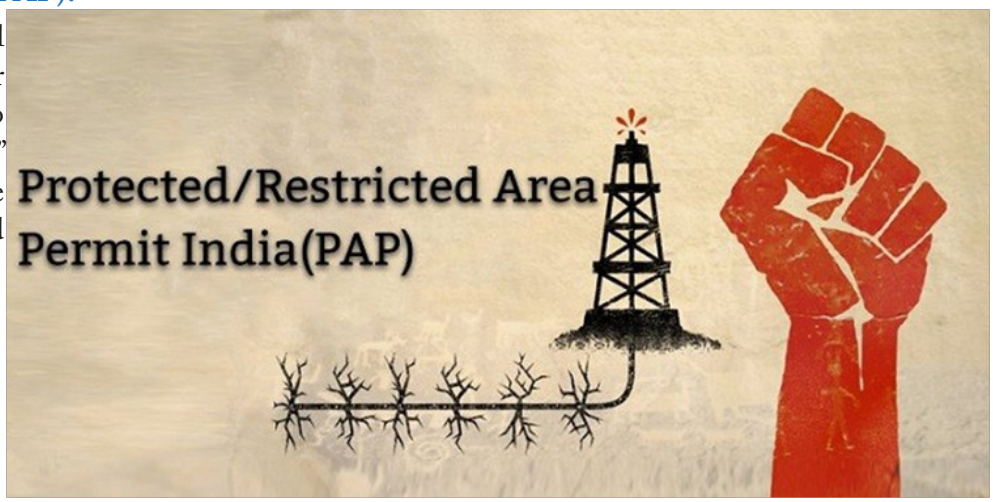
Implementing the suggested measures can lead to more productive sessions, ensuring that Parliament effectively fulfils its legislative and deliberative roles.

Protected Area Permit

Context:

The Indian government has reinstated the Protected Area Permit (PAP) regime in Manipur, Mizoram, and Nagaland due to security concerns stemming from the influx of people from neighbouring countries.

About Protected Area Permit (PAP):



- What it is: An official document required for foreign nationals to visit certain "protected" areas in India under the Foreigners (Protected Areas) Order, 1958.
- **States Under PAP:**
  - Arunachal Pradesh
  - Manipur
  - Mizoram
  - Nagaland
  - Sikkim (partly protected)
  - Parts of Himachal Pradesh, Jammu & Kashmir, Rajasthan, and Uttarakhand
  - Authority to Declare PAP: Declared by the Ministry of Home Affairs (MHA) under the Foreigners (Protected Areas) Order, 1958.
- **Procedure to Obtain PAP:**
  - Application submitted to Indian Missions abroad or competent local authorities in India.
  - Cases requiring special clearance referred to MHA with state government recommendations.
  - PAP valid for group tourists or individuals with extra-ordinary reasons.
- **Features of PAP:**
  - Valid for group tourists (minimum of 2 people).
  - Restricted to specified circuits/routes and entry/exit points.
  - Foreigners must register with the district Foreigners Registration Officer within 24 hours.
  - PAP is time-bound, and overstaying is prohibited.
  - Citizens from Afghanistan, China, and Pakistan require prior MHA

Malpractice in Exams

Context:

A seven-member panel headed by former ISRO chairman K Radhakrishnan has made a set of 101 recommendations to the Ministry of Education for conducting national level entrance exams in a "transparent, smooth and fair" manner.

Reasons for malpractice in exams:

- High Stakes: Entrance exams like NEET and JEE determine admissions to premier institutes, leading to unethical practices.
- Lack of Robust Systems: Dependence on outsourced agencies and weak digital infrastructure create vulnerabilities.
- Inadequate Monitoring: Insufficient oversight at test centres allows manipulation.
- Corruption and Collusion: Involvement of insiders and private service providers in leaks and irregularities.
- Technological Exploitation: Use of advanced cheating devices and hacking of online systems.

Recent Exam Scams in 2024:

1. NEET-UG Paper Leak: Reports of question paper leaks led to widespread criticism of the National Testing Agency (NTA).
2. UGC-NET Irregularities: Allegations of mismanagement and suspicious allocation of testing centres.
3. BPSC Exam Scam Allegation 2024 involved irregularities in the recruitment process, including alleged paper leaks and manipulation in the selection of candidates

Government initiatives to counter malpractice:

1. Strengthening NTA: Increased focus on enhancing its capacity and resources.
2. Biometric Verification: Implementation of Digi-Exam systems to verify candidates' authenticity.
3. Digital Infrastructure: Collaboration with Kendriya Vidyalayas and Navodaya Vidyalayas to establish computer-based testing centres.
4. Use of AI and Big Data: Predictive analytics to identify unusual patterns in exam results.
5. Legal Frameworks: Strict penalties under laws such as the Prevention of Malpractices in Exams Act in some states.

Public Examinations (Prevention of Unfair Means) Act, 2024:

- Aim: To curb malpractice, ensure transparency, and uphold the integrity of public examinations in India.
- Exams Covered: Includes national-level entrance exams like NEET, JEE, UGC-NET, and state-level recruitment or competitive examinations.
- Penalties: Strict provisions for offenders, including imprisonment of up to 10 years and fines up to 10 lakh for cheating, impersonation, or paper leaks.
- Accountability: Empowers authorities to hold organizers and service providers accountable for lapses and enforces measures like biometric verification and CCTV monitoring.

Challenges in countering malpractices:

1. Resource Constraints: Lack of funding and infrastructure to implement secure testing systems nationwide.
2. Coordination Issues: Difficulty in synchronizing efforts among central and state authorities.
3. Dependence on Private Agencies: Outsourcing leads to a lack of accountability.
4. Technological Barriers: Limited access to reliable digital solutions in rural areas.
5. Resistance to Reform: Bureaucratic inertia and reluctance to adopt new measures.

Key recommendations of the Radhakrishnan Committee:

1. Limit NTA's Scope: Focus primarily on entrance exams, reducing dependence on outsourced agencies.
2. Strengthen Local Coordination: Involve state and district officials in exam processes akin to election management.
3. Multi-Stage Testing: Introduce multi-session and adaptive testing models to enhance security and fairness.
4. Digital Transformation: Establish 400-500 nationwide computer-based testing centres within a year.
5. Improved Security Measures: Use sealed test centres, CCTV monitoring, and secure transport for question papers.
6. Candidate Authentication: Implement Digi-Exam systems to ensure biometric verification.
7. Harmonized Criteria: Standardize eligibility, admission criteria, and exam modes across institutions.

NOTE: This committee recommendation is NTA specific, which you can also use as a way ahead for curbing down malpractice in other exams too.

Conclusion:

To safeguard the integrity of national-level exams, robust digital infrastructure, transparent systems, and coordinated efforts are essential. The Radhakrishnan Committee's recommendations provide a pathway for reform, ensuring equitable opportunities for all students.

National Commission for Minority Educational Institutions (NCMEI)

Context:

The Union Minister addressed the 20th Foundation Day of the National Commission for Minority Educational Institutions (NCMEI), emphasizing the rights of minorities under the Constitution.

National Commission for Minority Educational Institutions (NCMEI):

- Founded In: Established in 2004 under the National Commission for Minority Educational Institutions Act, 2004.
- Ministry: Operates under the Ministry of Education.
- Aim: To safeguard and promote educational rights of religious and linguistic minorities as per Article 30(1) of the Constitution.
- **Powers and Functions:**
  - Quasi-judicial body with civil court powers.
  - Decides minority status and no objection certificate disputes for educational institutions.
  - Enquires complaints on deprivation of minority educational rights.
  - Advises and recommends to authorities regarding minority education issues.
  - Has appellate and original jurisdiction as per SC rulings.

Joint Parliamentary Committee (JPC)

Context:

The Constitution (129th) Amendment Bill, proposing simultaneous federal and state elections, has been referred to a Joint Parliamentary Committee (JPC) for wider consultation.

About Joint Parliamentary Committee (JPC):

- What is it: A JPC is an ad-hoc and bipartisan committee constituted to examine specific matters such as proposed legislation or policy issues in detail.
- Law governing formation: Formed under the Rules of Procedure and Conduct of Business in Lok Sabha.
- Who forms it: The Lok Sabha Speaker constitutes the JPC, and members are drawn from both Houses of Parliament.
- Once formed, the committee will have 90 days to submit its report, though this deadline can be extended if needed.
- Members Selection: Typically, up to 31 MPs (21 from Lok Sabha and 10 from Rajya Sabha) are selected, reflecting proportional party strength.
- **Powers and Function:**
  - The JPC is an ad-hoc Committee.
  - Examines bills, policies, or specific issues referred to it.
  - Consults stakeholders, experts, and officials for comprehensive analysis.
  - Can summon documents, witnesses, and experts for deliberations.
  - The committee's recommendations are advisoryand not mandatory for the government to follow.
  - Reports to: Submits its detailed findings and recommendations to the Parliament for further discussion and action.

Crime and Criminal Tracking Network and Systems (CCTNS)

Context:

The Crime and Criminal Tracking Network and Systems (CCTNS) has achieved full integration by linking all 17,130 police stations across India.

About Crime and Criminal Tracking Network and Systems (CCTNS):

- Launched in: 2009 under the Ministry of Home Affairs with a budget of 2,000 crore.
- Aim: To create a comprehensive and integrated system for enhancing the efficiency and effectiveness of policing across the country through IT-enabled solutions.
- Nodal agency: The National Crime Records Bureau (NCRB) is the central nodal agency that would manage CCTNS.
- **Objectives:**
  - Provide citizen-centric police services via a web portal.
  - Enable pan-India search on a national database of crime and criminal records.
  - Generate crime and criminal reports at State and Central levels.
  - Computerize police processes for better coordination and accountability.

About National Crime Records Bureau (NCRB):

- **Founded: 1986.**
  - Based on the recommendations of the Tandon Committee and National Police Commission (1977).
  - Headquarters: New Delhi.
  - Ministry: Ministry of Home Affairs (MHA).
- **Functions:**
  - Acts as a repository of crime and criminal data.
  - Publishes reports like Crime in India, Accidental Deaths & Suicides in India, and Prison Statistics.
  - Houses the Central Finger Print Bureau for fingerprint data.
  - Supports States with capacity building in IT, CCTNS, digital forensics, and network security.
  - Aids investigators in crime analysis and criminal tracking.

Uniform Civil Code

Context:

The union Home minister recently reaffirmed government commitment to implementing a Uniform Civil Code (UCC) nationwide, citing its successful implementation in Uttarakhand.

What is UCC?

The Uniform Civil Code aims to replace personal laws based on customs and religious scriptures with a unified legal framework applicable to all citizens, regardless of religion. It seeks to address areas such as marriage, divorce, inheritance, and adoption under a common legal structure, promoting equality and secularism.

Key Features of UCC:

1. Uniformity in Laws: Establishes a common set of laws governing civil matters across all religions.
2. Gender Equality: Removes discriminatory practices in personal laws, especially concerning women's rights.
3. Secular Legal System: Delinks civil law from religion, ensuring laws are religion-neutral.
4. National Integration: Promotes social harmony by creating a common legal identity.
5. Simplification of Legal Processes: Streamlines legal complexities arising from diverse personal laws.

Legal Framework and Articles Governing UCC:

- Article 44: Directive Principle of State Policy that mandates the State to endeavour to secure a Uniform Civil Code for all citizens.
- Article 14: Guarantees equality before the law and equal protection of the laws.
- Article 25: Protects religious freedom, raising questions about balancing religious practices with legal uniformity.
- Entry 5 of the Concurrent List in the Seventh Schedule, which specifically addresses various aspects including marriage, divorce, adoption, and succession, among others, allowing for legislation concerning personal laws.

Need for UCC in India:

1. Gender Equality: Eliminates discriminatory practices in personal laws.

E.g. Reforms in Hindu Succession Act provided daughters equal inheritance rights but excluded Muslim women from similar benefits.

2. Curbing Misuse of Personal Laws: Ensures fairness across religions by addressing legal loopholes.

E.g. Instances of misuse of triple talaq before its criminalization.

3. Promotes National Unity: Unifies diverse communities under one legal framework.

E.g. Persistent communal tensions highlight the need for legal uniformity.

4. Simplifies Legal Processes: Reduces conflicts arising from varying personal laws.

E.g. Disputes over inheritance rights between communities in states like Kerala and Tamil Nadu.

5. Protects Marginalized Communities: Provides equitable legal protection for minorities.

E.g. Tribal communities often face inequities under existing customary practices.

Best practices:

- Goa's UCC Practice: Rooted in the Portuguese Civil Code of 1867, mandates compulsory registration of marriages and provides equal property rights for sons and daughters, promoting gender equality and legal uniformity among all residents.
- Uttarakhand's UCC: Uttarakhand became the first Indian state to enact a Uniform Civil Code (UCC), establishing uniform laws on marriage, divorce, inheritance, and live-in relationships for all residents, irrespective of religion, while exempting Scheduled Tribes.

Leaders' Views on UCC:

1. B.R. Ambedkar: Emphasized the State's power to legislate for social reforms, including personal laws.
2. K.M. Munshi: Linked UCC with national unity and highlighted its role in modernizing societal practices.
3. Supreme Court: 2019 Jose Paulo Coutinho v. Maria Luiza Valentina Pereira case, the Court lauded Goa's implementation of a uniform civil code and urged for its nationwide adoption.
4. The 21st Law Commission, led by Justice Balbir Singh Chauhan in 2018, stated that a uniform civil code wasn't necessary or desirable at that stage, emphasizing the coexistence of secularism with the country's plurality.

Challenges to UCC:

1. Religious Opposition: Concerns over UCC infringing on religious practices.

E.g. Strong resistance from sections of the Muslim community over personal law reforms.

2. Diverse Customs: India's pluralistic society makes implementing a uniform code complex.

E.g. Regional differences in property rights among Hindu communities in Tamil Nadu and Karnataka.

3. Political Sensitivities: Accusations of UCC being used for vote-bank politics.

E.g. Allegations of political motives behind UCC discussions during elections.

4. Legal Ambiguity: Lack of clarity on how UCC would be harmonized with existing laws.

E.g. Debates on how to integrate tribal and customary laws.

5. Public Awareness: Limited understanding of UCC's implications among the masses.

E.g. Protests in Manipur against UCC reveal misconceptions about its purpose.

Way Ahead:

1. Inclusive Dialogue: Engage stakeholders across religions and communities to build consensus.
2. Phased Implementation: Begin with common areas like marriage, inheritance, and adoption.
3. Public Awareness Campaigns: Educate citizens on UCC's benefits to counter misinformation.
4. Balancing Religious Freedom: Ensure the UCC does not undermine constitutional rights under Article 25.
5. Strengthening Legal Frameworks: Build robust mechanisms to address potential conflicts and ambiguities.

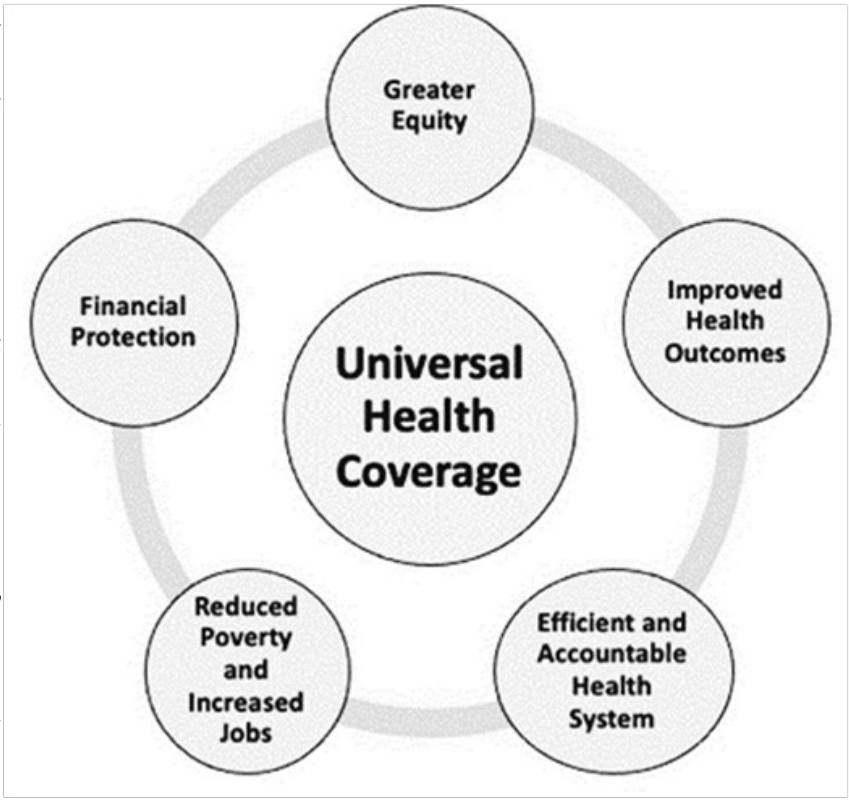
Conclusion:

As Dr. B.R. Ambedkar stated, "We are having liberty to reform our social system, which is full of inequities and inequalities." The Uniform Civil Code is a step toward a more equitable and secular India. Its implementation requires sensitivity, dialogue, and commitment to upholding constitutional values while respecting the nation's diversity.

Health Equity

Context:

Health equity remains a critical goal for achieving Universal Health Coverage (UHC) in India. Despite government initiatives systemic inequalities persist across gender, religion, and regions, widening the gap in access to quality healthcare services.



What is Health Equity?

Health equity ensures that everyone has a fair opportunity to achieve their highest health potential, addressing avoidable disparities caused by social, economic, and environmental factors.

Various Parameters of Health Equity

1. Access to Healthcare: Equitable distribution of hospitals, health workers, and medicines in rural and urban areas.
2. Financial Protection: Reducing out-of-pocket healthcare expenditures and ensuring insurance coverage.
3. Gender Parity: Equal healthcare access for women, men, and non-binary individuals.
4. Social Determinants: Addressing poverty, education, housing, and clean water to improve health outcomes.
5. Quality of Care: Ensuring timely, affordable, and standardized healthcare services for all.

Present Inequity in Health in India:

1. Gender Inequality:

- Anaemia among Women: 59% in the lowest wealth quintile (NFHS-5, 2019-21).
- Maternal mortality remains higher in rural areas due to lack of care.

2. Religious Inequality:

- Muslims have higher infant mortality rates (43 per 1,000 live births) than the national average (Census 2011).

3. Regional Disparity:

- Urban areas have 75% of healthcare professionals, but only 27% of India's population resides there (WHO).
- Rural CHCs face 83% shortages of specialists, worsening access to care.

4. Caste and Tribal Marginalization:

- Child Mortality: Higher among Scheduled Tribes and Scheduled Castes.
- Immunization rates lower for marginalized groups compared to upper castes (NFHS-5).

5. Economic Disparity:

- Out-of-pocket expenses: 39.4% of total health expenditure (NHA, 2021-22).
- Over 50 million people are pushed into poverty annually due to healthcare costs.

Government initiatives:

1. Ayushman Bharat – PMJAY: Provides 5 lakh annual health cover for low-income families.
2. National Health Mission (NHM): Focuses on strengthening primary and urban healthcare systems.
3. Pradhan Mantri Ayushman Bharat Digital Mission: Promotes digital healthcare access and efficiency.
4. Free Medicine Schemes: Tamil Nadu's robust drug procurement system ensures free medicines.
5. Focus on Primary Healthcare: Kerala's model emphasizes strong primary health infrastructure.

Challenges for health equity:

1. Inadequate Public Funding: Government healthcare spending stands at only 1.84% of GDP.
2. Shortage of Healthcare Workers: Severe deficit of doctors and specialists, particularly in rural areas.
3. Over-Reliance on Private Sector: High private healthcare costs exacerbate inequities.
4. Socioeconomic Barriers: Poverty, gender discrimination, and illiteracy hinder healthcare access.
5. Regional Imbalance: States with low healthcare infrastructure struggle with accessibility and quality of care.

Way ahead to achieve health equity:

1. Increased Public Health Spending: Raise budgetary allocation to 2.5% of GDP for improved infrastructure and resources.
2. Strengthen Primary Healthcare: Focus on PHCs and CHCs with adequate staffing and facilities in rural areas.
3. Expand Insurance Coverage: Integrate informal sector workers into schemes like PMJAY.
4. Leverage Technology: Use digital health platforms for telemedicine and health awareness.
5. Address Social Determinants: Tackle poverty, education gaps, clean water access, and nutrition to improve overall health outcomes.

Conclusion:

Achieving health equity requires political commitment, increased investment, and inclusive policies that address systemic disparities. As Nelson Mandela said, "Health cannot be a question of income; it is a fundamental human right."

Karnataka PDS Irregularities

Context:

The Comptroller and Auditor General (CAG) flagged irregularities in the implementation of Karnataka's Public Distribution System (PDS) during 2017-2022.

CAG Report on PDS Diversion:

- **Unauthorized Vehicles Used:**
  - Transporters used passenger vehicles (e.g., Tata Indica, Maruti Omni, three-wheelers) instead of authorized trucks.
- **Inflated Transport Claims:**
  - 1,725 trips out of 2,510 tested showed unauthorized vehicles transporting foodgrains.
- **Lack of Monitoring:**
  - WSD (Wholesale Depot) managers failed to ensure use of authorized vehicles per contract agreements.
- **Hygiene and Maintenance Issues:**
  - Poor hygiene observed, including pest infestations and stray animals in depots.

Relevance in UPSC exam syllabus:

- GS Paper II (Governance): Issues with PDS implementation and accountability in welfare schemes.
- GS Paper III (Economy): Leakages and inefficiencies in food distribution systems.
- Essay: Topics related to food security, governance reforms, and transparency in public systems.
- Ethics Paper (GS IV): Case studies on accountability, ethical lapses, and corruption in public service delivery.

POSH Act, 2013

Context:

The Supreme Court is hearing a PIL on applying the POSH Act to political parties, questioning their status as workplaces and Internal Complaints Committees (ICC) compliance.

About POSH Act:

- **What is POSH Act?**
  - Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013.
  - Objective: Protect women from sexual harassment at workplaces and ensure a mechanism for redressal.
- **Important Sections of the Act:**
  - Section 3(1): Prohibits sexual harassment at the workplace.
  - Section 4: Mandates the formation of an Internal Complaints Committee (ICC) in every workplace.
  - Section 9: Details the procedure for filing a complaint within three months of the incident.
  - Section 13: Discusses the inquiry procedure and actions against the accused if found guilty.

- **Who is Covered Under the Act?**
  - Employees: Includes permanent, temporary, contract workers, interns, and volunteers.
  - Workplace: Includes offices, public and private institutions, houses, hospitals, transport, and places visited during employment.
- **Features of the POSH Act:**
  - ICC Formation: Requires at least one external member with expertise in addressing sexual harassment.
  - Wide Definition of Workplace: Covers places visited during employment and extends to remote work settings.
  - Employer Responsibility: Ensures compliance, raises awareness, and reports annual compliance status.
  - Penalties: Non-compliance attracts fines and reputational damage for the organization.
  - Judicial Judgments on POSH Act:
  - Vishaka vs. State of Rajasthan (1997): Laid down guidelines for workplace sexual harassment, which later became the foundation for the POSH Act.
  - Kerala HC (2022): Held that political parties are not workplaces under the Act due to the absence of an employer-employee relationship.

ASHA Workers

Context:

ASHAs (Accredited Social Health Activists) play a pivotal role in India's healthcare system, especially in rural and underserved areas. Despite their significant contributions to maternal health, immunization, and awareness, these workers face numerous challenges that hinder their impact.

ASHA Workers in India:

- Origin: Launched in 2005 under the National Rural Health Mission (NRHM) to strengthen grassroots healthcare in rural areas.
- Who Are ASHAs: Female volunteers from local communities trained to promote health awareness and access to healthcare services.
- Aim: To serve as a link between communities and the healthcare system, fostering healthcare awareness and access at the village level.
- **Functions:**
  - Maternal and child healthcare.
  - Immunization drives.
  - Health education on sanitation, hygiene, and nutrition.
  - Support under national health programs like tuberculosis and family planning.

Role of ASHAs in Developing India:

1. Improving Maternal and Child Health: Promoting institutional deliveries and antenatal care has reduced maternal and infant mortality rates.
E.g.: Institutional delivery rate increased from 47% (2007) to 79% (2022).
1. Enhancing Immunization Rates: Mobilizing communities to participate in vaccination programs has improved child immunization rates.
2. Disease Surveillance: Reporting outbreaks and promoting early diagnosis under programs like Revised National Tuberculosis Control.
3. Advocacy and Behaviour Change: Creating awareness of sanitation, nutrition, and lifestyle diseases has led to improved public health behaviour.
4. Bridging Healthcare Gaps: Acting as a liaison between rural communities and public health facilities.
Government Initiatives to Empower ASHAs:
1. Remuneration and Incentives:
Increased pay and performance-based incentives announced in the 2018 budget.
2. Insurance Coverage: Free health insurance under Ayushman Bharat and Pradhan Mantri Jeevan Jyoti Bima Yojana.
3. Training Programs: Skill enhancement through continuous training under National Health Mission (NHM).
4. Recognition and Support: Platforms like Village Health Mapping and digital tools for better outreach and feedback.
5. Infrastructure Development: Improved logistics and access to medical supplies for effective delivery of services.

Challenges Faced by ASHA Workers:

1. Heavy Workload: Multiple responsibilities with limited support strain their efficiency.
2. Inadequate Compensation: Delayed payments and lack of social security benefits affect motivation.
3. Gender and Caste Discrimination: ASHAs, often from marginalized communities, face systemic biases.
4. Lack of Recognition: Insufficient acknowledgment of their efforts leads to dissatisfaction.
5. Inadequate Infrastructure: Limited access to transport and medical supplies hampers service delivery.

Way Ahead:

1. Formalize Employment Status: Transition ASHAs from volunteer roles to formal employment with benefits.
2. Strengthen Training and Resources: Provide modern training and ensure a steady supply of essential medical tools.
3. Enhance Financial Stability: Introduce timely and higher compensation with performance bonuses.
4. Recognition Programs: Establish awards and public acknowledgment to boost morale.
5. Digital Integration: Expand access to technology for real-time data collection and communication.

Conclusion:

As Nelson Mandela once said, “Health cannot be a question of income; it is a fundamental human right.” Empowering ASHAs is not just a policy priority but a moral imperative. Strengthening their roles with dignity, resources, and support will ensure that India’s healthcare system becomes more inclusive, effective, and capable of serving even the most marginalized.

Simultaneous election

Context:

The Union Cabinet approved “One Nation, One Election” to synchronize elections, sparking debates on its impact on federalism, democracy, and logistics.

What Is One Nation One Election (ONOE)?

- Definition: ONOE refers to holding elections for the Lok Sabha, all state assemblies, and local bodies simultaneously to streamline governance and reduce costs.
- Historical Practice: Simultaneous elections were conducted in India from 1951-1967 but were disrupted due to premature dissolutions of assemblies and the Lok Sabha.
- Scope: ONOE covers elections for the Lok Sabha and state assemblies, with municipal and panchayat elections synchronized within 100 days.

Constitutional Articles Involved in ONOE:

- Article 83 & 172: Relates to the duration of the Lok Sabha and state assemblies, requiring amendments for synchronization.
- Article 324A: Proposed for establishing logistical mechanisms for simultaneous elections.
- Article 368: Governs constitutional amendments requiring state ratification for changes impacting local bodies.

Need for ONOE:

1. Reduced Costs: ONOE aims to cut the high financial burden of frequent elections.
2. Governance Efficiency: Eliminates prolonged disruptions caused by the Model Code of Conduct (MCC).
3. Resource Optimization: Reduces diversion of security forces and personnel from essential duties.
4. Voter Fatigue: Prevents declining voter turnout caused by repeated elections.
5. Development Continuity: Minimizes policy paralysis and ensures uninterrupted governance.

Ramnath Kovind Committee Recommendations:

1. Two-Phase Elections:

- Phase 1: Lok Sabha and state assemblies.
- Phase 2: Local body elections within 100 days.

2. New Article 82A: Specifies terms and synchronization mechanisms for assemblies and Lok Sabha.
3. Midterm Polls: Ensures new elections for dissolved assemblies/Lok Sabha align with the national cycle.
4. Single Electoral Roll: A unified roll for all elections to streamline processes.
5. Logistical Planning: Advance procurement of EVMs, VVPATs, and deployment of personnel.

Challenges of ONOE:

1. Overshadowing Regional Issues: National issues may dominate, sidelining local priorities.
2. Impact on Regional Parties: Smaller parties may lose relevance, affecting political diversity.
3. Federalism Concerns: Centralized decision-making may undermine state autonomy.
4. Logistical Hurdles: Requires a significant scale-up in infrastructure, resources, and trained personnel.
5. Midterm Dissolutions: Aligning dissolved assemblies with the national cycle is complex.

Way Ahead:

1. Legislative Deliberation: Engage all stakeholders through detailed parliamentary discussions.
2. Consensus Building: Include states and regional parties to address federal concerns.
3. Pilot Projects: Implement ONOE in phases to assess feasibility and challenges.
4. Resource Investment: Strengthen electoral infrastructure and ensure preparedness.
5. Public Awareness: Educate citizens on the benefits and changes under ONOE.

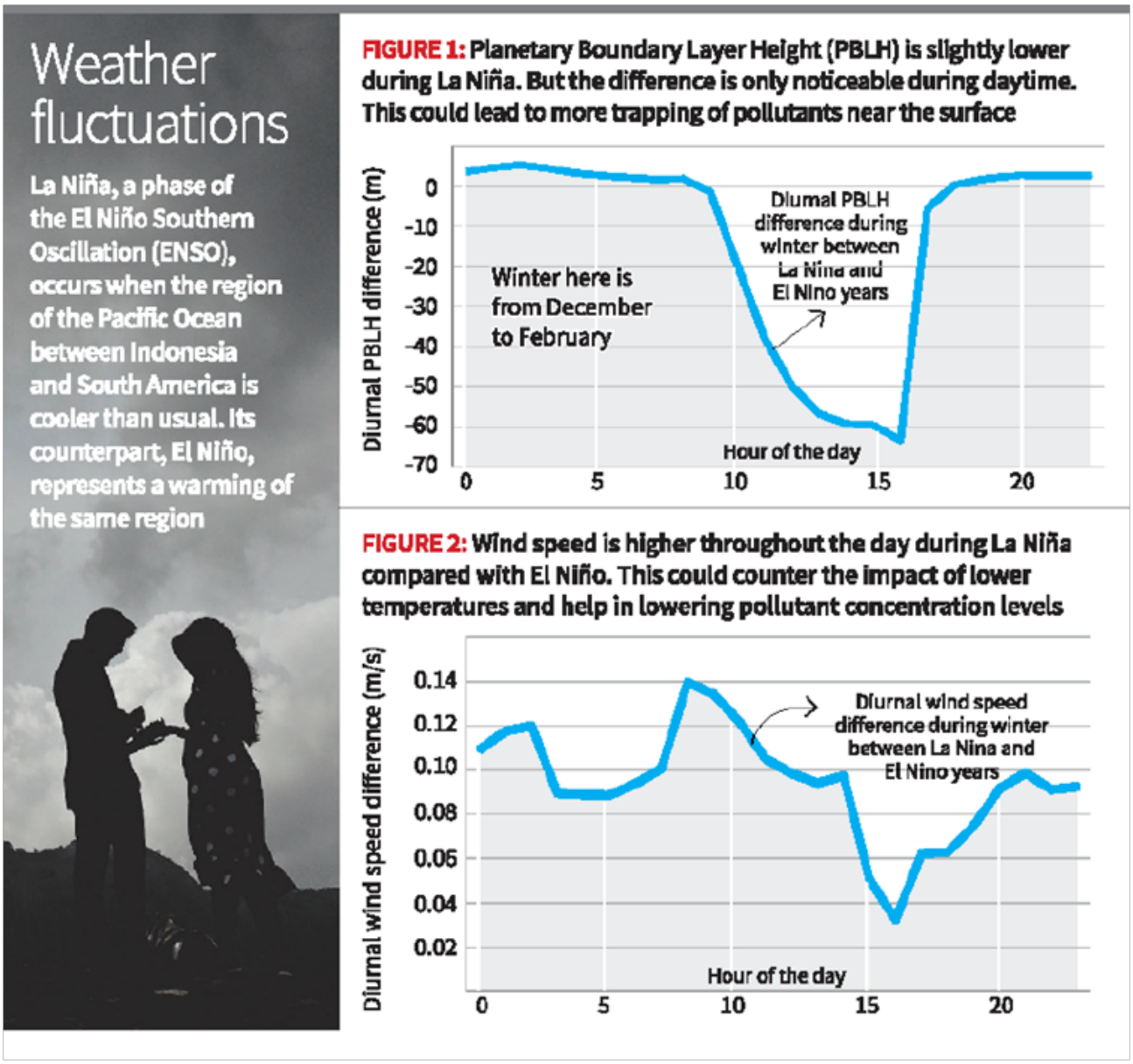
Conclusion:

A balanced approach is essential for implementing ONOE, ensuring cost efficiency without compromising democratic values, federal principles, and regional representation. As Justice Dipak Misra noted, "Any reform must harmonize with constitutional integrity and public welfare."

La Niña

Context:

La Niña, a critical phase of the El Niño Southern Oscillation (ENSO), significantly influences global and regional weather patterns, including India's monsoons and winters. Its delayed onset in 2024 has led to varied climatic effects.



About La Niña:

- What it is: A cooling phase of the Pacific Ocean, characterized by lower-than-average sea surface temperatures between Indonesia and South America.
- How it forms: Strengthened trade winds push warm water westward, allowing colder water to upwell in the central and eastern Pacific.
- **Global Impacts:**
  - o Increased hurricanes over the Atlantic Ocean.
  - o Droughts in Africa and western U.S.

- Enhanced rainfall in Southeast Asia and Australia.

- **Impacts on India:**
  - Above-normal monsoons (e.g., 2020-2022).
  - Colder winters in north India and cooler summer relief.
  - Higher wind speeds, improving air quality.
- **About El Niño:**
  - What it is: The warming phase of ENSO, with higher-than-average sea surface temperatures in the eastern Pacific Ocean.
  - How it forms: Weakened trade winds allow warm water to accumulate in the eastern and central Pacific.
- **Global Impacts:**
  - Heavy rainfall in the southern U.S. and western South America.
  - Severe droughts in Southeast Asia, Australia, and Africa.
  - Disruption of marine ecosystems due to warmer ocean waters.
- **Impacts on India:**
  - Below-normal monsoons (e.g., 2023).
  - Intense summer heat waves and prolonged droughts.
- Reduced agricultural output and water shortages.

About Triple Dip La Niña:

- What it is: When La Niña conditions persist for three consecutive years (rare occurrence).
- How it forms: Sustained strengthening of trade winds and persistent cooling of the Pacific over multiple cycles.
- **Global Impacts:**
  - Extended droughts in Africa and western U.S.
  - Increased cyclone activity in Australia and Atlantic hurricanes.
  - Prolonged disruptions in global agricultural and marine systems.
- **Impacts on India:**
  - Consistent above-normal rainfall (e.g., 2020-2022).
  - Cooler winters in north India.
  - Enhanced agricultural yield due to robust monsoons.

Cyclone Chido

Context:

Cyclone Chido, a super cyclone with winds exceeding 200 km/h, struck Mayotte, a French overseas territory in the Indian Ocean, causing unprecedented destruction.

About Cyclone Chido:

- Origin: Developed over the warm waters of the Indian Ocean, intensifying rapidly due to rising sea surface temperatures.
- Classification: A super cyclone with sustained wind speeds exceeding 200 km/h and gusts surpassing 250 km/h.

Criteria for a Super Cyclone

- Wind Speed: Sustained wind speeds of over 220 km/h (137 mph) or higher.
- Classification: Categorized as a Category 4 or 5 storm on the Saffir-Simpson scale.
- Low Central Pressure: Extremely low central pressure, often below 920 hPa.

About Mayotte:

- Location: Situated in the Mozambique Channel, between northwestern Madagascar and northeastern Mozambique in the Indian Ocean.
- Capital: Mamoudzou, located on the main island, Grande-Terre.
- Controlled by: Overseas department of France.
- Consists of Grande-Terre (main island), Petite-Terre, and surrounding islets.

Moldova

Context:

India extended gratitude to Moldova for its crucial support during Operation Ganga, which helped evacuate over 20,000 Indian nationals stranded in Ukraine in February 2022.

About Moldova:

- Capital: Chișinău
- Neighbours:

- **Romania (West)**
  - Ukraine (North, East, and South)
  - European Union Status: Moldova is not part of the EU but has EU candidate status as of 2022.
- **Transnistria Region:**
  - A breakaway territory on Moldova's eastern border across the Dniester River.
  - It is unrecognized internationally and has ongoing geopolitical significance.
- **Geographic Features:**
  - Rivers: Dniester River (major river), Prut River (border with Romania).
  - Mountains: Mostly low-lying terrain with rolling hills; Bălți Steppe and Codru hills are prominent.
  - Known for fertile land and a temperate continental climate.

Apiculture

Context:

In Assam, migratory beekeeping is thriving as beekeepers from states like West Bengal and Bihar bring their bee boxes to pollinate mustard fields and produce honey.

What is Apiculture?

- Definition: Apiculture, or beekeeping, involves the maintenance of bee colonies in artificial hives for honey, beeswax, and pollination services.
- Purpose: It supports sustainable agriculture and the production of honey and related products.

Types of Bees in Apiculture:

1. Apis mellifera (European Honeybee): Widely used for commercial honey production due to high yield.
2. Apis dorsata (Rock Bee): Known for large honeycombs; found in the wild.
3. Apis cerana (Asian Honeybee): Indigenous to South and Southeast Asia; suited for small-scale farming.
4. Trigona (Stingless Bee): Produces medicinal honey; used for niche markets.

Impact of Beekeeping on Agriculture:

- Improved Pollination: Bees facilitate cross-pollination, boosting crop yields for mustard, mango, coconut, and lychee.
- Enhanced Crop Quality: Pollination improves the size, taste, and nutritional value of fruits and vegetables.
- Biodiversity Conservation: Bees support wild plant reproduction, maintaining healthy ecosystems.
- Economic Benefits: Beekeepers earn through honey production and indirectly increase farmers' income via higher yields.

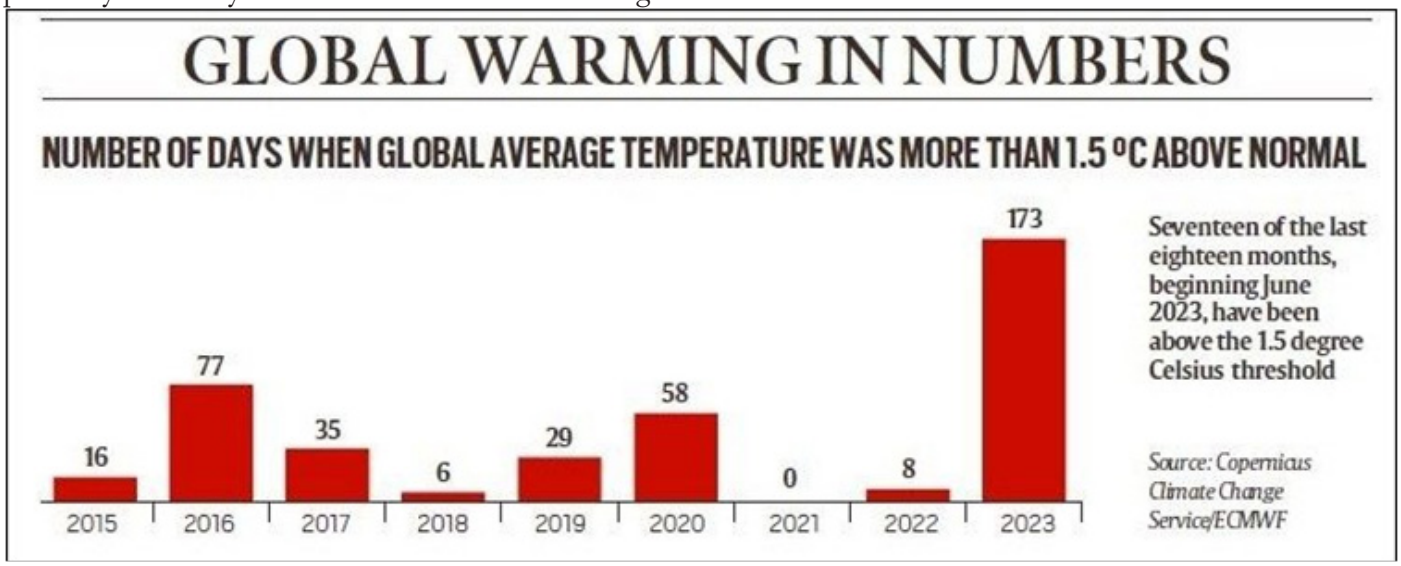
Global Warming

Context:

The year 2024 marked a grim milestone as global temperatures breached the 1.5°C threshold for the first time.

Definition:

Global warming refers to the long-term increase in Earth's average temperature due to the accumulation of greenhouse gases (GHGs) like carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) in the atmosphere, primarily caused by human activities such as burning fossil fuels and deforestation.

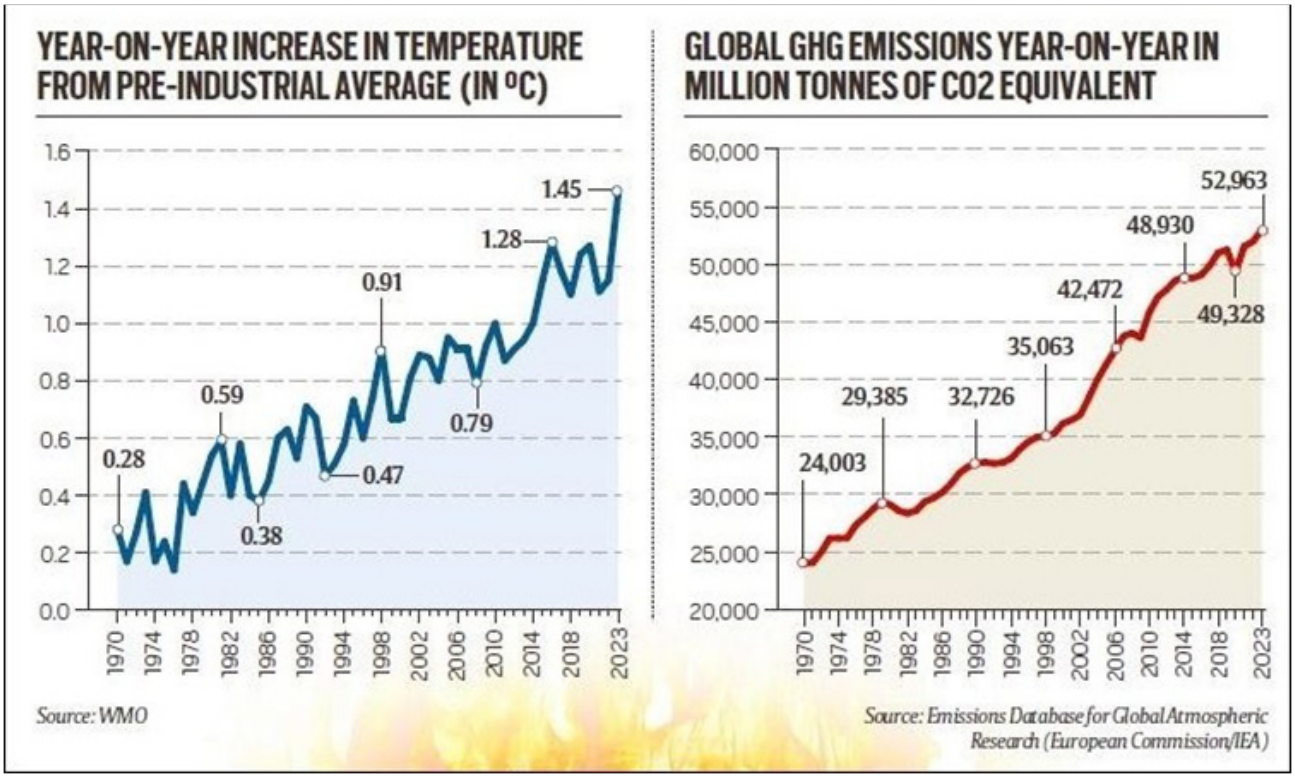


Mechanism of Global Warming:

- Solar Radiation Absorption: Sunlight reaches Earth, and the surface absorbs solar energy, heating up the planet.
- Infrared Radiation Emission: Earth radiates the absorbed energy back into the atmosphere as infrared radiation (heat).
- Greenhouse Gas Trapping: GHGs like CO_2, CH_4, and N_2O trap this heat in the atmosphere, preventing it from escaping into space.
- Enhanced Greenhouse Effect: Increased GHG concentrations amplify the natural greenhouse effect, causing more heat retention and warming.
- Feedback Loops: Melting ice reduces albedo (reflectivity), absorbing more heat, while warming oceans release stored CO_2, further accelerating warming.

2024 Data on Global Warming:

- Average Global Temperature: 1.55°C above pre-industrial levels; the warmest year on record.
- Days Breaching 1.5°C: 173 days in 2023; projections for 2024 indicate over 200 days exceeding the threshold.
- Sea Level Rise: Accelerated melting of polar ice caps and glaciers contributing to higher sea levels.
- Emissions Gap: IPCC data shows only a 2% reduction in global emissions by 2024, far below the required 43% cut by 2030.



Government Schemes to Tackle Global Warming:

- **Global Initiatives:**
  - Paris Agreement (2015): Limit warming below 2°C with updated Nationally Determined Contributions (NDCs).
  - Green Climate Fund: Provides financial resources to developing nations for climate-resilient projects.
  - UNFCCC and Kyoto Protocol: Frameworks for global cooperation in emissions reduction.
- **Indian Schemes:**
  - National Action Plan on Climate Change (NAPCC): Includes missions on renewable energy, water conservation, and energy efficiency.
  - Faster Adoption and Manufacturing of Electric Vehicles (FAME): Promotes e-mobility to reduce fossil fuel dependence.
  - National Green Hydrogen Mission: Aims to develop clean energy solutions.
  - State Action Plans on Climate Change (SAPCCs): Tailored state-level initiatives under the NAPCC.
  - Perform, Achieve, and Trade (PAT) Scheme: Enhances energy efficiency in industries and power plants.

Consequences of Global Warming:

- **Human Impact:**
  - Health Risks: Heat stress, asthma, and vector-borne diseases are on the rise.
  - Food Security: Crop failures and reduced yields due to droughts and floods.
  - Migration: Displacement from coastal and drought-affected regions.
  - Economic Losses: Damage to infrastructure and loss of livelihoods from extreme events.
  - Social Inequalities: Marginalized communities bear disproportionate impacts.
- **Environmental Impact:**
  - Loss of Biodiversity: Habitat destruction leading to species extinction.
  - Polar Melting: Accelerated ice melt increases sea levels and alters ecosystems.
  - Ocean Acidification: Absorption of CO_2 harms marine life and ecosystems.
  - Extreme Weather Events: Increased frequency and severity of cyclones, heatwaves, and droughts.
  - Deforestation and Desertification: Degraded landscapes reduce Earth's carbon-absorbing capacity.

Way Ahead:

- Accelerate Emissions Reductions: Shift to renewables and phase out fossil fuels globally.

- Climate Adaptation: Invest in infrastructure to withstand extreme weather, such as early warning systems.
- Technological Innovations: Focus on AI, quantum systems, and carbon capture technologies for clean energy.
- Global Cooperation: Fulfill commitments under the Paris Agreement and provide financial aid to vulnerable nations.
- Local Action: Promote sustainable agriculture, urban planning, and reforestation projects.

Conclusion:

The year 2024 highlights the urgency to act against global warming. While the 1.5°C target seems unattainable, accelerating adaptation and mitigation efforts can minimize its adverse impacts and secure a sustainable future.

Lion-Tailed Macaque

Context:

The lion-tailed macaque endemic to the Western Ghats, faces growing threats from increased human interaction due to habitat encroachment, tourism, and road crossings.

About Lion-Tailed Macaque:

- **What it is:**
  - Scientific name: Macaca silenus
  - An Old-World monkey named for its lion-like tufted tail and grey mane, also called a bearded monkey.
  - Known for distinct vocalizations (17 types) used for communication and territory marking.
- **Endemic to:**
  - Found exclusively in the rainforests of the Western Ghats in Karnataka, Kerala, and Tamil Nadu, India.
- Unique features:
  - Characterized by a grey mane-like fur around the face and a long, tufted tail.
  - Primarily arboreal, relying on dense rainforest canopies for food and safety.
- **IUCN Status:**
  - Listed as Endangered on the IUCN Red List.
  - Protected under Appendix I of CITES and Schedule I of the Wildlife (Protection) Act, 1972.
- **Habitat:**
  - Inhabits small, fragmented patches of rainforests in the Western Ghats, vulnerable to deforestation, fragmentation, and human intrusion.

Yana: Mammoth

Context:

The discovery of Yana, a 50,000-year-old baby mammoth in the melting permafrost of Yakutia, Russia, is one of the most exceptional finds in palaeontology.

About Mammoth:

- What it is: Mammoths are extinct species of the elephantid genus Mammuthus, known for their large size and adaptations to cold climates.
- Scientific Name: Mammuthus primigenius (Woolly Mammoth).
- IUCN Status: Extinct; they disappeared approximately 4,000 years ago.

- **Features:**
  - o Tusks: Spirally twisted, long tusks.
  - o Cold Adaptations: Thick fur, fat layers, and smaller ears to minimize heat loss.
  - o Habitat: Inhabited Africa, Asia, Europe, and North America during different epochs.
  - o Similarity Between Asian Elephants and Mammoths:
  - o Genetics: Asian elephants are more closely related to mammoths than to African elephants.
  - o Physical Features: Both share similar body structures like domed skulls and high foreheads.

India State of Forest Report 2023 (ISFR 2023)

Context:

The India State of Forest Report 2023 (ISFR 2023) was released by the Union Minister for Environment, Forest and Climate Change, at the Forest Research Institute, Dehradun.

India State of Forest Report 2023

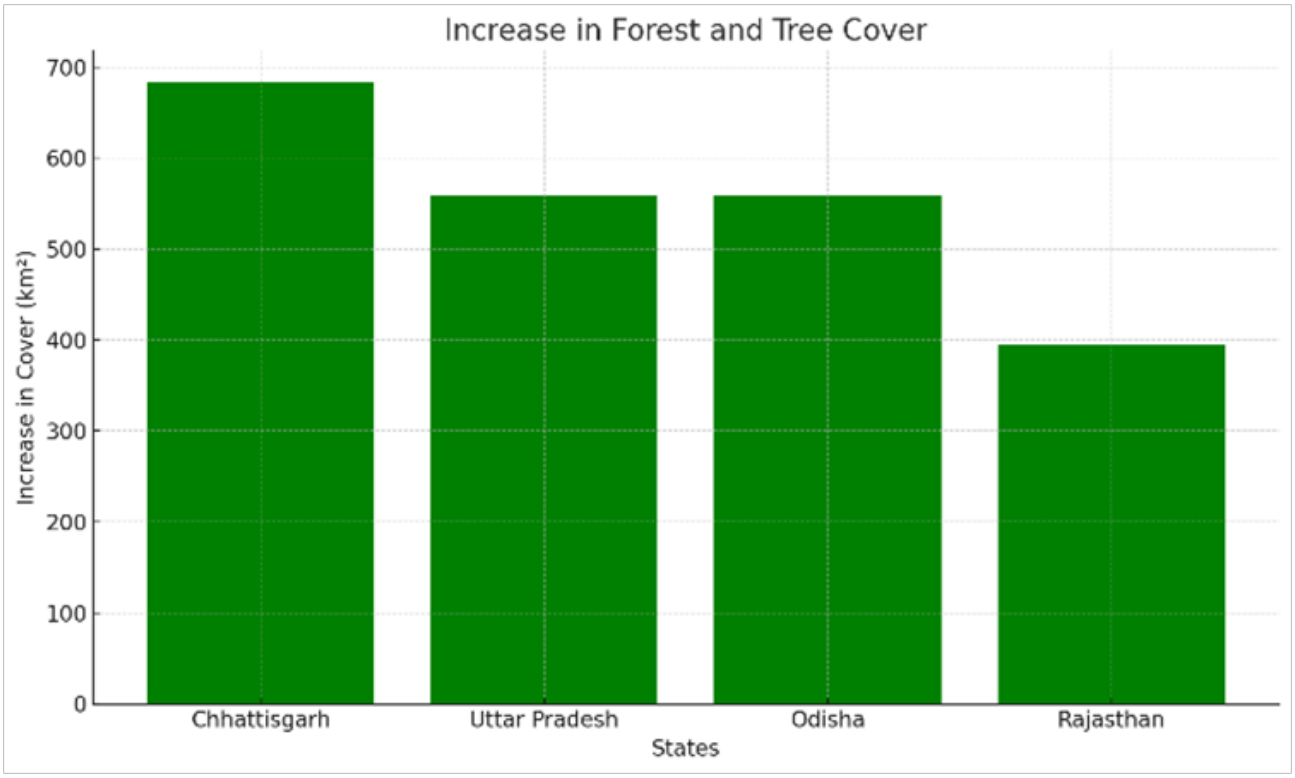
- Launched in: December 2023
- Department Involved: Forest Survey of India (FSI), under the Ministry of Environment, Forest, and Climate Change
- The biennial report by the Forest Survey of India (FSI) is an assessment of the country's forest resources.
- **Aim:**
  - o Assess forest and tree resources in India.
  - o Support natural resource management and policy evaluation.
  - o Monitor progress towards Nationally Determined Contributions (NDC) for climate change mitigation.
- **Key Features:**
  - o Forest and tree cover analysis using satellite imagery (ISRO's Resourcesat) and field-based National Forest Inventory (NFI).
  - o Thematic focus on forest health, biodiversity, carbon sequestration, mangrove cover, and agroforestry.
  - o Tracks carbon stock changes, critical for NDC targets under the Paris Agreement.
  - o Information on forest fire trends, bamboo cover, and soil health.
- **Key findings from report:**

Table: Forest and Tree Cover of India

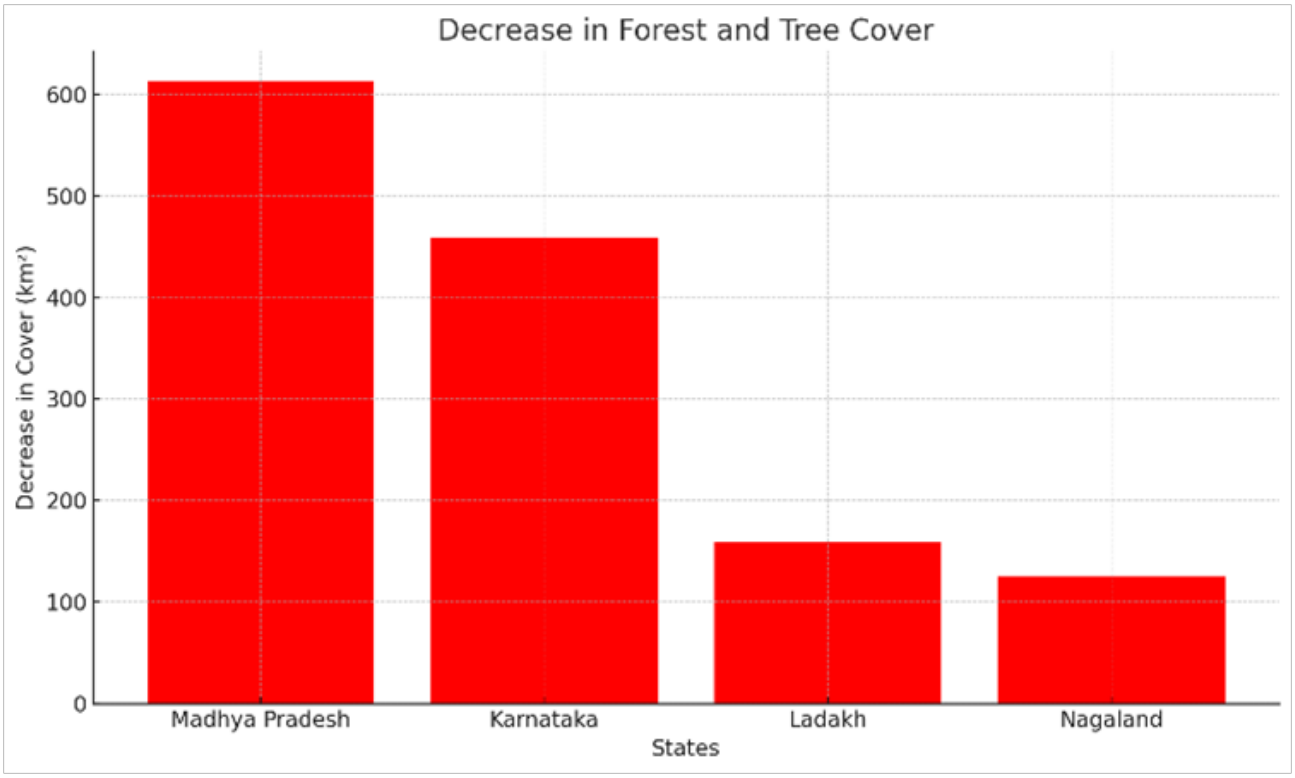
in km²

Class	Area	Percentage of GA
Forest Cover	7,15,342.61	21.76
Tree Cover	1,12,014.34	3.41
Total Forest and Tree Cover	**8,27,356.95**	**25.17**
Scrub	43,622.64	1.33
Non Forest	24,16,489.29	73.50
Geographical Area of the country	**32,87,468.88**	**100.00**

  - o The total forest and tree cover of the country is 8,27,356.95 km2 which is 25.17% of the geographical area of the country.
  - o The total Forest Cover has an area of 7,15,342.61 km2 (21.76%) whereas the Tree Cover has an area of 1,12,014.34 km2 (3.41%).
  - o Increase in Forest and Tree Cover:

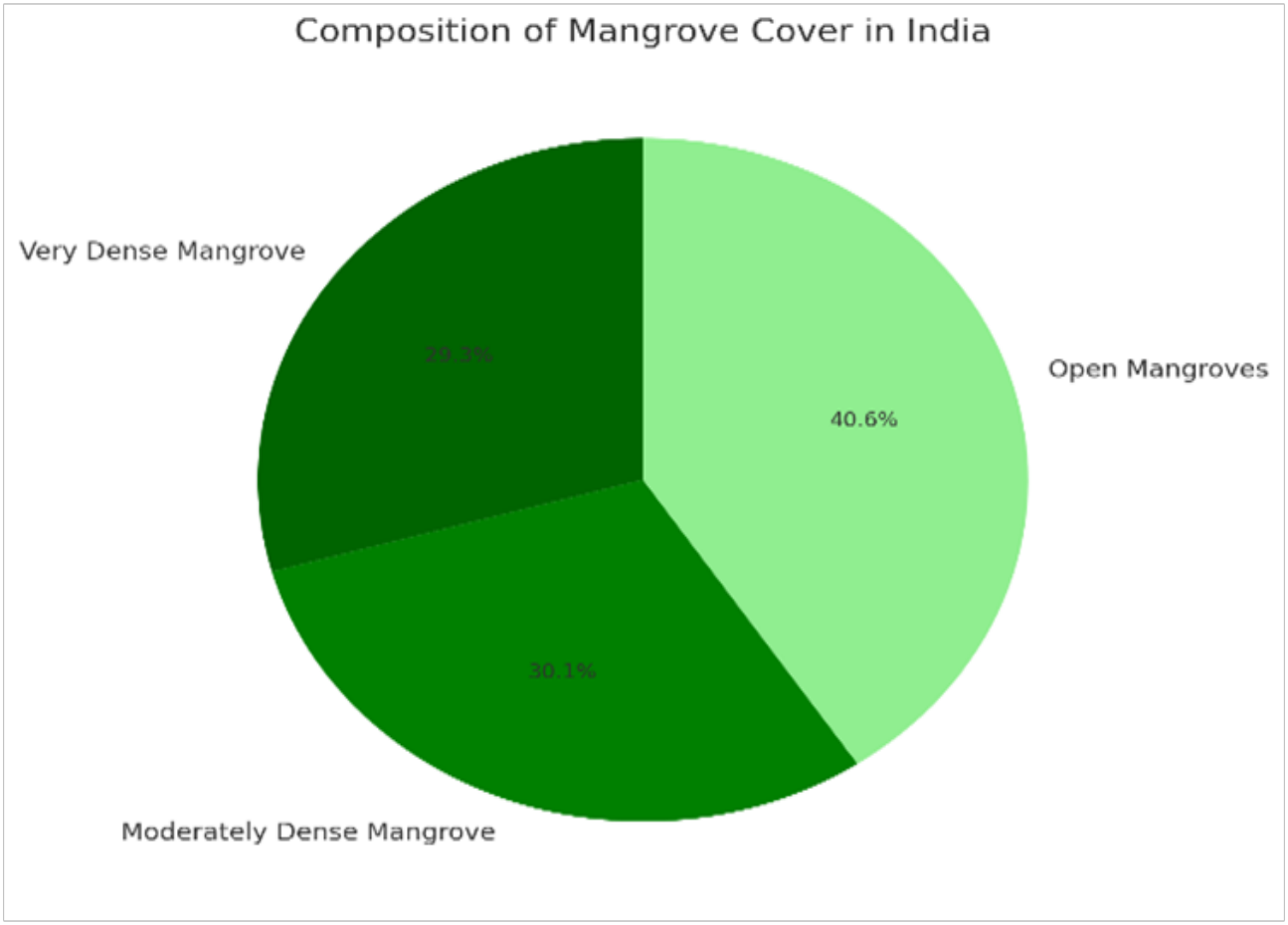


- **Decrease in Forest and Tree Cover:**

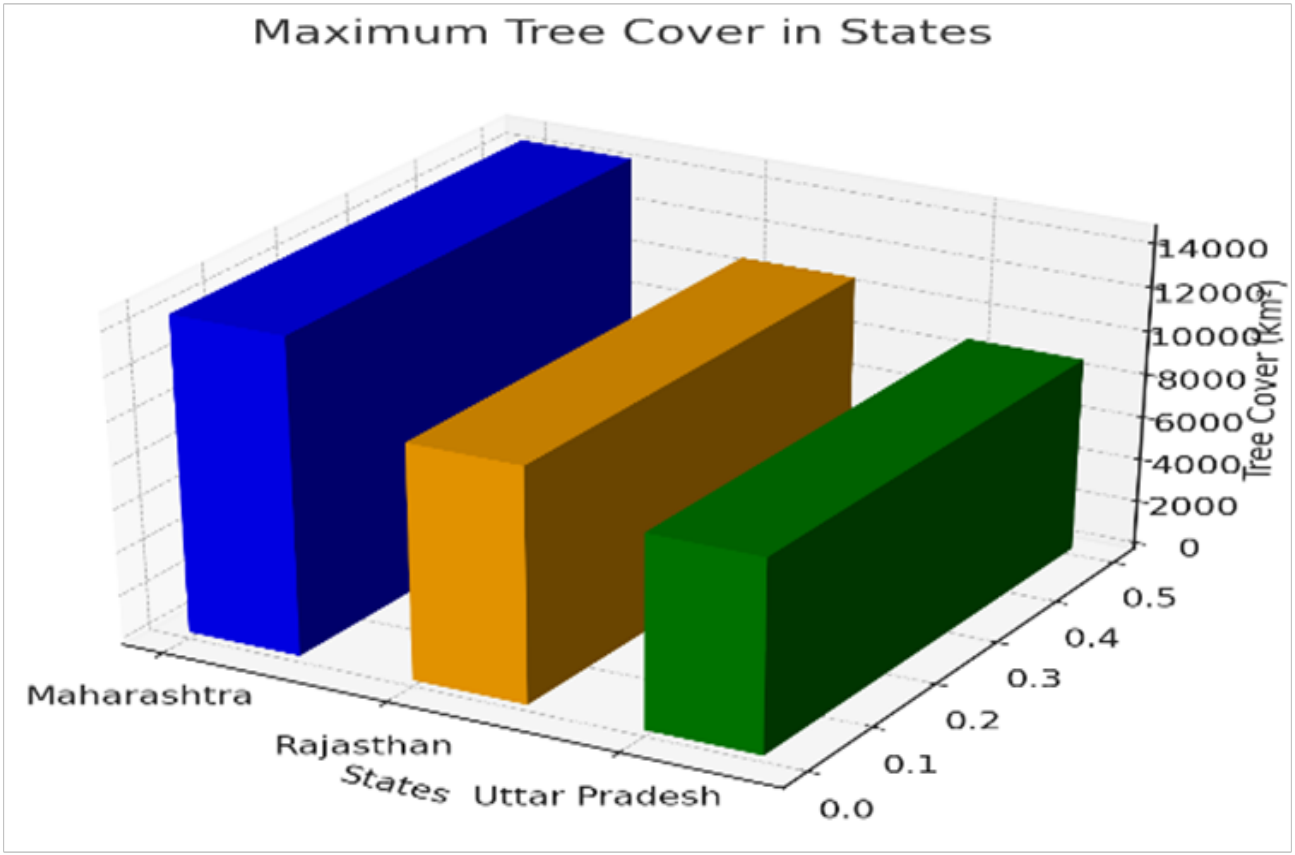


- The total forest and tree cover in the North Eastern region is 1,74,394.70 km2, which is 67% of geographical area of these states.

- **Composition of Mangrove Cover in India:**
  - The total Mangrove cover of the country is 4,991.68 km2 , which accounts for 15 % of the country's total geographical area.

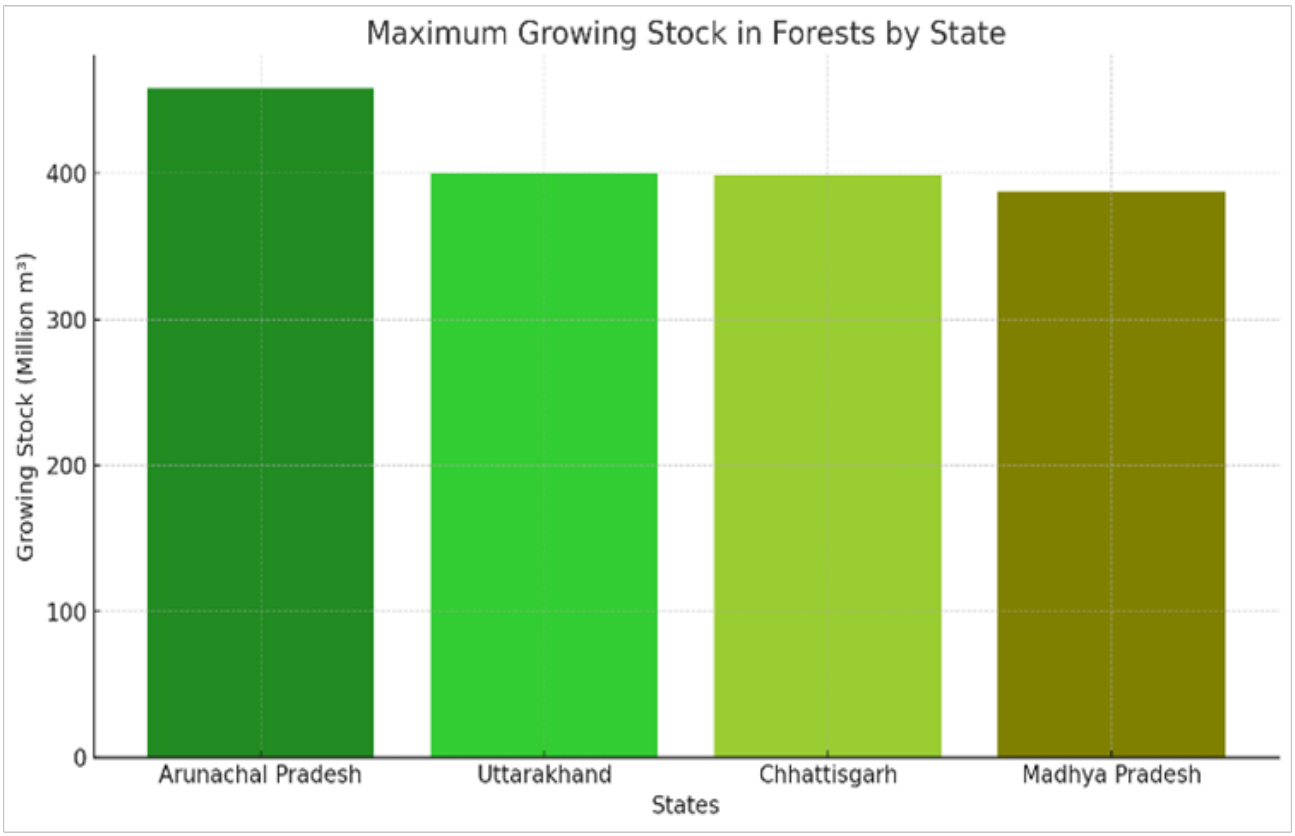


- **Tree cover:**

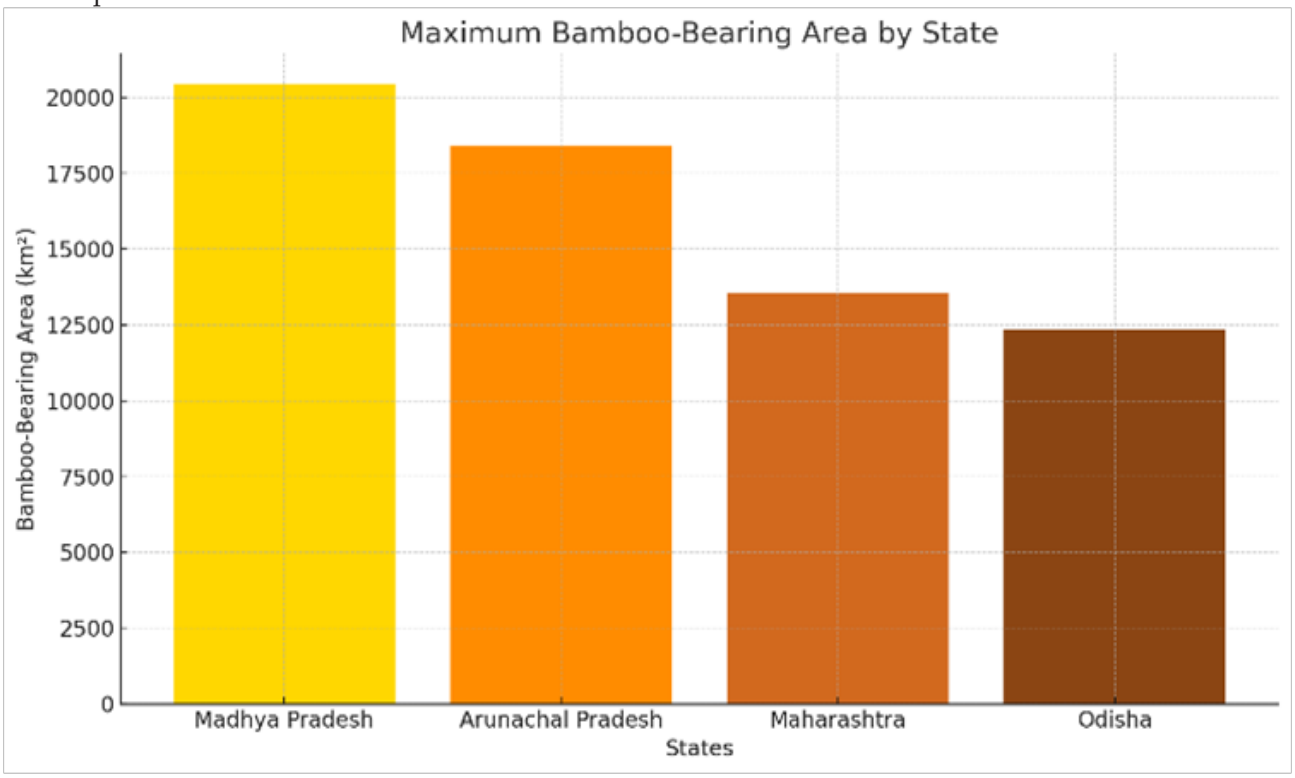


- **Stock of Wood:**

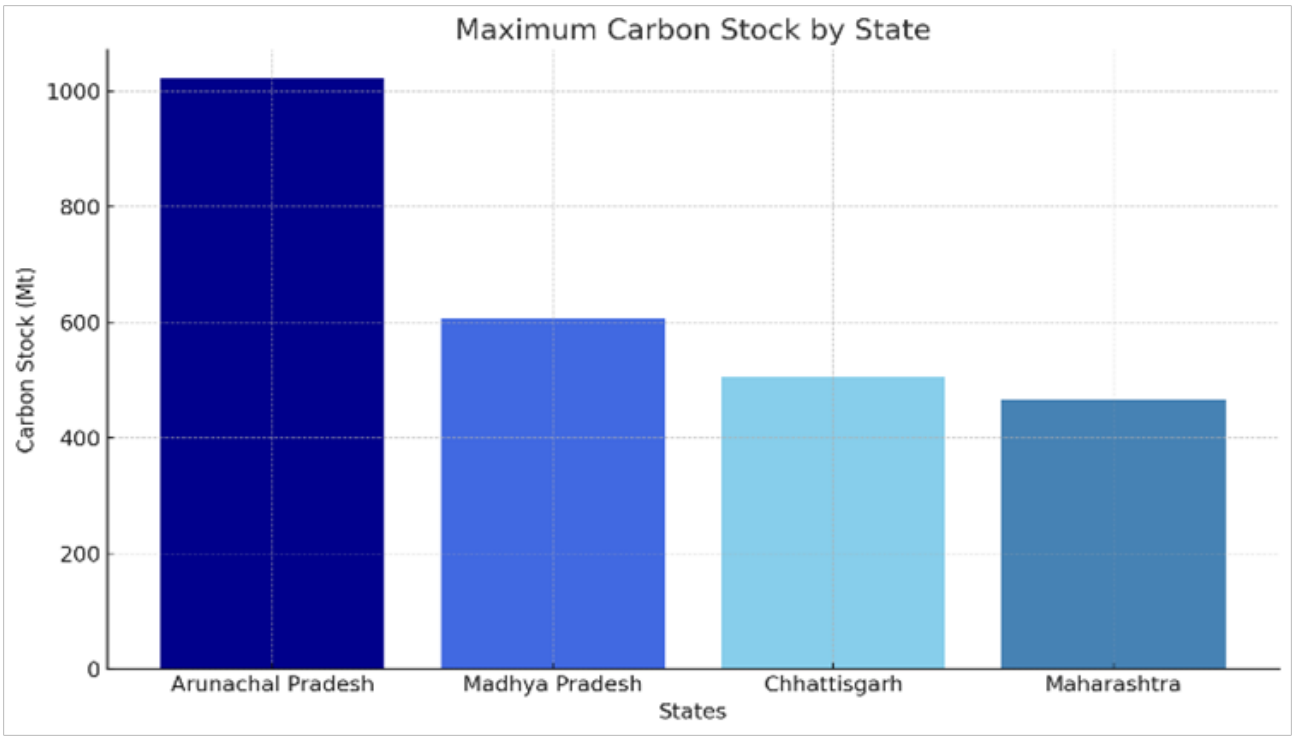
- The total growing stock of wood in the country is estimated at 6,429.64 M m3, which comprises 4,478.89 M m3 inside forest areas and 1,950.75 M m3 outside recorded forest areas (TOF).

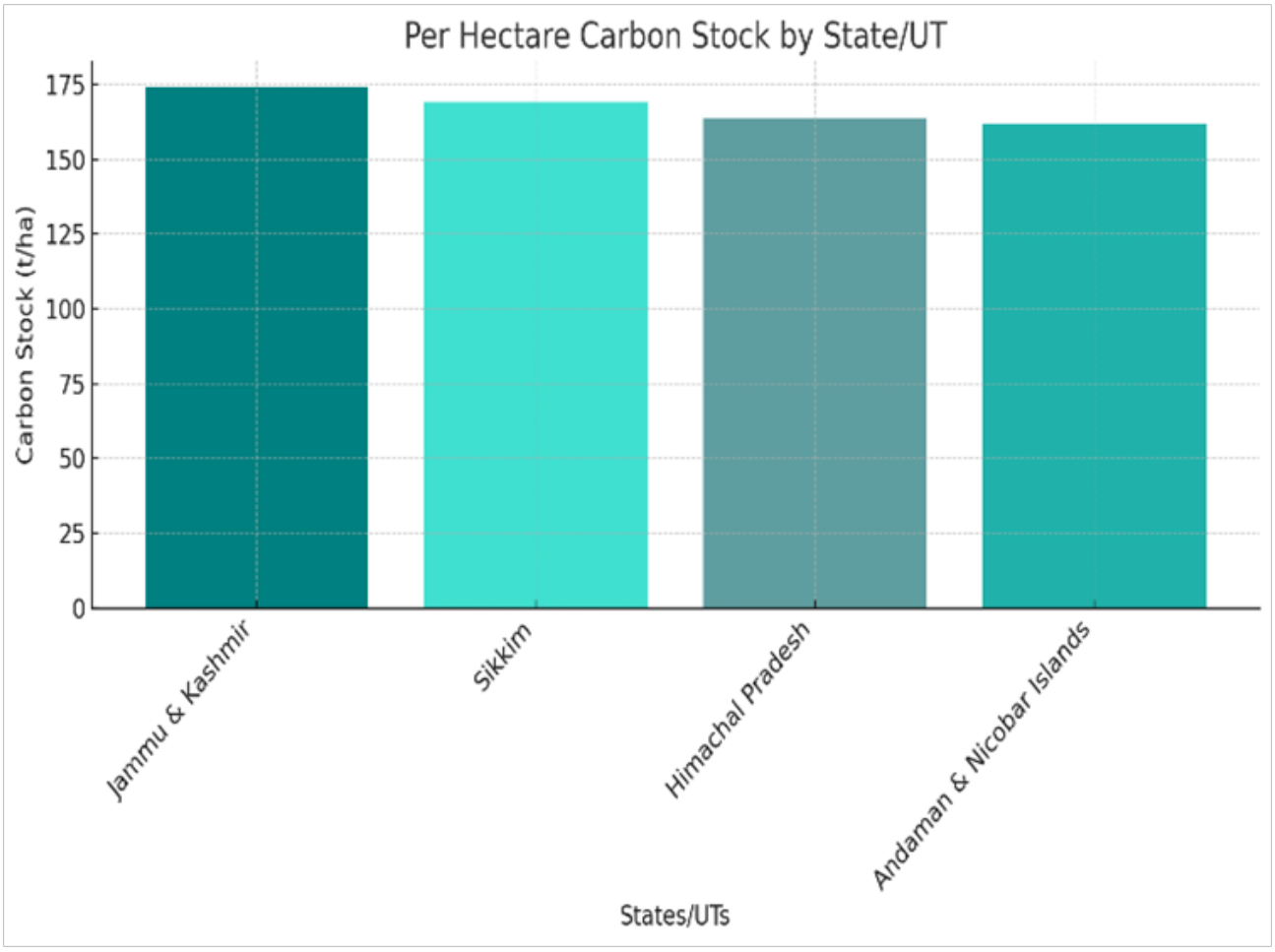


- **Bamboo:**
  - o The total bamboo bearing area of the country has been estimated to be 1,54,670 km2.
  - o There is an increase of 5,227 km2 in the bamboo bearing area of the country as compared to the previous assessment.



- **Carbon Stock:**
  - o The carbon stock for 2023 has been estimated as 7,285.5 Mt.
  - o There is an increase of 5 Mt of carbon stock as compared to the estimates of previous assessment.





Northern Giant Hornet

Context:

The United States successfully eradicated the invasive Northern Giant Hornet, commonly known as the "Murder Hornet," which posed significant threats to native pollinators and agriculture.

About Murder Hornet (Northern Giant Hornet)

- Scientific name: Vespa mandarinia.

- Habitat: Native to Asia; prefers forested areas and underground cavities for nesting.
- **Features:**
  - Up to 2 inches long.
  - Delivers venom nearly seven times stronger than that of honeybees.
  - Can sting multiple times and penetrate beekeeper suits.
- **Threats:**
  - Can decimate entire honeybee hives within 90 minutes by decapitating bees.
  - Competes with native pollinators, disrupting ecosystems and agriculture.
  - Deadly to humans; caused fatalities and injuries in China in 2013.

Ganges River Dolphin

Context:

For the first time, Indian wildlife experts successfully tagged a Ganges River dolphin, marking a historic milestone in the conservation of this endangered species.

- The initiative under Project Dolphin, supported by the Ministry of Environment, Forest, and Climate Change.
- Aim: To track the dolphin's movement, habitat use, and migratory patterns using advanced satellite-compatible lightweight tags.

About Ganges River Dolphin:

- Scientific name: Platanista gangetica gangetica
- Common name: Susu
- Habitat: Found in freshwater river systems, including the Ganga-Brahmaputra-Meghna and Karnaphuli-Sangu in India, Nepal, and Bangladesh.
- **Characteristics:**
  - Nearly blind, relying on echolocation for navigation and hunting.
  - Lives exclusively in freshwater ecosystems.
  - Sturdy, flexible body with large flippers and low triangular dorsal fins.
  - Females are larger than males and reproduce every 2-3 years, giving birth to a single calf.
  - Newborns are chocolate brown, turning grey-brown as adults.
- **Conservation status:**
  - IUCN: Endangered
  - Wildlife (Protection) Act, 1972: Schedule-I
  - CITES: Appendix I

Kisan Kavach

Context:

Union Minister launched Kisan Kavach, India's first-of-its-kind anti-pesticide bodysuit, aimed at safeguarding farmers from the harmful effects of pesticide exposure.

About Kisan Kavach:

- What it is: A washable and reusable anti-pesticide bodysuit designed to protect farmers from pesticide toxicity.
- Developed by: Biotechnology Research and Innovation Council (BRIC-inStem), Bangalore, in collaboration with Sepio Health Pvt. Ltd.
- Aim: To ensure farmer safety, promote sustainable agriculture, and prevent health complications caused by pesticides.

Features:

- Washable, reusable, and durable for up to a year.
- Advanced fabric technology deactivates pesticides upon contact through nucleophilic hydrolysis.
- Priced at 4,000, with potential for increased affordability as production scales up.
- How it works: Employs nucleophile attachment on cotton fabric, which deactivates harmful pesticides upon contact, preventing toxicity and health risks like breathing disorders and vision loss.

Arctic Tundra Emissions

Context:

The Arctic tundra, once a carbon sink, is now emitting CO2 and methane (CH4) due to rising temperatures and wildfires, as noted in the 2024 Arctic Report Card.

About Arctic Tundra:

What is Tundra Vegetation?

- Tundra vegetation refers to the sparse plant life found in cold, treeless regions like the Arctic and Alpine tundra.
- It includes mosses, lichens, grasses, sedges, and small shrubs, all adapted to harsh conditions.
- Latitude Found: The Arctic tundra lies between 66.5°N to 75°N, stretching across regions in Alaska, Canada, Greenland, Scandinavia, and Russia.
- Features: Characterized by permafrost, low temperatures, short growing seasons, and limited vegetation like mosses, lichens, and small shrubs.
- Habitat: Home to species such as Arctic foxes, caribou, polar bears, and migratory birds, adapted to harsh climates.
- **Significance:**
  - o Carbon Storage: Stores more than 6 trillion metric tonnes of carbon in permafrost soils.
  - o Climate Regulation: Acts as a cooling agent for the planet by reflecting solar radiation with its ice-covered surfaces.

Arctic tundra is emitting more carbon because:

- Thawing Permafrost: Rising temperatures (warming four times the global rate) activate microbes, breaking down organic matter and releasing CO2 and CH4.
- Increased Wildfires: The frequency and intensity of wildfires have surged, emitting GHGs and accelerating permafrost thaw.
- Temperature Records: 2024 recorded the second-highest Arctic surface air temperatures since 1900, further exacerbating emissions.
- GHG Feedback Loop: Released GHGs from thawing permafrost amplify global warming, perpetuating a cycle of higher emissions.

Hydroxymethanesulphonate

Context:

A study reveals hydroxymethanesulphonate, a secondary aerosol, forming in cold urban areas like Fairbanks, Alaska, reshaping understanding of aerosol chemistry in extreme conditions and its air quality impact.

About Hydroxymethanesulphonate:

- What it is: A secondary aerosol that forms from chemical reactions involving formaldehyde and sulphur dioxide in the presence of liquid water.

- **How it is formed:**
  - Occurs when formaldehyde reacts with sulphite ions in aerosol particles.
  - Requires liquid water within aerosol particles, even in extremely cold conditions (supercooled state).
- **Factors favoring its formation:**
  - Low temperatures: Inhibit ammonium volatilization, reducing aerosol acidity.
  - High ammonium ion concentrations: Neutralize acidity, enabling reactions.
  - Supercooled liquid water: Present in aerosols at sub-zero temperatures.
- **Impact on environment:**
  - Contributes to PM2.5 pollution, worsening air quality.
  - Influences cloud formation and radiative properties, affecting climate.
- **Impact on humans:**
  - Aggravates respiratory illnesses, lung diseases, and cardiovascular conditions.
  - Long-term exposure increases risks of premature mortality in polluted regions.

Carbon Market

Context:

With COP29 approving standards for establishing an international carbon market, countries aim to create a structured mechanism for trading carbon credits and offsets to meet their climate goals effectively.

What is a Carbon Market?

- A carbon market enables the trading of carbon credits, granting the holder the right to emit one tonne of carbon dioxide (CO2) or its equivalent.
- These markets operate on the principle of limiting emissions and allocating rights through tradable credits or offsets.
- Origin: Introduced in the U.S. during the 1990s under the cap-and-trade system for controlling sulphur dioxide emissions.

Working of a Carbon Market:

1. Issuance of Carbon Credits:

- Governments allocate a limited number of carbon credits, restricting total emissions.
- Each credit permits the emission of one tonne of CO2.

2. Trading:

- Companies that need more credits can buy from those with surplus.
- Market forces determine the price based on supply and demand.

3. Offsets:

- Companies purchase offsets by funding activities like afforestation or renewable energy projects to balance their emissions.

4. International Mechanism:

- Articles 6.2 and 6.4 of the Paris Agreement allow cross-border trading of emission reductions.

India's Initiatives in Carbon Markets:

- Perform, Achieve, Trade (PAT) Scheme: Targets industries to improve energy efficiency and trade surplus credits.
- Renewable Energy Certificates (REC): Facilitates trade in renewable energy to meet energy compliance targets.
- Energy Conservation Act, 2022 Amendment: Introduced a domestic carbon trading market to incentivize low-carbon technologies.

- Climate Action: Committed to a 45% reduction in emission intensity by 2030 as part of its Nationally Determined Contributions (NDCs).

Positive Consequences of Carbon Markets:

- Emission Reduction: Imposes financial costs on emissions, encouraging companies to adopt cleaner technologies.
- Economic Efficiency: Allows cost-effective allocation of emission rights through market trading.
- Financial Support for Green Projects: Funds projects like afforestation and renewable energy.
- Global Cooperation: Encourages international partnerships under Paris Agreement mechanisms.

Limitations of Carbon Markets:

1. Loopholes: Lack of stringent monitoring can lead to fraudulent claims or over-allocation of credits.
2. Price Volatility: Fluctuating credit prices can create market uncertainty.
3. Limited Impact on Emission Levels: Without strong caps, markets may fail to drive significant reductions.
4. Accessibility Issues: Small businesses and developing countries may struggle to participate effectively.
5. Criticism of Offsets: Offsets are seen as superficial solutions that don't address the root cause of emissions.

Way Ahead:

1. Stricter Regulations: Enforce robust monitoring and verification to prevent misuse.
2. Capacity Building: Support developing countries in accessing carbon markets effectively.
3. Incentives for Green Projects: Encourage innovative projects to offset emissions.
4. Transparency: Ensure clear guidelines and public reporting of emissions and credits.

Conclusion:

Carbon markets offer a promising mechanism to reduce emissions and achieve global climate targets. However, addressing regulatory gaps, ensuring equity, and fostering international cooperation are essential to maximize their potential and ensure sustainable outcomes.

Olive Ridley Turtles

Context:

Carcasses of Olive Ridley turtles continue to wash ashore along the Visakhapatnam coast during their breeding season. Experts attribute the deaths to marine pollution and accidental entanglement in fishing trawlers.

About Olive Ridley Turtles:

- Smallest and Most Abundant: They are the smallest and most abundant sea turtles globally.
- Name Origin: Lepidochelys olivacea.
- Unique Nesting (Arribada): Known for mass nesting, thousands of females lay eggs simultaneously on the same beach.
- Geographic Distribution: Found in the warm waters of the Pacific, Atlantic, and Indian Oceans.
- Odisha's Gahirmatha Marine Sanctuary is the world's largest rookery.
- Physical Features: Adults measure 62-70 cm, weigh 35-45 kg, and have paddle-like flippers with one or two claws.
- Diet and Habitat: They are omnivorous and solitary, spending most of their lives in the open ocean.
- Migration: Travel thousands of kilometers annually between feeding and mating grounds.
- **Conservation Status:**
- **IUCN Red List:**
    - Wildlife Protection Act, 1972: Schedule 1 (highest protection in India).
    - CITES: Appendix I (international trade ban).

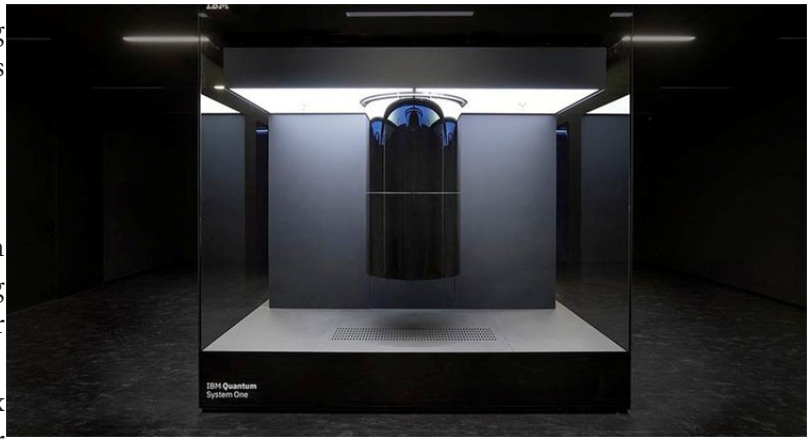
Chapter-
5

SCIENCE & TECHNOLOGY

Quantum Computing

Context:

Quantum computing is revolutionizing technology with its potential to solve problems far beyond the reach of classical computers.



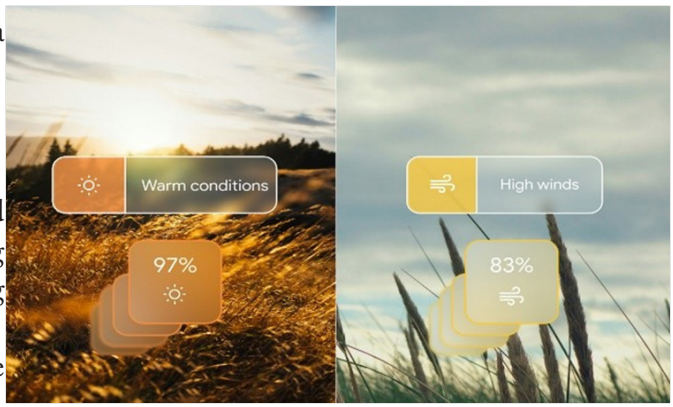
About Quantum Computing:

- **What it is:**
  - o A type of computing based on quantum mechanics, utilizing qubits instead of classical bits for calculations.
  - o Offers the ability to perform complex computations exponentially faster than classical computers in specific tasks.
- **Origin:**
  - o Concept proposed by Richard Feynman in 1982, envisioning computers that could simulate quantum systems.
  - o First commercial quantum computer, IBM Q System One, launched in 2019.
- **How it works:**
  - o Qubits: Unlike classical bits (0 or 1), qubits can be in a state of superposition, holding values of 0, 1, or both simultaneously.
  - o Entanglement: Qubits are intrinsically linked, enabling faster computations through instantaneous correlations.
  - o Quantum Gates: Operate on qubits like logic gates in classical computers, enabling complex calculations.
  - o Parallel Processing: Exploits superposition and entanglement to process multiple possibilities at once.
- **Limitations:**
  - o High Costs: Building and maintaining quantum computers is extremely expensive.
  - o Error Rates: Quantum states are fragile and prone to decoherence due to environmental noise.
  - o Scaling Challenges: Large-scale quantum computing requires millions of stable qubits.
  - o Limited Applications: Currently, only specific tasks like cryptographic problems benefit significantly.

GenCast

Context:

Google DeepMind recently unveiled GenCast, a groundbreaking AI-based weather forecasting model.



About GenCast:

- **What is GenCast?**
  - o GenCast is a diffusion-type AI model designed for probabilistic weather forecasting, predicting weather conditions using machine learning techniques.
  - o Parent Company: Developed by Google DeepMind.

- **How it works:**
  - Uses ensemble forecasting: Generates multiple predictions by combining historical data with noisy inputs and refining them iteratively through neural networks.
  - Trained on 40 years of reanalysis data (1979-2019).
  - Produces forecasts for up to 15 days with a spatial resolution of 0.25° x 0.25° and temporal resolution of 12 hours.
- **Existing forecast models:**
  - Numerical Weather Prediction (NWP): Relies on solving physical equations but requires high computational power and provides deterministic forecasts.
  - Huawei's Pangu-Weather: Predicts weekly weather faster than NWP models.
- Superiority of GenCast:
  - Probabilistic Forecasts: Better at predicting extreme weather and providing longer lead times for disaster preparation.
  - Efficiency: Faster and more resource-efficient than NWP models.
  - Extreme Event Prediction: Superior in tracking tropical cyclones and wind power production.

Quantum Satellite

Context:

India plans to launch its first quantum satellite within the next 2-3 years under the National Quantum Mission (NQM).

About Quantum Satellite:

- **What it is:**
  - A quantum satellite is a communication satellite that uses quantum physics principles, such as quantum entanglement and superposition, to enable highly secure data transmission.
- **Science behind its working:**
  - Quantum Cryptography: Utilizes quantum principles like entanglement and quantum measurement to secure data.
  - Quantum Key Distribution (QKD): Ensures encryption keys are shared securely between parties. Any eavesdropping alters the quantum state, alerting users.
  - Photon Transmission: Encodes information in photons, which are transmitted through free space or fibre-optic cables.
- **Features:**
  - Quantum Key Distribution (QKD): Facilitates secure encryption key exchanges.
  - Quantum Entanglement: Ensures instantaneous detection of tampering.
  - High-Speed Communication: Enhanced data security without sacrificing speed.
  - Global Reach: Enables long-distance secure communication through satellite-ground systems.
- **Advantages:**
  - Enhanced Security: Virtually immune to hacking due to quantum measurement principles.
  - Future-Proof Encryption: Counters threats posed by quantum computers to classical cryptographic systems.
  - Strategic Applications: Useful in defence, banking, and secure government communications.
  - Technological Leadership: Positions India as a global leader in quantum technologies.
- **Limitations:**
  - High Costs: Development, deployment, and maintenance are resource-intensive.
  - Distance Challenges: Signal loss over long distances due to atmospheric and technical constraints.
  - Denial-of-Service Risks: Eavesdroppers can disrupt transmissions without stealing data.
  - Hardware Limitations: Difficult to upgrade or patch quantum hardware.

Starlink Satellite

Context:

The recovery of a Starlink satellite device in Manipur has raised concerns about potential misuse by militants, despite Starlink not being authorized to operate in India.

About Starlink Satellite System:

- **What is Starlink?**
  - Designed by: SpaceX (owned by Elon Musk).
  - Purpose: To provide high-speed, low-latency internet globally, especially in remote and underserved areas.
- **How Starlink Works:**
  - Satellite Constellation: Operates using thousands of satellites in low Earth orbit (LEO) (~550 km above Earth).
- **Data Transmission:**
  - Satellites communicate with ground stations and user terminals.
  - Use laser links to transmit data efficiently between satellites.
  - User Equipment: Includes a small antenna and router that users install to access the service.
- **Key Features:**
  - High-Speed Internet: Speeds often exceed 100 Mbps, suitable for streaming, video calls, and browsing.
  - Low Latency: 20-70 milliseconds.
  - Global Coverage: Particularly effective in remote regions and areas with poor traditional internet infrastructure.
  - Resilient Connectivity: Maintains service during disasters or in areas with restricted internet access.

Bio-Bitumen-based National Highway

Context:

Union Minister inaugurated India's first bio-bitumen-based National Highway stretch on NH-44, Nagpur-Mansar Bypass.

About Bio-Bitumen:

- **What is Bio-Bitumen?**
  - Definition: A sustainable bio-based binder derived from renewable sources like crop stubble, vegetable oils, algae, or lignin.
  - Origin: Primarily extracted from lignocellulosic biomass or refined from residues of crude oil distillation.
- **NH-44 Bio-Bitumen Stretch**
  - Nagpur-Mansar Bypass on National Highway 44 in Maharashtra.

Production of Bio-Bitumen

- Primary Source: Lignin, a by-product of agricultural waste and plant-based materials.
- Process: Biomass is processed to extract lignin, which is converted into bio-bitumen.

Characteristics of Bio-Bitumen

- Eco-Friendly: Reduces greenhouse gas emissions by 70% compared to petroleum-based bitumen.

- Strength: Offers superior durability and load-bearing capacity.
- Bio-bitumen is 40% stronger than conventional asphalt.
- Sustainability: Promotes the use of agricultural residues, reducing stubble burning.

Applications of Bio-Bitumen

- Road Construction: Direct replacement for petroleum bitumen in asphalt pavements.
- Modifier: Enhances traditional bitumen properties.
- Rejuvenator: Restores aged asphalt's elasticity and functionality.
- Industrial Use: Applicable in waterproofing and adhesive materials.

Speed Gun

Context:

Traffic police have started using speed guns to crack down on speeding vehicles all over India lately.

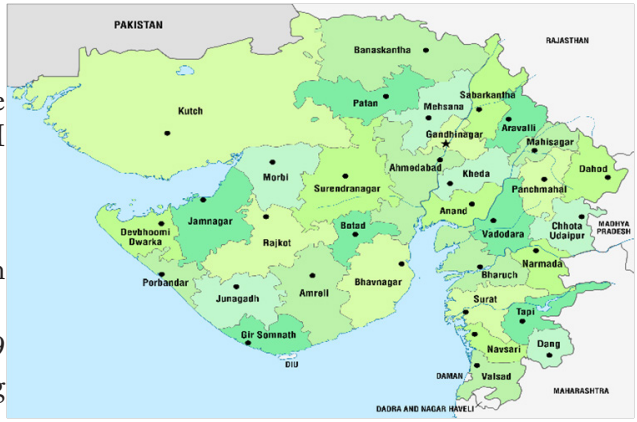
About Speed Gun:

- **What is a Speed Gun?**
  - o A device to measure the speed of a moving object without physical contact.
  - o Widely used in law enforcement, sports, and industrial applications.
- **How it Works:**
  - o Utilizes electromagnetic radiation to emit waves towards the moving object.
  - o Captures the reflected waves and calculates the speed based on the Doppler effect.
  - o Consists of a transmitter, receiver, and processing unit for speed calculation.
- **The Doppler Effect:**
  - o Concept: Change in the frequency of waves due to the relative motion between the source and the observer.
- **Application in Speed Guns:**
  - o Moving objects alter the frequency of reflected waves.
  - o Higher frequency indicates the object is approaching; lower frequency signals it is moving away.
- **Shortcomings of Speed Guns:**
  - o Beam Divergence: Radio waves spread out, potentially measuring multiple objects simultaneously.
  - o Continuous-Wave Radar Issues: Prone to interference from multiple vehicles.
  - o Technological Limitations: Requires advanced compensation systems for accurate targeting, increasing costs.
- Replacement by LIDAR: Laser-based speed guns provide better accuracy and focus, overcoming radio wave divergence limitations.

India's First Fully Solar-Powered Border Village

Context:

Masali village in Gujarat's Banaskantha district has become India's first fully solar-powered border village under the PM Suryaghar Yojana.



About Masali Village:

- Location: Banaskantha district, Gujarat, 40 km from the Pakistan border.
- Solarisation Scheme: Solar rooftops installed on 119 houses under the PM Suryaghar Yojana, generating over 225 kilowatts of electricity.

- **Significance:**
  - o First solar-powered border village in India.
  - o Promotes renewable energy and self-sufficiency in energy needs.
  - o Part of the Border Development Project to solarize 11 villages in Vav taluka and six in Suigam taluka.
  - o Boosts energy security in remote, strategic border areas.

GLP-1 receptor agonists

Context:

The WHO has endorsed GLP-1 receptor agonists, a new class of drugs for managing obesity, marking a shift in global health strategies to combat the growing obesity epidemic.

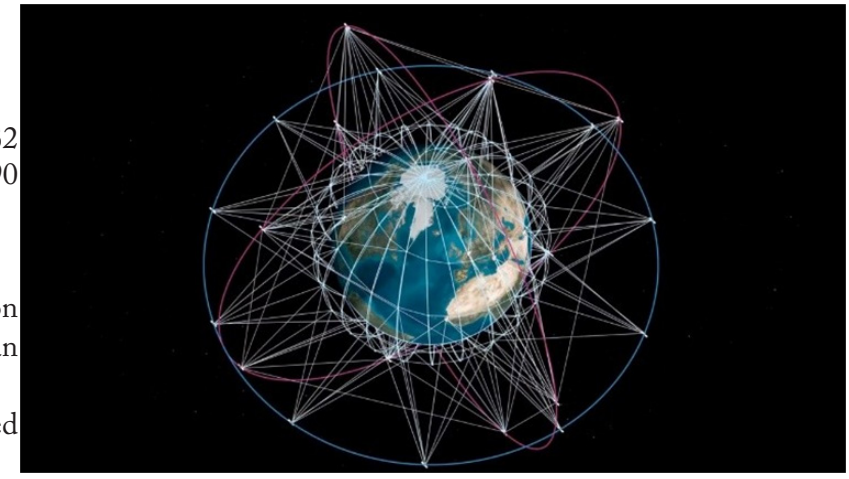
About GLP-1 Receptor Agonists:

- What it is: A class of medicines that mimic the Glucagon-Like Peptide-1 (GLP-1) hormone, which regulates appetite and blood sugar levels.
- **Uses:**
  - o Effective in treating obesity by reducing appetite and promoting weight loss.
  - o Initially developed for type 2 diabetes management.
  - o Drugs like semaglutide (Ozempic, Wegovy) and tirzepatide have shown up to 25% body weight reduction in trials.
- **Significance:**
  - o Addresses a global obesity pandemic, affecting nearly 1 in 8 people worldwide.
  - o Reduces risk factors associated with non-communicable diseases like cardiovascular diseases and diabetes.
  - o Holds transformative potential for both individual health outcomes and global healthcare costs, estimated to reach $3 trillion by 2030.

IRIS2 Space Programme

Context:

The EU has launched an ambitious IRIS2 space programme with a constellation of 290 satellites to rival Elon Musk's Starlink.



About IRIS2:

- Nations involved: European Union member states through the European Space Agency (ESA).
- Launched in: Announced and initiated in 2024.
- **Aim:**
  - o To provide secure, resilient, and uninterrupted connectivity for governmental and commercial purposes.
  - o To strengthen European autonomy and competitiveness in space technology.
- **Significance:**
  - o Strategic Asset: Bolsters EU sovereignty in space technology.
  - o Supports Security: Provides resilience against cyber and communication disruptions.
  - o Commercial Boost: Delivers high-end connectivity services to businesses.
  - o Complementary Programme: Adds to existing EU initiatives like Copernicus (Earth observation) and Galileo (satellite navigation).

Sacred Groves

Context:

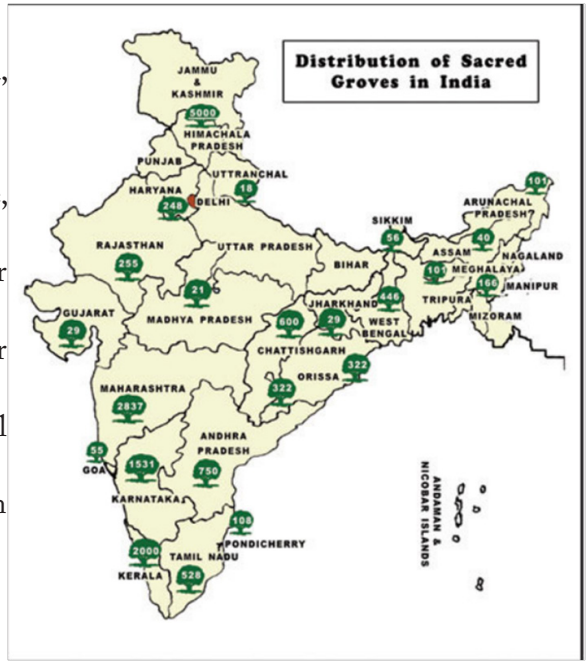
The Supreme Court has directed the Union Government to formulate a comprehensive policy to manage sacred groves, emphasizing their ecological and cultural importance.

About Sacred Groves:

- What they are: Sacred groves are patches of forest traditionally preserved by local communities due to their religious, cultural, or spiritual significance.
- Classification:

1. Traditional Sacred Groves: Dedicated to village deities represented by natural symbols.
2. Temple Groves: Forests preserved around temples for worship.
3. Cremation/Burial Ground Groves: Forest patches maintained near burial sites for rituals.

- **Distribution in India:**
  - Found across India, predominantly in Kerala, Karnataka, Maharashtra, Tamil Nadu, and the Western Ghats.
- **Importance and Significance:**
  - Cultural and Spiritual Value: Links nature and culture, fostering a sense of identity and heritage.
  - Biodiversity Conservation: Acts as sanctuaries for endangered species and genetic diversity.
  - Water Resource Management: Associated with water bodies, aiding aquifer recharge.
  - Soil Conservation: Vegetative cover prevents soil erosion and enhances fertility.
  - Environmental Indicator: Reflects potential vegetation in degraded areas.



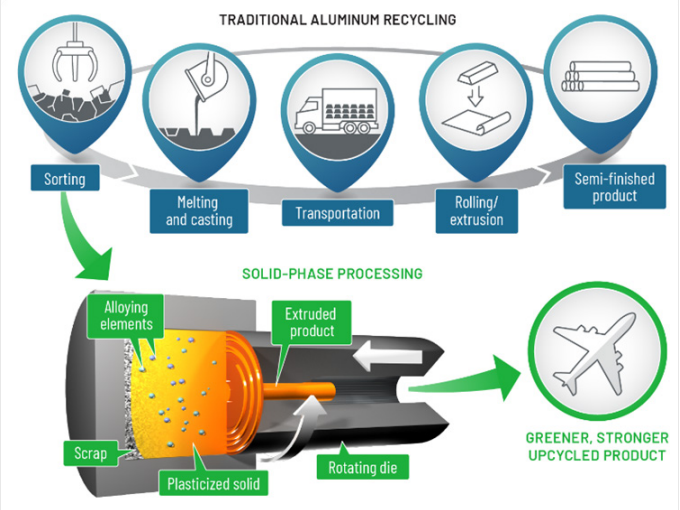
Solid Phase Alloying

Context:

A groundbreaking study highlights the potential of solid phase alloying to transform metal scrap into high-performance alloys without traditional melting processes.

About Solid Phase Alloying:

- **What is Solid Phase Alloying?**
  - Definition: Solid phase alloying is a technique to create metal alloys directly from scrap without melting, enhancing their properties.
  - Purpose: Upcycles metal scrap into high-performance alloys for various industrial applications.
  - Science Behind Solid Phase Alloying
  - The process operates entirely in the solid state, eliminating the need for bulk melting.
  - Utilizes friction and heat generated through high-speed rotation to blend and disperse metals uniformly.



- **The Process:**
  - Material Input: Aluminium scrap is mixed with copper, zinc, and magnesium.
  - Shear Assisted Processing and Extrusion (ShAPE):
  - A rotating die creates frictional heat, combining the metals into a uniform alloy.
  - Outcome: The final alloy matches the strength and performance of products made from primary

aluminium.

- **Benefits of Solid Phase Alloying:**
  - Energy Efficiency: Eliminates energy-intensive melting, reducing manufacturing costs.
  - Sustainability: Reduces waste by recycling industrial aluminium scrap.
  - Improved Properties: Produces durable, high-strength alloys comparable to new materials.
  - Versatility: Enables the creation of new alloys for 3D printing technologies.
  - Cost-Effectiveness: Low-cost feedstock from scrap leads to affordable high-performance materials.

Gene Therapy for Haemophilia A

Context:

Researchers has achieved a milestone by conducting a successful gene therapy trial for severe haemophilia A using a lentivirus vector.

Gene Therapy for Haemophilia A:

What is Haemophilia A?

- Definition: A hereditary bleeding disorder caused by the deficiency of clotting Factor VIII.
- Genetic Cause: It arises due to a defective gene on the X chromosome.
- Prevalence: More common in males; females are typically carriers.

Symptoms

1. Prolonged Bleeding: Following injury or surgery.
2. Spontaneous Bleeding: Internal bleeding in joints and muscles without apparent cause.
3. Bruising: Unusual or frequent bruises.
4. Hemarthrosis: Bleeding into joints, causing pain and swelling.

What is Replacement Therapy?

- Definition: A standard treatment where clotting factors are injected into the veins to replace the deficient Factor VIII.
- Mechanism: Derived from human plasma or produced synthetically (recombinant clotting factors).
- **Challenges:**
  - Short lifespan of clotting factors in the body.
  - Antibodies may neutralize the clotting factors, reducing effectiveness.

What is Roctavian?

- Definition: The first FDA-approved gene therapy for severe haemophilia A.
- **How It Works:**
  - Uses an adeno-associated virus (AAV) vector to deliver a corrected gene encoding Factor VIII.
  - The gene integrates into liver cells to produce clotting Factor VIII.
  - Efficacy: Reduces annual bleeding rates but requires corticosteroids to suppress immune reactions.
  - Limitations: Treatment response may wane over time, and pre-existing antibodies to AAV may limit its use.

Lentivirus Vector in Gene Therapy:

- **Advantages:**
  - Rarely triggers pre-existing
  - Integrates into host cells, ensuring long-term production of clotting factors.
  - Indian Approach: Gene transfer into adult stem cells for lifelong efficacy.

African Swine Fever

Context:

An outbreak of African Swine Fever (ASF), a highly contagious disease affecting pigs, has been reported in Kerala's Kottayam district. Authorities have initiated culling measures and declared infected zones to contain the disease's spread.

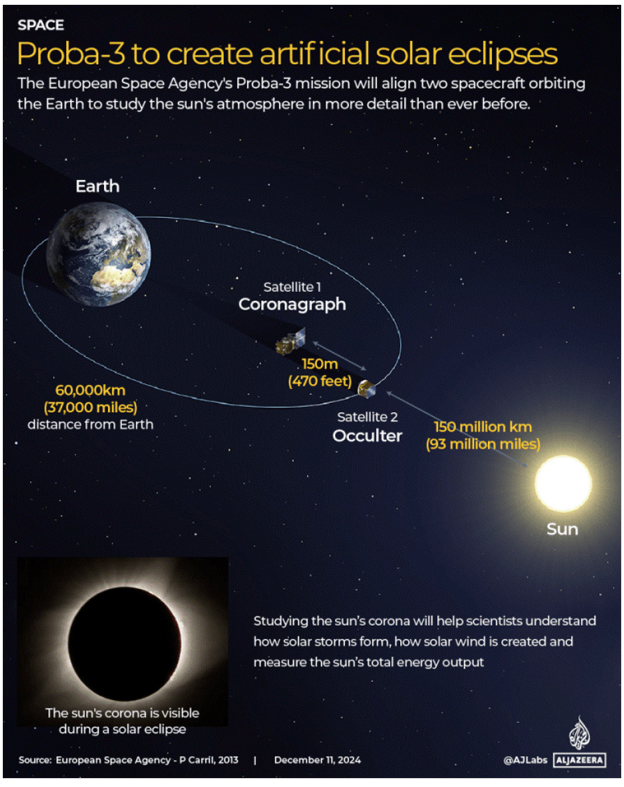
About African Swine Fever (ASF):

- **Origin:**
  - ASF is endemic to sub-Saharan Africa but has spread globally to regions like Asia and Europe.
- **Vector:**
  - Transmitted through direct contact with infected animals, contaminated clothing, vehicles, or bites by infectious soft ticks.
- **Mode of Spread:**
  - Direct contact with infected pigs or pork products.
  - Indirect contact via contaminated surfaces and equipment.
- **Disease Found In:**
  - Affects domestic and wild pigs exclusively.
- **Zoonotic or Not:**
  - ASF is not zoonotic; it poses no risk to human health.
- **Symptoms:**
  - Fever, loss of appetite, inflamed eye membranes, red skin, diarrhea, and vomiting.
- **Cure:**
  - No vaccine or cure is available. Culling infected pigs is the only effective containment measure

Artificial Solar Eclipse

Context:

The European Space Agency launched Proba-3 from India to create artificial solar eclipses for extended Sun corona studies using precise formation flying.



What is an Artificial Solar Eclipse?

- Definition: An artificial solar eclipse mimics the natural phenomenon where the moon blocks sunlight, allowing detailed observation of the Sun's corona.
- Created By: Two satellites align to block the Sun's light, creating a controlled shadow for scientific study.
- Purpose: To observe the Sun's corona and study phenomena such as why it is hotter than the Sun's surface.

How Artificial Solar Eclipse Works

- Satellite Pair: Two satellites — the Coronagraph Spacecraft (CSC) and the Occulter (OSC) — maintain precise alignment to simulate an eclipse.
- Shadow Creation: The Occulter spacecraft casts a shadow onto the Coronagraph spacecraft, mimicking the moon's role in a natural eclipse.
- Precision: Millimetres-level accuracy ensures a consistent eclipse for up to six hours per orbit.

Significance of Artificial Solar Eclipse

- Extended Observations: Enables studying the Sun's corona for hours, unlike natural eclipses, which last only minutes.
- Space Weather Predictions: Helps predict geomagnetic storms and mitigate disruptions to satellites and Earth-based systems.
- Scientific Insight: Unveils the mysteries of the corona, including its temperature anomaly and solar flares.

What is Precise Formation Flying (PFF) Technology?

- Definition: A technology that enables satellites to maintain an exact position and orientation relative to each other in orbit.
- Mechanism: Uses GPS, inter-satellite radio links, and automated control systems for alignment.
- Implementation in Proba-3: The satellites stay 150 meters apart, maintaining millimetre-level precision to simulate an eclipse.
- Benefits: Enhances mission accuracy and provides a platform for advanced observational techniques.

Cyber Slavery

Context:

The Tamil Nadu Crime Branch CID and Protector of Emigrants (POE), Chennai, thwarted an attempt to send three Tamil Nadu youth to Cambodia for "cyber slavery," where victims are coerced into participating in online scams.

About Cyber Slavery:

- **Definition:**
  - Cyber slavery refers to the coercion or trafficking of individuals into online scams or fraudulent activities controlled by organized criminal networks.
- **Characteristics:**
  - Victims are lured with false job promises and often transported across borders illegally.
  - They are forced to work under duress, committing online fraud or cybercrime.
  - Exploits vulnerable populations, using manipulation or threats to trap individuals.
- **Emerging Threat:**
  - Cyber slavery represents a modern form of trafficking, driven by rising online criminal networks and global connectivity.

Disease – X

Syllabus: Health

Context:

The recent outbreak in the Democratic Republic of Congo, claiming over 400 lives, has spotlighted Disease X, a hypothetical pathogen highlighted by the WHO in 2018.

What is Disease X?

- Definition: A placeholder for an unidentified, highly infectious pathogen capable of causing global pandemics.
- Potential Causes: It could stem from viruses, bacteria, fungi, or zoonotic sources.

- Historical Context: Conceptualized after the 2014–2016 Ebola outbreak, highlighting gaps in global health responses.
- Uncertainty: Disease X is unpredictable in its emergence, transmission, and impact.
- Severity: Predicted to be 20 times more lethal than SARS-CoV-2.

Features of Disease X:

- Novel Threat: Represents unknown pathogens with potential for rapid global spread.
- Wide Origins: Could be zoonotic, antimicrobial-resistant, or a result of bioterrorism.
- Human Impact: High mortality rates, overwhelming healthcare systems.
- Environmental Links: Driven by deforestation, urbanization, and climate change.

WHO Priority List of Pathogens:

- Purpose: Focus global efforts on diseases with high epidemic potential and insufficient medical countermeasures.
- Pathogens Listed: Includes Ebola, Marburg, Lassa fever, Nipah, Rift Valley fever, Zika, and Disease X.
- Criteria: High mortality, rapid spread, and lack of vaccines or treatments.

Patterns of Emerging Diseases:

1. Zoonotic Origins: About 70% of emerging diseases come from animals.
2. Environmental Factors: Deforestation, urban sprawl, and intensive agriculture increase risks.
3. Globalization: Interconnected travel and trade amplify local outbreaks into pandemics.
4. Undiscovered Threats: Over 1.7 million unknown viruses in wildlife could infect humans.

Initiatives to Counter Disease X:

Global Efforts:

1. WHO Pandemic Treaty: Aims for global cooperation in preparedness and equitable resource distribution.
2. Pandemic Fund: Strengthens health systems in low-income nations.
3. mRNA Technology Hub: Enhances vaccine production capacity in developing countries.
4. BioHub System: Facilitates global sharing of pathogens and viruses.
5. WHO Hub for Pandemic Intelligence: Develops research to bridge gaps in outbreak detection.

Indian Efforts:

1. Integrated Disease Surveillance Programme (IDSP): Tracks outbreaks and monitors trends.
2. National Institute of Virology: Conducts research on viral pathogens and zoonotic diseases.
3. Biotech Initiatives: Focus on indigenous vaccine development and diagnostic tools.
4. Emergency Response Fund: Allocates resources for immediate pandemic responses.

Challenges in Predicting Disease X:

1. Unpredictable Emergence: Complex interactions between humans, animals, and the environment.
2. Vast Pathogen Pool: Only a fraction of human-infecting pathogens are identified.
3. Climate Change: Alters disease transmission dynamics, expanding vector-borne illnesses.
4. Technological Gaps: Limited genomic data and inadequate global surveillance systems.
5. Resource Inequity: Disparities in healthcare infrastructure between nations.

Way Ahead:

1. Strengthen Surveillance: Expand real-time genomic sequencing and AI-driven outbreak prediction tools.
2. Global Cooperation: Promote equitable sharing of vaccines, diagnostics, and treatments.
3. Public Health Investment: Build robust healthcare infrastructure, particularly in vulnerable regions.
4. Education and Awareness: Train healthcare workers and inform communities about emerging threats.
5. Research and Development: Focus on universal vaccines and prototype pathogen platforms.

Conclusion:

Disease X represents an inevitable yet unpredictable health threat requiring global preparedness. Strengthened surveillance, equitable resource distribution, and international collaboration are critical to safeguarding humanity against the next pandemic.

Space Pollution

Context:

The rapid expansion of space activities has led to significant environmental challenges, including emissions from rocket launches and the growing issue of orbital debris.

Present Space Pollution Data and Trends:

- Orbital Debris: Over 13,230 satellites remain in orbit, with 10,200 still operational.
- Fragmentation Events: Around 650+ collisions and break-ups have created over 36,860 trackable objects.
- Mass in Orbit: The total mass of space objects exceeds 13,000 tonnes, significantly raising collision risks.
- Growth Rate: Increasing satellite launches by private and public entities exacerbate overcrowding in Low Earth Orbit (LEO).

Major Sources of Space Pollution:

- Defunct Satellites: Non-operational satellites remain in orbit, contributing to debris.
- Rocket Stages: Spent stages left in orbit after launches.
- Fragmentation Debris: Pieces from satellite collisions and explosions.
- Satellite Burnup Ash: Metallic residues released during atmospheric re-entry.

Rockets Impact Pollution:

1. Emission Composition: Rocket launches release carbon dioxide, black carbon, and water vapor.
2. Black Carbon Effects: Absorbs sunlight 500 times more efficiently than CO_2, amplifying warming.
3. Ozone Depletion: Chlorine-based propellants disrupt the ozone layer.
4. Energy Intensity: Rocket manufacturing consumes large amounts of energy and resources.

Major Initiatives to Counter Space Debris:

1. Kessler Syndrome Mitigation (NASA): Studies and strategies to avoid cascading collisions in orbit by limiting debris generation.
2. European Space Agency's (ESA) ClearSpace-1: A robotic mission to remove a single large piece of debris from orbit by 2025.
3. Japan's ELSA-d Mission: A demonstration by Astroscale for capturing and de-orbiting defunct satellites using magnetic capture technology.
4. United Nations' Guidelines for Long-Term Sustainability of Outer Space Activities: Non-binding recommendations for safe satellite operations, debris mitigation, and international cooperation.
5. Active Debris Removal (ADR) Projects: Development of technologies like nets, harpoons, and lasers to capture or de-orbit debris (e.g., ESA and JAXA).

Dangers of Outer Space Pollution:

1. Collision Risks: High-velocity debris can destroy operational satellites, disrupting communication and navigation.
2. Climate Monitoring Disruption: Space junk interferes with data collection for weather prediction and disaster management.

3. Human Spaceflight Hazards: Threatens missions like those on the International Space Station (ISS).
4. Cost Escalation: Avoiding debris through shielding or orbital adjustments increases mission expenses.

Barriers to Space Sustainability:

1. Lack of Regulation: No binding international laws govern emissions or debris management.
2. Commercial Resistance: Companies prioritize cost-efficiency over sustainable practices.
3. Data Sharing Issues: Security and proprietary concerns hinder the creation of a unified debris tracking system.
4. Outer Space Treaty Gaps: Absence of enforceable provisions for environmental safeguards.

Way Ahead:

1. Regulatory Frameworks: Establish binding agreements through The Committee on the Peaceful Uses of Outer Space (COPUOS) for emissions, debris mitigation, and data-sharing.
2. Green Technology Investment: Prioritize reusable rockets, biodegradable satellites, and cleaner fuels.
3. Debris Management: Develop Autonomous Debris Removal (ADR) systems and incentivize their adoption.
4. Global Collaboration: Foster international cooperation for equitable space access and environmental protection.
5. Sustainable Practices: Encourage private actors through financial incentives and penalties for eco-friendly approaches.

Conclusion:

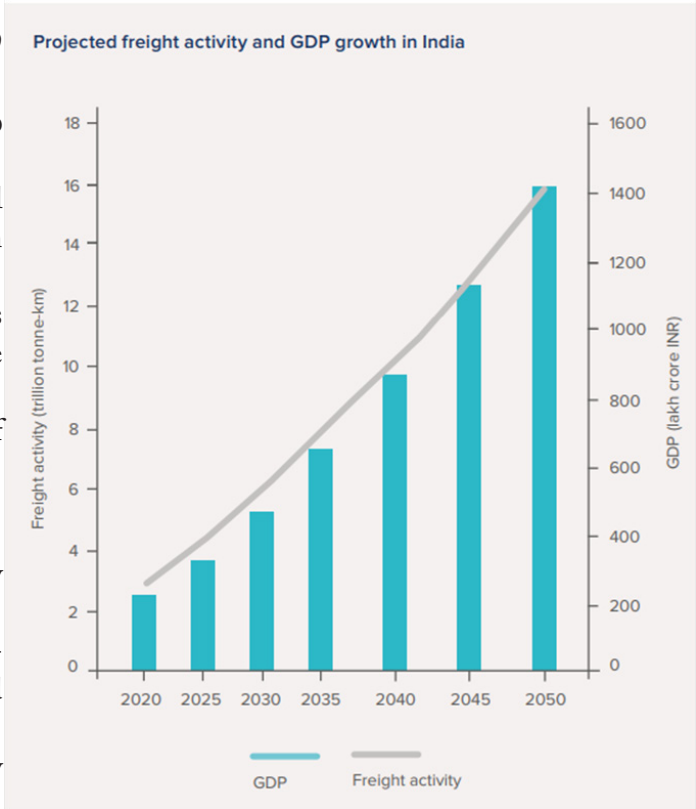
Space exploration must balance technological advancement with environmental responsibility. By implementing stringent regulations, fostering innovation, and encouraging global collaboration, humanity can secure a sustainable future for both the earth and outer space.

India Logistics Movement

Context:

India's logistics sector is transforming with initiatives like the National Logistics Policy and PM Gati Shakti to cut costs, boost efficiency, and enhance connectivity. Contributing 14% to GDP, it is pivotal to the $5 trillion economy goal.

Logistics Movement Data in India:



- Logistics Cost Reduction: Declined by 0.8-0.9 percentage points of GDP between FY14-FY22.
- Sector Contribution: Logistics contributes 14% to India's GDP and is valued at $250 billion.
- Transportation Efficiency: Average truck travel distance increased from 225 km to 300-325 km due to GST implementation.
- Bilateral Trade Facilitation: Unified Logistics Interface Platform (ULIP) has processed 382 use cases for automation and trade facilitation.
- Rail vs. Road Share: Road accounts for 66% of freight, rail 31%, waterways 3%, and air 1%.

Modes of Logistics Movements in India:

- Road: Largest contributor, with 66% share; key for short-haul and last-mile delivery.
- Rail: 31% share, suited for bulk goods and long-haul transportation; expanding with dedicated freight corridors.
- Waterways: 3% share; cost-effective for heavy goods; potential for coastal and inland navigation.
- Air: 1% share; critical for high-value, time-sensitive goods.

Importance of a Strong Supply Chain:

- Cost Reduction: Efficient logistics reduce production costs and improve profitability.
- Global Competitiveness: Enhances India's export potential and competitiveness in global markets.
- Economic Growth: Drives investment and supports MSMEs by reducing inefficiencies.
- Sustainability: Promotes eco-friendly practices like rail and waterway usage, reducing emissions.
- Employment: Generates jobs across transportation, warehousing, and technology sectors.

2024 Recent Government Initiatives:

- PM Gati Shakti: Multi-modal integration of transportation infrastructure for seamless connectivity.
- ULIP: Facilitating data-driven logistics through process digitization and automation.
- NLP Marine Policy: Boosts port logistics and coastal shipping efficiency.
- Capital Expenditure: 11.1% rise in infrastructure spending to support logistics networks.
- FAME II Scheme: Promoting electric vehicles for clean logistics.

Challenges Faced by Logistics Movement:

- High Costs: Logistics costs remain at 14% of GDP, higher than the global average.
- Infrastructure Gaps: Limited last-mile connectivity and inadequate warehousing facilities.

- Modal Imbalance: Over-dependence on road transport, underutilization of rail and waterways.
- Skilling Deficiency: Lack of trained workforce for advanced logistics management.
- Environmental Concerns: High emissions from diesel-powered trucks and poor fuel efficiency.

Way Ahead:

- Modal Diversification: Increase rail and waterway share through investments in infrastructure.
- Technology Adoption: Expand digital platforms like ULIP for efficient operations and tracking.
- Sustainable Practices: Promote electric vehicles and alternative fuels.
- Policy Alignment: Streamline regulations and ensure implementation of logistics-focused policies.
- Skill Development: Invest in training programs to enhance workforce capabilities.

Conclusion:

India's logistics sector is on a transformative journey, driven by robust policies and investments. With continuous advancements in technology, infrastructure, and sustainable practices, the sector is poised to be a cornerstone in India's economic aspirations.

Wealth Tax

Context:

The proposal to reintroduce wealth tax in India has sparked debates, with arguments for reducing inequality through redistribution versus concerns over capital flight and administrative inefficiencies.

What is Wealth Tax?

Wealth tax is a direct tax levied on the net wealth of individuals, HUFs, and companies to ensure redistribution of resources. In India, it was governed by the Wealth Tax Act, 1957, abolished in 2016 due to high administrative costs and low revenue collection.

Features and Criteria of Wealth Tax:

- Target Entities: Applicable to individuals, HUFs, and companies; excludes firms, co-operatives, and mutual funds.
- Net Wealth Definition: Includes immovable assets (e.g., real estate), financial instruments, and luxury items after deducting liabilities.
- Exemptions: Assets held by charitable institutions, political parties, and specific businesses.
- Rate: Previously, wealth exceeding 30 lakh was taxed at 1%.
- Valuation Date: Calculated annually as of March 31st.

Global Models of Wealth Taxation:

- **Norway:**
  - 85%-1.1% tax on net wealth.
  - Strong public support due to investments in health and education.
  - Minimal capital flight due to robust infrastructure and social trust.
- **Switzerland:**
- Decentralized system; cantons set individual tax rates.
- Wealth tax contributes 3.6%-3.8% of total state revenue.

Advantages of Wealth Tax:

1. Reduces Inequality: Ensures redistribution of wealth, promoting social equity.
2. Revenue for Development: Provides funding for health, education, and social services.
3. Encourages Productive Asset Allocation: Discourages investments in unproductive assets like gold and real estate.
4. Progressive Nature: Targets ultra-wealthy, leaving the middle class unaffected.

Disadvantages of Wealth Tax:

1. Capital Flight: Wealthy individuals may relocate to avoid taxes, reducing domestic investment.
2. High Administrative Costs: Challenges in asset valuation and compliance increase collection expenses.
3. Evasion and Loopholes: Wealth can be easily transferred or hidden, limiting effectiveness.
4. Impact on Savings and Investments: May discourage long-term wealth accumulation.

Way Ahead:

1. Targeted Approach: Focus on ultra-high-net-worth individuals while protecting the middle class.
2. Efficient Administration: Leverage technology for accurate wealth tracking and compliance.
3. Transparent Revenue Use: Channel tax revenues into visible improvements in health, education, and infrastructure to build trust.
4. Global Collaboration: Partner with other nations for data sharing and preventing tax evasion.
5. Periodic Review: Continuously evaluate the impact and modify policies as needed.

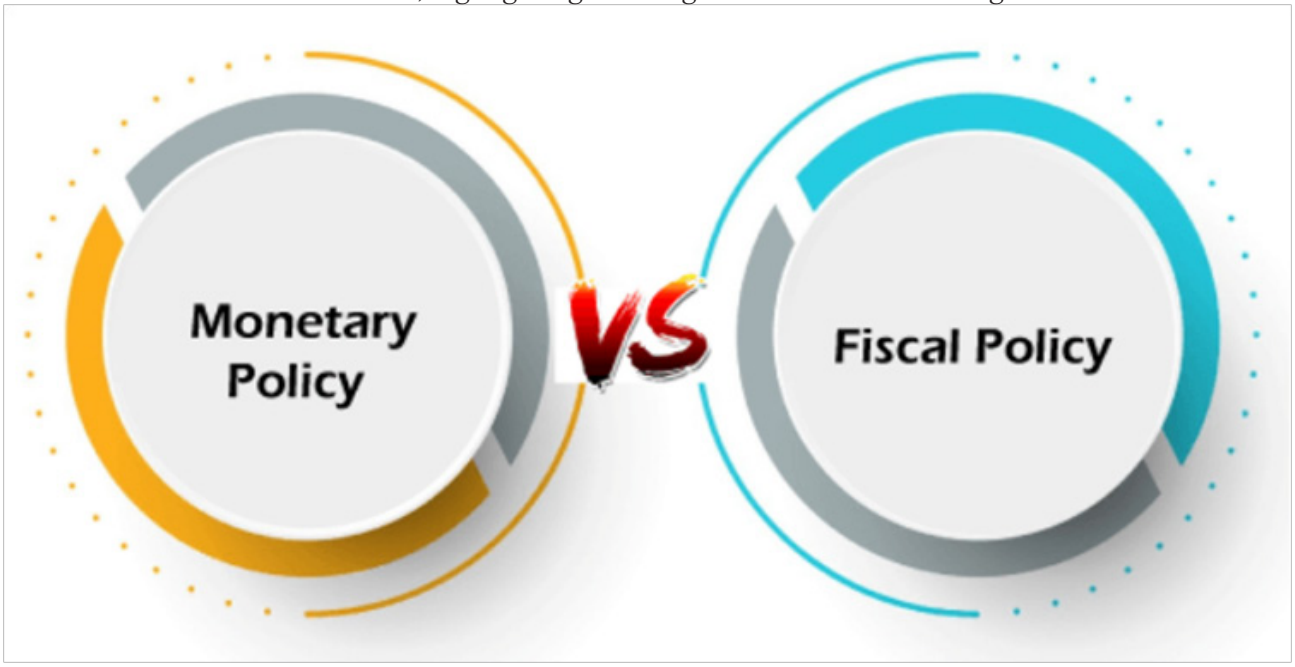
Conclusion:

Reintroducing a wealth tax in India requires a delicate balance between equity and efficiency. Lessons from global examples underscore the importance of targeted policies, robust administration, and transparent utilization to foster sustainable development without disrupting economic stability.

Monetary and Fiscal Policy

Context:

A finance ministry report cited monetary policy, macroprudential measures, and structural factors as possible contributors to the demand slowdown, highlighting differing views with the RBI on growth and inflation.



About Fiscal Policy:

- Definition: Fiscal policy refers to the government's use of taxation, spending, and borrowing to influence economic activity.
- **Tools of Fiscal Policy:**
  - Taxation: Adjusting tax rates to influence disposable income and spending.
  - Government Spending: Expenditure on public goods, infrastructure, and social programs.
  - Public Borrowing: Managing deficits through domestic or international borrowing.
  - Subsidies: Providing financial assistance to specific sectors to boost demand.
  - Transfers: Welfare payments like unemployment benefits and pensions.
  - Impact of Fiscal Policy on Growth and Demand:

Type	Tools	Impact on Growth	Impact on Demand
Expansionary Fiscal Policy	Tax cuts	Boosts infrastructure and employment	Increases disposable income
	Increased public spending	Promotes GDP growth	Stimulates aggregate demand
	Subsidies		
Contractionary Fiscal Policy	Higher taxes	Controls fiscal deficit	Reduces disposable income
	Reduced public spending	Slows down economic growth	Lowers aggregate demand to control inflation
	Austerity measures		

About Monetary Policy:

- Definition: Monetary policy involves the central bank's regulation of money supply and interest rates to maintain price stability and foster economic growth.
- Tools of Monetary Policy:
  - o Open Market Operations (OMO): Buying or selling government securities to control liquidity.
  - o Cash Reserve Ratio (CRR): Adjusting the percentage of deposits banks must hold as reserves.
  - o Repo and Reverse Repo Rates: Influencing short-term interest rates.
  - o Bank Rate: Long-term interest rate adjustments to influence credit availability.
  - o Quantitative Easing (QE): Injecting money into the economy by purchasing financial assets.
  - o Impact of Monetary Policy on Growth and Demand:

Type	Tools	Impact on Growth	Impact on Demand
Expansionary Monetary Policy	– Lower interest rates	– Encourages borrowing and investment	– Increases consumer spending
	– Reduce CRR	– Stimulates economic activity	– Boosts aggregate demand
	– Quantitative Easing (QE)		
Contractionary Monetary Policy	– Higher interest rates	– Reduces overheating in the economy	– Decreases consumer and business spending
	– Increase CRR	– Slows down GDP growth	– Controls inflation by reducing aggregate demand
	– Open Market Sales		

Critical Minerals

Context:

In 2023, the Ministry of Mines identified 30 critical minerals vital for India's economic growth and security. The report noted complete import dependency for 10 minerals, with China dominating the critical minerals sector.

Definition:

- Critical minerals are those minerals which are essential for economic development and national security, the lack of availability of these minerals or even concentration of existence, extraction or processing of these minerals in few geographical locations may lead to supply chain vulnerability and disruption.

Importance of Critical Minerals:

- Economic Development: Support industries like electronics, energy storage, and renewable energy.
- National Security: Essential for aerospace, defence, and telecommunication sectors.
- Sustainability: Vital for achieving global Net Zero emissions commitments through clean energy technologies.
- Technological Edge: Power critical sectors like semiconductors, EVs, and high-tech manufacturing.
- Global Transition: Underpin the shift to a low-carbon economy, fostering renewable energy adoption.

Factors leading to China's dominance in critical minerals:

1. Resource Base and Reserves: China has vast reserves of critical minerals like rare earth elements (REE), lithium, and graphite, ensuring a strong supply base.
2. Processing Capabilities: Controls 87% of rare earth processing, 58% of lithium refining, and 68% of silicon processing, dominating global supply chains.
3. Strategic Investments: Heavy investments in domestic and overseas mining projects to secure mineral assets globally.
4. Vertical Integration: Developed end-to-end infrastructure from mining to refining, ensuring efficiency and cost-effectiveness in production.

Sl. No.	Critical Mineral	Percentage (2020)	Major Import Sources (2020)
1.	Lithium	100%	Chile, Russia, China, Ireland, Belgium
2.	Cobalt	100%	China, Belgium, Netherlands, US, Japan
3.	Nickel	100%	Sweden, China, Indonesia, Japan, Philippines
4.	Vanadium	100%	Kuwait, Germany, South Africa, Brazil, Thailand
5.	Niobium	100%	Brazil, Australia, Canada, South Africa, Indonesia
6.	Germanium	100%	China, South Africa, Australia, France, US
7.	Rhenium	100%	Russia, UK, Netherlands, South Africa, China
8.	Beryllium	100%	Russia, UK, Netherlands, South Africa, China
9.	Tantalum	100%	Australia, Indonesia, South Africa, Malaysia, US
10.	Strontium	100%	China, US, Russia, Estonia, Slovenia
11.	Zirconium(zircon)	80%	Australia, Indonesia, South Africa, Malaysia, US
12.	Graphite(natural)	60%	China, Madagascar, Mozambique, Vietnam, Tanzania
13.	Manganese	50%	South Africa, Gabon, Australia, Brazil, China
14.	Chromium	2.5%	South Africa, Mozambique, Oman, Switzerland, Turkey
15.	Silicon	<1%	China, Malaysia, Norway, Bhutan, Netherlands

Distribution of Critical Minerals

- **In India**
  - Lithium: Found in Jammu & Kashmir (5.9 million tonnes).
  - Rare Earth Elements (REE): Andhra Pradesh, Odisha, and Rajasthan.
  - Graphite: Arunachal Pradesh (largest deposit in India).
  - Cobalt: Found in Odisha and Jharkhand.
  - Tungsten: Deposits in Rajasthan and Karnataka.
- **In the World**
  - China: Dominates lithium, graphite, and REE processing (controls 87% of rare earth processing).
  - Australia: Major producer of lithium and REE.
  - DRC: Largest cobalt reserves (60% of global output).
  - USA: Significant REE mining but lacks refining capabilities.
  - South America: Lithium Triangle (Chile, Argentina, Bolivia).

Initiatives taken by India for critical minerals:

- KABIL: Joint venture securing overseas mineral assets for supply-chain diversification.
- Strategic Partnerships: Member of Minerals Security Partnership and Critical Raw Materials Club.
- Exploration and Research: Geological Survey of India (GSI) and CSIR promoting domestic exploration and recycling technologies.

- Production-Linked Incentives: Focus on recycling and extracting critical minerals.
- National Strategies: Proposed Centre of Excellence for Critical Minerals (CECM) to streamline policies and strategies.

Challenges to critical minerals:

- Import Dependency: Heavy reliance on China for refining and processing critical minerals.
- Exploration Bottlenecks: Lack of advanced mining technology for deep-seated minerals.
- Policy Gaps: Absence of clear regulatory frameworks and incentives for private sector participation.
- Environmental Concerns: High environmental impact of mining and refining processes.
- Supply Chain Risks: Geopolitical tensions and export restrictions by dominant players like China.

Recommendations of Veena Dermal Committee:

1. Establish a Centre of Excellence for Critical Minerals to address technological gaps and enhance domestic capabilities.
2. Periodically update the list of critical minerals for India's evolving needs.
3. Promote recycling technologies and circular economy practices to reduce virgin mineral dependency.
4. Develop policies to attract private investment in mineral exploration and processing.
5. Strengthen international collaborations for securing overseas assets and sharing advanced technologies.

Conclusion:

India's growing focus on critical minerals is pivotal for sustaining economic growth, technological advancements, and energy transition. A comprehensive strategy addressing exploration, processing, and supply chain risks is essential to reduce dependency and achieve self-reliance in this critical sector.

State Fiscal Prudence

Context:

The Reserve Bank of India (RBI) released its report on state finances, highlighting the fiscal performance of Indian states.

RBI Data on State Fiscal Condition:

- Gross Fiscal Deficit (GFD): States contained GFD within 3% of GDP in 2022-23 and 2023-24; budgeted at 3.2% for 2024-25.
- Revenue Deficit: Limited to 0.2% of GDP in 2023-24.
- Capital Expenditure: Increased from 2.4% of GDP in 2021-22 to 3.1% budgeted for 2024-25.
- Outstanding Liabilities: Declined from 31% of GDP (March 2021) to 28.5% (March 2024), yet above the pre-pandemic level of 25.3%.

What is Fiscal Prudence?

- Definition: Fiscal prudence refers to the responsible management of public finances, focusing on controlling deficits, maintaining sustainable debt levels, and prioritizing productive expenditure.

Reasons Behind the Lack of Fiscal Prudence Among States:

- Populist Schemes: States like Punjab and Andhra Pradesh face financial strain due to free electricity, water subsidies, and farm loan waivers, impacting long-term fiscal sustainability.

E.g. Punjab's free electricity scheme for farmers increased the state's subsidy burden in 2023.

- Rising Debt Levels: Over-dependence on borrowing for capital and revenue expenditures.

E.g. West Bengal's debt-to-GDP ratio remained at 35.5% in 2023, well above the FRBM limit.

- Off-Budget Borrowings: Use of off-budget mechanisms such as guarantees and loans by state PSUs creates hidden liabilities.

E.g. Andhra Pradesh in 2023 faced scrutiny for 55,000 crore off-budget borrowing.

- Delay in Fiscal Reforms: Resistance to implementing reforms such as property tax increases or disinvestment.

E.g. Rajasthan deferred property tax hikes in 2024 due to political opposition.

- Dependence on Central Grants: States often rely on the Centre rather than building self-sustained revenue mechanisms.

E.g. Northeastern states relied heavily on central funds in 2023, limiting fiscal autonomy.

Initiatives to Achieve Fiscal Prudence:

- **RBI:**
  - State-Specific Fiscal Responsibility Legislations (FRLs): Legal framework for fiscal discipline.
  - Monitoring Off-Budget Borrowings: Enhanced reporting and transparency.
  - Encouraging Counter-Cyclical Fiscal Policies: Advocating expenditure and savings based on economic cycles.
- **Government:**
  - 14th and 15th Finance Commissions: Recommendations for fiscal consolidation and debt sustainability.
  - Debt Consolidation Roadmaps: Specific targets for states.
  - Increased Capital Allocation: Promoting growth-enhancing spending.
  - Subsidy Rationalization: Programs to optimize welfare expenditures.

Challenges to Fiscal Prudence in Indian States:

1. Rising Subsidies: Increased reliance on populist measures.
2. High Contingent Liabilities: Off-budget borrowing and guarantees strain finances.
3. Revenue Deficits: Poor tax administration and dependency on Central grants.
4. Debt Overhang: Liabilities remain above pre-pandemic levels despite recent reductions.

Way ahead to achieve fiscal prudence:

1. Adopt Risk-Based Frameworks: Implement counter-cyclical policies for financial resilience.
2. Debt Consolidation Roadmap: Set clear, time-bound targets for reducing liabilities.
3. Enhance Revenue Sources: Improve state tax administration and rationalize subsidies.
4. Transparency in Borrowings: Ensure strict reporting of off-budget liabilities.
5. Focus on Growth-Enhancing Expenditure: Prioritize capital spending to boost economic growth.

Conclusion:

The 15th Finance Commission's recommendations and RBI's insights serve as crucial guidelines for achieving sustained fiscal prudence in Indian states. Adopting comprehensive fiscal reforms is essential to balance developmental needs and fiscal sustainability.

UPI: Revolutionising Digital Payments in India

Context : Processed over 16 billion transactions worth ₹23.49 Lakh Crores in October 2024
Relevance : GS 3 (Economy)

Introduction

- Launched: 2016 by NPCI (National Payments Corporation of India).
- Objective: Promotion of digital economy .

Technological Framework

- Connects over 600 banks using mobile based platform for seamless financial transactions anywhere and anytime.
- Security: Single Click 2–Factor Authentication ensures secure payments.

Adoption and Growth

- Initial Phase: Moderate adoption; significant boost post-2017 demonetisation.
- Pandemic Impact: Accelerated usage during Covid–19 for contactless payments.
- E-Commerce :Rising trend of online shopping promoted digital payments.

Achievements (October 2024)

- Transactions: Processed more than16.58 billion transactions worth ₹23.49 Lakh Crores.
- Year-on-Year Growth: 45% increase from October 2023.
- India contributes 49% of real time global transactions.

Key Features

- Accessibility: Instant money transfers, 24/7 availability.
- Unified Access: Integration of multiple bank accounts in a single app.
- Privacy and Security: Virtual addresses and robust authentication.
- Payment Modes: QR codes, in-app, and merchant payments.
- Cashless Economy: Encourages alternatives to traditional cash payments.

Global Reach

- International Expansion: Functional in countries like UAE, Singapore, Bhutan, Nepal, and France.
- Strategic Growth: BRICS expansion and remittance facilitation.
- Future Vision: Strengthen India's leadership in global digital payments.

Future Prospects

- Credit Integration: Combining UPI with RuPay credit cards.
- Policy Enhancements: Continuous technological and regulatory upgrades.
- Rural Inclusion: Expanding reach to underserved regions.
- Global Leadership: Setting benchmarks in digital payment systems worldwide.

Benefits Under E-Shram Card

Context : As on 26th November 2024, over 30.42 crore unorganised workers have registered on eShram portal.
Relevance : GS 2 (Governance)

Background:

- Initiated: August 2021 by the Ministry of Labour and Employment.
- Objective: To create a National Database of Unorganised Workers (NDUW) and streamline the implementation of social security schemes for workers in the unorganised sector, such as construction

workers, migrant workers, gig workers, and platform workers.

Eligibility Criteria:

- Requirements:
- Aadhaar number and an Aadhaar-linked active mobile number.
- Active bank account.
- Exclusions: Not applicable to members of EPFO, ESIC, or NPS.
- Age Range: 16 to 59 years.

Benefits:

- Accidental Insurance: 2 lakh coverage under Pradhan Mantri Suraksha Bima Yojana (PMSBY).
- Social Security Schemes: Integrated benefits, including pensions, health insurance, and skill development programs.

Integration with Other Portals:

1. National Career Service (NCS):

1. Use of Universal Account Number (UAN) for job opportunities.

- Skill India Digital Portal:
- Access to skill enhancement programs and apprenticeship opportunities.
- myScheme Portal:
- One-stop search for government schemes based on user eligibility.

One-Stop-Solution Launch:

- Introduced: 21st October 2024.
- Purpose: To unify various welfare schemes for unorganised workers into a single, user-friendly platform.

Integrated Schemes:

- 12 key schemes, including:
- PMSBY
- PM Jeevan Jyoti Bima Yojana (PMJJBY)
- Ayushman Bharat
- PM SVANidhi
- PMAY (Urban & Gramin)
- MGNREGA

Achievements:

- Registrations: Over 30.42 crore unorganised workers as of November 2024.
- Data Utilisation: Facilitates targeted policy-making and scheme execution.

Future Prospects:

- Expanding Social Security: Adding more schemes to cover broader benefits.
- Skill Development: Enhanced focus on apprenticeship opportunities.
- Policy Formulation: Leveraging worker data for designing tailored policies.

National Digital Communication Policy, 2018 and its key developments

Overview

- Launch Year: 2018
- Vision: To establish a resilient, secure, accessible, and affordable digital communication infrastructure.
- Objective: Digital empowerment and vibrant digital ecosystem.

Relevance : GS 2 (Governance)

Key Achievements (2018–2024)

Infrastructure Expansion:

- Optical Fiber Cable Network: 17.5 lakh km (2018) → 41.9 lakh km (2024).

- Base Transceiver Stations: 19.8 lakh (2018) → 29.4 lakh (2024).

Broadband and Mobile Connectivity:

- Villages with Mobile Connectivity: 6,22,840 of 6,44,131 villages (2024).
- Broadband Subscribers: 48 crore (2018) → 94 crore (2024).
- Data Usage: 8.32 GB/month (2018) → 21.30 GB/month (2024).
- Tariff Reduction: ₹10.91/GB (2018) → ₹8.31/GB (2024).

Digital Bharat Nidhi (formerly USOF):

- BharatNet expansion: ₹1,39,579 crore for broadband to 2.64 lakh Gram Panchayats and 3.8 lakh villages.

Satellite Communication Reforms (2022)

- Simplified regulatory framework.
- Encouraged private sector participation in satellite systems.
- Connected 5,474 Gram Panchayats via satellites.
- Defined methodology for assigning spectrum for satellite-based services under Telecommunications Act, 2023.

Regulatory Reforms

TRAI's Role:

- Established in 1997 as an independent regulator.
- Issued directives to promote competition and transparency.

Impact

- Improved digital inclusivity and affordability.
- Accelerated deployment of 5G services.
- Enabled remote and underserved area connectivity through satellite.

National Cooperative Policy

Overview

- Ministry Formation: July 2021, operating under Cooperative Federalism principles.
- Objective: Strengthen rural cooperatives without infringing on state autonomy.

Relevance:GS 2 (Governance)
Key Developments

- National Urban Co-operative Finance and Development Corporation (NUCFDC)
- Established: 2024, as a Type II Non-Deposit Taking NBFC.
- Purpose: Enhance Urban Cooperative Banks (UCBs) through:
- Unified Technology Platform for UCBs to match national-level banks' services.
- Support for regulatory compliance, risk management, and financing.
- Promoting financial stability and resource efficiency.

Legal Framework

- State Cooperative Societies: Governed by respective State/UT laws.
- Multi-State Co-operative Societies (MSCS): Regulated under MSCS Act, 2002.

Major Initiatives (Annexure-I)

Primary Agricultural Credit Societies (PACS) Initiatives

- Computerization of PACS:
- ₹2,516 crore project for ERP-based software linking PACS with NABARD, StCBs, and DCCBs.
- Aims: Efficiency via Common Accounting System (CAS) & Management Information System (MIS).
- Model Bye-Laws for PACS:
- Enables multipurpose activities, inclusive membership, and improved governance.
- Expansion of PACS/ Dairy/ Fishery Cooperatives:
- Establishing new cooperatives in uncovered Panchayats with support from NABARD, NDDB, NFDB, etc.

- Decentralized Grain Storage Plan:
- Warehouses, processing units, and agri-infrastructure at PACS level.
- Convergence of government schemes like AIF, SMAM, PMFME.
- PACS as Common Service Centers (CSCs):
- Offering 300+ e-services like banking, insurance, Aadhaar, health services, etc.

PACS Diversification

- Retail Petrol/Diesel Outlets:
- Inclusion in Combined Category 2 for retail outlet allotments.
- LPG Distributorship:
- PACS eligible for LPG distributorships to expand economic activities.
- PM Bharatiya Jan Aushadhi Kendra:
- Operating Jan Aushadhi Kendras for rural access to affordable generic medicines.
- PM Kisan Samriddhi Kendras:
- PACS to provide fertilizers and related services to farmers.

Other Key PACS Roles

- Micro-ATMs for Financial Inclusion:
- Dairy/Fisheries cooperatives as Bank Mitras with doorstep financial services.
- Convergence with PM-KUSUM:
- Promotion of solar water pumps and photovoltaic module installations.
- O&M of Rural Water Supply Schemes:
- PACS eligible for operations and maintenance under Ministry of Jal Shakti.

Impact

- Strengthened financial and operational framework for UCBs and PACS.
- Enhanced rural employment, financial inclusion, and cooperative diversification.
- Improved governance and transparency in cooperative functioning.
- This policy promotes rural economic development through cooperative empowerment.

India's 100-Day TB Elimination Campaign

Context : On December 7, 2024 Ministry of Health launched the "100-day TB elimination campaign" to accelerate TB elimination efforts .
Relevance:GS 2(Health)

Objectives

- Accelerate TB Elimination by 2025 (ahead of the global SDG goal of 2030).

Focus on:

- Improved case detection
- Reduced diagnostic delays
- Enhanced treatment outcomes for vulnerable populations

Scope of Campaign

- Coverage: 347 districts in 33 states and UTs
- Aligned with:
- National TB Elimination Programme (NTEP)
- National Strategic Plan (NSP) for TB Elimination (2017–2025)

Achievements Under NTEP (2015–2023)

- Reduction in TB Incidence:
- From 237 per 100,000 (2015) to 195 per 100,000 (2023)
- Decline: 17.7%
- Decline in TB-Related Deaths:
- From 28 per lakh population (2015) to 22 per lakh population (2023)
- Decline: 21.4%
- Diagnostics in 2023:

- 1.89 crore sputum smear tests
- 68.3 lakh nucleic acid amplification tests
- Expansion of TB Preventive Treatment (TPT): Beneficiaries increased to 15 lakh.

Strategic Interventions

- Case Detection and Diagnostics:
- Target high-burden and vulnerable populations.
- Use Ayushman Aarogya Mandirs for grassroots-level access.
- Treatment and Support:
- Emphasis on shorter oral regimens for drug-resistant TB (DR-TB).
- Ni-kshay Poshan Yojana:
- ₹2,781 crores disbursed for nutritional support to 1 crore beneficiaries.
- Integration of PMTBMBA for comprehensive care of household contacts.
- Community Engagement:
- Over 1.5 lakh Ni-kshay Mitras involved in awareness campaigns.
- Engagement of ASHA workers, TB champions, and caregivers under the Ni-kshay SAATHI model.
- Integrated Care:
- Focus on co-morbidities
- Malnutrition, Diabetes, HIV, Substance Abuse

India's International Commitment

- Aligned with UN SDGs: End TB by 2025.
- Supports Gandhinagar Declaration (2023): Regional collaboration for TB elimination.

Way Forward

- Enhanced Infrastructure: Leverage existing health systems for diagnostics and treatment.
- Continued Political Will: Strengthen policy support for TB-free India.
- Community-Centric Approach: Sustain engagement with local leaders and stakeholders.

Impact of Climate Change on Agriculture

Climate change threatens agriculture by disrupting productivity, livelihoods, and food security .
Relevance: GS 3 (Environment)
Challenges :

- Climate change significantly affects agriculture, including crops, livestock, horticulture, and fisheries.
- Extreme weather conditions like droughts, floods, heatwaves, and frost are major concerns.

Policy Framework:

- National Action Plan on Climate Change (NAPCC): Initiated in 2008 to develop strategies for ecological sustainability and adaptation.
- National Mission for Sustainable Agriculture (NMSA): Focuses on enhancing climate resilience in agriculture.

National Innovations in Climate Resilient Agriculture (NICRA):

- Flagship project by ICAR studying climate impacts on agriculture and promoting climate-resilient technologies.

Outcomes:

- 2593 new crop varieties released (2014-2024), 2177 stress-tolerant.
- District-level vulnerability assessment for 651 agricultural districts.
- Identification of 310 vulnerable districts, including 109 as "very high" and 201 as "highly" vulnerable.
- Preparation of District Agriculture Contingency Plans (DACPs).
- Initiation of 448 Climate Resilient Villages (CRVs) in 151 districts across 28 states/UTs.

Capacity Building for Farmers:

- Awareness and training programs on climate-resilient practices.
- Demonstration of location-specific technologies in CRVs.

Key Government Schemes Under NMSA:

- Per Drop More Crop (PDMC): Micro-irrigation (drip and sprinkler) to improve water efficiency.
- Rainfed Area Development (RAD): Integrated Farming System (IFS) approach to enhance productivity and reduce climate risks.
- Mission for Integrated Development of Horticulture (MIDH): Focused on climate-resilient horticulture.
- National Bamboo Mission & Agroforestry: Promote sustainable farming practices.

Risk Mitigation and Insurance:

- Pradhan Mantri Fasal Bima Yojana (PMFBY): Comprehensive insurance against crop failures due to natural calamities.
- Weather-Based Crop Insurance Scheme (RWBCIS): Offers financial support for adverse weather-related losses.

Parliament Question Effects of Climate Change

Intro: India's climate action focuses on increasing forest cover, renewable energy, and addressing regional disparities to align with global sustainability goals.

Relevance:GS 3(Environment)

Forest Cover :

- Total forest cover in India (as per ISFR 2021): 7,13,789 sq. km.
- Net increase since ISFR 2019: 1,540 sq. km.

Contributing factors for the increase:

- Conservation measures.
- Afforestation programs.
- Restoration of degraded lands.

Regional Trends:
States with Increase in Forest Cover:

- Andhra Pradesh: +647 sq. km.
- Telangana: +632 sq. km.
- Odisha: +537 sq. km.
- Karnataka: +155 sq. km.
- Kerala: +109 sq. km.

States with Decrease in Forest Cover:

- Arunachal Pradesh: -257 sq. km.
- Manipur: -249 sq. km.
- Nagaland: -235 sq. km.
- Mizoram: -186 sq. km.
- Meghalaya: -73 sq. km.
- Reasons for decline: Natural calamities, anthropogenic pressures, and shifting cultivation.
- National Action Plan on Climate Change (NAPCC): Focuses on solar energy, sustainable habitat, agriculture, health, and forestry (Green India Mission).

India's renewable energy progress:

- Non-fossil fuel-based energy constitutes 46.52% of installed capacity (as of October 2024).
- Target: 50% by 2030.

Implications:

- India's afforestation effort is in sync with Sustainable Development Goal (SDG) 15: Life on Land.
- Inclusive climate action demands addressing of regional disparity.
- Strong global finance mechanism is need of the hour.

From Spices to Sustainability

Intro: Geographical Indication (GI) tags plays great role in preserving and promoting the cultural, agricultural, and economic heritage of North East India.

Relevance: GS 2(Governance)

Vision and Initiative

- Prine Minister vision connects North East India with the trinity of Emotion, Economy, and Ecology, aligning with sustainable and inclusive growth.
- Ashtalakshmi 2024 celebrates the rich diversity, resilience, and heritage of the region.

Role of GI Tags

- GI tags safeguard traditional practices, support local economies, and enhance global recognition for products.
- They promote sustainable economic growth while preserving the unique identity of each region.

Product Highlights by State

- Arunachal Pradesh:
- Adi Kekir Ginger: Known for medicinal properties, embodies traditional organic farming.
- Other GI products: Wakro Orange, Monpa Maize.
- Sikkim:
- Dalle Khursani (red chili): A livelihood source for 5,000+ families.
- Other products: Large Cardamom, Temi Tea, Sikkim Orchids, Sikkim Orange.
- Nagaland:
- Naga King Chilli (Raja Mircha): Among the hottest chilies globally, supports small-scale cultivation.
- Other products: Naga Tree Tomato, Chak Hao rice, Naga Cucumber.
- Assam:
- Kaji Nimu (lemon): Essential for Assamese cuisine and traditional remedies.
- Other products: Tezpur Litchi, Joha Rice, Bodo spices, Boka Chaul rice.

Cultural and Economic Impact

- Products embody sustainability, skilled craftsmanship, and community empowerment.
- GI tags elevate the market value, ensuring global recognition and fostering economic resilience.

Future Prospects

- The GI initiative aligns with India's goals for health and sustainability.
- Emphasis on expanding global reach and strengthening the local economy through organic farming and sustainable practices.

Strengths:

- Focuses on sustainable development and community empowerment.
- Recognizes the untapped potential of North East India's agricultural diversity.

Challenges:

- Requires effective marketing and infrastructure to maximize the benefits of GI-tagged products.
- Addressing socio-economic disparities within the region remains crucial.

Paramparagat Krishi Vikas Yojana

PKVY aim to boost sustainable agricultural practices, focusing on natural and organic farming .Key objective is to benefit farmers and environment through sustainability.

Relevance: GS 2(Schemes) , GS 3(Agriculture)

Bharatiya Prakritik Krishi Paddhati (BPKP)

- Initiated under Paramparagat Krishi Vikas Yojana (PKVY) in 2019-2020 in 8 states.
- Area sanctioned under BPKP (2020-21): Total: 409,400 ha
- Largest areas: Andhra Pradesh (1,00,000 ha), Madhya Pradesh (99,000 ha).
- Maharashtra has not opted for BPKP but conducted 578 training sessions under organic farming.
- Training and beneficiary data are maintained at the state level.

National Mission on Natural Farming (NMNF)

- Approved on 25th November 2024 as a standalone centrally sponsored scheme.

Objectives:

- Target to convert 1 crore farmers to natural farming.
- Cover 7.5 lakh ha under natural farming.

Paramparagat Krishi Vikas Yojana (PKVY)

- Provides end-to-end support to organic farmers, including production, certification, marketing, and branding using a cluster approach.

Financial assistance:

- ₹31,500/ha for 3 years, including:
- ₹15,000/ha for organic inputs (direct to farmers).
- ₹4,500/ha for marketing and branding.
- ₹3,000/ha for certification.
- ₹9,000/ha for training and capacity building.

Achievements (2015-2024):

- 14.99 lakh ha covered under organic farming.
- Developed 52,289 clusters with 25.30 lakh farmers.
- 8 states developed their own brands for organic products.

State-Wise Progress (PKVY)

- Top states in area covered: Andhra Pradesh (3,60,805 ha), Uttar Pradesh (1,71,184 ha), Rajasthan (1,48,500 ha).
- Top states in farmers benefitted: Andhra Pradesh (7.46 lakh), Uttar Pradesh (2.73 lakh).
- Total (2015-2024): Area: 14,98,583 ha and Farmers: 25.30 lakh.

Yuva Sahakar Scheme

Objective:

- Promote new cooperative societies with innovative ideas.
- Encourage young entrepreneur cooperatives operating for at least 3 months.

Relevance: GS 2(Scheme)

Features:

- Loan Tenure: Long-term loans up to 5 years.
- Interest Subvention: 2% on NCDC's term loan interest.
- Subsidy Convergence: Can combine with other GoI scheme subsidies.

Current Status (as of 30/11/2024):

- Funds sanctioned: ₹4,734.97 lakh.
- Funds disbursed: ₹294.44 lakh.
- Himachal Pradesh and Andhra Pradesh: No proposals received.

Initiatives

Strengthening PACS:

- Model Byelaws: 32 States/UTs aligned.
- Computerization: 67,930 PACS onboarded onto ERP software.
- Multipurpose PACS: 8,823 new cooperatives set up since 2023.

Agricultural & Rural Development:

- Grain Storage Plan: Decentralized warehouses and agri-infrastructure at PACS.
- PMKSK: 36,180 PACS operating fertilizer centers.
- Micro-ATMs: 7,446 distributed in Gujarat for doorstep banking.
- FFPOs: 70 Fish Farmer Producer Organizations registered.

Economic Diversification of PACS:

- Retail outlets for petrol/diesel and LPG distributorships.
- PM Bharatiya Jan Aushadhi Kendras: 755 PACS ready to operate.

White Revolution 2.0:

- Goals: Increase milk procurement by 50%, improve women's empowerment, and promote dairy cooperatives.
- Collaboration: NDDB & Ministry of Cooperation.

Urban & Rural Cooperative Banks:

- Expanded Lending: Housing loan limits doubled for UCBs and increased to ₹75 lakhs for Rural Cooperative Banks.
- Diversification: Lending allowed for commercial real estate and residential housing.
- Doorstep Banking: UCBs enabled for home-based financial services.

Impact of These Measures

- Enhanced rural and cooperative banking.
- Diversified income sources for PACS.
- Reduced agricultural wastage and improved farmer incomes.
- Better access to credit and market linkages.
- Empowered women and promoted self-reliance.

Waste Not, Celebrate More: The 25th Hornbill Festival Paves the Way for Sustainability!

- The 25th Hornbill Festival, known as the "Festival of Festivals," has adopted sustainability by going Zero-Waste and Single-Use Plastic (SUP)-Free.

Relevance: GS 1(Culture) , GS 3(Environment)

- This year's festival, celebrated in Nagaland, aimed to harmonize cultural celebration with environmental conservation.

Zero-Waste and SUP-Free Initiatives:

- All single-use plastics, including straws, disposable plates, cups, and plastic bags, were banned.
- Vendors were required to use sustainable alternatives like bamboo straws, biodegradable cutlery, leaf-based plates, and paper bags.
- Enforcement teams and volunteers ensured compliance, monitored usage, and educated attendees about eco-friendly choices.

Waste Management Practices:

- A comprehensive waste management system was established with waste segregation at the source.
- Dedicated bins for wet, dry, and recyclable waste, along with trained volunteers to guide disposal.
- On-site composting units handled wet waste, producing compost for local agriculture.

Circular Economy and Community Engagement:

- Food stalls used reusable or compostable utensils, and water refilling stations encouraged visitors to bring their own reusable bottles.
- 42 toilets were installed with strict maintenance schedules.
- Informative and interactive IEC campaigns promoted sustainable behavior among attendees.

Environmental Impact:

- Approximately 1 lakh SUP items were prevented daily, totaling around 1 million fewer items over the 10-day festival.
- The initiative avoided over 50 metric tons of CO_2 emissions, reducing the festival's carbon footprint.
- Local sourcing of eco-friendly materials contributed to a decrease in transportation-related emissions.

Global Model for Eco-Friendly Events:

- The Hornbill Festival's success in adopting zero-waste measures can serve as a model for similar events worldwide.
- The festival's commitment to sustainability aligns with global climate goals .

Parliament Question: Enhancing Complaint Redressal Through CPGRAM

CPGRAMS

- The Centralized Public Grievance Redress and Monitoring System (CPGRAMS) is an online platform available 24/7 for Indian citizens to lodge grievances related to service delivery by public authorities.

Relevance: GS 2(Governance)

- Accessibility: Citizens can access CPGRAMS through its website, a standalone mobile application, or via the UMANG app.
- Grievance Submission: Users can file complaints against any government department or institution. Each complaint is given a unique registration ID for tracking.
- Tracking and Appeals: The status of grievances can be tracked using the registration ID. If the resolution is unsatisfactory, citizens can provide feedback and file an appeal.
- Role-Based Access: Different ministries and states have role-based access to the system, ensuring that grievances are directed to the appropriate authorities for resolution

Impacts :

CPGRAMS Grievances Redressed:

- 1,12,30,957 grievances were addressed over five years (from January 1, 2020, to October 30, 2024).
- 23,24,323 grievances were redressed in 2024 (from January to October), setting an annual high.

CPGRAMS Reforms:

- The Government implemented the 10-step reforms of CPGRAMS to make the grievance process timely, meaningful, and accessible to citizens.
- 103,183 Grievance Officers were mapped on the portal, reducing the pendency in the Government of India to 54,339 Public Grievances as of October 31, 2024.

Guidelines and Feedback:

- Comprehensive Guidelines for effective grievance redressal were issued on August 23, 2024, integrating various platforms, establishing dedicated grievance cells, appointing experienced nodal officers, and emphasizing root cause analysis and feedback action.
- A Feedback Call Centre, operational since July 2022, has conducted 18,71,754 surveys to gather citizen feedback across multiple languages.

Intelligent Grievance Management System (IGMS):

- An MoU with IIT Kanpur led to the development of the IGMS, an AI/ML-enabled system that supports semantic search, exploratory analysis, and predictive insights, enhancing grievance redressal and citizen engagement.

CPGRAMS: 3 Years, 70 Lakh Grievances Solved

Context: The Centralized Public Grievance Redress and Monitoring System (CPGRAMS), developed by the Department of Administrative Reforms and Public Grievances (DARPG), is an online platform aimed at efficient grievance redressal.

Relevance : GS 2 (Governance)

Major Achievements (2022-2024):

- Grievances Resolved: Over 70 lakh grievances addressed effectively.
- Coverage:
- 92 Central Ministries/Departments & 36 States/UTs.
- 96,295 organizations mapped with 73,000+ active users.
- Timeline Reduced: Grievance redressal timeline reduced from 30 to 21 days.
- Milestones:
- December 2024: Fourth Sushasan Saptah resolved 3.44 lakh grievances through CPGRAMS and 14.84 lakh grievances on state portals.

Reforms & Innovations:

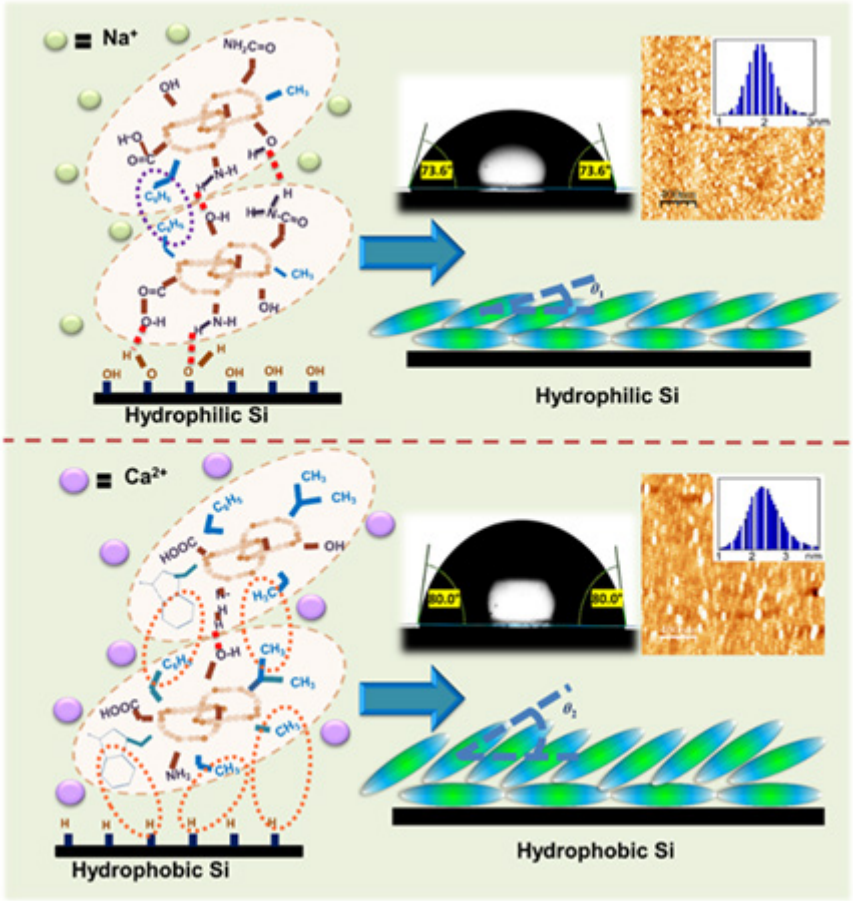
- Policy Guidelines 2024:
- Transparency, efficiency, and accountability emphasized through a 10-step reform process.
- Key Features:
- Grievance Cells & Nodal Officers in each Ministry/Department.
- Feedback Mechanism: Poor feedback triggers an appeal option.
- Grievance Redressal Index: Monthly rankings for performance tracking.
- AI-Powered Tools: Tree Dashboard analyzes grievances & feedback.
- NextGen CPGRAMS (Launching July 2025):
- Filing via WhatsApp/Chatbot.
- Features like voice-to-text, instant alerts, and auto-escalation.
- Machine learning-enabled auto-replies for officers.

Global Recognition:

- Highlighted at the Third Pan-Commonwealth Heads of Public Service Meeting (April 2024) as a model for effective governance.
- Case Study: Swift grievance redressal like reinstating a delayed electricity connection showcases the platform's citizen-centric impact.

Fabrication of Lysozyme Bilayers In Presence of Ions Can Mimic Biological Protein Absortion on Inserted Implants

Context: A research group at the Institute of Advanced Study in Science and Technology (IASST), Guwahati has developed stabilized lysozyme bilayers on silicon surfaces to mimic ion-mediated protein adsorption in living organisms. This innovation has significant implications for enhancing the functionality of implants and biomaterials.
Relevance : GS 3 (Science and Technology)



Features of the Research:
Lysozyme as a Model Protein:

- Found in tears, sweat, milk, and saliva.
- Contains four disulfide bonds essential for biological processes.

Ion-Mediated Adsorption:

- Experiment conducted on hydrophilic and hydrophobic silicon surfaces.
- Stabilization achieved in the presence of ions:
- Monovalent (Na*)
- Divalent (Ca^{2*})
- Trivalent (Y^{3*})

Protein Orientation:

- Bottom layer: Lysozyme in side-on orientation.
- Upper layer: Molecules in side-on or tilted orientation.

Stabilization Mechanism:

- Driven by hydrogen bonding, hydrophobic, and electrostatic interactions.
- Competing interactions result in:
- Native globular form on hydrophilic surfaces.
- Elongated structure on hydrophobic surfaces.

Significance of the Research:
Biomedical Applications:

- Mimics real biological processes for implants.
- Enhances ion-mediated protein-surface interactions for biomaterials.

Surface Properties:

- Increased lysozyme adsorption leads to higher contact angles, improving implant compatibility.

Room Temperature Fabrication:

- Simplifies the process for practical applications.

Publication:

- Published in the New Journal of Chemistry (Royal Society of Chemistry).

Mission Mausam

Introduction :

- Launch: September 2024 by the Ministry of Earth Sciences (MoES).
- Goal: Position India as a global leader in weather and climate science.
- Focus Areas: Enhance forecasting and climate resilience in agriculture, disaster management, and rural development.
- Key Institutions: India Meteorological Department (IMD), National Centre for Medium-Range Weather Forecasting (NCMRWF).

Relevance : GS 3 (Environment, Technology)

Need for Mission Mausam:

- Agrarian Economy: Erratic rainfall patterns, intensified by climate change, affect farming. Improved monsoon forecasting can help optimise sowing, irrigation, and crop yields.
- Disaster Preparedness: enhanced weather predictions can help reduce casualties and economic losses during extreme weather events like cyclones and floods,.
- Rural Development: Accurate weather forecasts assist in water resource management, livestock protection, and infrastructure planning.

Objectives:

- Enhance weather forecasting across various timescales.
- Develop high-resolution models for monsoon behavior predictions.
- Strengthen observational networks (radars, satellites, weather stations).
- Provide actionable advisories for sectors like agriculture, water, and disaster management.
- Build capacity through national and international collaborations.

Implementation Strategy:

- Infrastructure Development: Installation of Doppler Weather Radars (DWRs), Automatic Weather Stations (AWS), and rain gauges.
- Supercomputing Power: Utilize high-performance systems like Pratyush and Mihir for climate modeling.
- Collaborative Research: Partner with global organizations like the World Meteorological Organization (WMO).
- Public Outreach: Provide weather updates through the Mausam app and SMS services.

Current Status:

- Over 37 Doppler Weather Radars installed.
- Mausam app offers location-specific weather forecasts for 450 cities.
- Significant improvements in seasonal predictions under the National Monsoon Mission.
- Specialized programs for urban flooding and cyclone tracking initiated.

Focus on the North-East Region:

- The North-East faces challenges like floods and landslides due to its unique topography and climate. Mission Mausam focuses on:
- Deploying weather observation systems tailored to the region's needs.
- Providing localized forecasts and collaborating with state governments for disaster management.

Challenges:

- Geographical Diversity: Complex region-specific models needed for India's varied terrain.
- Climate Change Uncertainty: Rapid climate changes complicate long-term predictions.
- Infrastructure Gaps: Remote areas still lack adequate weather observation infrastructure.
- Awareness Levels: Ensuring effective use of forecast data by farmers and rural communities.

The MSME Revolution

Introduction :

- Recent years Micro, Small, and Medium Enterprises (MSMEs) have seen a significant rise in their exports, substantial contributions to the GDP, and an increase in the number of exporting units.

Relevance : GS 3 (Economy)

Highlights:

- Rise in Exports:
- MSME exports increased from ₹3.95 lakh crore in 2020-21 to ₹12.39 lakh crore in 2024-25.
- The number of exporting MSMEs rose from 52,849 in 2020-21 to 1,73,350 in 2024-25.
- Contributed 45.73% to exports in 2023-24, increasing to 45.79% by May 2024.
- Contribution to GDP:
- GVA by MSMEs in India's GDP was 29.7% in 2017-18, rising to 30.1% in 2022-23.
- Despite COVID-19 challenges, the sector sustained a 27.3% contribution in 2020-21, rebounding to 29.6% in 2021-22.
- Classification:
- Micro Enterprise: Investment ≤ ₹1 crore; turnover ≤ ₹5 crore.
- Small Enterprise: Investment ≤ ₹10 crore; turnover ≤ ₹50 crore.
- Medium Enterprise: Investment ≤ ₹50 crore; turnover ≤ ₹250 crore.
- From 2020-21 to 2021-22:
- 714 Micro enterprises scaled up to Medium.
- 3,701 Small enterprises upgraded to Medium.
- From 2023-24 to 2024-25:2,372 Micro enterprises scaled up to Medium.17,745 Small enterprises upgraded to Medium.

Importance of MSMEs:

- Economic Impact: MSMEs play a pivotal role in driving economic growth, contributing significantly to exports and GDP.
- Employment Generation: They are crucial for employment generation and entrepreneurship promotion.
- Resilience and Adaptability: MSMEs have shown remarkable resilience and adaptability, even amid economic challenges.
- Innovation and Development: Through innovation and growth, MSMEs foster inclusive development and enhance export competitiveness.

Schemes and Support for MSMEs:

- Prime Minister Employment Generation Programme (PMEGP): Financial assistance for new enterprises.
- Credit Guarantee Fund Trust for Micro & Small Enterprises (CGTMSE): Credit guarantees for MSME loans.
- Credit Linked Capital Subsidy Scheme (CLCSS): Capital subsidies for technology upgradation.
- Pradhan Mantri Mudra Yojana (PMMY): Loans for micro-enterprises.
- SIDBI Make in India Loan for Enterprises (SMILE): Financial assistance for MSMEs.

Kisan Kavach : Bharat's First Anti-Pesticide Bodysuit

- Purpose: Protect farmers from pesticide-related health hazards.
- Launch Date: 17th December 2024.
- Developer: BRIC-inStem (Bangalore) with Sepio Health Pvt. Ltd.
- Inspiration: Farmers' concerns about pesticide exposure led to innovation.

Relevance : GS 3 (Agriculture)

Features of Kisan Kavach

Comprehensive Protection:

- Includes a full-body suit, mask, headshield, and gloves.

Advanced Fabric Technology:

- Neutralizes harmful pesticides via nucleophilic-mediated hydrolysis.
- Technology published in Nature Communications.

Durability:

- Washable, reusable up to 150 washes, lasting about 2 years.

Cost:

- Initial price: ₹4,000 (plans to reduce cost for broader accessibility).

Significance of Pesticides

Need:

- Address 15-25% crop loss due to pests.
- Essential for productivity amid shrinking farmland.

Risks:

- Health hazards due to improper use, especially during mixing and spraying.
- Absorption through skin and other routes can be fatal (442 deaths: 2015–2018).

Government Interventions

Regulations:

- Insecticides Act, 1968 and Rules, 1971: Regulate pesticide use.
- Ban harmful pesticides; enforce penalties.

Promotion of Biopesticides:

- Simplified registration guidelines.
- Types: Bacillus thuringiensis, Trichoderma, neem formulations, etc.

Integrated Pest Management (IPM):

- Preventive and sustainable pest control practices.

Good Agricultural Practices (GAP)

Key Objectives:

- Ensure food safety.
- Promote environmental and economic sustainability.
- Improve working conditions for farmers.

Focus Areas:

- Bio-pesticides and organic farming adoption.
- Reduction in chemical pesticide consumption.

Conclusion

- Innovation: Kisan Kavach represents a breakthrough in safeguarding farmers.
- Future Vision:
- Strengthen biopesticide usage.
- Promote sustainable agriculture to ensure health, safety, and environmental well-being.

JAM(Jan Dhan, Aadhar, Mobile)TRINITY and digital revolution

Relevance : GS 2 (Governance)

JAM Trinity and Digital Revolution

- Components: Jan Dhan, Aadhaar, and Mobile (JAM Trinity).
- Impact:
- Over 54 crore Jan Dhan accounts with ₹2.39 lakh crore deposits (15x increase).
- 37.02 crore RuPay cards issued to account holders.
- Direct Benefit Transfer (DBT) eliminates middlemen, reducing corruption and fake beneficiaries.
- 10 crore fake beneficiaries removed, saving ₹2.75 lakh crore.
- Enhanced financial inclusion with 66% accounts from rural and semi-urban areas.
- Average deposit per Jan Dhan account: ₹4,352.
- Delhi: 65 lakh Jan Dhan accounts, deposits ₹3,114 crore.

Growth in Digital Transactions

- UPI Transactions:
- ₹200 lakh crore in FY 2023-24, a 138% increase from 2017-18.
- 40% of global real-time payments now occur in India.
- Operational in seven countries, boosting remittance flows.

Poverty Alleviation

- 25 crore people lifted out of poverty in the last decade.
- Schemes like PM Ujjwala Yojana benefited 2.59 lakh women.

Ayushman Bharat – PM Jan Arogya Yojana (AB-PMJAY)

- Launch Date: 23rd September 2018.
- Coverage:
- Health cover of ₹5 lakh per family/year for secondary and tertiary hospitalizations.
- Includes ASHA workers, Anganwadi helpers, and senior citizens aged 70+ (since Oct 2024).
- Implemented in 33 States/UTs.
- Statistics (as of 30th Nov 2024):
- 36 crore Ayushman Cards issued.
- 29,929 empaneled hospitals, including 13,222 private hospitals.
- 8.39 crore hospital admissions authorized worth ₹1.16 lakh crore.
- Healthcare Milestone:
- Largest COVID vaccine program with 221 crore doses administered.

Government Achievements

- More than 200 welfare schemes launched in the last 10 years.
- Initiatives under visionary leadership to empower the poor, enhance transparency, and integrate the marginalized into India's rising economy.

Empowering Farmers Through PM-AASHA

- Launched in September 2018 under the Ministry of Agriculture & Farmers Welfare.
- Objective: Ensure remunerative prices for farmers, reduce post-harvest distress, and promote crop diversification towards pulses and oilseeds.

Relevance : GS 3 (Agriculture)

Components:

- Price Support Scheme (PSS): Direct procurement of pulses, oilseeds, and copra.
- Price Deficiency Payment Scheme (PDPS): Price difference paid directly to farmers for oilseeds.
- Market Intervention Scheme (MIS): Addresses price volatility in perishable crops like Tomato, Onion, and Potato (TOP).

Rabi 2023-24 Procurement:

- Pulses:6.41 LMT procured at MSP value of ₹4,820 crore, benefiting 2.75 lakh farmers.
- Breakdown: Masoor (2.49 LMT), Chana (43,000 MT), Moong (3.48 LMT).
- Oilseeds: 12.19 LMT procured at MSP value of ₹6,900 crore, benefiting 5.29 lakh farmers.

Kharif 2024-25 Highlights:

- Soybean prices fell below MSP; 5.62 LMT procured under PSS for ₹2,700 crore, benefiting 2.42 lakh farmers—the highest-ever soybean procurement.

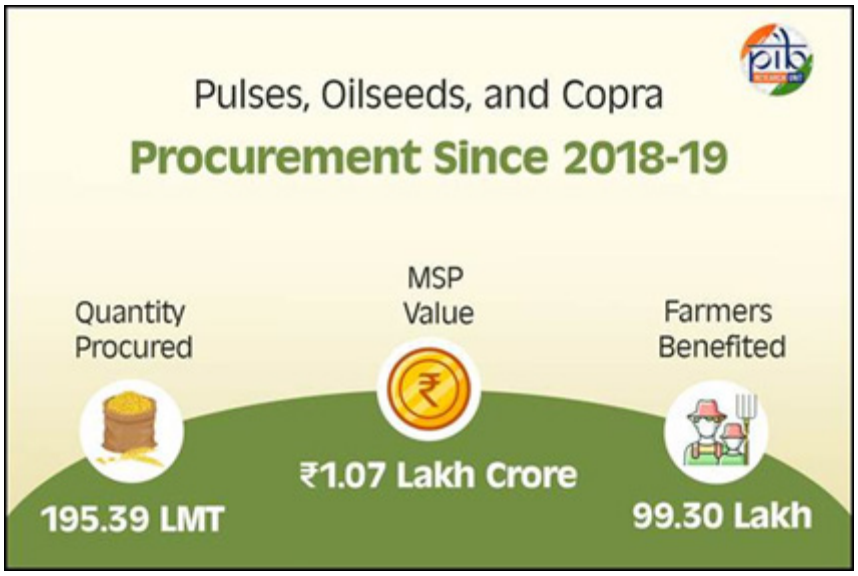
Long-Term Impact:

- Since 2018-19, 195.39 LMT of pulses, oilseeds, and copra procured at MSP value of ₹1,07,433.73 crore, benefiting 99.30 lakh farmers.

Scheme Details:

- Price Support Scheme (PSS):States can procure up to 25% of their production under MSP. Additional procurement capped at 25% of national production.
- Procurement ceiling lifted for Tur, Urad, and Masoor in 2024-25 for achieving self-sufficiency.
- Price Deficiency Payment Scheme (PDPS):Farmers compensated for price difference up to 15% of MSP value.
- Applies to pre-registered farmers selling up to 40% of production in designated markets.
- Market Intervention Scheme (MIS):For perishable crops like TOP (Tomato, Onion, Potato).
- Price stabilization through payments for price differences or transportation cost reimbursements.

Benefits of PM-AASHA:



- Economic Empowerment:Direct income support reduces post-harvest losses and enhances livelihoods.
- Rural economic growth through better price realization for small and marginal farmers.
- Price Stability:Counteracts price volatility and intermediaries' exploitation.
- Balances supply-demand disparities between producing and consuming states.

Government's Commitment:

- Collaboration with state governments and nodal agencies (NAFED, NCCF) for effective implementation.
- Focus on self-reliance in pulses and addressing price disparities in perishable crops.

Parliament Question : Mission MAUSAM

Mission Mausam is a multi-faceted initiative aimed at strengthening India's weather and climate sciences to tackle climate change and extreme weather challenges. Approved by the Union Cabinet, it is funded with an outlay of INR 2,000 crore for two years (2024–2026).

Relevance : GS 2(Schemes) , GS 3(Environment)

Objectives

Boosting Observational Infrastructure:

- Deployment of next-generation Doppler Weather Radars (DWRs), radiometers, and wind profilers.
- Enhanced monitoring using advanced sensors for upper atmosphere and oceanic observations.

Technological Integration:

- Incorporate Artificial Intelligence (AI), Machine Learning (ML), and high-performance computing (HPC).
- GIS-based automated Decision Support Systems for real-time data dissemination.

Improved Forecasting:

- Higher-resolution Earth System Models.
- Accurate prediction of cyclones, monsoons, extreme weather events, and air quality.

Disaster Risk Reduction:

- Impact-based strategies with multi-hazard early warning systems.
- Seasonal forecasting for better disaster preparedness.

Capacity Building:

- Training Earth Sciences professionals.
- Generating public awareness on climate-related risks.

Key Implementing Agencies

- India Meteorological Department (IMD): Weather observation and forecasting.
- Indian Institute of Tropical Meteorology (IITM): Research in atmospheric sciences.
- National Centre for Medium-Range Weather Forecasting (NCMRWF): Advanced numerical weather prediction.

- Supported by other institutions and collaborations with national and international agencies, academia, and industries.

Sectoral Benefits

- Agriculture: Enhanced monsoon and drought predictions.
- Disaster Management: Real-time alerts to reduce loss of life and property.
- Transport & Aviation: Safer air, sea, and road navigation.
- Health & Urban Planning: Improved air quality management and urban resilience.
- Energy & Infrastructure: Data-driven planning for sustainable development.

Strategic Importance

- Tackling Climate Change: Address chaotic weather patterns like localized droughts and flash floods.
- Enhanced Resilience: Improve disaster preparedness and societal adaptation.
- Global Leadership: Strengthen India's role in providing weather and climate services regionally and globally.

Conclusion

Mission Mausam represents a landmark step in building a weather-ready and climate-smart Bharat.

Urban Heat Island Effect on Top Cities

The urban heat island effect is when cities are warmer than surrounding rural areas due to the concentration of buildings, roads, and other infrastructure that absorb and re-emit the sun's heat Urbanisation and Warming in Indian Cities.

Relevance : GS 3 (Environment)

- Urbanisation contributes to warming through:
- Reduced vegetation cover.
- Heat-retaining construction materials.
- Increased energy demands.
- Urban planning and development is a constitutional function of Urban Local Bodies (ULBs) under the 12th Schedule.

Government Initiatives to Address Urban Heat Islands (UHIs)

Atal Mission for Rejuvenation and Urban Transformation (AMRUT):

- AMRUT (Phase I):2,429 park projects worth ₹5,044.28 crore developed, adding 5,044 acres of green space.
- AMRUT 2.0:1,729 park projects worth ₹1,027.62 crore approved.3,078 water body rejuvenation projects worth ₹6,159.29 crore approved.

Policy Guidelines by Ministry of Housing and Urban Affairs (MoHUA)

- Model Building Bye-Laws (MBBL), 2016: Addendum on "India Cooling Action Plan, 2019" issued as an

advisory to states.
- Urban Green Guidelines, 2014: Guidance for creating green spaces in urban areas.
- Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines:
- Advocates a Compact and Green City approach to increase open/green spaces and reduce urban heat islands.

Climate Smart Cities Assessment Framework (CSCAF), 2019
- Focuses on energy efficiency, water and waste management, green cover, and climate adaptation.
- Key Findings from Cities Readiness Report 3.0:
- 95 cities have disaster management plans with Hazard Risk, Vulnerability, and Capacity Assessments.
- 85 cities meet the green cover norm of more than 12%.
- 76 cities have allocated budgets for rejuvenation of water bodies and open areas.
- 41 cities have developed or are developing Climate Action Plans.

Climate Change and Temperature Trends
- IPCC Synthesis Report (2023):
- Human activities are the primary cause of global warming.
- Global surface temperature reached 1.1°C above pre-industrial levels (2011–2020).
- India's National Temperature Trend:
- From 1901–2022, the annual mean temperature in India increased by 0.64°C per 100 years (TNC Report, 2023).

Government Initiatives for the Promotion of Biofuels

Intro : Biofuels are liquid, gaseous, or solid fuels that come from renewable biological sources, such as plants, algae, and animal products

Relevance : GS 3 (Environment)

Government Initiatives for the Promotion of Biofuels

The Government, since 2014, has taken several measures to enhance blending of ethanol in petrol. These include:
- Expansion of feedstock for ethanol production.
- Administered price mechanism for procurement of sugarcane-based ethanol under the Ethanol Blended Petrol (EBP) Programme.
- Lowered GST rate to 5% on ethanol for the EBP Programme.
- Ethanol Interest Subvention Schemes (EISS) (2018-22) for ethanol production from molasses and grains.
- Long Term Offtake Agreements (LTOAs) by Oil Marketing Companies (OMCs) with Dedicated Ethanol Plants (DEPs).
- Notification of "Pradhan Mantri JI-VAN Yojana" (2019, amended in 2024) to provide financial support for Advanced Biofuels projects using lignocellulosic biomass and other renewable feedstock.
- Guidelines for sale of biodiesel for blending with high-speed diesel for transportation purposes (2019).
- Reduction in GST rate for biodiesel procurement for blending programmes from 12% to 5%.
- Amendment in the National Policy on Biofuels (2018) mandating 5% blending of biodiesel in diesel.

Promotion of Compressed Biogas (CBG):
- Financial assistance to CBG producers for biomass aggregation machinery and pipeline infrastructure.
- Mandated sale of CBG in Compressed Natural Gas (Transport) and Piped Natural Gas (Domestic) segments.

Ethanol Blended Petrol (EBP) Programme Achievements (2023-24) (as of 30.09.2024):
- Payment of approximately Rs 23,100 crore to farmers.
- Savings of more than Rs 28,400 crore in foreign exchange.
- Substitution of more than 43 lakh metric tonnes of crude oil.
- Net reduction of about 29 lakh metric tonnes of CO_2 emissions.

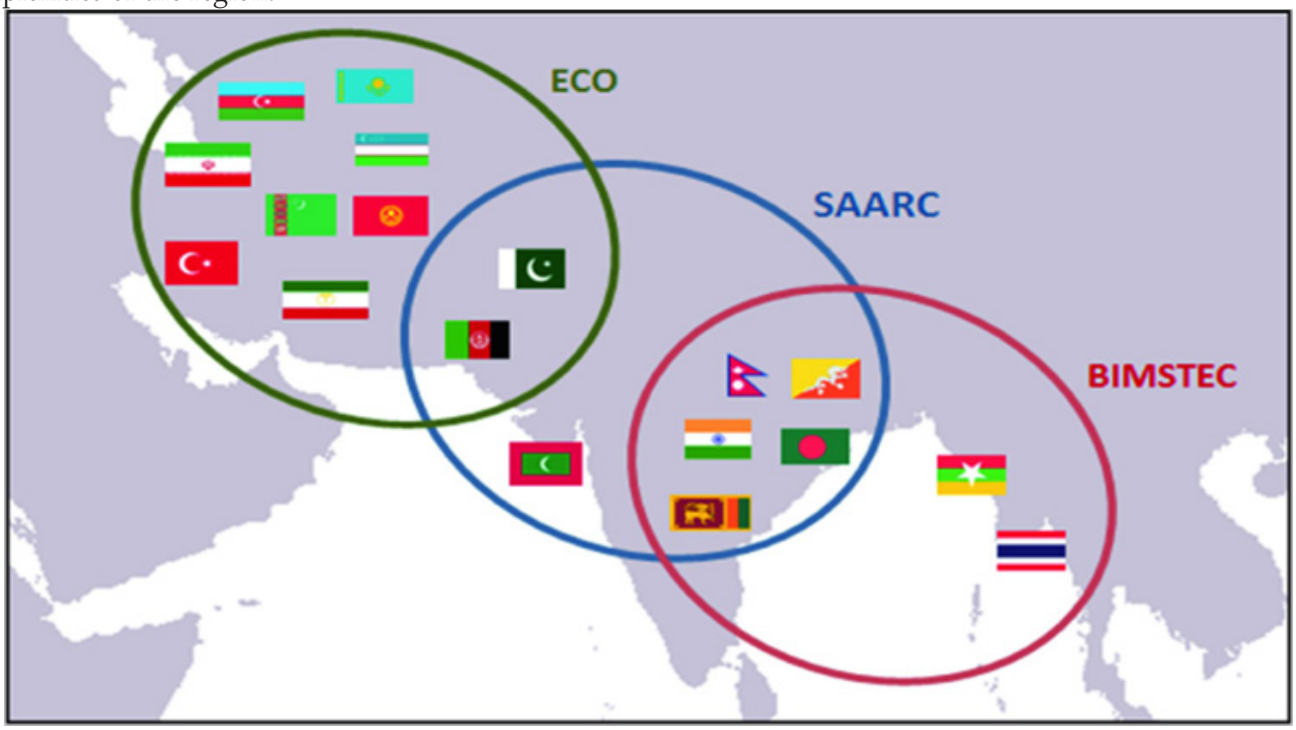
Chapter-
8

INTERNATIONAL RELATION

South Asian Economic Union

Context:

The South Asian Economic Union (SAEU) remains an aspirational vision amidst the geopolitical and economic complexities of the region.



What is the South Asian Economic Union?

- Definition: The SAEU is a long-term vision of the South Asian Association for Regional Cooperation (SAARC) to integrate the economies of its eight member states: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.
- Objective: To enhance regional trade, investment, connectivity, and economic cooperation through phased integration of markets.
- Foundation: Built on agreements like SAFTA (2006), aimed at reducing tariffs and promoting free trade among members.
- Pillars of Integration: Regional market integration, cross-border connectivity, energy cooperation, and private sector liberalization (ADB Report).

Data on Trade Among SAARC Members:

- Intra-regional trade share: Accounts for less than 5% of formal trade among SAARC nations.
- India's dominance: India contributes 73% of intra-regional exports but only 13% of imports, highlighting trade imbalances.
- Smaller members' reliance: Bhutan, Afghanistan, and Nepal rely heavily on intra-regional exports, with shares of 82%, 67%, and 71%, respectively.
- Trade barriers: Complex non-tariff barriers (NTBs) and safeguard measures limit trade liberalization under SAFTA.

Role of BIMSTEC in Asian Economic Union:

1. Regional Connectivity: BIMSTEC bridges South and Southeast Asia, promoting trade and connectivity through infrastructure projects like the BIMSTEC Master Plan for Transport Connectivity.

2. Economic Cooperation: Facilitates free trade agreements and sectoral collaborations, including energy, tourism, and technology, contributing to regional economic integration.

Role of SAARC in Asian Economic Union:

1. Trade Liberalization: SAARC established the South Asian Free Trade Area (SAFTA) to reduce tariffs and promote intra-regional trade, a critical step towards economic integration.
2. Policy Harmonization: Encourages member states to align trade and economic policies, creating a foundation for a unified market within South Asia.

India's Initiatives to Enhance Economic Cooperation

- Neighbourhood First Policy: Focuses on strengthening economic ties with SAARC nations through bilateral and multilateral agreements.
- India-Sri Lanka Cooperation: Expansion of the India-Sri Lanka Free Trade Agreement and development of Trincomalee as an energy hub.
- Energy Connectivity: Projects like the Bangladesh-Bhutan-India-Nepal (BBIN) energy grid to enhance regional power trade.
- Infrastructure Initiatives: Kaladan Multimodal Transit Transport Project and road corridors to improve trade connectivity with Myanmar and Bangladesh.
- Digital Connectivity: India's push for digital infrastructure and e-governance projects in neighboring countries to boost trade facilitation.

Challenges to the South Asian Economic Union:

- Political tensions: Conflicts between India and Pakistan, and differing alignments like Nepal's engagement with China's Belt and Road Initiative.
- Trade imbalances: India's export dominance and limited imports from other SAARC nations create economic disparities.
- Non-tariff barriers: Restrictive policies and lack of harmonized trade regulations limit regional trade growth.
- Infrastructure gaps: Poor transport and logistics infrastructure hinders effective cross-border trade.
- Economic disparity: Divergent economic policies and levels of development among SAARC members complicate integration efforts.

Way Ahead:

- Strengthen SAFTA: Revise and simplify trade agreements to eliminate non-tariff barriers and encourage fair trade practices.
- Boost connectivity: Invest in regional transport corridors, energy grids, and digital infrastructure to facilitate smoother trade and investment flows.
- Resolve political issues: Encourage multilateral dialogues to address geopolitical tensions and foster trust among SAARC nations.
- Leverage private sector: Involve businesses to drive innovation and investments in regional integration projects.
- Promote inclusivity: Focus on equitable policies to address trade imbalances and ensure smaller nations benefit from integration efforts.

Conclusion:

The vision of a South Asian Economic Union holds transformative potential for the region. However, achieving this goal requires addressing deep-rooted political and economic challenges through sustained efforts and cooperation. A phased and inclusive approach could gradually turn this distant dream into a reality, fostering growth and stability across South Asia.

African Union Stabilization and Support Mission in Somalia (AUSSOM)

Context:

The United Nations Security Council (UNSC) has authorized the African Union Stabilization and Support Mission in Somalia (AUSSOM), effective from January 1, 2025.

About African Union Stabilization and Support Mission in Somalia (AUSSOM):

- Full form: African Union Stabilization and Support Mission in Somalia.
- Established by: United Nations Security Council (UNSC) in collaboration with the African Union (AU).
- Aim: To stabilize Somalia by supporting its security infrastructure, addressing terrorism threats, and fostering sustainable peace and development.
- **Features:**
  - Transition from Anti-Terrorism Focus: Replaces the AU anti-terrorism operation with broader stabilization goals.
  - Scalable Peacekeeping Force: Ensures a sustainable and effective security presence while considering funding limitations.
  - Global Collaboration: Backed by international partners like the EU and the U.S., despite their funding concerns.

About Somalia:

- Location: Located in the Horn of Africa, Eastern Africa.
- Capital: Mogadishu.
- Neighbours: Ethiopia, Djibouti, and Kenya; coastline along the Indian Ocean.
- **Geographic Features:**
  - Rivers: Jubba and Shabelle are the major rivers, supporting agriculture.
  - Mountains: The Cal Madow and Karkaar ranges dominate the northern region.
  - Plateaus: Features plateaus and flatlands, including the Haud Plateau.
  - Climate: Predominantly arid and semi-arid, with drought-prone regions.

Underwater Cable

Context:

India is strengthening its digital connectivity with the launch of two new undersea cables, India Asia Xpress (IAX) and India Europe Xpress (IEX).

About Underwater Cables:

What it is: Fiber-optic cables laid under the ocean to transmit data at high speeds globally.

- **New Cables:**
  - o IAX: Connects Chennai and Mumbai with Singapore, Thailand, and Malaysia.
  - o IEX: Connects Chennai and Mumbai with France, Greece, Saudi Arabia, Egypt, and Djibouti.
- **How they work:**
  - o Fiber-optic technology transmits data using laser beams through thin glass fibres.
  - o Protected by layers of insulation, plastic, and steel wires.
  - o Buried under seabed near shores; laid directly on the ocean floor in deep sea.

Features:

- Depth and Placement: Buried near shores; placed directly on seabed in deep waters.
- Data Capacity: Can carry up to 224 Tbps in new-generation cables.
- Durability: Protected with multiple layers; routed to avoid fault zones, fishing areas, and anchors.
- Speed: Faster and more cost-efficient than satellite communication for large-scale data transfer.

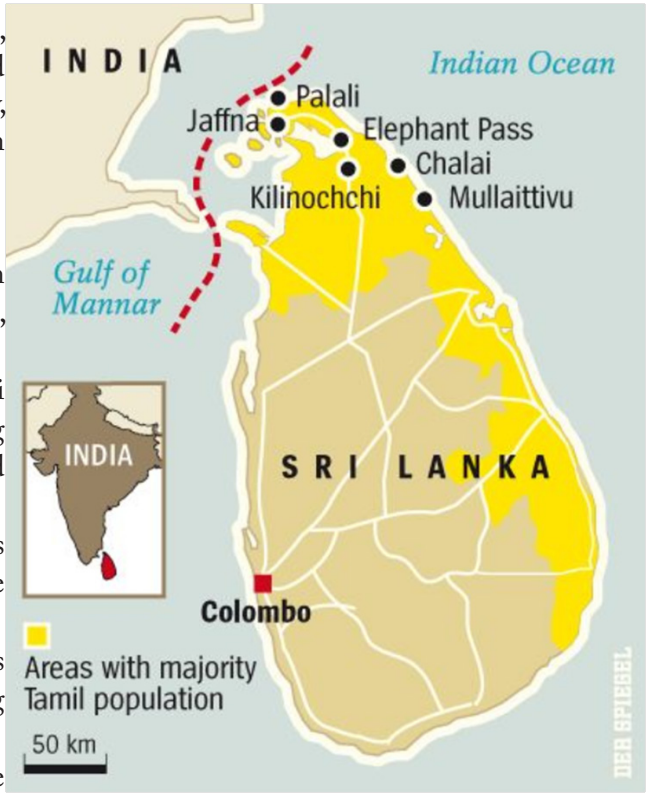
Why Underwater Cables over Satellites?

- Higher Capacity: Cables handle far more data than satellites.
- Cost-Effective: Cheaper on a bit-for-bit basis for large-scale data transfer.
- Reliability: More stable connections compared to satellites, especially for high-volume data

India and Sri Lanka

Context:

India and Sri Lanka share a long history of cultural, economic, and strategic ties. Recent developments have strengthened bilateral cooperation, particularly in trade, defence, and energy, amid concerns about geopolitical influences in the Indian Ocean region.



Historical Background and Agreements:

- Cultural Ties: Rooted in Buddhism, which spread from India to Sri Lanka during Emperor Ashoka's reign, fostering deep religious and historical connections.
- Post-Independence Relations: India supported Sri Lanka during its early nation-building years, including the Indo-Sri Lanka Agreement of 1987, which aimed to resolve the Tamil issue through autonomy.
- Civil War Era: Relations soured due to India's involvement through the Indian Peacekeeping Force (IPKF) and tensions over LTTE activities.
- Post-Civil War: India supported reconstruction efforts post-2009, aiding Tamil communities and addressing human rights concerns.
- Trade Relations: The India-Sri Lanka Free Trade

Agreement (ISFTA) signed in 2000 boosted bilateral trade, with India emerging as Sri Lanka's largest trading partner.

Recent outcomes of the meeting:

1. Economic Cooperation: Agreements on energy connectivity, including a multi-product petroleum pipeline and electricity grid integration.
2. Defence Commitments: Assurance from Sri Lanka to prevent its territory from being used against India's security.
3. Development Projects: Initiatives like the Indian Housing Project and renewable energy efforts targeting Tamil areas.
4. Regional Stability: Reaffirmation of mutual goals through the Colombo Security Conclave to enhance maritime security.

Significance of India-Sri Lanka Relations:

1. Strategic Location: Sri Lanka's position in the Indian Ocean makes it crucial for securing Sea Lanes of Communication (SLOCs).
2. Maritime Security: Ports like Hambantota are vital for regional stability amid rising Chinese influence.
3. Economic Collaboration: Trade, investment, and energy partnerships are key to regional development.
4. Cultural and People-to-People Ties: Shared history fosters goodwill and cooperation in areas like education and heritage conservation.

Concerns in India-Sri Lanka Relations:

1. Chinese Influence: Projects like Hambantota Port and Colombo airport raise security concerns.

E.g. Chinese naval vessel docking incidents in Sri Lankan waters.

1. Fishing Disputes: Indian fishermen's arrests in the Palk Strait create tensions.
2. Tamil Issue: Lack of progress on the 13th Amendment for Tamil autonomy remains contentious.
3. Geopolitical Rivalries: Balancing relationships with China and India is challenging for Sri Lanka.
4. Debt Crisis: Sri Lanka's economic instability requires careful navigation to ensure sustainable aid and trade ties.

Way ahead:

1. Strengthen Strategic Ties: Enhance maritime security through joint exercises and infrastructure investments.
E.g. Colombo Security Conclave and the Trincomalee oil tank farm project.

1. Address Tamil Issues: Advocate for equitable political solutions for Tamil minorities.
2. Expand Economic Engagement: Conclude the India-Sri Lanka Free Trade Agreement (FTA) for broader trade coverage.
3. Counter Chinese Influence: Leverage soft power and strategic investments to balance geopolitical competition.

E.g. Development of Sampur Power Plant.

1. People-Centric Initiatives: Focus on community welfare through education, healthcare, and housing programs.

Conclusion:

India-Sri Lanka relations are rooted in shared cultural heritage and strategic imperatives. Strengthening ties through mutual respect, economic cooperation, and security collaboration will ensure regional stability and prosperity in South Asia.

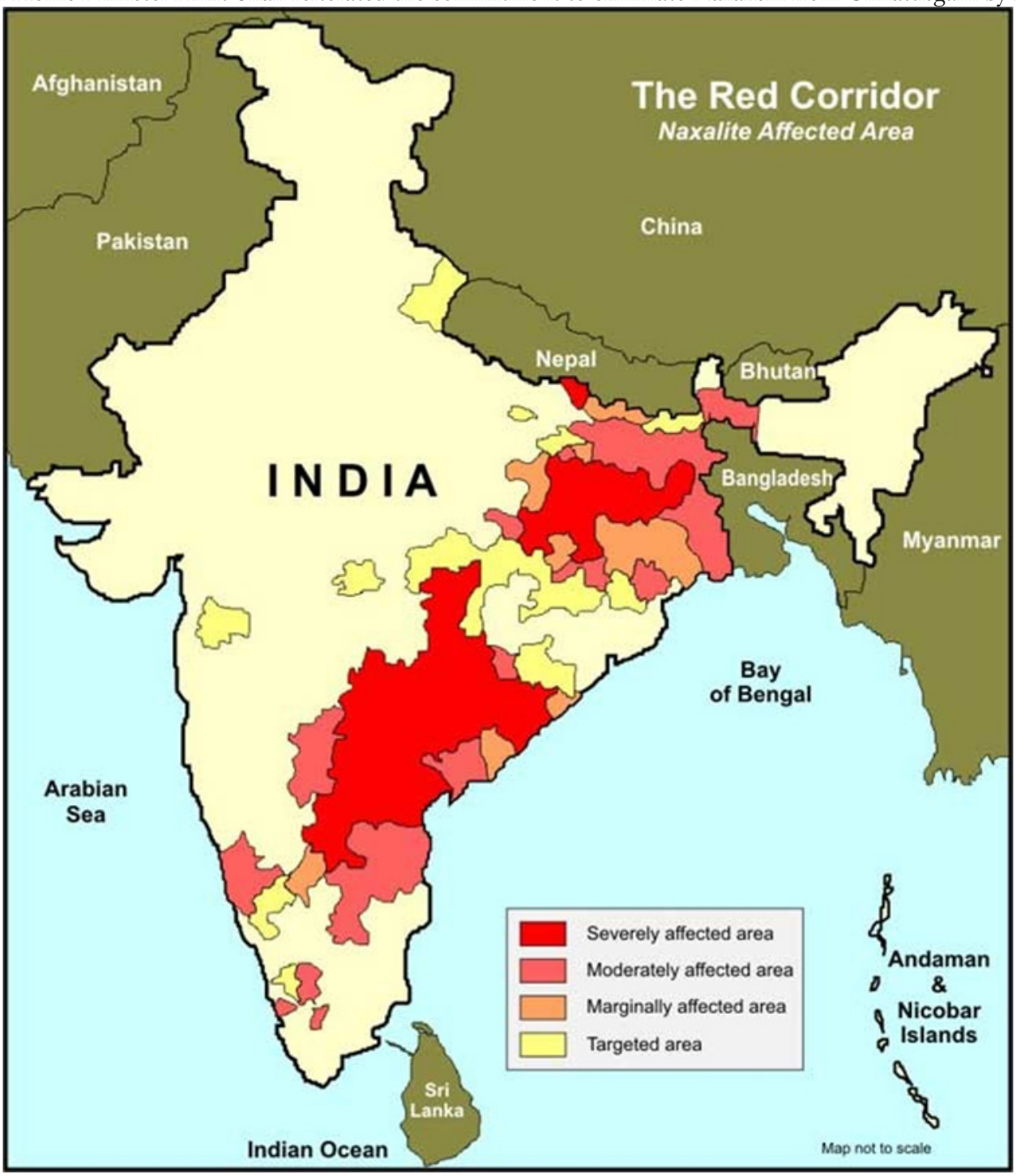
Chapter-
9

INTERNAL SECURITY

Naxalism

Context:

Union Home Minister Amit Shah reiterated the commitment to eliminate Naxalism from Chhattisgarh by 2026.



What is Naxalism?

- Definition: Naxalism is a form of Left-Wing Extremism (LWE) that aims to overthrow the state using violent means, inspired by Maoist ideology.

- Origin: Began in Naxalbari village, West Bengal, in 1967 as a tribal-peasant uprising.
- Ideology: Driven by Marxist-Leninist principles, with a focus on addressing issues like land reforms and exploitation.
- Objective: Establish a People's Democratic Republic through armed insurgency.
- Affected Regions: Mainly impacts the Red Corridor – states like Chhattisgarh, Jharkhand, Odisha, and Bihar.

Evolution of Naxalism in India:

- 1967 (First Stage): Peasant uprising in Naxalbari, West Bengal, led by Charu Majumdar, Kanu Sanyal, and Jangal Santhal.
- 1975-2004: Groups fragmented; People's War Group (PWG) in Andhra Pradesh and MCCI in Bihar strengthened.
- 2004 Onwards: PWG and MCCI merged to form CPI (Maoist), consolidating the Naxal movement.
- Spread of Red Corridor: Expansion into states like Chhattisgarh, Odisha, Jharkhand, and forays into southern states.
- Current Status: Naxal violence reduced by 47% (2015-2020) but remains concentrated in core regions.

Types of Naxalism:

- Rural Naxalism: Dominant in forested and tribal regions; targets government symbols and infrastructure.
- Urban Naxalism: Maoist infiltration in urban centres to radicalize intellectuals, students, and labour groups.

Reasons Behind Naxalism:

1. Economic Inequality: Unequal distribution of land and lack of employment opportunities for marginalized communities.
2. Exploitation of Tribals: Displacement of tribals due to mining, deforestation, and lack of forest rights.
3. Lack of Development: Absence of infrastructure like roads, schools, healthcare, and clean water.
4. Governance Deficit: Weak local governance, corruption, and failure to implement welfare schemes.
5. Political Marginalization: Exclusion of Dalits, Adivasis, and landless peasants from political participation.

Government initiatives to counter Naxalism:

1. Security Operations: Deployment of Central Armed Police Forces (CAPFs) and anti-Naxal units like Greyhounds and Bastariya Battalion.
2. Development Programs: Initiatives like Road Connectivity Project, Aspirational Districts Program, and ROSHNI Scheme.
3. Rehabilitation Policies: Surrender and rehabilitation programs to reintegrate former Naxals into society.
4. Intelligence Strengthening: Multi-Agency Centers (MACs) and UAV surveillance for real-time intelligence sharing.
5. Skill Development: Programs like Pradhan Mantri Kaushal Vikas Yojana (PMKVY) to provide employment opportunities.

SAMADHAN STRATEGY

- S– Smart Leadership
- A– Aggressive Strategy
- M– Motivation and Training
- A– Actionable Intelligence
- D– Dashboard Based KPIs and KRAs
- H– Harnessing Technology
- A– Action plan for each Theatre
- N– No access to Financing

Challenges to Counter Naxalism:

1. Terrain Complexity: Naxals exploit remote forests and inaccessible areas for guerrilla warfare.

2. Inadequate Coordination: Poor inter-state coordination among security forces and agencies.
3. Lack of Intelligence: Inadequate actionable intelligence and reliance on outdated technology.
4. Social Support Base: Strong Naxal influence among marginalized tribals and landless farmers.
5. Urban Maoism: Growing infiltration into intellectual and urban circles, complicating countermeasures.

Way ahead to tackle naxalism in India:

1. Holistic Development: Focus on roads, education, healthcare, and livelihood opportunities in affected regions.
2. Improved Governance: Address governance deficits with transparent implementation of welfare schemes.
3. Community Engagement: Win trust through tribal empowerment, forest rights, and inclusive policies.
4. Modernized Security Forces: Equip forces with advanced technology, better training, and intelligence tools.
5. Peace Dialogues: Open channels for political dialogue to reintegrate Naxals into the mainstream society.

Conclusion:

As Karl Marx aptly said, "The philosophers have only interpreted the world, in various ways; the point, however, is to change it." Tackling Naxalism requires a balanced approach of security measures, development, and inclusive governance to end decades of unrest and ensure lasting peace.

Chapter-
10

Yojana January 2025

1. India's Emergence As A Hub Of Knowledge And Technology

India's technological advancements drive its economic growth, aiming for a 5 trillion USD GDP by 2025. Key achievements include the Green and White Revolutions, atomic energy, space, and pharmaceutical progress.

- The country's focus on self-reliance led to indigenous solutions and growth in renewable energy.
- Initiatives like Digital India, Startup India, and UPI payments showcase India's commitment to inclusive, technology-driven progress, positioning it as a global economic leader.
- India ranks fifth in nominal GDP and third by purchasing power parity.

Technology As A National Priority

- Landscape of Science and Technology in India
- India has prioritized science and technology (S&T) to address key challenges like climate change, clean energy, and healthcare.
- The country's increasing investment in research and development (R&D) reflects this commitment, with the Gross Expenditure on R&D (GERD) reaching Rs 1,27,380.96 crores in 2020-21.
- The private sector now contributes 36.4% to GERD, particularly in pharmaceuticals, IT, and textiles.
- India's scientific output has surged, with publications growing 2.5 times from 2010 to 2020, positioning the country as a global leader in fields like computer science, engineering, and health sciences.

Innovation Ecosystem

- India's rise in the Global Innovation Index (GII), ranking 39th in 2024 from 81st in 2015, highlights its growing innovation focus.
- With over 100 unicorns and initiatives like Startup India, Atal Innovation Mission (AIM), and Atmanirbhar Bharat, India has become a global innovation hub. AIM, through programs like Atal Tinkering Labs (ATLs) and Atal Incubation Centres (AICs), supports students and startups with hands-on experience and funding.
- AIM's initiatives, including the Atal New India Challenge, foster a vibrant startup ecosystem and align India's innovation landscape with global standards.

Economic Impact Of Technology

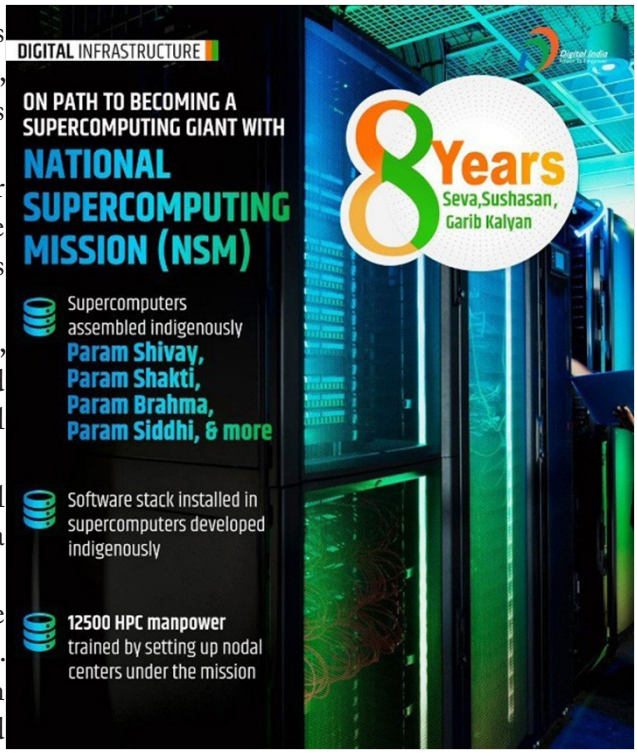
- Technology is transforming key sectors of India's economy, including agriculture, healthcare, manufacturing, and mobility.
- In agriculture, advancements like precision farming and AI-powered crop monitoring are enhancing productivity.
- In healthcare, digital tools such as telemedicine and AI-driven diagnostics are improving service delivery, especially in rural areas.
- The manufacturing sector has benefited from Industry 4.0 technologies, with initiatives like 'Make in India' attracting investments and positioning India as a global hub.
- The digital economy is also growing rapidly, driven by 5G, AI, and IoT, revolutionizing sectors like smart cities, transportation, and finance.
- India's shift towards translational research has accelerated the application of scientific discoveries in real-world scenarios.
- Programs like NIDHI and BIRAC foster collaboration between academia and industry, leading to breakthroughs in biotechnology, space technology, and renewable energy, positioning India as a leader in technology commercialization.

Social Impact Of Technology

- Launched in 2015, the Digital India mission has transformed access to public services, promoting inclusivity and transparency.

- It has expanded access to education, healthcare, and financial services through initiatives like Aadhaar, Common Service Centres (CSCs), and DigiLocker, particularly in rural areas.
- The success of Digital India is demonstrated by over 15 billion UPI transactions in a month, showcasing how technology empowers citizens.
- In healthcare, telemedicine and AI-driven diagnostics have revolutionized service delivery.
- Platforms like e-Sanjeevani and the Ayushman Bharat Digital Health Mission have improved accessibility and infrastructure.
- India's innovation during the Covid-19 pandemic, including the indigenous development of 'Covaxin' and global initiatives like 'Vaccine Maitri', highlighted its healthcare capabilities.
- The National Education Policy (NEP) 2020 focuses on multidisciplinary learning and digital infrastructure to equip students with 21st-century skills.
- The rise of EdTech platforms has democratized education, enabling individuals to upskill and participate in the global knowledge economy.

Strategic Impact Of Technology



- India's focus on self-reliance in defence technology has led to achievements in missile systems, aircraft carriers, and anti satellite technologies, exemplified by programs like IGMDP and INS Vikrant.
- In space, ISRO's successes, including the PSLV launcher and Chandrayaan-3 mission, alongside initiatives like Gaganyaan and space privatization, showcase India's growing technological prowess.
- India's strategic investments in emerging technologies, such as AI, robotics, quantum computing, and supercomputing, are strengthening its global competitive edge.
- The National Quantum Mission and National Supercomputing Mission (NSM) aim to position India as a leader in next-gen technologies.
- The PARAM Shivay supercomputer highlights the nation's advancements in high-performance computing.
- The Deep Ocean Mission focuses on seabed exploration and sustainable resource management, with manned submersibles reaching 6,000 meters.
- This mission underscores India's commitment to sustainability, climate change mitigation, and biodiversity conservation.

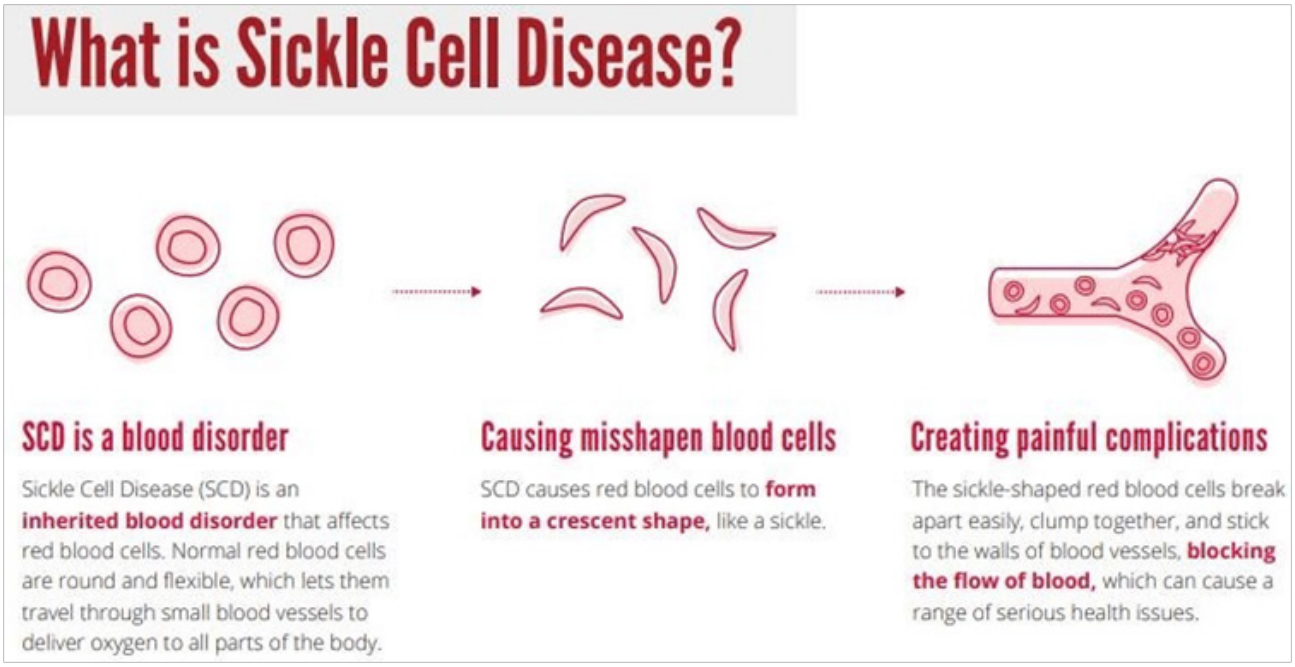
Conclusion

India's vision for science and technology aims to build a resilient, self-reliant, and inclusive future. Focusing on emerging fields like AI, quantum computing, and renewable energy, India seeks global leadership. Translational research ensures innovations benefit all. By investing in R&D, global partnerships, and talent, India strives to address global challenges like climate change and digital equity, while strengthening its economy and global influence. Science and technology will be key to a sustainable and prosperous future.

2. India's Mission Mode Approach Against Sickle Cell Disease

Sickle Cell Disease (SCD)

- Sickle Cell Disease (SCD) is an inherited genetic disorder characterized by abnormal hemoglobin, causing red blood cells to take a crescent shape.
- This condition leads to reduced red blood cell lifespan, chronic anemia, and severe pain crises.
- SCD is inherited in an autosomal recessive pattern, with individuals needing to inherit the defective gene from both parents.
- The disease primarily affects tribal populations in India, with over a million people suffering from SCD, especially in states like Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, and Maharashtra.



Prevalence Of Sickle Cell Disease (SCD)

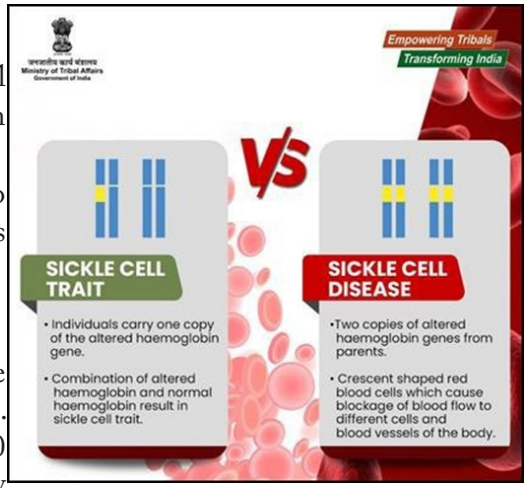
- **Globally:**
  - SCD is a global health challenge, especially in sub-Saharan Africa, South Asia, and India.
  - As per The Lancet (2023), SCD cases rose by 41.4%, from 54.6 lakh in 2000 to 77.4 lakh in 2021, with over 5 lakh annual births, mainly in sub-Saharan Africa.
  - SCD-related deaths increased by 43.4% during this period, with males and females equally affected.

Tribal Communities of India

- SCD Burden: About 12 lakh Indians are affected by Sickle Cell Disease (SCD), with a high prevalence in tribal populations.
- Tribal Demographics: Tribals constitute 8.6% (6.78 crore) of India's population (Census 2011).
- Health Impact: The Ministry of Health identifies SCD as one of the top 10 health issues disproportionately affecting tribal communities.
- Prevalence: According to NHM guidelines, 1 in 86 tribal births is affected by SCD.

Symptoms And Treatment

- Common symptoms of SCD include chronic anemia, painful episodes in various parts of the body, and delayed growth in children.
- Treatment options involve blood transfusions, hydroxyurea (to reduce complications), and more advanced techniques such as gene therapy and bone marrow transplants.



National Sickle Cell Anemia Eradication Mission (NSCAEM)

Launched in the Union Budget 2023, NSCAEM aims to eradicate sickle cell anemia by 2047, focusing particularly on India's tribal regions. The mission seeks to screen 70 million people aged 0-40 across 200 districts in 17 states, with a goal to reduce the burden of the disease. Key components include:

- Screening and Awareness: Extensive screening programs, smart cards indicating genetic risks, and ongoing monitoring.
- Integration with Healthcare: Collaboration with Ayushman Bharat Health and Wellness Centres to provide treatment, vaccines, and counseling.
- Digital Tracking: A dedicated web portal to track patient data and treatment progress.

Challenges In Addressing Sickle Cell Disease

India faces several challenges in combating SCD:

- High Burden: India has the world's second-largest sickle cell disease burden, affecting millions.
- Low Treatment Coverage: Only 18% of patients receive consistent treatment, with gaps in diagnosis, treatment, and adherence.
- Social Stigma and Misinformation: Myths about the disease in tribal areas contribute to delayed diagnosis and care.
- Operational Gaps: Health systems in affected areas are underfunded and lack resources to provide comprehensive care.

Way Forward

To successfully combat SCD, the following steps are essential:

- Early Detection: Introduce newborn screening programs for early identification of SCD.
- Integration with National Health Systems: Sickle cell management should be incorporated into national health services, with specialized centers for care.
- Public Education: Conduct awareness campaigns to reduce stigma and inform communities about prevention and genetic risks.
- Genetic Counseling: Provide counseling to families in high-risk areas about carrier screening and reproductive choices.
- Improved Accessibility: Ensure easy access to medications, local adherence support, and specialized centers for treatment.
- Strengthening Tribal Healthcare: Tailor healthcare initiatives to address the specific needs of tribal populations.
- Research and Development: Invest in research to explore new treatments and better understand the disease.

Conclusion

A comprehensive, multi-pronged approach is critical to eradicating sickle cell disease in India by 2047. With the government's commitment, the National Mission presents a significant opportunity to address the challenges associated with SCD. By overcoming social stigma, improving healthcare access, and fostering research and public awareness, India can reduce the impact of this disease and potentially eradicate it, much like the success achieved in the fight against polio.

3. Making Indian Agriculture Future-Ready

Recently, a six-point strategy was introduced by central government to enhance agricultural development, focusing on frontier technologies, nutritional security, and climate resilience.

- It includes increasing production, reducing production costs, ensuring fair minimum prices for produce, compensating losses caused by natural disasters, diversification of agriculture and promotion of natural and organic farming.
- Key emphasis was placed on empowering small farmers, women, and youth for financial inclusion and competitiveness.

Agriculture Overview (2024-25): Key Highlights

1. Budget Allocation:

- Record allocation of 1.52 lakh crore for agriculture and allied sectors.
- 9,941 crore allocated for agricultural research, 4,521 crore for animal husbandry and dairy, and 2,616 crore for fisheries to boost infrastructure and processing.

2. Production Achievements:

- Record foodgrain production (3323 LMT) in 2023-24, driven by rice (1378.25 LMT), wheat (1132.92 LMT), and Shree Anna (175.72 LMT).
- Oilseeds: Record production of rapeseed and mustard due to mission-mode initiatives.
- Pulses: Production rose from 163.23 LMT (2015-16) to 244.93 LMT (2023-24).
- Horticulture: Increase in fruits (112.73 MT), vegetables (205.80 MT), and other crops like spices, honey, and medicinal plants.

3. Minimum Support Price (MSP):

- MSP increased for all kharif and rabi crops, ensuring a margin of at least 1.5x the cost of production.
- Highest MSP margins: wheat (105%), rapeseed/mustard (98%), and pulses like lentil and gram.

4. Monsoon Impact:

- 5% surplus rainfall improved soil moisture, reservoir storage (123% of 2023 levels), and sowing area for paddy, oilseeds, and pulses.
- Better conditions expected to benefit winter crops like wheat and chickpea.

Key Agricultural Initiatives and Interventions

1. Digital Agriculture Mission (2,817 crore):

- Focus on digital transformation through Agristack, Krishi Decision Support System (KDSS), and Soil Profile Mapping.
- Creation of digital farmer identities linked to databases like land records and crops.
- Estimated to generate 2.5 lakh jobs for trained youth and Krishi Sakhis.

2. Climate Resilience and Research (3,979 crore):

- Targets sustainable food security through plant genetic resource management and crop improvement.
- Includes modernising agri-education under NEP 2020.

3. Livestock and Dairy Development (1,702 crore):

- Focus on enhancing genetic resources and modernising veterinary education.

4. Sustainable Horticulture (1,129.30 crore):

- Aims to increase farmer income through plantation crops, spices, and medicinal plants.

5. Natural Resource Management (1,115 crore):

- Promotes sustainable soil and water management.

6. Lab-to-Land Initiative:

- Strengthens Krishi Vigyan Kendras for last-mile farmer-researcher connectivity.

7. Umbrella Schemes:

- PM-RKVY & Krishonnati Yojana (1,01,321.61 crore):
- Promote sustainable agriculture, food security, and climate resilience.
- Streamline multiple schemes for flexibility and efficient state-level implementation.

Key Agricultural Import and Export Decisions

1. Onion Export:

- Minimum export price removed; export duty cut from 40% to 20%.
- Expected to boost income for onion growers by increasing global demand.

2. Basmati Rice Export:

- Restrictions on varieties priced between $800–$950 per metric tonne removed.
- Enhances global market access for premium Basmati rice farmers.

3. Edible Oil Import:

- Import duty on crude edible oils increased from 5.5% to 27.5% and on refined oils from 13.75% to 35.75%.
- Aims to support domestic oilseed farmers by stabilizing prices.

4. Integrated Agri-Export Facility:

- India's first such facility approved at Jawaharlal Nehru Port, Mumbai, under PPP mode worth 284.19 crore.
- Focuses on improving agri-logistics, reducing wastage, and boosting exports.

Strategies And Steps For Agricultural Development

The government has adopted a six-point strategy emphasizing production increase, cost reduction, fair pricing, disaster compensation, diversification, value addition, and natural farming. Key initiatives include:

1. Digital Initiatives:

National Pest Surveillance System (NPSS):

- Expected to boost income for onion growers by increasing global demand.
- Over 22,300 surveys conducted since its launch in August 2024.

Seed Authentication via SATHI Portal:

- Onboarding of 266 breeder seed centers to ensure farmers get quality seeds at affordable prices.

2. New Crop Varieties:

- 109 climate-resilient varieties of 61 crops released to tackle challenges like climate change, pest attacks, and nutritional deficiencies.

3. Farmer-Centric Communication:

- Krishi Chaupal: TV and radio program promoting best agricultural practices with interactive farmerexpert sessions.
- Farmers Grievance Redressal System (FGRS): Multi-channel, multilingual grievance registration with real-time tracking.

4. Insurance and Financial Inclusion:

- Pradhan Mantri Fasal Bima Yojana (PMFBY): Expansion to cover 293 lakh farmers and 365 lakh hectares for Kharif 2024, with a 12% growth in insured area.
- Kisan Credit Card (KCC) Saturation Campaign: Increased coverage under PMFBY.

5. Agriculture Infrastructure Fund:

- Surpassed targets with over 10,000 units established, 6,500 crores in loans sanctioned, and 10,000 crores in investments mobilized.

6. Natural Farming:

- Aiming to onboard 1 crore farmers within two years under the National Mission on Natural Farming (2023-24).
- Establishment of 10,000 bio-input resource centers for natural farming.
- Promotion of Farmer Producer Organizations, cooperatives, and start-ups for value addition and supply chain management.

7. PM-KISAN Scheme:

- Saturation drive added 25 lakh new farmers, increasing total beneficiaries to a record 9.51 crore.

4. Government Initiatives In Climate Change

India, a global leader in climate action, has made significant strides in meeting and surpassing its Nationally Determined Contribution (NDC) targets, aligned with the vision of Viksit Bharat@2047.

Achievements Against NDC Targets

1. Reduction in Emissions Intensity:

- Target: 33-35% reduction by 2030 (baseline 2005).
- Achievement: 33% reduction by 2019.
- Updated Target (2022): 45% reduction by 2030.

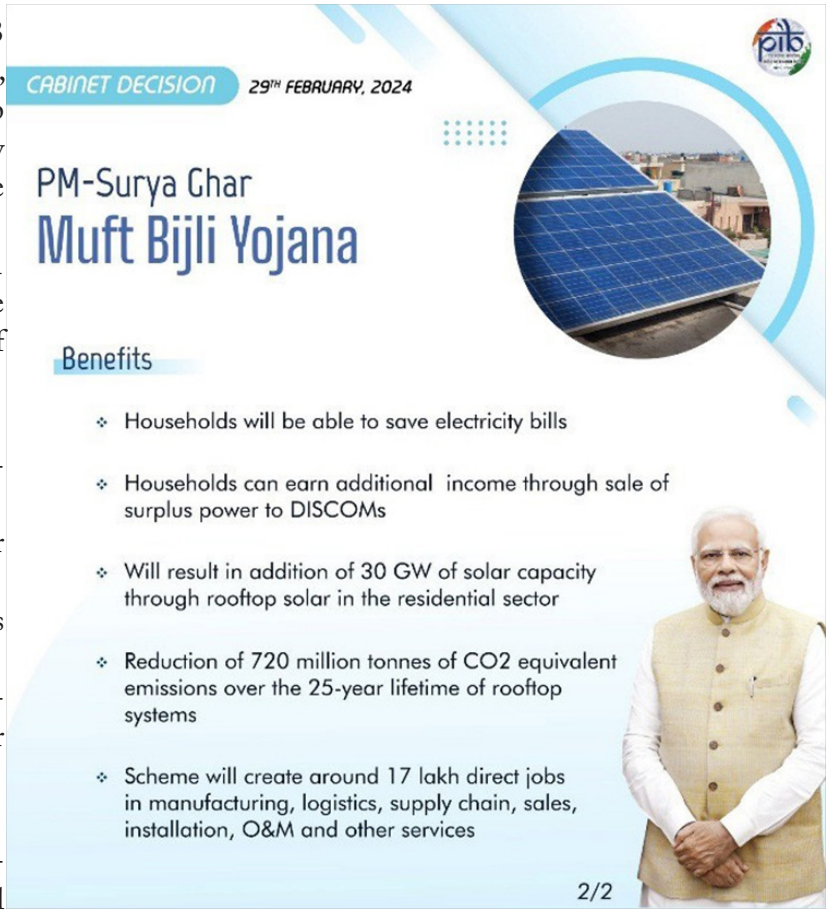
2. Non-Fossil Fuel Capacity:

- Target: 40% of installed capacity from non-fossil sources by 2030.
- Achievement: 45.40% as of May 2024.
- Updated Target (2022): 50% by 2030.

3. Solar Power Milestones:

- 15.03 GW added in 2023-24.
- Total capacity reached 82.64 GW by April 2024.

PM Surya Ghar Yojana (Muft Bijli Yojana):



- Launch & Objectives: Initiated on 13 February 2024 by PM Narendra Modi, this scheme aims to promote rooftop solar installations, reduce electricity expenses, and encourage sustainable energy practices.
- Budget & Targets: Allocated 75,021 crore to install solar panels on 1 crore homes, supplying up to 300 units of free electricity monthly.
- **Financial Assistance:**
  - Up to 60% subsidy for 2kW systems.
  - 40% subsidy (up to 78,000) for systems up to 3kW.
  - Collateral-free, low-interest loans for solar adoption.
  - Simplified Process: An online platform facilitates registration, vendor selection, and cost estimation.
- Focus Areas:
  - Rural outreach through model solar villages and incentives for local authorities.
  - Renewable energy goals of adding 30 GW solar capacity by 2030 and supporting India's 500 GW renewable target.
  - Employment generation with an expected 1.7 million jobs in the renewable energy sector.

Sovereign Green Bonds:

- Purpose: Raise funds for clean transport, renewable energy, and climate adaptation projects.

- Achievements: 8,000 crore raised in 2024 with 16,000 crore allocated for green infrastructure.
- Significance: Supports India's low-carbon transition in alignment with the Paris Agreement and COP26 commitments.
- Challenges: High risk perception and limited return data.

GOBARdhan Initiative:

- Objective: Convert organic waste into biogas, fostering a circular economy.
- Key Features: Establish 500 biogas facilities, generate bio-products like organic manure, and promote rural economic opportunities.
- Impact: Reduces methane emissions, aligns with Swachh Bharat Mission, and supports rural livelihoods.
- Challenges: High risk perception and limited return data.

Critical Mineral Mission:

- Objective: Enhance domestic production and recycling of minerals like lithium and copper.
- Key Features: Reduce import dependency and promote exploration and recycling to support energy, defense, and telecom industries.

MISHTI (Mangrove Initiative):

- Objective: Rehabilitate 540 sq. km of mangroves over five years across nine states and three UTs
- Impact: Strengthens climate resilience, supports carbon sequestration, and promotes ecotourism and sustainable livelihoods.

Amrit Dharohar Plan:

- Objective: Restore wetlands to enhance biodiversity, water quality, and community revenue generation.
- Key Features: Focus on ecotourism and sustainable wetland use with community participation.

Green Credit Program (GCP):

- Objective: Incentivize afforestation and ecosystem restoration.
- Key Features: Revised guidelines (2024) to facilitate marketable green credits for afforestation efforts.
- Impact: Contributes to India's net-zero goal by 2070 through increased forest cover and carbon sinks.

Solar Park Scheme

- The Solar Park Scheme, launched in 2014 and extended to FY 2025-26, aims to develop large-scale solar parks nationwide to support India's ambitious goal of achieving 500 GW of non-fossil fuel electricity by 2030.
- By addressing challenges related to land acquisition and infrastructure, the scheme fosters renewable energy infrastructure while encouraging private sector participation.

Eco Mark Scheme

- The ECO Mark Scheme, introduced in 1991 and updated under the Ecomark Rules 2024, promotes ecofriendly products across categories such as soaps, paints, electronics, and textiles.
- Administered by the Bureau of Indian Standards (BIS), the scheme integrates the ISI Mark with the ECO Logo, signifying compliance with environmental and quality standards, thereby encouraging sustainable consumption.

Eco Mark Scheme

- The Param Rudra Supercomputers, launched on 26 September 2024 under the National Supercomputing Mission, represent a significant milestone in India's technological progress.
- Built domestically by the Centre for Development of Advanced Computing (C-DAC) at a cost of Rs 130 crore, these systems address complex challenges in science, engineering, and climate research. Supporting Industry 4.0, the initiative also strengthens India's semiconductor ecosystem and global supply chain integration.
- These initiatives collectively underline India's commitment to renewable energy, sustainability, and advanced technology
- National Clean Air Programme (NCAP): Launched in 2019, it aims to reduce PM10 and PM2.5 levels by 20-30% by 2024 in 132 cities, addressing air pollution and contributing to climate mitigation.

- National Action Plan on Climate Change (NAPCC): Introduced in 2008, it includes missions like the National Solar Mission (100 GW target by 2022), National Water Mission, National Mission for Sustainable Agriculture, and Green India Mission, integrating mitigation and adaptation strategies across sectors.
- Energy Conservation (Amendment) Bill, 2022: Mandates non-fossil fuel energy use and introduces a carbon credit trading scheme to promote low-carbon practices and align with India's Paris Agreement targets.
- Net-Zero Strategy by 2070: At COP27, India's Long-Term Low Emission Development Strategy (LT-LEDS) outlined transitions to low-carbon electricity, sustainable transport, urban adaptation, enhanced forests, and CO_2 removal, emphasizing equity and climate justice.

Conclusion

India's initiatives demonstrate a balanced approach to economic growth and environmental sustainability, targeting net-zero by 2070. Programs like GOBARdhan and MISHTI, along with renewable energy promotion and carbon markets, reflect India's commitment to climate resilience and sustainable development under the vision of Viksit Bharat@2047.

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