IQRA IAS

An Institute for Civil Services

WEEKLY UPDATES

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POLITY & GOVERNANCE

Conduct of Election Rules, 1961: Recent Amendments

Syllabus: Polity and Governance (UPSC GS Paper-II)

Key Context and Background

1. Context:

- The Government of India amended **Rule 93(2)(a)** of the **Conduct of Election Rules, 1961**, restricting **public access** to certain **electronic election records** like **CCTV footage**, **webcasting recordings**, and **video logs**.

About the Conduct of Election Rules, 1961

2. Aim:

- To ensure **free and fair elections** by establishing comprehensive **procedures** for conducting elections to **Parliament** and **State Legislatures**.

3. Key Features:

1. **Framework for Elections:** Covers **nomination**, **polling**, **counting**, and **declaration of results** under specific sections and rules.
2. **Public Transparency:** As per **Rule 93(2)(a)** (prior to the amendment), **"all papers relating to elections"** were open for **public inspection**.
3. **Voter Secrecy:** Ensures **confidentiality of voters' identities** and actions during elections.
4. **Election Officers' Duties:** Defines roles and responsibilities of **polling** and **returning officers**.
5. **Resolution of Disputes:** Details mechanisms for resolving **disputes** and handling **complaints** during elections.

Recent Amendments

4. Revised Access Clause:

1. **Old Version:** Allowed **public inspection** of **"all papers relating to elections."**
2. **New Version:** Limits access to **"all other papers as specified in these rules"**, excluding electronic records like **CCTV footage**, **webcasting recordings**, and **video logs**.

5. Reason for Amendment:

1. **Prevention of Misuse:** Aimed at mitigating risks of **manipulation**, including misuse through **artificial intelligence (AI)** tools.
2. **Protecting Voter Secrecy:** Safeguards against **breaches of voter privacy** and electoral data security.

6. Retention of Candidate Access:

1. **Access Clause for Candidates: Candidates and their agents** retain access to **all election records**, including electronic materials.
2. **Judicial Oversight:** Restricted materials may still be accessed through **courts** for specific cases.

7. Scope of the Change:

- **Ambiguities Addressed:** Clarifies **Rule 93**, restricting public inspection of **electronic records** not explicitly specified in the rules (e.g., forms, observer reports).

No-Detention Policy: A Shift in Elementary Education

Syllabus: Education Policy and Governance (UPSC GS Paper-II)

Key Context

Context: The **Central Government** has amended the **Right to Education (RTE) Act, 2009**, scrapping the **No-Detention Policy (NDP)** in schools governed under it, including **Kendriya Vidyalayas**, **Jawahar Navodaya Vidyalayas**, and institutions under the **Ministry of Defence and Tribal Affairs**.

About No-Detention Policy (NDP)

2. What is NDP?

- Introduced under **Section 16 of the RTE Act, 2009**.
- **Purpose:** Prohibited detention of students until **Class 8**, ensuring **automatic promotion** to promote **minimum education levels** for all children.

3. Key Provisions:

- **Section 16:** Prohibits detention of students in **elementary education (Classes 1-8)**.
- **Amendment in 2019:** Allowed states to hold back students in **Classes 5 and 8** based on academic performance.

4. Current Status: 14 states and UTs continue with the no-detention policy.

Reasons for Removal

5. Declining Learning Outcomes: Students lacked **seriousness** about studies due to assured promotions.

6. Lack of Accountability: Schools failed to emphasize **learning outcomes**, as highlighted by the **HRD Ministry**.

7. States' Feedback: Many states demanded policy removal to improve **quality and accountability** in elementary education.

8. National Alignment: Linked with the **National Education Policy (NEP) 2020**, emphasizing **holistic and quality education**.

National Human Rights Commission (NHRC): Structure and Functions

Syllabus: Governance and Social Justice (UPSC GS Paper-II)

Key Context

1. Context: Justice V. Ramasubramanian, former Supreme Court judge, has been appointed as the **Chairperson** of the **National Human Rights Commission (NHRC)** by the **President of India**.

About NHRC

2. Establishment:

- Formed on **12 October 1993** under the **Protection of Human Rights Act (PHRA), 1993**.
- Created in accordance with the **Paris Principles, 1991**, endorsed by the **UN General Assembly in 1993**.
- **Type:** Statutory body established under the **PHRA Act, 1993**.

3. Aim: To **promote and protect human rights** as defined under **Section 2(1)(d) of PHRA**, including **life, liberty, equality, and dignity**, guaranteed by the **Constitution**.

Composition and Structure

4. Key Members:

- **Chairperson:** Former Chief Justice of India or Supreme Court judge.
- **Members:**
  - One former/sitting Supreme Court judge.
  - One former/sitting Chief Justice of a High Court.
  - Three members (including at least **one woman**) with experience in human rights.
- **Ex-Officio Members:** Chairpersons of National Commissions (SC/ST, Women, Minorities, etc.) and the **Chief Commissioner for Persons with Disabilities**.

Functions and Powers

5. Functions of NHRC:

1. **Inquiry:** Investigates **human rights violations** by public servants or due to negligence.
2. **Recommendations:** Suggests measures for **protection, promotion**, and **implementation** of human rights.
3. **Review of Laws:** Assesses treaties and **international instruments** related to human rights.
4. **Research and Awareness:** Promotes research, publications, and **awareness** of human rights.

5. **Visit Institutions:** Inspects **jails** and other detention facilities to ensure compliance with human rights standards.

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

Syllabus: Governance (UPSC GS Paper-II)

Key Details and Context

1. Context: The **Indian government** has notified the **Telecommunications (Procedures and Safeguards for Lawful Interception of Messages) Rules, 2024**, enhancing the framework for lawful interception of communications.

About the Rules

2. Competent Authority:

1. **Designated Authorities: Union Home Secretary** and **State Home Secretaries** can authorize interceptions.
2. **In Unavoidable Circumstances: Joint Secretary-level officers** are empowered to authorize interceptions.

3. Agency Authorization: The **Central Government** can authorize **law enforcement or security agencies** for interception under **Section 20(2) of the Telecommunications Act, 2023**.

4. Emergency Provisions:

- In **"remote areas"** or due to **"operational reasons"**, interception orders can be issued by: **Heads** or **second senior-most officers** of authorized agencies.
- **Confirmation Deadline:** Orders must be confirmed within **seven working days**.

5. Data Retention and Destruction: Interception records must be **destroyed every six months** unless retained for **functional or legal purposes**.

New Features of the Rules

6. Expanded Grounds for Interception: Interception can now be carried out in **"remote areas or for operational reasons"**, extending beyond **"emergent cases"**.

7. Limits on Officers Authorizing Interception: At the state level, only the **head** and **one additional senior-most officer** (at least **IGP rank**) can authorize interception.

8. Accountability for Non-Confirmation: Interception orders not confirmed within **seven days**:

- Cannot be **used for any purpose**, including as **evidence in court**.

9. Relaxed Procedure for Agencies: Authorized agencies have **greater flexibility** to issue interception orders without immediate approval, subject to **post-facto confirmation**.

No Detention Policy Scrapped for Classes 5 and 8

Syllabus: Education Policy and Governance (UPSC GS Paper-II)

Key Context

1. Context:

- The **Ministry of Education** has introduced new rules under the **Right of Children to Free and Compulsory Education (RTE) (Amendment) Rules, 2024**, allowing schools to **fail students** in **Classes 5 and 8** if they do not pass year-end exams.
- **Implementation Status:**
  - **16 states** and **2 Union Territories**, including **Delhi**, have already adopted this policy.
  - **Reason for Delay:** Awaited the **National Curriculum Framework (NCF)** released in **2023**.

Key Features of the New Policy

2. Key Provisions:

1. **Re-examination Opportunity:** Students who fail to meet promotion criteria will receive **additional instruction** and a **re-exam within two months** of result declaration.
2. **Elementary Education Protection:** No child can be **expelled from school** until completing **elementary education** (Class 8).

Arguments For and Against Detention

3. Arguments in Favor of Detention:

1. **Decline in Learning Outcomes:** More than **65 lakh students** failed in **Classes 10 and 12** in **2023**, highlighting gaps in foundational skills.
2. **Lack of Incentives: Automatic promotion** reduces motivation for students to work hard and diminishes **accountability** of teachers.

4. Arguments Against Detention:

1. **Stigmatization and Dropout Rates:** Fear of failure and **repeating classes** often leads to **higher dropout rates**.
2. **Child-Centric Learning:** Advocates a system focused on **holistic development** rather than just academic performance.

Background of No Detention Policy

5. Introduction: Part of the **Right to Education (RTE) Act, 2009**, aimed to reduce **dropout rates** by ensuring automatic promotion until Class 8.

About the RTE Act, 2009

6. Key Provisions:

1. **Right to Education:** Ensures **free and compulsory education** for children aged **6 to 14 years**, as per the **86th Constitutional Amendment Act** via **Article 21A**.
2. **Government Schools:** Provide free education and are managed by **School Management Committees (SMC)**.

PM CARES Fund

Syllabus: Governance – Welfare Schemes for Vulnerable Sections (UPSC GS-II)

Context

The **Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund (PM CARES Fund)** received contributions worth **₹912 crore** during the **2022-23 financial year**, highlighting its role in addressing emergencies and public health challenges.

About PM CARES Fund

1. Establishment:

- Founded on **March 27, 2020**, during the onset of the COVID-19 pandemic.
- Registered under the **Registration Act, 1908**.

2. Administration:

- Managed directly by the **Prime Minister's Office (PMO)**.
- **Honorary officials** (Additional/Joint Secretaries) oversee operations.

3. Trustees:

- **Ex-Officio Trustees:**
  - **Prime Minister** (Chairman).
  - **Minister of Defence**.
  - **Minister of Home Affairs**.
  - **Minister of Finance**.
- **Nominated Trustees:**
  - Justice K.T. Thomas (Retired).
  - Kariya Munda.
- **Advisory Board Members:** Rajiv Mehrishi, Sudha Murthy, Anand Shah.

4. Objectives:

- Address **public health emergencies**, **natural disasters**, and **calamities**.
- Provide financial assistance, build infrastructure, and fund research for **disaster relief efforts**.

Key Features of PM CARES Fund

5. Funding:

- Entirely financed through **voluntary contributions** (domestic and foreign) from **individuals** and **organizations**.
- **No direct budgetary support** from the government.

6. Legal and Financial Benefits:

- **Exempt from FCRA (Foreign Contribution Regulation Act).**
- **80G benefits** under the Income Tax Act, 1961, for contributors.
- Qualifies as **CSR expenditure** under the Companies Act, 2013.

7. Focus Areas:

- **Healthcare Infrastructure:** Establishing hospitals, oxygen plants, and medical equipment.
- **Emergency Services:** Upgrading disaster response mechanisms.
- **Support to Affected Individuals:** Financial aid to families impacted by disasters.

Significance

8. Rapid Response: Facilitates quick mobilization of resources during **public health crises** (e.g., COVID-19 pandemic).

9. Public-Private Collaboration: Encourages **corporate participation** and enhances government-private sector cooperation.

10. Disaster Preparedness: Funds used for creating **infrastructure** and research to better manage future calamities.

11. Global Contributions: Open to **foreign donations**, enhancing India's capacity to manage large-scale emergencies.

Challenges and Concerns

12. Transparency:

- Criticism over the lack of **RTI (Right to Information) applicability**.
- **Public scrutiny** is limited despite significant contributions.

13. Oversight Mechanism: No parliamentary oversight, leading to demands for **greater accountability**.

14. Overlap with Existing Funds: Questions raised about its necessity given the presence of **PM National Relief Fund (PMNRF)**.

Way Forward

15. Enhance Transparency: Provide **detailed public audits** and reports on fund utilization.

16. Strengthen Oversight: Include independent experts for **review and evaluation** of fund usage.

17. Broader Utilization: Use funds for **capacity-building measures** like disaster resilience training and infrastructure development.

18. Public Engagement: Increase awareness to ensure wider participation from citizens and corporates.

Operation Greens Scheme

Syllabus: Governance - Welfare Schemes for Farmers (UPSC GS-III)

Context

The **Operation Greens Scheme**, aimed at stabilizing crop prices and enhancing farmer welfare, has reportedly utilized only **34%** of its allocated budget for **2024-25**, as per a parliamentary report.

About Operation Greens Scheme

1. What it is:

- A **Central Sector Scheme** under the **Pradhan Mantri Kisan SAMPADA Yojana**.
- Focused on **price stabilization** and **minimizing post-harvest losses** in agricultural markets.

2. Ministry Involved: Ministry of Food Processing Industries (MoFPI).

3. Launched: November 2018 with an initial outlay of ₹500 crore.

Aims of the Scheme

1. **Stabilize Prices:** Reduce **price volatility** in key perishable crops.
2. **Enhance Farmer Income:** Target interventions to increase **farmers' earnings**.
3. **Minimize Losses:** Prevent **post-harvest wastage** through better infrastructure and logistics.
4. **Market Linkages:** Establish robust **farm-to-market connections**.

Crops Covered

1. Initially Covered: Tomato, **Onion**, and **Potato** (**TOP** crops).

2. Expanded in 2021: 22 perishable crops, including **mango**, **banana**, **apple**, **guava**, **ginger**, and **shrimp**.

3. Aatmanirbhar Bharat (2020): Temporary inclusion of **all fruits and vegetables** under short-term measures.

Features of the Scheme

1. Long-Term Interventions:

- Develop **production clusters** and **Farmer Producer Organizations (FPOs)**.
- Build **farm-gate infrastructure** (e.g., storage, grading, and processing facilities).
- Enhance **value addition** capacities through food processing.

2. Short-Term Interventions:

- **Subsidies (50%)** on transportation and storage costs to protect growers from **distress sales**.
- Support **logistical solutions** to mitigate post-harvest losses.

3. Expanded Scope: Integrated **value chain development** extended to **22 crops** under the **15th Finance Commission Cycle (2021-26)**.

Significance of Operation Greens

1. Farmer Welfare: Mitigates **price crashes** during bumper harvests, ensuring **fair prices**.

2. Consumer Benefits: Stabilizes prices for consumers by reducing **supply-demand gaps**.

3. Boost to Food Processing: Strengthens **agro-processing industries**, enhancing **exports** and **value-added products**.

4. Infrastructure Development: Builds critical **storage** and **supply chain infrastructure**, reducing wastage.

5. Promotes Aatmanirbhar Bharat: Aligns with self-reliance goals by fostering **domestic value chains**.

Challenges

1. **Budget Underutilization:** Only **34%** of the budget spent in 2024-25, reflecting **implementation bottlenecks**.
2. **Awareness Gap:** Limited awareness among farmers and stakeholders about the scheme's benefits.
3. **Inadequate Logistics:** Weak **transportation** and **cold storage networks** hinder effective price stabilization.
4. **Focus on TOP Crops:** Initial over-reliance on **tomato**, **onion**, and **potato** crops limited the scheme's broader impact.

Way Forward

5. **Boost Awareness:** Launch campaigns to educate farmers and FPOs about **benefits and procedures** under the scheme.
6. **Strengthen Infrastructure:** Focus on developing **cold storage**, **transportation**, and **processing units**.
7. **Address Implementation Delays:** Simplify the application process and **fast-track fund disbursement** to farmers.
8. **Regional Customization:** Tailor interventions to suit the **crop diversity** and **climatic conditions** of specific regions.
9. **Digital Platforms:** Use **e-marketplaces** for real-time price discovery and direct marketing for farmers.

INTERNATIONAL RELATIONS

United Nations Internal Justice Council (IJC)

Syllabus: International Relations (UPSC GS Paper-II)

Key Details and Context

Context:

- **Appointment:** Former Supreme Court Judge **Justice Madan B Lokur** has been appointed as the **Chairperson** of the United Nations Internal Justice Council (**IJC**) for a **four-year term**, ending on **November 12, 2028**.

About the IJC

Creation and Purpose:

- **Created By: UN General Assembly** as part of a **reformed internal justice system**.
- **Objective:** To ensure **accountability**, **independence**, and **professionalism** in the UN's internal justice system.

Functions Under: Operates under the **UN Secretary-General** with oversight from the **General Assembly**.

Aim: To strengthen the **administration of justice** in the UN by enabling a **fair and transparent system** for resolving disputes between staff and management.

Powers and Functions

5. Key Functions of the IJC:

1. **Search for Judges:** Identifies and interviews candidates for vacancies in the **UN Dispute Tribunal (UNDT)** and **UN Appeals Tribunal (UNAT)**.
2. **Recommendations:** Recommends **2-3 candidates** for each vacancy to the **General Assembly**, ensuring **geographical diversity**.
3. **Oversight:** Provides inputs on the **justice system's implementation** to the **General Assembly**.
4. **Independence Monitoring:** Monitors the **independence** and **accountability** of internal justice mechanisms.

Appointment of the Chairperson

6. Appointment Process:

1. **Selection: Chairperson** is selected by **consensus** from the four other Council members.
2. **Official Appointment:** Done by the **UN Secretary-General**.

7. Tenure: Chairperson serves a **four-year term**.

Structure of the IJC

8. Members Composition:

- **Total Members: Five**, including:
    1. **1 Staff Representative**.
    2. **1 Management Representative**.
    3. **2 Distinguished External Jurists** (nominated by staff and management).
    4. **1 Chairperson** (selected by consensus).

Rooppur Nuclear Power Plant: Bangladesh's First Nuclear Power Project

Syllabus: International Relations, Infrastructure Development (UPSC GS Paper-II & III)

Key Context

1. Context:

- The **Rooppur Nuclear Power Plant** in **Bangladesh**, built with **Russian collaboration under Rosatom**, has recently been scrutinized for alleged **irregularities**.

About Rooppur Nuclear Power Plant

2. Location:

- Situated in **Rooppur, Ishwardi Upazila**, in the **Pabna District** of Bangladesh.
- Located on the **banks of the Padma River**, facilitating cooling and transportation.

3. Construction: Built by **Rosatom**, Russia's **state nuclear corporation**, under an intergovernmental agreement.

4. Features:

1. **Total Capacity: 2.4 GWe**, comprising two **VVER-1200 reactors** (pressurized water reactors).
2. **Timeline:** Expected to become operational by **2025**, marking Bangladesh's entry into nuclear energy.

Significance of the Rooppur Nuclear Power Plant

5. Strategic Importance:

- **Energy Security:** Aims to reduce **dependency on fossil fuels**, diversifying Bangladesh's energy mix.
- **Economic Development:** Supports **industrial growth** by meeting rising energy demands.
- **Technological Advancements:** Facilitates the transfer of **nuclear technology** and know-how to Bangladesh.

6. Regional Impact:

- Enhances Bangladesh's standing in **South Asia's energy landscape**.
- Promotes cooperation with **Russia**, strengthening bilateral ties.

Challenges and Allegations

7. Key Issues:

1. **Allegations of Irregularities:** Reports of **financial and operational misconduct** in the construction phase.
2. **Safety Concerns:** Nuclear power plants require stringent **safety protocols**, raising concerns over potential risks.
3. **Dependency on Russia:** Reliance on Russian expertise and materials could create **long-term vulnerabilities**.

Free Movement Regime (FMR): Regulating India-Myanmar Border Relations

Syllabus: International Relations and Internal Security (UPSC GS Paper-II & III)

Key Context

1. Context:

- The **Union Home Ministry** introduced new protocols for the **Free Movement Regime (FMR)** along the **India-Myanmar border**, regulating movement within **10 km** of the unfenced border after a suspension period.

About Free Movement Regime (FMR)

2. What it is: FMR permits **visa-free movement** for residents within a specified radius of the India-Myanmar border for **familial, cultural, and economic purposes**.

3. Nations Involved: India and Myanmar.

4. Establishment: Initiated in **1968**, governed by **bilateral agreements** and **administrative protocols** between the two nations.

5. Features:

1. **Territorial Limit:** Initially **40 km**, reduced to **16 km** in **2004**, and now further limited to **10 km** under the new protocols.
2. **Border Pass System:**
   - Residents are issued a **pass** allowing a **maximum stay of seven days** in the neighbouring country.
   - **Monitoring Agencies:** Assam Rifles and state authorities.
3. **Regulated Entry Points: 43 designated points** with mandatory **biometric verification** and **health checks**.

States and Border Lengths Involved

6. Indian States Sharing Border with Myanmar:

- **Arunachal Pradesh:** 520 km.
- **Nagaland:** 215 km.
- **Manipur:** 398 km.
- **Mizoram:** 510 km.

Significance of FMR

7. Socio-Cultural Ties: Facilitates **traditional ties** among border communities with familial and cultural connections across borders.

8. Economic Benefits: Supports **cross-border trade** and livelihood activities for local populations.

9. Security and Strategic Interests: Provides a mechanism to regulate cross-border movement, preventing illegal activities like **smuggling** and **insurgency**.

Challenges and Issues

10. Security Concerns: Risk of **insurgent infiltration**, smuggling of arms, narcotics, and counterfeit currency.

11. Monitoring Difficulties: Fencing challenges due to rugged terrain and cultural resistance from border communities.

12. Public Health Risks: Potential for **disease transmission** due to unrestricted movement.

Way Forward

13. Key Recommendations:

1. **Strengthen Monitoring Mechanisms:** Enhance capabilities of Assam Rifles and state authorities with **modern technology** like drones and surveillance systems.
2. **Bilateral Coordination:** Strengthen **India-Myanmar cooperation** for effective regulation and enforcement.
3. **Engage Local Communities:** Build trust by involving communities in **border management**.
4. **Infrastructure Development:** Improve **roads, entry points**, and **biometric facilities** to streamline regulated movement.

Joint Military Exercises: Surya Kiran 2024 and SLINEX-24

Syllabus: International Relations - Bilateral Relations and Strategic Cooperation (UPSC GS Paper-II)

Key Context

1. Context:

- The **18th editions** of **Surya Kiran** (India-Nepal) and **SLINEX-24** (India-Sri Lanka) are scheduled, highlighting India's focus on strengthening regional defence and strategic partnerships.

Military Exercises in News

2. Surya Kiran 2024:

- **Location:** Saljhandi, Nepal
- **Nations Involved: India and Nepal**
- **Focus Areas:**
  - **Jungle Warfare:** Enhancing capabilities for combat in dense forest terrains.

- **Counter-Terrorism:** Coordinating efforts to counter non-state actors and asymmetric threats.
- **Humanitarian Operations:** Training for disaster response under the **UN Charter** framework.

3. SLINEX-24:

- **Location:** Visakhapatnam, India
- **Nations Involved: India and Sri Lanka**
- **Focus Areas:**
  - **Maritime Cooperation:** Strengthening collaboration in securing the Indian Ocean Region (IOR).
  - **Interoperability:** Enhancing coordination and synergy between the two navies.

Significance of Joint Military Exercises

4. Strategic Importance:

- **Regional Stability:** Reinforces India's commitment to ensuring peace and security in **South Asia**.
- **Countering Threats:** Enhances readiness against terrorism, piracy, and other maritime threats.

5. Diplomatic Value:

- **Trust Building:** Strengthens bilateral ties through defence diplomacy.
- **Soft Power Projection:** Showcases India's role as a reliable partner in regional security.

6. Capacity Building:

- **Interoperability:** Improves coordination for joint missions and operations.
- **Skill Sharing:** Facilitates the exchange of tactics, techniques, and operational procedures.

Way Ahead

7. Recommendations:

1. **Expand Multilateral Engagements:** Include other regional nations in exercises like BIMSTEC members for broader security cooperation.
2. **Strengthen Logistics Sharing:** Implement logistics agreements to improve the operational reach of joint forces.
3. **Focus on Emerging Threats:** Incorporate cybersecurity and space-based threats in future exercises.
4. **Leverage Technology:** Use simulations and AI-based training for enhancing the scope of exercises.

UN Convention Against Cybercrime: A Global Framework for Digital Security

Syllabus: International Relations - Global Security and Cybersecurity (UPSC GS Paper-II)

Key Context

1. Context:

- The **UN General Assembly** adopted the **Convention Against Cybercrime** in 2024, aimed at strengthening **international cooperation** to combat cyber threats and protect societies.

About the Convention Against Cybercrime

2. Adoption and Implementation:

- **Adopted by:** 193 UN Member States through consensus.
- **Signature Opens:** In **Hanoi, Vietnam (2025)**.
- **Legally Binding:** First UN instrument on cybercrime.
- **Effective Date:** Enters into force **90 days after ratification by the 40th signatory**.

3. Key Provisions:

1. **Domestic Legislation:** Requires states to enact laws criminalizing unauthorized access to **information and communication systems**.
2. **International Cooperation:**
   - Promotes global collaboration for:
     - **Investigations**,
     - **Evidence sharing**,
     - **Prosecution of cybercrimes**.
   - Upholds principles of **sovereign equality**, **territorial integrity**, and **non-intervention**.

- Encourages bilateral/multilateral arrangements for **data transfer** with safeguards.

3. **Child Protection:** Criminalizes the production, sale, distribution, and broadcasting of **child sexual exploitation material**.
4. **Human Rights Compliance:** Ensures all measures align with **international human rights laws**, safeguarding freedom and privacy.

Significance of the Convention

4. Global Impact:

- **Global Justice Policy:** Establishes a robust framework to address **cybercrime** worldwide.
- **Support for Developing Nations:** Empowers resource-limited countries to tackle **sophisticated cyber threats**.

5. Enhanced Cybersecurity: Strengthens **digital trust** by fostering **international cooperation** and **legal harmonization**.

6. Addresses Emerging Threats: Provides mechanisms to counter cybercrimes involving:

- **Financial fraud**,
- **Data breaches**,
- **Critical infrastructure attacks**.

Challenges and Way Forward

7. Challenges:

- **Enforcement Gaps:** Requires strong national mechanisms for effective implementation.
- **Sovereignty Concerns:** Balancing international cooperation with domestic jurisdictional autonomy.
- **Resource Disparity:** Developing nations may face challenges in aligning with technical and procedural requirements.

8. Way Ahead:

1. **Capacity Building:** Support developing countries with training, funding, and technology-sharing mechanisms.
2. **Transparency Mechanisms:** Foster trust through **transparent data sharing agreements** and accountability frameworks.
3. **Collaborative Platforms:** Establish real-time **cybersecurity collaboration centers** among member states.
4. **Periodic Reviews:** Regular updates to address evolving cybercrime tactics and technologies.

South Asian Economic Union: Vision and Challenges

Syllabus: International Relations - Regional Groupings and Agreements (UPSC GS Paper-II)

Key Context

1. Context: The concept of the **South Asian Economic Union (SAEU)** remains aspirational due to the complex geopolitical and economic dynamics in South Asia.

About South Asian Economic Union

2. Definition: SAEU is a vision of the **South Asian Association for Regional Cooperation (SAARC)** aimed at integrating the economies of its eight member states: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

3. Objective: Enhance **regional trade**, **investment**, **connectivity**, and **economic cooperation** through phased market integration.

4. Foundation: Built on agreements like **SAFTA (South Asian Free Trade Area, 2006)**, focused on **reducing tariffs** and promoting **free trade** among members.

5. Pillars of Integration (ADB Report):

- **Regional Market Integration**
- **Cross-Border Connectivity**
- **Energy Cooperation**
- **Private Sector Liberalization**

Data on Intra-Regional Trade Among SAARC Members

6. Key Statistics:

- **Intra-regional trade share:** Less than **5%** of formal trade among SAARC nations.

- **India's dominance:**
  - **73%** of intra-regional exports.
  - Only **13%** of intra-regional imports, highlighting trade imbalances.
- **Dependence of Smaller Nations:**
  - Bhutan: **82%** of exports are intra-regional.
  - Afghanistan: **67%**, Nepal: **71%**.

7. Trade Barriers: Non-Tariff Barriers (NTBs): Complex restrictions limit trade liberalization.

Role of Regional Groupings in Asian Economic Union

8. BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation):

- **Regional Connectivity:** Bridges South and Southeast Asia, focusing on infrastructure like the **BIMSTEC Master Plan for Transport Connectivity**.
- **Economic Cooperation:** Promotes **free trade agreements** and collaboration in energy, tourism, and technology.

9. SAARC (South Asian Association for Regional Cooperation):

- **Trade Liberalization:** Established **SAFTA** to reduce tariffs and promote trade.
- **Policy Harmonization:** Aligns economic policies to build a foundation for a unified market.

India's Role in Regional Cooperation

10. Initiatives:

- **Neighbourhood First Policy:** Strengthens economic ties through bilateral and multilateral agreements.
- **India-Sri Lanka Cooperation:** Expansion of **India-Sri Lanka FTA** and energy projects.
- **Energy Connectivity:** Projects like **BBIN energy grid** for regional power trade.
- **Infrastructure Development:**
  - **Kaladan Multimodal Transit Transport Project**.
  - Road corridors connecting Myanmar and Bangladesh.
- **Digital Connectivity:** E-governance and digital infrastructure projects.

Challenges to South Asian Economic Union

11. Political Tensions: Conflicts like **India-Pakistan disputes** and Nepal's alignment with **China's Belt and Road Initiative (BRI)**.

12. Trade Imbalances: India's export dominance limits balanced trade growth.

13. Non-Tariff Barriers: Restrictive policies and lack of harmonized regulations.

14. Infrastructure Gaps: Weak transport and logistics infrastructure.

15. Economic Disparities: Varied development levels and policies among SAARC nations.

Way Ahead

16. Recommendations:

1. **Revamp SAFTA:** Eliminate non-tariff barriers and promote fair trade practices.
2. **Boost Connectivity:** Invest in **regional corridors**, **energy grids**, and **digital infrastructure**.
3. **Resolve Political Issues:** Facilitate **multilateral dialogues** to foster trust.
4. **Private Sector Involvement:** Encourage businesses to drive innovation and investment.
5. **Inclusivity:** Ensure **equitable policies** to benefit smaller nations.

African Union Stabilization and Support Mission in Somalia (AUSSOM)

Syllabus: International Relations - Global Institutions (UPSC GS Paper-II)

Context

The **United Nations Security Council (UNSC)**, in collaboration with the **African Union (AU)**, has authorized the launch of the **African Union Stabilization and Support Mission in Somalia (AUSSOM)**, effective **January 1, 2025**.

About AUSSOM

1. Full Form: African Union Stabilization and Support Mission in Somalia.

2. Established by: The **United Nations Security Council (UNSC)** in partnership with the **African Union (AU)**.

3. Aim: To **stabilize Somalia** by supporting its **security infrastructure**, addressing **terrorism threats**, and fostering **peace and sustainable development**.

4. Features of AUSSOM:

1. **Transition from Anti-Terrorism Focus:** Replaces the AU's earlier **anti-terrorism operations** with broader **stabilization goals**.
2. **Scalable Peacekeeping Force:** Ensures a **sustainable security presence** tailored to funding limitations.
3. **Global Collaboration:** Supported by international partners like the **EU** and **U.S.**, though concerns remain over funding.

About Somalia

5. Location: Situated in the **Horn of Africa**, Eastern Africa.

6. Capital: Mogadishu.

7. Neighbours:

- Borders **Ethiopia**, **Djibouti**, and **Kenya**.
- Coastline along the **Indian Ocean**.

8. Geographic Features:

- **Rivers:** Jubba and Shabelle, vital for agriculture.
- **Mountains:** Cal Madow and Karkaar ranges in the northern region.
- **Plateaus:** Includes the **Haud Plateau**.
- **Climate:** Predominantly **arid and semi-arid**, with frequent droughts.

Significance of AUSSOM

9. Countering Instability: Addresses long-standing **terrorism threats**, including groups like **Al-Shabaab**.

10. Regional Stability: Enhances security in the **Horn of Africa**, preventing **spillover effects** into neighboring countries.

11. Transition to Peacebuilding: Moves beyond military solutions to focus on **institution building**, **reconciliation**, and **economic recovery**.

12. Global Security: Contributes to international efforts to combat terrorism and promote peace in strategic regions.

Challenges Ahead

13. Funding Concerns: EU and **U.S.** funding may be insufficient to sustain operations effectively.

14. Local Resistance: Fragile relations with Somali leadership and communities could hinder mission goals.

15. Geopolitical Tensions: Competing interests among international partners could disrupt coordination.

16. Environmental Risks: Droughts and famine in Somalia exacerbate **humanitarian crises**, complicating stabilization efforts.

Way Ahead

17. Recommendations:

- **Sustainable Funding Mechanisms:** Secure commitments from global stakeholders for long-term support.
- **Inclusive Governance:** Collaborate with Somali leadership and local communities to ensure alignment with national priorities.
- **Capacity Building:** Strengthen Somalia's **security forces** and governance institutions.
- **Integrated Approach:** Combine military efforts with **humanitarian aid**, **economic development**, and **drought resilience programs**.

Greenland

Syllabus: International Relations – Geopolitical Strategies, Arctic Geopolitics

Context

The **United States** has once again expressed interest in **buying Greenland**, a strategically vital island, but Greenland has reiterated that it is **not for sale**.

About Greenland

1. Location:

- **World's Largest Island**, located between the **Arctic Ocean** and the **Atlantic Ocean**.
- Lies east of the **Canadian Arctic Archipelago**.

2. Status: An **autonomous territory** under the **Kingdom of Denmark**.

3. Geographic Features:

- **Ice Sheet:** Nearly **three-quarters** of its surface is permanently covered by **ice**.
- **Population:** Predominantly **Inuit communities** who migrated from Alaska via Northern Canada.

Greenland's Significance

1. Geopolitical Strategy:

- **Arctic Passage Control:**
  - Greenland's location is critical for managing **Arctic trade routes** like the **Northeast, Northwest, and Central Passages**.
  - These passages are becoming increasingly navigable due to **climate change** and melting ice.

2. Military Importance:

- **Historical Use:** U.S. previously used Greenland for **Arctic defence**, including operations like **Camp Century** during the Cold War.
- **Strategic Bases:** Greenland hosts **Thule Air Base**, a key component of U.S. **missile warning systems** and **space surveillance**.

3. Economic Potential:

- **Natural Resources:** Greenland holds **vast reserves of rare earth minerals**, energy resources, and untapped potential due to melting ice.
- **Fishing and Tourism:** Emerging economic opportunities in **fishing** and **ecotourism** sectors.

4. Countering China's Arctic Ambitions:

- **Polar Silk Road:** Greenland is crucial for the U.S. to counter **China's growing influence** in the Arctic, especially through its **Polar Silk Road initiative**.
- **Arctic Dominance:** Strengthening U.S. dominance in the **Arctic Council** and preventing Chinese expansion.

Challenges in U.S. Interest in Greenland

1. Sovereignty Concerns: Greenland asserts its **autonomy** and **territorial integrity**, strongly opposing any **sale**.

2. Strategic Rivalries: Increased U.S. interest may **escalate tensions** with other Arctic stakeholders, including **Russia** and **China**.

3. Environmental Risks: Exploiting Greenland's resources could **exacerbate climate change** and disrupt fragile Arctic ecosystems.

4. Indigenous Rights: The indigenous Inuit population seeks to protect their **land, culture, and livelihood** from external interference.

INTERNAL SECURITY & DEFENCE

Review of Implementation of New Criminal Laws in ICJS 2.0

Syllabus: Governance and Internal Security (UPSC GS Paper-II and III)

Key Context

1. Context:

- The **Ministry of Home Affairs (MHA)** has directed the **National Crime Records Bureau (NCRB)** to expedite the **implementation of three new criminal laws** within the framework of **Inter-Operable Criminal Justice System (ICJS) 2.0**.
- Emphasis was placed on utilizing **e-applications** like **eSakshya**, **Nyaya Shruti**, **eSign**, and **eSummons** for efficiency.

About ICJS

2. Conceptualization and Objective:

- **Conceptualized By:** e-Committee of the **Supreme Court of India**.
- **Objective:** Seamless transfer of **data and information** among the pillars of the **criminal justice system**, including:
  - **Police**,
  - **Courts**,
  - **Prisons**,
  - **Prosecution**,
  - **Forensic Labs**,
  - **Fingerprints Units**.

3. Features:

1. **Data Integration:** Links **Crime and Criminal Tracking Networks and Systems (CCTNS)** with **e-Courts** and **e-Prisons**.
2. **One Data Once Entry:** Ensures data entry is done once and shared across all pillars.
3. **Implementation:** Managed by **NCRB** in collaboration with the **National Informatics Centre (NIC)**.
4. **Phases:**
   - **Phase I (2018–2022):** Focused on integration and testing.
   - **Phase II (2022–2026):** Emphasis on state-wide adoption and advanced applications.

Key Recommendations for ICJS 2.0

4. Suggested Enhancements:

1. **e-Applications:** Widespread use of:
   - **eSakshya:** Manages evidence.
   - **Nyaya Shruti:** Facilitates electronic judicial proceedings.
   - **eSign and eSummons:** Expedites documentation and case notifications.
2. **Predefined Alerts:** Generate alerts for criminal cases at **specific stages and timelines** to expedite investigations.
3. **Data-Rich Platform:** NCRB to develop a **comprehensive platform** benefiting **Investigation Officers** and stakeholders.

Other Initiatives Leveraging Technology in Criminal Justice System

5. Key Projects:

1. **Safe City Project:** Smart policing initiative launched in **8 cities** to enhance urban safety.
2. **National Automated Fingerprint Identification System (NAFIS):** Enables rapid and accurate **identification of individuals**.
3. **DNA Analysis Units:** Strengthened in **Central and State Forensic Science Laboratories** for better evidence analysis.
4. **Common Integrated Police Application (CIPA):** Automates processes at **police stations** for improved efficiency.

Significance of ICJS 2.0

6. Key Benefits:

1. **Efficiency in Investigations:** Reduces delays in **data sharing** across agencies.
2. **Transparency:** Enhances accountability through **seamless tracking** of case progress.
3. **Data Accuracy:** Eliminates duplication through **single-point data entry**.
4. **Strengthened Justice Delivery:** Enables faster adjudication of cases with **integrated databases**.

UN General Assembly Adopts Convention Against Cybercrime

Syllabus: International Relations and Internal Security (UPSC GS Paper-II and III)

Key Context

1. Context:

- The **UN General Assembly** adopted the **Convention Against Cybercrime**, the first **legally binding UN instrument** on cybercrime.
- Open for **signature in 2025** in **Hanoi, Vietnam**, the convention will come into force **90 days after being ratified by the 40th signatory**.

Key Provisions

2. Domestic Legislation: Mandates member states to enact laws making it illegal to **breach information and communication systems**without authorization.

3. International Cooperation:

- Promotes collaboration in:
  - **Investigations**,
  - **Evidence sharing**, and
  - **Prosecution** of cybercrimes.
- Upholds principles of **sovereign equality**, **territorial integrity**, and **non-intervention**.
- Encourages **bilateral/multilateral agreements** for the transfer of **personal data**, subject to safeguards.

4. Child Protection: Requires states to criminalize activities like: **Production**, **sale**, **distribution**, and **broadcasting** of **child sexual exploitation material**.

5. Human Rights: Ensures implementation aligns with **international human rights law**, protecting individual freedoms.

Significance of the Convention

6. Key Benefits:

1. **Global Cybercrime Policy:** Establishes a **unified framework** to combat cybercrime globally.
2. **Empowering Developing Nations:** Helps nations address **sophisticated cyber challenges** while respecting their **sovereign capabilities**.
3. **Enhanced Cooperation:** Fosters **international collaboration**, strengthening collective defense against digital threats.

UN General Assembly Adopts Programme of Action for Landlocked Developing Countries (LLDCs) for 2024–2034

Syllabus: International Relations and Global Issues (UPSC GS Paper-II)

Key Context

1. Context:

- The **UN General Assembly** has adopted a **Programme of Action for LLDCs** for the decade **2024–2034**, building on the:
  - **Vienna Programme of Action (2014–2024)** and
  - **Almaty Programme of Action (2003)**.
- Aims to address challenges faced by **Landlocked Developing Countries (LLDCs)** through targeted priorities and measurable outcomes.

Key Targets of the Programme

2. Economic Growth and Employment:

- **Labour Productivity and Jobs:** Boost by **50%** across all sectors by **2034**.
- **Special Economic Zones:** Support the development of **industrial parks** and **economic zones**.

3. Trade Facilitation:

- **Non-Tariff Barriers:** Reduce or eliminate **arbitrary and unjustified barriers**.
- **Global Merchandise Exports:** Double LLDCs' share by **2034**.
- **WTO Agreement on Trade Facilitation:** Ensure effective implementation across all LLDCs.

4. Disaster Risk Reduction: Sendai Framework (2015–2030): Fully implement disaster risk reduction strategies to mitigate vulnerabilities.

About LLDCs

5. Definition and Statistics:

- **Landlocked Countries:** Lack direct access to the sea.
- **Number: 32 LLDCs** with a population of approximately **570 million**.
- **Doubly Landlocked Countries: Liechtenstein** and **Uzbekistan** (surrounded entirely by other landlocked nations).

Challenges Faced by LLDCs

6. Trade Hurdles:

- Dependence on **transit nations** leads to:
  - **Higher trade costs**,
  - **Delays**, and
  - **Reduced competitiveness** in global markets.

7. Economic Growth:

- **Limited Trade and Export Opportunities:** Constrains economic development.
- **Foreign Direct Investment (FDI):** Reduced inflows due to geographic disadvantages.

8. Global Trade Share: LLDCs contributed only **1.1%** to global merchandise exports in **2022**.

Significance of the Programme

9. Key Outcomes:

1. **Economic Empowerment:** Enhances **labour productivity** and job creation.
2. **Trade Competitiveness:** Reduces barriers to trade and expands global market access.
3. **Disaster Resilience:** Strengthens LLDCs' ability to handle natural and climate-related disasters.

ECONOMY

Critical Minerals: Vital for India's Economic and Strategic Goals

Syllabus: Economy (UPSC GS Paper-III)

Key Context

1. Context:

- In **2023**, the Ministry of Mines identified **30 critical minerals** essential for **India's growth and security**.
- Notable concern: **Complete import dependency** for **10 minerals**, with **China dominating** the critical minerals sector.

Definition of Critical Minerals

2. Definition:

- Minerals essential for **economic development** and **national security**.
- Vulnerability arises from:
  - **Limited availability** or **geographical concentration** of extraction/processing.
  - Risk of **supply chain disruption**.

Importance of Critical Minerals

3. Economic and Strategic Significance:

1. **Economic Development** Key to industries like **electronics**, **energy storage**, and **renewable energy**.
2. **National Security:** Crucial for **aerospace**, **defence**, and **telecommunication** sectors.
3. **Sustainability:** Supports global **Net Zero emissions** goals via **clean energy technologies**.
4. **Technological Edge:** Powers sectors like **semiconductors**, **electric vehicles (EVs)**, and **high-tech manufacturing**.
5. **Global Transition:** Enables the shift to a **low-carbon economy** through renewable energy adoption.

China's Dominance in Critical Minerals

4. Factors Behind China's Lead:

1. **Resource Base and Reserves:** Large reserves of **Rare Earth Elements (REE)**, **lithium**, and **graphite**.
2. **Processing Capabilities:** Controls:
   - **87% of REE processing**.
   - **58% of lithium refining**.
   - **68% of silicon processing**.
3. **Strategic Investments:** Significant investments in **domestic** and **overseas mining projects**.
4. **Vertical Integration:** End-to-end control from **mining to refining**, ensuring **cost efficiency**.

Distribution of Critical Minerals

5. In India:

- **Lithium:** Jammu & Kashmir (5.9 million tonnes).
- **Rare Earth Elements (REE):** Andhra Pradesh, Odisha, Rajasthan.
- **Graphite:** Arunachal Pradesh (largest deposit).
- **Cobalt:** Odisha and Jharkhand.
- **Tungsten:** Rajasthan and Karnataka.

6. Globally:

- **China:** Dominates lithium, graphite, and REE processing.
- **Australia:** Major lithium and REE producer.
- **DRC (Democratic Republic of Congo):** Largest cobalt reserves (60% global output).
- **USA:** Significant REE mining but lacks refining capabilities.
- **South America: Lithium Triangle** (Chile, Argentina, Bolivia).

India's Initiatives for Critical Minerals

7. Key Initiatives:

1. **KABIL (Khanij Bidesh India Limited):** Secures **overseas mineral assets** for supply-chain diversification.
2. **Strategic Partnerships:** Membership in **Minerals Security Partnership** and **Critical Raw Materials Club**.
3. **Exploration and Research:** Geological Survey of India (**GSI**) and **CSIR** promoting **domestic exploration** and **recycling technologies**.
4. **Production-Linked Incentives (PLI):** Focus on **recycling and extraction** of critical minerals.
5. **National Strategies:** Proposed **Centre of Excellence for Critical Minerals (CECM)** to streamline policies.

Challenges to Critical Minerals

8. Major Challenges:

1. **Import Dependency:** Heavy reliance on **China** for refining and processing.
2. **Exploration Bottlenecks:** Lack of advanced **mining technology** for deep-seated minerals.
3. **Policy Gaps:** No clear **regulatory framework** for private sector participation.
4. **Environmental Concerns:** High **ecological impact** of mining and refining.
5. **Supply Chain Risks:** Vulnerable to **geopolitical tensions** and export restrictions by dominant players.

Recommendations by Veena Dermal Committee

9. Key Suggestions:

1. **Centre of Excellence for Critical Minerals:** Address **technological gaps** and enhance **domestic capabilities**.
2. **Dynamic List:** Regularly update the list of critical minerals for evolving needs.
3. **Promote Recycling:** Focus on **circular economy practices** to reduce virgin mineral dependency.
4. **Policy Incentives:** Attract private sector investment in **exploration** and **processing**.
5. **International Collaborations:** Secure **overseas assets** and **advanced technologies** through partnerships.

Parliamentary Standing Committee Report on Crude Oil Storage

Syllabus: Infrastructure and Energy Security (UPSC GS Paper-III)

Key Context

1. Context:

- The **Parliamentary Standing Committee on Petroleum & Natural Gas** raised concerns over India's **Strategic Petroleum Reserves (SPR)**.
- **Observation:** While ₹5,000 crore was allocated in the **2023-24 budget** for filling SPRs, **no expenditure** was incurred in FY24.

About India's Strategic Petroleum Reserves (SPR)

2. Genesis: Initiated in **2004** to establish **strategic crude reserves** for energy security.

3. Managing Institution: Operated by **Indian Strategic Petroleum Reserves Limited (ISPRL)**, a **Special Purpose Vehicle** under the **Oil Industry Development Board (OIDB)**, managed by the **Ministry of Petroleum & Natural Gas**.

4. India's SPR Programme:

1. **Phase-I (Completed):**
   - **5.33 MMT capacity** across three locations:
     - **Visakhapatnam**, **Mangalore**, and **Padur** (largest).
2. **Phase-II (Approved in 2021):**
   - Additional **commercial-cum-strategic facilities**:
     - **Chandikhol (4 MMT)** in Odisha.
     - **Padur (2.5 MMT)** in Karnataka.

5. Total Storage Capacity:

- **Strategic Storage (ISPRL Caverns):** Provides **9.5 days of coverage**.
- **Commercial Storage (Oil Companies):** Contributes **64.5 days of coverage**.
- **Phase-II Additions:** Will add **11 more days**, helping India approach the **International Energy Agency (IEA)**standard of **90 days**.

Strategic Significance of SPR

6. Strategic Role:

1. **Price Stabilization Tool:**
    - Example: In **2021**, India coordinated the release of **5 million barrels** with global consumers to stabilize oil prices.
2. **Energy Security & Diplomatic Leverage:**
    - Enhances India's resilience during **supply disruptions**.
    - Example: **UAE's Abu Dhabi National Oil Company** was the **first foreign entity** to store crude in India's strategic reserves in **2017**.

About Indian Strategic Petroleum Reserves Limited (ISPRL)

7. Genesis and Type: Established in **2004** as a **Special Purpose Vehicle (SPV)**, fully owned by **OIDB**.

8. Key Features:

1. **Commercialization: 30% of storage capacity** can be leased to **Indian/foreign companies**.
2. **Emergency Rights:** The Government retains the **first right** to the entire crude oil in **emergencies**.

55th Goods and Services Tax (GST) Council Meeting

Syllabus: Indian Economy and Taxation (UPSC GS Paper-III)

Key Context

1. Context: The **55th GST Council meeting** was held in **Jaisalmer, Rajasthan**, focusing on **tax rate changes**, **trade facilitation**, and **compliance streamlining** under the **Goods and Services Tax (GST)** framework.

Key Recommendations by GST Council

2. Exemptions:

1. **Gene Therapy:** Complete **GST exemption** for **gene therapy** services.
2. **Motor Vehicle Accident Fund:** Contributions by **general insurance companies** from third-party motor vehicle premiums exempted from GST.

3. Tax Rate Reductions: Fortified Rice Kernel (FRK): GST rate reduced to **5%**.

4. Clarifications on GST Liability:

1. **Pepper and Raisins:** Supplied by an **agriculturist** will **not attract GST**.
2. **Popcorn (e.g., Caramel Popcorn):** Mixed with **sugar** will attract **18% GST**.

About GST Council

5. Constitutional Mandate:

- **Article 279A:** Inserted by the **Constitution (101st) Amendment Act, 2016**.
- **Role:** Responsible for making recommendations on issues related to the implementation of GST.

6. Composition of GST Council:

1. **Chairperson: Union Finance Minister**.
2. **Members:**
    - **Union Minister of State** (Revenue or Finance).
    - **State Ministers In-charge** of finance/taxation or any nominated minister by each state government.

7. Decision-Making Process:

- **Majority Requirement:** Decisions require at least **three-fourths of weighted votes (75%)** of members present and voting.
- **Voting Weightage:**
    - **1/3rd for the Centre**.
    - **2/3rd for the States**.

Kamarajar Port: A Catalyst for Port-Led Industrialization

Syllabus: Infrastructure and Economic Development (UPSC GS Paper-III)

Key Context

1. Context: Tamil Nadu's **Kamarajar Port** has achieved a **154% capacity growth**, emerging as a key player in India's **Sagarmala Programme**, driving **port-led industrialization**.

About Kamarajar Port

2. Establishment:

1. Declared a **major port** under the **Indian Ports Act, 1908**, in **March 1999**.
2. Incorporated as **Ennore Port Limited** under the **Companies Act** in **October 1999**.

3. Location: Located on the **Coromandel Coast**, approximately **24 km north of Chennai Port**, Tamil Nadu.

4. Features:

1. **12th Major Port of India:** Recognized as the 12th **major port** in India.
2. **First Corporatized Port:** India's **first corporatized major port**, registered as a **public company**.
3. **Strategic Importance:** Integral to the **National Perspective Plan** of the **Sagarmala Programme**, focusing on **port-led industrialization** and enhancing India's maritime capabilities.

Significance of Kamarajar Port

5. Economic Contributions:

- Drives **industrial growth** in Tamil Nadu.
- Enhances **export-import connectivity** in the region.

6. Strategic Relevance: Supports **Sagarmala Programme** by promoting **coastal shipping** and **logistics efficiency**.

Annual Survey of Unincorporated Sector Enterprises (ASUSE) 2023-24: Key Findings

Syllabus: Economic Development (UPSC GS Paper-III)

Key Context

1. Context: The **National Statistics Office (NSO)**, under the **Ministry of Statistics and Programme Implementation (MoSPI)**, released the results of the **Annual Survey of Unincorporated Sector Enterprises (ASUSE)** for the reference period **October 2023 – September 2024**.

About ASUSE

2. Objective: To measure **economic and operational characteristics** of **unincorporated non-agricultural establishments** in sectors like:

- **Manufacturing**,
- **Trade**, and
- **Other Services** (excluding construction).

3. Purpose: Provides **input for policymaking**, supports **national accounts statistics**, and aids **data-driven decisions** for key ministries.

Key Findings of ASUSE 2023-24

4. Growth in Establishments: Total establishments increased to **7.34 crore**, reflecting a **12.84% growth** compared to **2022-23**.

5. Female Entrepreneurship: Female-owned proprietary establishments rose to **26.2%** from **22.9%** in 2022-23, signaling a rise in **female entrepreneurship**.

6. Contribution to GVA (Gross Value Added): GVA contribution grew by **16.52%** (at current prices), driven primarily by the **services sector**.

7. Employment and Labour Productivity:

- Sector employed over **12 crore workers**.
- **GVA per worker** (labour productivity) increased by **5.62%** (at current prices).

8. Digital Adoption: Establishments using the internet grew to **26.7%**, up from **21.1%** in 2022-23, indicating a shift toward **digital adoption**.

Significance of the Unincorporated Non-Agricultural Sector

9. Importance:

1. **Employment Generation:** Provides jobs to a significant portion of the workforce.
2. **GDP Contribution:** Contributes substantially to the country's economic output.
3. **Entrepreneurship Promotion:** Encourages self-reliance and innovation.
4. **Support to Incorporated Sector:** Acts as a **backbone** in the domestic **supply value chain**.

About Unincorporated Sector Enterprises

10. Characteristics:

1. **Legal Status:** Not incorporated as a **legal entity separate** from the owner.
2. **Asset Ownership:** Assets belong to the **owner**, not the enterprise.
3. **Contractual Limitations:** Cannot engage in contracts or incur liabilities independently.
4. **Debt Liability:** Owners are **personally liable** for debts or obligations incurred.

RBI's Report on Trend and Progress of Banking in India 2023-24

Syllabus: Indian Economy - Banking Sector (UPSC GS Paper-III)

Key Context

1. Context: The **Reserve Bank of India (RBI)** released its annual report under the **Banking Regulation Act, 1949**, assessing the performance and trends of India's banking sector for **2023-24**.

Key Highlights

2. Scheduled Commercial Banks (SCBs):

1. **Credit Growth and Profitability: Profitability improved** for the sixth consecutive year.
2. **Asset Quality:** Gross **Non-Performing Assets (NPAs)** declined to a **13-year low** of **2.5%** in September 2024.
3. **Capital Adequacy: Capital-to-Risk-Weighted Assets Ratio (CRAR):**
    - Achieved **16.8%**, well above the regulatory requirement of **9%** (as mandated by RBI) and the **8%**required under **BASEL-III norms**.

3. Urban Co-operative Banks (UCBs):

- Combined balance sheet expanded.
- **Asset quality improved** for the third straight year.

4. Non-Banking Financial Companies (NBFCs):

- Achieved **double-digit credit growth**.
- Gross NPAs declined to **3.4%** by September 2024.

5. Technological Advancements: Platforms like the **Unified Lending Interface (ULI)** and **Open Credit Enablement Network (OCEN)** introduced to improve **credit access** for small businesses and individuals.

6. Financial Inclusion: Upcoming **National Strategy for Financial Inclusion (NSFI) 2025-30** aims to:

- Deepen financial inclusion.
- Address challenges in access and financial literacy.

Concerns Highlighted

7. Rising Banking Frauds:

- Fraud cases surged to **₹21,367 crore** during April-September 2024, compared to **₹2,623 crore** in the same period last year.
- Poses risks to:
  - **Reputation**,
  - **Operations**, and
  - **Financial stability** of the banking sector.

Key Terms Explained

8. CRAR (Capital-to-Risk-Weighted Assets Ratio):

- Compares a bank's **capital (net worth)** to its **risk-weighted assets**.
- Higher CRAR indicates stronger financial health and ability to absorb risks.

9. Gross NPAs (Non-Performing Assets): Loans where borrowers fail to make payments for **90 days or more**.

RBI Sets Up Committee to Develop AI Framework in Financial Sector

Syllabus: Indian Economy - Technology in Financial Services (UPSC GS Paper-III)

Key Context

1. Context: The **Reserve Bank of India (RBI)** has established an **8-member committee**, chaired by **Dr. Pushpak Bhattacharyya**, to develop a framework for the **responsible and ethical use of AI** in the financial sector.

2. Objective of the Committee:

- Assess the **current adoption levels** of AI in financial services.
- Identify **potential risks** associated with AI.
- Recommend a framework to ensure ethical and responsible use of AI.

Benefits of AI in Financial Services

3. Key Advantages:

1. **Operational Efficiency:**
   - **Automation of repetitive tasks**, enabling faster and accurate processing of large datasets.
   - Example: **Loan application processing**.
2. **Enhanced Decision-Making:** Uses **predictive analytics** to forecast market trends and support **algorithmic trading**.
3. **Customer Relationships:** Improves customer interactions through **24/7 AI-powered chatbots** and **virtual assistants**.
4. **Improved Risk Management:** Shifts from reactive to **proactive fraud detection**, preventing fraud before it occurs.

Concerns with AI in Financial Services

4. Potential Risks:

1. **Embedded Bias:** AI models can amplify **biases** in training data, leading to **financial exclusion** or discriminatory practices.
2. **Data Privacy and Security:** Risk of breaches violating **personal data protection regulations**.
3. **Other Concerns: Inconsistent AI responses** and **cyber-attack vulnerabilities**.

Significance of the Framework

5. Why is a Framework Needed?

1. **Ethical Use:** To ensure AI applications are **fair**, **transparent**, and **non-discriminatory**.
2. **Risk Mitigation:** Addresses concerns related to **bias**, **privacy**, and **security**.
3. **Trust in Technology:** Builds confidence among stakeholders in the **financial sector**.

Real Effective Exchange Rate (REER): An Overview

Syllabus: Indian Economy - External Sector (UPSC GS Paper-III)

Key Context

1. Context: The **Real Effective Exchange Rate (REER)** index of the **Indian rupee** reached a record **108.14 in November 2024**, strengthening by **4.5%** during this calendar year, according to **RBI data**.

What is REER?

2. Definition: REER is the **weighted average value of a country's currency** against the currencies of its **trading partners**, adjusted for **inflation differences**.

Factors Determining REER

3. Key Determinants:

1. **Nominal Exchange Rates: Bilateral exchange rates** between a country's currency and its trading partners.
2. **Inflation Differentials:** Differences in **inflation rates** between the home country and trading partners.
3. **Trade Weights:** Importance of each trading partner, based on the **volume of trade**.

How is REER Calculated?

4. Calculation Steps:

1. **Bilateral Exchange Rates:** Compute the **average exchange rate** for each trading partner.
2. **Trade Weights:** Assign weights based on the **share of trade** with each partner.
3. **Inflation Adjustment:** Convert **nominal effective exchange rate (NEER)** to REER by adjusting for inflation differences.

Formula for REER:

REER=(∑(Nominal Exchange Rate with Partner×Trade Weight))÷Inflation Adjustment FactorREER=(∑(Nominal Exchange Rate with Partner×Trade Weight))÷Inflation Adjustment Factor

What Does REER Indicate in the Economy?

5. Implications of Changes in REER:

1. **Increase in REER:**
   - **Currency Overvaluation:**
     - **Exports become costlier**, reducing competitiveness in global markets.
     - **Imports become cheaper**, increasing trade imbalances.
2. **Decrease in REER:**
   - **Currency Undervaluation:**
     - Improves **export competitiveness**.
     - Raises **import costs**, helping protect domestic industries.

Significance of REER for India

6. Key Insights:

- **Higher REER (108.14):**
  - Indicates potential concerns of **export uncompetitiveness** for India in global markets.
  - Reflects a stronger rupee in real terms against trading partners.

6. **Policy Implications:** RBI may use REER trends to manage currency policies and ensure **trade balance stability**.

Wealth Tax: Debates on Reintroduction in India

Syllabus: Economy - Taxation and Inequality (UPSC GS Paper-III)

Key Context

1. Context: Proposals to **reintroduce wealth tax** in India have sparked debates on its potential to reduce inequality versus concerns about **capital flight** and administrative inefficiencies.

What is Wealth Tax?

2. Definition: Wealth tax is a **direct tax** levied on the **net wealth** of individuals, **Hindu Undivided Families (HUFs)**, and companies to promote **redistribution of resources**.

3. Historical Context in India:

- Governed by the **Wealth Tax Act, 1957**.
- **Abolished in 2016** due to:
  - **High administrative costs**.
  - **Low revenue collection**.

Features and Criteria of Wealth Tax

4. Key Provisions:

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

Global Models of Wealth Taxation

5. Examples:

1. **Norway:**
   - Tax rate: **0.85%–1.1%** on net wealth.
   - Strong public support due to investments in **health** and **education**.
   - Minimal **capital flight** due to robust **infrastructure** and **social trust**.
2. **Switzerland:**
   - Decentralized system; **cantons** set individual tax rates.
   - Wealth tax contributes **3.6%–3.8%** of total state revenue.

Advantages of Wealth Tax

6. Key Benefits:

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

Disadvantages of Wealth Tax

7. Key Challenges:

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

Way Ahead

8. Recommendations:

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

Monetary and Fiscal Policy: Balancing Growth and Stability

Syllabus: Indian Economy - Economic Growth, Planning, and Resource Mobilization (UPSC GS Paper-III)

Key Context

1. Context: A recent **finance ministry report** highlighted differing views with the **Reserve Bank of India (RBI)** on growth and inflation, emphasizing the roles of **monetary policy** and **fiscal policy** in addressing demand slowdowns.

Fiscal Policy

2. Definition: Fiscal policy refers to the **government's use of taxation, spending, and borrowing** to influence a country's economic activity.

3. Tools of Fiscal Policy:

- **Taxation:** Adjusting tax rates to affect **disposable income** and spending.
- **Government Spending:** Investments in **public goods, infrastructure**, and **social programs**.
- **Public Borrowing:** Financing deficits through **domestic or international borrowing**.
- **Subsidies:** Supporting specific sectors to boost **demand**.
- **Transfers:** Welfare payments like **pensions** or **unemployment benefits**.

4. Types of Fiscal Policy and Their Impacts:

Type	Tools	Impact on Growth	Impact on Demand
Expansionary Fiscal Policy	Tax cuts, public spending, subsidies	Boosts infrastructure, employment, and GDP	Increases disposable income, stimulates demand
Contractionary Fiscal Policy	Higher taxes, reduced spending	Controls fiscal deficit, slows growth	Reduces disposable income, lowers demand to control inflation

Monetary Policy

5. Definition: Monetary policy involves the **central bank's regulation of the money supply** and **interest rates** to maintain **price stability** and foster **economic growth**.

6. Tools of Monetary Policy:

- **Open Market Operations (OMO):** Buying or selling government securities to control **liquidity**.
- **Cash Reserve Ratio (CRR):** Adjusting the percentage of deposits banks must hold as reserves.
- **Repo and Reverse Repo Rates:** Influencing **short-term interest rates**.
- **Bank Rate:** Adjusting long-term interest rates to influence **credit availability**.
- **Quantitative Easing (QE):** Infusing money by purchasing **financial assets**.

7. Types of Monetary Policy and Their Impacts:

Type	Tools	Impact on Growth	Impact on Demand
Expansionary Monetary Policy	Lower interest rates, reduce CRR, QE	Encourages borrowing, investment; boosts GDP	Increases consumer and business spending
Contractionary Monetary Policy	Higher interest rates, increase CRR	Controls overheating, reduces inflation	Decreases spending, controls aggregate demand

Comparison of Fiscal and Monetary Policies

Aspect	Fiscal Policy	Monetary Policy
Controlled By	Government (Finance Ministry)	Central Bank (RBI)
Objective	Economic growth, income redistribution	Price stability, inflation control
Tools Used	Taxation, public spending, subsidies	Interest rates, liquidity regulation
Time Lag	Longer implementation and effect period	Faster implementation, shorter effect period
Flexibility	Political considerations may limit flexibility	More flexible, apolitical decisions

Way Ahead

8. Recommendations for Synergy:

1. **Counter-Cyclical Policies:** Combine **expansionary fiscal policy** with **accommodative monetary policy** during economic slowdowns.
2. **Coordination Between RBI and Government:** Align fiscal and monetary policies to maintain **macroeconomic stability**.
3. **Focus on Structural Reforms:** Enhance **supply-side measures** to address long-term growth challenges.
4. **Monitoring Mechanisms:** Continuously assess impacts of policies on **growth**, **inflation**, and **demand**.

Factsheet: Household Consumption Expenditure Survey (HCES) 2023-24

Syllabus: Indian Economy - Growth, Development, and Employment (UPSC GS Paper-III)

Key Context

1. Context: The **Ministry of Statistics and Programme Implementation (MoSPI)** released findings of the second **Household Consumption Expenditure Survey (HCES)** covering **August 2023–July 2024**.

2. Importance of the Survey: The survey tracks **household expenditure**, helping policymakers measure **poverty**, **inequality**, and **consumption patterns**.

Key Findings

3. Average Monthly Per Capita Expenditure (MPCE):

- **Rural:** ₹4,122
- **Urban:** ₹6,996

4. Urban-Rural Gap in MPCE: Declined from **71% (2022-23)** to **70% (2023-24)**, indicating **faster consumption growth** in rural areas.

5. Inequality Among Classes:

- **Bottom 5% of Rural Population:** ₹1,677 MPCE.
- **Top 5% of Rural Population:** ₹10,137 MPCE.

6. Inequality Among States:

- **Highest MPCE: Sikkim**.
- **Lowest MPCE: Chhattisgarh**.

7. Consumption Behavior:

- **Non-Food Expenditure:**
  - Rural Areas: 53% of total expenditure.
  - Urban Areas: 60% of total expenditure (majorly on **conveyance** and **clothing**).
  - **Urban Rent:** 7% of non-food expenditure.
- **Food Expenditure:** Beverages and processed food constitute the largest share.

8. Decline in Consumption Inequality:

- **Gini Coefficient:** Improved for both rural and urban areas compared to the previous year, indicating reduced income inequality.

About Household Consumption Expenditure Survey (HCES)

9. Objectives:

- Collects data on household **consumption patterns** and **expenditure** on goods and services.
- Uses **MPCE (Monthly Per Capita Expenditure)** as the primary indicator.

10. Significance:

- Assesses **poverty**, **inequality**, and **social exclusion**.
- Informs **policy decisions** on welfare and economic growth.

11. Conducted by: National Sample Survey Office (NSSO) under MoSPI.

Significance of Findings

12. Economic Implications:

- **Narrowing Urban-Rural Gap:** Reflects increased **consumption momentum** in rural areas, signaling **inclusive growth**.
- **Improved Gini Coefficient:** Indicates progress in reducing **inequality**, fostering equitable development.

13. Policy Relevance:

- Helps identify **regional disparities** in consumption for targeted interventions.
- Informs strategies to address **class inequality** through welfare programs.

Way Forward

14. Recommendations:

1. **Targeted Policies:** Address gaps in **low-consumption states** like Chhattisgarh.
2. **Rural Development Focus:** Continue promoting rural consumption through **employment** and **infrastructure development**.
3. **Reduce Class Disparity:** Implement schemes to uplift the **bottom 5%** of earners.
4. **Improve Data Collection:** Enhance HCES coverage and periodicity to better reflect real-time changes.

Rupee Depreciation: Causes, Impact, and Solutions

Syllabus: Economy - Exchange Rate Dynamics and Monetary Policy (UPSC GS Paper-III)

Key Context

1. Context: The Indian **rupee's exchange rate** against the **US dollar** has breached the **₹85 mark**, marking its **sharpest depreciation** in two years.

2. Definition of Exchange Rate: Represents the **value of one currency relative to another**, functioning as the **price of one currency** expressed in terms of another.

Key Factors Responsible for Rupee's Depreciation

3. Strengthening of the US Dollar:

- **US Federal Reserve:** Aggressive monetary tightening has led to **capital outflows** from emerging markets like India.
- Example: Significant **Foreign Portfolio Investment (FPI) outflows** from India.

4. Widening Trade Deficit: Driven by **higher crude oil imports**, increasing India's import bill.

5. High Inflation in India:

- **Inflationary Pressures:** High domestic inflation reduces the rupee's purchasing power, leading to depreciation.

Impact of Rupee's Depreciation

6. Negative Impact:

1. **Higher Import Costs:** Increases the cost of essential imports like **crude oil**, further **widening the trade deficit**.
2. **Foreign Debt Pressure:** Servicing external debt becomes costlier in rupee terms.
3. **Inflationary Pressures:** Imported goods become more expensive, contributing to **domestic inflation**.

7. Positive Impact:

1. **Boost to Exports:** Indian goods become more **price-competitive** in international markets.
2. **Higher Remittance Value:** Non-Resident Indians (NRIs) benefit from a higher exchange rate when sending money back home.

Measures to Stabilize the Rupee

8. Direct Dollar Sales:

- **Action:** Increase the **supply of USD** in the market to stabilize demand-supply dynamics, supporting the rupee's value.

9. Foreign Exchange Swaps:

- **Action:** The **Reserve Bank of India (RBI)** can perform buy-sell swaps to manage **dollar liquidity** without significantly depleting **forex reserves**.

10. Attract Foreign Investments:

- **Policy Incentives:** Tax benefits or regulatory easing to encourage **Foreign Direct Investment (FDI)** and **portfolio inflows**.

Way Forward

11. Recommendations:

- **Diversify Exports:** Expand into new markets and value-added sectors to reduce the trade deficit.
- **Energy Alternatives:** Reduce dependence on crude oil imports by investing in **renewable energy** and domestic production.
- **Monetary Coordination:** Balance between **RBI interventions** and long-term macroeconomic measures.
- **Enhance Competitiveness:** Focus on improving **domestic productivity** and **manufacturing capacity**.

Government to Borrow ₹3.94 Lakh Crore via Treasury Bills (T-Bills)

Syllabus: Economy - Government Securities and Fiscal Management (UPSC GS Paper-III)

Key Context

1. Context: The **Reserve Bank of India (RBI)** announced a calendar for issuing **Treasury Bills (T-Bills)** worth ₹3.94 lakh crore, a type of **Government Security (G-Sec)**, to meet short-term borrowing needs.

Government Securities Market in India

2. What Are Government Securities (G-Secs)?

- **Definition:** Tradeable instruments issued by the **Central** or **State Governments** acknowledging a debt obligation.
- **Issuance Platform:** Conducted by RBI through auctions on the **E-Kuber platform**.
- **Registry and Depository:** Managed by RBI's **Public Debt Office (PDO)**.

3. Participants in the G-Secs Market:

- **Institutions:** Commercial banks, primary dealers, insurance companies, cooperative banks, regional rural banks, mutual funds.
- **Retail Investors:** Can participate through the **non-competitive bidding section**.

Types of G-Secs in India

4. Short-Term Instruments (Maturity < 1 Year):

1. **Treasury Bills (T-Bills):**
    - **Nature:** Money market instruments with no interest (zero-coupon).
    - **Issued At:** A **discount** and redeemed at **face value** on maturity.
    - **Tenors:**
        - **91 days**
        - **182 days**
        - **364 days**
2. **Cash Management Bills (CMBs):**
    - **Purpose:** Address temporary mismatches in government cash flows.
    - **Maturity:** Less than 91 days.
    - **Introduced in:** 2010.

5. Long-Term Instruments (Maturity ≥ 1 Year):

1. **Dated G-Secs (Government Bonds):**
    - **Nature:** Fixed or floating interest rate instruments with semi-annual interest payments.
    - **Maturity Range:** 5 to 40 years.
2. **State Development Loans (SDLs):**
    - **Issued By:** State Governments.
    - **Interest Payment:** Half-yearly.

Key Notes on G-Secs

6. Issuers:

- **Central Government:** Issues **both T-Bills** and **bonds/dated securities**.
- **State Governments:** Issue only **bonds/dated securities** (SDLs).

7. Importance of T-Bills:

- **Liquidity Management:** Helps manage short-term funding needs.
- **Safe Investment:** Risk-free returns as they are backed by the government.

Way Ahead

8. Recommendations for Strengthening G-Sec Market:

1. **Retail Participation:** Expand retail access via digital platforms and simplified bidding processes.
2. **Awareness Programs:** Educate investors on the safety and returns of G-Secs to increase participation.
3. **Integration with Global Markets:** Enhance market depth by aligning with international benchmarks.
4. **Efficient Issuance Mechanisms:** Improve transparency in issuance and pricing.

Dr. Pushpak Bhattacharyya Committee

Syllabus: Economy - Governance in Financial Systems (UPSC GS Paper-III)

Context

The **Reserve Bank of India (RBI)** has formed an **eight-member committee** under **Dr. Pushpak Bhattacharyya** to create a framework for the ethical and responsible adoption of **Artificial Intelligence (AI)** in the financial sector.

About Dr. Pushpak Bhattacharyya Committee

1. Established by: Reserve Bank of India (RBI).

2. Members: A total of **8 members**, chaired by **Dr. Pushpak Bhattacharyya**, a renowned AI expert and professor at **IIT Bombay**.

3. Aim: To develop a **Framework for Responsible and Ethical Enablement of AI (FREE-AI)** in the **Indian financial sector**.

4. Objectives:

- Provide a roadmap for the **ethical and secure adoption** of AI by financial entities.
- Align AI practices with global standards while addressing **India-specific challenges**.

Need for the Committee

5. Key Drivers:

- **AI Trends in Finance:** Assess AI adoption globally and domestically in financial services.
- **Risk Mitigation:** Identify risks (bias, misuse, cyber vulnerabilities) and propose strategies for **evaluation**, **mitigation**, and **monitoring**.
- **Compliance Requirements:** Create clear guidelines for **banks**, **NBFCs**, **fintech firms**, and **payment system operators**.
- **Governance:** Design a governance framework for **ethical AI use**, ensuring **transparency**, **accountability**, and **fairness**.

Key Focus Areas of the Committee

6. Framework Design:

- Ethical considerations in **AI model development**.
- Prevention of **algorithmic bias** and ensuring **inclusivity**.

7. Risk Management:

- Identifying AI-related **cybersecurity risks**.
- Protecting consumer data and ensuring **privacy compliance**.

8. Regulatory Compliance: Align AI practices with RBI guidelines and **global AI ethics standards**.

9. Stakeholder Involvement: Propose mechanisms for collaboration among **regulators**, **industry players**, and **academia**.

Significance of the Committee

10. Enhances Financial Stability: Reduces risks associated with **unregulated AI adoption**.

11. Strengthens Consumer Trust: Protects consumers from AI misuse and ensures fair treatment.

12. Global Leadership: Positions India as a leader in **responsible AI governance** in finance.

13. Facilitates Innovation: Encourages fintech firms to innovate while adhering to **ethical guidelines**.

Way Ahead

14. Recommendations for the Committee:

- Develop an **AI Ethics Charter** for the financial sector.
- Ensure regular **audits** of AI systems for compliance and fairness.
- Promote the use of **explainable AI** to make algorithms more transparent.
- Encourage **capacity building** in financial institutions for AI expertise.

AGRICULTURE

Report of Parliamentary Standing Committee on Agriculture, Animal Husbandry, and Food Processing

Syllabus: Agriculture and Allied Sectors (UPSC GS Paper-III)

Key Context and Overview

1. Context: The **Parliamentary Standing Committee** presented recommendations to enhance the **livestock sector**, addressing **challenges** and **policy gaps**.

2. Status of Livestock Sector in India:

1. **Global Ranking:** India has the **largest livestock population in the world**.
2. **Contribution to GVA (2022-23):**
   - Accounts for **4.66% of total GVA**.
   - Sector's contribution to **agricultural GVA** increased from **24.32% to 30.38%** (2014-15 to 2022-23).
3. **Growth Rate:** Sector grew at a **Compound Annual Growth Rate (CAGR)** of **7.38%** during this period.

Key Concerns Highlighted

3. Issues Identified:

1. **Low Budget Allocation:** Inadequate funding for institutes like **Small Livestock Institutes**, **Breed Improvement Institutes**, and the **Veterinary Council of India**.
2. **Feed and Fodder Shortages:** Only **5% of cultivable land** is under fodder production, despite India housing **15% of the world's livestock**.
3. **Livestock Insurance:** Only **1% of livestock** is insured.
4. **Other Challenges: Underutilization of funds**, **low productivity**, and **slow progress of schemes**.

Key Recommendations

4. Proposed Measures:

1. **Declare Livestock a Special Sector:** Ensure **focused attention** and **resource allocation**.
2. **Achieve NPDD Targets:** Prioritize setting up **Bulk Milk Coolers** and **Automatic Milk Collection Units**.
3. **Support for Stray Cattle:**
   - Subsidize or incentivize farmers to care for **non-productive cattle**.

- Fund **Gaushalas** for stray cattle management.

4. **Expand Livestock Insurance:** Cover a larger portion of the **53.5 crore livestock population**.
5. **Additional Recommendations:**
   - Launch a **Genetic Upgradation Program**.
   - Create a **National Fodder Mission** to address feed shortages.

India's Initiatives for the Livestock Sector

5. Key Government Programs:

1. **Rashtriya Gokul Mission:** Focuses on **conserving** and **upgrading indigenous breeds** through selective breeding.
2. **Kisan Credit Card (KCC) and Animal Health Infrastructure Fund:** Expands **credit access** and strengthens **animal health infrastructure**.
3. **Dairy Programs:** Programs like **National Programme for Dairy Development (NPDD)** modernize the dairy sector and encourage **entrepreneurship**.
4. **Health & Disease Control: National Animal Disease Control Programme** tackles diseases like **Foot-and-Mouth Disease (FMD)** and **Brucellosis**.

Government Schemes for Fisheries: Matsya Seva Kendras and Sagar Mitras

Syllabus: Indian Economy - Agriculture and Allied Sectors (UPSC GS Paper-III)

Key Context

1. Context: The government launched initiatives like **Matsya Seva Kendras** and **Sagar Mitras** under flagship schemes to boost **fisheries productivity** and promote **sustainable practices**.

About Matsya Seva Kendras

2. What it is: One-stop solution centres offering **extension services** to fish farmers and hatcheries.

3. Launched in: Introduced under the **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** in **2020**.

4. Aim: To provide **comprehensive support** in aquaculture, disease management, and farmer training.

5. Features:

1. **Labs for Analysis:** Equipped with facilities for **water**, **soil**, and **microbial testing**.
2. **Need-Based Services:** Offers **disease testing**, **capacity building**, and **technology adoption**.
3. **Community Engagement:** Mobilizes **cooperatives**, **self-help groups (SHGs)**, and **start-ups** to share best practices.

About Sagar Mitra

6. What it is: A **field-level interface** between the government and **coastal fishers**.

7. Launched in: Implemented across **coastal states and UTs** under **PMMSY**.

8. Aim: To support fishers with **data dissemination**, **market insights**, and **sustainable fishing practices**.

9. Features:

1. **Data Collection:** Gathers data on **marine catch**, **market trends**, and **prices**.
2. **Information Dissemination:** Updates on **local regulations**, **weather forecasts**, and **potential fishing zones**.
3. **Hygiene and Safety:** Promotes **hygienic fish handling** and provides **safety guidelines**.

Significance of These Initiatives

10. Economic Benefits: Enhances fishers' **productivity** and **income** through better technology and market access.

11. Sustainable Practices: Promotes **responsible fishing** and **aquaculture management**, ensuring long-term resource availability.

12. Community Development: Empowers **fishing communities**, improving **livelihoods** and building **capacity** at the grassroots.

Way Ahead

13. Recommendations:

1. **Expand Coverage:** Increase the reach of Matsya Seva Kendras and Sagar Mitras to **inland fisheries** and **remote coastal regions**.
2. **Digital Integration:** Develop **mobile apps** for real-time data sharing, market access, and training.
3. **Infrastructure Development:** Strengthen **cold storage**, **processing units**, and **logistics networks**.
4. **Awareness Campaigns:** Educate fishers on **sustainable practices**, government schemes, and market opportunities.

SOCIETY, SOCIAL ISSUES
SOCIAL JUSTICE

Social Media and Teenagers: Balancing Benefits and Risks

Syllabus: Society and Social Issues (UPSC GS Paper-I)

Key Context

1. Context: The rising use of **social media by teenagers** has triggered debates on its **positive impacts** and **potential harm**, with countries like **Australia banning social media for under-16s** emphasizing the need for regulation.

Rise of Social Media Usage by Teenagers

2. Trends and Patterns:

1. **Widespread Access: 43% of Indian children** aged 8-18 have active social media accounts, often accessed via parental smartphones.
2. **Growing Dependency:** Late-night scrolling and excessive **screen time** disrupt sleep and health.
3. **Global Patterns:** Nations like **Norway** and **France** have initiated regulations to curb overuse.
4. **Demographic Reach:** Teenagers use platforms for **self-expression**, **learning**, and **social connections**.

Benefits of Social Media for Teenagers

3. Key Advantages:

1. **Social Interaction:** Connects them with **peers**, **family**, and **communities**, fostering relationships.
2. **Educational Opportunities:** Access to **learning resources**, online **forums**, and **academic discussions**.
3. **Creativity:** Encourages **creative expression** via videos, images, and profile customization.
4. **Identity and Support:** Provides support to **marginalized groups** (LGBTQ+, disabled youth).
5. **Mental Well-being:** Offers emotional support and a sense of **belonging** through online groups.

Issues with Social Media and Children

4. Key Concerns:

1. **Cyberbullying:** Harassment and threats leading to **psychological stress**.
2. **Exposure to Inappropriate Content:** Risk of encountering **violent**, **aggressive**, or **sexual material**.
3. **Addiction:** Compulsive usage disrupts sleep and increases **anxiety** and **depression**.
4. **Privacy Risks:** Personal data may be **misused** or sold.
5. **Pressure and Comparison:** Unrealistic standards harm **self-esteem**, especially among teenage girls.

Government Initiatives to Handle Social Media Usage

5. Key Actions:

1. **Y20 Initiative:** Engages youth in policy-making on **digital safety** and **mental health**.
2. **Digital Detox Campaigns:** Promotes **balanced screen time** and offline activities.
3. **IT Act and Data Protection Act:** Proposes safeguards for **privacy** and exposure online.
4. **National Cybersecurity Initiatives:** Focus on creating **child-safe online spaces** through content moderation.

Way Ahead

6. Key Recommendations:

1. **Parental Engagement:** Encourage open conversations and set **negotiated guidelines** for usage.
2. **Education:** Integrate **digital literacy** and **citizenship** into school curricula.
3. **Regulated Access:** Implement **age-appropriate features** and limit usage during specific time windows.
4. **Collaborations with Tech Companies:** Develop **safe modes** and **curated content** for children.
5. **Global Cooperation:** Adopt international models like:
    - **Finland's digital citizenship program**.
    - **France's mobile ban in schools**.

Conclusion

A balanced approach to **regulating social media** is essential for safeguarding teenagers' **mental well-being** while enabling **digital engagement**. Collaborative efforts between **parents**, **governments**, and **tech platforms** can ensure a healthier and more productive relationship with the digital world, fostering **responsible and informed online behavior**.

South Korea Becomes a 'Super-Aged' Society

Syllabus: Society, Population, and Global Issues (UPSC GS Paper-I)

Key Context

1. Context:

- South Korea's **Ministry of the Interior and Safety** declared the nation a **"super-aged" society**, with the share of its population aged **65 or over exceeding 20%**.
- South Korea is the **second country in Asia** after **Japan** to achieve this demographic milestone.

Global Definition of Aging

2. UN Definitions:

- **Aging Society:** Population aged **65+ exceeds 7%**.
- **Aged Society:** Population aged **65+ exceeds 14%**.
- **Super-Aged Society:** Population aged **65+ exceeds 20%**.

Status of Aging

3. World:

1. **Global Trends:** The population aged **60+ was 1 billion in 2020**, projected to reach **2.1 billion by 2050**.
2. **Low- and Middle-Income Countries:** Two-thirds of the elderly population will live in these regions by **2050**, accelerating global aging trends.

4. India:

1. **Elderly Population Projections:** India's population aged **65+ will exceed 20% of the total** by **2050** (**UNFPA 2023**).

Challenges of an Aging Society

5. Economic Challenges:

- **Shrinking Workforce:** Reduced productivity and economic growth.
- **Healthcare Costs:** Rising expenses due to age-related diseases.
- **Social Security:** Increased expenditure on pensions and welfare programs.

6. Social Challenges:

- **Caregiving Responsibilities:** Families face increased caregiving burdens.
- **Generational Gaps:** Need for social cohesion amidst generational differences.

7. Infrastructure Challenges:

- **Age-Friendly Urban Spaces:** Design of cities to accommodate elderly needs.

- **Transportation Systems:** Adjustments for reduced mobility.

Steps Taken to Address Aging

8. Global Initiatives:

1. **Madrid International Plan of Action on Ageing (2002):** Promotes a better quality of life for older adults.
2. **WHO Global Strategy (2016–2020):** Focuses on **healthy aging** and **age-friendly environments**.
3. **UN SDGs:** Address aging through **Goal 3 (Health)** and **Goal 10 (Reduced Inequality)**.
4. **UN Decade of Healthy Ageing (2021–2030):** Promotes well-being and quality of life for the elderly.

9. Initiatives in India:

1. **Ayushman Bharat - PMJAY:** Provides public health insurance for preventive and curative care.
2. **National Policy for Older Persons (1999):** Comprehensive policy for senior citizens.
3. **Maintenance and Welfare of Parents and Senior Citizens Act (2007):** Ensures financial security and caregiving support for the elderly.
4. **National Programme for the Health Care for the Elderly (NPHCE):** Focus on preventive, curative, and rehabilitative treatment.

Report on Domestic Migration: '400 Million Dreams'

Syllabus: Social Justice and Governance (UPSC GS Paper-II)

Key Context

1. Context: The **Economic Advisory Council to the Prime Minister (EAC-PM)** released a report titled **'400 Million Dreams'**, analyzing **domestic migration trends** in India since the **2011 Census**.

2. Definition of Domestic Migration: Internal Migration: Movement of people **within a country** from one region to another.

Push and Pull Factors Influencing Migration

3. Push Factors:

- **Lack of job opportunities**.
- **Natural disasters**.
- **Inadequate education** and **healthcare facilities**.

4. Pull Factors:

- **Economic opportunities**.
- **Higher standard of living**.
- **Peace and stability**.

Key Findings of the Report

5. Reduction in Domestic Migrant Numbers:

- Migrant population decreased by **12%**, from **45.57 crore (2011)** to **40.20 crore (2023)**.
- **Migration Rate:** Dropped from approximately **38%** to an estimated **29%** in 2023.

6. Migration Dynamics:

1. **Short-Distance Migration:** Predominates due to the **negative effect of distance** on labor mobility.
2. **Migration Origins:** Primarily from areas around major **urban centers** like **Delhi**, **Mumbai**, **Chennai**, **Bangalore**, and **Kolkata**.

7. Major Migration Routes: UP-Delhi, **Gujarat-Maharashtra**, **Telangana-AP**, **Bihar-Delhi** (state level).

8. State-wise Changes:

- **Increased Share of Migrants: West Bengal**, **Rajasthan**, and **Karnataka**.
- **Decreased Share of Migrants: Maharashtra** and **Andhra Pradesh**.

Reasons for Decline in Migrant Numbers

9. Contributing Factors:

1. **Improved Infrastructure:** Better **roads**, **education**, **healthcare**, and **public transport** in origin areas.
2. **Localized Economic Growth:** Creation of **jobs closer to rural areas**, reducing the need for long-distance migration.

Steps Taken for Migrant Welfare

10. Key Initiatives:

1. **Inter-State Migrant Workmen Act, 1979:** Regulates **employment conditions** and prevents **human rights violations**.
2. **Ayushman Bharat - PMJAY:** Provides **₹5 lakh health coverage** for **secondary and tertiary care** to migrant workers.
3. **One Nation One Ration Card (ONORC) Scheme:** Ensures **ration card portability** nationwide for **migrants and their families**.

Conclusion

The **'400 Million Dreams'** report highlights a notable **decline in domestic migration rates**, driven by **improved local infrastructure** and **localized economic opportunities**. While this trend reflects progress in **development at origins**, continued emphasis on **migrant welfare initiatives** like **ONORC** and **PMJAY** remains essential to address the needs of the **migrant workforce** and ensure **social security**.

Maharashtra Prisons and Correctional Services Bill, 2024

Syllabus: Governance and Social Justice (UPSC GS Paper-II)

Key Context

1. Context:

- Maharashtra has passed the **Maharashtra Prisons and Correctional Services Bill, 2024**, consolidating laws related to the regulation of prisons and correctional services in the state.
- The Bill is based on the **Model Prisons Act, 2023**.

Key Features of the Model Prisons Act, 2023

2. Specialized Jails: Establishes **high-security**, **open**, and **semi-open jails** to suit the nature of offenses and offenders.

3. Legal Aid and Incentives: Provides mechanisms for **parole**, **furlough**, and **early release** based on **good conduct**.

4. Rehabilitation: Focuses on **vocational training** and **skill development** to help prisoners reintegrate into society.

5. Inclusive Accommodation: Ensures separate facilities for **women** and **transgender prisoners** to meet their specific needs.

Prison System in India

6. Constitutional Framework:

- **Prisons and prisoners** fall under the **State List** (Entry 4) of the Constitution.
- Governed by the **Prisons Act, 1894**, replaced by the **Model Prisons Act, 2023**, and state-specific prison manuals.

Need for Prison Reforms

7. Key Issues Identified:

1. **Colonial Era Law:** The Supreme Court in **Ramamurthy vs State of Karnataka (1996)** emphasized replacing the outdated **Prisons Act, 1894**.
2. **Rising Prison Occupancy:** According to the **Prisons in India 2024 report**, as of **December 31, 2022**, India had **5.73 lakh inmates**, with:
    - **75.8% undertrial prisoners**.
3. **Inhumane Conditions:** Prisons face issues like **overcrowding**, **poor sanitation**, and **inadequate medical care**.

Other Measures Taken for Prison Reforms

8. Notable Initiatives:

1. **Fast-Track Courts:** Expedite trials of **pending cases** to reduce the undertrial population.

2. **National Human Rights Commission (NHRC):** Protects the **basic rights of prisoners**.
3. **Model Prison Manual 2016:** Provides detailed guidelines on **facilities** for undertrial inmates.
4. **Justice Krishna Iyer Report, 1987:** Highlighted the condition of **women prisoners** in India.

Welfare Scheme Debate in India

Syllabus: Governance and Social Justice (UPSC GS Paper-II)

Key Context

1. Context: Welfare schemes and **direct cash transfers** have become a defining feature of India's socio-political landscape, raising questions about their **fiscal sustainability** and **long-term development impact**.

2. Recent Examples (2024):

- **'Mukhyamantri Mahila Samman Yojana' (Delhi):** ₹2,100/month for women to support economic independence.
- **'Kalaignar Magalir Urimai Thogai' (Tamil Nadu):** ₹1,000/month for women to enhance household financial security.
- **'Ladli Behna Yojana' (Madhya Pradesh):** ₹1,250/month credited for electoral success of the ruling party.
- **'Gruha Lakshmi Scheme' (Karnataka):** ₹2,000/month for women's empowerment.
- **Maharashtra's 'Ladki Bahin Scheme':** Cash aid to boost women's socio-economic position.

Understanding Welfare Schemes

3. Types of Welfare Schemes:

1. **Monetary Welfare:** Direct cash transfers like pensions, unemployment benefits, and aid for women (e.g., PM-KISAN).
2. **Developmental Welfare:** Focused on education (Sarva Shiksha Abhiyan), healthcare (Ayushman Bharat), and food security (PDS).
3. **Employment Schemes:** Programs like **MGNREGA**, providing rural employment opportunities.
4. **Subsidy-Based Welfare:** Subsidies for fertilizers, LPG, electricity, and more.
5. **Social Infrastructure Support:** Investments in health, education, housing, and digital access.

Impact of Monetary Welfare on Indian Society

4. Positive Consequences:

1. **Women Empowerment:** Promotes economic independence and decision-making in patriarchal setups.
2. **Poverty Alleviation:** Direct cash helps meet basic needs, reducing poverty levels.
3. **Education and Health Benefits:** Improves **nutrition** and **school attendance** for children.

5. Negative Consequences:

1. **Dependence on State Aid:** Encourages reliance on welfare, deterring self-reliance.
2. **Distorted Electoral Incentives:** Politicians prioritize **populist measures** over long-term growth.

Limitations of Cash Transfer Welfare

6. Key Challenges:

1. **Inflationary Impact:** Cash inflows without corresponding productivity may lead to **inflation**.
2. **Exclusion Errors:** Administrative inefficiencies exclude **deserving beneficiaries**.
3. **Limited Long-Term Benefits:** Fails to address **structural issues** like unemployment or skill gaps.
4. **Fiscal Stress:** Strains public finances, reducing funds for **capital-intensive projects**.
5. **Political Misuse:** Often used as **electoral bait**, diluting focus on sustainable development.

Way Ahead

7. Strategies for Improvement:

1. **Skill Development:** Focus on education and **skill-building** for self-reliance.
2. **Targeted Welfare:** Implement **research-backed aid** to minimize misuse and inefficiencies.
3. **Infrastructure Investments:** Prioritize **long-term assets** like healthcare, education, and digital access.
4. **Public Awareness:** Educate citizens on **fiscal impacts** and limitations of **unsustainable freebies**.
5. **Monitoring Mechanisms:** Leverage technology for transparent and efficient welfare distribution.

Employees' Provident Fund Organisation (EPFO)

Syllabus: Indian Economy - Social Security and Welfare (UPSC GS Paper-II & III)

Key Context

1. Context: The **Employees' Provident Fund Organisation (EPFO)** recorded a net addition of **13.41 lakh members** in **October 2024**, highlighting its expanding coverage among the organized workforce.

About EPFO

2. Establishment and Administration:

- **Established:** 1952 under the **Employees' Provident Fund and Miscellaneous Provisions Act, 1952**.
- **Administered By:** Ministry of Labour and Employment.

3. Aim: To ensure **social security** for the organized sector workforce through schemes for:

  - **Provident Fund**,
  - **Pension**, and
  - **Insurance**.

Powers and Functions of EPFO

4. Management of Social Security Schemes:

- EPFO oversees three major schemes:
  1. **Employees' Provident Fund Scheme (1952):**
     - **Features:**
       - Accumulation of savings plus interest.
       - Partial withdrawal permitted for specific purposes like education, marriage, or medical emergencies.
     - **Objective:** Provides financial security upon **retirement** or in case of **death**.
  2. **Employees' Pension Scheme (1995):**
     - **Features:**
       - Monthly pension for **retirement**, **disability**, or to **survivors** after the employee's death.
     - **Objective:** Ensures steady income during old age or incapacitation.
  3. **Employees' Deposit Linked Insurance Scheme (1976):**
     - **Features:**
       - Provides **life insurance benefits** up to **₹6 lakh** to nominees in case of the employee's death.
     - **Objective:** Financial support for dependents.

5. Administrative Roles:

- Manages contributions from employers and employees across **122 offices nationwide**.
- Ensures compliance with the **EPF Act**, including mandatory contributions by employers and employees in eligible sectors.
- Facilitates additional benefits like **housing schemes**.

Significance of EPFO

6. Social and Economic Impact:

1. **Social Security:** Protects organized sector workers and their families from economic insecurity due to retirement, disability, or death.
2. **Nationwide Reach:** Expanding membership demonstrates **increased formalization of labor** in India.
3. **Economic Stability:** Contributes to long-term financial savings and sustains national economic growth through investments.

Suposhit Gram Panchayat Abhiyan: Combating Malnutrition and Promoting Health

Syllabus: Governance and Social Justice (UPSC GS Paper-II & III)

Key Context

1. Context: The **Prime Minister** launched the **Suposhit Gram Panchayat Abhiyan** to address **malnutrition** and promote **healthy living** in rural India.

About Suposhit Gram Panchayat Abhiyan

2. Objective: Encourage villages to adopt **nutrition-focused practices** to ensure **better health outcomes** and combat malnutrition.

3. Focus Areas:

1. **Malnutrition Eradication:** Reduce **stunting**, **wasting**, and **underweight** prevalence among children and women.
2. **Healthy Competition:** Foster a **spirit of competition** among villages to achieve health and nutrition goals.
3. **Sustainable Development:** Integrate **nutrition improvement** with broader **sustainable rural development** practices.

4. Approach:

- **Community-Driven Initiatives:** Leverage local participation and leadership for improving **nutritional awareness** and practices.
- **Convergence Model:** Align efforts with existing schemes like **Poshan Abhiyan**, **MGNREGA**, and **NRLM** for holistic development.

5. Significance:

- **National Priorities:** Supports India's commitment to **Sustainable Development Goals (SDGs)**, particularly:
  - **Goal 2:** Zero Hunger.
  - **Goal 3:** Good Health and Well-Being.
- **Policy Alignment:** Reinforces initiatives like **Poshan Abhiyan** and **Anaemia Mukt Bharat**.
- **Empowerment:** Strengthens **community participation** in tackling malnutrition and promoting **health literacy**.

Way Ahead

6. Key Recommendations:

1. **Capacity Building:** Train Panchayats and community leaders in **nutrition-sensitive planning**.
2. **Data-Driven Monitoring:** Leverage **technology** for tracking nutritional outcomes at the village level.
3. **Behavioral Change Campaigns:** Promote **awareness** about healthy eating, sanitation, and maternal care.
4. **Convergence of Schemes:** Ensure better coordination between **health**, **education**, and **rural development programs**.
5. **Incentivize Performance:** Recognize and reward **high-performing villages** to encourage widespread participation.

Pradhan Mantri Rashtriya Bal Puraskar: Recognizing Exceptional Child Achievements

Syllabus: Governance and Social Justice (UPSC GS Paper-II)

Key Context

1. Context: The **Pradhan Mantri Rashtriya Bal Puraskar** was conferred in **2024**, honoring **17 young achievers** for their contributions in **art, bravery, and innovation**.

About Pradhan Mantri Rashtriya Bal Puraskar

2. What it is: India's highest civilian award for children, recognizing exceptional achievements in various fields.

3. Awarded by: President of India on behalf of the **Government of India**.

4. Ministry Involved: Organized by the **Ministry of Women and Child Development**.

5. Categories:

- **Art & Culture**
- **Bravery**
- **Innovation**
- **Science & Technology**
- **Social Service**
- **Sports**
- **Environment**

6. Eligibility Criteria:

- **Citizenship:** Must be an **Indian citizen**.
- **Age:** 5–18 years as of **July 31** of the respective year.

- **Time Frame:** Achievements must have occurred within **two years** prior to the nomination deadline.

7. Number of Awards: Up to **25 awards** conferred annually, with flexibility at the discretion of the **National Selection Committee**.

8. Award Details: Recognition Includes:

  - A **medal**
  - A **certificate**
  - A **citation booklet**

Significance of the Award

9. Encouraging Excellence: Promotes **talent and innovation** among children, inspiring them to excel in diverse fields.

10. National Recognition: Highlights the contributions of young achievers to **society and the nation**.

11. Promotes Awareness: Raises awareness about **child development** and **potential contributions** to the nation's progress.

12. Catalyst for Social Change: Recognizes efforts in **bravery** and **social service**, encouraging active participation in nation-building.

Way Forward

13. Recommendations:

1. **Inclusive Outreach:** Enhance visibility in **rural** and **marginalized communities** to discover hidden talents.
2. **Integration with Education:** Encourage schools to actively nominate and support exceptional students.
3. **Digital Platform:** Develop an **online nomination portal** for seamless application processes.
4. **Awareness Campaigns:** Promote awareness through **social media** and **school workshops**.

GEOGRAPHY AND DISASTER

China Approves World's Largest Hydropower Dam on the Brahmaputra

Syllabus: International Relations, Geography, Environment (UPSC GS Paper-II and III)

Key Context

1. Context:

- China has approved the construction of the **world's largest hydropower dam** on the **Yarlung Zangbo River**(Brahmaputra) in the **Medog region of Tibet**.
- The project is set to surpass the capacity of the **Three Gorges Dam**, currently the world's largest.

Project Overview

2. Location: Situated on the **lower reaches of the Yarlung Zangbo River**, at the **Great Bend Gorge** where the river takes a U-turn into **Arunachal Pradesh** in India.

3. Stated Purpose:

1. **Carbon Neutrality Goals:** To support China's transition to **carbon neutrality** by boosting clean energy production.
2. **Industrial Development:** Promote industries and create job opportunities in the **Tibet Autonomous Region**.

Concerns Associated with the Dam

4. Engineering Challenges:

- **Tibetan Plateau:** Prone to **earthquakes** and **tectonic activity**, increasing risks for large-scale infrastructure.

5. Environmental Impact:

- **Local Ecology:** Disruption to **biodiversity** and **ecosystems** in the Himalayan region.

- **Downstream Water Flow:** Alterations in the river's flow may affect **agriculture**, **fisheries**, and **biodiversity** downstream.

6. Geopolitical Risks:

- **Control Over Water Flow:** Potential to manipulate water resources, impacting **India** and **Bangladesh**.
- **Flood Risks:** Fears of intentional release of excess water during conflicts, leading to **flooding** in downstream regions.

India's Response

7. Existing Mechanisms:

1. **Expert Level Mechanism (ELM):** Established in **2006**, under which China provides India with **hydrological data** on the **Brahmaputra** and **Sutlej rivers** during flood seasons.

8. India's Hydropower Projects: India is building its own **hydropower dam** on the Brahmaputra in **Arunachal Pradesh** to counterbalance China's strategic advantage.

Significance and Way Forward

9. Implications for India and Bangladesh:

- China's control over the Brahmaputra could exacerbate **water security** concerns, necessitating:
  - **Bilateral Agreements**: To ensure fair and equitable water sharing.
  - **Regional Cooperation**: Strengthening ties with Bangladesh for joint strategies.

10. Mitigation Strategies:

- **Engagement with China:** Strengthen **ELM** to address data transparency and disaster management.
- **Investment in Infrastructure:** Expedite construction of **India's hydropower projects** in the Northeast.
- **Environmental Monitoring:** Work with international organizations to assess and mitigate ecological risks.

20 Years of the Indian Ocean Tsunami

Syllabus: Disaster Management; Environment and Geography (UPSC GS Paper-III)

Key Context

1. Context:

- **2004 Indian Ocean Tsunami:** Triggered by a **9.1 magnitude earthquake** near the **Sunda Trench (Indonesia)**, devastating **14 countries**.
- Sunda Trench lies on the **Pacific "Ring of Fire"**, a region of intense **seismic activity**.

About Tsunamis

2. Definition and Causes:

1. **Definition:** Series of **enormous waves** caused by **violent seafloor movement**.
2. **Causes: Earthquakes**, **landslides**, **lava entering the sea**, **seamount collapse**, or **meteorite impact**.

3. Features of Tsunami Waves:

1. **In Deep Oceans: Amplitude negligible**, making them **unnoticeable** by ships.
2. **In Shallow Water:** Wave amplitude increases significantly as the water depth decreases.
3. **Speed Dependence:** Speed of tsunami waves depends on **ocean depth**, not distance from the source.

4. Transformation of Tsunami Waves (Example Data):

- **Deep Water (4,000m):** Wavelength: **213 km**, Wave height: **Minimal**.
- **Shallow Water:** Wavelength shortens to **23 km**, Wave height rises to **10 m**.
- **Closer to Coast:** Wavelength further shortens to **10.6 km**, Wave height dramatically increases to **50 m**.

Tsunami Preparedness: Global and Indian Initiatives

5. Global Efforts:

1. **UNESCO-IOC Tsunami Ready Recognition Programme: Community-based initiative** to enhance **risk prevention** in coastal zones.
2. **Tsunami United Programme: UNESCO's flagship initiative** to increase **preparedness**.
3. **Global Tsunami Early Warning and Mitigation Programme:** Supports countries in **assessing tsunami risks** and implementing **Early Warning Systems**.

6. India's Efforts:

1. **Indian Tsunami Early Warning Centre (ITEWC):**
   - Operates under the **Indian National Centre for Ocean Information Sciences (Hyderabad)**.
   - National authority to issue **tsunami advisories**.
2. **NDMA Guidelines:** Comprehensive guidelines on **Tsunami Management** in India.
3. **Technological Advancements:** Development of **apps and devices** for warnings (e.g., **GEMINI device** for sea alerts).

Forest Fires Hotspots Down in 2023-24: India State of Forest Report 2023

Syllabus: Environment and Disaster Management (UPSC GS Paper-III)

Key Context

1. Context:

- According to the **India State of Forest Report 2023**, forest fire hotspots have decreased in **2023-24** compared to **2021-22**.
- Data is derived using **MODIS (Moderate Resolution Imaging Spectro-radiometer)** and **SNPP-VIIRS (Suomi-National Polar-orbiting Partnership - Visible Infrared Imaging Radiometer Suite)** sensors.

Key Findings

2. Hotspot Detection Statistics:

1. **2023-24:**
   - **MODIS Sensor:** Detected **26,390 hotspots**.
   - **SNPP-VIIRS Sensor:** Detected **2,03,544 hotspots**.
2. **2021-22:**
   - **MODIS Sensor:** Detected **29,675 hotspots**.
   - **SNPP-VIIRS Sensor:** Detected **2,23,333 hotspots**.

3. Regional Trends:

1. **Highest Fire Incidences (2023-24): Uttarakhand**, **Odisha**, and **Chhattisgarh**.
2. **Rising Incidents: Himachal Pradesh** and **Jammu & Kashmir** witnessed a significant rise compared to **2022-23**.
3. **Declining Incidents: Goa** and **Karnataka** reported a steep decline in fire occurrences.

Impact of Forest Fires

4. Environmental Impact:

1. **Greenhouse Gas Emissions:** Forest fires emit **2.5 to 4.0 billion tons of CO2 annually**, exacerbating **global warming**.
2. **Biodiversity Loss:** Degrades **forest ecosystems** and threatens biodiversity.

5. Human and Wildlife Health:

1. **Health Issues:** Smoke from forest fires causes **premature deaths** among humans and wildlife.
2. **Economic Impact:** Adversely affects **rural livelihoods** and **national economies**.

Initiatives Taken to Combat Forest Fires

6. Technological and Legislative Measures:

1. **Van Agni Geo-portal:** Developed by the **Forest Survey of India**, it serves as a **single-point information system** on forest fires.
2. **Wildlife (Protection) Act, 1972:** Prohibits setting fires in **sanctuaries** or leaving fires unattended, endangering ecosystems.

7. Community Participation:

1. **Joint Forest Management Committees (JFMCs):** Promotes **community involvement** in forest fire prevention and control.
2. **Eco-Development Committees (EDCs):** Encourages **community collaboration** for sustainable forest management.

Kilauea Volcano: Renewed Eruption in December 2024

Syllabus: Geography - Physical Features (UPSC GS Paper-I)

Key Context

1. Context: Kilauea Volcano, one of the world's most active volcanoes, resumed eruption in **December 2024**, drawing global attention to its activity.

About Kilauea Volcano

2. Location:

- Situated on the **southeastern shore** of **Hawaii's Big Island**.
- Lies within the **Hawaii Volcanoes National Park**, a UNESCO World Heritage Site.

3. Type of Volcano:

- An **active shield volcano** known for its:
  - **Broad, sloping profile**.
  - **Fluid lava flows**, which are less explosive compared to stratovolcanoes.

4. Geographic Formation:

- Part of the **Hawaiian hotspot**, a volcanic hotspot in the central Pacific Ocean.
- Integral to the **Hawaiian-Emperor seamount chain**.
- **Second-youngest** volcanic product of the hotspot, after Mauna Loa.

5. Physical Features:

- **Large Caldera at the Summit:** Contains a **lava lake** that periodically drains and refills during eruptions.
- **Two Active Rift Zones:** These fissures extend from the summit and contribute to volcanic activity along the flanks.

Significance of Kilauea Volcano

6. Global Importance:

- **Geological Study:** Offers insights into **hotspot volcanism** and **mantle plume activity**.
- **Cultural Significance:** Revered in Hawaiian mythology as the home of **Pele**, the goddess of fire and volcanoes.
- **Tourism:** Attracts millions of visitors to the **Hawaii Volcanoes National Park**.

7. Environmental Impacts:

- **Lava Flows:** Can destroy property and disrupt ecosystems.
- **Air Quality:** Releases gases like **sulfur dioxide**, contributing to vog (volcanic smog).

HISTORY, ART & CULTURE

Belagavi Congress Session, 1924: A Landmark in India's Freedom Struggle

Syllabus: Modern Indian History (UPSC GS Paper-I)

Key Context

1. Context: The **39th Indian National Congress Session**, chaired by **Mahatma Gandhi** in **Belgaum (now Belagavi)** in **1924**, celebrates a century as a pivotal event in India's freedom movement.

About the Belagavi Congress Session

2. Year and Presidentship: Held in **December 1924**, this was the **only Congress session chaired by Mahatma Gandhi** during his lifetime.

3. Blend of Political and Social Reform:

- Focused on **political objectives** like **Swaraj** alongside **social issues**, including:
  - **Eradication of Untouchability**.
  - Promotion of **Khadi** and **sanitation**.
  - Strengthening **Hindu-Muslim unity**.

4. Institutional Transformation:

- Gandhi **restructured the Congress** into a **mass movement** by: Reducing membership fees by **90%**, making it accessible to **all social classes**.

5. Focus on Grassroots Empowerment:

- Promoted:
  - **Contributions to hand-spun khadi**, emphasizing **self-reliance**.
  - Development of **village industries**, shifting focus from urban strategies to **rural revitalization**.

Cultural and Ethical Impact

6. Key Highlights:

1. **Advocacy for Equality: Brahmin volunteers** performed sanitation work, breaking social hierarchies.
2. **Cultural Performances:** Featured **Vishnu Digambar Paluskar** and **Gangubai Hangal**, reflecting the integration of art into nationalism.
3. **Famous Declaration by Gandhi:** "If I am to be born again, may I be born a **Bhangi**," underscoring his commitment to **social justice** and **upliftment**.

Infrastructure Legacy

7. Key Contributions: Construction of **Pampa Sarovara**, a **well for the session**, which continues to serve **Belagavi**, symbolizing **sustainability** and **long-term benefits** of the session.

Visionary Resolutions

8. Unique Proposals:

1. **Urban Planning:** Advocated **organized urban development** linked to cultural and economic goals.
2. **Cow Protection:** Highlighted the connection between **economic development** and **cultural preservation**, showcasing Gandhi's **holistic vision**.

Significance of the Session

9. Importance in Freedom Struggle:

- Marked Gandhi's ability to blend **political mobilization** with **social reform**.
- Transformed the **Indian National Congress** into a **grassroots movement**.

10. Relevance Today:

- The session's emphasis on **self-reliance**, **inclusive development**, and **sustainable practices** aligns with contemporary policy goals.

5,000-Year-Old Water Management Techniques Unearthed at Rakhigarhi

Syllabus: History and Culture - Harappan Civilization (UPSC GS Paper-I)

Key Context

1. Context:

- Recent excavations at **Rakhigarhi**, a major **Harappan site**, revealed **advanced water management techniques**including a water storage system with a depth of **3.5 to 4 feet**.
- A dried riverbed of the **Chautang (Drishavati) River** was also discovered.

Water Management Practices of the Harappan Civilization

2. Elaborate Drainage Systems:

- **Features:**
  - Underground drains made of **precisely laid bricks**.
  - Connected houses to **wider public drains** for efficient sewage disposal.
- **Locations:** Found in major cities like **Mohenjodaro** and **Harappa**.

3. Small Bunds:

- **Purpose:** Built to store **rainwater** for **irrigation** and **drinking**.
- **Location: Lothal**, Gujarat.

4. Dockyard at Lothal:

- **Description:**
  - Near the **Sabarmati River**, a **lined structure** with channels for **water inlet and outlet**.
  - Used for **trade and water management**, showcasing advanced planning.

5. Channels and Reservoirs at Dholavira:

- **Features:**
  - Made entirely of **stone** to store rainwater or divert water from nearby **rivulets**.
  - Evidence of **hydraulic engineering** for conservation and storage.

6. Tanks and Wells at Mohenjodaro:

- **Rainwater Harvesting:** Rainwater collected in **tanks** and brought to **household wells** via an efficient drainage system.
- **The Great Bath:** A **large tank** with a brick floor, possibly used for **mass bathing** during religious events.

About Rakhigarhi

7. Location: Situated in the **Hissar district, Haryana**, on the **Ghaggar-Hakra river plain**.

8. Key Findings:

- **Archaeological Mounds:** Significant evidence of **residential structures**, **streets**, **drainage systems**, and **burial grounds**.
- **DNA Evidence:** First-ever **Harappan DNA evidence** from skeletal remains.
- **Craft Activities:** Areas dedicated to **craft production**, showcasing a thriving economy.

Significance of Harappan Water Management

9. Technological Prowess: Reflects **advanced hydraulic engineering** and planning in **urban water conservation**.

10. Socio-Cultural Impact: Integration of **water systems** into daily life and **religious practices** (e.g., The Great Bath).

11. Sustainable Practices: Reliance on **rainwater harvesting** and **river systems** illustrates their commitment to **resource conservation**.

ENVIRONMENT & ECOLOGY

India State of Forest Report 2023 (ISFR 2023)

Syllabus: Environment (UPSC GS Paper-III)

Key Details and Findings

1. Context: Union Minister for Environment, Forest, and Climate Change launched the ISFR 2023 at the **Forest Research Institute, Dehradun**.

2. Launched By: Forest Survey of India (FSI), under the **Ministry of Environment, Forest, and Climate Change (MoEFCC)**.

3. Aim:

- **Assessment:** Evaluate India's **forest and tree resources**.
- **Policy Support:** Aid in **natural resource management** and **policy evaluation**.
- **Climate Targets:** Monitor progress towards **Nationally Determined Contributions (NDCs)** for mitigating **climate change**.

4. Key Features:

1. **Technology Use:**
   - **Satellite Imagery:** Data from **ISRO's Resourcesat**.
   - **Field-based Inventory:** Collected through the **National Forest Inventory (NFI)**.
2. **Focus Areas:**
   - **Forest Health, Biodiversity, Carbon Sequestration**, and **Agroforestry**.
   - Analysis of **Mangrove Cover** and **forest fire trends**.
3. **Carbon Stock Monitoring:** Tracks changes critical for **Paris Agreement** targets.
4. **Resource Coverage:** Includes **bamboo cover** and **soil health** assessments.

Key Findings

5. Total Forest and Tree Cover:

- **Combined Area: 8,27,356.95 km^2**, accounting for **25.17%** of India's geographical area.
- **Forest Cover: 7,15,342.61 km^2** (**21.76%**).
- **Tree Cover: 1,12,014.34 km^2** (**3.41%**).

6. North Eastern Region: Forest and Tree Cover: 1,74,394.70 km^2, accounting for **67%** of the region's geographical area.

7. Mangrove Cover: Total Area: 4,991.68 km^2 (**15%** of the country's geographical area).

8. Stock of Wood:

- **Total Stock: 6,429.64 million m^3 (M m^3)**.
  - **Inside Forest Areas: 4,478.89 M m^3**.
  - **Outside Forest Areas (TOF): 1,950.75 M m^3**.

9. Bamboo Cover: Total Area: 1,54,670 km^2, with an **increase of 5,227 km^2** from the previous report.

10. Carbon Stock:

- **2023 Estimate: 7,285.5 Mt (million tonnes)**.
- **Increase: 5 Mt** compared to the previous assessment.

Bio-Bitumen-based National Highway

Syllabus: Infrastructure; Environment (UPSC GS Paper-III)

Key Details and Context

1. Context: Inauguration: India's first **bio-bitumen-based National Highway stretch** on the **Nagpur-Mansar Bypass (NH-44)** in Maharashtra by the **Union Minister**.

About Bio-Bitumen

2. What is Bio-Bitumen?

1. **Definition:** A **sustainable bio-based binder** derived from **renewable sources** like **crop stubble**, **vegetable oils**, **algae**, or **lignin**.
2. **Origin:** Extracted from **lignocellulosic biomass** or refined from **crude oil distillation residues**.

3. NH-44 Bio-Bitumen Stretch: Location: **Nagpur-Mansar Bypass** on **National Highway 44**, Maharashtra.

Production and Characteristics of Bio-Bitumen

4. Production of Bio-Bitumen:

1. **Primary Source:** Derived from **lignin**, a **by-product** of **agricultural waste** and **plant-based materials**.
2. **Process: Biomass processing** to extract lignin, which is then converted into **bio-bitumen**.

5. Characteristics of Bio-Bitumen:

1. **Eco-Friendly:** Reduces **greenhouse gas emissions** by **70%** compared to petroleum-based bitumen.
2. **Strength: 40% stronger** than conventional asphalt, offering **superior durability** and **load-bearing capacity**.
3. **Sustainability:** Encourages the use of **agricultural residues**, helping reduce **stubble burning**.

Applications of Bio-Bitumen

6. Applications:

1. **Road Construction:** Direct replacement for **petroleum bitumen** in **asphalt pavements**.
2. **Modifier:** Enhances the **properties of traditional bitumen**.
3. **Rejuvenator:** Restores the **elasticity and functionality** of aged asphalt.
4. **Industrial Use:** Applicable in **waterproofing** and **adhesive materials**.

Draft Solid Waste Management (SWM) Rules, 2024

Syllabus: Environment and Sustainable Development (UPSC GS Paper-III)

Key Context

1. Context:

- The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has notified the **Draft Solid Waste Management (SWM) Rules, 2024**, set to come into force on **1st October 2025**.
- **Objective:** To address the **adverse effects of unmanaged solid waste**, implement **circular economy principles**, and strengthen monitoring in **urban and rural areas**.

About Solid Waste Management (SWM)

2. Definition: The practice of **controlling generation, collection, storage, transport, processing, and disposal** of solid waste.

Key Highlights of SWM Rules, 2024

3. Waste Management Guidelines:

1. **Construction and Demolition Waste:** Waste generators must **store separately** and dispose of as per the **Construction and Demolition Waste Management Rules, 2016**.
2. **Bulk Waste Generators:** Must procure **Extended Bulk Waste Generator Responsibility Certificates** from local bodies for environmentally sound **sanitary waste collection and transportation**.
3. **Non-Recyclable Waste:** Waste with **calorific value ≥ 1500 Kcal/kg** must not be disposed of in **landfills**.

4. Monitoring and Registration:

1. **Centralized Online System (CPCB):** To register and manage **annual returns** of all obligated entities.
2. **Facility Operators:** Operators of **Treatment, Storage, and Disposal Facilities** must register on the **centralized portal**.

5. Local Body Responsibilities:

- **Prevent Burning:** Ban agriculture and horticulture waste burning.
- **Penalties:** Impose **heavy penalties** on offenders involved in **open waste burning**.

Challenges Associated with SWM

6. Key Issues:

1. **Collection and Segregation:** Lack of **proper source segregation** and waste collection mechanisms.
2. **Indiscriminate Dumping:** Dumping of **electronic waste** and other non-biodegradable materials.
3. **Financial Constraints:** Limited funding for **waste collection and transportation** infrastructure.

Global Warming: Breaching the 1.5°C Threshold

Syllabus: Environment and Climate Change (UPSC GS Paper-III)

Key Context

1. Context: 2024 marked a grim milestone with global temperatures breaching the **1.5°C threshold** for the first time, underscoring the urgent need for climate action.

Definition of Global Warming

2. What is Global Warming?

- The **long-term increase** in Earth's average temperature due to the **accumulation of greenhouse gases (GHGs)**such as **CO_2, CH_4, and N_2O**.
- **Primary Causes:** Human activities like **burning fossil fuels** and **deforestation**.

Mechanism of Global Warming

3. Process:

1. **Solar Radiation Absorption:** Sunlight reaches Earth, where the surface absorbs solar energy, warming the planet.
2. **Infrared Radiation Emission:** Earth radiates absorbed energy back into the atmosphere as heat.
3. **Greenhouse Gas Trapping:** GHGs trap heat in the atmosphere, preventing it from escaping into space.
4. **Enhanced Greenhouse Effect:** Increased GHG levels amplify the natural greenhouse effect, causing more heat retention.
5. **Feedback Loops:**
    - Examples:
        - **Melting ice** reduces reflectivity (albedo), absorbing more heat.
        - **Warming oceans** release stored CO_2, accelerating warming.

2024 Data on Global Warming

4. Key Statistics:

1. **Average Global Temperature: 1.55°C above pre-industrial levels**, the warmest year on record.
2. **Days Breaching 1.5°C Threshold:**
    - **2023:** 173 days.
    - **2024 Projections:** Over 200 days.
3. **Sea Level Rise:** Accelerated melting of **polar ice caps** and **glaciers**.
4. **Emissions Gap:**
    - **IPCC data:** Only a **2% reduction** in global emissions by 2024, against the required **43% cut by 2030**.

Consequences of Global Warming

5. Human Impacts:

1. **Health Risks:** Increase in **heat stress**, **asthma**, and **vector-borne diseases**.
2. **Food Security: Crop failures** and reduced yields due to **droughts** and **floods**.
3. **Migration:** Displacement from **coastal regions** and **drought-prone areas**.
4. **Economic Losses:** Damage to **infrastructure** and livelihoods from **extreme events**.
5. **Social Inequalities:** Marginalized communities face **disproportionate impacts**.

6. Environmental Impacts:

1. **Loss of Biodiversity: Habitat destruction** leading to species extinction.

2. **Polar Melting:** Accelerates **sea-level rise** and disrupts ecosystems.
3. **Ocean Acidification: CO_2 absorption** harms marine life.
4. **Extreme Weather Events:** Increased **frequency and severity** of cyclones, heatwaves, and droughts.
5. **Deforestation and Desertification:** Degraded landscapes reduce Earth's **carbon-absorbing capacity**.

Government Schemes to Tackle Global Warming

7. Global Initiatives:

1. **Paris Agreement (2015):** Limit warming to **below 2°C** with updated **Nationally Determined Contributions (NDCs)**.
2. **Green Climate Fund:** Financial resources for **developing nations** to implement climate-resilient projects.
3. **UNFCCC and Kyoto Protocol:** Frameworks for **global cooperation** in emissions reduction.

8. Indian Initiatives:

1. **National Action Plan on Climate Change (NAPCC):** Includes missions on **renewable energy**, **water conservation**, and **energy efficiency**.
2. **FAME (Faster Adoption and Manufacturing of Electric Vehicles):** Promotes **e-mobility** to reduce fossil fuel dependence.
3. **National Green Hydrogen Mission:** Develops **clean energy solutions**.
4. **State Action Plans on Climate Change (SAPCCs):** Tailored **state-level initiatives** under NAPCC.
5. **PAT Scheme (Perform, Achieve, and Trade):** Enhances **energy efficiency** in industries.

Way Forward

9. Key Measures:

1. **Accelerate Emissions Reductions:** Shift to **renewables** and phase out **fossil fuels** globally.
2. **Climate Adaptation:** Invest in **early warning systems** and climate-resilient infrastructure.
3. **Technological Innovations:** Develop **AI-driven systems**, **quantum technologies**, and **carbon capture solutions**.
4. **Global Cooperation:** Fulfill **Paris Agreement** commitments and provide financial aid to vulnerable nations.
5. **Local Actions:** Promote **sustainable agriculture**, **reforestation**, and **urban planning**.

Ken-Betwa Link Project: India's First Interlinking of Rivers

Syllabus: Infrastructure and Environment (UPSC GS Paper-III)

Key Context

1. Context: The **Prime Minister** will lay the foundation stone for the **Ken-Betwa Link Project** in **Khajuraho, Madhya Pradesh**, marking a milestone in India's efforts to interlink rivers.

About Ken-Betwa Link Project

2. What it is:

- **India's first interlinking of rivers project** under the **National Perspective Plan (NPP)** for river interlinking.
- **Estimated Cost:** ₹44,605 crores, with **90% funding by the Central Government**.

3. Rivers Involved: Ken River and **Betwa River**, both tributaries of the **Yamuna River**.

Phases of the Project

4. Phase I:

1. **Daudhan Dam Construction:** Located in the **Panna Tiger Reserve**.
2. **Infrastructure Components:**
    - Low-Level and High-Level Tunnels.
    - **Ken-Betwa Link Canal**.
    - **Powerhouses** for hydropower generation.

5. Phase II:

1. **Lower Orr Dam Construction:** Addresses water storage and flood control.
2. **Additional Projects: Bina Complex Project** and **Kotha Barrage**.

Regions Covered

6. Coverage and Benefits:

- Provides **irrigation** to over **8 lakh hectares** of land.
- **Beneficiary Districts: 10 districts** across **Madhya Pradesh** and **Uttar Pradesh**.

Significance of the Project

7. Key Impacts:

1. **Agriculture:** Enhances irrigation for water-scarce regions, boosting agricultural productivity.
2. **Water Supply:** Addresses water scarcity in drought-prone areas.
3. **Hydropower Generation:** Supports renewable energy goals with the construction of **powerhouses**.
4. **Economic Development:** Promotes regional development through improved infrastructure.

Environmental and Social Concerns

8. Challenges:

1. **Ecological Impact:** The project passes through the **Panna Tiger Reserve**, posing risks to wildlife.
2. **Displacement:** Resettlement and rehabilitation issues for affected communities.
3. **Interstate Disputes:** Potential conflicts over water sharing between **Madhya Pradesh** and **Uttar Pradesh**.

Discovery of Yana: The 50,000-Year-Old Mammoth

Syllabus: Environment and Prehistoric Life (UPSC GS Paper-III)

Key Context

1. Context: The discovery of **Yana**, a **50,000-year-old baby mammoth**, in the **melting permafrost** of Yakutia, Russia, is a landmark find in **palaeontology**.

About Mammoths

2. What are Mammoths?

- Extinct species of the elephantid genus **Mammuthus**, known for their large size and adaptations to **cold climates**.
- **Scientific Name: Mammuthus primigenius** (Woolly Mammoth).
- **IUCN Status: Extinct**; disappeared around **4,000 years ago**.

3. Features of Mammoths:

1. **Tusks:** Long, **spirally twisted tusks**, used for defense and foraging.
2. **Cold Adaptations: Thick fur**, layers of **fat**, and **smaller ears** to minimize heat loss.
3. **Habitat:** Lived in **Africa**, **Asia**, **Europe**, and **North America** during different epochs.

Similarity Between Asian Elephants and Mammoths

4. Key Similarities:

1. **Genetics:** Asian elephants are more closely related to **mammoths** than to African elephants.
2. **Physical Features:** Both share similar structures like **domed skulls** and **high foreheads**.

Significance of the Discovery

5. Importance of Yana's Discovery:

- Provides insights into **palaeoclimate**, **prehistoric ecosystems**, and the extinction of megafauna.
- Highlights the impact of **climate change** on permafrost, revealing fossilized remains.
- Offers potential for genetic studies to explore the feasibility of **de-extinction** projects.

Tiger Translocation Projects in India: Enhancing Conservation through Relocation

Syllabus: Environment and Biodiversity (UPSC GS Paper-III)

Key Context

1. Context:

- Madhya Pradesh will translocate **15 tigers** from **Bandhavgarh**, **Panna**, **Kanha**, and **Pench Tiger Reserves** to **Rajasthan**, **Odisha**, and **Chhattisgarh** under the **animal exchange programme**.
- This marks the **largest relocation of big cats** from any state in India.

About Inter-State Tiger Translocation Projects

2. Objective:

- **Reintroduction:** Restoring tiger populations in areas where they have become extinct.
- **Reinforcement:** Supplementing tiger numbers in underpopulated reserves to enhance their **long-term viability**.

3. Historical Context: India's **first tiger relocation project** was initiated in **2018**, relocating two big cats from **Kanha** and **Bandhavgarh Tiger Reserves** to **Satkosia Tiger Reserve, Odisha**.

4. Key Facilitator:

- **National Tiger Conservation Authority (NTCA):** Governs and facilitates tiger translocation projects across India.

Benefits of Tiger Translocation

5. Ecological Impact:

- **Restores Predator-Prey Dynamics:** Improves ecosystem balance in underpopulated reserves.

6. Human-Wildlife Conflict Mitigation:

- Reduces pressure in **overcrowded reserves**, minimizing human-tiger conflicts.

7. Rewilding Landscapes:

- Revives habitats where tigers were historically present but are now **locally extinct**.

Concerns and Challenges

8. Protests from Local Communities: Fear of **tiger attacks** among villagers near the relocation areas.

9. Territorial Disputes: Conflict with existing tiger populations, pushing relocated tigers into **human-dominated areas**.

10. Management Issues: Inadequate **prey base** and poor **habitat management** in some relocation sites.

Way Forward

11. Recommendations:

1. **Pre-Relocation Assessments:** Ensure robust prey availability, habitat quality, and territorial space.
2. **Community Engagement:** Educate and involve local communities to address fears and gain their support.
3. **Monitoring Mechanisms:** Deploy advanced technology like **radio collars** for post-relocation tracking.
4. **Capacity Building:** Strengthen forest management teams and resources in translocation areas.
5. **Integrated Approach:** Collaborate with states to align relocation efforts with local conservation plans.

BIOTECHNOLOGY & HEALTH

Pashmina Certification and Next Generation DNA Sequencing Facilities at WII

Syllabus: Environment and Science & Technology (UPSC GS Paper-III)

Key Context

1. Context:

- The **Union Minister** inaugurated **Pashmina Certification** and **Next Generation DNA Sequencing (NGS) facilities** at the **Wildlife Institute of India (WII)**.
- Focus on studying **genetic adaptation to climate change**, **pathogen-host interactions**, and developing **conservation strategies** for endangered species like **tigers**, **elephants**, and **riverine dolphins**.

About Next Generation DNA Sequencing (NGS)

2. What is DNA Sequencing?

1. **Definition:** Determines the **exact order of nucleotides** (**Adenine, Guanine, Cytosine, Thymine**) in a DNA molecule.
2. **Significance:** Decodes **genetic information** in specific DNA segments.

3. What is NGS?

1. **Modern Technique:** Allows rapid sequencing of **large amounts of DNA or RNA**.
2. **Benefit:** Can sequence an **entire genome in days**, compared to **months** with earlier methods.

Applications of NGS Across Fields

4. Key Applications:

1. **Microbiology:** Tracks **pathogens**, monitors **outbreaks**, and studies **antimicrobial resistance**.
2. **Medical Research & Gene Therapy:** Identifies **cancer types**, replaces **defective genes** for inherited diseases, and enhances **precision drug delivery**.
3. **Wildlife Conservation:** Assesses **genetic health**, monitors **disease**, detects **illegal trade**, and evaluates **climate impacts** on biodiversity.
4. **Agriculture:** Sequences crop genomes for **drought resistance** and analyzes pests' DNA for **eco-friendly pest control**.

About Pashmina

5. What is Pashmina?

1. **Source:** Derived from **Changthangi goats** of **Ladakh**.
2. **Characteristics: Ultra-fine cashmere wool** (12-16 microns), traditionally hand-spun and woven.
3. **Recognition:** Received **GI tag** in 2019.

6. Certification:

- **Pashmina Testing and Quality Certification Centre** in **Srinagar** ensures:
  - **Authenticity** of Pashmina.
  - Maintains **quality standards** through rigorous testing.

SCIENCE & TECHNOLOGY

India's Quantum Satellite Plan

Syllabus: Science and Technology (UPSC GS Paper-III)

Key Details and Features

1. Context:

- **India's Plan:** The country aims to launch its **first quantum satellite** in the next **2-3 years** under the **National Quantum Mission (NQM)**.

2. About Quantum Satellite:

- **Definition:** A communication satellite leveraging **quantum physics principles** like **quantum entanglement** and **superposition** to enable **highly secure data transmission**.

Scientific Basis and Features

3. Science Behind Its Working:

1. **Quantum Cryptography:**
   - **Definition:** Secures data using principles like **quantum entanglement** and **measurement**.
2. **Quantum Key Distribution (QKD):**
   - Ensures **encryption keys** are exchanged securely.
   - **Alert System:** Any **eavesdropping** changes quantum states, alerting users.
3. **Photon Transmission:** Encodes information in **photons**, transmitted through **free space** or **fibre-optic cables**.

4. Key Features:

1. **Quantum Key Distribution (QKD):** Secure encryption key exchanges.
2. **Quantum Entanglement:** Instant detection of **tampering attempts**.
3. **High-Speed Communication:** Enhances **data security** without speed compromise.
4. **Global Reach:** Facilitates **long-distance secure communication** via **satellite-ground systems**.

Advantages and Strategic Significance

5. Advantages:

1. **Enhanced Security:** Virtually **immune to hacking** due to **quantum measurement principles**.
2. **Future-Proof Encryption:** Counters threats from **quantum computers** to classical systems.
3. **Strategic Applications:** Useful in **defence**, **banking**, and **secure government communications**.
4. **Technological Leadership:** Positions **India as a leader** in **quantum technologies** globally.

Limitations and Challenges

6. Limitations:

1. **High Costs:** Development and deployment are **resource-intensive**.
2. **Distance Challenges:** Signal loss over long distances due to **atmospheric interference**.
3. **Denial-of-Service Risks:** Eavesdroppers can **disrupt transmission** without data theft.
4. **Hardware Limitations:** Difficult to **upgrade or patch quantum hardware** post-deployment.

Starlink Satellite System and Security Concerns

Syllabus: Science and Technology; Internal Security (UPSC GS Paper-III)

Key Context and Concerns

1. Context:

- A **Starlink satellite device** was recovered in **Manipur**, raising concerns about **potential misuse by militants**.
- **Starlink** is **not authorized** to operate in India.

About the Starlink Satellite System

2. What is Starlink?

1. **Designed By:** Developed by **SpaceX**, owned by **Elon Musk**.
2. **Purpose:** To provide **high-speed, low-latency internet** globally, focusing on **remote** and **underserved areas**.

3. How Starlink Works:

1. **Satellite Constellation:** Operates thousands of satellites in **low Earth orbit (LEO)** (~550 km above Earth).
2. **Data Transmission:**
   - **Satellites communicate** with ground stations and user terminals.
   - Use **laser links** to transmit data efficiently between satellites.
3. **User Equipment:** Includes a **small antenna** and **router**, installed by users to access the service.

Key Features of Starlink

4. Features:

1. **High-Speed Internet:** Speeds often exceed **100 Mbps**, suitable for **streaming**, **video calls**, and **browsing**.
2. **Low Latency:** Delays as low as **20-70 milliseconds**.
3. **Global Coverage:** Effective in **remote regions** or areas with poor traditional internet infrastructure.
4. **Resilient Connectivity:** Reliable during **disasters** or in areas with **restricted internet access**.

Concerns Regarding Starlink in India

5. Unauthorized Operation: Starlink is not licensed in India, leading to concerns about **illegal use** or **security breaches**.

6. Potential Misuse:

- Devices like Starlink could be exploited by **militant groups** for:
  - **Untraceable communication**.
  - Bypassing **traditional internet restrictions**.

Speed Gun: Enhancing Traffic Regulation

Syllabus: Science and Technology; Governance (UPSC GS Paper-III)

Key Context and Overview

1. Context: Traffic police across India are increasingly using **speed guns** to monitor and curb **speeding vehicles**, enhancing road safety and enforcement.

About Speed Guns

2. What is a Speed Gun?

1. **Definition:** A **non-contact device** to measure the speed of moving objects.
2. **Applications:** Used in **law enforcement** (e.g., traffic regulation), **sports**, and **industrial monitoring**.

3. How Speed Guns Work:

1. **Electromagnetic Radiation:**
   - Emits **waves** towards the moving object.
   - Measures the **reflected waves** to calculate speed.
2. **Components:** Includes a **transmitter**, **receiver**, and **processing unit** for speed calculation.

4. The Doppler Effect in Speed Guns:

1. **Concept:** Describes the **change in wave frequency** due to the **relative motion** between the wave source and observer.
2. **Application in Speed Guns:**
   - **Approaching Object:** Produces a **higher frequency** in reflected waves.

- **Receding Object:** Produces a **lower frequency** in reflected waves.

Shortcomings of Speed Guns

5. Limitations:

1. **Beam Divergence:** Radio waves **spread out**, which may result in capturing speeds of **multiple objects simultaneously**.
2. **Continuous-Wave Radar Issues:** Susceptible to **interference** from multiple moving vehicles.
3. **Technological Constraints:** Requires **advanced compensation systems** for precise targeting, leading to **higher costs**.

6. Replacement by LIDAR (Light Detection and Ranging):

- **Advantages of LIDAR-based Speed Guns:**
  - Uses **laser technology**, providing:
    - **Improved accuracy**.
    - Better **focus** on individual targets.
    - Overcomes limitations of **radio wave divergence**.

SpaDeX Mission: Pioneering Space Docking Technology

Syllabus: Science and Technology (UPSC GS Paper-III)

Key Context

1. Context:

- India's **SpaDeX mission** (Space Docking Experiment) will be launched on **December 30, 2024**, using **PSLV-C60**.
- Aim: Develop and demonstrate **in-space docking technology** for spacecraft.

About SpaDeX Mission

2. What is SpaDeX?

- A **cost-effective technology demonstrator** by **ISRO** to enable **in-space docking** of two small spacecraft.

3. Launch Details:

- **Vehicle:** PSLV-C60.
- **Payload:** Two spacecraft:
  - **Chaser: SDX01**.
  - **Target: SDX02**.
- **Orbit:** Low Earth Orbit (470 km).

Objectives of SpaDeX

4. Primary Objectives:

1. Demonstrate **rendezvous**, **docking**, and **undocking** of two spacecraft.

5. Secondary Objectives:

1. **Electric Power Transfer:** Between docked spacecraft for future robotic applications.
2. **Composite Control:** Post-docking payload operations.

New Technologies in SpaDeX

6. Key Innovations:

1. **Docking Mechanism:** Features a **low-impact androgynous docking system** with two motors for safe and precise operations.
2. **Sensor Suite:**
   - Includes advanced sensors like:
     - **Laser Range Finder (LRF)**.
     - **Proximity and Docking Sensor (PDS)**.
     - **Video monitors** for real-time precision.
3. **RODP Processor: GNSS-based system** for accurate inter-satellite **position and velocity determination**.

4. **ISL Communication:** Autonomous **inter-satellite link** for real-time **communication** and state sharing.

Significance of the Mission

7. Key Contributions:

1. **Technological Milestone:** Positions India as the **fourth country** to develop **space docking technology**.
2. **Space Exploration:**
   - Paves the way for:
     - **Chandrayaan-4**,
     - **Space stations**,
     - **Sample return missions**.
3. **Cost-Effective Innovation:** Develops **indigenous, scalable solutions** for complex space operations.
4. **Global Collaboration:** Adopts standards similar to the **International Docking System**, fostering **international cooperation**.

GenCast: AI-Driven Weather Forecasting Model

Syllabus: Science and Technology (UPSC GS Paper-III)

Key Context

1. Context: Google DeepMind recently unveiled **GenCast**, an AI-based model designed for **probabilistic weather forecasting**, marking a significant advancement in meteorological predictions.

About GenCast

2. What is GenCast?

- A **diffusion-type AI model** developed for **probabilistic weather forecasting** using **machine learning techniques**.
- **Parent Company:** Developed by **Google DeepMind**.

3. How Does It Work?

- **Ensemble Forecasting:** Combines **historical weather data** with **noisy inputs** and refines predictions through **neural networks**.
- **Training Data:** Trained on **40 years of reanalysis data (1979-2019)**.
- **Forecast Specifications:**
  - Predicts weather for up to **15 days**.
  - **Spatial Resolution:** 0.25° x 0.25°.
  - **Temporal Resolution:** 12 hours.

Existing Weather Forecast Models

4. Comparison with Other Models:

1. **Numerical Weather Prediction (NWP):**
   - Solves **physical equations** to predict weather.
   - **Challenges:** High **computational requirements**; offers deterministic forecasts.
2. **Huawei's Pangu-Weather:** Predicts **weekly weather** faster than NWP models.

Superiority of GenCast

5. Key Advantages:

1. **Probabilistic Forecasts:** Better at predicting **extreme weather events** with **longer lead times**, aiding **disaster preparedness**.
2. **Efficiency:** Faster and more **resource-efficient** compared to NWP models.
3. **Extreme Event Prediction:** Performs exceptionally in forecasting **tropical cyclones** and **wind power production**.

Significance of GenCast

6. Implications:

- **Disaster Management:** Improves readiness for **cyclones**, **floods**, and other extreme events.
- **Renewable Energy:** Enhances forecasts for **wind power generation**, aiding energy planning.
- **Resource Optimization:** Reduces **computational costs** while maintaining high accuracy.

Quantum Computing: Revolutionizing Technology

Syllabus: Science and Technology (UPSC GS Paper-III)

Key Context

1. Context: Quantum computing is reshaping the technological landscape with its potential to address **complex problems** far beyond the capabilities of **classical computers**.

About Quantum Computing

2. What is Quantum Computing?

- A type of computing that utilizes the principles of **quantum mechanics**.
- Replaces **classical bits** with **qubits**, enabling exponentially faster computations for specific tasks.

3. Origin of Quantum Computing:

1. **Concept Proposal:** Introduced by **Richard Feynman** in **1982** to simulate **quantum systems**.
2. **First Commercial Quantum Computer: IBM Q System One**, launched in **2019**.

How Quantum Computing Works

4. Key Principles:

1. **Qubits (Quantum Bits):** Unlike classical bits (0 or 1), qubits can exist in **superposition**, holding values of **0, 1, or both simultaneously**.
2. **Entanglement:** Qubits are intrinsically linked, allowing faster computations through **instantaneous correlations**.
3. **Quantum Gates:** Operate on qubits, functioning like **logic gates** in classical computers to perform complex calculations.
4. **Parallel Processing:** Exploits **superposition** and **entanglement** to process multiple possibilities simultaneously.

Applications of Quantum Computing

5. Potential Use Cases:

1. **Cryptography:** Breaks classical encryption algorithms, paving the way for **quantum-resistant encryption**.
2. **Drug Discovery:** Simulates molecular interactions for faster development of **new medicines**.
3. **Optimization Problems:** Solves logistical and financial optimization challenges in **supply chains**, **airlines**, and **investment portfolios**.
4. **Artificial Intelligence:** Accelerates machine learning by processing vast datasets efficiently.
5. **Climate Modeling:** Simulates complex **climate models**, improving predictions and solutions for **climate change**.

Limitations of Quantum Computing

6. Challenges:

1. **High Costs:** Building and maintaining quantum computers is extremely **expensive**.
2. **Error Rates: Quantum states** are fragile, prone to **decoherence** due to environmental noise.
3. **Scaling Challenges:** Requires **millions of stable qubits** for large-scale applications, which is currently unattainable.
4. **Limited Applications:** Effective only for **specific problems** like cryptography; most tasks still rely on classical computing.

Kaveri Engine: India's Indigenous Gas Turbine Project

Syllabus: Science and Technology - Indigenization and Development (UPSC GS Paper-III)

Key Context

1. Context: The **Kaveri engine**, developed by **Gas Turbine Research Establishment (GTRE)** under **DRDO**, has been cleared for **inflight testing**, marking a significant milestone in India's **aerospace technology** development.

About Kaveri Engine

2. Developed by: Designed and developed by **GTRE**, under the **Defence Research and Development Organisation (DRDO)**.

3. History:

- **Initiated in 1986:** Originally intended to power the **Light Combat Aircraft (LCA) Tejas**.
- **Setbacks:** Could not meet operational requirements and was decertified for the **LCA program**.
- **Repurposed:** Now focused on powering **Unmanned Aerial Vehicles (UAVs)**.
- **Revival Efforts (2016):** Collaboration with **SAFRAN** for technical support to address limitations.

Features of the Kaveri Engine

4. Current Capabilities:

- **Thrust Generation:** Produces **49–51 kN thrust**, making it suitable for UAVs like the **Ghatak UCAV**.

5. Future Enhancements:

- Plans to integrate an **afterburner** to achieve **73–75 kN thrust**, making it compatible with advanced combat aircraft applications.

6. Testing and Validation:

- **High-Altitude Simulations:** Tested in **Russia** under extreme conditions.
- **Ground Trials:** Conducted extensively in India for performance validation.

Significance of Kaveri Engine

7. Strategic Importance:

- **Indigenization of Defence Technology:** Reduces dependency on foreign engines for critical defence applications.
- **UAV Capabilities:** Supports advanced indigenous platforms like the **Ghatak UCAV**, enhancing India's aerial combat potential.

8. Economic Impact:

- Saves foreign exchange by reducing reliance on imported engines.
- Boosts the domestic aerospace industry, creating opportunities for **R&D** and manufacturing.

9. Technological Advancement:

- Demonstrates India’s growing expertise in **jet engine technology**, a complex field requiring high precision and innovation.

Way Forward

10. Recommendations:

1. **Focus on Scaling:** Accelerate the development of higher-thrust variants for use in combat aircraft.
2. **Collaborative R&D:** Continue partnerships with global leaders for **technology transfer** and expertise.
3. **Field Integration:** Test the engine in real-world combat and operational scenarios to validate performance.
4. **Encourage Private Sector Participation:** Leverage private industry capabilities to scale production and enhance innovation.

Parker Solar Probe: The First Close Encounter with the Sun

Syllabus: Science and Technology - Space Technology (UPSC GS Paper-III)

Key Context

1. Context:

- NASA’s **Parker Solar Probe** performed a historic flyby at the **perihelion point**, becoming the **closest human-made object to the Sun**.
- **Speed Achieved:** Approximately **700,000 kilometers per hour**, making it the **fastest human-made object in history**.

About Parker Solar Probe

2. Objective:

- **Primary Goal:** To study the **outermost part of the Sun's atmosphere**, the **corona**, and enhance understanding of the **solar wind**.

3. Launched in: 2018, as part of NASA's mission to explore the Sun.

4. Key Features:

- **Trajectory:** Utilizes **Venus flybys** to adjust its orbit closer to the Sun.
- **Instruments:**
  - **FIELDS Experiment:** Measures electric and magnetic fields.
  - **Integrated Science Investigation of the Sun (IS⊙IS):** Detects energetic particles in the Sun's atmosphere.

Importance of Studying Solar Activity

5. Understanding Space Weather:

- Solar events like **solar flares** and **coronal mass ejections (CMEs)** produce **space weather** that can disrupt:
  - **Satellite operations**
  - **Communication systems**
  - **GPS navigation**

6. Safeguarding Technology and Infrastructure:

- **Geomagnetic Storms:** Solar activity induces currents in the **electric grid**, potentially causing:
  - **Blackouts**
  - **Equipment damage**

7. Protection of Astronauts: Solar radiation poses a significant threat to astronauts in space.

Scientific Significance

8. Solar Wind:

- The **solar wind** is a continuous stream of charged particles (**protons and electrons**) emanating from the corona.
- Understanding its dynamics helps in predicting **space weather events**.

9. Corona Exploration: Studying the corona offers insights into why it is significantly **hotter than the Sun's surface**.

Key Terminology

10. Perihelion and Aphelion:

- **Perihelion:** The closest point to the Sun in an orbit.
- **Aphelion:** The farthest point from the Sun in an orbit.

Way Forward

11. Recommendations:

1. **International Collaboration:** Enhance global efforts to monitor and predict solar activity.
2. **Technology Development:** Invest in technologies to mitigate the impact of geomagnetic storms.
3. **Space Weather Forecasting:** Develop advanced forecasting models for early warnings.