IQRA IAS

An Institute for Civil Services

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POLITY & GOVERNANCE

Uniform Civil Code: A Step Toward Legal Uniformity

Syllabus: Polity and Governance (GS Paper II), Social Justice (GS Paper II)

Context:

The Prime Minister has highlighted the need for a **Uniform Civil Code (UCC)**, referring to the vision of the **Constituent Assembly** for a **secular civil code** to replace diverse personal laws based on religion.

What is Uniform Civil Code (UCC)?

1. **Definition:** A set of laws governing **personal matters** like **marriage**, **divorce**, inheritance, and adoption for all citizens, irrespective of their **religion**.
2. **Constitutional Provision: Article 44** of the **Directive Principles of State Policy (DPSP)** directs the State to endeavor to secure a **UCC**for all citizens across India.
3. **Current Enforcement:**
    - **Uttarakhand** became the first state to implement UCC in **2024**.
    - **Goa** already follows similar provisions under the **Portuguese Civil Code, 1867**.

Need for UCC

1. **Fostering Unity and Integrity:** Eliminates practices conflicting with **Fundamental Rights**, promoting **national integration**.
2. **Reforming India's Social System:** Addresses **gender inequality** and removes discriminatory practices, especially against **women**.
3. **Promoting Uniformity:** Ensures consistency in laws, similar to **criminal laws**, which apply equally to all citizens, irrespective of religion.

Challenges in Implementing UCC

1. **Protective Constitutional Provisions:** The **5th and 6th Schedules** preserve the **customary practices** of **Scheduled Areas** and **Tribal Areas**, potentially conflicting with UCC.
2. **Doctrinal Differences:** Communities fear that UCC may compromise **traditions** and **religious freedom**, guaranteed under **Article 25** of the Constitution.

Judicial Perspectives on UCC

1. **Shah Bano Case (1985):** The Supreme Court emphasized the need for UCC to address **inequities in personal laws**.
2. **Sarla Mudgal Case (1995):** Reiterated the importance of UCC for ensuring **social justice** and equality.
3. **Dr. B.R. Ambedkar's View:** Advocated that UCC should **harmonize** with the **sentiments** of various communities to avoid polarization.

Perspectives Favoring UCC

1. **K. M. Munshi:** Argued that UCC is crucial for upholding the **secular foundation** of the Constitution.
2. **Alladi Krishnaswami Aiyyar:** Believed UCC would foster **harmony** and **amity among communities**.

Conclusion:

A **Uniform Civil Code** represents a pivotal step toward achieving **legal uniformity**, ensuring **equality**, and promoting **social justice**. However, its implementation must balance **constitutional mandates**, **religious freedoms**, and **cultural sensitivities**, aligning with the inclusive vision of the **Constitution of India**.

Supreme Court's Stance Against Long-Term Temporary Employment in Public Institutions

Syllabus: Indian Polity (GS Paper II), Social Justice

Context:

The Supreme Court of India, in the **Jaggo & Ors. vs. Union of India & Ors.** case, condemned the misuse of long-term temporary employment in public institutions, emphasizing its detrimental effects on justice and public trust.

Case Highlights

1. **Context:** Four **housekeeping staff** at the **Central Water Commission** were employed on **ad hoc terms for over 20 years**, only to be abruptly terminated in 2018.
2. **Ruling:**
    - The Supreme Court:
        - **Quashed the termination** orders.
        - Directed their **reinstatement**.
        - Mandated their **regularization** in employment.

Issues Highlighted by the SC

1. **Exploitation in the Gig Economy:**
    - Growth in the **gig economy** has led to an increase in **precarious work arrangements**, especially in the private sector.
    - Workers lack **job security**, **essential benefits**, and **fair treatment**.
2. **Outsourcing in the Public Sector:** Public institutions avoid regular employment obligations by **outsourcing temporary positions**, perpetuating worker exploitation.
3. **Violation of Rules and Impact on Morale:**
    - Long-term use of temporary workers for essential duties violates **international labor standards**.
    - This not only risks legal challenges but also undermines **employee morale** and institutional integrity.

Related Landmark Cases on Public Sector Employment

1. **State of Karnataka vs. Uma Devi (2006):** The court ruled that **long-term irregular employees** performing essential roles should be **considered for regularization**.
2. **Vinod Kumar & Ors. vs. Union of India & Ors.:** Emphasized that **procedural technicalities** cannot prevent regularization when workers have served long-term in roles akin to permanent employees.

The Gig Economy in India

1. **Scope:** As per **NITI Aayog**, the gig workforce is expected to grow from **7.7 million (2020-21)** to **23.5 million (2029-30)**.
2. **Legal Frameworks:**
    - **Code on Social Security, 2020:** Defines **gig workers** and extends **social security benefits** to them.
    - **Occupational Safety, Health and Working Conditions Code, 2020:** Promotes **safe working conditions** and regulates **contract labor**.

Significance of SC's Observations

1. **Justice for Workers:** Highlights the need for **fair treatment and job security** for temporary workers.
2. **Accountability in Public Institutions:** Prevents misuse of **temporary contracts** to bypass regular employment norms.
3. **Alignment with International Standards:** Promotes adherence to **global labor norms**, safeguarding workers' rights.
4. **Balancing Flexibility with Security:** Encourages institutions to balance **employment flexibility** with **job stability** and **worker benefits**.

Way Forward

1. **Policy Reforms:** Enact rules limiting the duration of **temporary employment** for essential roles.
2. **Strengthen Oversight:** Enhance regulatory frameworks to monitor **outsourcing practices** in public institutions.
3. **Expand Social Security:** Extend comprehensive **social security coverage** for gig and temporary workers.
4. **Awareness Campaigns:** Educate workers about their **rights and legal protections** under labor laws.
5. **Incentivize Regularization:** Offer fiscal or operational incentives for institutions prioritizing **regular employment**.

Addressing Declining Legislative Productivity in Indian Parliament

Syllabus: Polity (GS Paper II)

Context:

The **Winter Session 2024** witnessed significant disruptions, leading to reduced legislative productivity, unfulfilled parliamentary functions, and stalled governance reforms.

Highlights of Winter Session 2024

1. **Low Functioning Hours:**
   - **Lok Sabha:** Operated for **52%** of scheduled time.
   - **Rajya Sabha:** Functioned at **39%**, facing frequent disruptions.
2. **Impact on Question Hour:**
   - Rajya Sabha: Non-functional for **15 out of 19 days**.
   - Lok Sabha: Operated for less than 10 minutes on **12 out of 20 days**.
3. **Legislative Backlog:** Only one bill passed (**Bharatiya Vayuyan Vidheyak, 2024**), marking the lowest productivity in six Lok Sabha terms.
4. **No Private Members' Business:** Lok Sabha conducted none; Rajya Sabha discussed one resolution.
5. **Vacant Deputy Speaker Post: 18th Lok Sabha** has failed to elect a Deputy Speaker since 2019, violating constitutional mandates.

Reasons Behind Disruptions

1. **Political Polarization:** Deep ideological divides result in confrontational politics and frequent walkouts.
2. **Contentious Legislation:** Introduction of controversial bills without adequate consultation sparks opposition protests.
3. **Unaddressed Opposition Demands:** Issues raised by the opposition remain unaddressed, leading to prolonged disruptions.
4. **Procedural Violations:** Sloganeering, unruly behaviour, and rushing to the well of the house disturb proceedings.
5. **External Influences:** External controversies spill into parliamentary debates, diverting focus from legislative agendas.

Consequences of Disruptions

1. **Legislative Delays:** Critical bills and reforms are stalled, delaying policy implementation.
2. **Resource Wastage:** Public funds allocated for parliamentary sessions are underutilized.
3. **Erosion of Public Trust:** Frequent disruptions diminish confidence in democratic institutions.
4. **Missed Debates:** Socio-economic and governance issues go undiscussed.
5. **International Image:** Persistent disruptions tarnish India's image as a functioning democracy.

Way Forward

1. **Strengthening Parliamentary Procedures:** Enforce stricter rules to curb unruly behaviour and ensure adherence to decorum.
2. **Promoting Bipartisan Dialogue:** Facilitate constructive dialogue between the ruling party and opposition for amicable resolution of issues.
3. **Pre-Legislative Consultations:** Ensure stakeholder engagement before introducing significant legislation to build consensus.
4. **Enhancing Disciplinary Measures:** Empower authorities to take prompt action against MPs violating rules.
5. **Public Awareness and Accountability:** Increase transparency and hold MPs accountable for conduct in the house.

Supreme Court Expands Powers of NIA for Investigating Non-Scheduled Offences

Syllabus: Polity and Governance (GS Paper II), Internal Security (GS Paper III)

Context:

The **Supreme Court** ruled that the **National Investigation Agency (NIA)** can investigate **non-scheduled offences** if they are connected to scheduled offences under the **NIA Act, 2008**. This expansion enhances NIA's jurisdiction in addressing **complex criminal networks**.

About NIA Act, 2008

1. **Scheduled Offences under the Act:**
   - Specifies categories of offences that NIA can investigate, including:
     - **Atomic Energy Act, 1962**
     - **Anti-Hijacking Act, 1982**
     - **SAARC Convention (Suppression of Terrorism) Act, 1993**
     - **Unlawful Activities (Prevention) Act, 1967 (UAPA)**

2. **Scope of New Ruling:** Enables NIA to investigate **non-scheduled offences** if they are **linked to scheduled offences**, ensuring comprehensive investigations.

About NIA

1. **Establishment:** Created under the **NIA Act, 2008** after the **26/11 Mumbai attacks** as a **Central Counter-Terrorism Law Enforcement Agency**.
2. **Headquarters and Zonal Offices:**
    - HQ: **New Delhi**
    - Zonal offices in **Guwahati** and **Jammu**.
3. **Mandate:** Investigates offences affecting **sovereignty**, **security**, and **integrity of India**, as well as crimes affecting **friendly relations** with foreign states.

Steps to Strengthen NIA

1. **NIA Amendment Act, 2019:**
    - Expanded mandate to include offences related to:
        - **Human trafficking**
        - **Prohibited arms manufacture/sale**
        - **Cyber-terrorism**
    - Granted jurisdiction to investigate cases **beyond India's borders**.
2. **Nodal Agency for Terror Funding:** Designated as the central agency for investigating **Terror Funding** and **Fake Indian Currency Notes (FICN)**.
3. **National Terror Data Fusion and Analysis Centre (NTDFAC):** Established for leveraging **Big Data Analytics** to enhance counter-terrorism efforts.

1. **Holistic Investigations:** Addresses complex interlinkages between **scheduled** and **non-scheduled offences**, ensuring **comprehensive justice**.
2. **Strengthened Counter-Terrorism Framework:** Enhances NIA's capability to investigate crimes critical to **national security**.
3. **Global Outreach:** Expanded jurisdiction bolsters India's efforts in counter-terrorism on an **international scale**.

One Nation, One Election Bills Introduced in Lok Sabha

Syllabus: Polity and Governance (GS Paper II)

Context:

Two bills, **Constitution (129th Amendment) Bill, 2024**, and **Union Territories Laws (Amendment) Bill, 2024**, were introduced in the **Lok Sabha** to establish a mechanism for conducting **simultaneous elections** for **Lok Sabha** and **State Legislative Assemblies (SLA)**.

Key Provisions of the Constitution (129th Amendment) Bill, 2024

1. **Insertion of New Article 82A:**
    - **Simultaneous Elections:** The **Election Commission** will conduct **general elections** for **Lok Sabha** and all **State Legislative Assemblies (SLA)** simultaneously.
    - **Term Alignment:** The term of all **SLAs** will end concurrently with the full term of the **Lok Sabha**.
2. **Amendment to Article 83:**
    - **Unexpired Term and Mid-Term Elections:**
        - If the **Lok Sabha** is dissolved before completing its **5-year term**, the period between the dissolution and the full term will be treated as the **unexpired term**.
        - In such cases, a **mid-term election** will be conducted, and the newly constituted **Lok Sabha** will serve only the **unexpired term**.
3. **Amendment to Article 172:** Defines **unexpired term** and **full term** for **State Legislative Assemblies (SLA)**, aligning with simultaneous elections.

Key Provisions of Union Territories Laws (Amendment) Bill, 2024

1. **Amendments:** Modifies the **Union Territories (UT) Act, 1963**, **National Capital Territory of Delhi Act, 1991**, and **Jammu and Kashmir Reorganization Act, 2019**.
2. **Objective:** Aligns the **duration of UT Legislative Assemblies** with the timeline for **simultaneous elections** for **Lok Sabha** and **SLAs**.

Significance of Simultaneous Elections

1. **Increased Voter Turnout:** Addresses **voters' fatigue** caused by frequent elections, encouraging higher participation.
2. **Stable Policy and Growth:** Reduces **policy paralysis** caused by frequent imposition of the **Model Code of Conduct (MCC)**.
3. **Efficient Governance:** Minimizes disruption in the **delivery of public services**, as the **frequent deployment** of government officials and security forces for elections affects their regular duties.

Germany Set for Snap Elections Following Chancellor's Loss of Confidence

Syllabus: International Relations (GS Paper II), Polity (Comparative Constitutions)

Context:

Germany is set for **snap elections** after the Chancellor lost a **vote of confidence** in the **Bundestag** (German Parliament). **Snap elections** are held earlier than scheduled to resolve political deadlocks or seize political opportunities.

How Does the German Election System Work?

1. **Electoral System: Mixed Member Proportional Representation System:** Combines the **first-past-the-post system** (majority system) with **proportional representation** based on votes for party lists in Länder (states).
2. **Seats in Bundestag:**
   - **299 seats:** Elected through **first votes** (majority system).
   - Remaining seats: Allocated through **second votes** (proportional representation).
3. **Dual Voting System:**
   - **First Vote:** For individual candidates in constituencies (majority system).
   - **Second Vote:** For party lists in Länder (proportional representation).
4. **Overhang Seats:** If a party wins more seats via the majority system than entitled by proportional representation, the party retains the additional seats as **overhang seats**.
5. **Balance Seats:** To maintain proportionality, **balance seats** are added to other parties to ensure their overall vote share is accurately reflected in the Bundestag.

Election of Chancellor

1. **Nomination:** The **Federal President** nominates a candidate for **chancellorship** after federal elections.
2. **Bundestag Election:**
   - The **Bundestag** elects the Chancellor through a **secret ballot**.
   - To win, the candidate must secure an **absolute majority** of votes.
3. **Multiple Rounds of Voting:**
   - **Second Round:** Held if no absolute majority is secured in the first round.
   - **Third Round:** If the second round fails, the candidate with the **largest number of votes** in the third round is elected.

Significance of Snap Elections in Germany

1. **Resolving Political Deadlock:** Snap elections can address parliamentary stalemates, ensuring governance continuity.
2. **Maintaining Stability:** Offers voters an opportunity to recalibrate the political mandate, fostering **legitimacy** in leadership.
3. **Potential Political Realignment:** Allows parties to capitalize on shifting public opinion or resolve coalition disputes.

POSH Act, 2013: Safeguarding Women at Workplaces

Syllabus: Polity and Governance (GS Paper II), Social Justice (GS Paper II)

Context:

The Supreme Court is hearing a PIL on applying the **POSH Act, 2013** to **political parties**, debating their status as workplaces and **Internal Complaints Committee (ICC)** compliance.

About POSH Act

What is POSH Act?

1. **Full Form: Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013**.
2. **Objective:**
   - Protects women from **sexual harassment** at workplaces.
   - Ensures a mechanism for **redressal**.

Key Sections of the Act

1. **Section 3(1): Prohibition** of sexual harassment at the workplace.
2. **Section 4:** Mandates the formation of an **Internal Complaints Committee (ICC)** in every workplace.
3. **Section 9:** Procedure for filing complaints within **three months** of the incident.

4. **Section 13:** Details the **inquiry process** and actions against the accused if found guilty.

Who is Covered Under the Act?

1. **Employees:** Includes **permanent**, **temporary**, **contract workers**, **interns**, and **volunteers**.
2. **Workplace:** Covers **offices**, **public and private institutions**, **hospitals**, **transport**, **houses**, and locations visited during employment.

Features of the POSH Act

1. **ICC Formation:** ICC must include at least one **external member** with expertise in addressing **sexual harassment issues**.
2. **Wide Definition of Workplace:** Extends to **remote work settings** and places visited during employment.
3. **Employer Responsibility:** Employers must ensure compliance, raise **awareness**, and submit an **annual compliance report**.
4. **Penalties: Non-compliance** can lead to **fines** and reputational damage for the organization.

Judicial Judgments on POSH Act

1. **Vishaka vs. State of Rajasthan (1997):** Laid down guidelines for addressing workplace **sexual harassment**, forming the foundation of the POSH Act.
2. **Kerala HC (2022):** Held that **political parties** do not qualify as workplaces under the POSH Act due to the lack of an **employer-employee relationship**.

Conclusion:

The **POSH Act, 2013**, ensures a safe and inclusive workplace for women. Expanding its scope to entities like **political parties** could address systemic issues of workplace harassment and align with evolving societal and organizational structures. Judicial scrutiny on such cases is pivotal to further strengthening **gender justice** in the workplace.

Joint Parliamentary Committee (JPC): Structure, Powers, and Significance

Syllabus: Polity and Governance (GS Paper II)

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)

1. **Definition:** A **JPC** is an **ad-hoc, bipartisan committee** constituted to examine specific matters such as proposed **legislation**, **policy issues**, or other **specialized subjects**.
2. **Governing Framework:** Formed under the **Rules of Procedure and Conduct of Business in Lok Sabha**.
3. **Formation:**
    - Constituted by the **Speaker of the Lok Sabha**.
    - Members are drawn from **both Houses of Parliament** (Lok Sabha and Rajya Sabha).
4. **Composition:**
    - Typically comprises **up to 31 members**:
        - **21 from Lok Sabha**.
        - **10 from Rajya Sabha**.
    - Members are selected based on **proportional party strength** in Parliament.
5. **Tenure:** The committee is required to submit its **report within 90 days**, though extensions can be granted if necessary.

Powers and Functions of JPC

1. **Ad-Hoc Nature:** Formed to examine **specific issues**, **bills**, or **policies** referred to it.
2. **Examination and Consultation:**
    - Consults stakeholders, officials, and experts for an in-depth understanding of the issue.
    - Can summon **documents**, **witnesses**, and **experts** for deliberation.
3. **Recommendations:**
    - Submits a detailed **report** with findings and recommendations to Parliament.
    - Recommendations are **advisory** and **not binding** on the government.
4. **Parliamentary Oversight:** Ensures comprehensive **scrutiny** of issues to facilitate informed policymaking.

Significance of JPC

1. **Detailed Examination:** Provides a platform for **thorough analysis** of complex issues, ensuring comprehensive understanding.
2. **Bipartisan Approach:** Reflects diverse viewpoints, fostering **democratic deliberation**.
3. **Public Accountability:** Enhances **government accountability** by scrutinizing proposed policies and decisions.
4. **Stakeholder Engagement:** Brings in inputs from **experts** and **affected parties**, making the process inclusive.

Limitations of JPC

1. **Non-Binding Recommendations:** The government is not obligated to adopt JPC's suggestions.
2. **Time-Consuming:** Prolonged deliberations may delay legislative processes.
3. **Political Bias:** Proportional representation may lead to **politicization** of the committee's work.

Examples of Notable JPCs in India

1. **Bofors Scandal (1987):** Examined allegations of kickbacks in defense deals.
2. **2G Spectrum Case (2011):** Investigated the allocation of 2G licenses.
3. **Banking Sector Frauds (2020):** Reviewed policies and practices leading to banking frauds.

Phase III of e-Courts Mission Mode Project: Towards a Digitized Judiciary

Syllabus: Governance (GS Paper II), E-Governance (GS Paper III)

Context:

The Union Cabinet has approved **Phase III of the e-Courts Mission Mode Project**, which aims to promote **digital, online, and paperless courts** by digitizing entire court records and enhancing ICT capabilities in the Indian Judiciary.

About the e-Courts Mission Mode Project

1. **Initiation:** Launched in **2007** as part of the **National e-Governance Plan** to enable **ICT-based transformation** in the judiciary.
2. **Phases Implemented:**
   - **Phase I (2011-2015):** Initial ICT enablement of courts.
   - **Phase II (2015-2023):** Expanded coverage and infrastructure development.
3. **Current Phase (Phase III):**
   - **Timeframe:** 4 years (2023–2027).
   - **Financial Outlay:** ₹7,210 crore.
4. **Objective:** To create a **unified technology platform** for seamless interaction between **courts, litigants, and other stakeholders**, ensuring a **paperless judiciary**.
5. **Implementation:**
   - **High Courts** will oversee execution.
   - Funds will be allocated by the **Department of Justice (Ministry of Law)** based on recommendations from the **e-Committee of the Supreme Court**.
   - The **e-Committee** is responsible for **policy planning**, **strategic direction**, and providing **implementation guidance**.

Significance of Digitalization of Courts

1. **Judicial Modernization:** Facilitates **data-driven decisions** and enhances the **efficiency** of justice delivery systems through full **digitization**.
2. **Reducing Case Pendency:** Incorporating technologies like **Artificial Intelligence (AI)** and **Optical Character Recognition (OCR)**improves case management, speeding up justice delivery and reducing **pendency**.
3. **Ease of Justice:** Promotes **transparency** and **accessibility** for litigants, enabling smoother communication with courts and stakeholders.
4. **Environmental Sustainability:** By reducing reliance on paper, the project supports a **sustainable and eco-friendly judiciary**.

Radhakrishnan Panel Proposes Restructuring of National Testing Agency (NTA)

Syllabus: Governance (GS Paper II), Education (GS Paper II)

Context:

The **Radhakrishnan Panel**, formed in **June 2024** after allegations of question paper leaks in **Common University Entrance Test (CUET-UG)**, has recommended significant reforms to address systemic flaws in **entrance examinations**conducted in India.

Issues with Common Entrance Tests in India

1. **Question Paper Leaks and Marks Irregularities:** Incidents like the alleged **NEET UG 2024 paper leak** and irregularities in **grace marks** undermine credibility.
2. **Frequent Exam Cancellations and Technical Glitches:** Failures in **biometric infrastructure**, server crashes, and other systemic issues cause **frequent cancellations**(e.g., **UGC NET June 2024**).
3. **Operational Transparency: Delays in results**, inconsistent **difficulty levels**, and normalization processes create dissatisfaction among students.
4. **Corruption and Political Influence:** Scams like the **Vyapam scam** in Madhya Pradesh highlight vulnerabilities to corruption and undue influence.

Recommendations of the Radhakrishnan Panel

1. **DigiExam Platform:** Inspired by **DigiYatra**, to ensure **comprehensive authentication** and prevent **impersonation** during examinations.
2. **Restructuring NTA:** Focus NTA solely on conducting **higher education entrance exams**, ensuring operational efficiency.
3. **Institutional Linkages:** Collaborate with **state and district authorities** for:
   - Identifying suitable **testing centers**.
   - Monitoring **suspicious elements**.
4. **Mobile Testing Centers:** Deploy testing centers in **rural, remote,** and **thinly populated areas** to increase accessibility for aspirational candidates.
5. **Other Recommendations:**
   - **Grievance Redressal Cell:** To address complaints promptly.
   - **Mental Health Support:** Provide psychological counseling for exam-related stress.
   - **Strengthened Test Audit:** Implement robust systems for exam monitoring and evaluation.

Various Initiatives for Exam Reforms in India

1. **Public Examinations (Prevention of Unfair Means) Act:** Legislation to curb **malpractices** in public examinations.
2. **Biometrics for Verification:** Use of **biometric authentication** for student identity verification.
3. **Computer-Based Real-Time Examinations:** Digitized exams to ensure efficiency and transparency.
4. **Formation of National Testing Agency (NTA):** Established to streamline the **conduct of competitive examinations**.

Significance of Recommendations

1. **Enhanced Credibility:** Reforms like **DigiExam** and **strengthened audits** will ensure exam transparency and fairness.
2. **Accessibility: Mobile testing centers** will provide opportunities to students in **remote areas**, ensuring inclusivity.
3. **Operational Efficiency:** Restructuring NTA will help focus resources and reduce systemic failures.
4. **Student Support:** Initiatives for **mental health support** and grievance redressal will address student concerns and reduce stress.

Combating Malpractice in Exams: Key Challenges and Solutions

Syllabus: Governance (GS Paper II), Education and Transparency

Context:

A seven-member panel headed by former ISRO chairman **K. Radhakrishnan** presented **101 recommendations** to the Ministry of Education to ensure **transparent, smooth, and fair** conduct of national-level entrance exams like **NEET** and **JEE**.

Reasons for Malpractice in Exams

1. **High Stakes:** Exams like NEET and JEE determine admissions to **premier institutes**, encouraging **unethical practices**.
2. **Lack of Robust Systems:** Dependence on **outsourced agencies** and weak **digital infrastructure** create vulnerabilities.
3. **Inadequate Monitoring:** Insufficient oversight at **test centres** allows manipulations.
4. **Corruption and Collusion: Insiders** and private service providers often facilitate paper leaks and irregularities.
5. **Technological Exploitation:** Use of **advanced cheating devices** and hacking of online systems undermine exam integrity.

Recent Exam Scams (2024)

1. **NEET-UG Paper Leak:** Reports of question paper leaks sparked criticism of the **National Testing Agency (NTA)**.
2. **UGC-NET Irregularities:** Allegations of mismanagement and suspicious allocation of test centres.
3. **BPSC Scam Allegation:** Reports of **paper leaks** and manipulation in candidate selection during recruitment processes.

Government Initiatives to Counter Malpractice

1. **Strengthening NTA:** Enhanced **resources** and **capacity building** to oversee national-level exams.
2. **Biometric Verification:** Implementation of **Digi-Exam** systems to authenticate candidates.
3. **Digital Infrastructure:** Collaboration with **Kendriya Vidyalayas** and **Navodaya Vidyalayas** to set up computer-based test centres.
4. **Use of AI and Big Data: Predictive analytics** to identify anomalies in exam results.
5. **Legal Frameworks:** Enactment of **Public Examinations (Prevention of Unfair Means) Act, 2024**.

Public Examinations (Prevention of Unfair Means) Act, 2024

1. **Aim:** To curb **malpractice**, ensure **transparency**, and uphold the **integrity** of public exams.
2. **Coverage:** Includes exams like **NEET**, **JEE**, **UGC-NET**, and **state-level recruitment tests**.
3. **Penalties:** Offenders face up to **10 years imprisonment** and fines up to **₹10 lakh** for cheating, impersonation, or paper leaks.
4. **Accountability:** **Organizers** and **service providers** held accountable for lapses, with measures like **biometric verification**and **CCTV monitoring** mandated.

Challenges in Countering Malpractices

1. **Resource Constraints:** Lack of funding and infrastructure for **secure testing systems** nationwide.
2. **Coordination Issues:** Difficulty in aligning efforts among **central** and **state authorities**.
3. **Dependence on Private Agencies:** Outsourcing leads to **reduced 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 reliance on **outsourced agencies**.
2. **Strengthen Local Coordination:** Involve **state and district officials** in exam management, similar to election processes.
3. **Multi-Stage Testing:** Introduce **multi-session** and **adaptive testing models** for enhanced security and fairness.
4. **Digital Transformation:** Establish **400-500 nationwide computer-based test 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** for biometric verification.
7. **Harmonized Criteria:** Standardize eligibility, admission criteria, and exam modes across institutions.

Strategies to Curb Malpractice in Other Exams

- Replicate NTA-specific reforms across other **exam systems**.
- Strengthen **grassroots monitoring** using **local administration** and **volunteers**.
- Expand the use of **AI-based fraud detection** tools in recruitment and state-level exams.

Overview of the National Commission for Minority Educational Institutions (NCMEI)

Syllabus: Governance (GS Paper II), Education (GS Paper II)

Context:

The Union Minister addressed the **20th Foundation Day** of the **National Commission for Minority Educational Institutions (NCMEI)**, highlighting its role in safeguarding the **educational rights of minorities** under the Constitution.

About NCMEI

1. **Establishment:** Founded in **2004** under the **National Commission for Minority Educational Institutions Act, 2004**.
2. **Ministry:** Operates under the **Ministry of Education**.
3. **Aim:** To **safeguard and promote educational rights** of **religious** and **linguistic minorities** as per **Article 30(1)** of the Constitution.

Key Powers and Functions of NCMEI

1. **Quasi-Judicial Body:** Holds powers similar to a **civil court**.
2. **Decision-Making:**
    - Decides:
        - **Minority status** of educational institutions.
        - **No Objection Certificate (NOC)** disputes.

3. **Addressing Complaints:** Investigates cases of **deprivation of minority educational rights**.
4. **Advisory Role:** Advises and makes recommendations to **government authorities** on issues concerning minority education.
5. **Jurisdiction:** Holds both **appellate** and **original jurisdiction** as upheld by **Supreme Court rulings**.

Significance of NCMEI

1. **Promotes Educational Rights:** Upholds **Article 30(1)**, ensuring minorities' right to establish and administer educational institutions.
2. **Ensures Justice:** Provides a platform for resolving disputes and ensuring **fair treatment** of minority institutions.
3. **Strengthens Inclusivity:** Advocates for equitable access to **education** for all communities.
4. **Advisory Role:** Guides authorities in implementing **minority education policies** effectively.

Crime and Criminal Tracking Network and Systems (CCTNS): A Leap in Digital Policing

Syllabus: Governance (GS Paper II), Internal Security (GS Paper III)

Context:

The **Crime and Criminal Tracking Network and Systems (CCTNS)** has achieved a significant milestone by integrating **17,130 police stations across India**, enhancing the efficiency of policing and criminal tracking.

About CCTNS

1. **Launch Year:** Initiated in **2009** under the **Ministry of Home Affairs (MHA)** with a budget of **₹2,000 crore**.
2. **Objective:** To create a **comprehensive IT-enabled system** to improve policing across the country.
3. **Nodal Agency:** Managed by the **National Crime Records Bureau (NCRB)**.
4. **Key Features:**
    - Integration of all **17,130 police stations** for real-time information sharing.
    - Pan-India **search functionality** on a national database of **crime and criminal records**.
    - Citizen-friendly services through a **web portal** for FIR registration, complaint tracking, and more.

Objectives of CCTNS

1. **Citizen Services:** Provide **citizen-centric police services** like online FIR registration and complaint tracking.
2. **National Database:** Enable **pan-India search** for crimes and criminals for seamless coordination.
3. **Crime Analytics:** Generate **crime and criminal reports** for state and central levels to aid policymaking.
4. **Process Automation:** Digitize police processes for improved efficiency, coordination, and **accountability**.

About National Crime Records Bureau (NCRB)

1. **Established:** Founded in **1986** based on recommendations by the **Tandon Committee** and the **National Police Commission (1977)**.
2. **Headquarters:** Located in **New Delhi**.
3. **Parent Ministry:** Functions under the **Ministry of Home Affairs (MHA)**.
4. **Key Functions:**
    - **Data Repository:** Houses crime and criminal data at the national level.
    - **Publications:** Publishes critical reports like:
        - *Crime in India.*
        - *Accidental Deaths & Suicides in India.*
        - *Prison Statistics in India.*
    - **Fingerprint Database:** Manages the **Central Finger Print Bureau**.
    - **Capacity Building:** Provides training and support in **IT**, **CCTNS**, **digital forensics**, and **network security**.
    - **Crime Analysis:** Aids investigators with tools for crime trend analysis and **criminal tracking**.

Significance of CCTNS

1. **Enhanced Efficiency:** Streamlines police processes and improves operational efficiency.
2. **Better Coordination:** Enables real-time sharing of information between police stations and other law enforcement agencies.
3. **Crime Prevention:** Facilitates **proactive crime prevention** by identifying patterns and hotspots.
4. **Transparency:** Enhances public trust through citizen-friendly services and increased accountability.
5. **National Security:** Strengthens internal security by creating a unified **crime and criminal database**.

Challenges in Implementation

1. **Infrastructure Gaps:** Limited digital infrastructure, especially in rural police stations.
2. **Training Deficit:** Inadequate training for police personnel in using CCTNS effectively.
3. **Data Accuracy** Ensuring reliable and updated information in the database.
4. **Inter-Agency Coordination:** Challenges in integrating with other law enforcement and judicial bodies.

Way Forward

1. **Infrastructure Development:** Invest in **IT infrastructure** and connectivity for all police stations, especially in rural areas.
2. **Capacity Building:** Conduct regular training programs for police personnel on **digital tools** and **CCTNS usage**.
3. **Data Validation:** Implement systems for regular **data audits** to ensure accuracy and reliability.
4. **Integration with Other Systems:** Link CCTNS with other platforms like **courts**, **prisons**, and **forensic labs** for seamless collaboration.
5. **Public Awareness:** Educate citizens about **CCTNS services** to enhance usage and engagement.

Parliamentary Standing Committee Report on Social Justice and Empowerment (SJ&E): Challenges and Recommendations

Syllabus: Governance (GS Paper II), Welfare Schemes

Context:

The **Parliamentary Standing Committee on Social Justice and Empowerment** has released its report on the **Demands for Grants (2024-25)** of the Department of SJ&E, highlighting key concerns, challenges, and recommendations for improving welfare schemes for vulnerable sections.

Key Concerns Highlighted in the Report

1. **Lack of Physical Targets:** Schemes like the **Pradhan Mantri Adarsh Gram Yojana (PMAGY)** lack defined physical targets, making it difficult to assess outcomes.
2. **Implementation Challenges:**
   - Significant **underutilization of funds** due to:
     - Incomplete documentation.
     - Delays in fund release by states.
3. **Weak Enforcement of Legislations:**
   - Poor implementation of laws such as:
     - **Protection of Civil Rights Act, 1955.**
     - **SC and ST (Prevention of Atrocities) Act, 1989.**
   - States' inability to establish requisite implementation mechanisms.

Recommendations by the Committee

1. **Capacity Building:** Strengthen the capabilities of **state implementing institutions** for effective scheme execution and target achievement.
2. **Promote Cooperative Federalism:** Ensure states actively contribute their **share of resources** for seamless implementation of centrally-sponsored schemes.
3. **Information, Education, and Communication (IEC):** Improve **publicity and awareness** of schemes for wider dissemination and beneficiary reach.
4. **Address State-Specific Issues:**
   - Conduct **regional workshops** to identify local challenges.
   - Sensitize states on timely submission of **State Action Plans** and effective fund utilization.

Major Welfare Schemes Reviewed

1. **For Scheduled Castes:**
   - **SHREYAS:** Scholarships for Higher Education for Young Achievers Scheme.
   - **PM AJAY:** Pradhan Mantri Anusuchit Jaati Abhyuday Yojana.
2. **For Other Backward Classes (OBCs):**
   - **PM YASASVI:** PM Young Achievers Scholarship Award Scheme for Vibrant India.
3. **For Senior Citizens:**
   - **Rashtriya Vayoshree Yojana (RVY):** Provides assistive devices for senior citizens.
   - **Atal Vayo Abhyuday Yojana (AVYAY):** Focused on elderly welfare.
4. **For Marginalized Sections:**
   - **SMILE:** Support for Marginalized Individuals for Livelihood and Enterprise, covering beggars, transgender persons, and the homeless.

Way Forward

1. **Streamlined Targets and Monitoring:** Set clear **physical and financial targets** for schemes to ensure measurable outcomes.
2. **Effective Fund Utilization:** Address bottlenecks in **fund release** and enhance accountability at the state level.
3. **Strengthening Legislation Enforcement:** Build state capacity for the **effective enforcement** of protective laws.
4. **Wider Awareness Campaigns:** Use digital platforms and local networks for **IEC activities** to ensure scheme accessibility.
5. **Increased Collaboration:** Foster **state and central cooperation** to bridge implementation gaps and address region-specific issues.

INTERNATIONAL RELATIONS

Suspension of MFN Clause in India-Switzerland Tax Treaty: Implications and Context

Syllabus: International Relations (GS Paper II), Economy (GS Paper III)

Context:

Switzerland has announced the suspension of the **Most Favoured Nation (MFN)** clause in its **Double Taxation Avoidance Agreement (DTAA)** with India, effective **January 1, 2025**. This decision follows a 2023 ruling by the **Indian Supreme Court** concerning the applicability of the MFN clause in tax treaties.

Understanding the MFN Clause in Tax Treaties

1. **Definition:** The **MFN clause** in tax treaties ensures that if a country offers a more favorable tax rate or benefit to a third country, the same benefit is automatically extended to the treaty partner.
2. **Purpose:** Promotes **equality** in international taxation by preventing **discrimination** and ensuring all treaty partners receive the same benefits.

Background of the India-Switzerland DTAA

1. **Establishment:** The **India-Switzerland DTAA** was signed in **1994** to prevent double taxation on income.
2. **Amendments:** Amended in **2010** to incorporate provisions like the **MFN clause**.

Supreme Court Ruling and Its Implications

1. **Case Overview:** In **2023**, the **Indian Supreme Court** ruled that the **MFN clause** in tax treaties does not automatically apply when a country joins the **Organisation for Economic Co-operation and Development (OECD)** if the tax treaty was signed before the country became an OECD member.
2. **Key Findings:**
   - The **MFN clause** requires explicit **notification** under the **Income Tax Act, 1961**, to be enforceable.
   - Benefits under the **DTAA** cannot be claimed retroactively from the date a country joins the **OECD**.

Switzerland's Response

1. **Suspension of MFN Clause:** Citing the lack of **reciprocity** and the Supreme Court's interpretation, Switzerland announced the suspension of the **MFN clause** in its **DTAA** with India, effective **January 1, 2025**.
2. **Impact on Withholding Tax Rates:** Dividends paid to **Indian tax residents** by Swiss entities will be subject to a **10% withholding tax**, increased from the current **5%**.

Implications of the Suspension

1. **For Indian Companies:** Increased **tax liabilities** due to higher withholding tax rates on dividends received from Swiss investments.
2. **For Swiss Investments in India:** Swiss companies receiving dividends from Indian entities will continue to face a **10% withholding tax**, as per the existing **DTAA** provisions.
3. **Re-evaluation by Other Countries:** This development may prompt other nations to reconsider the application of the **MFN clause** in their tax treaties with India.
4. **European Free Trade Association (EFTA) Investments:** Investments under the **EFTA**, which includes Switzerland, are expected to remain unaffected by this suspension.

Moldova Joins International Solar Alliance Framework Agreement

Syllabus: Environment (GS Paper III), International Relations (GS Paper II)

Context:

Moldova has signed the **International Solar Alliance (ISA)** Framework Agreement, a global initiative to promote **solar energy solutions**. The ISA FA, which came into force in **2017**, was amended in **2020** to allow **all UN member states** to join.

About International Solar Alliance (ISA)

1. **Headquarters: Gurugram, India**
2. **Genesis:** Conceptualized on the sidelines of **COP21** in **Paris (2015)** as a collaborative initiative between **India** and **France**.
3. **Aim:** To unite global efforts in combating **climate change** by promoting **solar energy solutions**.
4. **Mission – 'Towards 1000' Strategy:**
   - Mobilize **USD 1,000 billion** for solar energy investments by **2030**.
   - Ensure **energy access** to **1,000 million people**.
   - Achieve **1,000 GW** of solar energy installation.
5. **ISA Assembly:** Apex decision-making body that oversees and implements the **Framework Agreement**.
6. **Membership: 104 Member countries** and **16 signatory countries**.

Significance of ISA

1. **Sustainable Solar Cooling:** Promotes low global warming potential **solar-based cooling technologies**, particularly for **small- and medium-sized farms**.
2. **Carbon Emission Mitigation:** Aims to reduce **1,000 million tonnes** of CO_2 annually.
3. **India's Role in Clean Energy:** Advances India's leadership in **clean energy**, **energy security**, and achieving **net-zero emissions** by **2070**.
4. **Global Solar Market Development:** Encourages large-scale deployment of **solar energy** at reduced costs through **collaborative development**.

Key ISA Initiatives

1. **Scaling Solar Applications for Agricultural Use (SSAAU):** Addresses the growing demand for **solar water pumps**.
2. **ISA CARES:** Provides **innovative solar energy solutions** for health in **low- and middle-income countries**.
3. **Solarizing Heating and Cooling Systems:** Facilitates solar adoption for **commercial**, **industrial**, and **residential** heating and cooling needs.
4. **Global Solar Facility:** Launched at **COP27** to catalyze investments in underserved regions, particularly across **Africa**.

UK Joins Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

Syllabus: International Relations (GS Paper II), Economy (GS Paper III)

Context:

The **UK** has become the first **European country** to join the **Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)**, strengthening its trade ties with the **Indo-Pacific region**. This follows the signing of the **accession protocol** in **2023**.

About CPTPP

1. **Genesis:**
   - A **Free Trade Agreement (FTA)** originally signed by **11 countries** in **March 2018** in **Santiago, Chile**.
   - Entered into force on **December 30, 2018**, after the **US withdrew** from the original **Trans-Pacific Partnership (TPP)** in **2017**.
2. **Membership:**
   - Now comprises **12 member nations**, including the **UK**.
   - Other members: **Australia, Canada, Japan, New Zealand, Brunei, Chile, Malaysia, Mexico, Peru, Singapore, and Vietnam**.
3. **Significance of CPTPP:**
   - Accounts for about **15% of global GDP**.
   - Provides trade access to a market of more than **500 million people**.

Significance of Multilateral Groupings like CPTPP for India

1. **Economic Opportunities:** Joining such blocs would allow India to tap into **new markets**, leveraging the **"China plus one" strategy** to diversify supply chains.
2. **Boost to Exports:** Reduced tariffs and enhanced market access in the **Asia-Pacific region** could significantly boost **exports**, particularly from India's **Micro, Small, and Medium Enterprises (MSMEs)**, which account for **40%** of India's total exports.
3. **Integration into Global Supply Chains:** Membership in trade blocs like CPTPP would position India better in **global value chains**, facilitating economic growth and reducing dependence on a few markets.

Morocco: A Strategic Partner for India in Defence and High-Tech

Syllabus: International Relations (GS Paper II), Geography (GS Paper I)

Context:

Morocco is emerging as a key partner for India in **defence** and **high-tech sectors**, encouraging Indian firms to establish production units that can serve as a **gateway to Africa and Europe**.

About Morocco

1. **Location:** Situated in **western North Africa**, across the **Strait of Gibraltar**.
2. **Borders: Algeria** to the east, **Western Sahara** to the south, and coastlines along the **Atlantic Ocean** and **Mediterranean Sea**.
3. **Capital: Rabat**
4. **Largest City: Casablanca**, renowned for its **industrial** and **commercial** prominence.
5. **Geography:** Dominated by the **Atlas Mountains** and **Rif Mountain** ranges.
6. **Unique Coastlines:** The only African nation with exposure to both the **Atlantic Ocean** and the **Mediterranean Sea**.

Places in News in Morocco

1. **Casablanca:** Morocco's **industrial and commercial hub**, reflecting its **modern economic aspirations**.
2. **Rabat:** The **capital city** and venue for the **India-Morocco Defence Industry Seminar**.

Strategic Importance for India

1. **Defence Partnership:** Morocco is fostering ties with India by inviting **Indian defence firms** to establish production units.
2. **Gateway to Africa and Europe:** Positioned as a strategic hub for accessing both **African** and **European** markets.
3. **High-Tech Collaboration:** Encourages cooperation in advanced technologies, fostering **innovation-driven industries**.

India's Growing Focus on Mineral Diplomacy for Strategic Security

Syllabus: International Relations (GS Paper II), Economy (GS Paper III)

Context:

India's **technological growth** faces challenges due to dependency on **imported critical minerals**. With **China controlling 60%** of **rare earth** and **critical mineral production** and **80% of processing**, India is focusing on **mineral diplomacy** to secure resources, reduce vulnerabilities, and ensure **mineral security**.

What is Mineral Diplomacy?

1. **Definition:** Efforts by a nation to **secure critical minerals** for its **economic** and **national security**, reducing risks of **supply disruptions** and dependence on **geopolitical competitors**.
2. **Objective:** Minimize **strategic vulnerabilities** and ensure a **stable supply chain** for critical minerals essential to **technology**, **defence**, and **energy security**.

Pillars of India's Mineral Diplomacy

1. **Establishing Joint Ventures:**
   - **KABIL's International Partnerships:**
     - **Khanij Bidesh India Ltd. (KABIL)** has secured agreements with **Australia**, **Argentina**, **Bolivia**, and **Chile** to access critical mineral assets.
   - **India-Central Asia Collaboration:**
     - India and **Kazakhstan** formed a joint venture for **titanium slag** production.
     - Proposed the **India-Central Asia Rare Earths Forum** to tap critical mineral resources in the region.

2. **Ensuring Cooperative Engagements:**
   - Engaging in **minilateral** and **multilateral initiatives** to strengthen mineral security:
     - **Quad:** Collaboration with **Australia, Japan, and the U.S.** for critical mineral supply chains.
     - **Indo-Pacific Economic Framework for Prosperity (IPEF):** Focuses on economic resilience and resource access.
     - **Mineral Security Partnership (MSP):** Promotes cooperation in critical mineral supply chain development.
     - **G7 Partnerships:** Fosters international coordination on critical minerals.

Significance of Mineral Diplomacy

1. **Strategic Autonomy:** Reduces dependence on **China**, enhancing India's **strategic independence**.
2. **Economic Growth:** Ensures uninterrupted supply of minerals essential for **high-tech industries**, including **semiconductors**, **renewable energy**, and **defence technologies**.
3. **Global Leadership:** Positions India as a proactive player in **global resource management**, strengthening partnerships with **mineral-rich nations**.

Strategic and Geographic Importance of Golan Heights

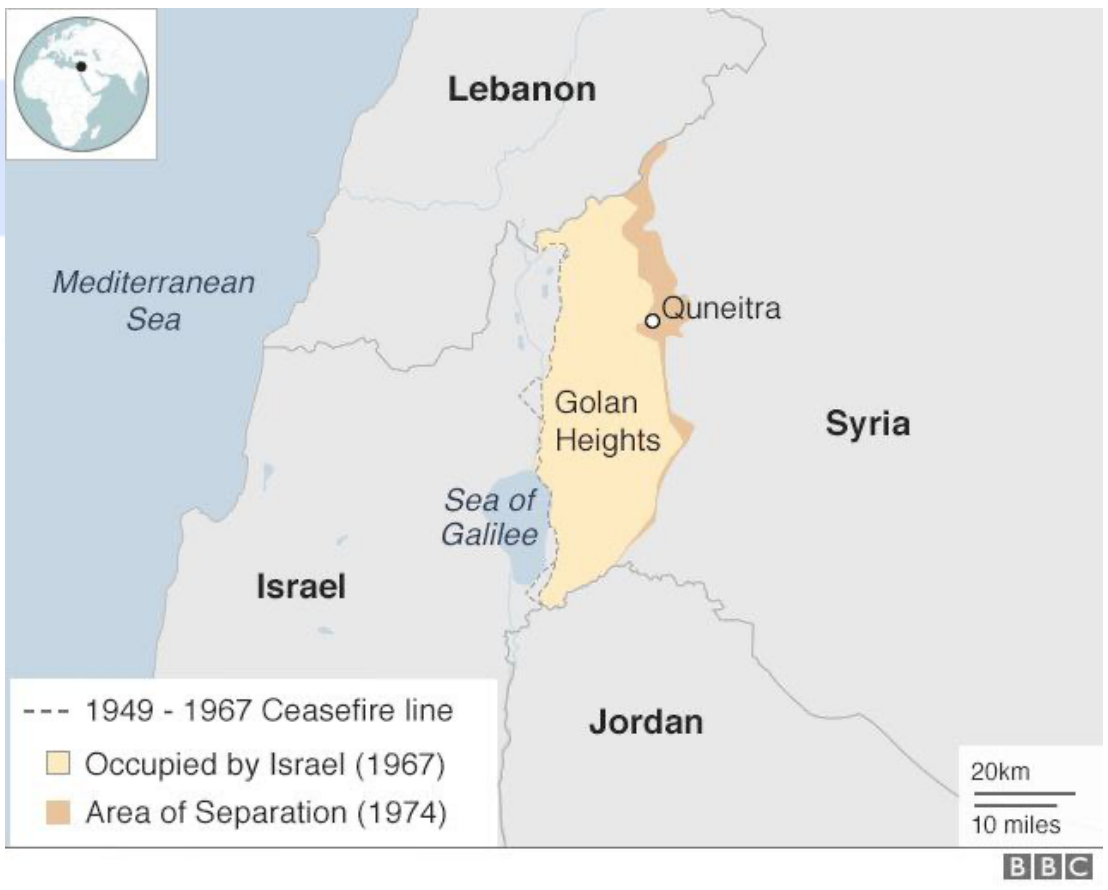
Syllabus: International Relations (GS Paper II), Geography (GS Paper I)

Context:

The **Israeli government** recently announced plans to **double its population** in the **Golan Heights**, a region captured during the **1967 Six-Day War** and annexed in **1981**.

About Golan Heights

1. **Location:**
   - A hilly region **overlooking the upper Jordan River Valley** to the west.
   - Neighbors:
     - **Israel** (west), **Syria** (east), and **Jordan** (south).
2. **Geographic Features:**
   - **Boundaries:** Enclosed by:
     - **Jordan River**, **Sea of Galilee**, **Mount Hermon**, **Wadi Al-Ruqqād**, and **Yarmūk River**.
   - **Area:** Covers **1,150 sq. km**.
   - **Resources:** Features **fertile soil** and **key water resources**.



Historical Background

1. **1967 Six-Day War:** Captured by **Israel** from **Syria** during the war.
2. **1981 Annexation:** Israel annexed the region, a move not recognized internationally.
3. **2019 U.S. Recognition:** The **United States** became the first country to recognize **Israeli sovereignty** over the Golan Heights.

Significance of the Golan Heights

1. **Strategic Security:** Acts as a **buffer zone** between **Israel** and **Syria**, providing high-ground military advantage.
2. **Water Resources:**
   - Contains critical **aquifers**.
   - Supplies water to the **Jordan River** and the **Sea of Galilee**, a major source of fresh water for Israel.
3. **Agricultural Importance:**

- **Fertile soil** supports: **Vineyards**, **orchards**, and **grazing lands**.

4. **Tourism and Settlements:**
   - Hosts **Israeli settlements** and the **Druze community**, contributing to **local economies**.
   - Scenic landscapes attract **tourists**, boosting the tourism sector.

Controversies and Challenges

1. **International Disputes:** The annexation is not recognized by the **United Nations** or most countries.
2. **Syrian Claims: Syria** continues to claim sovereignty over the region, complicating peace talks.
3. **Impact on Regional Stability:** Israeli plans for **expansion** in the Golan Heights increase tensions in an already volatile region.

Key Insights from the 4th Edition of ILO Global Estimates on International Migrants in the Labour Force

Syllabus: Economy (GS Paper III), International Relations (GS Paper II), Social Issues (GS Paper I)

Context:

The **International Labour Organization (ILO)** released the **4th edition of Global Estimates on International Migrants in the Labour Force**, providing data on the growing population of migrant workers and their challenges.

Key Findings

1. **Global Migrant Numbers: 284.5 million** international migrants were recorded, with **255.7 million** in the global **working-age population** (15 and over).
2. **Gender Composition:**
   - **Women:** Constitute **38.7%** of international migrant labour force.
   - **Men:** Account for **61.3%**.
3. **Labour Force Contribution:** International migrants represented **4.7%** of the global labour force in 2022.
4. **Unemployment:** Unemployment rates among **international migrants** were **higher** than for non-migrants.

Who are International Migrants?

1. **Definition:**
   - **Persons residing in a country** other than their country of birth (foreign-born residents).
   - Includes **refugees, asylum seekers**, and related groups.
2. **Role in Economic Growth:** Migrants contribute significantly to global economic growth through **labour** and **remittances**.
3. **Remittance Trends:** International remittances increased from **USD 128 billion in 2000** to **USD 831 billion in 2022** (*World Migration Report 2024*).

Key Challenges Faced by International Migrants

1. **Discrimination:**
   - **Earnings Gap:** Migrants earn **25% less** than local workers.
2. **Rising Conflicts:** Conflicts like **Ukraine-Russia** and **Middle East crises** displace millions.
3. **Limited Access to Services:**
   - **Healthcare and Social Protection:** During **COVID-19**, many migrant workers lacked **basic medical assistance** and **income security** in destination countries.
4. **Social Challenges:**
   - **Xenophobia:** Rising **hostility towards foreigners** exacerbates the plight of migrants.

Global Initiatives for International Migrants

1. **International Organization for Migration (IOM):** Established in **1951**, the IOM is the leading **inter-governmental organization** for migration management.
2. **International Labour Organization (ILO):** Advocates for **migrant worker rights** and promotes **fair labour migration practices**.
3. **1990 UN Convention: International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families**, adopted by the UN General Assembly.
4. **Global Compact for Migration (2018):** First intergovernmental agreement addressing all dimensions of international migration, aiming for **safe, orderly, and regular migration**.

Way Forward

1. **Ensuring Equal Rights:** Strengthen **legal frameworks** to eliminate **discrimination** and ensure **fair wages** for migrant workers.
2. **Conflict Mitigation:** Global cooperation to address **geopolitical conflicts** affecting migrant populations.
3. **Access to Social Services:** Provide **universal access** to healthcare and **social protection** for migrants in destination countries.
4. **Awareness Campaigns:** Promote awareness to counter **xenophobia** and highlight the **economic contributions** of migrants.
5. **Improving Data Collection:** Strengthen mechanisms for collecting and analyzing **migrant-specific data** to inform policy decisions.

Strengthening India-Sri Lanka Relations for Regional Stability

Syllabus: International Relations (GS Paper II)

Context:

India and Sri Lanka share a long history of **cultural, economic, and strategic ties**, which have recently deepened through cooperation in **trade, defence**, and **energy**, against the backdrop of growing **geopolitical competition** in the **Indian Ocean region**.

Historical Background and Agreements

1. **Cultural Ties:** Rooted in **Buddhism**, which spread from India to Sri Lanka during **Emperor Ashoka's reign**, fostering religious and historical connections.
2. **Post-Independence Relations:**
   - **Indo-Sri Lanka Agreement (1987):** Sought to resolve the **Tamil issue** by offering autonomy to Tamil regions.
3. **Civil War Era:**
   - Relations were strained due to:
     - **Indian Peacekeeping Force (IPKF)** involvement.
     - Tensions over **LTTE activities**.
4. **Post-Civil War (2009):**
   - India supported **reconstruction efforts**, focusing on:
     - **Aid to Tamil communities**.
     - Addressing **human rights concerns**.
5. **Trade Relations:**
   - **India-Sri Lanka Free Trade Agreement (ISFTA), 2000:** Boosted trade, making India **Sri Lanka's largest trading partner**.

Recent Outcomes of Bilateral Meetings

1. **Economic Cooperation:** Agreements on **energy connectivity**, including:
   - Multi-product **petroleum pipelines**.
   - **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:
     - **Indian Housing Project**.
     - Renewable energy efforts in **Tamil areas**.
4. **Regional Stability:** Reaffirmed mutual goals under the **Colombo Security Conclave** for **enhanced maritime security**.

Significance of India-Sri Lanka Relations

1. **Strategic Location:** Sri Lanka's position in the **Indian Ocean** is crucial for securing **Sea Lanes of Communication (SLOCs)**.
2. **Maritime Security:** Ports like **Hambantota** play a key role in regional stability amid **Chinese influence**.
3. **Economic Collaboration:** Trade, investment, and energy partnerships bolster **regional development**.
4. **Cultural and People-to-People Ties:** Shared history fosters goodwill 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.
   - **Example:** Chinese naval vessels docking in Sri Lankan waters.
2. **Fishing Disputes:** Arrests of Indian fishermen in the **Palk Strait** create tensions.
3. **Tamil Issue:** Lack of progress on the **13th Amendment** for Tamil autonomy remains contentious.
4. **Geopolitical Rivalries:** Sri Lanka struggles to balance relationships with **China** and **India**.
5. **Debt Crisis:** Sri Lanka's **economic instability** requires sustainable aid and trade ties.

Way Forward

1. **Strengthen Strategic Ties:**
   - Enhance maritime security through joint exercises and **infrastructure investments**.
   - **Examples:** Colombo Security Conclave and Trincomalee oil tank farm project.
2. **Address Tamil Issues:** Advocate for **equitable political solutions** for Tamil minorities.
3. **Expand Economic Engagement:** Conclude the **India-Sri Lanka Free Trade Agreement (FTA)** for broader trade coverage.
4. **Counter Chinese Influence:**
   - Leverage **soft power** and **strategic investments** to balance geopolitical competition.
   - **Example:** Development of **Sampur Power Plant**.
5. **People-Centric Initiatives:** Focus on **community welfare** through education, healthcare, and housing programs.

Arakan Army: A Regional Threat in South Asia

Syllabus: International Relations (GS Paper II), Internal Security (GS Paper III)

Context:

The **Arakan Army**, an insurgent group from Myanmar, has reportedly **encroached on Bangladesh's territory** near Teknaf, escalating tensions along the **Bangladesh-Myanmar border**.

About the Arakan Army (AA)

1. **Founded: 2009**.
2. **Nature:** An **ethno-nationalist armed group** and the military wing of the **United League of Arakan (ULA)**.
3. **Representation:** Represents the **Rakhine ethnic group** in Myanmar's **Rakhine State**.
4. **Aim:**
   - Advocates for **greater autonomy** and the restoration of **sovereignty** for the Rakhine people.
   - Challenges Myanmar's **central government** to secure regional independence.
5. **Operational Regions:**
   - Primarily based in **Myanmar's Rakhine State**.
   - Expanded operations into **border areas** near **Bangladesh**, including:
     - **Teknaf region**.
     - **Saint Martin's Island**.

Significance of the Arakan Army's Activities

1. **Strategic Positioning:** Located along key maritime and land routes, the group's encroachment poses challenges to **regional stability**.
2. **Cross-Border Implications:**
   - Infiltration into **Bangladesh's territory** near Teknaf raises concerns about:
     - **Sovereignty violations**.
     - **Security risks** for both nations.
3. **Geopolitical Impact:**
   - Adds pressure on Myanmar's internal conflict management.
   - Strains Bangladesh-Myanmar relations amid existing tensions over **Rohingya refugee crises**.

Challenges Posed by the Arakan Army

1. **Security Threats:** Armed incursions destabilize **border security** and may lead to cross-border conflicts.
2. **Impact on Refugees:** The presence of insurgents in Rakhine impacts **Rohingya refugees**, already displaced and vulnerable.
3. **Illegal Activities:** Potential involvement in **illegal trade**, **drug trafficking**, and other cross-border crimes.
4. **Regional Instability:** Escalates geopolitical tensions involving **Bangladesh**, **Myanmar**, and potentially neighboring nations like **India**.

Bangladesh's Concerns

1. **Encroachment on Sovereignty:** Reports of territorial violations near **Teknaf** highlight challenges in maintaining territorial integrity.
2. **Border Management:** Struggles to monitor and secure its porous borders with Myanmar.
3. **Humanitarian Crisis:** Further complicates the **Rohingya crisis**, with potential spillover of violence into refugee camps.

Way Forward

1. **Strengthen Border Security:** Deploy **advanced surveillance** and **patrolling mechanisms** along the Bangladesh-Myanmar border.
2. **Regional Cooperation:** Engage with Myanmar and regional partners like **India** and **ASEAN** to address insurgency concerns.
3. **Address Root Causes:** Support initiatives to resolve **Rakhine's political grievances** through dialogue and development.

4. **Diplomatic Engagement:** Utilize international forums to press Myanmar for greater accountability and actions against insurgent groups.
5. **Humanitarian Support:** Ensure security for **Rohingya refugees** while addressing the risks posed by insurgent groups like the Arakan Army.

INTERNAL SECURITY & DEFENCE

Protected Area Permit (PAP)

Syllabus: Internal Security – Governance

Context:

The Government of India has reinstated the **Protected Area Permit (PAP)** regime in **Manipur**, **Mizoram**, and **Nagaland**due to security concerns over the influx of individuals from neighbouring countries.

About Protected Area Permit (PAP):

1. **What It Is:**
   - An official document required by **foreign nationals** to visit specific "protected" areas in India.
   - Governed under the **Foreigners (Protected Areas) Order, 1958.**
2. **States and Regions Under PAP:**
   - **Northeastern States:** Arunachal Pradesh, Manipur, Mizoram, Nagaland, parts of Sikkim.
   - **Others:** Parts of Himachal Pradesh, Jammu & Kashmir, Rajasthan, and Uttarakhand.
3. **Authority to Declare PAP:**
   - Declared by the **Ministry of Home Affairs (MHA)** based on national security and strategic considerations.

Procedure to Obtain PAP:

1. **Application Submission:** Foreigners must submit applications to **Indian Missions abroad** or **competent local authorities** within India.
2. **Special Cases:** Applications requiring **special clearance** (e.g., from citizens of specific countries) are referred to the **MHA**with recommendations from the concerned state government.
3. **Eligibility:** PAP is issued to **group tourists** (minimum of 2) or **individuals** with exceptional reasons.

Features of PAP:

1. **Validity:** Time-bound and valid for pre-specified **circuits/routes** and **entry/exit points.**
2. **Registration Requirement:** Foreigners must register with the district **Foreigners Registration Officer** (FRO) within **24 hours** of arrival.
3. **Restricted Countries:** Citizens of **Afghanistan, China, and Pakistan** (and others deemed sensitive) require prior approval from the **MHA.**
4. **Group Size:** Typically issued to **groups** of two or more people.
5. **Prohibited Activities:** Overstaying and deviation from approved routes are strictly prohibited.

Why PAP is Important:

1. **National Security:** Protects sensitive border regions from unauthorized foreign access.
2. **Indigenous Protection:** Safeguards **cultural, social, and environmental integrity** of indigenous communities in these regions.
3. **Controlled Tourism:** Regulates the flow of foreign tourists to maintain **ecological balance** and **local harmony.**
4. **Strategic Concerns:** Mitigates the risk of **illegal migration, espionage, and security threats** from neighbouring countries.

ECONOMY

75 Years of the Banking Regulation Act, 1949: A Milestone in Financial Stability

Syllabus: Indian Economy (GS Paper III)

Context:

The **Banking Regulation Act, 1949**, celebrated its **75th anniversary**, marking its pivotal role in regulating and supervising India's banking sector to ensure financial stability and depositor protection.

Key Provisions of the Banking Regulation Act, 1949

1. **Licensing and Operations:**
   - Mandatory **RBI license** for banks to operate.
   - Guidelines for opening and closing branches.
2. **Management Oversight:**
   - RBI's control over the **composition of the board of directors** and appointment of key personnel.
   - Powers to approve or remove directors and senior management in the interest of the banking system.
3. **Financial Stability:** Regulations on **cash reserves**, **statutory liquidity ratios (SLR)**, and restrictions on dividend distribution.
4. **Public Disclosure:** Mandatory **audits** and transparency in financial reporting to protect depositor interests.
5. **Regulatory Oversight:** Empowered RBI to issue directions, inspect books, and impose penalties for non-compliance.

Achievements of the Banking Regulation Act, 1949

1. **Inclusion and Outreach:** Directed credit to priority sectors like **agriculture** and **small industries**, fostering **financial inclusion**.
2. **Stabilization:** Ensured **banking sector resilience** during crises like the **2008 global financial crisis** through regulatory measures (capital adequacy, liquidity norms).
3. **Trust Building:** Strengthened depositor confidence by providing a robust **regulatory framework** and deposit insurance (DICGC).
4. **Prompt Corrective Action (PCA):** Enabled early identification of distressed banks and prescribed **corrective measures** to prevent failures.
5. **Adaptation to New Challenges:**
   - Addressed modern banking needs:
     - Introduction of **Payment Banks (2014)**.
     - Launch of **Small Finance Banks (2016)** to cater to niche banking needs.
     - Facilitated growth of **digital banking** and **fintech solutions**.

Historical Context

- **Pre-Independence Banking Regulation:**
  - Banks were regulated under the **Companies Act (1850)** and **RBI Act (1934)**.
  - Post-1949: The Banking Regulation Act introduced **comprehensive reforms** to address evolving banking requirements.

Significance of the Act Today

1. **Strengthening Financial Inclusion:** Aligns banking regulations with **financial inclusion objectives**, fostering growth in underserved sectors.
2. **Global Standards Compliance:** Ensures Indian banks adhere to **international banking norms** like Basel III.
3. **Safeguarding Depositors:** Enhanced depositor security through **resolution mechanisms** and improved governance.
4. **Adapting to Technological Advancements:** Supports **digital banking**, **UPI integration**, and innovations in financial technology.

Challenges and Way Forward

1. **Challenges:**
   - Evolving nature of **cyber threats** in digital banking.
   - Addressing the increasing complexity of **global banking operations**.
   - Managing **non-performing assets (NPAs)** in a dynamic economic environment.
2. **Way Forward:**
   - Strengthen **cybersecurity frameworks** for digital banking.
   - Enhance the **PCA framework** to identify risks in smaller banks.
   - Facilitate **greater autonomy** for RBI to address systemic risks effectively.

RBI Enhances Collateral-Free Agricultural Loan Limit

Syllabus: Economy (GS Paper III), Agriculture (GS Paper III)

Context:

The **Reserve Bank of India (RBI)** has raised the limit for **collateral-free agricultural loans** from ₹1.6 lakh to ₹2 lakh, aiming to improve **financial access** for farmers and support their **operational and developmental needs**.

Key Directives to Banks

1. **Enhanced Loan Limit:** The collateral-free agricultural loan limit has been increased from ₹1.6 lakh to ₹2 lakh per borrower.
2. **Implementation Timeline:** The revised guidelines will be effective from **January 1, 2025**, ensuring prompt financial assistance.
3. **Awareness Campaigns:** Banks must initiate **awareness drives** to inform farmers and stakeholders about the new directive.

Significance of the Enhanced Limit

1. **Enhanced Credit Accessibility:** Increases loan availability for **small and marginal farmers**, who constitute **over 86%** of the agricultural sector.
2. **Streamlined Loan Disbursement:** Simplifies the loan process, encouraging greater uptake of **Kisan Credit Card (KCC)** loans.
3. **Promotion of Financial Inclusion:** Expands formal **financial access** for rural farming communities, fostering **credit-driven economic growth**.
4. **Alignment with Sustainable Agriculture Goals:** Supports the government's vision for **sustainable agriculture** by enabling farmers to invest in better resources.

Key Issues in Agricultural Credit Disbursement

1. **Skewed Focus:** Heavy emphasis on **short-term crop loans**, neglecting medium- and long-term agricultural investments.
2. **Rising Fiscal Burden:** Frequent **loan waivers** increase fiscal stress on state governments.
3. **Dependence on Non-Institutional Credit:** Farmers often rely on **moneylenders**, exposing them to high-interest rates and exploitation.

Other Initiatives to Enhance Agricultural Credit Flow

1. **Promotion of Co-operative Credit Societies:** Strengthening **Primary Agricultural Credit Societies (PACS)** to provide loans at the **grassroots level**.
2. **Kisan Credit Card (KCC) Scheme:** Ensures **adequate and timely credit** for agricultural operations, inputs, and allied activities.
3. **Modified Interest Subvention Scheme:** Offers **short-term loans** at concessional interest rates for agriculture and allied activities.

Supreme Court Clarifies GST on Coconut Oil

Syllabus: Economy (GS Paper III), Governance

Context:

The Supreme Court of India ruled that **coconut oil** packaged in **small quantities** is taxed as **edible oil (5% GST)** unless explicitly labeled and marketed as **hair oil**, which attracts **18% GST**.

About Coconut Oil Tax Dispute

1. **Case Background:**
   - The issue revolved around the classification of **coconut oil** sold in packages ranging from **5 ml to 2 litres**under the **GST regime**.
   - The Revenue Department argued that small-sized coconut oil packages should be classified as **hair oil**, attracting **18% GST**.
2. **GST Classification:**
   - **Edible Oil:** Attracts **5% GST**.
   - **Hair Oil:** Attracts **18% GST**.
   - Confusion arose due to the **dual-use nature** of coconut oil, used both for cooking and as a cosmetic product.
3. **Supreme Court Judgment:**
   - Coconut oil not explicitly labeled or marketed as **hair oil** is classified under **edible oil** and taxed at **5%**.
   - **Packaging Size:** Cannot be the sole determinant for classification.
   - **Labelling:** Clear and explicit labelling is essential for classifying a product as **hair oil**.
   - The decision aligns with the **Harmonized System of Nomenclature (HSN)** for global tax consistency.

Significance of the Ruling

1. **Clarity in Taxation:**
    - Reduces ambiguity in **GST classification** of dual-use products.
    - Ensures fair taxation practices for manufacturers and consumers.
2. **Consumer Impact:** Lowers the tax burden on **households** using coconut oil for cooking.
3. **Implications for Revenue Department:**
    - Encourages **strict labelling practices** to avoid disputes.
    - Sets a precedent for resolving similar dual-use product classification issues.

About Coconut Oil

1. **Versatility:** Widely used for **cooking**, **hair care**, and **skincare**.
2. **Global Production Ranking:**
    - **Top Producers:**
        1. Indonesia
        2. Philippines
        3. India
        4. Brazil
3. **India's Contribution:**
    - Kerala leads in **coconut production**, **coconut oil**, and related products.
    - Coconut cultivation is significant in other states like Tamil Nadu, Karnataka, and Andhra Pradesh.

Ensuring Fiscal Prudence Among Indian States

Syllabus: Economy (GS Paper III), Public Finance

Context:

The **Reserve Bank of India (RBI)**, in its report on state finances, highlighted the fiscal performance and challenges faced by Indian states in achieving **fiscal prudence**.

Key Findings from RBI Report

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

What is Fiscal Prudence?

- **Definition:** Responsible management of public finances through:
    - **Controlling deficits.**
    - **Maintaining sustainable debt levels.**
    - **Prioritizing productive expenditure.**

Reasons for Lack of Fiscal Prudence Among States

1. **Populist Schemes:**
    - Free electricity, water subsidies, and loan waivers strain state finances.
    - **Example:** Punjab's **free electricity scheme** raised subsidy burdens in 2023.
2. **Rising Debt Levels:**
    - Over-reliance on borrowing for both capital and revenue expenditures.
    - **Example:** West Bengal's **debt-to-GDP ratio** at 35.5% in 2023 exceeds the **FRBM limit**.
3. **Off-Budget Borrowings:**
    - Hidden liabilities through guarantees and loans by state PSUs.
    - **Example:** Andhra Pradesh's ₹55,000 crore off-budget borrowing in 2023.
4. **Resistance to Fiscal Reforms:**
    - States often avoid politically sensitive reforms like property tax increases.
    - **Example:** Rajasthan deferred property tax hikes in 2024.
5. **Dependence on Central Grants:**
    - Limited focus on self-sustained revenue generation.
    - **Example:** Northeastern states relied heavily on **central funds** in 2023.

Government Initiatives for Fiscal Prudence

1. **RBI Initiatives:**
    - **Fiscal Responsibility Legislations (FRLs):** Legal frameworks for fiscal discipline.
    - **Monitoring Off-Budget Borrowings:** Promoting transparency and better reporting.
    - **Counter-Cyclical Fiscal Policies:** Managing spending and savings based on economic cycles.
2. **Government Interventions:**
    - **Finance Commission Recommendations:** 14th and 15th commissions emphasized fiscal consolidation.
    - **Debt Consolidation Roadmaps:** Defined targets for states.
    - **Increased Capital Allocation:** Encouraging growth-focused spending.
    - **Subsidy Rationalization:** Optimizing welfare expenditure programs.

Challenges to Fiscal Prudence

1. **Rising Subsidies:** Increased reliance on **populist measures** leads to fiscal strain.
2. **High Contingent Liabilities:** Off-budget borrowing and guarantees elevate financial risks.
3. **Revenue Deficits:** Poor **tax administration** and dependency on central grants.
4. **Debt Overhang:** Liabilities remain above pre-pandemic levels, hampering fiscal flexibility.

Way Forward

1. **Risk-Based Frameworks:** Implement counter-cyclical fiscal policies for better financial resilience.
2. **Debt Consolidation:** Establish **time-bound targets** to reduce liabilities.
3. **Enhance Revenue Generation:** Strengthen **state tax administration** and rationalize subsidies.
4. **Transparency in Borrowings:** Ensure strict **reporting of off-budget liabilities** to minimize hidden fiscal risks.
5. **Focus on Productive Expenditure:** Prioritize **capital spending** to boost infrastructure and economic growth.

NITI Aayog's S.A.F.E Accommodation Report: Enhancing Housing for Industrial Workers

Syllabus: Economy (GS Paper III), Urbanization and Infrastructure

Context:

The **Site Adjacent Factory Employee (S.A.F.E.) Accommodation Report** by NITI Aayog emphasizes the importance of **secure, affordable, and flexible housing** for industrial workers. This initiative aims to bolster **India's manufacturing sector** by addressing workers' housing needs near industrial sites.

Key Highlights of the Report

1. **Purpose of S.A.F.E Accommodation:**
    - Supports India's goal of becoming a **global manufacturing hub**.
    - Enhances workers' productivity and well-being by providing **secure housing** near factories.
2. **Housing Needs Identified:**
    - **Affordability:** Cost-effective housing options to fit workers' budgets.
    - **Flexibility:** Temporary and permanent housing solutions catering to varied needs.
    - **Proximity:** Housing near industrial sites to reduce commute time and costs.
3. **Impact on Manufacturing Sector:**
    - Boosts **workforce retention** by improving living conditions.
    - Attracts **investments** by showcasing worker-centric industrial policies.
    - Enhances **worker productivity** through improved health and reduced fatigue.

About NITI Aayog

1. **Establishment:** Formed in **2015**, replacing the **Planning Commission**.
2. **Objective:** Foster **cooperative federalism** and drive economic development with a **bottom-up approach**.
3. **Leadership Structure:**
    - **Chairperson:** Prime Minister of India.
    - **Vice-Chairperson:** Appointed by the Prime Minister.
    - **Members:** Includes Chief Ministers of all states, UTs, and up to **four ex-officio members** from the Union Council of Ministers.
    - **Chief Executive Officer (CEO):** Appointed by the Prime Minister, with the rank of a Secretary to the Government of India.
4. **Functions:**
    - **Policy Formulation:** Develops strategic plans and initiatives.
    - **Cooperative Federalism:** Enhances state and central collaboration.

- **Monitoring Programs:** Evaluates government schemes for effectiveness.
- **Sustainability and Inclusion:** Advocates for inclusive growth and sustainable practices.

Recommendations in the S.A.F.E Accommodation Report

1. **Public-Private Partnerships (PPP):** Involve private developers in building and managing worker housing projects.
2. **State-Led Initiatives:** Encourage states to include worker housing under **affordable housing schemes**.
3. **Incentives for Industries:** Provide **tax benefits** or **subsidies** for companies developing on-site housing for employees.
4. **Worker-Centric Policies:**
   - Ensure **basic amenities** such as clean water, sanitation, and connectivity.
   - Promote **safety and security** in worker accommodations.
5. **Flexibility in Housing Design:** Include modular housing units that can be adapted to changing workforce needs.

Way Forward

1. **Integrate Housing with Industrial Development:** Align worker housing with industrial corridors and **smart cities projects**.
2. **Monitoring Mechanism:** Develop systems for regular assessment of **housing quality** and **worker satisfaction**.
3. **Enhance Urban-Industrial Linkages:** Strengthen connections between **housing, transportation**, and **workplace infrastructure**.
4. **Leverage Technology:** Use **GIS mapping** to identify suitable sites for worker accommodations.

Union Government Launches 'Jalvahak' Scheme to Boost Inland Waterways

Syllabus: Infrastructure (GS Paper III), Environment (GS Paper III)

Context:

The Union Government has unveiled the **'Jalvahak' Scheme**, aimed at promoting **cargo transportation** via **inland waterways** for **safe, timely, and cost-effective delivery**, supporting **sustainable logistics**.

About the Jalvahak Scheme

1. **Ministry Involved:** Launched by the **Union Ministry of Ports, Shipping & Waterways**.
2. **Implementing Agencies:** Jointly implemented by the **Inland Waterways Authority of India (IWAI)** and **Inland & Coastal Shipping Ltd (ICSL)**, a subsidiary of the **Shipping Corporation of India**.
3. **Aim:** To incentivize the **modal shift** of **800 million tonne-kilometers** of cargo using inland waterways with an investment of **₹95.4 crores**.
4. **Time Frame:** Valid for an **initial period of three years**.
5. **Route Coverage:**
   - **NW-1:** Kolkata - Patna - Varanasi - Patna - Kolkata.
   - **NW-2:** Kolkata to Pandu (Guwahati).
   - **NW-16:** Barak River via the **Indo Bangladesh Protocol Route (IBPR)**.
6. **Incentives:** Offers reimbursement of up to **35% of operating costs** for transporting cargo over a distance of more than **300 km**.

Significance of the Scheme

1. **Logistics Cost Reduction:** Lowers overall **transportation costs** for businesses.
2. **Decongestion:** Reduces the burden on **road** and **rail networks**.
3. **Sustainable Transportation:** Promotes **eco-friendly** logistics, contributing to **environmental sustainability**.

Inland Waterways in India

1. **National Waterways Act, 2016:** Declares **111 waterways** as **National Waterways (NWs)** to boost **Inland Water Transport (IWT)**.
2. **Major National Waterways:**
   - **NW-1:** Haldia to Allahabad (Ganga-Bhagirathi-Hooghly River System).
   - **NW-2:** Dhubri to Sadiya (River Brahmaputra).
   - **NW-16:** Barak River.
3. **Institutional Structure:** The **Inland Waterways Authority of India (IWAI)**, established under the **IWAI Act, 1985**, regulates and develops inland waterways in India.

Credit Guarantee Scheme for e-NWR Based Pledge Financing (CGS-NPF)

Syllabus: Economy (GS Paper III), Agriculture (GS Paper III)

Context:

The **Credit Guarantee Scheme for e-NWR Based Pledge Financing (CGS-NPF)** has been launched, enabling **farmers**to avail loans against **electronic Negotiable Warehouse Receipts (e-NWRs)** by depositing their commodities in **WDRA-accredited warehouses**.

About e-NWRs

1. **Definition:** A **digital version** of traditional warehouse receipts, governed by the **Warehousing (Development and Regulation) Act, 2007**.
2. **Features:**
   - Allows goods deposited in registered warehouses to be **transferred** or **sold** through endorsement.
   - Issuance of NWRs has been mandatory in **electronic form** since **2019**.

Key Features of the CGS-NPF Scheme

1. **Ministry:** Ministry of **Consumer Affairs, Food & Public Distribution**.
2. **Total Corpus: ₹1,000 crore** for **post-harvest finance**.
3. **Coverage:**
   - Loans up to **₹75 lakhs** for agricultural purposes.
   - Loans up to **₹200 lakhs** for non-agricultural purposes.
4. **Eligible Institutions:** All **scheduled banks** and **cooperative banks**.
5. **Eligible Borrowers: Small and marginal farmers**, women, SC/ST/PwD farmers, MSMEs, traders, FPOs, and farmer cooperatives.
6. **Risks Covered:** Addresses **credit risks** and **warehouseman risks**.
7. **Guarantee Coverage:**
   - **85%** for loans up to ₹3 lakh and **80%** for loans between ₹3 to ₹75 lakh for small/marginal farmers, women, SC/ST, and PwD.
   - **75%** for other borrowers.

Significance of the Scheme

1. **Minimizes Distress Selling:** Ensures availability of **post-harvest finance**, enabling farmers to store produce and sell at **better prices**.
2. **Enhances Bankers' Confidence:** Mitigates default risks arising from **credit** and **warehouseman risks**, encouraging financial institutions to lend.

About Warehousing Development and Regulatory Authority (WDRA)

1. **About:** A **statutory body** under the **Warehousing (Development & Regulation) Act, 2007**.
2. **Objective:** Introduces the **Negotiable Warehouse Receipt (NWR) system**, allowing farmers to store their produce in **scientifically managed warehouses**.
3. **Key Functions:**
   - Regulates warehouses.
   - Promotes **scientific storage** and boosts **supply chain efficiency**.

Achievements and Challenges of the Smart Cities Mission (SCM)

Syllabus: Urban Development (GS Paper III), Governance (GS Paper II), Social Issues (GS Paper I)

Context:

The **Smart Cities Mission (SCM)** has achieved **91% project completion**, creating **smarter and more livable urban spaces** across India.

About the Smart Cities Mission (SCM)

1. **Launch Year:** Initiated in **2015**.
2. **Aim:** To improve the **quality of life** in **100 cities** through efficient services, robust infrastructure, and sustainable urban solutions.
3. **Key Implementation Approaches:**
   - **Area-Based Development (ABD):** Focuses on targeted development of specific city areas through **redevelopment** or **greenfield projects**.
   - **Pan-City Projects:** Implements **technology-driven solutions** to enhance **city-wide infrastructure** and services.
4. **Mission Features:**
   - Establishment of **Special Purpose Vehicles (SPVs)** for implementation.

- Promotes **competitive federalism** and **citizen engagement**.
- Encourages funding from multiple sources, including private investment.

Key Achievements of SCM

1. **Integrated Command and Control Centres (ICCC):** Operational in all **100 Smart Cities**, leveraging technologies like **AI**, **IoT**, and **Data Analytics** for improved urban management.
2. **Public Safety:** Over **84,000 CCTV cameras** installed to monitor crime and enforce traffic regulations.
3. **Solid Waste Management: 66 cities** have deployed **RFID-enabled vehicles** to optimize waste collection.
4. **Healthcare Facilities: 172 e-health centers** and **152 health ATMs** established for accessible healthcare.
5. **Promoting Active Living:** Initiatives like **Cycles4Change** and **Streets4People** create open spaces for healthy lifestyles.
6. **Food Safety: EatSmart Cities** promotes food hygiene and sustainable food practices in urban areas.
7. **Transport Solutions: Transport4All:** Encourages startups to support public transport.

Challenges in Smart Cities Mission

1. **Adapting to Emerging Needs:** Addressing **COVID-19 impacts** and post-pandemic urban planning challenges.
2. **Inclusivity:** Ensuring equitable access to **public spaces** and **services** for all citizens.
3. **Food Hygiene and Health:** Further efforts required to improve **food safety** standards in smart cities.

Strategies and Suggestions

1. **Enhanced Area-Based Development:** Expand **redevelopment** and **greenfield projects** to increase efficiency and sustainability.
2. **Inclusive Pan-City Initiatives:** Implement **smart solutions** across entire cities to ensure **equitable benefits** for all.
3. **Citizen Engagement:** Foster greater community participation to align developments with **local needs**.
4. **Technological Integration:** Expand the use of **AI** and **data analytics** for real-time urban management.
5. **Focus on Hygiene and Health:** Scale up projects like **EatSmart Cities** and **e-health services** to improve overall well-being.

Sovereign Gold Bond Scheme: A Secure Investment Alternative

Syllabus: Economy (GS Paper III), Financial Instruments

Context:

The Indian government is considering discontinuing the **Sovereign Gold Bond (SGB) Scheme** due to **high financing costs**, despite its role in providing a secure and interest-earning alternative to physical gold.

About Sovereign Gold Bond Scheme

1. **Launched:** Introduced in **November 2015**.
2. **What It Is:** A **government-backed debt security**, denominated in **grams of gold**, serving as an alternative to physical gold holdings.
3. **Issuer:** Issued by the **Reserve Bank of India (RBI)** on behalf of the **Government of India**.
4. **Eligibility:**
   - Open to **Indian residents**, including:
     - **Individuals**.
     - **Hindu Undivided Families (HUFs)**.
     - **Trusts**, **universities**, and **charitable institutions**.
   - **Minors** can invest through guardians.
5. **Investment Limits:**
   - **Minimum Investment:** 1 gram of gold.
   - **Maximum Investment:**
     - 4 kg for **individuals** and **HUFs** per fiscal year.
     - 20 kg for **trusts**.

Benefits of SGB Scheme

1. **Interest Earning:** Provides a **2.5% annual interest** on the investment, credited semi-annually.
2. **No Storage Risks:** Eliminates concerns of **theft**, **loss**, or **purity issues** associated with physical gold.
3. **Tax Benefits: Exemption from capital gains tax** on redemption.
4. **Market-Linked Value:** The redemption value is tied to the **market price of gold** at maturity.
5. **Liquidity Options:** Tradable on stock exchanges after a lock-in period of 5 years.

Risks of SGB Scheme

1. **Price Volatility:** Returns are tied to **gold market prices**, making them susceptible to fluctuations.
2. **Potential Capital Loss:** If gold prices fall, investors could incur **capital loss** despite the interest earnings.

Significance of SGB Scheme

1. **Reduces Gold Imports:** Helps curb the **demand for physical gold**, reducing India's **current account deficit (CAD)**.
2. **Encourages Formal Investments:** Promotes **financial savings** over informal or physical gold holdings.
3. **Government Financing:** Provides a **low-cost borrowing mechanism** for the government.

Challenges Leading to Potential Discontinuation

1. **High Financing Costs:** The government incurs significant costs to offer interest payments and manage gold price-linked redemption.
2. **Low Public Awareness:** Many potential investors remain unaware of the scheme's benefits.
3. **Preference for Physical Gold:** Cultural and emotional attachments drive demand for **tangible gold** over digital alternatives.

India's First Fully Solar-Powered Border Village: Masali

Syllabus: Energy and Infrastructure (GS Paper III), Rural Development

Context:

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

About Masali Village

1. **Location:** Situated in **Banaskantha district, Gujarat**, about **40 km from the Pakistan border**.
2. **Solarisation Details:**
   - Solar rooftops installed on **119 houses**, generating over **225 kilowatts** of electricity.
   - Implemented under the **PM Suryaghar Yojana**.
3. **Significance:**
   - Marks India's **first solar-powered border village**.
   - Enhances **energy self-sufficiency** and reduces reliance on traditional energy sources.
   - Boosts development in remote, strategic border areas.

Part of a Larger Initiative

1. **Border Development Project:**
   - Aims to solarize **11 villages in Vav taluka** and **6 in Suigam taluka** in Gujarat.
   - Focuses on **renewable energy adoption** in border areas for **energy security** and **sustainable development**.
2. **Strategic Importance:**
   - Promotes **energy security** in remote and sensitive regions near the international border.
   - Reduces carbon footprint and aligns with India's **green energy goals**.

About PM Suryaghar Yojana

1. **Objective:**
   - Promote **solar energy adoption** in rural and border regions.
   - Enhance access to **clean and affordable energy**.
2. **Key Features:**
   - **Subsidized rooftop solar installations** for households.
   - Encourages local employment and skills in **renewable energy sectors**.
   - Supports India's commitment to achieving **net-zero emissions** by 2070.

Significance of Solarisation in Border Areas

1. **Energy Self-Sufficiency:** Reduces dependence on grid power in **remote regions**.
2. **Environmental Benefits:** Promotes **renewable energy**, reducing greenhouse gas emissions.
3. **Strategic Development:** Supports **border security personnel** by ensuring uninterrupted energy supply.
4. **Economic Upliftment:** Generates local employment opportunities in **solar energy installation** and maintenance.

Way Forward

1. **Replicating the Model:** Expand solarisation to other **border villages** across India.
2. **Integration with National Goals:** Align with India's targets under **National Solar Mission** and **Paris Climate Agreement**.
3. **Capacity Building:** Train locals in **solar energy technologies** for long-term sustainability.
4. **Enhancing Rural Infrastructure:** Combine solar energy initiatives with improved **road, communication**, and **health infrastructure** in remote areas.

Standing Committee on Railways Recommends Steps for Modernization and Financial Sustainability

Syllabus: Infrastructure (GS Paper III), Governance

Context:

The **Standing Committee on Railways** released its report addressing challenges in **modernization**, **financial sustainability**, and operational efficiency of Indian Railways, while proposing measures for improvement.

Key Issues Highlighted

1. **Financial Challenges:**
   - Heavy reliance on **freight revenue**:
     - Freight revenue (2023-24): ₹1,68,293 crore.
     - Passenger revenue: ₹70,693.33 crore.
2. **Operational Inefficiencies:**
   - **Stagnant freight train speed:** Average speed remains **25 km/hr** for the past 11 years.
3. **Safety Concerns:**
   - **Slow deployment of Kavach system:**
     - Only **1,465 route km** in South Central Railway and **80 route km** in North Central Railway are equipped.
     - Kavach ensures safe train operations by applying brakes automatically and facilitating inclement weather navigation.
4. **Limited R&D Investments:**
   - R&D allocation for 2024-25 was **₹72.01 crore**, including **PPP projects**, which is insufficient for innovation.

Key Recommendations

1. **Revenue Enhancement:**
   - **Review AC Class Fares:** Align with operational costs while keeping **general class affordable**.
   - **Boost Non-Fare Revenue:** Target **20% non-fare revenue** by 2030 through **advertising**, **commercial property development**, and leveraging assets.
2. **Infrastructure Development:**
   - Streamline **land acquisition** processes.
   - Enhance **coordination with state governments** for faster project clearances.
   - Expedite completion of **Dedicated Freight Corridors (DFC)** to improve freight efficiency.
3. **Safety and Modernization:**
   - Eliminate **unmanned level crossings** to reduce accidents.
   - Accelerate **track renewal** to ensure reliability and safety.
   - Fast-track deployment of the **Kavach system** across all zones for operational safety.

Significance of the Recommendations

1. **Enhanced Financial Viability:** Diversifying revenue streams and rationalizing fares will ensure **financial sustainability**.
2. **Operational Efficiency:** Increasing **freight train speed** and completing DFCs will improve transport capacity and turnaround time.
3. **Improved Safety Standards:** Scaling up the Kavach system and removing unmanned crossings will significantly reduce accidents.
4. **Encouraging Innovation:** Greater R&D investment can facilitate **technological advancements** and modernize railway operations.

Challenges in Implementation

1. **State Coordination:** Aligning with state governments for land acquisition and project execution remains complex.
2. **Funding Constraints:** Achieving non-fare revenue targets and securing funds for large-scale infrastructure upgrades.
3. **Technology Deployment:** Ensuring timely installation of Kavach and addressing compatibility issues with existing systems.
4. **Passenger Affordability:** Balancing fare hikes with affordability for lower-income groups.

Way Forward

1. **Policy Reforms:** Introduce **incentives for private investment** in railway projects.
2. **Infrastructure Modernization:** Complete **key freight corridors** and modernize passenger services to compete with road and air transport.
3. **Digital Transformation:** Leverage **AI and IoT** for real-time monitoring of train operations and safety measures.
4. **Enhanced R&D:** Allocate sufficient resources to foster **innovative railway technologies**.

SMILE Program: Enhancing India's Logistics Ecosystem

Syllabus: Economy – Infrastructure and Industrial Growth

Context:

The Government of India and the **Asian Development Bank (ADB)** signed a $350 million policy-based loan under the **Strengthening Multimodal and Integrated Logistics Ecosystem (SMILE)** program to bolster India's logistics and manufacturing sectors.

About the SMILE Program:

1. **What It Is:** A policy-based loan program aimed at enhancing India's logistics infrastructure and manufacturing sector.
2. **Ministry:** Implemented by the **Department for Promotion of Industry and Internal Trade (DPIIT)** under the **Ministry of Commerce and Industry.**
3. **Funded By: Asian Development Bank (ADB).**
4. **Aim:**
    - Improve logistics efficiency.
    - Strengthen supply chain resilience.
    - Expand manufacturing capabilities.
5. **Features:**
    - **Multimodal Logistics Infrastructure:** Enhances integration at national, state, and city levels.
    - **Standardization:** Develops uniform logistics and warehousing standards to attract private investment.
    - **Trade Logistics:** Improves efficiency in external trade logistics operations.
    - **Smart Systems:** Promotes low-emission, efficient, and technology-driven logistics solutions.

Additional Note:

The **SMILE** acronym is also used for the **Support for Marginalized Individuals for Livelihood and Enterprise**scheme under the **Ministry of Social Justice and Empowerment**, focusing on empowering transgender individuals.

About Asian Development Bank (ADB):

1. **Headquarters: Mandaluyong, Metro Manila, Philippines.**
2. **Established: December 19, 1966.**
3. **Members:**
    - **69 members,** including regional (e.g., India, China) and non-regional (e.g., USA, Japan) countries.
    - Includes members from the **UN Economic and Social Commission for Asia and the Pacific (UNESCAP)**and non-regional developed countries.
4. **Functions:**
    - Promotes social and economic development in Asia-Pacific.
    - Provides **loans, grants, and technical assistance** for development projects.
5. **Features:**
    - **Weighted Voting System:** Based on capital subscriptions.
    - **Major Shareholders:**
        - **Japan:** 15.57%
        - **USA:** 15.57%
        - **China:** 6.43%
        - **India:** 6.32%
        - **Australia:** 5.77%

Significance of SMILE Program:

1. **Boosts Manufacturing:** Enhances supply chain resilience for India's growing industrial base.
2. **Improves Trade Efficiency:** Reduces logistical bottlenecks, improving India's export competitiveness.
3. **Attracts Private Investments:** Standardized infrastructure and policies make the sector more appealing for private players.
4. **Supports Sustainability:** Encourages low-emission solutions, aligning with India's environmental commitments.

AGRICULTURE

Apiculture: A Key Driver for Sustainable Agriculture

Syllabus: Environment (GS Paper III), Agriculture (GS Paper III)

Context:

In **Assam**, **migratory beekeeping** is gaining momentum as beekeepers from **West Bengal** and **Bihar** bring bee boxes to pollinate **mustard fields** and produce **honey**.

What is Apiculture?

1. **Definition: Apiculture**, or beekeeping, is the practice of maintaining **bee colonies** in **artificial hives** for producing **honey**, **beeswax**, and providing **pollination services**.
2. **Purpose:** Supports **sustainable agriculture** and promotes 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**; predominantly found in the **wild**.
3. **Apis cerana (Asian Honeybee):** Indigenous to **South** and **Southeast Asia**; ideal for **small-scale farming**.
4. **Trigona (Stingless Bee):** Produces **medicinal honey**, catering to **niche markets**.

Impact of Beekeeping on Agriculture

1. **Improved Pollination:** Bees facilitate **cross-pollination**, significantly boosting crop yields for crops like **mustard**, **mango**, **coconut**, and **lychee**.
2. **Enhanced Crop Quality:** Pollination improves **size**, **taste**, and **nutritional value** of fruits and vegetables.
3. **Biodiversity Conservation:** Bees aid in the reproduction of **wild plants**, helping maintain **healthy ecosystems**.
4. **Economic Benefits:** Beekeepers earn from **honey production**, while farmers benefit from **higher yields**, increasing **income**.

Parliamentary Report Highlights Key Issues and Recommendations for Farmers' Welfare

Syllabus: Agriculture (GS Paper III), Governance (GS Paper II)

Context:

The **Parliamentary Standing Committee** presented its report on the **'Demands for Grants' for Farmers' Welfare** to the Lok Sabha, addressing challenges in the agriculture sector and proposing recommendations to enhance farmers' welfare and productivity.

Key Issues Highlighted

1. **Sluggish Growth in Agriculture Sector:**
   - Growth declined to **1.4% in 2023-24** from **4.7% in 2022-23**.
   - Despite employing **54.6%** of the total workforce, agriculture contributes only **18.4% of India's GVA** (2022-23).
2. **Stagnant Allocation to Agriculture:**
   - The **Department of Agriculture & Farmers Welfare (DoA&FW)** received ₹1.22 lakh crore for FY24, slightly lower than ₹1.23 lakh crore in FY21.
3. **Other Issues:**
   - **Underutilization of funds.**
   - **Low farmer income** and productivity.
   - **Increased debt burden** on farmers.

Recommendations by the Committee

1. **Legal Guarantee for Minimum Support Price (MSP):** To safeguard **farmers' livelihoods**, promote **rural economic growth**, and enhance **national food security**.

2. **Increase in PM-KISAN Assistance:**
    - Double the assistance from ₹6,000 to ₹12,000 per annum.
    - Extend the scheme to **tenant farmers** and **farm labourers**.
3. **Change in Nomenclature:** Rename **DoA&FW** to the **Department of Agriculture, Farmers & Farm Labourers Welfare** to recognize and focus on the welfare of farm labourers.
4. **Establishment of a National Commission for Minimum Living Wages:** To ensure **fair wages** for farm labourers, addressing their economic vulnerabilities.
5. **Compulsory Universal Crop Insurance Scheme:** Introduce a crop insurance scheme for **smallholder farmers** with up to **2 hectares of land**, modeled on **PM-JAY** for health insurance.

Significance of Recommendations

1. **Economic Empowerment:** Legal MSP and increased assistance under **PM-KISAN** can enhance **farmers' income** and reduce **economic distress**.
2. **Inclusive Welfare:** Recognizing **farm labourers** in policy frameworks ensures more **equitable agricultural development**.
3. **Risk Mitigation:** A **universal crop insurance scheme** can provide financial security to **smallholder farmers**, reducing dependency on loans.
4. **Sustainable Growth:** Addressing sluggish growth and fund underutilization can strengthen **agriculture's contribution to GDP** and **rural employment**.

Kisan Kavach: India's First Anti-Pesticide Bodysuit for Farmers' Safety

Syllabus: Science and Technology (GS Paper III), Agriculture (GS Paper III)

Context:

The Union Minister launched **Kisan Kavach**, a groundbreaking **anti-pesticide bodysuit**, aimed at protecting farmers from the **harmful effects of pesticide exposure**, promoting safer agricultural practices.

About Kisan Kavach

1. **What It Is:** A **washable** and **reusable bodysuit** designed to shield farmers from **pesticide toxicity**.
2. **Developed By: Biotechnology Research and Innovation Council (BRIC-inStem)**, Bangalore, in collaboration with **Sepio Health Pvt. Ltd.**
3. **Aim:** To ensure **farmer safety**, encourage **sustainable agriculture**, and prevent **health complications** arising from pesticide exposure.

Features of Kisan Kavach

1. **Durability: Washable and reusable**, with a lifespan of up to **one year**.
2. **Advanced Fabric Technology:** Employs **nucleophilic hydrolysis**, a mechanism that **deactivates harmful pesticides** upon contact with the fabric.
3. **Affordable Pricing:** Priced at **₹4,000**, with scope for reduced costs as **production scales up**.
4. **Health Benefits:** Prevents pesticide-related issues such as **breathing disorders** and **vision loss**.

How It Works

1. **Nucleophile Attachment:** The fabric is coated with **nucleophiles** that interact with pesticides.
2. **Deactivation Mechanism:** On contact, the **pesticides are neutralized**, rendering them harmless, thereby reducing **toxicity risks**.

Significance of Kisan Kavach

1. **Farmer Health Protection:** Provides a **practical solution** to minimize pesticide-related health issues.
2. **Promotion of Sustainable Agriculture:** Encourages safer handling of pesticides, aligning with **sustainable farming practices**.
3. **Economic and Social Impact:** Enhances productivity by reducing health-related absenteeism among farmers.
4. **Innovation in Agriculture:** Demonstrates the role of **technology** in addressing **agriculture-related health challenges**

Challenges in Sugar Production in India Amid Climate Changes

Syllabus: Economy (GS Paper III), Agriculture (GS Paper III), Environment (GS Paper III)

Context:

Erratic **monsoon rainfall** and **warmer winters** have led to a **12% decrease** in **sugar production** in India this season, underlining the vulnerability of this key agricultural sector to climate variations.

India's Sugar Production

1. **Global Ranking:** India is the **second-largest producer** of sugar globally, following **Brazil** (as of October 2024).
2. **State-Wise Sugar Production:**
    - **Top-Producing States:**
        - **Uttar Pradesh**: Known for subtropical sugarcane.
        - **Maharashtra** and **Karnataka**: Leading tropical producers.
        - Other states: **Tamil Nadu**, **Gujarat**, and **Andhra Pradesh**.

Characteristics of Sugarcane in India

1. **Climatic Requirements:**
    - Thrives in **tropical and subtropical regions**.
    - Requires **75–150 cm annual rainfall** and **temperatures of 20°C–40°C** for optimal growth.
2. **Soil Preference:** Grows best in **deep, fertile loam soils** with good drainage.
3. **Seasonality:**
    - **Tropical Regions:** Harvested during **October–March**.
    - **Subtropical Regions:** Harvested during **February–May**.
4. **Water Demand: Highly water-intensive**, requiring extensive **irrigation** in areas with insufficient rainfall.
5. **Uses:**
    - Primary use: **Sugar production**.
    - Secondary uses: **Ethanol production**, fodder, and jaggery manufacturing.

Challenges Affecting Sugar Production

1. **Erratic Rainfall Patterns: Monsoon variability** has disrupted water availability during crucial growth phases.
2. **Warmer Winter Temperatures:** Reduced **chilling hours** affect crop maturity and sucrose accumulation.
3. **Water Scarcity:** Being a **water-intensive crop**, sugarcane struggles in regions with poor irrigation infrastructure.
4. **Soil Degradation:** Over-cultivation and monocropping lead to declining soil fertility in major sugarcane belts.
5. **Climate Change Impacts:** Increased **frequency of droughts** and **flooding** poses a long-term risk to production.

Way Forward for Sustainable Sugar Production

1. **Climate-Resilient Varieties:** Develop and promote **drought- and heat-resistant sugarcane varieties**.
2. **Efficient Irrigation Techniques:** Implement **drip irrigation** and water-saving technologies to reduce water demand.
3. **Diversification:** Encourage crop diversification to reduce reliance on sugarcane monoculture.
4. **Ethanol Blending:** Enhance **ethanol production** from sugarcane to improve its economic viability and reduce dependence on sugar production.
5. **Agroforestry and Soil Health:** Promote **agroforestry practices** and improve soil health through crop rotation and organic farming methods.
6. **Policy Support:**
    - Ensure **minimum support prices (MSP)** and timely subsidies for farmers.
    - Invest in **weather prediction systems** and **insurance coverage** for climate risks.

Advancing Gender-Inclusive AgriTech for Women Farmers

Syllabus: Inclusive Growth, Agriculture (GS Paper III), Social Justice

Context:

The **World Economic Forum (WEF)** released a report titled **"Agritech for Women Farmers: A Business Case for Inclusive Growth"**, emphasizing the need for gender-inclusive AgriTech solutions to enhance the productivity, income, and empowerment of women farmers globally.

Key Findings from the Report

1. **Feminization of Agriculture:**
    - Women contribute to nearly **50% of India's agricultural value chains** (e.g., cotton, sugarcane, tea, coffee, cashews).
    - Despite their substantial involvement, women:
        - Earn **60% less** than men.
        - Face limited access to **finance, training, and technology**.
2. **Efficiency Gains:** Data-driven AgriTech can reduce **food loss and waste**, enabling businesses to optimize **supply chains** and enhance resilience.
3. **Business Imperative:** Gender-inclusive AgriTech represents a strategic **business opportunity** for private sector growth.

Challenges for Women Farmers in Adopting AgriTech

Demand-Side Barriers:

1. **Sociocultural Constraints:**
   - Traditional gender roles and **mobility restrictions** hinder women's access to AgriTech.
   - Safety and security concerns limit **field participation**.
2. **Limited Resources: Land ownership disparities** restrict women's access to **formal credit** and farm services.
3. **Low Literacy Levels:** Limited **education** and **digital literacy** reduce awareness and adoption of AgriTech solutions.

Supply-Side Barriers:

1. **Data Deficiency:** Absence of **gender-disaggregated data** limits understanding of specific challenges faced by women farmers.
2. **Support System Gaps:**
   - Inadequate **mentorship** and **peer learning opportunities**.
   - Weak linkage between **agricultural research** and **extension services**.

The 4Ps Framework for AgriTech Solutions for Women Farmers

1. **Product:**
   - Design **intuitive technologies** tailored to women's needs.
   - Ensure products address **practical on-field challenges**.
2. **Price:** Offer **affordable solutions** and **subsidies** to improve access.
3. **Promotion:** Conduct **targeted awareness campaigns** to educate women farmers on AgriTech benefits.
4. **Place:** Enhance accessibility by establishing **strategically located support centers**.

Added P - People: Focus on training women in leadership roles within **AgriTech enterprises**.

The Way Forward for Gender-Inclusive AgriTech

1. **Policy Interventions:** Strengthen policies to promote **women's land ownership** and access to formal credit.
2. **Capacity Building:** Train women in **digital literacy** and the **effective use of AgriTech tools**.
3. **Data Collection:** Develop **gender-disaggregated datasets** to track the impact of AgriTech on women.
4. **Private Sector Engagement:** Position gender inclusivity as a **business strategy** for AgriTech providers.
5. **Public-Private Partnerships (PPPs):** Encourage collaboration to provide **subsidized AgriTech solutions** and integrate women farmers into value chains.
6. **Community-Based Models:** Leverage women's self-help groups (SHGs) for **peer mentoring** and dissemination of AgriTech knowledge.

ETHICS, SOCIETY & SOCIAL ISSUES

Health Equity: Bridging the Gap in Universal Health Coverage

Syllabus: Health (GS Paper II), Social Justice (GS Paper II)

Context:

Achieving **health equity** is vital for **Universal Health Coverage (UHC)** in India. Despite numerous government initiatives, **systemic inequalities** in access to healthcare persist across **gender, religion, caste, region,** and **economic groups**, widening the disparity in health outcomes.

What is Health Equity?

1. **Definition: Health equity** ensures everyone has a fair chance to achieve their **highest health potential**, addressing disparities caused by **social, economic,** and **environmental factors**.

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 expenditures** and increasing **insurance coverage**.
3. **Gender Parity:** Ensuring **equal healthcare access** for women, men, and non-binary individuals.
4. **Social Determinants:** Addressing **poverty, education, housing,** and **clean water access** for better health outcomes.
5. **Quality of Care:** Delivering **timely, affordable,** and standardized healthcare services to all.

Present Inequities in Health in India

1. **Gender Inequality:**
   - **Anaemia among Women:** Affects **59%** in the lowest wealth quintile (**NFHS-5, 2019-21**).
   - **Maternal Mortality:** Higher in rural areas due to lack of care.
2. **Religious Inequality:**
   - **Infant Mortality Rates:** Higher among **Muslims** (**43 per 1,000 live births**) than the national average (**Census 2011**).
3. **Regional Disparity:**
   - **Urban Concentration: 75%** of healthcare professionals serve **27%** of the population (**WHO**).
   - **Rural Shortages: 83%** of Community Health Centres (CHCs) lack specialists.
4. **Caste and Tribal Marginalization:**
   - **Child Mortality:** Higher among **Scheduled Tribes (STs)** and **Scheduled Castes (SCs)**.
   - **Immunization Rates:** Lower for marginalized groups (**NFHS-5**).
5. **Economic Disparity:**
   - **Out-of-pocket Expenses:** Constitute **39.4%** of total health expenditure (**NHA, 2021-22**).
   - **Poverty Impact:** Over **50 million** people pushed into poverty annually due to healthcare costs.

Government Initiatives for Health Equity

1. **Ayushman Bharat – PMJAY:** Provides **₹5 lakh annual health cover** for low-income families.
2. **National Health Mission (NHM):** Strengthens **primary** and **urban healthcare systems**.
3. **Ayushman Bharat Digital Mission:** Promotes **digital healthcare access** and efficiency.
4. **Free Medicine Schemes:** Example: Tamil Nadu's robust **drug procurement system** ensures free medicines.
5. **Kerala Model:** Focuses on strong **primary healthcare infrastructure** for improved health outcomes.

Challenges to Health Equity

1. **Inadequate Public Funding:** Healthcare spending remains at **1.84% of GDP**.
2. **Healthcare Workforce Shortage:** Severe deficit of **doctors** and **specialists**, especially in rural areas.
3. **Dependence on Private Sector:** High costs in private healthcare exacerbate inequities.
4. **Socioeconomic Barriers: Poverty, gender discrimination,** and **illiteracy** hinder access.
5. **Regional Imbalances:** States with poor **healthcare infrastructure** face challenges in accessibility and quality.

Way Forward to Achieve Health Equity

1. **Increase Public Health Spending:** Raise healthcare budget to **2.5% of GDP** to improve **infrastructure** and resources.
2. **Strengthen Primary Healthcare:** Focus on **Primary Health Centres (PHCs)** and **CHCs** with adequate staffing and facilities.
3. **Expand Insurance Coverage:** Integrate informal sector workers into schemes like **PMJAY**.
4. **Leverage Technology:** Use **telemedicine** and digital platforms for better health access and awareness.
5. **Address Social Determinants:** Improve **nutrition, education**, and access to **clean water** to enhance overall health outcomes.

Combating Technology-Facilitated Gender-Based Violence (TFGBV) in the Digital Era

Syllabus: Governance (GS Paper II), Social Justice (GS Paper II), Ethics and Technology (GS Paper IV)

Context:

A study by the **Economist Intelligence Unit** revealed that **38% of adult women** have faced **technology-facilitated gender-based violence (TFGBV)**. This highlights the urgent need to address gender-based abuse in the **digital sphere**.

What is TFGBV?

1. **Definition: TFGBV** refers to actions carried out via the **internet** or **mobile technology** that harm individuals based on their **gender** or **sexual identity** or enforce **harmful gender norms**.
2. **Forms of TFGBV:**
   - **Cyberstalking**, **online trolling**, and **non-consensual sharing of intimate images**.
   - **Impersonation**, **fraud through fake profiles**, and **voyeurism**.

Characteristics of TFGBV

1. **Anonymity:** Perpetrated anonymously, often across **geographical boundaries**, making it challenging to identify and hold perpetrators accountable.
2. **Ease of Perpetration:** Requires minimal **technological skills**, time, or effort and can be executed using **low-cost tools**.
3. **Impunity:** Abusers frequently escape **punishment** or **accountability** due to the limitations of legal frameworks.
4. **Persistence of Abuse:** The **viral nature** of digital content leads to persistent abuse, causing ongoing **psychological trauma** for victims.

Way Forward for Combating TFGBV

1. **Implement Global Digital Compact Recommendations:** Adopt guidelines from the **UN Summit of the Future** to counter **technology-enabled sexual and gender-based violence**.
2. **Expand Digital Literacy Programs:** Focus on educating communities, particularly in **rural areas**, about digital safety and rights.
3. **Collaborate with the Tech Industry:**
   - Develop **AI-driven content moderation systems** to detect abusive content.
   - Ensure user-friendly **reporting mechanisms** for victims.
4. **Develop Robust Survivor Support Systems:** Initiatives like **TechSakhi** to provide **counselling**, **legal aid**, and **rehabilitation** for survivors.

GEOGRAPHY AND DISASTER

Santa Ana Winds: A Fire-Prone Weather Phenomenon

Syllabus: Geography (Climatology), Disaster Management

Context:

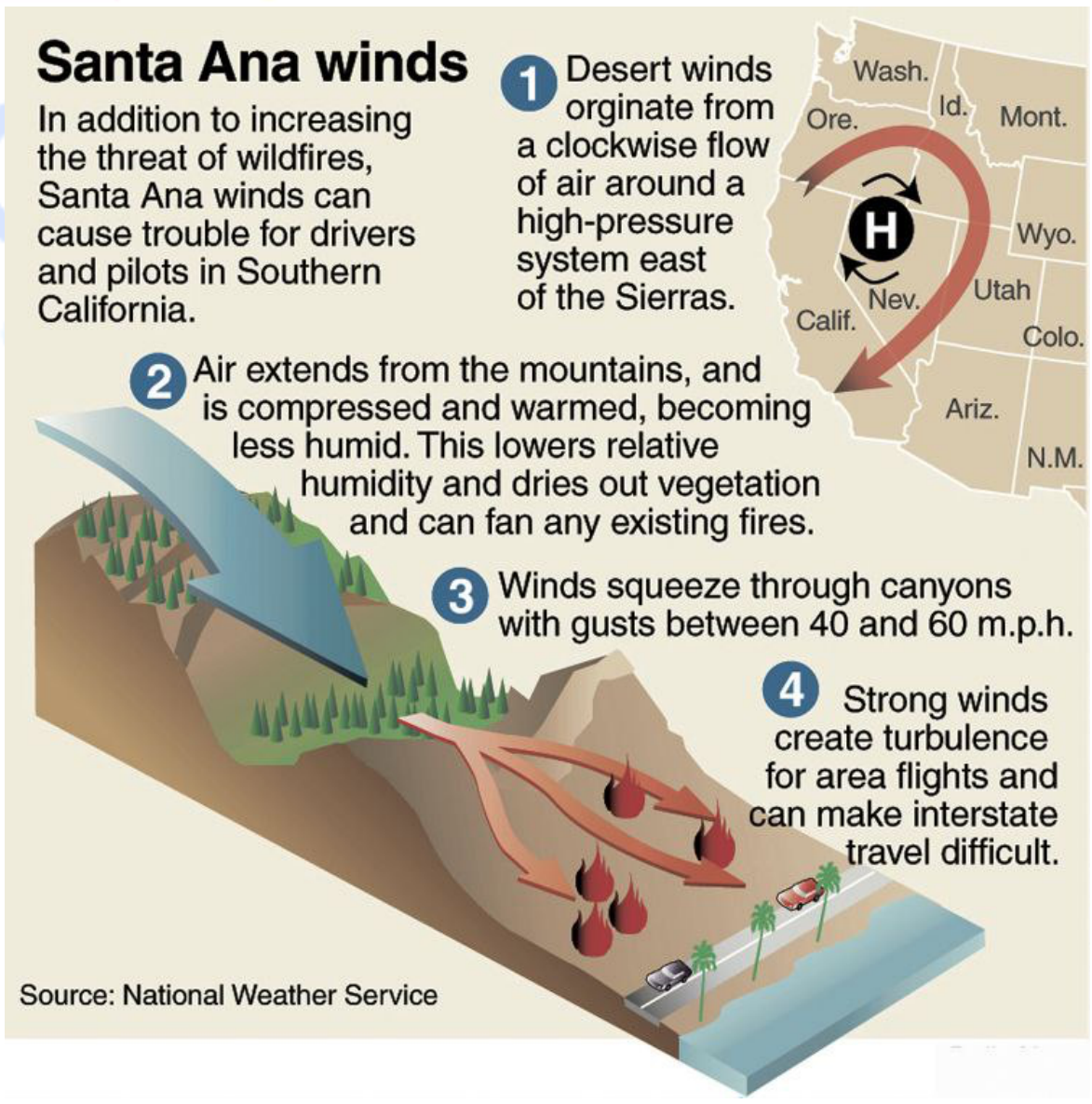
Santa Ana winds, a seasonal weather phenomenon in **California**, are marked by **hot, dry, gusty conditions** that heighten wildfire risks and cause widespread damage.

What Are Santa Ana Winds?

1. **Definition:**
   - **Santa Ana Winds**: Strong, dry winds originating from **inland deserts**, significantly impacting **Southern California's** weather patterns.
2. **Seasonality:** Occur primarily in the **fall** but may also be experienced in **winter**.

Formation of Santa Ana Winds

1. **High-Pressure Systems:** A **high-pressure system** develops over the **Great Basin**, creating a **pressure gradient**.
2. **Airflow Dynamics:** The high-pressure system pushes **north-to-northeasterly winds** toward the lower-pressure **coastal areas**.
3. **Downslope Effect:** As winds descend through **mountain passes**, they compress, warm, and lose moisture, reducing **relative humidity** and amplifying their intensity.
4. **Wind Speed:** Gusts can reach speeds of up to **80 mph**, leading to hazardous conditions.



Regions Affected by Santa Ana Winds

1. **Primary Impact Area:** Southern California, including **Los Angeles**, **San Diego**, and **Ventura counties**.
2. **Secondary Impact:** Regions like **Baja California** and adjacent coastal areas may also experience similar effects.

Impacts of Santa Ana Winds

1. **Wildfire Risk:** Hot, dry winds dry out **vegetation**, creating perfect conditions for **wildfires** to ignite and spread rapidly.
2. **Structural Damage:** High wind speeds can **damage buildings**, **power lines**, and **trees**.
3. **Health Effects:** Dust and allergens stirred by winds can aggravate **respiratory issues**.
4. **Power Disruptions: Utility companies** may implement **precautionary power outages** to avoid wildfire ignition caused by downed lines.

Kerch Strait: Strategic Link Between the Black Sea and Sea of Azov

Syllabus: Geography (GS Paper I), International Relations (GS Paper II)

Context:

A **Russian oil tanker, Volgoneft-212**, split during a storm in the **Kerch Strait**, resulting in a significant **oil spill**, raising environmental and geopolitical concerns.

About Kerch Strait

1. **Geographical Location:** Connects the **Black Sea** with the **Sea of Azov**.
2. **Separating Landforms:** Lies between **Crimea's Kerch Peninsula (west)** and **Russia's Taman Peninsula (east)**.
3. **Historical Significance:**
   - Historically called the **Cimmerian Bosporus**.
   - Later known as the **Straits of Yenikale**, named after the **Yeni-Kale fortress** in **Kerch**.
4. **Strategic Importance:**
   - **Trade Route:** Crucial for Russian exports of **crude oil, grain,** and **liquefied natural gas (LNG)**.
   - **Geopolitical Hotspot:** Significant due to its proximity to **Crimea**, a contested region.
5. **Key Harbor:** The city of **Kerch**, situated in Crimea, holds historical and economic relevance, giving the strait its name.

Environmental Concerns

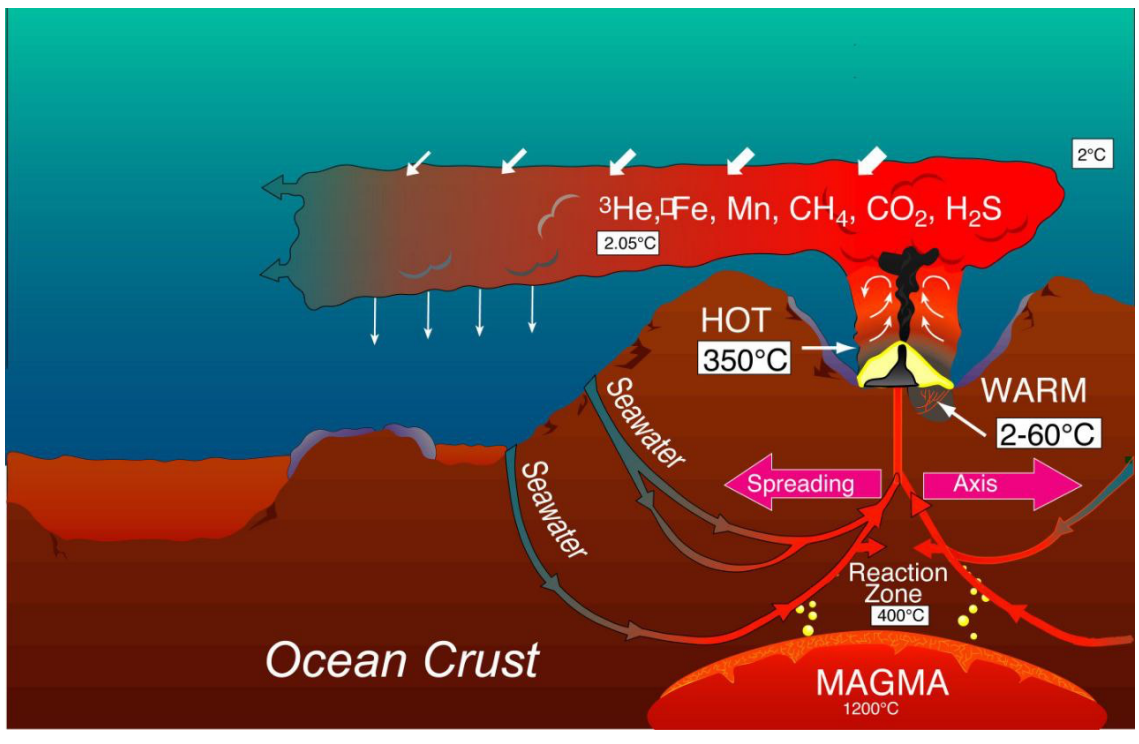
1. **Oil Spill Risks:** The **Volgoneft-212** incident highlights vulnerabilities in shipping routes.
2. **Marine Ecosystem Threats:** Spills can damage the **marine biodiversity** of both the **Black Sea** and **Sea of Azov**.

Hydrothermal Vents: Nature's Underwater Springs and Their Significance

Syllabus: Geography (GS Paper I), Environment (GS Paper III)

Context:

Indian oceanographers captured an image of an **active hydrothermal vent** at a depth of **4,500 meters** in the Indian Ocean, marking a significant milestone in deep-sea exploration.



About Hydrothermal Vents

1. **Definition:** Hydrothermal vents are **underwater springs** formed in tectonically active regions where **seawater interacts with magma** beneath the ocean floor.
2. **Location:**
   - Found near **tectonic plate boundaries**, ridges, and volcanic arcs.
   - Examples: **Central and Southwest Indian Ridges**.

Geographical Formation of Hydrothermal Vents

1. **Cold Seawater Penetration:** Seawater seeps through **cracks** in the ocean crust near **tectonic boundaries**.

2. **Heating by Magma:** The water is **superheated** (up to **370°C**) as it interacts with **magma** beneath the ocean floor.
3. **Emergence as Plumes:**
    - The heated water, enriched with dissolved minerals, emerges through the vent, forming:
        - **Mineral-rich plumes**.
        - Structures like **chimneys**, made of sulfide deposits.

Significance of Hydrothermal Vents

1. **Mineral Deposits:** Rich in economically beneficial minerals such as: **Copper**, **zinc**, **cobalt**, **nickel**, **gold**, and **silver**.
2. **Ecosystem Insights:** Hosts unique **chemosynthetic organisms** that:
    - Thrive without sunlight.
    - Provide insights into **life in extreme environments**.
3. **Economic Potential:** Vents have long activity spans (**hundreds to thousands of years**), making them viable for sustained **resource exploration**.
4. **Scientific Research:** Enhance understanding of:
    - **Deep-sea geological processes**.
    - Resource potential, supporting strategic initiatives like **India's Deep Ocean Mission**.

Deep Ocean Mission and Hydrothermal Vents

1. **Deep Ocean Mission (DOM):** India's strategic initiative to explore and harness **deep-sea resources**.
2. **Role of Hydrothermal Vents:**
    - **Resource Exploration:** Mapping mineral-rich zones.
    - **Biodiversity Research:** Studying extreme marine ecosystems.

La Niña: Understanding Its Climatic Impacts

Syllabus: Geography (GS Paper I), Environment (GS Paper III)

Context:

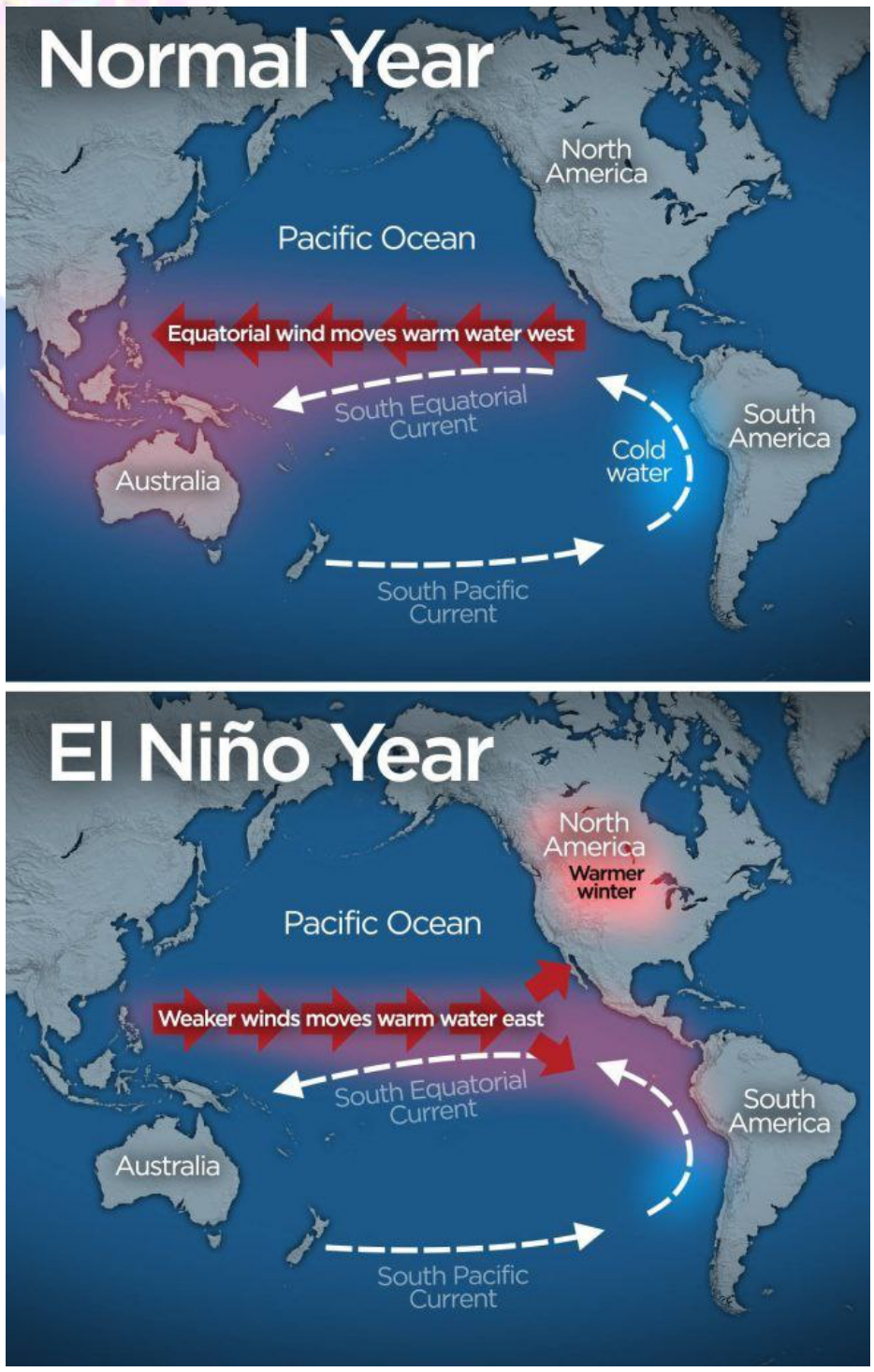
La Niña, a critical phase of the **El Niño Southern Oscillation (ENSO)**, significantly influences **global and regional weather patterns**, including **India's monsoons and winters**. The **delayed onset in 2024** has resulted in varied climatic effects worldwide.

About La Niña

1. **What It Is:** A **cooling phase** of the Pacific Ocean, marked by **lower-than-average sea surface temperatures** between **Indonesia** and **South America**.
2. **How It Forms: Strengthened trade winds** push warm water **westward**, allowing **colder water** to upwell in the **central and eastern Pacific**.
3. **Global Impacts:**
    - **Increased hurricanes** in the Atlantic Ocean.
    - **Droughts** in **Africa** and the western **U.S.**
    - **Enhanced rainfall** in **Southeast Asia** and **Australia**.
4. **Impacts on India:**
    - **Above-normal monsoons** (e.g., **2020-2022**).
    - **Colder winters** in **north India** and relief from summer heat.
    - **Higher wind speeds**, leading to improved **air quality**.

About El Niño

1. **What It Is:** A **warming phase** of ENSO, characterized by **higher-than-average sea surface temperatures** in the **eastern Pacific Ocean**.
2. **How It Forms: Weakened trade winds** allow warm water to accumulate in the **eastern** and **central Pacific**.
3. **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 waters.
4. **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

1. **What It Is:** Occurs when **La Niña conditions** persist for **three consecutive years** (a rare phenomenon).
2. **How It Forms:** Sustained **strengthening of trade winds** and persistent **cooling of the Pacific Ocean** over multiple cycles.
3. **Global Impacts:**
   - Extended **droughts** in **Africa** and the western **U.S.**
   - Increased **cyclone activity** in **Australia** and **Atlantic hurricanes**.
   - Prolonged disruptions in **agricultural** and **marine systems**.
4. **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 Strikes Mayotte: A Super Cyclone in the Indian Ocean

Syllabus: Geography (GS Paper I), Disaster Management (GS Paper III)

Context:

Cyclone Chido, a **super cyclone** with wind speeds exceeding **200 km/h**, struck **Mayotte**, a French overseas territory in the **Indian Ocean**, causing widespread destruction and highlighting the increasing threat of extreme weather events.

About Cyclone Chido

1. **Origin:** Developed over the **warm waters of the Indian Ocean**, intensifying rapidly due to **rising sea surface temperatures**.
2. **Classification:** Categorized as a **super cyclone**, with sustained wind speeds over **200 km/h** and gusts surpassing **250 km/h**.

Criteria for a Super Cyclone

1. **Wind Speed:** Sustained wind speeds exceeding **220 km/h** (137 mph).
2. **Classification:** Falls under **Category 4 or 5** on the **Saffir-Simpson scale**.
3. **Low Central Pressure:** Central pressure often below **920 hPa**, indicating extreme intensity.

About Mayotte

1. **Location:** Situated in the **Mozambique Channel**, between **northwestern Madagascar** and **northeastern Mozambique** in the **Indian Ocean**.
2. **Capital: Mamoudzou**, located on the main island, **Grande-Terre**.
3. **Governance:** An **overseas department of France**, under French administration.
4. **Geographical Composition:** Consists of **Grande-Terre** (main island), **Petite-Terre**, and surrounding **islets**.

Significance of Cyclone Chido

1. **Climatic Concern:** Reflects the increasing intensity of tropical cyclones due to **global warming** and **rising sea temperatures**.
2. **Disaster Management Challenge:** Emphasizes the need for **preparedness** and **climate-resilient infrastructure**, especially in vulnerable island territories.

Understanding Cold Wave Conditions in India

Syllabus: Environment (GS Paper III), Disaster Management (GS Paper III)

Context:

The **India Meteorological Department (IMD)** has issued a **cold wave** forecast for northern states like **Himachal Pradesh, Punjab, and Rajasthan**, with dense fog affecting parts of **Assam** and **Rajasthan**.

What is a Cold Wave?

1. **Definition:** A **cold wave** is a weather condition characterized by **extreme cooling**, with temperatures significantly below normal levels for that time of year.

2. **Criteria to Declare a Cold Wave:**
    - **Plains:** Minimum temperatures fall below **10°C** and are **5°C to 6.4°C** below normal.
    - **Severe Cold Wave:** Temperatures are **5°C or more below normal**.
    - **Hills:** Temperatures below **0°C** indicate a cold wave.

Geographic Reasons for Cold Wave in India

1. **Western Disturbances:** Weak or absent western disturbances allow **cold air** from the north to penetrate deeply into the Indian subcontinent.
2. **Snowfall in the Himalayas: Fresh snowfall** leads to **cold winds** sweeping across the northern plains, intensifying cooling.
3. **Clear Skies: Radiative cooling** during nights due to clear skies lowers temperatures significantly.

Cold Wave as a Declared Disaster

1. **National Policy on Disaster Management (NPDM):** Includes **cold waves** under disaster classification, enabling **relief measures** and mitigation efforts.

Impacts of Cold Wave on India

1. **Human Health:** Increased cases of **hypothermia**, **respiratory illnesses**, and **cardiovascular stress**, especially among **vulnerable populations** like the elderly and homeless.
2. **Agriculture:** Damage to **standing crops** like **wheat** and **mustard** due to **frost**, affecting **yields** and **farmer income**.
3. **Energy Demand:** Higher demand for **heating**, stressing **power supply systems** and increasing energy costs.
4. **Livelihoods:** Adverse effects on **outdoor workers**, particularly **farmers** and **labourers** exposed to cold conditions.
5. **Transportation: Dense fog** causes disruptions in **air, road, and rail traffic**, increasing the risk of accidents and delays.

Mitigation and Preparedness Measures

1. **Public Health Measures:**
    - Establish **temporary shelters** for the homeless with heating facilities.
    - Promote **awareness campaigns** on protection against cold-related illnesses.
2. **Agricultural Adaptation:** Encourage farmers to adopt **frost-resistant crop varieties** and **protective irrigation techniques**.
3. **Energy Management:** Strengthen **power infrastructure** to meet increased energy demands during cold waves.
4. **Transportation Safety:** Implement **fog alert systems** and ensure vehicles are equipped with **anti-fog lights**.
5. **Disaster Management:** Leverage **local administrative units** to implement **cold wave action plans** and distribute essential supplies in affected regions

Vanuatu: Earthquake-Hit Island Nation and its Geopolitical Significance

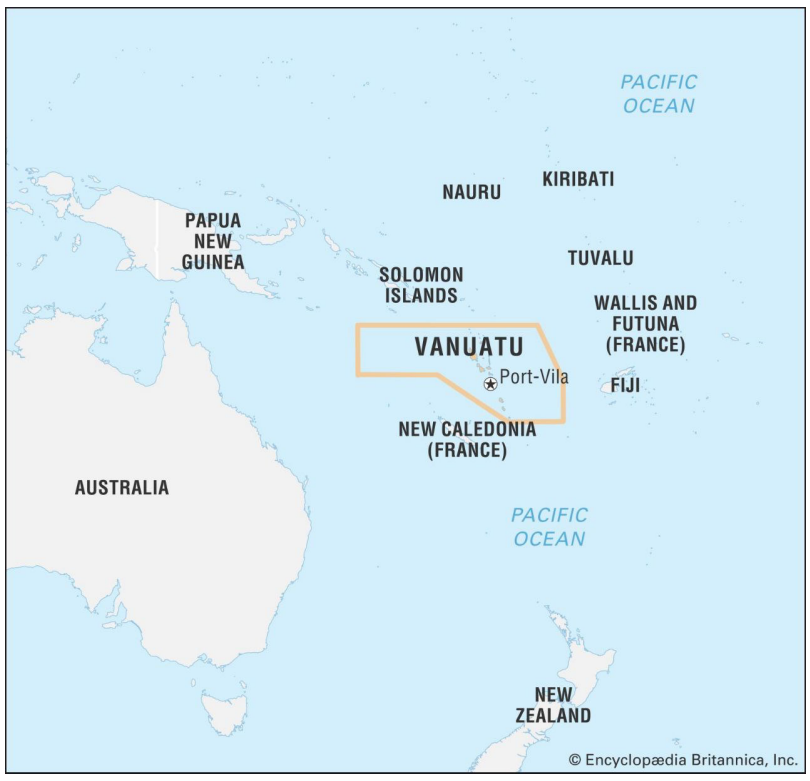
Syllabus: Geography (GS Paper I), Disaster Management (GS Paper III), International Relations (GS Paper II)

Context:

A **7.3 magnitude earthquake** recently struck **Vanuatu**, a **South Pacific island nation**, causing extensive damage and potential casualties.

About Vanuatu

1. **Location:**
    - Situated in the **South Pacific Ocean**.
    - East of **Australia**, west of **Fiji**, and southeast of the **Solomon Islands**.
2. **Capital: Port Vila**, located on the island of **Efate**.
3. **Geographic Features:**
    - Comprises **13 principal volcanic islands** and numerous smaller ones.
    - Active volcanoes include **Yasur**, **Manaro**, and **Garet**.
    - Known for **rugged terrain**, coral reefs, and unique biodiversity.
4. **Colonial History:**
    - Originally inhabited by **Melanesians**.
    - Became a joint **Anglo-French colony** under the name **New Hebrides**.
    - Gained independence in **1980**, adopting its current name.



Climate Change Vulnerability

1. **Global Risk Status:** Ranked as the **most at-risk country** globally under the **UN World Risk Index**.

2. **Rising Sea Levels:** Faces sea level rise at **twice the global average**, threatening coastal communities.
3. **Extreme Weather Events:** Frequently experiences **cyclones**, **flooding**, and **earthquakes**, exacerbating its vulnerability.
4. **Environmental Challenges:** Coastal erosion, coral bleaching, and freshwater scarcity threaten its **ecosystem and livelihoods**.

Impact of the Earthquake

1. **Human Casualties and Displacement:** Potential loss of lives and displacement of communities due to destruction of homes and infrastructure.
2. **Economic Damage:** Significant damage to **critical infrastructure**, including **ports**, **roads**, and **public facilities**, affects trade and daily life.
3. **Tsunami Threat:** Large earthquakes often trigger **tsunamis**, further endangering island nations like Vanuatu.

Way Forward for Disaster Management in Vanuatu

1. **Strengthening Infrastructure:** Build **earthquake-resistant buildings** and improve **coastal defenses** to mitigate tsunami impacts.
2. **Early Warning Systems:** Enhance **seismic monitoring** and **disaster preparedness plans**.
3. **International Collaboration:** Partner with global organizations to secure **funding** and **technical expertise** for disaster resilience.
4. **Community Awareness:** Conduct **awareness programs** and drills to prepare communities for natural disasters.
5. **Climate Adaptation:** Invest in projects that address **rising sea levels**, such as **relocation** of vulnerable communities and promotion of **sustainable tourism**.

District-Level Climate Risk Assessment in India: Flood and Drought Vulnerabilities

Syllabus: Disaster Management, Climate Change (GS Paper III)

Context:

The **District-Level Climate Risk Assessment Report for India** by IIT Guwahati, IIT Mandi, and CSTEP highlights the dual risks of floods and droughts using the **IPCC framework**, with a focus on vulnerable populations and regions.

Key Findings of the Report

1. **Flood Risk Assessment:**
   - **Very High Flood Risk:** 51 districts, concentrated in: **Assam, Bihar, Uttar Pradesh, West Bengal, Gujarat, Odisha, Jammu & Kashmir.**
   - **High Flood Risk:** 118 districts.
2. **Drought Risk Assessment:**
   - **Very High Drought Risk:** 91 districts, concentrated in: **Bihar, Assam, Jharkhand, Odisha, Maharashtra.**
   - **High Drought Risk:** 188 districts.
3. **Dual Risks (Flood and Drought):** 11 districts identified with **Very High Risk** of both flood and drought.

Definition by the India Meteorological Department (IMD):

1. **Drought:**
   - **Rainfall Deficiency:** ≥26% of long-term normal.
   - **Classification:**
     - Moderate: Deficiency of **26–50%**.
     - Severe: Deficiency of **>50%**.
2. **Flood:**
   - **Definition:** Overflow of water submerging dry land due to:
     - Heavy rainfall.
     - Cyclonic events.
     - Exceeding river or water body capacity.

Recommendations and Way Forward

1. **Multi-Scale and Sectoral Approach:** Assess risks across various sectors (e.g., agriculture, water, energy) and at different scales (state, district, local).
2. **Climate Change Scenarios:** Incorporate **future climate projections** to better understand long-term risks.
3. **Capacity Building:** Train state and district administrators in **climate risk management** and response strategies.
4. **Framework for Emerging Risks:**
   - Update assessments to include new threats like:
     - **Landslides.**
     - **Heat Stress.**
     - **Compound Events** (e.g., concurrent droughts and floods).

Significance of the Report

1. **Policy Implications:**
   - Provides a **scientific basis** for disaster preparedness and resource allocation.
   - Informs climate-resilient development planning at the district level.
2. **Focus on Vulnerable Populations:** Highlights regions requiring **urgent interventions** to mitigate socio-economic impacts.
3. **Adaptation Strategies:** Guides the formulation of **localized adaptation measures** to address dual challenges of floods and droughts.

HISTORY, ART & CULTURE

Destruction of Neolithic Ash Mound in Karnataka Highlights Need for Heritage Conservation

Syllabus: History and Culture (GS Paper I), Environment and Heritage Conservation (GS Paper III)

Context:

A **Neolithic ash mound**, dating back **4,000–5,000 years**, near **Sangankallu Hiregudda** in **Ballari, Karnataka**, has been destroyed by landowners, raising concerns about the preservation of **India's archaeological heritage**.

About Neolithic Sites

1. **What They Represent: Neolithic sites** mark the advent of **agriculture** and **animal husbandry**, showcasing the transition from **nomadic** to **settled lifestyles** between **7000–1000 BCE**.
2. **Key Features of Neolithic Sites:**
   - **Ash Mounds:** Formed by the **ritual burning of dung** and organic materials, symbolizing early community activities.
   - **Artifacts:** Include **stone tools**, **pottery**, and remnants of **settlements**.
   - **Cultural Practices:** Evidence of **Nandi worship**, early rituals, and **community-based agriculture**.
3. **Significance:** Provide insight into the **socio-cultural evolution** and **technological advancements** of early humans.

Prominent Neolithic Sites in India

1. **Sangankallu (Karnataka):** Known for **ash mounds** and evidence of early **agricultural heritage**.
2. **Mehrgarh (Balochistan, Pakistan):** Evidence of **early farming** practices and **storage facilities**.
3. **Chirand (Bihar):** Findings of **pottery**, tools, and **animal domestication evidence**.
4. **Burzahom (Kashmir): Pit dwellings** and **burial sites** reflecting early human settlement patterns.
5. **Payyampalli (Tamil Nadu):** Known for **early agricultural settlements** and lifestyle practices.

Destruction of Neolithic Ash Mounds: Challenges and Implications

1. **Cultural Loss:** Destruction of the **Sangankallu ash mound** erases valuable evidence of **rituals** and **early agricultural practices**.
2. **Neglect of Heritage:** Highlights **lack of awareness** and **regulatory gaps** in protecting India's rich **archaeological legacy**.
3. **Impact on Research:** Loss of critical **archaeological data** impairs our understanding of **human history** and **civilizational progress**.
4. **Legal and Ethical Concerns:** Non-compliance with **heritage protection laws** like the **Ancient Monuments and Archaeological Sites and Remains Act, 1958**.

Way Forward for Heritage Conservation

1. **Strengthening Heritage Laws:** Enforce stricter penalties for the destruction of **archaeological sites** and improve **monitoring mechanisms**.
2. **Community Engagement:** Involve **local communities** in heritage protection through **awareness campaigns** and **capacity building**.
3. **Technological Documentation:** Use **GIS mapping**, **3D scanning**, and **aerial surveys** to document and preserve endangered sites.
4. **Policy Initiatives:**
   - Increase funding for **archaeological research** and conservation efforts.
   - Promote **heritage tourism** as a sustainable means to preserve and valorize such sites.

ENVIRONMENT & ECOLOGY

Carbon Markets: A Pathway to Climate Action

Syllabus: Environment (GS Paper III)

Context:

With COP29 approving standards for **international carbon markets**, countries aim to establish a mechanism for trading **carbon credits** and **offsets**, facilitating effective climate goals.

What is a Carbon Market?

1. **Definition:**
   - **Carbon Market**: A system for trading **carbon credits**, where each credit allows the emission of one tonne of **carbon dioxide (CO2)** or its equivalent.
   - **Mechanism**: Operates by limiting emissions and allocating rights through **tradable credits** or **offsets**.
2. **Origin:** Introduced in the **1990s** in the **United States** as a part of the **cap-and-trade system** for reducing **sulphur dioxide emissions**.

Working of a Carbon Market

1. **Issuance of Carbon Credits:**
   - **Governments** issue a restricted number of **credits**, limiting overall emissions.
   - Each credit represents **one tonne of CO2**.
2. **Trading:**
   - Companies with **excess credits** can sell them to those in need.
   - **Market Forces**: Prices fluctuate based on **supply and demand**.
3. **Offsets:** Companies fund **afforestation** or **renewable energy projects** to offset 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

1. **Perform, Achieve, Trade (PAT) Scheme:**
   - Focuses on improving **energy efficiency** in industries.
   - Surplus credits are **tradable**.
2. **Renewable Energy Certificates (REC):** Promotes trade in **renewable energy** to meet **compliance targets**.
3. **Energy Conservation Act, 2022 Amendment:** Introduced a **domestic carbon market** to incentivize **low-carbon technologies**.
4. **Climate Action Commitment: NDCs**: India aims for a **45% reduction** in **emission intensity** by **2030**.

Positive Consequences of Carbon Markets

1. **Emission Reduction:** Imposes **financial costs** on emissions, motivating the adoption of **cleaner technologies**.
2. **Economic Efficiency:** Ensures a **cost-effective allocation** of emission rights.
3. **Support for Green Projects:** Funds initiatives like **afforestation** and **renewable energy**.
4. **Global Cooperation:** Facilitates international collaboration under **Paris Agreement mechanisms**.

Limitations of Carbon Markets

1. **Loopholes:** Weak **monitoring** can lead to **fraudulent claims** or **over-allocation of credits**.
2. **Price Volatility:** Fluctuating prices create **market uncertainty**.
3. **Limited Impact: Weak caps** may fail to achieve significant **emission reductions**.
4. **Accessibility Issues: Small businesses** and **developing nations** face challenges in participation.
5. **Criticism of Offsets:** Considered a **superficial solution**, failing to address the root cause of emissions.

Way Ahead

1. **Stricter Regulations:** Implement **robust monitoring** and **verification systems**.
2. **Capacity Building:** Empower **developing nations** to access **carbon markets**.
3. **Incentives for Green Projects:** Encourage **innovative initiatives** to offset emissions.
4. **Transparency:** Develop **clear guidelines** and ensure **public reporting** of emissions.

Olive Ridley Turtles: Guardians of the Ocean

Syllabus: Environment and Ecology (GS Paper III)

Context:

Carcasses of **Olive Ridley turtles** are being found along the **Visakhapatnam coast** during their breeding season, primarily due to **marine pollution** and **accidental entanglement** in fishing trawlers.

About Olive Ridley Turtles

1. **Smallest and Most Abundant:** The **Olive Ridley turtles** are the **smallest** yet **most abundant** sea turtles globally.
2. **Scientific Name: Lepidochelys olivacea**.
3. **Unique Nesting Behavior (Arribada):** Known for **mass nesting**, where thousands of females lay eggs simultaneously on the same beach.
4. **Geographic Distribution:**
   - Found in the **Pacific, Atlantic,** and **Indian Oceans**, thriving in warm waters.
   - **Odisha's Gahirmatha Marine Sanctuary** is the **world's largest rookery** for Olive Ridleys.
5. **Physical Features:** Adults measure **62-70 cm**, weigh **35-45 kg**, and have **paddle-like flippers** with one or two claws.
6. **Diet and Habitat:**
   - **Omnivorous**: Feed on jellyfish, shrimp, crabs, and algae.
   - Lead **solitary lives** in the **open ocean**.
7. **Migration** Migrate **thousands of kilometers annually** between feeding and mating grounds.

Conservation Status

1. **IUCN Red List:** Classified as **Vulnerable**.
2. **Wildlife Protection Act, 1972 (India):** Listed under **Schedule I**, granting **highest protection**.
3. **CITES (Convention on International Trade in Endangered Species):** Listed under **Appendix I**, prohibiting international trade.

Solid Phase Alloying: Revolutionizing Metal Recycling

Syllabus: Science and Technology (GS Paper III), Environment (GS Paper III)

Context:

A recent study demonstrates the potential of **solid phase alloying** to convert **metal scrap** into **high-performance alloys**without the need for traditional melting methods.

About Solid Phase Alloying

1. **What is Solid Phase Alloying?**
   - **Definition**: A process to create **metal alloys** directly from **scrap materials** without melting, improving their properties.
   - **Purpose**: Upcycles **metal scrap** into **high-performance alloys** for various **industrial applications**.
2. **Science Behind Solid Phase Alloying:**
   - Operates entirely in the **solid state**, avoiding energy-intensive **bulk melting**.
   - Uses **friction** and **heat** from high-speed rotation to blend and disperse metals **uniformly**.

The Process of Solid Phase Alloying

1. **Material Input: Aluminium scrap** is mixed with **copper, zinc, and magnesium**.
2. **Shear Assisted Processing and Extrusion (ShAPE):** A rotating die generates **frictional heat**, combining metals into a **uniform alloy**.
3. **Outcome:** Produces alloys with **strength and performance** matching products made from **primary aluminium**.

Benefits of Solid Phase Alloying

1. **Energy Efficiency:** Eliminates energy-intensive **melting**, lowering **manufacturing costs**.
2. **Sustainability:** Reduces **waste** by recycling **industrial aluminium scrap**.
3. **Improved Properties:** Produces **durable, high-strength alloys** comparable to newly sourced materials.
4. **Versatility:** Supports the creation of **new alloys** suitable for **3D printing technologies**.
5. **Cost-Effectiveness:** Utilizes **low-cost feedstock** from scrap, making high-performance materials more **affordable**.

India's Nuclear Power Capacity Set to Triple by 2031-32

Syllabus: Science and Technology (GS Paper III), Environment (GS Paper III)

Context:

The Union Minister for Science and Technology announced that **India's nuclear power capacity** is expected to **triple** by **2031-32**, with a long-term vision of achieving **100 GW** capacity by **2047**, as outlined in the **Vision Document for Amrit Kaal** by the **Department of Atomic Energy (DAE)**.

Status of Nuclear Energy in India

1. **Current Contribution:** Accounts for about **3%** of India's total **electricity generation** in 2022-23, making it the **fifth-largest source** of electricity in the country.
2. **Operational Capacity: Nuclear Power Corporation of India Limited (NPCIL)** operates **24 reactors** across **7 power plants**, with a total capacity of **8180 MW**.

Need for Nuclear Energy in India

1. **Growing Energy Demand:** India's expanding **population** and economy necessitate increased energy supply, as the nation is poised to become the **third-largest economy** by the decade's end.
2. **Limited Fossil Fuel Resources:** Heavy reliance on **imported coal, oil, and natural gas** creates risks for **energy security** and **economic stability**.
3. **Environmental Benefits:**
    - **Carbon savings:** Every unit of nuclear energy replacing coal-based power saves **1 kg of CO_2 emissions**.
    - Supports India's goal to become a **net-zero emitter** by **2070**.

Concerns Associated with Nuclear Energy

1. **Raw Material Constraints: Limited uranium reserves** and dependency on imports hinder expansion.
2. **High Upfront Cost: Capital-intensive** compared to other energy sources like coal and natural gas.
3. **Radioactive Waste Management:**
    - Challenges in **long-term storage** and safe disposal of radioactive materials.
    - Public fear due to past nuclear incidents like **Chernobyl** and **Fukushima**.

Steps Taken by the Government for Nuclear Energy

1. **Thorium-Based Nuclear Plant:** Setting up the **world's first thorium-based plant**, **Bhavni**, at **Kalpakkam, Tamil Nadu**, using Uranium-233.
2. **Atomic Energy (Amendment) Act, 2015:** Enables **NPCIL** to form joint ventures with other Indian **PSUs** to meet funding needs for nuclear program expansion.

India's 3-Stage Nuclear Energy Program

1. **Stage I: Pressurized Heavy Water Reactors (PHWR):**
    - Use **natural uranium** to produce **plutonium-239**.
    - Heavy water ($\mathbf{D_2O}$) acts as moderator and coolant.
2. **Stage II: Fast Breeder Reactors:**
    - Utilize **Uranium-238** and **plutonium-239** from the first stage.
3. **Stage III: Advanced Heavy Water Reactors (AHWR):**
    - Powered by a mix of **thorium** and **uranium**.

Waste to Worth: Addressing India's Urban Water Crisis through Wastewater Reuse

Syllabus: Environment (GS Paper III), Urbanization (GS Paper III)

Context:

The **Centre for Science and Environment (CSE)** and **National Mission for Clean Ganga (NMCG)** jointly released the report **"Waste to Worth: Managing India's Urban Water Crisis through Wastewater Reuse"**, highlighting the potential of wastewater treatment for achieving **water circularity** and sustainability.

Key Highlights of the Report

1. **Decline in Per Capita Freshwater Availability:** India's annual per capita freshwater availability has dropped below **1,700 cubic meters**, indicating water stress.
2. **Untreated Wastewater: 72%** of wastewater in India flows untreated into nearby **rivers**, **lakes**, and other water bodies.
3. **Potential for a Circular Economy in Water:**
   - **20%** of groundwater blocks are classified as critical or overexploited.
   - **55%** of households lack proper drainage, relying on open or no drains.

Challenges of Wastewater Treatment in India

1. **Low Operational Capacity of Sewage Treatment Plants (STPs):** Operational capacity stands at **26,000 MLD**, compared to the installed capacity of **31,000 MLD**.
2. **Systemic Issues:**
   - Mixing of different wastewater types.
   - Lack of integrated sewage networks.
   - Limited prioritization of wastewater management.

Key Recommendations from the Report

1. **Governance Reforms:**
   - Enforce **district/city-level bye-laws** with effective **monitoring mechanisms**.
   - Example: In **Karnataka**, Urban Local Bodies coordinate with the **Waste Water Reuse Resource Centre**.
2. **Equity and Justice:** Ensure **reuse benefits** reach **underprivileged communities** in informal and unplanned settlements.
3. **Decentralized STPs:** Develop **localized treatment plants** based on topography, like in **Bangalore**, where districts are divided into three zones to meet area-specific needs.

Policy Initiatives for Wastewater Treatment in India

1. **Swachh Bharat Mission (SBM) 2.0:** Promotes the **reuse of treated wastewater** for urban development.
2. **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0:** Mandates cities with a population above **0.01 million** to recycle their used water.
3. **National Framework on Safe Reuse of Treated Wastewater:** A strategic initiative by **NMCG** to guide the safe reuse of treated wastewater.

Arctic Tundra Transitions from Carbon Sink to Emissions Source

Syllabus: Environment (GS Paper III), Climate Change (GS Paper III)

Context:

The **Arctic tundra**, once a critical **carbon sink**, is now emitting **carbon dioxide (CO_2)** and **methane (CH_4)** due to rising temperatures and increased wildfires, as highlighted in the **2024 Arctic Report Card**.

About Arctic Tundra

1. **Tundra Vegetation:**
   - Refers to **sparse plant life** adapted to cold, treeless regions.
   - Includes **mosses, lichens, grasses, sedges**, and small shrubs.
2. **Geographical Location:** Lies between **66.5°N to 75°N**, covering regions in **Alaska, Canada, Greenland, Scandinavia**, and **Russia**.
3. **Features:**
   - **Permafrost:** Permanently frozen ground.

   - **Low Temperatures:** Extreme cold with short growing seasons.
   - **Vegetation:** Limited to small plants like **mosses** and **lichens**.
4. **Biodiversity:** Habitat for **Arctic foxes, caribou, polar bears**, and **migratory birds**, all adapted to the tundra's harsh environment.
5. **Significance:**
   - **Carbon Storage:** Holds over **6 trillion metric tonnes of carbon** in permafrost soils.
   - **Climate Regulation:** Reflects **solar radiation** with ice-covered surfaces, cooling the planet.

Why is the Arctic Tundra Emitting More Carbon?

1. **Thawing Permafrost:** Rising temperatures (warming **four times faster than the global average**) activate microbes that break down organic matter, releasing **CO2** and **CH4**.
2. **Increased Wildfires:** Higher frequency and intensity of wildfires release **greenhouse gases (GHGs)** and accelerate **permafrost thaw**.
3. **Temperature Records: 2024:** Recorded the **second-highest Arctic surface air temperatures** since 1900, intensifying emissions.
4. **GHG Feedback Loop:** Released **GHGs** amplify global warming, perpetuating a cycle of higher emissions and further **permafrost thaw**.

Implications of Arctic Emissions

1. **Global Warming Acceleration:** Methane, a potent GHG, intensifies **short-term warming**, exacerbating climate change.
2. **Biodiversity Impact:** Altered habitats threaten Arctic species like **polar bears** and **migratory birds**.
3. **Disruption of Carbon Cycle:** Arctic emissions disrupt the global **carbon balance**, reducing Earth's capacity to sequester carbon.
4. **Sea-Level Rise:** Melting permafrost contributes to **ice sheet destabilization**, leading to **rising sea levels**.

Climate Change and the Shifting Tree Line in the Himalayas

Syllabus: Environment (GS Paper III), Biodiversity (GS Paper III)

Context:

Climate change is altering the **tree line landscape** in the central Himalayas, where the water-dependent **Himalayan birch (Betula utilis)** is being replaced by the more **drought-tolerant fir tree (Abies spectabilis)**.

About Fir Trees (Abies spectabilis)

1. **What It Is:** A **slow-growing evergreen conifer** commonly found in mountainous regions.
2. **Features:**
   - **Needle-like leaves** and conical shape.
   - Retains **foliage year-round**, contributing to **high water-use efficiency**.
   - Adapted to **colder climates** with **moderate moisture requirements**.
3. **Found In:**
   - **Mid to high altitudes** of the Himalayas (**2,500–3,700 meters**).
   - Thrives in **cooler, less moisture-stressed environments**.

About Himalayan Birch (Betula utilis)

1. **What It Is:** A **deciduous broadleaved tree** species native to the Himalayan region.
2. **Features:**
   - Known for its **peeling bark** and bright green leaves.
   - Requires **abundant water** and cooler climates to survive.
   - Sheds leaves in winter, aiding **nutrient cycling**.
3. **Found In:**
   - **Upper altitudes** of the Himalayas (**2,900–4,500 meters**).
   - Thrives in **wetter, snow-fed environments**.

Comparison: Fir Tree vs. Himalayan Birch

FEATURE	FIR TREE (ABIES SPECTABILIS)	HIMALAYAN BIRCH (BETULA UTILIS)
TYPE	Evergreen conifer	Deciduous broadleaf
PREFERRED ALTITUDE	2,500–3,700 meters	2,900–4,500 meters
WATER NEEDS	Moderate	High
CLIMATE ADAPTATION	Thrives in warmer conditions	Struggles with warming and dryness
GROWTH	Slower, drought-tolerant	Faster, water-dependent

Impact of Climate Change on Tree Line Dynamics

1. **Shift in Species Dominance: Himalayan birch** struggles with warming temperatures and reduced water availability, leading to its **replacement by fir trees**.

2. **Impact on Ecosystems:** Loss of **broadleaf species** affects **nutrient cycling**, while dominance of **conifers** alters soil properties and water retention.
3. **Reduced Carbon Sequestration:** Birch forests sequester **more carbon** due to their faster growth, but their decline could affect **carbon dynamics**.
4. **Habitat Alterations:** Shifting tree lines impact species like **snow leopards**, **Himalayan monals**, and others dependent on specific vegetation zones.

Way Forward for Conservation

1. **Monitoring Tree Line Dynamics:** Use **GIS mapping** and **satellite imagery** to track vegetation shifts and climate impacts.
2. **Afforestation and Reforestation:** Promote **climate-resilient species** to maintain ecological balance in high-altitude ecosystems.
3. **Climate Mitigation Measures:** Address **global warming** through policies aligned with international frameworks like the **Paris Agreement**.
4. **Community Participation:** Engage local communities in **conservation efforts** and sustainable resource management.

Wroughton's Free-Tailed Bat Sighted in Delhi's Yamuna Biodiversity Park

Syllabus: Environment (GS Paper III), Biodiversity Conservation (GS Paper III)

Context:

A **Wroughton's Free-tailed Bat** (*Otomops wroughtoni*), a **Critically Endangered** species, was sighted for the first time in **northern India** at **Delhi's Yamuna Biodiversity Park**.

About Wroughton's Free-tailed Bat

1. **What It Is:**
   - A species of **free-tailed bat**, known for its **powerful flight** and preference for **cave-like habitats**.
   - First discovered in **1913**, this rare bat species has historically been observed in limited regions.
2. **Habitat:**
   - Found in:
     - **Western Ghats (Karnataka)**
     - **Northeastern India (Meghalaya)**
     - **Cambodia**
   - Roosting Preferences:
     - Prefers **dark**, **damp**, and slightly **warm environments**, such as caves.
3. **Conservation Status:**
   - **Critically Endangered (IUCN):** Threatened by **habitat loss** and limited known populations.

About Yamuna Biodiversity Park

1. **Location:** Situated along the **Yamuna riverfront** in Delhi.
2. **Developed By: Delhi Development Authority (DDA)** with technical support from the **Centre for Environmental Management of Degraded Ecosystems (CEMDE)**.
3. **Features and Contributions:**
   - **Habitat Creation:** Provides an alternative habitat for **migratory** and **resident bird species**.
   - **Genetic Conservation:** Conserves **wild genetic resources** of agricultural crops.
   - **Groundwater Recharge:** Enhances **groundwater recharge** and **freshwater availability** in the region.

Significance of the Sighting

1. **Expanding Knowledge:** The sighting expands the known **geographical range** of Wroughton's Free-tailed Bat.
2. **Biodiversity Hotspot:** Highlights the **ecological importance** of **Yamuna Biodiversity Park** as a critical habitat for rare and endangered species.
3. **Conservation Implications:** Underscores the need for **preserving habitats** to protect **critically endangered species**.
4. **Indicator of Ecosystem Health:** Presence of such species reflects the **health and success** of biodiversity conservation efforts.

Way Forward for Conservation

1. **Enhanced Monitoring:** Conduct **regular surveys** to monitor populations and habitat preferences of Wroughton's Free-tailed Bat.
2. **Habitat Protection:** Prevent habitat degradation in both natural and man-made ecosystems like the Yamuna Biodiversity Park.
3. **Community Awareness:** Promote **public awareness** about the ecological importance of bats and their role in **ecosystem services**, such as pollination and pest control.
4. **Collaborative Research:** Encourage collaboration between **conservation bodies**, researchers, and local authorities for species-specific conservation strategies.

Key Insights from the IEA's 'Coal 2024: Analysis and Forecast to 2027'

Syllabus: Economy (GS Paper III), Environment (GS Paper III), Energy Security

Context:

The **International Energy Agency (IEA)** published its **'Coal 2024: Analysis and Forecast to 2027' report**, highlighting global trends in coal **demand, production**, and **trade** by region and grade.

Trajectory of Coal Usage

1. **Coal Demand:**
   - **Global Trends:** Expected to **shrink in advanced economies** but grow in certain **emerging economies** like **India**, **China**, and **Indonesia**.
   - **India:** Anticipated to see the **largest increase in coal demand**, driven by high **power demand** linked to **economic growth**.
2. **Coal Production:**
   - **Global Trends:** Expected to reach an **all-time high in 2024**, followed by stabilization through 2027.
   - **India's Role:**
     - **Largest contributor** to global coal production growth.
     - Coal production increased by **10% in 2023**, exceeding **1 billion tonnes** for the first time.
     - In 2024, coal production is projected to grow by an additional **8%**.

Reasons for Persistent Coal Usage

1. **Rising Power Demand:** Linked to **industrial growth**, **infrastructure development**, and the goal of achieving sustained **economic growth**.
2. **Weather-Related Fluctuations: Renewable energy sources** like wind and solar are subject to **variability**, which is offset by the **reliability of coal power**.
3. **Electrification of Services:** Increased electrification in sectors like **mobility**, **industrial heat**, and emerging industries such as **data centers** and **AI** relies on coal-based energy.
4. **Profitability of Coal Exporters:** Coal profits surged post-**COVID-19** and during the **2022 energy crisis**, driving continued production and exports.

India's Initiatives for Coal Optimization

1. **Promotion of Renewable Energy:**
   - **PM KUSUM Scheme:** Encourages solar energy adoption in agriculture.
   - **PM Surya Ghar Muft Bijli Yojana:** Promotes rooftop solar installations.
2. **Streamlined Mine Opening Approvals:**
   - **Mine Opening Permission Module:** Expedites the process for opening coal mines to meet rising demand.
3. **Reducing Emissions from Thermal Plants:**
   - Use of techniques like:
     - **Flue Gas Desulphurization (FGD):** Reduces sulfur emissions.
     - **Electro Static Precipitator (ESP):** Captures particulate matter emissions.

Key Takeaways

- **Emerging Economies Lead Demand Growth:** India and China are central to global coal demand.
- **India as a Production Hub:** India's production capacity and growth are pivotal for global supply.
- **Balancing Energy Needs with Sustainability:** India's dual focus on renewable energy promotion and emissions control highlights efforts to balance **economic growth** with **environmental responsibility**.

Supreme Court Directives for Protecting Sacred Groves

Syllabus: Environment (GS Paper III), Culture and Heritage Conservation (GS Paper I), Governance (GS Paper II)

Context:

The **Supreme Court (SC)** issued directives to the **Rajasthan Government** for identifying and protecting **sacred groves**, such as **Orans**, in line with the **T.N. Godavarman judgment (1996)**.

Key Directives and Suggestions of the Supreme Court

1. **Protection Under the Wildlife Protection Act, 1972:**
   - **Section 36(c):** Suggested declaring **sacred groves** as **community reserves** to ensure legal protection.

2. **Replication of Piplantri Model:** Inspired by the **Piplantri village model** in Rajasthan, where 111 trees are planted for every girl child born, the SC urged its implementation in other regions.
3. **Comprehensive Policy Development:**
    - Directed the **Ministry of Environment, Forest and Climate Change (MoEFCC)** to create a comprehensive policy for **governance and management** of sacred groves.
    - The policy must include a plan for a **nationwide survey** of sacred groves.
4. **Community Empowerment:** Suggested identifying and empowering **traditional communities** as custodians under the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**.
5. **Constitution of Committees:** Instructed **MoEFCC** and the **Forest Department, Rajasthan** to establish a **committee** for supervising the **mapping and identification** of sacred groves.

About Sacred Groves

1. **Definition: Sacred groves** are patches of **forests** or clusters of **trees** with significant **cultural or spiritual value**, protected by local communities.
2. **India's Sacred Groves:**
    - **Global Leader:** India has the **highest concentration of sacred groves**, with over **100,000 sites**.
    - **Regional Names:**
        - Rajasthan: **Deora**, **Malvan**.
        - Uttarakhand: **Bugyal**.
    - **UNESCO Recognition: Living Root Bridges (Jingkieng Jri)** in Meghalaya are a UNESCO World Heritage Site.

Significance of Sacred Groves

1. **Cultural Significance:** Reflect traditional **belief systems**, fostering **community-driven conservation**.
2. **Ecological Benefits:** Preserve **biodiversity**, act as **carbon sinks**, and contribute to **groundwater recharge**.
3. **Climate Resilience:** Offer **natural protection** against climate change effects, such as soil erosion and flooding.
4. **Sustainable Livelihoods:** Sacred groves support **traditional forest dwellers** by providing **resources** like medicinal plants.

Challenges in Protecting Sacred Groves

1. **Urbanization and Development Pressure:** Encroachments and deforestation for **infrastructure projects** threaten their existence.
2. **Lack of Legal Protection:** Many sacred groves lack **legal recognition** or conservation frameworks.
3. **Cultural Erosion:** Modernization and migration dilute traditional **beliefs and practices** associated with sacred groves.
4. **Data Deficiency:** Absence of a **comprehensive database** hinders targeted conservation efforts.

Way Forward

1. **Legislative Strengthening:** Expand legal protection through amendments to the **Wildlife Protection Act** and the **Forest Rights Act**.
2. **Community Involvement:** Empower **local communities** as stewards of sacred groves, offering incentives and capacity building.
3. **Awareness Campaigns:** Highlight the **cultural and ecological importance** of sacred groves to foster community participation.
4. **Scientific Mapping and Monitoring:** Utilize **GIS technology** and **remote sensing** to identify, map, and monitor sacred groves across India.
5. **Replication of Models:** Promote **Piplantri-like models** nationwide to integrate **environmental conservation** with **social initiatives**.

India's First Ganges River Dolphin Tagging Initiative in Assam

Syllabus: Environment (GS Paper III), Biodiversity Conservation (GS Paper III)

Context:

India conducted its **first-ever dolphin tagging exercise** under **Project Dolphin** to study the **Ganges River Dolphin's**migratory patterns, habitat utilization, and distribution, particularly in fragmented river systems.

About the Tagging Initiative

1. **Objective:** To understand:
    - **Migratory patterns.**
    - **Range and distribution.**
    - **Habitat utilization** in fragmented river systems.
2. **Implementation:**
    - Conducted by the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.
    - Executed by the **Wildlife Institute of India (WII)** in collaboration with the **Assam Forest Department**.
3. **Funding:** Supported by the **National CAMPA Authority**, which manages funds under the **Compensatory Afforestation Fund (CAF) Act, 2016**.

About Project Dolphin

1. **Launch:** Initiated in **2020** by the **MoEFCC**, modeled after **Project Tiger**.
2. **Aim:** Conservation of:
    - **Ganges River Dolphins** (Platanista gangetica).
    - The **riverine ecosystem** supporting them.

About Ganges River Dolphin (Platanista gangetica)

1. **National Significance:** Declared **India's National Aquatic Animal** in **2009**.
2. **Habitat:** Restricted to freshwater systems in:
    - **Ganges-Brahmaputra-Meghna** basin.
    - **Karnaphuli-Sangu** river systems of Nepal, India, and Bangladesh.
    - **India hosts 90%** of the global population.
3. **Conservation Status:**
    - **IUCN Status:** Endangered.
4. **Key Features:**
    - **Echolocation:** Relies on sound reflection for navigation and biological needs as it is **essentially blind**.
    - **Physical Characteristics:**
        - Long, thin snout.
        - Rounded belly, stocky body, and large flippers.
        - **Females larger** than males.
    - **Umbrella Species:** Known as the **"Tiger of the Ganges"**, signifying its ecological importance.
    - **Local Name:** Called **'Susu'**, reflecting the sound it makes while breathing.

Significance of the Initiative

1. **Conservation Insights:** Provides data on **dolphin movement**, **river health**, and habitat fragmentation.
2. **Ecosystem Protection:** Helps formulate strategies for conserving **riverine biodiversity**.
3. **River Health Monitoring:** Indicates the ecological state of **major river systems**, supporting broader conservation goals.
4. **Policy and Action Plans:** Strengthens the implementation of **Project Dolphin** and related conservation measures.

Way Forward for Ganges Dolphin Conservation

1. **Strengthen Legal Protections:** Enforce measures under **Wildlife Protection Act, 1972**.
2. **Community Participation:** Engage **local communities** in conservation efforts to reduce anthropogenic pressures.
3. **Habitat Restoration:** Restore fragmented river systems and ensure **uninterrupted water flow**.
4. **Reduce Pollution:** Implement strict regulations to curb **industrial and agricultural pollution** in river systems.
5. **Public Awareness Campaigns:** Promote awareness of the ecological importance of dolphins as an **indicator species**.

Nexus Assessment Report by IPBES: Interlinking Biodiversity, Water, Food, and Health

Syllabus: Environment (GS Paper III), International Organizations

Context:

The **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)** has released the **Nexus Assessment Report**, which provides a scientific analysis of interconnections among **biodiversity, water, food, health, and climate change**, along with response strategies to maximize co-benefits.

Key Findings of the Report

1. **Economic Costs of Environmental Damage:**
    - Unaccounted-for costs of current economic activity impacting **biodiversity, water, food, and health** are estimated at **$10-25 trillion annually**.
    - Public subsidies and these unaccounted costs incentivize **nature-damaging activities**.
2. **Biodiversity Decline:**
    - Global biodiversity has declined by **2-6% per decade** over the last **30-50 years**, reducing ecosystems' ability to:
        - **Sequester carbon**, worsening climate change.
        - Sustain critical ecosystem services.
3. **Drivers of Biodiversity Loss:**
    - Indirect drivers such as **waste, overconsumption**, and **population growth** amplify direct drivers like:
        - **Land-use and sea-use changes.**

- **Pollution.**
- **Invasive alien species.**

4. **Water and Ecosystem Degradation:** Unsustainable practices such as **freshwater withdrawals** and **wetland degradation** have reduced water quality and climate resilience.
5. **Health Impacts:** About **50% of emerging infectious diseases** are driven by **ecosystem, animal, and human health interconnections**, emphasizing the need for integrated health approaches.

Way Forward

1. **Restoration of Carbon-Rich Ecosystems:** Prioritize restoration of **forests**, **mangroves**, and other ecosystems to enhance biodiversity and carbon sequestration.
2. **One Health Approach:** Integrate **biodiversity management** with strategies to reduce risks of zoonotic diseases.
3. **Nature-Based Urban Solutions:** Promote reliance on **green infrastructure** and urban **nature-based solutions** to mitigate environmental risks.
4. **Sustainable Agriculture:** Adopt **sustainable agricultural practices** to balance food production with biodiversity conservation.
5. **Indigenous Knowledge:** Leverage the **traditional knowledge of indigenous communities** for sustainable ecosystem management.

About IPBES

1. **Establishment:**
   - Founded in **2012** to strengthen the **science-policy interface** for biodiversity conservation and sustainable development.
2. **Nature:**
   - An **independent intergovernmental body** with **150 member governments**, including **India as a founding member**.
3. **Mandate:** Focuses on the conservation and sustainable use of biodiversity to enhance **human well-being**.
4. **Relationship with UN:** Not a UN body but receives secretariat support from the **UN Environment Programme (UNEP)**.

Northern Giant Hornet (Murder Hornet)

Syllabus: Environment – Biodiversity

Context:

The United States successfully eradicated the **Northern Giant Hornet** (*Vespa mandarinia*), also known as the **Murder Hornet**, which posed severe threats to pollinators, agriculture, and ecosystems.

About the Northern Giant Hornet:

1. **Scientific Name:** *Vespa mandarinia.*
2. **Habitat:**
   - Native to **Asia.**
   - Prefers **forested areas** and underground cavities for nesting.
3. **Physical Features:**
   - **Size:** Up to **2 inches** in length.
   - **Venom Potency:** Nearly **7 times stronger** than that of honeybees.
   - **Sting Capability:**
     - Can sting **multiple times.**
     - Able to penetrate **beekeeper suits.**

Threats Posed by the Northern Giant Hornet:

1. **To Honeybees:**
   - Can destroy entire **honeybee hives** within 90 minutes by decapitating bees.
   - A major concern as honeybees are essential for **pollination** in agriculture.
2. **To Native Pollinators:** Competes with **native pollinators,** disrupting local ecosystems.
3. **To Agriculture:** Disrupts pollination processes, directly affecting **crop yields.**
4. **To Humans:** Deadly stings caused **fatalities and injuries** in China in 2013.

Steps Taken for Eradication in the U.S.:

1. **Detection and Monitoring:**
   - Used **radio trackers** to locate nests.
   - Set **traps** for capturing hornets.
2. **Nest Destruction:** Removed nests using specialized **suits** and equipment to minimize human risk.
3. **Public Awareness:** Engaged local communities for early detection and reporting.
4. **International Collaboration:** Collaborated with experts from Asia to understand the hornet's behavior and control methods.

Significance of Eradication:

1. **Protection of Pollinators:** Safeguards **honeybee populations** vital for pollination.
2. **Agricultural Security:** Ensures the stability of **crop production** dependent on pollinators.
3. **Ecosystem Balance:** Prevents disruption caused by an invasive predator in **native ecosystems.**
4. **Human Safety:** Reduces risk of **fatal stings** to humans and animals.

Bordoibam-Bilmukh Bird Sanctuary

Syllabus: Environment – Conservation and Biodiversity

Context:

The **Bordoibam-Bilmukh Bird Sanctuary (BBBS)** in **Assam** has seen a significant decline in bird species, with a 72% reduction over the past 27 years. This alarming drop is mainly attributed to anthropogenic activities impacting the sanctuary's biodiversity.

Key Features of the Sanctuary:

1. **Location and Size:**
   - Situated on the border of **Dhemaji** and **Lakhimpur** districts in **Assam**.
   - Declared a **wildlife sanctuary** in **1996**.
   - Covers an area of **11.25 sq. km**, predominantly wetland.
2. **Habitat:**
   - The sanctuary features **flooded valley grasslands** and wetlands, providing an ideal habitat for migratory and resident birds.
   - Experiences a **moist tropical climate**, essential for the flourishing of diverse species.
3. **Flora and Fauna:**
   - **Flora:** Dominated by **aquatic plants** and **grassland species**, which contribute to the sanctuary's biodiversity.
   - **Fauna:**
     - **Migratory Birds:** Spot-billed Pelican (**Pelecanus philippensis**), Lesser Adjutant (**Leptoptilos javanicus**).
     - **Resident Birds:** Indian Pond Heron, Fulvous Whistling Duck.

Decline in Bird Species:

The sanctuary has witnessed a **72% decline in bird species** over the last 27 years, primarily driven by **anthropogenic pressures** such as:

- **Habitat destruction** from agriculture and urbanization.
- **Pollution** affecting water quality and food sources.
- **Disturbance** from human activities like poaching and encroachment.

Importance of the Sanctuary:

1. **Biodiversity Hotspot:** The sanctuary is a critical habitat for migratory birds, many of which use it as a stopover point along their migration routes.
2. **Ecological Balance:** The wetland ecosystem plays a vital role in maintaining local biodiversity, water regulation, and providing livelihoods for surrounding communities.

Conservation Efforts Needed:

1. **Protection from Encroachment:** Strengthening enforcement to prevent further encroachment and land-use changes.
2. **Pollution Control:** Addressing pollution sources, especially from agricultural runoff and waste.
3. **Community Involvement:** Engaging local communities in conservation and sustainable tourism practices.
4. **Restoration Projects:** Implementing habitat restoration initiatives to revive degraded ecosystems and improve biodiversity.

BIOTECHNOLOGY & HEALTH

Gene Therapy for Haemophilia A: A Step Towards Lifelong Treatment

Syllabus: Science and Technology (GS Paper III), Health (GS Paper II)

Context:

Researchers have successfully conducted a **gene therapy trial** for **severe haemophilia A** using a **lentivirus vector**, marking a significant breakthrough in treatment.

Gene Therapy for Haemophilia A

What is Haemophilia A?

1. **Definition:** A **hereditary bleeding disorder** caused by the deficiency of **clotting Factor VIII**.
2. **Genetic Cause:** Arises due to a **defective gene** on the **X chromosome**.
3. **Prevalence: More common in males**, as females are typically carriers.

Symptoms of Haemophilia A

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

What is Replacement Therapy?

1. **Definition:** Standard treatment involving injection of **clotting factors** into veins to replace **Factor VIII**.
2. **Mechanism:** Clotting factors are derived from **human plasma** or produced **synthetically** (recombinant clotting factors).
3. **Challenges:**
    - Short **lifespan** of clotting factors in the body.
    - **Antibodies** may neutralize clotting factors, reducing effectiveness.

What is Roctavian?

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

Lentivirus Vector in Gene Therapy

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

Nanoplastics and Their Role in the Spread of Antibiotic Resistance

Syllabus: Science and Technology (GS Paper III), Health and Environment

Context:

A recent study reveals that **nanoplastics** derived from **single-use plastic bottles (SUPBs)** contribute to the spread of **antibiotic resistance (AR)** by facilitating gene transfer between bacteria.

Key Findings of the Study

1. **Nanoplastics in Diverse Environments:** Nanoplastics coexist with **microorganisms** in various ecosystems, including the **human gut**.
2. **Polyethylene Terephthalate Bottle-Derived Nanoplastics (PBNPs):**
   - PBNPs promote the transfer of **antibiotic resistance genes (ARGs)** between bacteria through **horizontal gene transfer (HGT)**.
   - Example: Transfer of ARGs from **E. coli** to **Lactobacillus acidophilus**, a beneficial human gut bacterium.
3. **Mechanisms of AR Gene Transfer:**
   - **Direct Transformation Pathway:** PBNPs act as carriers, transporting **antibiotic resistance plasmids** across bacterial membranes.
   - **Outer Membrane Vesicle (OMV) Pathway:** PBNPs cause **oxidative stress** and damage to bacterial surfaces, increasing OMV secretion and facilitating gene transfer.
4. **Impact on Human Health:** Increased antibiotic resistance in **beneficial gut bacteria** could disrupt gut microbiota, impacting human health.

What Are Nanoplastics?

1. **Definition:** Solid particles of synthetic or heavily modified natural polymers sized between **1 nm and 1000 nm**.
2. **Sources:**
   - **Primary:** Cosmetics, paints, electronics, drugs.
   - **Secondary:** Breakdown of **microplastics** from products like single-use plastics.
3. **Impact:**
   - Easily penetrate **cells and tissues** in living organisms.
   - Found in **human blood**, **liver**, **lungs**, and **reproductive tissues**, raising significant health concerns.

Significance of the Study

1. **Emerging Health Risks:** Highlights nanoplastics as **emerging agents** of antibiotic resistance.
2. **Microbial Ecosystem Disruption:** Threatens beneficial bacteria in critical ecosystems, including the **human gut microbiome**.
3. **Antibiotic Resistance Amplification:** Nanoplastics contribute to the **global challenge of antibiotic resistance**, complicating treatment of infections.

Way Forward

1. **Reduce Plastic Usage:** Minimize the production and use of **single-use plastics**, particularly those prone to **nanoplastic formation**.
2. **Enhanced Waste Management:** Improve systems for **plastic waste recycling** and **disposal** to curb nanoplastic release.
3. **Research and Monitoring:** Conduct more studies on the **impact of nanoplastics** on human health and microbial ecosystems.
4. **Public Awareness:** Educate the public on the dangers of **plastic pollution** and **antibiotic resistance**.
5. **Policy Interventions:** Formulate stringent regulations for **single-use plastics** and promote alternatives like biodegradable materials.

Understanding the H5N1 Avian Flu Outbreak

Syllabus: Health (GS Paper II), Disaster Management

Context:

California has declared a **state of emergency** due to a widespread **H5N1 avian flu outbreak**, severely impacting the **dairy industry** and causing **human infections**.

About H5N1 Bird Flu

1. **What It Is:**
   - A highly **pathogenic strain** of avian influenza caused by the **influenza A(H5N1)** virus.
   - Primarily affects **birds** but can occasionally infect humans.
2. **Types:** Includes subtypes like **A(H5N1)** and **A(H7N9)**, classified based on surface proteins **hemagglutinin (H)** and **neuraminidase (N)**.
3. **Symptoms in Humans:**
   - **Mild Cases:** Pink eye, cough, sore throat, fatigue.
   - **Severe Cases:** Fever, shortness of breath, nausea, diarrhea, and respiratory complications.
4. **Transmission:**
   - **Animal-to-Human:** Contact with infected animal fluids (saliva, feces, or milk).
   - **Human-to-Human:** Rare, limited cases of human-to-human transmission have been reported.
5. **Zoonotic Nature:** The virus is **zoonotic**, meaning it can jump from animals to humans but is **not easily transmissible** between humans.

Impact of H5N1 Outbreak

1. **Agriculture and Livelihoods:**
   - Massive losses in the **poultry and dairy industry** due to culling of infected animals.

- Disruption in **food supply chains**.

2. **Public Health Concerns:**
   - Risk of **human infections** leading to severe respiratory illnesses.
   - Increased burden on **healthcare systems** due to treatment and prevention measures.
3. **Economic Effects:**
   - Loss of **livelihoods** for poultry farmers and dairy workers.
   - Increased cost of **poultry and dairy products**.

Treatment and Prevention

1. **Treatment:**
   - **Antiviral Medications:** Drugs like **oseltamivir (Tamiflu)** are effective in treating symptoms.
   - **Supportive Care:** Managing respiratory complications through oxygen therapy or ventilation if needed.
2. **Preventive Measures:**
   - Avoiding direct contact with **infected animals**.
   - Ensuring **proper cooking** of poultry and eggs.
   - **Biosecurity Measures:** Enhanced monitoring and containment strategies on poultry farms.
3. **Vaccination Research:** Development of **avian flu vaccines** for both humans and birds is ongoing.

India's Preparedness for Avian Flu

1. **Animal Husbandry Guidelines:** Regular surveillance and monitoring of **poultry farms**.
2. **Disease Control Plans:** Implementation of the **National Avian Influenza Control Plan** to prevent outbreaks.
3. **Public Awareness Campaigns:** Educating farmers and the public on **biosecurity measures**.
4. **Healthcare Coordination:** Establishing protocols for managing **zoonotic diseases** through integrated coordination between veterinary and human health services.

GLP-1 Receptor Agonists: A Game-Changer in Obesity Management

Syllabus: Health (GS Paper II), Science and Technology

Context:

The **World Health Organization (WHO)** has endorsed **GLP-1 receptor agonists**, a revolutionary class of drugs, for managing **obesity**, highlighting a global shift in strategies to tackle the rising obesity epidemic.

About GLP-1 Receptor Agonists

1. **What They Are:** GLP-1 receptor agonists are drugs that **mimic the hormone Glucagon-Like Peptide-1 (GLP-1)**, which regulates **appetite** and **blood sugar levels**.
2. **How They Work:**
   - Suppress appetite by targeting the brain's hunger centers.
   - Slow gastric emptying, promoting a feeling of fullness.
   - Improve insulin secretion and reduce blood sugar levels.
3. **Examples of GLP-1 Agonists:**
   - **Semaglutide** (marketed as **Ozempic** and **Wegovy**).
   - **Tirzepatide** (dual-action drug targeting GLP-1 and GIP).

Uses and Benefits

1. **Obesity Management:** Proven to achieve up to **25% body weight reduction** in clinical trials.
2. **Diabetes Treatment:** Initially developed to manage **type 2 diabetes** by improving glycemic control.
3. **Broader Health Benefits:** Reduces risks of **cardiovascular diseases**, **hypertension**, and other obesity-related disorders.
4. **Global Significance:**
   - Addresses a global obesity pandemic affecting nearly **1 in 8 people worldwide**.
   - Has the potential to significantly **reduce healthcare costs**, which are projected to reach **$3 trillion** globally by 2030.

Challenges and Considerations

1. **Cost Barriers:** These drugs are **expensive**, limiting accessibility in low- and middle-income countries.
2. **Side Effects:** Common side effects include **nausea**, **vomiting**, and **gastrointestinal discomfort**.
3. **Dependency and Long-Term Use:** Sustained benefits require **continuous use**, which may be financially and logistically challenging.
4. **Ethical Concerns:** Risk of overprescription in populations without clinical obesity.

Implications for India

1. **Rising Obesity Epidemic:** Nearly **40% of urban Indians** are either overweight or obese, increasing risks for **diabetes** and **cardiovascular diseases**.
2. **Healthcare Transformation:** Adoption of GLP-1 receptor agonists could relieve the **burden on healthcare systems**.
3. **Accessibility Challenges:** High drug costs pose significant challenges in India's **public health setup**.
4. **Policy and Regulation:** Inclusion in **national health programs** and subsidization could promote equitable access.

Way Forward

1. **Expand Access:** Leverage **public-private partnerships** to make these drugs affordable.
2. **Integrate into Healthcare Systems:** Develop guidelines for **prescription and usage** of GLP-1 agonists in India's **National Health Mission**.
3. **Promote Preventive Care:** Strengthen **lifestyle interventions** like exercise and nutrition alongside pharmacological solutions.
4. **Awareness and Training:** Educate healthcare providers on appropriate **patient selection** and **management**.

Never Events: Ensuring Patient Safety in Healthcare

Syllabus: Health (GS Paper II), Ethics in Governance

Context:

Never events are serious, preventable healthcare incidents that highlight lapses in safety protocols, with severe consequences for patients. These events are **avoidable** with proper safety measures.

About Never Events

1. **Definition: Never events** are **serious, preventable medical errors** that should not occur if healthcare systems adhere to safety protocols.
2. **Origins:**
   - Coined in **2002** by the **National Quality Forum (NQF)** in the USA.
   - Adopted globally by countries like the **U.K.**, **Canada**, and others to improve patient safety.
3. **Examples of Never Events:**
   - **Wrong-Site Surgeries:** Operating on the wrong body part.
   - **Medication Errors:** Administering the incorrect drug or dose.
   - **Foreign Objects Left in Patients:** Retained surgical instruments after surgery.
   - **Misdiagnoses Leading to Wrong Treatment:** Severe harm due to diagnostic errors.
4. **Significance:**
   - **Promotes Patient Safety:** Focuses on eliminating preventable harm.
   - **Enhances Accountability:** Holds healthcare providers responsible for lapses.
   - **Improves Trust:** Encourages public confidence in healthcare systems.

Global Perspective on Never Events

1. **United States (NQF):** Tracks never events through the **Serious Reportable Events (SREs)** list.
2. **United Kingdom (NHS):** Maintains a **Never Events List**, ensuring nationwide reporting and accountability.
3. **Canada:** Focus on **Patient Safety Incidents** and preventive measures.

India's Position on Never Events

1. **Challenges:**
   - **Lack of Uniform Protocols:** Absence of standardized safety measures across healthcare facilities.
   - **Underreporting:** Limited documentation and reporting of medical errors.
   - **Resource Constraints:** Inadequate infrastructure and workforce to implement stringent protocols.
2. **Current Initiatives:**
   - **National Patient Safety Implementation Framework (2018-2025):** Focuses on creating a culture of safety in healthcare.
   - **Clinical Establishments Act (2010):** Provides guidelines for quality and accountability in healthcare services.

Key Steps to Prevent Never Events

1. **Standardized Safety Protocols:** Develop and enforce **uniform guidelines** for all healthcare providers.
2. **Training and Capacity Building:** Regular **training programs** for healthcare workers to address potential errors.
3. **Technology Integration:** Use of **barcoding systems**, **electronic health records**, and **AI-based tools** to minimize human errors.
4. **Error Reporting Systems:** Establish **non-punitive platforms** to encourage reporting of medical errors.
5. **Regular Audits:** Conduct **periodic reviews** of clinical practices and safety measures.

Way Forward

1. **Legislative Measures:** Enact laws mandating **error reporting** and imposing penalties for negligence.
2. **Public Awareness:** Educate patients about their **rights and safety measures** in healthcare.
3. **Research and Innovation:** Invest in **healthcare technology** to predict and prevent errors.
4. **Collaborative Efforts:** Foster partnerships between **government, private healthcare providers**, and **civil society** to promote patient safety.

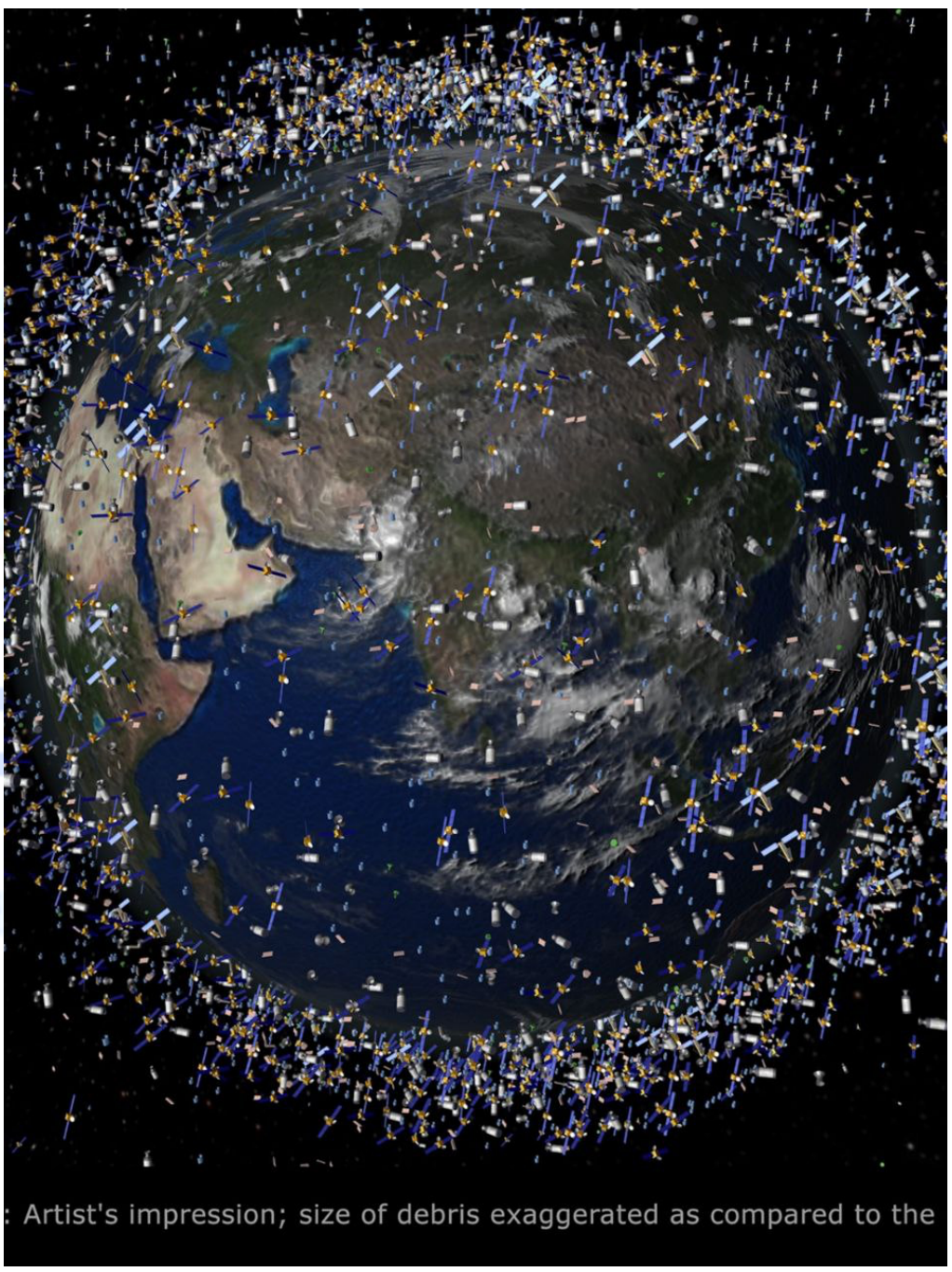
SCIENCE & TECHNOLOGY

Tackling Space Debris: Collaborative Efforts by Japan and India

Syllabus: Science and Technology (GS Paper III), International Relations (GS Paper II), Environment (GS Paper III)

Context:

Japanese startup **Orbital Lasers** and Indian robotics company **InspeCity** are collaborating to develop a **laser-equipped satellite** system for **de-orbiting space debris** and extending spacecraft lifespans.


: Artist's impression; size of debris exaggerated as compared to the

What is Space Debris?

1. **Definition:** Non-functional **artificial objects** and their fragments in **Earth orbit** or **re-entering the atmosphere**.
2. **Current Statistics:** Out of **35,150 tracked objects**, only **25% are operational satellites** (*United Nations University*).

Concerns Related to Space Debris

1. **Threat to Space Exploration:**
   - Collisions can disable operational spacecraft and damage critical components like **solar panels** and **optics**.
   - Example: A collision with a **10-cm object** could cause **catastrophic fragmentation** of a satellite.
2. **Kessler Syndrome:** A chain reaction of cascading collisions leading to **uncontrolled debris growth** that threatens all orbital activities.
3. **Risk to Life on Earth:** Large debris re-entering the atmosphere in an **uncontrolled manner** poses risks to populations on the ground.

Proposed Technology: Laser-Equipped Satellite

1. **Concept by Orbital Lasers:**
   - Uses **laser energy** to vaporize parts of space junk, stopping its rotation.
   - Enables **servicing spacecraft** to perform orbital maneuvers more effectively.
2. **Potential Applications:**
   - **De-orbiting defunct satellites.**
   - **Extending spacecraft lifespan** through advanced orbital adjustments.

Initiatives to Address Space Debris

Global Efforts:

1. **RemoveDEBRIS Mission:** Demonstrates technologies for **active debris removal (ADR)**.
2. **LignoSat:** A wooden satellite crafted from **magnolia wood** to minimize debris risk.
3. **UN Conventions:**
   - **Liability Convention, 1972:** Addresses damage caused by space objects.
   - **Registration Convention, 1976:** Mandates the registration of objects launched into outer space.

India's Initiatives:

1. **Project NETRA: Network for Space Objects Tracking and Analysis** to monitor space debris.
2. **Debris-Free Space Missions by 2030:** Aimed at ensuring **sustainable orbital environments** for future missions.

Way Forward

1. **Adoption of Effective Disposal Strategies:** Mandate **end-of-mission disposal** for satellites and decommissioned spacecraft.
2. **Passivation of Spacecraft:** Limit **on-orbit breakups** by releasing residual energy sources like **fuel** or **batteries**.
3. **International Collaboration:** Foster partnerships like the **Japan-India collaboration** to share expertise and resources.
4. **Enhanced Monitoring Systems:** Strengthen **space situational awareness (SSA)** capabilities globally.
5. **Regulation and Accountability:** Enforce stricter **global regulations** to prevent the proliferation of space debris.

Human Rated Launch Vehicle Mark-3 (HLVM-3): Key to India's Gaganyaan Mission

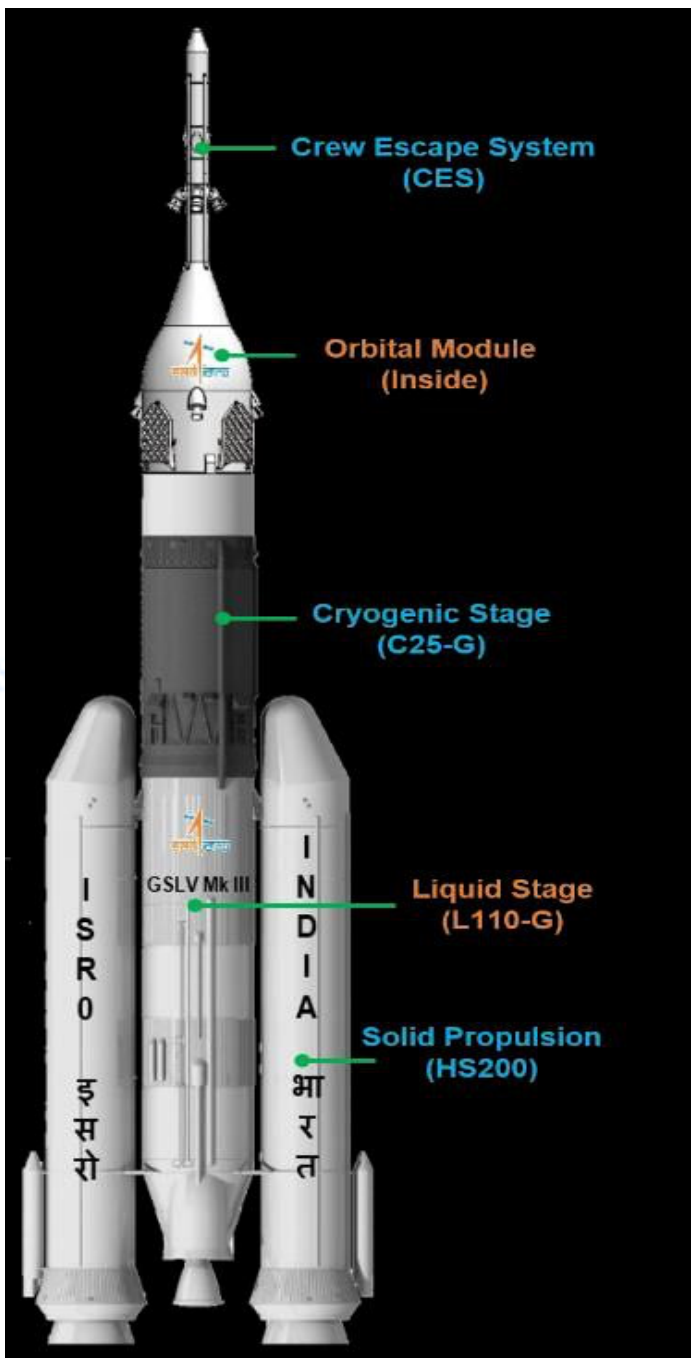
Syllabus: Science and Technology (GS Paper III), Space Technology

Context:

The **Indian Space Research Organisation (ISRO)** has begun assembling the **Human Rated Launch Vehicle Mark-3 (HLVM-3)** for Gaganyaan's first uncrewed flight.

About Human Rated Launch Vehicle Mark-3 (HLVM-3)

1. **Definition:** The **HLVM-3** is a **human-rated version** of ISRO's LVM3 (Launch Vehicle Mark-3), specifically designed for the **Gaganyaan mission** to safely carry humans to space.
2. **Objective:** To enable **safe human spaceflight** by integrating advanced **reliability** and **safety features**.



Key Features of HLVM-3

1. **Three-Stage Design:** Combines **solid, liquid**, and **cryogenic stages** for optimal performance.
2. **Payload Capacity:** Capable of carrying **10 tonnes** to **Low Earth Orbit (LEO)**.
3. **Specifications:**
   - **Height:** 53 meters.
   - **Weight:** 640 tonnes.
4. **Crew Escape System (CES):** Operational up to the **atmospheric flight separation stage**, ensuring astronaut safety in emergencies.

How HLVM-3 Differs from Other ISRO Launch Vehicles

1. **Human-Rated Design:** Enhanced reliability with **redundant systems** to ensure **crew safety**, unlike PSLV or GSLV.
2. **Crew Escape System:** Unique to manned missions, enabling safe ejection of astronauts during anomalies.
3. **Payload and Design:** Optimized for carrying the **crew module** with **life-support systems**, absent in other vehicles.

Significance of HLVM-3

1. **Gaganyaan Mission:** Acts as the **backbone** for Gaganyaan, India's **first human spaceflight program**.
2. **Enhanced Safety:** Incorporates advanced systems for **reliable and safe space travel**, critical for **manned missions**.
3. **Technology Development for BAS:** Serves as a precursor to the **Bharatiya Antariksh Station (BAS)** by providing critical data and technology for future space programs.
4. **Milestone in Space Exploration:** Positions India among the select nations with **human spaceflight capabilities**.

IndiaAI Calls for Proposals to Foster Ethical and Responsible AI

Syllabus: Science and Technology, Governance (GS Paper III)

Context:

The **IndiaAI Mission**, under the **Safe & Trusted AI pillar**, seeks proposals to develop tools and frameworks promoting **ethical and responsible AI** adoption, emphasizing transparency, fairness, and societal awareness.

About IndiaAI Mission

- **Agency:** IndiaAI operates as an **Independent Business Division (IBD)** under the **Union Ministry of Electronics and IT (MeitY)**.
- **Objective:** To promote the development of **indigenous AI tools** and establish India as a leader in responsible AI.
- **Focus Area:** Address challenges like **bias, discrimination, and lack of transparency** in AI systems while ensuring **accountability and societal trust**.

Themes Identified for Safe and Trusted AI

1. **Watermarking & Labelling:**
   - Develop tools to authenticate and trace AI-generated content.
   - Ensure security and prevent the spread of harmful materials.
2. **Ethical AI Frameworks:**
   - Align AI systems with **global standards** and human values.
   - Promote fairness, transparency, and non-discrimination in AI decision-making.
3. **AI Risk Assessment & Management:**
   - Create tools to evaluate risks in deploying AI in **public services**.
   - Enhance safety and ensure responsible usage.
4. **Stress Testing Tools:**
   - Develop mechanisms to evaluate AI performance under extreme conditions.
   - Identify vulnerabilities in AI models and build trust for **critical applications**.
5. **Deepfake Detection Tools:**
   - Create systems to detect and mitigate **deepfakes** in real time.
   - Prevent **misinformation** and promote a secure digital ecosystem.

Need for Ethical AI Framework

1. **Prevention of Bias and Discrimination:** Ensure AI systems do not perpetuate societal inequalities.
2. **Transparency in Decision-Making:** Make AI decision-making processes understandable and accountable.
3. **Promotion of Societal Awareness:** Encourage public trust and confidence in AI systems.
4. **Safe Deployment of AI in Public Services:** Minimize risks in areas like healthcare, education, and governance.

Other Initiatives Promoting Ethical AI

Global Initiatives:

1. **OECD Principles on AI:** Emphasizes fairness, transparency, accountability, and robustness in AI systems.
2. **UNESCO's Ethics of Artificial Intelligence (2021):** Establishes ethical guidelines for AI development and deployment globally.

Indian Initiatives:

1. **National Strategy for AI (NITI Aayog):** Focuses on inclusivity, fairness, and fostering responsible AI development.
2. **Responsible AI for All (#AIForAll):** Promotes bias mitigation, transparency, and privacy-respecting AI systems.

Significance of Ethical AI Development

1. **Trust Building:** Ensures public confidence in AI systems by mitigating risks like bias and misinformation.
2. **Economic Impact:** Responsible AI fosters innovation and positions India as a global leader in ethical AI development.
3. **Societal Inclusion:** Reduces inequalities and ensures fair access to AI technologies.
4. **Regulatory Preparedness:** Aligns India with global frameworks, paving the way for seamless international collaboration.

Underwater Cables: Enhancing Digital Connectivity

Syllabus: Science and Technology – Infrastructure

Context:

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

About Underwater Cables:

1. **What It Is:** Fiber-optic cables laid under the ocean to transmit high-speed data globally.
2. **New Cables:**
    - **India Asia Xpress (IAX):** Connects **Chennai and Mumbai** with **Singapore, Thailand, and Malaysia.**
    - **India Europe Xpress (IEX):** Connects **Chennai and Mumbai** with **France, Greece, Saudi Arabia, Egypt, and Djibouti.**

How Underwater Cables Work:

- **Fiber-Optic Technology:** Data is transmitted via **laser beams** through thin **glass fibres.**
- **Construction:** Protected by layers of **insulation, plastic, and steel wires.**
- **Placement:**
    - **Shore Areas:** Buried under the seabed.
    - **Deep Sea:** Laid directly on the ocean floor.

Features of Underwater Cables:

1. **Depth and Placement:** Buried near shores to avoid damage; laid on the seabed in deep waters.
2. **Data Capacity:** New-generation cables can carry up to **224 Tbps** of data.
3. **Durability:** Multiple protective layers to safeguard against damage from anchors, fishing activities, and fault zones.
4. **Speed:** Provides **faster and cost-efficient** data transfer compared to other modes like satellites.

Why Underwater Cables over Satellites?

1. **Higher Capacity:** Cables handle significantly more data than satellites.
2. **Cost-Effective:** Cheaper per bit for large-scale data transmission.
3. **Reliability:** Offers **stable and uninterrupted connections**, especially for high-volume transfers.
4. **Latency:** Lower delay in signal transmission compared to satellite communication.

Significance of IAX and IEX Cables for India:

1. **Strengthened Connectivity:** Links India to key international hubs in Asia, Europe, and Africa.
2. **Economic Impact:** Boosts India's position as a **global data hub.**
3. **Support for Digital Economy:** Enhances infrastructure for industries reliant on digital services.
4. **Strategic Significance:** Reduces dependency on other nations for critical digital infrastructure.
5. **Alignment with Digital India:** Supports India’s initiatives to enhance **internet penetration and digital services.**