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POLITY

Reimagining India's Prison System

📌 **Syllabus Mapping:**

- **GS Paper II – Governance, Constitution, Polity, and Social Justice**
- **GS Paper II – Government Policies & Interventions**
- **GS Paper III – Security, Disaster Management (institutional preparedness), Technology in Governance**

Introduction

The release of the **Prison Statistics India (PSI) 2023** by the National Crime Records Bureau has once again re-energised debates surrounding the condition of prisons in India. Chronic issues—**undertrial population, overcrowding, lack of uniform standards, and outdated laws**—continue to impede the evolution of correctional institutions into humane and reform-oriented spaces. Recent initiatives, including the **Model Prisons and Correctional Services Act, 2023**, aim to modernise a system still functioning within a colonial framework.

Governance Architecture of Prisons in India

Constitutional Framework

- Prison administration comes under the **State List (Entry 4, List II, Seventh Schedule)**.
- Hence, **State Governments/UT administrations** are primarily responsible for management of prisoners and prison infrastructure.

Central Government's Role

- The **Ministry of Home Affairs (MHA)** provides policy guidance, model legislation, financial assistance, and technological support.
- Earlier, governance relied heavily on **Prisons Act, 1894**, a colonial legislation that focused more on discipline than rehabilitation.

Shift to Model Legislation

- The **Model Prisons and Correctional Services Act, 2023** serves as a **uniform guiding framework** for states.
- It consolidates provisions of:
  - **Prisoners Act, 1900**
  - **Transfer of Prisoners Act, 1950**
- Seeks to replace outdated norms with principles of **correctional justice**, **inmate welfare**, and **security modernization**.

Key Judgments

⚖️ **Suhas Chakma v. Union of India (2024)**

- 🏢 Apex Court emphasized open prisons as a viable alternative to reduce overcrowding and improve rehabilitation outcomes.
- ➡️ Reinforces the shift from punitive to reformative justice

👩 **Hussainara Khatoon v. State of Bihar (1979)**

- 🕐 Recognized speedy trial as an intrinsic part of Article 21, leading to mass release of undertrial prisoners
- 💡 It marked the birth of public interest litigation in prison rights

Judicial Interpretations and Progressive Jurisprudence

Concept of Open Prisons

- Facilities with **minimal supervision**, where inmates engage in community work.
- Rajasthan is a leading example.
- Aligns with **Gulam Nabi Azad Committee (1956)** ideas on rehabilitative incarceration.

Key Government Measures for Prison Reforms

1. Addressing Discrimination and Ensuring Uniformity

- Amendments to the **Model Prison Manual 2016** and **Model Prisons Act 2023** after Supreme Court's directions in **Sukanya Santha vs Union of India**, mandating elimination of **caste-based discrimination**.
- Manual seeks **standardisation** in management, welfare, discipline, and grievance redressal across states.

2. Supporting Economically Vulnerable Prisoners

- **Support to Poor Prisoners Scheme**
  - Offers financial assistance to undertrials unable to secure bail or pay fines.
  - Aligns with principles of **equal access to justice**.

3. Technological Interventions

- **E-Prisons Project**: Integrates prisoner data nationwide, ensuring transparency in admission, release, parole, and legal status.
- **FASTER (Fast and Secured Transmission of Electronic Records)**: Ensures instantaneous dispatch of bail orders by Supreme Court, reducing unnecessary detention.
- **Modernization of Prisons Project**: Upgrades surveillance systems, perimeter security, and emergency response mechanisms.

Committee Recommendations and Expert Views

A. Supreme Court's Foundational Principles

The Court has repeatedly stressed three core principles:

1. A prisoner **retains personhood**.
2. All **human rights remain intact**, barring those inevitably restricted by confinement.
3. No additional suffering should be imposed beyond what is necessary for incarceration.

These align with scholar **Jeremy Bentham's** concept of proportionality and modern theories of **restorative justice**.

B. Parliamentary Committee on Home Affairs

- Use of **trackable bracelets** for monitoring parolees or those on bail.
- **Renovation of colonial-era prisons** while preserving heritage potential.
- Creation of a **Prison Development Fund** to finance welfare programmes.

C. Justice A.N. Mulla Committee

- Establishment of **Indian Prisons & Correctional Service** as an All-India Service.
- Mainstreaming **after-care, rehabilitation, and probation**.
- Periodic access for **press and civil society** for transparency.
- Separation of **undertrials from convicts**, ensuring non-criminalisation of petty offenders.

D. Justice Amitava Roy Committee

- **Fast-track courts** for long-pending petty cases.
- **Video conferencing** for production of aged and ailing prisoners.
- Dedicated **women's prisons**, medical wards, and welfare schemes for **transgender inmates**.
- **Segregation** of first-time offenders to reduce internal violence and recidivism.

Contemporary Dimensions and Broader Context

Dimension	Key Contemporary Issues / Examples
Human Rights	NCRB PSI 2023 reports >70% undertrial population; NHRC releases repeated advisories on overcrowding.
Technology	E-Prisons, AI-driven surveillance in some Tihar Jail units, biometric systems.
Gender & Vulnerable Groups	Growing focus on women inmates, transgender welfare guidelines by MHA (2024).
Global Comparisons	Scandinavian model emphasises dignity, education, reintegration—India exploring aspects of this through open prisons.
Socio-Economic Factors	Studies by CHRI show most inmates belong to marginalised castes and poor households.

Conclusion

Keywords: Reformative Justice, Human Rights, Judicial Oversight, Technological Modernisation, Rehabilitation

India's prison reform discourse is transitioning from a colonial punitive paradigm toward a **rehabilitative and rights-based approach**. The **Model Prisons and Correctional Services Act, 2023**, supported by judicial interventions and expert committee recommendations, signals a broader recognition that prisons must uphold **dignity**, ensure **correctional support**, and facilitate **smooth reintegration** into society. By combining technology, human rights safeguards, and administrative professionalism, India can transform its prisons into institutions that genuinely support societal reform.

MAINS PRACTICE QUESTION

"Critically examine the significance of the Model Prisons and Correctional Services Act, 2023 in transforming India's prison system from a punitive to a reformative framework."

GOVERNANCE

Regulating AI-Driven Content: IT Rules 2025

📌 **Syllabus Mapping:**

- **GS Paper II – Governance, Digital Regulation, Government Policies & Interventions**
- **GS Paper II – Role of Executive & Regulatory Bodies**
- **GS Paper III – Science & Technology, Cybersecurity, AI Ethics**

Introduction

The Government of India has introduced significant modifications to the **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021** to address the growing misuse of **synthetically generated content**, especially deepfakes. These amendments, which come into force on **15 November 2025**, aim to enhance accountability, strengthen user safety, and establish clear labelling norms for AI-generated content across digital platforms.

Context and Background

Evolution of the IT Rules Framework

- The **IT Rules 2021**, amended earlier in **2022 and 2023**, constitute India's principal rulebook for regulating intermediaries, digital media publishers, and social media platforms.
- Their core objective is to ensure **safe digital spaces**, enforce **due diligence**, and provide users mechanisms to report harmful content.
- The Rules classify intermediaries into:
  - **Social Media Intermediaries (SMIs)** – platforms enabling user-to-user interaction.
  - **Significant Social Media Intermediaries (SSMIs)** – platforms with a user base exceeding a threshold notified by the Government.

The 2025 amendments represent the next step in India's digital governance, responding to the rapid expansion of **AI-driven misinformation and hyper-realistic synthetic content**.

Key Features of the IT (Amendment) Rules, 2025

1. Definition of Synthetically Generated Information (SGI)

- SGI refers to **artificially created or algorithmically altered content**, including images, audio, text, and videos produced using computer resources.
- It covers deepfakes and AI-generated content that appear *realistic* and are difficult to distinguish from original material.

2. Mandatory Labelling of Synthetic Content

Intermediaries enabling generation or modification of SGI must:

- Embed **permanent, unique metadata** or identifiers into such content.
- Ensure:
  - For **visual content**: label must cover at least **10% of surface area**.
  - For **audio content**: label must cover the **first 10% of duration**.
- Platforms are prohibited from **removing or tampering** with labels, ensuring traceability.

3. Enhanced Compliance Obligations for SSMIs

SSMIs must now:

- Obtain **user declarations** when they upload synthetic or manipulated content.
- Deploy **automated tools** and verification systems to check such declarations.
- Display clear and prominent notices identifying SGI.
- Risk losing their **safe harbour immunity** under the IT Act if they fail to comply.

This aligns with the principle of **platform accountability**, long advocated by scholars such as Cass Sunstein in digital governance debates.

4. Senior-Level Authorisation for Content Takedown

Only high-ranking officials—**Joint Secretary and above** in the Centre or equivalent State authorities, and **DIG-rank police officers**—may issue takedown requests.
This ensures:

- A **uniform chain of responsibility**
- Greater checks against misuse of takedown powers
- Protection of **freedom of expression** while ensuring security

Challenges in Detecting AI-Generated Content

1. Accuracy and Benchmarking Gaps

- AI detectors show **high error rates**, leading to **false positives** (human content flagged as AI) and **false negatives**(AI content undetected).
- Absence of global standards complicates evaluation.

2. Infrastructure and Capacity Limitations

- The surge of synthetic content far exceeds current computing, storage, and forensic capacities.
- Scaling up detection tools involves significant financial costs.

3. Anonymity and Cross-Border Jurisdiction

- Deepfakes can be produced anonymously or hosted on foreign servers.
- Lack of harmonised international cooperation hampers enforcement.

4. Imperceptibility of Advanced AI Tools

- Platforms like **DALL·E, Midjourney, Stable Diffusion** generate near-real content that is difficult to detect even with advanced tools.

5. Balancing Innovation, Regulation, and Privacy

- Excessive surveillance through metadata tracking raises privacy concerns.
- Restrictive norms may discourage innovation in AI research.

These challenges highlight what AI ethicist **Luciano Floridi** calls the problem of "invisibility of digital manipulation" in the infosphere.

Initiatives to Tackle Deepfakes

A. India's Efforts

1. Election Commission of India (ECI) Guidelines

- Mandatory labelling of AI-altered political content covering **at least 10% of screen space**.
- Top-band placement of labels in video content.
- Political parties must remove manipulated content from official channels within **3 hours**.

2. Digital Personal Data Protection Act, 2023

- Penalises deepfakes involving personal data without consent.
- Imposes obligations on **Data Fiduciaries**, including AI platforms.

3. Indian Cyber Crime Coordination Centre (I4C)

- Issues takedown notices under IT Act and IT Rules.
- Supports initiatives such as **SAHYOG Portal**, **CERT-In**, and National Cyber Crime Reporting mechanisms.

B. Global Responses

- **EU AI Act** mandates watermarking of synthetic content.
- **China's AI labelling rules** require mandatory disclosure for all AI-generated material.
- **Denmark's proposed deepfake law** strengthens digital copyright protection and individual rights.

Way Forward

1. Establishing a Digital Provenance Framework

- Create invisible yet verifiable signatures across content, similar to Aadhaar-like authentication.
- Ensure traceability without violating user privacy.

2. Tiered Accountability Model

- Differentiate obligations based on platform size, risk exposure, and ability to influence public discourse.

3. Strengthening Governance Architecture

- Build technical standards, independent oversight bodies, and clear regulatory protocols.
- Ensure regular audits and transparency reports by intermediaries.

4. AI Watermarking and Content Authentication

- Use cryptographically secure watermarks and metadata tags in all SGI.
- Align with global norms to ensure interoperability.

5. International Harmonisation

- Align Indian rules with emerging global standards to ensure cross-border cooperation in combating misinformation.

6. Multi-Stakeholder Collaboration

- Engage experts, platforms, civil society, academia, and regulators to build consensus and share best practices.
- Promote AI literacy among citizens to help them identify manipulated content.

Conclusion

Keywords: AI Governance, Deepfake Regulation, Platform Accountability, Digital Provenance, Online Safety

Strengthening the IT Rules through the 2025 amendments marks a decisive step towards a **secure, transparent, and trustworthy digital ecosystem**. As India navigates the complexities of AI-generated misinformation, a balanced approach—combining **technological safeguards**, **robust legal frameworks**, and **public awareness**—is essential. The long-term objective must be a regulatory architecture that enables **innovation** while upholding **integrity, safety, and digital rights**.

MAINS PRACTICE QUESTION

"Discuss the significance of the IT (Amendment) Rules, 2025 in addressing the challenges posed by synthetically generated content. How can India balance innovation with robust digital regulation?"

Oversight in India's Pharmaceutical Industry

📌 **Syllabus Mapping:**

- **GS Paper II – Governance, Health Regulation, Statutory Bodies**
- **GS Paper III – Science & Technology, Biotechnology, Public Health**
- **GS Paper II – Issues Relating to Development and Management of Health Services**

Introduction

A recent alert issued by the **World Health Organization (WHO)** regarding the presence of contaminated cough syrups linked to the deaths of children has once again drawn attention to gaps in **India's pharmaceutical regulatory architecture**. India, often called the *"pharmacy of the Global South"*, faces increasing scrutiny over quality control, manufacturing practices, and enforcement mechanisms—areas central to safeguarding public health and maintaining global trust.

Context: The Recent Incident

India's drug regulatory ecosystem has flagged three formulations—**Coldrif (Sresan Pharmaceuticals), Respifresh (Rednex Pharmaceuticals), and ReLife (Shape Pharma)**—as contaminated. These cough syrups reportedly contained harmful impurities, raising serious concerns over **quality assurance, manufacturing oversight, and systemic compliance failures**.

Regulatory Framework Governing Pharmaceuticals in India

1. Drugs and Cosmetics Act, 1940 & Rules, 1945

- Serve as India's foundational legislation for regulating **import, manufacture, distribution, and sale** of medicines.
- Focus on ensuring **quality, safety, and therapeutic efficacy**.
- Empower both central and state authorities to enforce compliance.

2. State Drug Regulatory Authorities

- Grant licences, undertake inspections, and monitor local manufacturing units.
- Form the first tier of enforcement but often face resource constraints and uneven capacity across states.

3. Central Drugs Standard Control Organisation (CDSCO)

- India's **National Regulatory Authority**, operating under the Ministry of Health & Family Welfare.
- Responsible for:
  - Approving **new drugs and clinical trials**
  - Setting **quality standards**
  - Monitoring **imported drugs**
  - Coordinating with State regulators

4. National Pharmaceutical Pricing Authority (NPPA)

- Implements the **Drugs (Prices Control) Order** to prevent overpricing and ensure affordability.

5. Good Manufacturing Practices (GMP) under Schedule M

- Prescribe standards aligned with **WHO guidelines**.
- Cover Facility hygiene, quality control systems, testing procedures, documentation, etc.
- However, implementation varies widely, particularly among smaller manufacturers.

Key Challenges Leading to Spurious or Substandard Drugs

1. Regulatory Fragmentation

- Overlapping jurisdiction between CDSCO and state authorities contributes to **uneven enforcement**.
- Lack of centralized tracking creates blind spots.

2. Toxic Contamination and Chemical Adulteration

- Past investigations found **Diethylene Glycol (DEG)** in cough syrups—a chemical used in industrial solvents and lethal when ingested.
- Similar incidents occurred in **Gambia (2022) and Uzbekistan (2022)**, severely damaging India's global pharmaceutical reputation.

3. Weak Quality Control and Testing Infrastructure

- Poor laboratory capacity, inadequate sampling, and weak implementation of GMP allow unsafe medicines to enter the supply chain.

4. Storage and Supply Chain Issues

- Improper stocking conditions and poor cold chain management cause degradation of formulations, making them **ineffective or harmful**.

5. Absence of a Mandatory Drug Recall Law

- India lacks a **binding national recall framework**, despite discussions since 1976.
- Current mechanisms rely on voluntary action by manufacturers, limiting swift response.

6. Proliferation of Online Spurious Drugs

- WHO estimates that **1 in 10 medicines** in low- and middle-income countries are substandard or falsified.
- Unregulated online pharmacies facilitate distribution of counterfeit drugs.

Scholar **Amartya Sen** notes that "health security is a component of human capability"; thus, gaps in drug governance directly undermine public well-being.

Recommendations and Policy Directions

Standing Committee on Chemicals and Fertilizers (2024–25): Calls for urgent reforms focusing on **enforcement, regulatory capacity, and public education**.

1. Strengthen Enforcement Through Rigorous Implementation

- Enforce the **Drugs and Cosmetics Act, 1940** and Rules robustly across all states.
- Establish uniformity in inspections and compliance checks.

2. Swift Prosecutions and Deterrent Penalties

- Shut down non-compliant units.
- Introduce faster legal processes and impose **stricter penalties** to deter violations.

3. Enhanced Monitoring and Periodic Inspections

- Prioritise high-risk areas and manufacturers.
- Build digital databases for real-time monitoring of licences, recalls, and adverse events.

4. Make Good Distribution Practices (GDP) Legally Binding

- Ensure quality is maintained not only during manufacturing but throughout the supply chain.

5. Improve Inter-Agency Coordination

- Facilitate cooperation between CDSCO, state regulators, law enforcement, and customs authorities.
- Create joint task forces to track counterfeit drug networks.

6. Strengthen GMP Implementation

- Fast-track rollout of **revised WHO-aligned GMP norms**, especially for small and medium firms.

7. Launch a National Awareness Campaign

- Educate citizens and healthcare workers on:
  - How to identify genuine medicines
  - Reporting mechanisms for adverse drug reactions
  - Dangers of procuring drugs from unverified online platforms

Contemporary Relevance and Global Perspective

Dimension	Current Developments
Public Health	WHO advisories on cough syrups exported from India in 2022–24.
Global Trade	Export restrictions and heightened scrutiny by African and Southeast Asian regulators.
Technology	Use of blockchain in pharma supply chain in countries like the US under the Drug Supply Chain Security Act (DSCSA).
Governance	India's push for a **centralised drug database** and strengthening of CDSCO capacities post 2023–24 incidents.

Conclusion

Keywords: Drug Safety, Regulatory Oversight, Public Health Governance, Quality Control, Pharmaceutical Accountability

Ensuring drug safety is central to safeguarding public health and retaining India's reputation as the **pharmacy of the developing world**. Addressing structural regulatory gaps, improving compliance with Good Manufacturing Practices, and building a transparent recall and monitoring system are necessary to prevent recurrence of tragedies linked to contaminated medicines. Strengthening coordination between authorities, enhancing consumer awareness, and adopting global best practices will be essential to building a trustworthy and resilient pharmaceutical ecosystem.

MAINS PRACTICE QUESTION

"Evaluate the systemic challenges in India's pharmaceutical regulatory framework. How can India strengthen drug safety oversight while maintaining its global role in the pharmaceutical supply chain?"

India's Decade of SDG Progress

📌 Syllabus Mapping

- **GS Paper II – Governance, International Relations, Multilateral Bodies**
- **GS Paper III – Economy, Environment, Inclusive Growth, Sustainable Development**
- **GS Paper I – Society and Social Justice**

Introduction

Ten years have passed since the world embraced the **2030 Agenda for Sustainable Development** in 2015. As the global community reaches this milestone, the performance of individual nations—especially large emerging economies like India—provides an important lens to evaluate the collective journey toward the **17 Sustainable Development Goals (SDGs)** and their **169 targets**, rooted in the Brundtland Commission's principle of **intergenerational equity**.

1. Understanding the SDGs

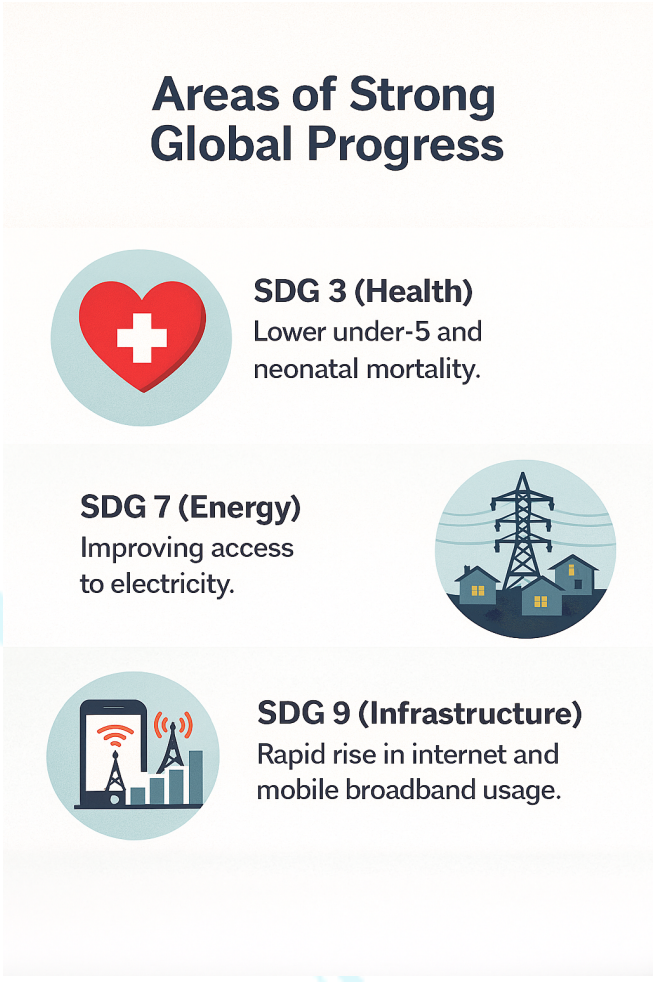
- The concept of **sustainable development**, articulated in the **1987 Brundtland Report**, emphasises development that fulfils present needs while safeguarding the future.
- The SDGs adopted in 2015 represent a universal commitment to **eradicate poverty**, **reduce inequality**, **protect ecosystems**, and promote **peace, justice, and strong institutions**.
- The agenda operates under the overarching principle of **"Leave No One Behind."**

2. Global Performance: A Mixed Picture

According to the **10th Sustainable Development Report (2025)**:

Key Highlights

- **Finland**, **Sweden**, and **Denmark** remain the top global performers.
- **East and South Asia** have shown the **fastest progress**, driven largely by socioeconomic improvements and infrastructure expansion.
- Only **17% of SDG targets** are currently on track to meet the 2030 deadline—revealing a widening global implementation gap.



3. India's SDG Performance: Decadal Review

India entered the **top 100** for the first time in 2025, ranking **99th** with a score of **67/100**.

Major Achievements Across Key Goals

SDG	Progress Highlights
SDG-1 (No Poverty)	**135 million** people exited multidimensional poverty (2015–2021).
SDG-2 (Zero Hunger)	Undernourishment at **13.7%** (SOFI 2024).
SDG-3 (Health)	Maternal mortality declined to **80.5** per 100,000 live births.
SDG-4 (Education)	Net primary enrolment at **99.9%**.
SDG-5 (Gender Equality)	**77.5%** of family planning needs met via modern methods.
SDG-7 (Clean Energy)	**99.2%** population with electricity access.
SDG-9 (Infrastructure)	**886 million** active internet users (IAMAI 2024).

4. Integrating SDGs into India's Development Framework

a) Whole-of-Government Approach

- Vertical integration across **Union–State–Local** levels.
- Horizontal coordination across ministries.
- **NITI Aayog** functions as the core institutional anchor.
- **State Support Mission** strengthens state-level implementation.

b) Data-Driven Competitive Federalism

Through indices such as:

- SDG India Index
- School Education Quality Index
- Composite Water Management Index
  These tools create **incentives for states** to enhance performance and build evidence-based governance.

c) Localization of SDGs

- District-level SDG mapping enhances precision.
- Example: **NER District SDG Index**, influencing targeted investments such as the **$825 million PM-DevINE programme** in the Northeast.

d) Institutional Strengthening

Many states have set up **SDG Coordination and Acceleration Centres**, enabling:

- Better monitoring
- Convergence of schemes
- Timely course correction

e) Inclusive Development Focus

- The **Aspirational Districts Programme (ADP)** has transformed lagging regions.
- UNDP notes accelerated improvements in health, nutrition, and education outcomes within three years.

5. Persistent Challenges Hindering SDG Achievement

a) Data Gaps: Several indicators—especially under **SDG 17 (Partnerships)**—remain unmeasured due to uneven state-level data availability.

b) Regional Imbalances

- **Bihar, Jharkhand, Uttar Pradesh** continue to have high multidimensional poverty.
- In contrast, **Kerala, Sikkim, Tamil Nadu** consistently report superior social outcomes.

c) Financial Limitations

- Domestic resource mobilisation is inadequate.
- Limited access to private green financing and development aid constrains implementation.

d) Institutional Weaknesses

- Fragmented coordination across ministries and state departments.
- Monitoring of progress often prioritises Central schemes while neglecting State-led efforts.

e) Sustainability vs Growth Dilemma

India faces a difficult balance in:

- Expanding renewable energy
- Conserving forests
- Reducing emissions intensity
- Managing waste and water scarcity

f) COVID-19 Aftershocks

- Learning losses
- Lower routine immunisation
- Disruptions in maternal and child health services
  These have slowed progress on multiple SDGs.

6. Way Forward: Bridging the Gaps

a) Strengthening Data Systems

- Build robust, real-time data architecture at national, state, and district levels.
- Invest in local capacity building for accurate reporting.

b) Mobilising Sustainable Finance

- Innovate financing tools: **Green bonds**, **SDG-aligned budgeting**, **blended finance**.
- Expand CSR participation and multilateral partnerships.

c) Improving Governance

- Promote cooperative federalism with tighter coordination mechanisms.
- Integrate SDG targets into medium-term expenditure frameworks.

d) Multi-Stakeholder Engagement

- Involve civil society, academia, and private sector for community-led innovation.
- Encourage public awareness campaigns to make SDGs a “people’s movement.”

e) Reinforcing Environmental Sustainability

- Prioritise clean energy transition, climate-resilient agriculture, and circular economy models.
- Promote water efficiency, waste-to-energy plants, and natural resource restoration.

Conclusion

India's first decade under the SDG framework reflects **significant gains in poverty reduction**, access to **healthcare**, **education**, and **infrastructure**, supported by institutional reforms and federal cooperation. Yet, bridging regional disparities, closing data gaps, and accelerating environmental action remain critical for achieving the **2030 vision** of sustainable and inclusive development. With coordinated governance, enhanced financing, and societal participation, India can strengthen its trajectory toward realising the **core SDG commitment of leaving no one behind.**

Mains Practice Question

Critically evaluate India's progress in achieving the Sustainable Development Goals over the past decade. What institutional, financial, and governance reforms are necessary to accelerate SDG attainment by 2030?

INTERNATIONAL RELATIONS

Global Anti-Immigration Policies

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Diaspora, Global Governance**
- **GS Paper II – Government Policies & interventions affecting Citizens Abroad**
- **GS Paper I – Society, Social Issues, Demographic Trends**

Introduction

In recent years, several advanced and emerging economies have witnessed a noticeable rise in **anti-immigration narratives**, restrictive visa policies, and polarised political campaigns. From Western democracies tightening entry norms to parts of Asia framing migration as a cultural or security threat, the trend reflects deeper structural anxieties and a widening divide on the question of global mobility.

Contemporary Developments

New episodes across countries indicate escalating resistance to immigration:

- **United States:** Substantial hike in **H-1B visa fees**, with political rhetoric linking migration to unemployment and security.
- **Japan:** The **Sanseito Party** has popularised campaigns portraying immigrants as part of a "silent invasion" undermining cultural purity.
- **Australia:** Organised marches under banners like **"March for Australia"** protesting Indian migration and multicultural expansion.

This global shift aligns with the rise of **populist politics**, where governments react to public anxieties by limiting legal migration pathways, tightening welfare norms, expanding border protection, and framing immigrants as economic or cultural competitors.

Key Drivers Behind the Rise of Anti-Immigration Sentiments

1. Economic Concerns

- Immigrants are perceived as affecting local employment opportunities, depressing wages, or stressing welfare systems.
- **BREXIT** was strongly influenced by fears of job loss and wage competition from foreign labour.

2. Social and Cultural Anxiety

- Migration is often viewed as a threat to **national identity**, language, or traditional values—particularly in ageing societies or those encountering rapid demographic shifts.
- This trend is evident across **Europe** and the **United States** where debates increasingly link cultural preservation with reduced immigration.

3. Political Populism

- Leaders and parties use anti-immigration narratives to mobilise voters, often portraying migrants as economic burdens or security threats.
- Italy's Prime Minister **Giorgia Meloni** frequently characterises migration as an "invasion," reinforcing nationalist sentiment.

4. Security-Driven Perceptions

- Following major global events like **9/11**, migration became associated with terrorism, illicit border crossings, and organised crime—prompting tighter legal regimes.

5. Impact of Misinformation

- Social media fosters xenophobic narratives by circulating exaggerated claims about migrants "taking jobs" or "increasing crime."
- In Germany, widespread fake news on migrant-related crimes intensified anti-immigrant mobilisations.

Political theorists like **Zygmunt Bauman** argue that migration anxiety is rooted in a "crisis of belonging" in modern societies—where uncertainties make cultural outsiders easy scapegoats.

Consequences of Anti-Immigration Trends

1. Economic Repercussions

- Restrictions reduce the labour supply in migrant-dependent sectors like construction, agriculture, and healthcare.
- **Post-Brexit UK** faced severe shortages in the farming sector due to lack of migrant labour.

2. Demographic Challenges

- Developed countries already facing ageing populations experience worsening **dependency ratios** and labour deficits.
- Japan and several EU nations are struggling to sustain economic productivity amid shrinking workforces.

3. Socio-Cultural Fragmentation

- Reduced multicultural exchange increases **polarisation**, undermines social cohesion, and normalises xenophobic attitudes.

4. Decline in Innovation and Research Capacity

- Immigrants contribute significantly to high-skilled sectors.
- According to the **National Foundation for American Policy**, **over half of U.S. billion-dollar start-ups (55%)**have at least one immigrant founder; restrictive rules hamper this ecosystem.

5. Foreign Policy and Diplomatic Concerns

- Deportations, discriminatory visa practices, and targeted rhetoric affect bilateral relations with source countries.
- Restrictive policies may also invite criticism from international human rights organisations.

Measures Taken to Prevent Illegal Immigration (India-Specific)

1. **National Register of Citizens (NRC):** Developed first in Assam (1951) to identify citizens and address concerns over illegal migration.
2. **Immigration and Foreigners Act, 2025:** Grants the Union Government enhanced powers to regulate entry/exit and mandate travel documentation.

These efforts demonstrate India's attempt to maintain a balanced approach between managing borders and ensuring legitimate migration flows.

How India Should Respond to Rising Global Anti-Immigration Sentiments

1. Diplomatic Engagement

- Strengthen bilateral negotiations with countries like the **US, Australia, Japan**, and European nations to ensure safety, legal security, and non-discrimination for Indian workers and students.

2. Leveraging Diaspora Diplomacy

- Use cultural missions, embassies, and diaspora organisations to counter negative stereotypes and highlight the contribution of Indian professionals globally.

3. Enhancing Domestic Job Creation

- Reduce push factors by expanding high-quality opportunities in IT, healthcare, manufacturing, and emerging sectors.
- Programs like **Make in India**, **Skill India**, and **Startup India** need synchronised implementation to retain skilled talent.

4. Combatting Misinformation and Stereotypes

- Collaborate with global digital platforms to curb the spread of xenophobic or misleading narratives targeting migrants.

5. Promote Safe, Legal, and Managed Migration

- Strengthen pre-departure training, legal literacy, and grievance mechanisms for Indian migrants.

- Sign bilateral labour mobility agreements with major destination countries.

Conclusion

Keywords: Populism, Cultural Anxiety, Global Mobility, Diaspora Diplomacy, Migration Governance

The worldwide rise of anti-immigration sentiment stems from complex economic, cultural, and political dynamics. For India—home to one of the largest diasporas—the challenge lies in navigating this landscape through **effective diplomacy**, safeguarding its citizens abroad, and building inclusive domestic opportunities. A balanced, evidence-driven approach grounded in **human rights**, global cooperation, and responsible migration management will be crucial to ensuring that mobility remains a bridge of opportunity rather than a source of conflict.

MAINS PRACTICE QUESTION

"Analyse the global rise of anti-immigration policies. What implications do these developments hold for India, and how should India recalibrate its diplomatic and domestic strategies in response?"

India–Afghanistan Strategic Reset

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, India and its Neighbourhood, Bilateral Engagements**
- **GS Paper II – Regional Security, Diaspora, Global Organisations (UNSC)**
- **GS Paper III – Internal Security (Terrorism & Cross-Border Threats)**

Introduction

For the first time since the Taliban's takeover of Kabul in **August 2021**, Afghanistan's Foreign Minister has visited India, signalling a significant recalibration in New Delhi's engagement with the new regime. The visit, made possible through a **UN Security Council travel exemption**, highlights the evolving dynamics of India–Afghanistan relations amid shifting regional geopolitics and persistent security challenges.

Key Developments from the Visit

1. Revival of Diplomatic Channels

- India has upgraded its presence in Kabul by restoring its **Technical Mission** to full-fledged **Embassy status**.
- This marks New Delhi's most visible political engagement with the Taliban administration since 2021.

2. Boost to Connectivity

- Launch of the **India–Afghanistan Air Freight Corridor**, aimed at enhancing bilateral trade and facilitating smoother movement of goods despite Afghanistan's landlocked geography.

3. Infrastructure and Energy Cooperation

- Both sides reaffirmed commitment to development initiatives such as the **Salma Dam (India–Afghanistan Friendship Dam)** in Herat.
- India expressed readiness to partner on additional **hydro-power and water management projects**, areas critical for Afghanistan's economic revival.

Why India is Re-engaging with Afghanistan?

1. Safeguarding National Security

- India's primary objective is preventing Afghanistan from becoming a **sanctuary for terrorist groups**.
- Multiple outfits—**Al-Qaeda, IS-Khorasan Province, Lashkar-e-Taiba, and Jaish-e-Mohammed**—retain a foothold in the region.
- Assurances from Kabul that Afghan soil will not be used against India offer strategic reassurance, even if cautiously interpreted.

2. Securing Strategic Investments

- India has committed over **USD 3 billion** toward more than **500 development projects**, spanning:
  - Roads and power
  - Healthcare and education
  - Irrigation and agriculture
  - Capacity-building initiatives
- Protecting this developmental footprint remains a key motive behind renewed engagement.

3. Geopolitical Balancing

Countering Pakistan

- Strained Pakistan–Afghanistan relations under the Taliban offer India an opportunity to regain diplomatic space.
- India aims to prevent Afghanistan from being used as a **strategic depth** for anti-India activities.

Managing China's Strategic Expansion

- China has intensified outreach through **CPEC extensions** and **BRI-linked trilateral mechanisms** involving Pakistan and Afghanistan.
- India views deeper Chinese entrenchment as detrimental to its broader neighbourhood strategy.

Regional and Global Context

1. Moscow Format Consultations

- India's participation in the 7th session underscores its alignment with regional stakeholders—Russia, Iran, Central Asian republics—calling for a **stable and inclusive Afghanistan**.

2. Russia's Recognition of the Taliban

- Moscow's formal recognition lends the Taliban government greater international legitimacy.
- This expands Russia's influence and may compel India to reassess engagement modalities.

3. United States' Renewed Signalling

- Reports of US interest in **Bagram Air Base** indicate Washington's renewed strategic watch on Afghanistan.
- This complicates the geopolitical landscape, as multiple powers contest influence.

4. China's Strategic Posture

- China's push for integrating Afghanistan with **CPEC** aims to expand its western frontier connectivity.
- Such moves could shift regional balances unless countered through strategic engagement.

Challenges for India in Resetting Ties

1. Absence of Formal Recognition

- India has refrained from recognising the Taliban regime, limiting official interactions and legal frameworks for cooperation.

2. Diplomatic and Ethical Dilemmas

- Engagement with a regime criticised for **exclusionary governance**, restrictions on **women's rights**, and **religious intolerance** raises concerns regarding India's normative foreign policy principles.

3. Balancing Strategy with Humanitarian Obligations

- India must weigh its security and geopolitical interests against the human rights situation in Afghanistan.
- As a democracy, India risks reputational costs if perceived as legitimising a theocratic and oppressive administration.

Broader Dimensions and Contemporary Relevance

Dimension	Current Developments
Security	Persisting terror networks & porous borders threaten regional stability.
Economy	Afghanistan's economic collapse increases dependence on regional actors like China & India.
Human Rights	Restrictions on women's education and civil liberties draw global criticism.
Geopolitics	Multi-power competition among US, Russia, China shaping Afghan affairs.
Diplomatic Strategy	India's "pragmatic engagement without recognition" is gaining prominence.

International relations scholar **Hans Morgenthau** notes that foreign policy is ultimately shaped by **national interest**, not ideological alignment—an idea reflected in India's recalibrated approach.

Conclusion

Keywords: Strategic Engagement, Terrorism, Geopolitical Balancing, Developmental Partnership, Regional Stability

India's renewed outreach to Afghanistan represents a **pragmatic shift** anchored in national security, strategic investments, and regional geopolitics. While it does not equate to recognition of the Taliban regime, it reflects an understanding that disengagement may cede strategic space to rival powers and jeopardise India's

long-term interests. A careful combination of **dialogue, calibrated engagement, humanitarian support, and regional coordination** will be crucial for shaping a stable and balanced India–Afghanistan relationship.

MAINS PRACTICE QUESTION

"Critically analyse India's recent strategic engagement with Afghanistan under Taliban rule. How can India balance its security imperatives and geopolitical concerns with its commitment to human rights and democratic values?"

India–Russia Relations

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Bilateral Relations, Strategic Partnerships**
- **GS Paper II – Effect of Policies of Developed Countries on India's Interests**
- **GS Paper III – Security, Defence Technology, Energy Security**

Introduction

India and Russia recently marked the **25th anniversary** of their **Declaration of Strategic Partnership (2000)**—a framework that has shaped their political, defence, economic, and technological cooperation for over two decades. With 22 annual summits, institutionalised dialogues, and engagements across multilateral platforms, the relationship remains one of India's most durable partnerships despite emerging global realignments.

Evolution of the Partnership: Key Highlights

1. Political and Diplomatic Convergence

- The **Annual Summit mechanism** remains the cornerstone of political engagement.
- Both nations coordinate on international and regional platforms including the **UN, BRICS, SCO, G20**, and the **UNSC** where Russia continues to support India's candidature for a **permanent seat**.
- The **2+2 Dialogue** and ministerial meetings add depth to strategic consultations.

2. Defence and Security Cooperation

- Russia accounted for **36% of India's defence imports (2020–24)** as per SIPRI.
- Major platforms include the **S-400 Triumf**, **MiG-29K**, **Su-30MKI**, and the lease of a nuclear submarine.
- Cooperation has evolved from a **buyer–seller model** to joint development—e.g., **BrahMos cruise missile**, **AK-203 rifles**, and plans for futuristic weapon systems.
- Annual exercises such as **INDRA** and **Avia-Indra** further cement operational interoperability.

3. Energy and Natural Resources

- Russia has emerged as **India's largest crude oil supplier**, offering discounted supplies that helped India control inflation.
- Indian firms—including **ONGC Videsh**—have invested in projects in the **Russian Far East (RFE)**.
- Nuclear energy is another major pillar, highlighted by cooperation on the **Kudankulam Nuclear Power Plant**.

4. Trade and Economic Cooperation

- Bilateral trade reached **USD 68.7 billion in FY 2024–25**, driven largely by India's crude oil imports.
- Both countries aim for **USD 100 billion trade by 2030**.
- Nearly **90% of bilateral trade** currently occurs in **local currencies**—rupee and rouble.

5. Connectivity Initiatives

Russia can enhance India's access to Eurasia through:

- **International North–South Transport Corridor (INSTC)**
- **Northern Sea Route**
- **Chennai–Vladivostok Eastern Maritime Corridor**

These projects aim to diversify India's connectivity beyond the Indo-Pacific.

6. Science, Technology & Space Cooperation: Russia is supporting India's **Gaganyaan mission**, particularly in astronaut training and crew safety technologies.

7. Cultural & People-to-People Connections: Soft power links—Soviet affinity for Indian cinema, popularity of yoga in Russia, and cultural exchanges—have built enduring goodwill.

Major Challenges in the Current India–Russia Relationship

1. Severe Trade Imbalance

- India imports over **USD 63.84 billion**, while exports remain at **USD 4.88 billion** (FY 2024–25).
- Surplus rupees in **Special Rupee Vostro Accounts** (SRVAs) remain unusable for Russia due to sanctions and restrictions in the Western financial system.

2. Declining Defence Imports

- India's diversification toward the **US, France, Israel**, and rapid indigenous defence production has reduced overdependence on Russia.

3. Cross-Cutting Geopolitical Alignments

- India's convergence with the US—through QUAD, defence agreements, and Indo-Pacific cooperation—creates strategic divergence with Russia.
- Russia's deepening **"no-limits partnership"** with China and growing ties with Pakistan introduce further complications.

4. Impact of US Sanctions (CAATSA)

- India has refrained from signing major new defence deals post-S-400 due to the risk of **CAATSA sanctions**, complicating future cooperation.

How India Balances Relations with the US and Russia

1. Strategic Autonomy as the Guiding Principle

- India's response to global conflicts—including the **Russia-Ukraine war**—is driven by national interest.
- India abstained from UNSC resolutions condemning Russia, emphasising diplomacy and dialogue instead.

2. Issue-Based Alignment

- India maintains strong security cooperation with the US while preserving time-tested ties with Russia.
- This "multi-alignment" approach ensures flexibility in a multipolar world.

3. Quiet Multilateral Diplomacy

- India leverages forums like **BRICS, SCO, G20**, and platforms of the Global South to act as a bridging power.

4. Alternative Payment Mechanisms

- By promoting **rupee–rouble trade** and exploring currency internationalisation, India seeks to insulate bilateral trade from Western financial sanctions.

Political thinkers like **Jawaharlal Nehru** and **Kenneth Waltz** have highlighted the value of non-alignment and multipolar stability—principles reflected in India's contemporary foreign policy choices.

Way Forward

1. **Strengthen Strategic Trust:** Candid dialogue is needed to manage anxieties arising from Russia–China proximity and India–US convergence.
2. **Boost Tier-II and People-to-People Diplomacy:** Enhance academic exchanges, youth interactions, and station more Indian correspondents in Russia to deepen societal understanding.
3. **Diversify the Trade Basket:** Encourage exports in:
    - IT and pharmaceuticals
    - Textiles and agriculture
    - Machinery and engineering goods
4. **Expand Joint Research & Defence Co-Development:** Build on the success of **BrahMos**, focusing on AI, unmanned systems, new-generation propulsion, and cybersecurity.
5. **Accelerate Negotiations for an FTA with the EAEU:** An early agreement can unlock broader Eurasian markets and reduce trade imbalance.
6. **Strengthen Cooperation in Nuclear and Renewable Energy:** Russia can collaborate with India on **Small Modular Reactors (SMRs)**, fusion research, and hydrogen technologies.
7. **Explore New Areas:** Collaboration in Arctic research, quantum technologies, and digital security can redefine the partnership's future scope.

Conclusion

Keywords: Strategic Partnership, Multipolarity, Strategic Autonomy, Energy Security, Defence Cooperation

India–Russia relations are at an inflection point. While legacy sectors like defence and energy remain important, the partnership must evolve to align with new geopolitical realities. The future lies in expanding cooperation into **technology, innovation, connectivity, and diversified trade**, supported by sustained diplomacy and mutual trust. A modernised relationship will allow both nations to maintain strategic relevance in a rapidly changing global order.

MAINS PRACTICE QUESTION

"In the context of transforming global geopolitics, critically evaluate the evolving nature of India–Russia relations. How can both countries adapt their partnership to emerging strategic and economic challenges?"

Gaza Peace Summit

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, India and Global Diplomacy, Middle East Affairs**
- **GS Paper II – Effect of Policies of Developed Nations on India's Interests**
- **GS Paper I – World Geography (Geopolitical Landscapes of West Asia)**

Introduction

The United States and Egypt recently co-hosted the **Gaza Peace Summit** in **Sharm El-Sheikh**, aiming to restore stability in one of the most conflict-ridden zones of West Asia. The summit comes amid persistent violence, humanitarian distress, and great-power competition in the region. India's participation at ministerial level reflects New Delhi's growing diplomatic involvement in broader Middle Eastern processes.

Key Developments at the Summit

1. Adoption of the 20-Point "Trump Declaration for Enduring Peace and Prosperity"

- The United States, Egypt, Qatar, and Turkey—acting as primary ceasefire mediators—endorsed a declaration outlining Washington's new peace initiative.
- The framework emphasises that all future disputes must be settled **through diplomacy**, avoiding force and prolonged conflict.

2. Focus on Demilitarisation and Reconstruction

- Calls for **complete disarmament of Hamas**.
- Proposes an **internationally supervised reconstruction mechanism**, ensuring that humanitarian aid and rebuilding efforts are insulated from militant control.

3. Commitments Regarding Gaza's Status

- Israel is expected not to **occupy, annex, or forcibly displace Palestinians** from Gaza.
- The plan outlines a long-term governance and security architecture but **does not guarantee a two-state solution**, thereby sidestepping the core political aspiration of Palestinians.

4. India's Engagement

- India's Minister of State for External Affairs welcomed renewed peace efforts and highlighted the importance of a stable Middle East for global and regional security.

Significance of Peace in the Region

1. Expansion of Abraham Accords

- A stable environment may encourage additional states to join the **Abraham Accords**, expanding the network of diplomatic and economic ties between Israel and Arab states.

2. Strategic Geography

- The region lies across crucial maritime chokepoints:
  - **Red Sea**
  - **Strait of Hormuz**
  - **Suez Canal**
- These corridors are vital for global energy flows and commercial shipping.

3. Great-Power Competition

- Absence of durable peace may intensify rivalries:
  - **Russia** seeking security leverage

  - **China** pushing economic initiatives through the Belt and Road framework
- A stable Middle East helps moderate external interference and reduces geopolitical fragmentation.

4. Economic and Demographic Importance

- West Asia hosts a **young and growing population**, projected to reach **580 million by 2030**, providing a considerable market for global trade.

5. Importance for India

- India relies on the region for:
  - Nearly **70% of its crude oil imports**
  - Remittances from a large Indian workforce
- Initiatives such as the **India–Middle East–Europe Economic Corridor (IMEC)** and **I2U2** highlight India's increasing strategic footprint.

India's Evolving Approach to the Palestinian Issue

● 1947–1991: Support for Palestinian Self-Determination

- Driven by anti-colonial solidarity and alignment with Arab partners.
- India supported the **two-state solution** and formally recognised Palestine in **1988**.

● 1991–2014: Deepening Ties with Israel

- Full diplomatic relations with Israel were established in **1992**, reshaping India's West Asia policy.
- Defence and strategic cooperation expanded significantly.

● 2014–Present: De-Hyphenation Strategy

- India maintains **independent relationships** with Israel and Palestine.
- Visits by the Indian Prime Minister to **Israel (2017)** and **Palestine (2018)** reflect a balanced yet pragmatic approach.
- India continues to support a **sovereign Palestinian state**, even as strategic, technological, and security ties with Israel grow stronger.

This reflects what scholar **C. Raja Mohan** describes as India's shift from ideological foreign policy to **interest-based pragmatism**.

Geopolitical Significance of Key Locations in the Region

Location	Importance
Gaza	Mediterranean coastline; site of recurring conflict; governed by Palestinian Authority since 1993 (semi-autonomous).
West Bank	Territories divided under Oslo Accords into Areas A, B, and C; source of major political contention.
Golan Heights	Strategic plateau contested between Israel and Syria.
Sinai Peninsula	Geopolitical bridge between Africa and Asia; bounded by Suez Canal and Red Sea.
Jerusalem	Revered city for Jews, Christians, and Muslims; core issue in peace negotiations.

Conclusion

Keywords: Peace Diplomacy, Two-State Solution, Geopolitical Stability, Abraham Accords, Middle East Security

The Gaza Peace Summit reflects renewed international commitment to a diplomatic resolution of the conflict. While the 20-point plan provides a framework for reducing violence and rebuilding Gaza, it avoids addressing the long-standing political question of Palestinian statehood. For India, a stable Middle East is essential for energy security, diaspora welfare, and long-term connectivity initiatives. India's carefully balanced posture—grounded in principles and practical interests—will remain central as regional and great-power dynamics continue to evolve.

MAINS PRACTICE QUESTION

"Critically examine the implications of the recent Gaza Peace Summit for regional stability in West Asia. How should India balance its strategic interests with its long-standing position on the Palestinian issue?"

India–EFTA TEPA

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Bilateral/Regional Trade Agreements**
- **GS Paper III – Indian Economy, Trade Policy, Investment, Technology Transfer**
- **GS Paper II – Effect of Global Economic Groupings on India**

Introduction

The **India–European Free Trade Association (EFTA) Trade and Economic Partnership Agreement (TEPA)**—signed on **10 March 2024**—officially entered into force on **1 October 2025**. The agreement is historic for India as it uniquely combines **investment guarantees**, **employment creation**, and **market access**, marking one of the most ambitious FTAs India has concluded with a group of advanced economies.

Key Features of the TEPA

1. Large-Scale Capital Investment Commitments

- EFTA countries have pledged **USD 100 billion in investments over 15 years**, supporting India's **Make in India**and manufacturing ecosystem.
- This investment is projected to create **over one million direct jobs**, making TEPA India's first FTA with such explicit employment-linked assurances.

2. Enhanced Market Access for Goods

- Indian sectors—**machinery, chemicals, textiles, processed food, and engineering products**—gain improved access to the high-income EFTA markets.
- EFTA has offered concessions on **92.2% of tariff lines**, covering **99.6% of India's exports** to the bloc.
- This reduces compliance burdens and enhances India's export competitiveness.

3. Breakthrough in Services and Labour Mobility

- TEPA is India's first FTA with strong provisions on **Mutual Recognition Agreements (MRAs)** in regulated professions such as:
  - Nursing
  - Architecture
  - Chartered accountancy
- This will help Indian professionals secure easier recognition of qualifications.
- Better access across:
  - **Mode 1 (Cross-border digital services)**
  - **Mode 3 (Commercial presence)**
  - **Mode 4 (Temporary movement of professionals)**

4. Balanced Intellectual Property Rights Framework

- TEPA keeps IPR standards aligned with **TRIPS**, respecting India's need to protect access to **generic medicines**.
- Provisions prevent "**evergreening**" of patents, safeguarding India's pharma interests.

5. Sustainability and Trade Facilitation

- Agreement promotes transparency, harmonisation of procedures, and simplified trade frameworks.
- Encourages adoption of sustainable standards and inclusive development.

6. Technology Transfer and Collaboration

- EFTA—home to advanced technology clusters—offers India collaboration in:
  - Precision engineering
  - Renewable energy
  - Biotechnology
  - Medical research
  - Advanced R&D and innovation ecosystems

7. Strengthening India's Global Negotiating Profile

- TEPA positions India as an equal negotiating partner with advanced economies, strengthening credibility in future trade talks.

About EFTA

- Established in **1960** to promote free trade and economic integration.
- Members: **Iceland, Liechtenstein, Norway, Switzerland** – all in the **Schengen Area**, but outside the EU.
- Combined GDP exceeds **USD 1 trillion**, with a population of around **13 million**.
- India is EFTA's **fifth-largest trading partner** after the EU, USA, UK, and China.
- Among EFTA states, **Switzerland** is India's largest trading partner, followed by **Norway**.

Challenges and Limitations of TEPA

1. Limited Gains in Goods Trade for India

- India may not see major benefits in goods trade because:
  - EFTA tariffs are already low.

- Many Indian exports enjoyed prior duty-free access.

2. Trade Imbalance Remains Significant

- FY 2024–25 data:
  - **India's exports to EFTA**: USD **1.97 billion**
  - **Imports from EFTA**: USD **22.44 billion**
- TEPA may deepen this asymmetry without Indian efforts to strengthen its own export capacity.

3. Agricultural Barriers Persist

- Several politically sensitive agricultural products—including **dairy, soya, and coal**—are excluded.
- Switzerland's stringent quality and phytosanitary standards complicate India's market access.

4. Investment Limitations

- TEPA excludes participation from **pension funds and sovereign wealth funds**, limiting the scale of potential long-term capital inflows.

Strategic and Economic Significance for India

1. **Economic Diversification:** TEPA helps India diversify its export markets beyond the US and EU.
2. **Technology and R&D Leap:** EFTA states—especially Switzerland—are innovation leaders, offering India potential for cutting-edge technology absorption.
3. **Global Credibility:** Helps India position itself as a **trusted partner in resilient supply chains**, aligning with global realignment trends.
4. **Boost to Manufacturing and Employment:** Mandatory investment and job creation targets make TEPA a tool for domestic industrial transformation.
5. **Strengthening Economic Ties with Non-EU Europe:** Provides a robust alternative to India–EU FTA negotiations, which have been delayed for years.

Way Forward

1. **Enhancing India's Export Competitiveness:** Focus on quality, certification, and supply chain capabilities to fully utilise EFTA market access.
2. **Deepening Services Sector Engagement:** Leverage MRAs to expand Indian professional footprint in high-skill EFTA economies.
3. **Encouraging High-Tech Investments:** Create favourable regulatory frameworks for Swiss and Norwegian firms to establish innovation centres in India.
4. **Negotiating Access for Sensitive Sectors:** Continue dialogue to reduce non-tariff barriers in agriculture and processed food exports.
5. **Aligning with Global Sustainability Standards:**Meet EFTA's advanced environmental and labour standards to ensure long-term export viability.

Conclusion

Keywords: Free Trade Agreement, Technology Transfer, Market Access, Investment Commitments, Sustainable Trade

The India–EFTA TEPA marks a **transformational milestone** in India's trade diplomacy. It blends investment guarantees, employment generation, and technology collaboration—areas traditionally absent in earlier FTAs. While challenges remain, particularly regarding trade imbalances and agricultural access, TEPA positions India strategically in a shifting global economy and sets a new template for future trade agreements.

MAINS PRACTICE QUESTION

"TEPA has been described as the most forward-looking trade agreement India has signed with a developed-country grouping. Critically evaluate its potential benefits and limitations for India's economy."

India–ASEAN Summit

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Regional Groupings, India and Its Neighbourhood**
- **GS Paper II – Bilateral/Multilateral Engagements, Act East Policy**
- **GS Paper III – Maritime Security, Blue Economy, Regional Connectivity**

Introduction

The **47th ASEAN Summit**, held in **Kuala Lumpur, Malaysia**, under the theme *"Inclusivity and Sustainability"*, marked a significant phase in Southeast Asia's political and economic landscape. The summit also hosted the **22nd ASEAN–India Annual Summit**, reaffirming India's Act East Policy and underscoring the expanding strategic partnership between India and the ASEAN region.

Key Outcomes of the 47th ASEAN Summit

1. Expansion of ASEAN Membership

- **Timor-Leste** was formally admitted as **ASEAN's 11th member**, reflecting the grouping's commitment to regional inclusion and integration.
- The expansion strengthens ASEAN's political geography and reinforces its ambition for a cohesive Southeast Asia.

2. Kuala Lumpur Accord: Thailand–Cambodia Ceasefire

- A major diplomatic achievement was the signing of a **joint ceasefire agreement** between Thailand and Cambodia.
- The Accord aims to prevent border clashes, improve bilateral trust, and contribute to broader regional stability.

3. Twice-Yearly ASEAN Summits

- The summit reiterated ASEAN's established practice of convening **two summits annually**, hosted by the country holding the **ASEAN Chairmanship**.
- This maintains institutional continuity and coordinated responses to emerging challenges.

Highlights of the 22nd ASEAN–India Annual Summit

1. Strengthening Maritime Cooperation

- The year **2026** has been declared the **ASEAN–India Year of Maritime Cooperation**, underscoring shared concerns regarding:
  - Freedom of navigation
  - Maritime security
  - Blue economy development
  - Disaster risk management
- India reaffirmed support for **ASEAN Centrality** in the Indo-Pacific, aligning with frameworks such as **AOIP (ASEAN Outlook on the Indo-Pacific)** and India's **Act East Policy**.

2. Advancing Sustainable Tourism

- Adoption of the **ASEAN–India Joint Leaders' Statement on Sustainable Tourism**, promoting:
  - Cultural exchanges
  - Eco-friendly tourism projects
  - Community-based tourism models
  - Digital platforms for travel management
- This initiative aligns with India's push for green tourism and ASEAN's recovery post-pandemic.

3. Plan of Action: 2026–2030

- India extended strong support for implementation of the **ASEAN–India Plan of Action (2026–2030)** to operationalise the **ASEAN–India Comprehensive Strategic Partnership**.
- Key focus areas include:
  - Digital transformation
  - Trade facilitation
  - Connectivity initiatives such as the **India–Myanmar–Thailand Trilateral Highway**
  - Education and skill development
  - Climate resilience and renewable energy cooperation

Broader Significance of ASEAN for India

1. Strategic Centrality in the Indo-Pacific

- ASEAN's geography links the Indian Ocean and Pacific Ocean, making it vital for safeguarding India's maritime interests.

2. Economic Partnership

- ASEAN is one of India's largest trading partners with bilateral trade crossing **USD 110 billion**, supported by agreements like **AIFTA** (ASEAN–India FTA).

3. Connectivity and Infrastructure

- Projects such as:
  - **Trilateral Highway**
  - **Kaladan Multimodal Transit Transport Project**

  strengthen India's physical and economic integration with Southeast Asia.

4. Security and Defence Cooperation

- Collaboration in:
  - Anti-piracy
  - HADR (Humanitarian Assistance and Disaster Relief)
  - Counterterrorism
    supports regional stability.

5. Cultural and Civilisational Ties

- ASEAN and India share deep cultural linkages, visible in Buddhism, maritime history, and diaspora connections.

Contemporary Relevance

- ASEAN remains a pivot of the emerging multipolar Indo-Pacific order.
- India's close engagement ensures balanced regional power dynamics, especially against the backdrop of China's assertiveness in the South China Sea.
- Cooperation in digital economy, green transitions, and resilient supply chains is becoming increasingly important amid global disruptions.

Conclusion

Keywords: ASEAN Centrality, Act East Policy, Maritime Cooperation, Strategic Partnership, Indo-Pacific

The 47th ASEAN Summit and the subsequent ASEAN–India engagement represent renewed momentum in India's outreach to Southeast Asia. With ASEAN expanding to 11 members, prioritising sustainability, and focusing on conflict resolution, India's partnership with the region has gained additional strategic depth. Going forward, sustained cooperation in maritime security, connectivity, digital innovation, and sustainable development will be crucial to shaping a stable and prosperous Indo-Pacific.

MAINS PRACTICE QUESTION

"Discuss the significance of ASEAN in India's Act East Policy. How do recent developments at the 47th ASEAN Summit enhance India–ASEAN strategic cooperation?"

EU–India Strategic Agenda

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Bilateral Agreements, India and the Developed World**
- **GS Paper III – Science & Tech, Defence, Energy Security, Trade & Investment**
- **GS Paper II – Diaspora, Migration and Mobility**

Introduction

India and the United Kingdom recently released a comprehensive **Joint Statement** during the UK Prime Minister's visit to India, marking a major step forward in bolstering economic, technological, defence, and climate cooperation. The engagement reflects the momentum of the **2030 Roadmap for India–UK Strategic Partnership**, which seeks to modernise bilateral relations across multiple domains.

Key Highlights of the Joint Statement
1. Technology and Innovation Cooperation

Both sides celebrated significant breakthroughs in critical and emerging technologies under the **Technology Security Initiative (TSI)**.

a. Cutting-Edge Telecommunications and Digital Infrastructure

- Establishment of a **Connectivity & Innovation Centre** to advance:
  - **AI-native 6G networks**
  - **Non-Terrestrial Networks (NTNs)**
  - **Telecom cybersecurity solutions**
- Supported by **joint funding of at least £24 million** aimed at developing resilient and secure telecom ecosystems.

b. Responsible Artificial Intelligence

- Launch of a **Joint Centre for AI** focusing on:
  - Climate solutions
  - FinTech
  - BioTech

  - Healthcare innovation
- Prioritises **ethical and responsible AI deployment**, aligning with global AI governance norms.

c. Critical Minerals Collaboration

- Announcement of **Phase 2** of the UK–India **Critical Minerals Supply Chain Observatory**.
- Expanded mineral coverage and a **new satellite campus at IIT-ISM Dhanbad**, supporting India's resource security and clean-energy ambitions.

2. Trade and Investment

a. Resetting of JETCO

- India and the UK agreed to "reset" the **Joint Economic and Trade Committee (JETCO)**.
- JETCO will serve as the institutional mechanism to oversee and leverage the **Comprehensive Economic and Trade Agreement (CETA)** currently under negotiation.

b. Investment Flows and Market Access

- Both sides acknowledged progress made in diversifying bilateral trade and enabling greater cross-border investment, especially in financial services, technology, and manufacturing.

3. Defence and Maritime Security

a. Indo-Pacific Cooperation

- India and the UK committed to deeper coordination in the **Indo-Pacific**, recognising shared interests in maintaining a **free, open, and rules-based maritime order**.

b. Regional Maritime Security Centre of Excellence

- Agreement to establish an **RMSCE** under the **Indo-Pacific Oceans Initiative (IPOI)**.
- The centre will enhance:
  - Maritime domain awareness
  - Counter-piracy operations
  - Capacity-building among regional partner countries

4. Education, Migration, and People-to-People Ties

a. Migration and Mobility Partnership

- Both countries reaffirmed their commitment to the **Migration and Mobility Partnership**, which encourages:
  - **Legal migration pathways**
  - Facilitated movement for students and professionals
  - Steps to curb irregular and unlawful migration

b. Internationalisation of Higher Education

- India approved the establishment of **Queen's University Belfast** and **Coventry University** campuses in **GIFT City**, marking a milestone in cross-border education collaboration.

5. Climate, Energy, and Sustainable Development

a. Joint Climate Tech Start-up Fund

- India and the UK announced co-investment in a **Climate Tech Start-up Fund** aimed at scaling innovation in:
  - Carbon mitigation
  - AI-enabled climate solutions
  - Renewable energy technologies

b. Energy Transition Partnerships

- Both sides reaffirmed cooperation through:
  - **Offshore Wind Taskforce**, promoting large-scale renewable energy integration
  - **Global Clean Power Alliance (GCPA)**, enhancing global green-energy collaboration

This aligns with India's renewable energy trajectory and the UK's global commitments under COP frameworks.

Broader Significance of India–UK Partnership

1. **Strategic Convergence:** Both nations share democratic values and support a **rules-based international order**, especially in the Indo-Pacific.
2. **Technological Alliances for the Future:** Collaboration in AI, critical minerals, and 6G will play a central role in shaping future industrial growth.
3. **Economic Complementarities:** India's rising manufacturing ecosystem and UK's advanced R&D capabilities create synergies for innovation-led growth.
4. **People-to-People Linkages:** A 1.7-million strong Indian diaspora in the UK remains central to cultural and economic partnerships.

Conclusion

Keywords: Strategic Partnership, Indo-Pacific, Technology Security, Climate Cooperation, Migration Framework

The India–UK Joint Statement reflects a **modern, multifaceted strategic partnership** built on shared interests in technology, trade, defence, and sustainable development. As both countries navigate complex global transitions, the convergence in innovation, maritime security, critical minerals, and climate tech positions the relationship as a forward-looking anchor in the evolving Indo-Pacific and global landscape.

MAINS PRACTICE QUESTION

"Examine the strategic significance of the recent India–UK Joint Statement. How do emerging areas of cooperation such as technology, critical minerals, and maritime security redefine their bilateral partnership?"

India–Mongolia Relations

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Bilateral/Regional Groupings, India–EU Relations**
- **GS Paper III – Economy, Trade Agreements, Technology & Security**
- **GS Paper II – Global Governance, Multilateralism**

Introduction

The European Council has formally endorsed a new **EU–India Strategic Agenda**, setting a forward-looking framework for cooperation based on five priority pillars. These pillars seek to respond to the evolving geopolitical environment, global economic disruptions, and the strategic convergence between Europe and India. The agenda lays the foundation for deepened collaboration in trade, technology, security, connectivity, and institutional capacity-building.

Priority Pillars of the EU–India Strategic Agenda

1. Prosperity and Sustainability

This pillar focuses on building **resilient, inclusive, and sustainable economic growth**.

Key Components

- **Trade Expansion:**
  Finalising the **India–EU Free Trade Agreement (FTA)** and concluding the **Investment Protection Agreement (IPA)** remain central goals.
- **Supply Chain Resilience:**
  Joint focus on securing diversified and sustainable supply chains for critical materials and industrial goods.
- **Green Transition:**
  Cooperation on **decarbonisation**, climate finance, circular economy models, and sustainable infrastructure aligns with both the European Green Deal and India's net-zero ambitions.

Significance

- Enhances India's export competitiveness.
- Supports Europe's need for reliable partners beyond China.

2. Technology and Innovation

This pillar underscores the increasing importance of **digital transformation** and advanced technologies.

Key Focus Areas

- Collaboration on **critical and emerging technologies** such as AI, quantum computing, 5G/6G networks, semiconductors, space technologies, and cybersecurity.
- Strengthened engagement under the **EU–India Trade and Technology Council (TTC)**.

- Enhanced research partnerships through **Horizon Europe**, enabling Indian institutions and innovators to collaborate with leading European research centres.

Strategic Relevance

- Reduces technological dependency on authoritarian digital ecosystems.
- Advances secure, interoperable digital infrastructures aligned with democratic values.

3. Security and Defence Cooperation

Amid growing geopolitical competition and regional instability, this pillar aims to strengthen India–EU coordination in global security.

Major Areas of Cooperation

- Joint initiatives in the **Indo-Pacific**, including maritime domain awareness and support for a **rules-based maritime order**.
- Cooperation to counter hybrid threats, cyberattacks, terrorism, and disinformation.
- Collaboration in defence supply chains and emerging security technologies.

Broader Impact

This strengthens Europe's engagement in the Indo-Pacific and complements India's broader partnerships with like-minded democracies.

4. Connectivity and Global Issues

This pillar strengthens collaboration on regional and global connectivity initiatives.

Highlights

- Support for major connectivity frameworks such as:
  - **India–Middle East–Europe Economic Corridor (IMEC)**
  - **Global Gateway Initiative**
- Promotion of high-standard, sustainable infrastructure development in third countries.
- Cooperation in multilateral spaces such as the **UN**, **G20**, and global climate forums.

Strategic Importance

- Offers an alternative to China's Belt and Road Initiative.
- Enhances India's role as a major connectivity partner across Eurasia, Africa, and the Indo-Pacific.

5. Enablers Across All Pillars

To support the effective implementation of the four pillars, several cross-cutting enablers have been identified.

Key Enablers

- **Skills mobility agreements**, facilitating movement of students, researchers, and skilled professionals.
- **Knowledge sharing and institutional partnerships** between think tanks, universities, and industrial clusters.
- **Business-to-business (B2B) engagement** to foster innovation, market access, and technology transfer.
- Enhanced administrative coordination for smooth implementation of sectoral initiatives.

Why It Matters: These enablers provide the institutional scaffolding necessary for long-term, stable cooperation.

Broader Geopolitical Relevance

Dimension	Context
Strategic Autonomy	India and the EU both seek diversified partnerships in an era of great-power competition.
Economic Diversification	Europe aims to reduce dependence on China; India seeks stronger access to high-value markets.
Climate Leadership	Cooperation aligns both parties toward global climate action.
Technology Governance	Shared democratic norms help shape global digital standards.

Conclusion

Keywords: Strategic Agenda, Connectivity, Technology Governance, Indo-Pacific, Multilateral Cooperation

The EU–India Strategic Agenda marks a critical milestone in broadening and deepening the partnership between two major democratic actors. With comprehensive pillars covering trade, technology, security, connectivity, and institutional cooperation, the agenda strengthens the foundation for a resilient and future-ready relationship. As the global order undergoes rapid transitions, an ambitious and aligned EU–India partnership will play a vital role in shaping stable, sustainable, and equitable global governance.

MAINS PRACTICE QUESTION

"Critically analyse the five priority pillars of the new EU–India Strategic Agenda. How can this framework strengthen India's strategic and economic positioning in a rapidly changing geopolitical landscape?"

India–Mongolia Relations

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, India and Its Neighbourhood-Extended, Bilateral Agreements**
- **GS Paper II – Global Groupings, Multilateral Engagements, Cultural Diplomacy**
- **GS Paper III – Energy Security, Mineral Resources, Strategic Minerals**

Introduction

India and Mongolia recently commemorated the **10th anniversary of their Strategic Partnership**, marked by the visit of the Mongolian President to India. The milestone was accompanied by a set of important MoUs covering development financing, cultural cooperation, spiritual ties, and emerging areas such as critical minerals and resilient supply chains. The visit reinforces the long-standing civilisational bonds rooted in Buddhism and reflects growing convergence in geopolitical and economic interests.

Major MoUs and Areas of Cooperation

1. Development Cooperation

- Both countries reaffirmed their strong commitment to the **Mongol Oil Refinery Project**, one of the largest development projects undertaken by India abroad.
- The refinery is being constructed through a **USD 1.7 billion Line of Credit (LoC)** from India, aimed at strengthening Mongolia's energy independence and reducing its reliance on fuel imports from neighbouring countries.

2. Cultural Cooperation

- An MoU was signed between the **Ladakh Autonomous Hill Development Council (LAHDC)** and Mongolia's **Arkhangai Province**.
- This partnership promotes cooperation in tourism, cultural exchanges, education, and preservation of Himalayan and Mongolian heritage.

3. Spiritual and Buddhist Diplomacy

India announced several landmark initiatives:

- Sending holy relics of **Sariputra and Maudgalyayana**, the chief disciples of Lord Buddha, to Mongolia—deepening Buddhist civilisational ties.
- Supporting the **digitisation of around 1 million ancient Buddhist manuscripts**, preserving shared heritage.
- Strengthening the institutional connect between **Nalanda University** (India) and **Gandan Monastery** (Mongolia), enabling research collaboration and spiritual exchanges.

These initiatives highlight India's use of **soft power** and **Buddhist diplomacy**, a concept emphasised by foreign policy thinkers like Joseph Nye.

4. Strengthening People-to-People Connectivity

- India has extended **free e-visa facilities** to Mongolian citizens, promoting tourism, education, and cultural travel.

5. Trade, Energy, and Economic Engagement

- Both countries discussed expanding trade and exploring **third-country port access**, given Mongolia's landlocked geography.
- Cooperation in **uranium, resilient supply chains, and critical minerals** was identified as a major future area—particularly relevant for India's clean energy transition.
- Mongolia possesses significant deposits of **coking coal**, critical for India's steel industry.

Significance of Mongolia for India

1. Strategic and Geopolitical Importance

- Mongolia's location between Russia and China positions it as a strategic partner in India's broader **"Neighbourhood First"** and **"Act East"** policies.
- As a democratic nation in Northeast Asia, Mongolia contributes to a **balanced regional order** and supports India's vision for a **free, open, and rules-based Indo-Pacific**.

2. Diplomatic and Multilateral Convergence

- Mongolia supports India in various international platforms, including the **UN**, and both countries coordinate positions on development, democracy, and global governance reforms.
- The partnership helps India strengthen its outreach in the **Eurasian region**.

3. Economic and Resource Security

- Mongolia's abundant reserves of:
  - **coking coal**,
  - **uranium**, and
  - **critical minerals**

  make it a valuable partner for India's industrial growth and energy security.

4. Civilisational and Cultural Bond

- Buddhism forms the foundation of India–Mongolia relations, deeply influencing people-to-people goodwill and diplomatic cooperation.

Contemporary Relevance

Dimension	Significance
Energy Security	Mongol refinery project aids Mongolia's self-reliance; India gains strategic goodwill.
Critical Minerals	Supports India's clean-tech supply chain diversification amidst global shortages.
Geo-Strategy	Helps India engage more deeply in Northeast and Central Asia.
Soft Power	Buddhist diplomacy enhances India's cultural influence.
Connectivity	Third-country port access discussions address Mongolia's landlocked constraints.

Conclusion

Keywords: Strategic Partnership, Buddhist Diplomacy, Critical Minerals, Development Cooperation, Soft Power

India–Mongolia relations have entered a deeper and more strategic phase as both nations celebrate a decade of elevated partnership. With expanding cooperation across development finance, culture, energy, and strategic minerals, the relationship now spans both traditional and emerging sectors. Anchored in civilisational warmth and guided by converging geopolitical interests, the India–Mongolia partnership is well-positioned to play a meaningful role in the evolving Asian and global landscape.

MAINS PRACTICE QUESTION

"Discuss the strategic significance of Mongolia for India. How do recent developments in the 10th anniversary of the India–Mongolia Strategic Partnership deepen their economic, cultural, and geopolitical cooperation?"

Sevilla Forum on Global Debt

📌 **Syllabus Mapping:**

- **GS Paper II – International Institutions, UN Bodies, Global Governance**
- **GS Paper III – Economy, External Sector, Global Financial Architecture, SDGs**
- **GS Paper II – Effect of International Developments on Indian Interests**

Introduction

The **16th session of the United Nations Conference on Trade and Development (UNCTAD16)** witnessed the launch of the **Sevilla Forum on Debt**, a landmark initiative aimed at addressing the deepening global debt distress faced by developing nations. The forum forms part of broader international efforts to reform global financing mechanisms and ensure sustainable development pathways in the Global South.

What is the Sevilla Forum on Debt?

1. Leadership and Institutional Support

- Led by **Spain**, with substantive support from:
  - **UNCTAD**
  - **UN Department of Economic and Social Affairs (UN DESA)**
- The forum's objective is to consolidate diverse stakeholders—**creditors, debtor nations, financial institutions, and global academia**—to develop shared solutions on **debt sustainability, management, and innovative restructuring mechanisms**.

2. Link to the Fourth International Conference on Financing for Development (FfD4)

- The forum is a major outcome of **FfD4**, which emphasised the urgency of restructuring global financial systems in favour of developing countries.
- It is an integral part of the **Sevilla Platform for Action**, aimed at reforming global financial governance.

3. Complementary Initiatives under the Sevilla Platform: The platform includes four major outcomes, with the Forum being one of them:

a. **Debt Swaps for Development Hub:** Mechanism allowing developing countries to swap existing debt for investments in SDGs such as education, climate resilience, women empowerment.
b. **Debt-for-Development Swap Programme:** Empowers countries to convert debt liabilities into targeted development spending.
c. **Debt "Pause Clause" Alliance:** A contingency framework that temporarily suspends debt repayments during natural disasters, pandemics, or economic crises.
d. **Sevilla Forum on Debt:** Ensures ongoing dialogue on structural debt challenges and coordinates between key actors to enable timely restructuring.

4. Link to the Sevilla Commitment

- The forum supports the implementation of the **Sevilla Commitment**, an intergovernmentally agreed financing framework aimed at closing the **USD 4 trillion annual SDG financing gap**.
- It is the first major financing-for-development agreement since the **Addis Ababa Action Agenda (2015)**.

Understanding the Global Debt Crisis

1. Unprecedented Scale of the Crisis

- **Global public debt reached USD 102 trillion in 2024**, rising sharply due to post-pandemic recovery costs, global inflation, and high interest rates.
- Developing nations collectively owe **USD 31 trillion**, with limited fiscal space to service obligations.

2. Heavy Debt Service Burden

- Developing countries spend **USD 1.4 trillion annually** just on debt servicing, diverting scarce resources from essential development priorities.

3. Human Development Consequences

- Over **3.4 billion people** live in countries spending more on **debt repayments than on health or education**.
- This exacerbates inequality, slows poverty reduction, and widens socio-economic gaps.

4. Structural Challenges

- Rising global interest rates
- Dollar-denominated debt vulnerabilities
- Fragmented creditor landscape (traditional donors, private creditors, China-led institutions)
- Lack of coordinated debt resolution mechanisms

Economist **Joseph Stiglitz** has repeatedly warned that the global financial architecture is "*biased against developing countries, leading to debt traps and stalled development*"—a concern the Sevilla Forum seeks to address.

Why the Sevilla Forum Matters

1. **Inclusive Global Dialogue:** Unlike traditional debt discussions dominated by a few institutions (WB, IMF, Paris Club), the forum brings **all stakeholders** to the table.
2. **Focus on Development-Centric Debt Management:** Prioritises SDG-linked relief mechanisms rather than austerity-driven conditionalities.
3. **A Pathway for Systemic Reform:** Can contribute towards a more equitable global financial governance structure, especially for the Global South.
4. **Disaster-Responsive Debt Framework:** 'Pause Clauses' offer crucial flexibility for climate-vulnerable nations, especially small island developing states (SIDS).
5. **Complementing Multilateral Efforts:** Supports other global mechanisms such as:

- G20 Common Framework on Debt
- Paris Summit for New Global Financing Pact
- UN-led SDG financing negotiations

Relevance for India

1. **Strengthening Global South Solidarity:** India has consistently championed the concerns of heavily indebted developing nations, including during its **G20 Presidency**.
2. **Opportunity to Shape New Global Financing Norms:** Participation in the Sevilla process allows India to influence reforms aligned with its vision for inclusive development.
3. **Commercial Opportunities:** India's expanding development financing and Lines of Credit can align with new debt swap models.

Conclusion

Keywords: Debt Sustainability, Global South, SDG Financing Gap, Financial Architecture Reform, UNCTAD

The Sevilla Forum on Debt marks a significant step toward rethinking global debt governance at a time when developing countries face unprecedented economic stresses. By promoting inclusive stakeholder participation, encouraging development-linked debt relief, and aligning with the Sevilla Commitment's roadmap, the initiative strengthens global efforts to build a fairer and more sustainable financial architecture. In an era of mounting debt distress, such multilateral platforms are indispensable for enabling developing countries to invest in health, education, climate adaptation, and long-term growth.

MAINS PRACTICE QUESTION

"Assess the significance of the Sevilla Forum on Debt in addressing the global debt crisis. How can such multilateral initiatives support developing countries in achieving sustainable development goals?"

India at UNHRC

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, UN Bodies, Global Governance**
- **GS Paper II – Human Rights Mechanisms, India's Role in Multilateral Institutions**

Introduction

India has once again secured a seat on the **United Nations Human Rights Council (UNHRC)**—this time **unopposed**—for the term **2026–2028**. This marks India's **seventh election** to the Council, reaffirming its rising global stature and sustained role in international human rights discussions. The election reflects broad trust in India's diplomatic engagement and commitment to inclusive and democratic governance.

About the UN Human Rights Council (UNHRC)

1. Institutional Overview: The UNHRC is the premier **intergovernmental body** tasked with promoting and protecting human rights worldwide. It operates under the umbrella of the **United Nations system** and engages with governments, civil society, and independent experts.

2. Historical Genesis

- Created in **2006** by the **UN General Assembly**.
- Replaced the **Commission on Human Rights**, which had faced criticism for inefficiencies and politicisation.
- Intended to bring greater credibility, accountability, and universality to the UN's human rights mandate.

3. Membership Structure

- Comprises **47 member states**, elected by the **UN General Assembly** via secret ballot.
- Members serve **three-year terms** and cannot serve more than **two consecutive terms**.
- Seats are allocated on a regional basis to ensure balanced geographic representation.

4. Core Functions: The UNHRC undertakes several key responsibilities:

a. **Global Deliberation and Norm-Setting:** Provides an international platform for debates on human rights, emerging global concerns, and thematic issues.
b. **Adoption of Resolutions:** Passes resolutions addressing violations, condemning abuses, and guiding member states on human rights standards.
c. **Universal Periodic Review (UPR):** Conducts peer reviews of every UN member state's human rights records every 4.5 years.
d. **Special Procedures:** Mandates independent experts, working groups, and rapporteurs to investigate human rights situations worldwide.
e. **Emergency Sessions:** Convenes urgent meetings to respond to crises such as conflicts, humanitarian violations, and mass atrocities.

Significance of India's Election

1. **Recognition of India's Diplomatic Credibility:** Being elected unopposed signifies broad support for India's role in multilateral forums and trust in its ability to contribute constructively to global debates.
2. **Advancing India's Human Rights Leadership:** India's presence in the Council enables it to advocate:

- Democratic values
- Inclusive development
- Counter-radicalisation
- Gender equity
- Digital rights and data protection

3. Voice of the Global South

India acts as a bridge between developed and developing nations, amplifying the concerns of:

- Least Developed Countries (LDCs)
- Small Island Developing States (SIDS)
- Conflict-affected and resource-constrained economies

4. Opportunity to Shape International Norms

Membership provides India the platform to influence discussions on:

- Refugee rights
- Climate justice
- Technology and human rights
- Counterterrorism and human rights balance

5. Supporting India's Global Aspirations: As India advocates for UNSC reforms and stronger Global South representation, its membership in UNHRC adds credibility to its claims of responsible global leadership.

Broader Context and Contemporary Relevance

Dimension	Significance
Geopolitics	Human rights are central to global narratives; membership boosts India's strategic voice.
Soft Power	Aligns with India's democratic credentials and civilisational values.
Multilateral Engagement	Strengthens participation across UN bodies, complementing India's G20 leadership momentum.
Global South Issues	Enhances India's role in discussions on climate justice, inequality, and humanitarian crises.

Conclusion

Keywords: UNHRC, Multilateral Diplomacy, Global South, Human Rights Governance, India's Leadership

India's unopposed election to the UN Human Rights Council underscores its growing diplomatic influence and commitment to constructive global engagement. As the world navigates complex human rights challenges—from digital surveillance to conflict-driven humanitarian crises—India's role within the Council will be crucial in promoting balanced, development-oriented, and inclusive global norms. This membership also reinforces India's aspiration to shape a fairer and more representative global governance architecture.

MAINS PRACTICE QUESTION

"What is the significance of India's election to the UN Human Rights Council for the 2026–28 term? Analyse how India can leverage this position to strengthen its global leadership on human rights and multilateral governance."

UN Cybercrime Convention

📌 **Syllabus Mapping:**

- **GS Paper II – International Relations, Multilateral Treaties, UN Bodies**
- **GS Paper III – Internal Security: Cybersecurity, Cyber Laws, Emerging Technologies**
- **GS Paper II – Global Governance & Multilateral Institutions**

Introduction

A major milestone in global cyber governance was reached when **72 out of 193 UN member states** signed the **United Nations Convention Against Cybercrime** in Hanoi. This is the world's first universally negotiated and legally binding treaty aimed at addressing cybercrime and enabling cross-border cooperation through a common evidentiary and enforcement framework. Notably, **India has not signed the treaty yet**, reflecting its cautious stance on sovereignty and digital governance.

About the UN Convention Against Cybercrime

1. Adoption and Entry into Force

- Adopted by the **UN General Assembly on 24 December 2024**.
- Will come into force **90 days after the 40th state ratifies** it.
- Signing is open **until 31 December 2026**.
- Negotiations were supported by the **UN Office on Drugs and Crime (UNODC)**.

2. Nature of the Convention

This is the **first global treaty** covering:

- Collection of **electronic evidence**
- Standards for cross-border data sharing
- A unified approach to investigating and prosecuting cybercrimes

It aims to harmonise digital criminal laws and strengthen cooperative enforcement mechanisms across jurisdictions.

Context: Budapest Convention vs. New UN Convention

Budapest Convention on Cybercrime (2001)

- First international treaty on cybercrime, led by the **Council of Europe**.
- Many countries including **India, Russia, and China** refused to sign it due to sovereignty concerns and unilateral data-sharing requirements.

Why a New Treaty?

Countries like Russia and China argued for:

- A **UN-led, universally negotiated** treaty
- Stronger emphasis on **state sovereignty**
- Equal decision-making for all UN members

The new convention accommodates these demands.

Key Features of the UN Convention Against Cybercrime

1. Expanded List of Offences

The convention covers both **cyber-dependent** and **cyber-enabled** crimes, including:

- Hacking, malware attacks, denial-of-service
- Online financial fraud
- Child sexual exploitation and grooming
- Non-consensual sharing of intimate images
- Identity theft, impersonation-based crimes

2. International Cooperation Mechanisms

- Establishes a **24×7 international assistance network**.
- Enables expedited sharing of electronic evidence.
- Provides guidelines for joint investigations and information exchange.

3. Protection of National Sovereignty

States must implement obligations **in line with sovereign equality and territorial integrity**, ensuring:

- Non-interference in domestic affairs
- Respect for national cybersecurity frameworks
- Domestic control over data requests

This was a central demand from developing nations.

4. Victim-Centric Approach

Encourages states to ensure:

- Access to recovery and rehabilitation services
- Compensation and restitution mechanisms
- Removal of illegal or harmful online content

Implementation is based on each nation’s domestic law.

5. Human Rights Safeguards

Ensures compliance with:

- International human rights law
- Right to privacy
- Freedom of expression
- Due process and fair trial guarantees

This prevents misuse of the convention for digital surveillance or political repression.

Significance of the Convention

1. Strengthening Multilateral Cyber Governance: The convention reflects a renewed global commitment to **multilateral diplomacy**, especially at a time of increasing geopolitical digital fragmentation.

2. Addressing Global Cyber Threats: With global cybercrime costs projected to reach **USD 10.5 trillion by 2025**, a universal framework is essential to ensure coordinated action against:

- Ransomware networks
- Deepfake-driven fraud
- AI-enabled attacks
- Cross-border data theft

3. Supporting Developing Countries: Countries in the **Global South** often lack:

- Cyber forensic capabilities
- Trained law enforcement
- Technical infrastructure

The convention promotes:

- Capacity building
- Technical assistance
- Digital resilience frameworks

4. Regulation of New-Age Threats: Provides an institutional foundation to address:

- AI-generated disinformation
- Synthetic media frauds
- Attacks on critical infrastructure
- Digital terrorism financing networks

Conclusion

Keywords: Cyber Governance, Multilateral Treaty, Digital Sovereignty, Electronic Evidence, UNODC

The UN Cybercrime Convention marks a significant step in building a unified, rules-based global digital order. Its effectiveness will depend on inclusive implementation, preventing misuse under the guise of national security, and ensuring adequate support for developing nations. For India, the decision to sign will require balancing **strategic autonomy, cyber sovereignty, privacy norms, and international cooperation** in an evolving digital ecosystem.

MAINS PRACTICE QUESTION

"Discuss the significance of the UN Convention Against Cybercrime in strengthening global cyber governance. What factors should guide India's approach towards signing or not signing the treaty?"

INTERNAL SECURITY & DEFENCE

Left-Wing Extremism: Trends & Strategy

📌 **Syllabus Mapping:**

- **GS Paper III – Internal Security, Left-Wing Extremism, Role of Security Agencies**
- **GS Paper II – Governance, Welfare Schemes, Rights of Tribals**
- **GS Paper I – Post-Independence India (Insurgency Movements)**

Introduction

The Ministry of Home Affairs has reported a substantial contraction in **Left-Wing Extremism (LWE)**, with the number of the most affected districts shrinking from **six to three**—all located in **Chhattisgarh (Bijapur, Sukma, Narayanpur)**. States such as **Andhra Pradesh and Telangana** have now been delisted from the LWE-affected category, marking a decisive shift in India's long battle against Maoist insurgency. The government has set the ambitious target of **complete elimination of LWE by March 31, 2026**.

Understanding Left-Wing Extremism (LWE)

1. Nature and Ideology

- LWE—commonly known as **Naxalism**—is one of India's most persistent internal security challenges.
- Rooted in **socio-economic inequalities**, land alienation, and tribal marginalisation, the movement draws from **Maoist revolutionary ideology**.
- The goal is to **overthrow the Indian democratic state** and establish a classless, authoritarian Communist order through violence and propaganda.

2. Historical Background

- Originated in **Naxalbari (West Bengal)** in **1967**, spearheaded by Charu Majumdar and Kanu Sanyal.
- Expanded into what came to be known as the **"Red Corridor"**, covering:
  - Chhattisgarh
  - Jharkhand
  - Odisha
  - Maharashtra
  - Madhya Pradesh
  - Andhra Pradesh
  - Telangana
  - Kerala
  - West Bengal

3. Present Geographical Spread

- LWE-affected districts have reduced from **18 to 11**, with violence now concentrated mainly in a few pockets of Bastar region.

Threats Posed by LWE

1. Human Cost

- Between **2004 and 31 March 2025**, India lost **8,895 lives** to LWE-related incidents (MHA data).
- Victims include civilians, security personnel, and local tribal communities.

2. Destruction of Critical Infrastructure

- Maoist groups deliberately destroy:
  - **Schools**
  - **Roads and bridges**
  - **Rail tracks**
  - **Telecom towers**
  - **Health centres**
- The intent is to block development, maintain isolation, and preserve their control.

3. Subversion of Democratic Processes

- Maoist intimidation has historically prevented elections in certain areas.
  - Example: **Polling booths could not be set up in parts of Bijapur for 17 years**.

4. Economic and Psychological Impact

- Deterrence to investment, loss of employment opportunities, and persistent climate of fear.

Government Measures to Counter LWE

The government's strategy combines **Security**, **Development**, and **Rights-based Governance**, often summarised as a **holistic 3P approach: Police, Progress, and Participation**.

A. Developmental Interventions

1. Connectivity Expansion (3Cs: Road, Mobile & Financial)

- **Financial Inclusion**:
  - **1,000+ bank branches** and **900 ATMs** opened in the 30 most affected districts.
  - **5,900 Post Offices** with banking facilities established since 2014.

2. Education and Skill Development

- **178 EMRS (Eklavya Model Residential Schools)** operational.
- **48 ITIs** and **61 Skill Development Centres (SDCs)** functional in LWE districts.

3. Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (2024)

- Aims for complete saturation of basic amenities in **15,000+ tribal villages**, benefiting **1.5 crore people**.

4. Civic Action Programme (CAP)

- Builds trust between security forces and local communities through welfare activities.

B. Security Initiatives

1. SAMADHAN Framework (2017)

A comprehensive strategy covering:

- **Smart leadership**
- **Aggressive operations**
- **Motivation and training**
- **Actionable intelligence**
- **Dashboard-based monitoring**
- **Harnessing technology**
- **No access to financing**

2. Financial Choking of Maoist Networks

- **NIA** and **ED** invoked the **Prevention of Money Laundering Act (PMLA)** to dismantle funding channels and seize assets.

3. Strengthening Security Infrastructure

- Establishment of **Fortified Police Stations**, new battalions, and enhanced road mobility.
- Use of drones, satellite mapping, and surveillance technologies.

4. Surrender & Rehabilitation Policy

- Encourages militants to return to the mainstream with incentives, livelihood support, and skill training.

5. Protection of Local Rights

- Implementation of **PESA** and **Forest Rights Act (FRA)** to empower local tribal communities.

Way Forward

1. **Sustained Holistic Approach:** Continued integration of **security operations** with **developmental delivery** and **grassroots empowerment**.
2. **Strengthening Local Policing:** Recruitment of local youth, modernisation of police forces, and establishment of **Joint Command Centres**.
3. **Addressing Grievances:** Effective **grievance redressal mechanisms** and strict monitoring of land and forest rights.
4. **Judicial Strengthening:** Fast-tracking investigation, prosecution, and conviction of LWE-related crimes.

5. Countering Ideological Propaganda

- Promote awareness through community engagement, civil society participation, and digital campaigns.
- Strengthen **Civic Action Programmes** to build long-term trust.

Thinker **Amartya Sen's capability approach** reminds us that genuine development requires empowering communities with education, health, and rights—areas that directly counter the socio-economic roots of extremism.

Conclusion

Keywords: LWE Decline, Security-Development Strategy, SAMADHAN, Red Corridor Transformation, Tribal Empowerment

India's battle against LWE is entering its final and most decisive stage. The transformation from **"Red Corridors" to "Growth Corridors"** has been enabled by a multi-dimensional strategy that blends robust security operations with unprecedented development outreach and empowerment of tribal communities. By continuing this calibrated approach, India can secure durable peace, expand state presence, and ensure development dividends for the most marginalised regions long bypassed by governance.

MAINS PRACTICE QUESTION

"Left-Wing Extremism is no longer India's most significant internal security challenge, yet vulnerabilities remain. Discuss the factors behind the decline of LWE and suggest measures needed to ensure its complete elimination."

AFSPA & Security–Human Rights Balance

📌 **Syllabus Mapping:**

- **GS Paper III – Internal Security, Role of Armed Forces, Insurgency in North-East**
- **GS Paper II – Governance, Human Rights, Federal Relations**
- **GS Paper II – Judiciary & Constitutional Safeguards**

Introduction

The Ministry of Home Affairs has extended the **Armed Forces (Special Powers) Act, 1958 (AFSPA)** in parts of **Manipur, Nagaland, and Arunachal Pradesh** for another six months, citing persistent security concerns. While AFSPA has contributed significantly to stabilising insurgency-affected areas, its extended use has revived debates on human rights, accountability, and federalism.

About the Armed Forces (Special Powers) Act, 1958

1. Nature and Purpose

AFSPA is a special law granting **extraordinary operational powers** to the armed forces to act in areas officially declared as **"disturbed"**. The Act is intended to bolster civil administration in regions where public order is threatened by insurgency or violence.

2. Applicability

- In force in parts of **Nagaland, Assam, Manipur, Arunachal Pradesh**.
- Withdrawn from **Tripura (2015), Meghalaya (2018), Mizoram (1980s)**.
- A parallel version, the **Armed Forces (J&K) Special Powers Act, 1990**, continues in Jammu & Kashmir.

3. Legislative Framework

AFSPA, enacted by Parliament in 1958, builds upon colonial-era legislation such as the **Armed Forces Special Powers Ordinance, 1942**, giving the military enhanced authority during emergency situations.

Key Provisions of AFSPA

1. Declaration of Disturbed Area (Section 3)

- A State Governor, UT Administrator, or the Central Government may declare any region as "disturbed" if conditions require the **armed forces to support civil authorities**.

2. Special Powers Granted (Section 4)

- **Use of force** (including lethal force) against violators of law in disturbed areas.
- **Arrest without warrant** based on suspicion.

- **Entry and search** of premises without warrant.
- **Prohibition of assembly** of five or more persons.
- **Destruction of militant hideouts**, fortified positions, or arms dumps.

3. Immunity Clause (Section 6)

- Security personnel enjoy protection from prosecution for actions taken under AFSPA **without prior sanction of the Central Government**.

4. Custody Norms

- Arrested individuals must be handed over to the nearest police station **"with least possible delay."**

Judicial Pronouncements

1. **Naga People's Movement of Human Rights v. Union of India (1997):** Upheld AFSPA as **constitutionally valid**, but mandated safeguards including proportionality in use of force and periodic review of disturbed area declarations.
2. **EEVFAM v. Union of India (2016):** Stated that **immunity under Section 6 is not absolute**; allegations of excessive force must be investigated.
3. **Sebastian M. Hongray v. Union of India (1984):** Established accountability of security personnel even within AFSPA's framework.

Critical Evaluation of AFSPA

Arguments Supporting AFSPA

1. **National Security Imperatives:** Effective for tackling insurgencies in sensitive border regions (North-East, J&K).
2. **Rapid Response Capability:** Allows decisive action without procedural delays, especially in high-risk zones.
3. **Protection of Forces:** The sanction clause prevents **frivolous or politically motivated litigation** against armed personnel.
4. **Institutional Endorsement:** Supreme Court validation and parliamentary backing strengthen legitimacy.
5. **Proven Impact:** Reduction of insurgency in **Mizoram, Tripura**, and parts of the North-East demonstrates its operational effectiveness.

Arguments Against AFSPA

1. **Human Rights Violations:** Provisions on lethal force and immunity contradict **Articles 14, 21, and 22** of the Constitution.
2. **Culture of Impunity:** Section 6 hampers prosecution even in cases of alleged extrajudicial killings, torture, or abuse.
3. **Prolonged Militarisation:** Indefinite extensions normalise militarised governance, damaging trust between local communities and the state.
4. **Federal Concerns:** Central control over disturbed area declarations undermines **state autonomy** and sidelines state police.
5. **International Criticism:** AFSPA has frequently been questioned in international human rights forums, including under **UDHR**, **ICCPR**, and the **Convention Against Torture**.

Government Measures to Address LWE

To enhance legitimacy and reduce dependence on AFSPA, several reforms have been suggested by expert committees.

Key Committee Recommendations

1. **Jeevan Reddy Committee (2005):** Repeal AFSPA; incorporate essential provisions into the **UAPA, 1967**.
2. **Second Administrative Reforms Commission (2007):** Repeal AFSPA after broad consultations; strengthen civil governance.
3. **Santosh Hegde Commission (2013):** Investigate fake encounters and strengthen grievance mechanisms.
4. **Justice J.S. Verma Committee (2013):** In cases of **sexual violence**, armed personnel must be tried under ordinary criminal law.

Way Forward

1. Restrict and Rationalise Application

- Apply AFSPA only in **limited and clearly identified districts**, with periodic review.

2. Strengthening Accountability

- Amend immunity provisions to allow credible investigation into allegations of misconduct.
- Ensure all arrests meet **24-hour judicial production norms**.

3. Capacity Building of Local Police

- Improve state police training, equipment, and intelligence systems.
- Prioritise CRPF and state forces for regular law-and-order duties.

4. Human Rights and Counterinsurgency Balance

- Adopt Standard Operating Procedures (SOPs) that integrate **proportionality and minimum force**, in line with global norms.

5. Community Engagement

- Expand civic action programmes, local development initiatives, and confidence-building measures.

Thinker **Kautilya** in *Arthashastra* emphasised that internal security must always be balanced with **public welfare**, a principle equally relevant in modern counterinsurgency.

Conclusion

Keywords: AFSPA Reform, Human Rights Accountability, Disturbed Areas, Counterinsurgency Law, Federalism

AFSPA remains an important instrument for national security, especially in areas facing persistent insurgency. However, its continued application raises complex questions regarding rights, accountability, and the role of democratic oversight. A calibrated approach—strengthening civil governance, ensuring accountability, and reducing armed deployment—is essential to preserve both **security** and **constitutional values**.

MAINS PRACTICE QUESTION

"AFSPA is often described as necessary but controversial. Critically assess the Act in terms of security needs, constitutional safeguards, and human rights concerns. Suggest reforms for a balanced framework."

Mahi Banswara Atomic Project

📌 Syllabus Mapping

- **GS Paper III – Energy Security, Science & Technology, Infrastructure, Nuclear Power**
- **GS Paper II – Governance, Public Sector Undertakings, Strategic Sectors**
- **GS Paper I – Economic Development and Regional Growth**

Introduction

The foundation stone of the **Mahi Banswara Rajasthan Atomic Power Project (MBRAPP)** has been laid, marking a significant step toward India's long-term nuclear energy expansion plan. The project is a key component of India's strategy to enhance **clean, reliable, and indigenous** power capacity as part of its climate commitments and growing electricity demand.

1. Overview of the Mahi Banswara Atomic Power Project

a) Location

- Situated in **Banswara district, Rajasthan**, near the **Mahi Dam** on the **River Mahi**.
- The region provides adequate water resources and suitable geological conditions for reactor construction.

b) Installed Capacity

- Comprises **4 × 700 MWe Pressurised Heavy Water Reactors (PHWRs)**.
- These are **indigenously designed PHWRs**, forming the backbone of India's nuclear fleet.

c) Implementing Agency

- The project will be developed by **Anushakti Vidhyut Nigam (ASHVINI)**—a joint venture between:
  - **Nuclear Power Corporation of India Ltd. (NPCIL)**
  - **National Thermal Power Corporation (NTPC)**
    This partnership signals deeper PSU collaboration in strategic energy infrastructure.

d) Part of India's "Fleet Mode" Initiative

- India is constructing **10 identical 700 MW PHWRs** under fleet-mode.
- Uniform design, standardised procurement and construction processes reduce:
  - Cost overruns
  - Construction delays
  - Technological variations
- Fleet mode accelerates commissioning timelines and builds nuclear manufacturing ecosystems.

2. India's Nuclear Power Capacity: Current Status and Goals

a) Current Nuclear Fleet (as of January 2025)

- **24 reactors** across **7 nuclear power stations**.
- Total installed capacity: **8,180 MW**.

b) Expansion Target

- Government aims to raise capacity to **22,480 MW by 2031–32**.
- This aligns with India's clean-energy transition and efforts to diversify its non-fossil power portfolio.

c) Contribution to Electricity Mix

- Nuclear energy accounts for **3.61%** of India's electricity generation (2022–23).
- It is the **fifth-largest non-fossil source**, after:
  - Solar
  - Wind
  - Large hydro
  - Bio-energy

Given rising electricity demand and climate goals, nuclear energy is positioned as a dependable **baseload source**complementing renewables.

3. India's Three-Stage Nuclear Power Programme (NPP)

India's nuclear strategy—conceptualised by **Homi Bhabha**—is built around optimal utilisation of limited uranium and abundant thorium reserves.

Stage 1: Pressurised Heavy Water Reactors (PHWRs)

- Runs on **natural uranium** as fuel and **heavy water** as moderator.
- India is currently operating this stage successfully.
- PHWRs also produce plutonium as a by-product, necessary for Stage 2.

Stage 2: Fast Breeder Reactors (FBRs)

- Utilises **plutonium-based fuel** generated from Stage 1.
- Produces more fissile material than it consumes ("breeding").
- Key example: **Prototype Fast Breeder Reactor (PFBR)** at Kalpakkam.

Stage 3: Thorium-Based Reactors

- Uses **thorium-232**, abundant in India's monazite sands.
- Thorium is converted into **Uranium-233**, a fissile material.
- Will enable long-term energy security with domestically available thorium resources.

4. Significance of the Mahi Banswara Project

a) Strengthening Indigenous Nuclear Design

The deployment of 700 MWe PHWRs reflects:

- India's technological self-reliance
- Mature reactor manufacturing capabilities
- Expansion of the domestic nuclear supply chain

b) Enhancing Energy Security

Nuclear power provides:

- **Stable baseload electricity**
- Low-carbon energy contribution
- Reduced dependence on imported fossil fuels

c) Supporting Climate Commitments

Helps in achieving:

- **Net-zero by 2070**
- Gradual decarbonisation of India's power sector

d) Regional Development

Benefits to Rajasthan:

- Employment generation
- Industrial development
- Infrastructure upgrades
- Long-term economic activity around the project site

e) Boost to Fleet-Mode Deployment

This project supports scaling up India's nuclear manufacturing ecosystem through:

- Standardisation
- Lower costs
- Faster construction cycles

Conclusion

The **Mahi Banswara Rajasthan Atomic Power Project** represents a major milestone in India's nuclear expansion strategy. By leveraging indigenous PHWR technology, fleet-mode construction, and collaborative public-sector partnerships, India is advancing toward long-term **clean energy security**, strategic autonomy, and climate resilience. The project reinforces the vision of a robust nuclear infrastructure supporting India's transition to a low-carbon future.

Mains Practice Question

Discuss the significance of the Mahi Banswara Rajasthan Atomic Power Project in the context of India's nuclear energy expansion and its three-stage Nuclear Power Programme. How does the fleet-mode approach strengthen India's energy security?

ECONOMY

Internationalisation of the Rupee

📌 **Syllabus Mapping:**

- **GS Paper III – Indian Economy, External Sector, Currency Management, Financial Markets**
- **GS Paper II – International Economic Relations, Bilateral/Regional Trade Mechanisms**

Introduction

The Reserve Bank of India has introduced a set of new policy measures aimed at **widening the global use of the Indian Rupee (INR)** in trade, finance, and investment. The move is part of India's long-term objective of making the rupee a more widely accepted international currency, thereby reducing dependence on foreign exchange reserves and strengthening India's economic resilience.

What is Internationalisation of the Rupee?

Internationalisation refers to allowing the **Indian Rupee to be used for international trade and cross-border financial transactions**, enabling foreign entities to:

- Settle trade in rupees
- Raise loans in rupees
- Hold rupee-denominated assets
- Invest in Indian markets using INR

As economist **Barry Eichengreen** notes, internationalisation reduces currency risk, lowers transaction costs, and enhances a nation's strategic autonomy in global finance.

Key Measures Announced by RBI

1. Rupee Loans to Non-Residents

- **Authorised Dealer (AD) banks** in India—as well as their overseas branches—can now **lend directly in INR** to residents of:
  - Bhutan
  - Nepal
  - Sri Lanka
- The measure also covers lending to **banks** in these countries.

Significance:

- Boosts regional financial integration and supports neighbouring economies facing currency instability.
- Helps promote INR as a settlement and financing currency in South Asia.

2. Establishing Transparent Rupee Reference Rates

- The **Financial Benchmarks India Limited (FBIL)** will now prepare transparent and market-driven **reference rates of INR** against major global currencies.
- The RBI currently publishes reference rates for:
  - US Dollar
  - Euro
  - Japanese Yen
  - British Pound (Sterling)

Why This Matters:

- Transparent benchmarks are essential for derivatives, cross-currency swaps, hedging, and international invoicing.
- Builds trust in INR for international investors and trading partners.

3. Wider Use of Special Rupee Vostro Accounts (SRVAs)

- Surplus balances in SRVAs can now be invested in:
  - **Corporate bonds**
  - **Commercial papers (CPs)**

Earlier: SRVA balances were only allowed to be invested in **central government securities**.

Advantages:

- Enhances liquidity and attractiveness of rupee accounts for foreign banks.
- Broadens participation in India's corporate debt market.
- Deepens the rupee trade settlement mechanism introduced in 2022.

Special Rupee Vostro Account (SRVA): Explained

A **Special Rupee Vostro Account** is an account maintained by a **foreign bank** with an **Indian bank**, allowing trade settlements **directly in INR** without converting to USD or any other foreign currency.

Benefits of SRVA Mechanism

- Reduces reliance on dollar-based transactions.
- Supports countries under sanctions or facing forex shortages.
- Encourages long-term rupee accumulation and investment.

Countries like Russia, Sri Lanka, UAE, and Mauritius have shown interest in rupee trade settlement.

Why Internationalisation of the Rupee Matters

1. Reducing Dependence on the Dollar

- Minimises external vulnerability amid global currency fluctuations.
- Protects India during periods of dollar shortages or volatility.

2. Enhancing India's Global Economic Influence

- More trade denominated in INR elevates India's position in global markets.
- Supports India's role in Global South financial architecture.

3. Lowering Transaction Costs

- Eliminates currency conversion costs for Indian exporters/importers.
- Makes trade with India more attractive.

4. Strengthening Financial Stability

- International use of INR allows India to borrow in its own currency at competitive rates.
- Reduces exchange rate risks for corporates and banks.

5. Facilitating Larger Regional Integration

- South Asian countries that depend heavily on India benefit from easier settlement and credit access.
- Helps India counterbalance regional influence of other major economies.

Challenges Ahead

Despite progress, several structural challenges remain:

- Limited global holding of rupee reserves.
- Need for fuller capital account convertibility (long-term goal).
- Deepening corporate bond market for foreign investors.
- Wider acceptance of INR in major trading blocs.
- Ensuring rupee stability amid global financial volatility.

Conclusion

Keywords: Rupee Internationalisation, External Sector, Currency Resilience, SRVA Mechanism, Regional Financial Integration

The RBI's new measures mark an important step toward making the rupee a globally used currency, enhancing India's financial sovereignty and reducing dependence on the US dollar. By widening the use of SRVAs, establishing transparent reference rates, and permitting rupee loans to neighbouring countries, India is laying the foundation for a more resilient external sector. Continued reforms in financial markets, trade settlement mechanisms, and global partnerships will be essential for realising the full potential of a globally accepted rupee.

MAINS PRACTICE QUESTION

"Discuss the significance of the recent RBI measures to promote internationalisation of the rupee. What challenges must India overcome to make INR a widely accepted global currency?"

SWAMIH Fund for Stalled Projects

📌 **Syllabus Mapping:**

- **GS Paper III – Indian Economy, Banking & Financial Sector, Real Estate Sector**
- **GS Paper II – Governance (Housing & Urban Development)**

Introduction

The Reserve Bank of India (RBI) has granted an exemption to the **SWAMIH Fund** (Special Window for Affordable and Mid-Income Housing) from its recently tightened regulatory norms governing **Alternate Investment Funds (AIFs)**. The step reflects the unique public-interest mandate of SWAMIH and its central role in addressing stalled real estate projects and reviving homebuyer confidence across India.

Regulatory Background

- RBI issues regulatory guidelines for investments made by **regulated entities (REs)**—mainly banks, NBFCs, and financial institutions—into AIFs.
- Recent tightening aims to avoid **"evergreening" of stressed loans** via fund structures.
- The exemption shows that SWAMIH is treated differently due to its **sovereign backing, public purpose, and developmental role**.

About SWAMIH Fund (Launched 2019)

1. Nature and Structure

- Classified as a **Category II Alternate Investment Fund (AIF)** under SEBI regulations.
- AIFs are **privately pooled investment vehicles** that mobilise funds from sophisticated domestic and foreign investors for targeted investments.

- Category II includes funds that do not have leverage except for temporary funding needs. *Examples:* Private equity funds, debt funds, and venture capital funds (including angel funds).

2. Regulatory Oversight

- **SEBI** regulates AIFs and sets norms on eligibility, reporting, disclosure, investor protection, and fund governance.

3. Objective and Purpose

- SWAMIH was created as a **government-backed last-mile financing solution** to revive stalled housing projects in the **affordable and mid-income categories**.
- It aims to:
  - Provide **priority debt financing**
  - Enable completion of stuck real estate projects
  - Deliver homes to buyers who have invested their savings but faced long delays
  - Restore confidence in the real estate and construction sector

4. Fund Manager: Managed professionally by **SBICAP Ventures Limited (SVL)**, a subsidiary of **State Bank of India (SBI)**.

Why SWAMIH is Important

1. Addressing Stalled Real Estate Projects

- Millions of homebuyers faced severe delays due to stalled construction.
- SWAMIH intervenes by injecting last-mile funding to complete viable projects.

2. Boosting Demand and Market Stability

- Completion of stalled projects revives market sentiment in the real estate sector, which is a major contributor to:
  - Urban employment
  - Ancillary industries
  - Construction supply chains

3. Protecting Homebuyers: The fund directly safeguards the interests of **middle- and lower-income households** whose financial security depends on housing assets.

4. Strengthening Financial Sector Stability: By preventing stressed projects from turning into NPAs, the fund supports healthier balance sheets for banks, NBFCs, and developers.

5. Complementing Government Housing Initiatives: Aligns with programmes such as **PMAY (Pradhan Mantri Awas Yojana)** and **Housing for All** targets.

Why RBI Exempted SWAMIH from AIF Restrictions

1. **Public Purpose Mandate:** Unlike typical AIFs driven by profit, SWAMIH serves a **developmental and welfare-oriented function**.
2. **Systemic Importance:** Ensures smooth completion of numerous stalled projects, impacting urban development and economic growth.
3. **Sovereign Backing:** Government support reduces risks associated with the fund, justifying regulatory flexibility.
4. **Avoid Disrupting Ongoing Projects:** Additional restrictions could have limited capital flows, delaying the completion of thousands of homes.

Contemporary Relevance

Dimension	Significance
Housing Sector	Addresses one of the biggest challenges—unfinished housing stock.
Financial Sector Stability	Prevents project-level distress from spilling over into the banking system.
Urban Development	Enables planned urbanisation and infrastructure development.
Investor Confidence	Reinforces trust in government-backed financial mechanisms.

Conclusion

Keywords: Affordable Housing, AIF Regulation, Priority Debt, Real Estate Revival, Last-Mile Funding

The SWAMIH Fund has emerged as a critical instrument for stabilising India's real estate sector by ensuring last-mile financing for affordable and mid-income housing projects. RBI's exemption underscores its strategic significance and its unique developmental mandate. By unlocking stalled housing units and protecting homebuyers, SWAMIH not only supports economic revival but also strengthens India's commitment to inclusive urban development.

MAINS PRACTICE QUESTION

"Discuss the significance of the SWAMIH Fund in resolving stalled housing projects in India. How does its exemption from recent RBI AIF regulations support financial stability and urban development?"

Engels' Pause & AI Economy

📌 **Syllabus Mapping:**

- **GS Paper I – Industrial Revolution, Economic Transformations**
- **GS Paper III – Economy, Technology & Employment, Inequality**
- **GS Paper II – Impact of Science & Technology on Society**

Introduction

Geoffrey Hinton, the 2024 Nobel laureate and a leading thinker in artificial intelligence, has cautioned that the rapid advancement of AI may trigger a modern version of **"Engels' Pause"**—a period of rising productivity but stagnating wages for workers. The comparison highlights growing concerns that technological progress may not translate into broad-based economic well-being.

What is Engels' Pause?

1. Origin of the Concept

- The term **"Engels' Pause"** was coined by Oxford economist **Robert Allen**, drawing from **Friedrich Engels'**observations in *The Condition of the Working Class in England* (1845).
- Engels documented how early industrialisation in Britain (1780–1840) led to major increases in output without proportional improvement in workers' living standards.

2. Key Features of the Period

- Massive technological change driven by **steam power and mechanisation**.
- Industrial productivity surged, but **real wages remained stagnant**.
- Wealth accumulated in the hands of industrial capitalists and factory owners.
- Resulted in **urban poverty, social unrest, and widening inequality**.

Why the Concern Today? AI and the Prospect of a Modern Engels' Pause

The AI revolution mirrors early industrialisation in terms of rapid technological disruption and unequal benefit distribution.

1. Driver of Change

- **Historical:** Mechanisation and steam engines
- **Today:** Artificial intelligence, machine learning, robotics, automation

2. Productivity Trends

- **Industrial Revolution:** Higher output from factories
- **AI Era:** Increased productivity through automated decision-making, data processing, and digital systems

3. Wage Dynamics

- **Past:** Workers' wages did not rise despite economic expansion
- **Present:** Projections indicate:
  - **Low- and mid-skilled workers** may face wage stagnation or job losses
  - High-skilled workers (AI scientists, data engineers) may experience sharp wage growth

4. Distribution of Gains

- **Industrial Revolution:** Capital owners and inventors became wealthy
- **AI Economy:** Gains accrue disproportionately to:
  - Large technology corporations
  - Venture capital funds
  - High-skilled AI specialists

5. Social Outcomes

- **Historical:** Urban crowding, poor working conditions, labour unrest
- **Modern:**
  - Job displacement
  - Labour-market polarisation
  - Widening inequality between nations and within societies

Contemporary Significance

1. Labour Market Disruption

AI threatens millions of jobs in:

- Manufacturing
- Retail
- Customer service
- Logistics
- Administrative roles

This could replicate historical patterns of inequality.

2. Productivity vs. Wage Growth Decoupling: While companies using AI may experience rapid productivity gains, workers may not see corresponding wage improvements.

3. Inequality Across Nations

- Developed economies may enjoy accelerated AI-driven gains
- Developing nations dependent on labour-intensive sectors may face stagnation, creating a new global "tech divide"

4. Policy Implications

To avoid an AI-induced Engels' Pause, governments must:

- Strengthen social protection systems
- Promote reskilling and upskilling
- Regulate monopolistic digital platforms
- Ensure equitable taxation of digital giants
- Encourage ethical and inclusive AI deployment

Thinkers like **Thomas Piketty** emphasise that unchecked technological shifts can create extreme forms of wealth concentration.

Conclusion

Keywords: Inequality, Productivity, Technological Disruption, Labour Polarisation, AI Economy

Engels' Pause underscores how economic growth alone does not guarantee equitable outcomes. Geoffrey Hinton's warning invites policymakers to reflect on the historical lessons of the Industrial Revolution to ensure that the benefits of AI are broadly shared. The challenge for the 2020s and 2030s is to translate technological advances into inclusive growth rather than allow a new age of inequality to emerge.

MAINS PRACTICE QUESTION

"What is Engels' Pause? Discuss its relevance in the context of the modern AI-driven economy and the challenges it poses for inclusive growth."

India's Services Sector 2025

📌 **Syllabus Mapping:**

- **GS Paper III – Indian Economy: Growth, Development, Employment**
- **GS Paper II – Social Justice (Gender & Inclusive Growth)**
- **GS Paper I – Economic Geography (Sectoral Composition of the Economy)**

Introduction

NITI Aayog has released two significant reports (October 2025) assessing the evolving nature of India's **services sector**, focusing on output, employment, and inclusiveness across states. As India transitions into a **service-led economy**, understanding the sector's internal structure, disparities, and employment potential becomes crucial for achieving **Viksit Bharat @2047**.

1. Structure of the Indian Economy: An Overview

India's economy is broadly classified into **three sectors**, each contributing differently to national income and employment.

A. Primary Sector (Agriculture & Allied Activities)

- Includes **farming, fishing, forestry, mining**.
- Contributes **15–16%** to GDP (2024–25) but employs around **42% of the workforce**, making it the **largest employer but least productive sector**.
- Acts as the backbone of rural livelihoods.

B. Secondary Sector (Manufacturing & Industry)

- Involves **manufacturing, construction, and industrial production**.
- Contributes nearly **25–27%** to GDP and **28%** of total employment.
- Drives **industrialisation, urbanisation, and structural transformation**.

C. Tertiary Sector (Services Sector)

- Consists of **banking, IT, communication, education, healthcare, hospitality, tourism, trade**, etc.
- Contributes close to **55% of GDP** and nearly **40% of exports**, employing **about 30%** of the workforce.
- Represents India's **largest driver of growth** and centre of innovation.

2. Significance of the Services Sector

- Since 2010, services have been India's **main engine of economic growth**, led by **IT–BPM, financial services, communications, education, logistics, and healthcare**.
- India contributes **13–14% of global digitally delivered services**, reflecting strong competitiveness.
- Generates **high-value urban jobs**, boosts **foreign exchange earnings**, and enhances India's role as a **knowledge-based economy**.

3. Key Findings of NITI Aayog's 2025 Reports

A. Output (GVA) Trends

- Service sector share in **Gross Value Added (GVA)** increased from **51% (2013–14) to 55% (2024–25)**.
- **Modern services**—IT, finance, real estate, telecom—show high productivity but **limited job creation**.
- **Traditional services**—trade, transport, hospitality—generate employment but have **lower value addition**.

State-Level Patterns

- **Southern and western states** like Karnataka, Maharashtra, Tamil Nadu, Telangana dominate high-growth services.
- **Northern and eastern states** lag due to slower diversification and weaker urbanisation.

Export Trends

- India's **services exports hit USD 340 billion** in 2024–25.
- Dominated by **digital, professional, and financial services**, reinforcing India's global positioning.

B. Employment Trends

Employment Growth

- Around **188 million people** now work in services (29.7% of total employment).
- Sector added **40 million jobs** in six years, yet India's services employment share remains **below global average (~50%)**.

High Informality

- Over **75% of workers** remain in **informal, low-productivity activities**.
- Dual structure:
  - **High-skill modern services** → high productivity, limited jobs.
  - **Low-skill traditional services** → more jobs, low wages.

Rural–Urban Imbalance

- **60% urban workforce** in services vs. **less than 20%** in rural areas.
- Service hubs remain concentrated in metros, limiting spatial inclusiveness.

C. Gender Dimensions

- Women's participation in services fell from **25.2% (2017–18)** to **20.1% (2023–24)**.
- **Wage gap persists**:
  - Rural women earn **less than half** of male wages.
  - Urban women earn **~84%** of male earnings.
- Women disproportionately engaged in **informal service roles**—trade, caregiving, hospitality.
- Representation in **IT, finance, leadership** remains below **10%**.

Barriers Include

- Safety and mobility issues
- Digital skill gaps
- Unpaid care burdens
- Occupational segregation

4. Analytical Insights

- India's services expansion is **output-heavy but employment-light**, reflecting jobless or job-poor growth.
- **Capital-intensive services** (IT, finance) generate high value but limited jobs.
- Persistent **gender inequality** despite higher female education levels.
- Regional concentration of service-sector output restricts **balanced and inclusive growth**.
- High informality limits productivity and worker protection.

5. Policy Recommendations (NITI Aayog)

A. Promote Labour-Intensive Service Sub-sectors

- Tourism, retail, logistics, education, healthcare to expand job creation.

B. Encourage Formalisation

- Extend **EPFO and ESI** coverage.
- Ease compliance for **MSMEs** in services.

C. Regional Diversification

- Develop **service clusters** in Tier-II and Tier-III cities.
- Improve digital infrastructure and connectivity.

D. Skill & Digital Empowerment

- Strengthen **Skill India 2.0**, **PM–KVY**, and vocational skilling.
- Increase focus on **AI, cloud computing, cybersecurity, data analytics**.

E. Gender-responsive Interventions

- Ensure **equal pay**, safe mobility, childcare, flexible work models, leadership mentoring.
- Encourage higher female participation in STEM and digital services.

F. Strengthen Traditional Services

- Support artisans and rural service providers through:
  - **Pradhan Mantri Vishwakarma Yojana**
  - **Shyama Prasad Mukherji Rurban Mission**

G. Enhance Innovation and Global Linkages

- Strengthen Startup India, Digital India, PLI schemes.
- Integrate India's services more deeply into **global value chains (GVCs)**.

Way Forward

Keywords: Service-led Growth, Informality, Regional Imbalance, Digital Skilling, Gender Inclusion

To achieve inclusive growth, India must ensure that the services sector becomes **more employment-oriented**, geographically dispersed, and gender-equitable. Strengthening linkages between **primary, secondary, and tertiary sectors**, investing in human capital, and expanding service clusters beyond metros are key steps toward **Viksit Bharat @ 2047**.

A service-led model must therefore be complemented with **manufacturing growth**, digital innovation, and strong labour market reforms.

MAINS PRACTICE QUESTION

"India's services sector is the largest contributor to GDP but remains employment-poor. Discuss the structural challenges within the sector and suggest measures to make services-led growth more inclusive."

POLICIES AND WELFARE SCHEMES

MGNREGA & Water Security Reforms

📌 Syllabus Mapping

- **GS Paper II – Governance, Welfare Schemes, Social Justice, Panchayati Raj**
- **GS Paper III – Rural Development, Water Resources, Agriculture, Inclusive Growth**
- **GS Paper I – Poverty, Regional Disparities, Social Empowerment**

Introduction

The Union Government has recently amended **Schedule-I** of the **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005**, placing explicit emphasis on **water conservation and groundwater management**across rural blocks. Given rising water stress and uneven aquifer depletion, this policy shift aligns rural livelihood generation with long-term resource sustainability, while retaining the core mandate of wage employment.

1. Objectives and Foundational Features of MGNREGA

a) Core Objectives

- Provide **at least 100 days** of guaranteed unskilled manual work per rural household annually.
- Strengthen the **livelihood resource base** of rural poor through durable assets.
- Promote **social inclusion**, gender inclusion, and equitable access to employment.
- Empower **Panchayati Raj Institutions**, making local bodies central to implementation.

b) Salient Features

- **Centrally Sponsored Scheme** with **60:40** Centre–State cost-sharing.
- Applicable to all adults above **18 years** residing in rural areas.
- Enforces **right to work**, **right to unemployment allowance**, and **timely wage payment**.
- Mandates **social audits** by Gram Sabhas to ensure transparency.
- Wage rates indexed to **CPI–AL**.
- Provision of **additional 50 days** in:
  - Drought/natural calamity-hit areas
  - For ST households dependent on land under the **Forest Rights Act, 2006**

2. Major Amendments: Water Conservation as the Priority

The updated Schedule-I categorizes rural blocks using the **Dynamic Ground Water Resources Assessment Report** and mandates specific expenditure thresholds on water-related works.

a) Priority Categories & Mandatory Spending

Block Category	Minimum Share for Water Conservation Works
Over-Exploited	**65%**
Critical	**65%**
Semi-Critical	**40%**

Safe	**30%**

b) Significance of the Reforms

- Aligns employment with rejuvenation of **aquifers, ponds, canals, reservoirs, check dams**, and watershed structures.
- Promotes **climate-resilient livelihoods** by addressing water scarcity affecting agriculture.
- Supports **Mission Amrit Sarovar**, **Jal Shakti Abhiyan**, and broader SDG-6 targets.
- Enhances rural resilience to droughts, groundwater depletion, and seasonal migration.

3. Key Procedural and Supportive Features

a) Worker-Centric Provisions

- At least **1/3rd beneficiaries must be women**.
- **Delay compensation** at **0.05% per day** beyond the 16-day payment window.
- Special provisions for **vulnerable groups**, including:
  - Persons with disabilities
  - Nomadic and De-notified Tribes
  - Primitive Tribal Groups
  - Women in special circumstances
  - Senior citizens (65+)
  - HIV positive persons
  - Rehabilitated bonded labour
  - Internally displaced persons

b) Structural and Governance Mechanisms

- **Wage-to-material ratio of 60:40** at Gram Panchayat level.
- **GeoNREGA** for digital asset tracking with "before–during–after" geotagged images.
- **Project UNNATI** for upskilling active workers to ensure transition into full-time employment.
- Emphasis on durable assets—water harvesting structures, irrigation canals, rural connectivity.

4. Achievements and Contemporary Relevance

a) Social and Economic Impact

- World's largest rights-based social protection programme.
- Women's participation increased from **48% (2014)** to **58% (2025)**, boosting female labour force participation.
- Acts as an **economic stabilizer**, especially during:
  - Agricultural distress
  - Droughts
  - Migration cycles
  - Economic slowdowns

b) Environmental and Ecological Contributions

- Large-scale rejuvenation of **watersheds, ponds, aquifers, and degraded lands**.
- Supports climate adaptation and rural water security—critical as India faces rising groundwater stress.

c) Governance Strengthening

- Enhances deep **federal decentralization**, as PRIs lead planning and monitoring.
- Social audits enhance transparency and public accountability.

5. Broader Context: Understanding Water Stress and MGNREGA's Role

Water Security Challenges

- Over **600 million Indians** face high to extreme water stress.
- Agriculture consumes nearly **85%** of freshwater.
- More than **15%** of India's assessment units are over-exploited or critical.

MGNREGA as a Water-Security Engine

- Linking employment with water conservation creates a **virtuous cycle**:
  - More water → better agriculture → reduced distress migration → higher incomes
- Adds durable infrastructure for long-term rural productivity.

Conclusion

The amendment to MGNREGA's Schedule-I marks a strategic shift toward **water-centric rural development**, combining livelihood security with critical natural resource restoration. By integrating groundwater management with guaranteed employment, the scheme continues to serve as India's backbone for **inclusive development, climate resilience, and grassroots empowerment**.

Mains Practice Question

"MGNREGA has evolved from an employment programme into a critical instrument for rural ecological resilience." Critically examine this statement in light of the recent amendments prioritising water conservation.

ETHICS

Nobel Peace Prize 2025: Venezuela's Democratic Struggle

📌 Syllabus Mapping

- **GS Paper II – International Relations, Global Institutions, Democracy & Human Rights**
- **GS Paper I – World History (Political Movements, Democratic Struggles)**
- **GS Paper IV – Ethics (Courage, Human Rights, Peace)**

Introduction

The **Nobel Peace Prize 2025** has been awarded to **María Corina Machado**, a prominent Venezuelan opposition leader, for her sustained efforts to ensure a **peaceful, democratic transition** in Venezuela. Her recognition highlights the global significance of non-violent resistance and the international community's support for democratic values in authoritarian contexts.

1. About the 2025 Nobel Peace Prize Winner – Maria Corina Machado

- A leading political dissident in Venezuela known for championing **free elections, civil liberties, and human rights**.
- Advocated for a **peaceful resolution** to the country's political and humanitarian crisis.
- Her activism focused on:
  - Strengthening democratic institutions
  - Protecting human rights defenders
  - Promoting electoral transparency
- Faced persecution, disqualification, and repeated intimidation but maintained a **non-violent approach** in line with global peacebuilding principles.

Significance of Her Recognition

- Reinforces global support for **democracy and rule of law**.
- Validates non-violent activism in regions facing authoritarianism.
- Draws attention to the humanitarian and political turmoil in Venezuela, encouraging international mediation and solidarity.

2. Nobel Peace Prize: Scope and Evolution

Origins

- Established in **1901** as part of Alfred Nobel's will.
- Awarded annually in Oslo, Norway.

Key Areas of Recognition (Post–World War II)

1. **Arms Control & Disarmament**: Recognising efforts to reduce nuclear, chemical, and conventional weapons.
2. **Peace Negotiations**: Rewarding mediators and leaders resolving violent conflicts through diplomacy.
3. **Democracy & Human Rights**: Honouring activists defending civil liberties, political freedom, and equality.
4. **Creating a Peaceful and Well-Organized World**: Organisations promoting global governance, cooperation, humanitarian relief.

Prominent Themes Over the Years

- Non-violence (inspired by Gandhian principles)
- Humanitarian assistance
- International institutions (e.g., UN bodies)

- Women-led peacebuilding movements

3. Indian Recipients of the Nobel Peace Prize

Recipient	Year	Contribution
Mother Teresa	1979	Humanitarian work with the poor, sick, and marginalized through the Missionaries of Charity.
Kailash Satyarthi	2014	Global advocacy against child labour and trafficking; championing children's rights.

Their work reflects India's contribution to **global humanism, justice, and peace-based activism**.

4. Broader Context: Democracy and Peace in Today's World

A. Global Democratic Backsliding

- Rise of populism, digital misinformation, and weakening of institutions.
- Nobel recognition signals support for **restoring electoral integrity** and safeguarding democratic norms.

B. Peacebuilding through Non-Violent Resistance

Thinkers like **Gene Sharp** emphasize that non-violent civic movements are critical in transforming authoritarian systems.

C. Role of International Institutions

- UN, OAS (Organization of American States), and EU have engaged with Venezuela's crisis.
- Awards like the Nobel Prize mobilize diplomatic support and global awareness.

Conclusion

The 2025 Nobel Peace Prize awarded to Maria Corina Machado reaffirms the global commitment to **peaceful democratic transitions**, human rights, and principled resistance against authoritarianism. Her recognition underscores the enduring relevance of non-violent activism in shaping just, inclusive, and accountable political systems worldwide.

Mains Practice Question

Evaluate the significance of awarding the Nobel Peace Prize to pro-democracy leaders such as Maria Corina Machado. How do such recognitions influence global peacebuilding, international diplomacy, and democratic movements?

SOCIETY AND SOCIAL ISSUES

ILO's State of Social Justice Report – Global Assessment for Doha 2025

📌 Syllabus Mapping

- **GS Paper II – Governance, Welfare Schemes, Social Justice, International Organisations (ILO)**
- **GS Paper III – Economic Development, Employment, Inclusive Growth**
- **GS Paper I – Society, Inequality, Demographic Issues**

Introduction

The **International Labour Organization (ILO)** has released its landmark report, **"The State of Social Justice: A Work in Progress"**, ahead of the **Second World Summit for Social Development (Doha, 2025)**. The summit commemorates **30 years of the 1995 Copenhagen Summit**, which articulated a comprehensive blueprint for poverty eradication, full employment, and social integration. The new report assesses global progress across the pillars of social justice and highlights persistent structural challenges.

1. Background: Copenhagen to Doha – Three Decades of Social Justice Agenda

a) Copenhagen Declaration (1995)

The original summit set out **10 core commitments**, including:

- **Eradicating poverty**
- **Achieving full and productive employment**

- **Advancing social integration**
- **Ensuring equality between men and women**
- **Promoting human rights and dignity**

b) Purpose of the 2025 Report

The new ILO assessment provides an updated global overview of:

- Poverty and employment trends
- Social protection coverage
- Inequality and human rights concerns
- Labour market transitions (environmental, digital, demographic)

2. Understanding Social Justice

Social justice implies that **every individual**, regardless of caste, gender, race, or background, must have access to:

- **Freedom and dignity**
- **Economic security**
- **Equal opportunities**
- **Material well-being and spiritual well-being**

It fosters **inclusive growth**, enhances **trust in institutions**, and reinforces **long-term peace and stability**.

3. Key Global Achievements Reported by ILO

a) Reduction in Extreme Poverty

- From **39% (1995) → 10% (2025)**
- Working poverty reduced from **28% → 7%**

b) Expansion of Social Protection

- For the **first time**, more than **50% of the global population** is covered by at least one social protection programme.

c) Progress in Gender Equality

- Gender gap in labour force participation narrowed from **26 percentage points (2005)** to **24 points (2025)**.

d) Decline in Cross-country Inequality

- Driven largely by productivity growth in middle-income countries.

e) Sharp Reduction in Child Labour

- From **20.6% (1995)** to **7.8% (2024)**.

These gains reflect significant progress but remain uneven across regions.

4. India-Specific Achievements

a) **Poverty Reduction:** India's extreme poverty declined dramatically from **16.2% (2011–12)** to **2.3% (2022–23)**.
b) **Female Labour Force Participation (FLFP):** Rose sharply from **23.3% (2017–18)** to **41.7% (2023–24)**.
c) **Social Protection Coverage:** Increased from **19% (2015)** to **64.3% (2025)**—reflecting expanded welfare schemes.
d) **Decline in Income Inequality:** India ranked **4th globally** in income equality (Gini coefficient: **25.5**).
e) **Access to Services:** **Jal Jeevan Mission**: Over **15.72 crore rural households** now have piped water supply.

These improvements highlight India's progress in welfare provisioning and inclusive development.

INDIA-SPECIFIC ACHIEVEMENTS

a) Poverty Reduction
India's extreme poverty dramatically declined from 16.2% (2011–12) to 2.3% (2022–23).

b) Female Labour Force Participation (FLFP)
Rose sharply from 23.3% (2017–18) to 41.7% (2023–24).

c) Social Protection Coverage
Increased from 19% (2015) to 64.3% (2025)—rreflecting expanded welfare schemes.

d) Decline in Income Inequality
India ranked 4th globally in income equality (Ginl coefficient: 25.5).

e) Access to Services
Jal Jeevan Mission: Over 15.72 crore rural households now have piped water supply.

5. Key Concerns: Persistent Barriers to Social Justice

A. Challenges Related to Fundamental Rights

a) Gender Wage Gap

- Women earn only **78% of male earnings (2025)**.
- At current pace, wage parity is **50–100 years away**.

b) Child Labour

- Nearly **138 million children (5–17 years)** still engaged in labour;
- **50%** involved in **hazardous occupations**.

c) Forced Labour

- Increased from **24.9 million (2016) → 27.6 million (2021)**.

B. Challenges in Equal Access to Opportunities

a) **Wealth and Income Concentration:** Top **1%** controls **20% of global income** and **38% of global wealth**.
b) **Informal Employment:** Accounts for **58% of global employment**, lacking security and social protection.
c) **Access to Basic Services:** **1 in 4** individuals lacks access to **clean drinking water**.

C. Challenges in Fair Transitions

1. **Environmental Transition:** Measures needed to limit warming to **2°C** may displace **~6 million jobs** in the fossil fuel sector.
2. **Digital Transition (AI Impact):** One in **four jobs** likely to undergo transformation due to generative AI and automation.
3. **Demographic Transition**

- Low- and upper-middle-income countries must address **youth unemployment** and productivity gaps.
- High-income nations face challenges of **ageing labour forces** and shrinking working-age populations.

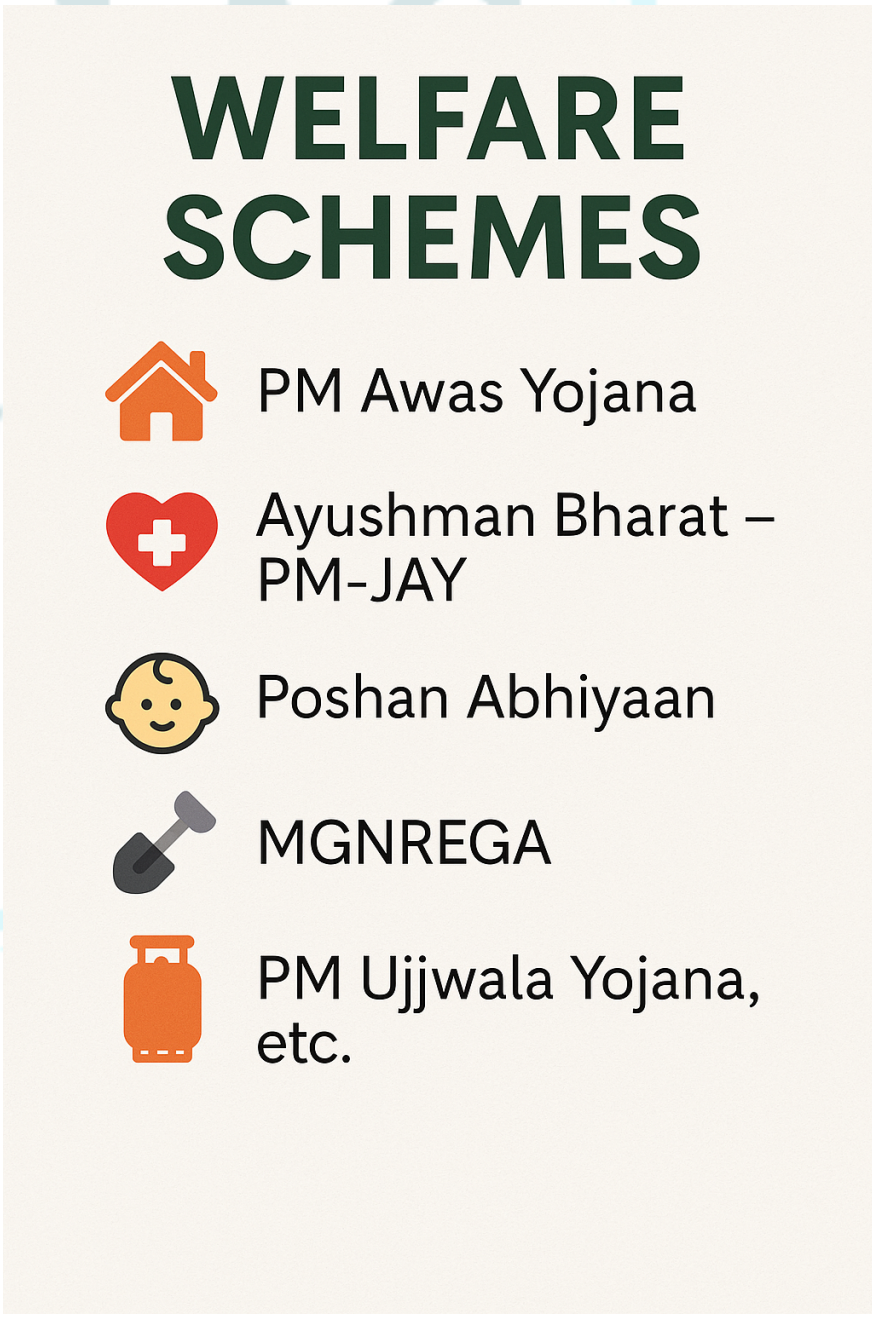
6. Key Global and National Initiatives Supporting Social Justice

A. Global Frameworks

a) **Global Coalition for Social Justice (ILO, 2023):** Coalition bringing together governments, workers, employers, and partners to build actionable pathways for social justice.
b) **ILO Decent Work Agenda:** Promotes:

- Fair income
- Job security
- Rights at work
- Social protection

c) **ILO Declaration on Social Justice for a Fair Globalization (2008):** Places the **Decent Work Agenda** at the centre of global policy discourse.
d) **Universal Declaration of Human Rights (1948):** Foundational human rights guarantee underpinning global social justice efforts.
e) **SDGs, ICESCR, and Global Alliance against Hunger and Poverty:** Provide global frameworks for poverty eradication, sustainability, and rights-based development.



B. India-Specific Initiatives

a) Constitutional Measures

- **Preamble:** Social, economic & political justice
- **Article 23:** Prohibition of forced labour
- **Article 38:** Duty of State to reduce inequalities

b) Legislative Measures

- **Protection of Civil Rights Act (1955)**
- **SC/ST (Prevention of Atrocities) Act (1989)**
- **Rights of Persons with Disabilities Act (2016)**

c) Institutional Measures

- **NCSC**, **NCST**, **NCW**, **NHRC**, etc.

7. Way Forward

A. Fair Distribution

- Strengthen **collective bargaining rights**.
- Update **minimum wage policies** and operationalize **living wages**.
- Enhance the **coverage, adequacy and sustainability** of social protection systems.
- Improve enforcement of **non-discrimination policies**.

B. Equal Access to Opportunities

- Build **Active Labour Market Policies (ALMPs)**: skilling, job-matching, vocational training.
- Support **formalization pathways** for micro and small enterprises.
- Government-backed **employment subsidies** (wage subsidies, hiring incentives).
- Strengthen **public employment programmes**, such as **MGNREGA**.

C. Fair Transitions

- **Place-based economic strategies**, especially in regions affected by decline in fossil industries.
- Introduce **partial retirement**, flexible work, and anti-age discrimination laws.
- Expand **paid family leave** to support elderly care.
- Promote **green jobs**, digital literacy, and social protection for gig and platform workers.

Conclusion

The ILO report reaffirms that while the world has made meaningful progress in poverty reduction, gender inclusion, and social protection expansion, **social justice remains an unfinished mission**. To sustain and deepen these gains, countries must adopt **people-centered policies**, ensure **equitable distribution of opportunities**, strengthen **social protection**, and align economic growth with **dignity, rights and justice** for all.

Mains Practice Question

The ILO's "State of Social Justice" report highlights both achievements and persistent structural barriers to equality. Critically evaluate these global and Indian trends and identify policy measures necessary for ensuring fair distribution, equal access to opportunities, and fair transitions.

Global Hunger Index 2025 – India's Status

📌 Syllabus Mapping

- **GS Paper II – Governance, Welfare Schemes, Social Justice, Health and Nutrition**
- **GS Paper III – Food Security, Agriculture, Poverty, Climate Change, SDGs**
- **GS Paper I – Society & Development Indicators**

Introduction

The **Global Hunger Index (GHI) 2025**, jointly produced by **Concern Worldwide** (Ireland) and **Welthungerhilfe**(Germany), has placed India in the **'serious' hunger category**, renewing focus on food security, child malnutrition, and the systemic drivers of hunger. The index—widely used as a global comparative tool—reveals that hunger reduction has slowed worldwide, jeopardising the achievement of **SDG 2: Zero Hunger by 2030**.

1. Understanding the Global Hunger Index (GHI)

a) About the Index: GHI is an **annual composite index** assessing hunger at global, regional, and national levels using indicators related to nutrition, child health, and mortality.

b) Organisations Involved: Although compiled by Concern Worldwide and Welthungerhilfe, the dataset draws from:

- **FAO**
- **UNICEF**
- **WHO**
- **IFPRI**

d) Four Components of GHI: Each country's GHI score is calculated from the following weighted indicators:

1. **Undernourishment** – 1/3 weight
2. **Child Stunting** (low height-for-age) – 1/6 weight
3. **Child Wasting** (low weight-for-height) – 1/6 weight

4. **Child Mortality** (under-five deaths) – 1/3 weight

d) GHI Severity Scale (0–100)

- ≤ 9.9 – Low
- 10.0–19.9 – Moderate
- 20.0–34.9 – **Serious**
- 35.0–49.9 – Alarming
- ≥ 50.0 – Extremely Alarming

India's score places it in the **third category: Serious**.

2. Key Findings of the GHI 2025

A. India-Specific Findings

a) India's Rank and Score

- **Rank:** 102 out of 123 countries
- **GHI Score: 25.8** (Serious category)

b) Undernutrition: 172 million Indians are undernourished—**13.5 million more** than in 2016.

c) Child Malnutrition: 1 in 3 children is stunted, reflecting long-term nutritional deprivation.

The trends indicate persistent structural barriers such as maternal health, poverty, dietary diversity, sanitation, and access to early childhood services.

B. Global Trends

a) SDG-2 Off Track: At least **56 countries** will not achieve *even low levels of hunger* by 2030 at the current pace.

b) Global Score

- **2025 GHI score: 18.3 (Moderate)**
- Only marginal progress since 2016 (score: 19.0).

c) Regional Inequalities

- **Serious hunger** in:
  - Sub-Saharan Africa
  - South Asia
- **Alarming hunger** in:
  - Somalia
  - Democratic Republic of Congo
  - South Sudan
  - Others facing conflict and drought

d) Drivers of Hunger Globally

- Armed conflicts (Sudan, Gaza, Sahel)
- Extreme climate shocks (droughts, heatwaves, cyclones)
- Inflation and economic crises
- Weak governance and inconsistent political commitment

3. India: Structural Causes Fueling Hunger

a) Intergenerational Malnutrition: Low caloric intake, anaemia, and poor maternal health transfer nutritional deficits to newborns.

b) Inequality and Poverty: Large socio-economic disparities restrict access to:

- Nutritious food
- Health services
- Education and sanitation

c) Maternal and Child Health Gaps

- Low dietary diversity
- Inadequate antenatal care

- High prevalence of anaemia among women

d) Chronic Malnutrition and Dietary Transition

- Shift toward calorie-dense but nutrient-poor diets.
- Lack of micronutrient-rich foods in rural diets.

e) Agriculture-Nutrition Disconnect: Food production has increased, but nutritional outcomes lag due to distribution and affordability barriers.

4. Consequences of Hunger

a) Child Mortality: 45% of under-five deaths globally are linked to undernutrition.

b) Reduced Productivity: Malnutrition diminishes:

- Physical strength
- Cognitive development
- Learning outcomes

→ Leading to lower long-term wages and national economic loss.

c) Healthcare Burden: Malnourished populations face higher disease incidence, straining public health systems.

d) Broader Social Impacts

- Violation of **Right to Food**
- Increased risk of famine-like conditions
- Reinforcement of intergenerational inequality
- Lower human capital formation

5. India's Policy Interventions to Address Hunger

a) Food Security and Nutrition

- **PMGKAY:** Free food grains to 80 crore people.
- **NFSA (2013):** Legal entitlement for subsidised food grains.
- **ICDS:** Supplementary nutrition for children and mothers.

b) Maternal and Child Health

- **PM Matru Vandana Yojana:** Cash support for nutrition and maternity.
- **POSHAN Abhiyaan:** Targets malnutrition through technology, convergence, and behavioural change.

c) Food Safety and Dietary Health

- **Eat Right India:** Promotes safe, healthy, and sustainable diets.

d) WASH and Rural Infrastructure

- Schemes improving water, sanitation, and health indirectly reduce malnutrition burdens.

6. Way Forward

A. Strengthening Governance and Political Commitment

- Recognise food security as a **legal right**, not a welfare measure.
- Transparent monitoring and real-time nutrition surveillance.

B. Financing for Nutrition

- Reverse recent cuts to nutrition and ICDS budgets.
- Adopt **results-based financing** and leverage international support.

C. Build Resilient, Inclusive Food Systems

- Promote **climate-resilient agriculture**.
- Strengthen **land and water rights** for smallholders.
- Diversify production toward pulses, millets, vegetables, and fruits.

D. Multisectoral, Localised Approaches

- Convergence across **health, agriculture, WASH, education, and social protection**.
- Empower **local governments** for community-led nutrition planning.
- Reduce food loss and improve value chains.

E. Focus on Maternal and Early Childhood Nutrition

- Expand antenatal care, micronutrient support, and breastfeeding promotion.
- Address anaemia and ensure regular growth monitoring.

Conclusion

The 2025 Global Hunger Index underscores that hunger is not merely the absence of food but a consequence of **poverty, conflict, climate shocks, and governance gaps**. India must prioritise nutrition-sensitive development, resilient agriculture, universal social protection, and community-driven solutions to secure the **Right to Food** and align with the **Zero Hunger** vision. Ensuring equitable nourishment is integral to inclusive growth, human capital formation, and long-term national development.

Mains Practice Question

India continues to fall under the 'serious' category in the Global Hunger Index. Analyse the key structural drivers of hunger in the country and suggest policy measures to strengthen food and nutrition security.

Sree Narayana Guru – Social Reform Legacy

📌 Syllabus Mapping

- **GS Paper I – Indian Society, Social Reformers, Social Empowerment**
- **GS Paper II – Social Justice, Vulnerable Groups, Role of Civil Society**
- **GS Paper IV – Ethics (Humanism, Equality, Compassion)**

Introduction

The President of India recently inaugurated the **Mahasamadhi Centenary** of **Sree Narayana Guru** in Kerala, marking 100 years since the passing of one of India's most influential social reformers. His life and work remain foundational to Kerala's transformation from a deeply caste-stratified society to one recognized for human development, social mobility, and egalitarian values.

1. Early Life and Background

- **Birth:** 1856, in Chempazhanthy, near present-day Thiruvananthapuram.
- **Community:** Born into the **Ezhava community**, historically regarded as an "untouchable" group in Kerala's rigid caste hierarchy.
- **Context:** Kerala society of the 19th century was characterized by:
  - Extreme caste oppression
  - Religious exclusion
  - Denial of education to lower castes
  - Temple entry restrictions

Sree Narayana Guru emerged as a reformer who challenged these entrenched structures using **spiritual philosophy, ethical reasoning, and peaceful mobilization**.

2. Teachings and Philosophical Principles

a) Universalism and Humanism

- His famous message **"One Caste, One Religion, One God for Humanity"** emphasized spiritual unity and the essential oneness of humankind.
- Promoted values of **self-purification, compassion, simplicity, and inclusivity**.

b) Education as Social Transformation

- Saw education as a **tool of liberation** for oppressed communities.
- Encouraged schools, libraries, and learning institutions across Kerala.

c) Rejection of Superstition and Ritualistic Orthodoxy

- Advocated **rational spirituality**, urging people to rely on knowledge, ethics, and self-respect rather than ritual rigidity.

d) Gender Equality

- Ensured female participation in schools and emphasized the need for **equal opportunity for women**.

e) Advaita Ashram (1913)

- Established at Aluva.
- Based on **Om Sahodaryam Sarvatra**—the belief that all human beings are equal before God.

3. Major Contributions and Reform Movements

A. Aruvipuram Movement (1888)

- In a revolutionary act, he consecrated a **Sivalinga** at Aruvipuram.
- This challenged centuries-old Brahminical monopoly over temple consecration.

Significance:

- Asserted the **right of marginalized communities to worship**.
- Marked a turning point in Kerala's socio-religious awakening.
- Symbolized resistance against caste-based exclusion.

B. Upliftment of the Ezhava Community

- Founded the **Sri Narayana Dharma Paripalana Yogam (SNDP Yogam)** in 1903.
- Focus:
  - Social mobility
  - Education
  - Economic empowerment
  - Dignity and self-respect

He reinterpreted Hindu religion as a means of **ethical reform**, rejecting caste hierarchy and ritual pollution.

C. Institutional Reform

- Set up:
  - **Monasteries**
  - **Temples**
  - **Schools**
  - **Priestly training structures**

These created **parallel channels of spiritual and social legitimacy**, liberating socially excluded groups from monopolistic control of priestly classes.

D. Support to Vaikom Satyagraha (1924–25)

- Played a strategic role in guiding the **Vaikom Satyagraha**, one of the earliest non-violent struggles against untouchability.
- Leaders included:
  - **T.K. Madhavan**
  - **K.P. Kesava Menon**
  - **K. Kelappan (Kerala Gandhi)**

Impact:

- Opened temple roads to lower castes.
- Served as a precursor to the Temple Entry Proclamation (1936).
- Inspired subsequent civil rights movements in Kerala.

4. Literary Contributions

Sree Narayana Guru enriched Malayalam and Sanskrit literature with spiritual, ethical, and philosophical works, including:

- **Atmopadesa Śatakam**
- **Daiva Dasakam**
- **Anukampa Dasakam**
- **Advaitha Deepika**
- **Brahmavidya Panchakam**
- **Bhadrakali Ashtakam**

These texts blended **Advaita philosophy** with social ethics and universal human values.

Contemporary Relevance

- His messages resonate within modern debates on **social justice, caste discrimination, secularism, and human dignity**.
- Kerala's achievements in literacy and social development are often attributed to reformers like him.
- His approach offers lessons for inclusive governance and **peaceful transformation of society**.

Conclusion

Sree Narayana Guru stands as a towering reformer who transformed Kerala's social landscape through non-violence, education, spiritual humanism, and moral persuasion. His movements against casteism, his role in temple-entry struggles, and his elevation of marginalized communities continue to guide India's pursuit of **equality, dignity, and social harmony**.

Mains Practice Question

Discuss the contributions of Sree Narayana Guru to the social reform movement in Kerala. How did his philosophy and initiatives challenge caste hierarchies and promote egalitarian transformation?

India's Medal Haul: 2025 World Para Athletics Championships

📌 **Syllabus Mapping:**

- **GS Paper II – Social Justice: Disability, Inclusiveness, Welfare Measures**
- **GS Paper I – Sports and Culture; Role of Society in Social Empowerment**
- **GS Paper III – Achievements in Science & Sports and Associated Institutions**

Introduction

India created sporting history at the **2025 World Para Athletics Championships**, achieving its **best-ever performance**with a remarkable **22 medals**, including **6 Gold**. The achievement gains further significance as India became the **fourth Asian country** to host this prestigious global para-sport event, marking an important milestone in its journey towards inclusive sporting excellence.

About World Para Athletics

Para athletics forms the **largest and most diverse discipline** within the international Paralympic movement.

1. Governance

- Administered by the **International Paralympic Committee (IPC)**.
- The sport follows classification systems to ensure fair competition among athletes with different types of disabilities.

2. Key Competitions

- **Paralympic Games:** Conducted every four years; the pinnacle of para-sport excellence.
- **World Para Athletics Championships:** Organised biennially; the biggest global stage exclusively for para-athletics.
- **World Para Athletics Grand Prix:** Annual series of international meets held across multiple cities since 2013.

3. Historical Background

- The first official para-athletics competition dates back to **1952**, marking the beginning of organised competitive sport for persons with disabilities.

Significance of India's Achievement

1. Sporting Excellence

- Winning **22 medals** demonstrates India's rapid rise in international para-sport, supported by improved coaching, scientific training, and athlete welfare mechanisms.

2. Hosting the Championships

By hosting the event for the first time:

- India strengthened its credentials as a global sporting destination.
- Enhanced infrastructure for para-sport was created, which will benefit future athletes.
- Provided greater visibility to the issues and achievements of persons with disabilities.

3. Social and Policy Implications

- The success aligns with the objectives of the **Rights of Persons with Disabilities Act, 2016**, promoting inclusion and equality.
- Reinforces government initiatives such as:
  - **Khelo India – Para Games**
  - Increased funding under the **Target Olympic Podium Scheme (TOPS)**
  - Dedicated support for classification, sports science, and international exposure

4. Inspiration and Inclusivity

- The performance serves as a powerful demonstration of resilience, challenging social stereotypes around disability.
- Promotes a more inclusive sporting ecosystem, encouraging greater participation at grassroots levels.

India's Broader Para-Sports Ecosystem

1. Expanding Infrastructure

- Establishment of specialised training centres and rehabilitation-focused sports institutes.
- Integration of assistive technologies, biomechanics, and physiotherapy support systems.

2. Talent Identification

- State-level and national para-athletics trials are improving pathways for young athletes.

3. Institutional Support

- National Paralympic Committee of India (PCI) has strengthened coordination with IPC.
- Enhanced collaboration between sports federations, private academies, and disability rights groups.

Conclusion

Keywords: Para-Sports, Disability Inclusion, Paralympic Movement, Inclusive Infrastructure

India's record-breaking performance at the World Para Athletics Championships 2025 is more than a sporting triumph—it reflects a maturing commitment to **inclusive development** and the empowerment of persons with disabilities. By investing in world-class training, hosting international events, and strengthening institutional frameworks, India is steadily becoming a global leader in para-sport excellence.

MAINS PRACTICE QUESTION

"India's performance at the 2025 World Para Athletics Championships reflects both sporting progress and deeper social transformation. Discuss the significance of para-sports in promoting inclusion and the policy measures required to strengthen India's para-sport ecosystem."

GEOGRAPHY AND DISASTER

Amazon's Flying Rivers

📌 **Syllabus Mapping:**

- **GS Paper I – Geography: Climatic Processes, World Physical Geography**
- **GS Paper III – Environment & Ecology: Forest Ecosystems, Climate Change Impact**

Introduction

The Amazon rainforest, often called the "lungs of the Earth," is not only a global carbon sink but also a crucial driver of South America's hydrological balance. One of its most fascinating contributions is the creation of **"Flying Rivers"**—vast atmospheric streams of water vapour that transport moisture across thousands of kilometres, shaping rainfall patterns far beyond the forest.

What Are Flying Rivers?

"Flying rivers" refer to **large volumes of water vapour flowing through the atmosphere**, similar to terrestrial rivers but invisible to the eye. These air-borne moisture channels function as **atmospheric water highways** that distribute rain across the continent.

How the Flying Rivers System Works

1. **Moisture Source: The Atlantic Ocean :** Warm currents in the tropical Atlantic lead to strong evaporation. This moisture-laden air moves westward toward the Amazon Basin.
2. **Role of Trade Winds:** The **easterly trade winds** carry this humid air across the equator and push it into the Amazon rainforest.
3. **Amazon Forests as a "Biological Pump"**

- The Amazon trees absorb massive quantities of groundwater.
- Through **transpiration**, they release water vapour back into the atmosphere.
- This process recycles and amplifies moisture, increasing atmospheric humidity.

This mechanism is so powerful that it pumps an estimated **20 billion tonnes of water vapour per day** into the air—more than the Amazon River's surface discharge.

4. Cloud and Rainfall Formation

The recycled moisture condenses into clouds, creating rainfall across:

- The central and western Amazon
- The Andes Mountains
- Southern South America (including agricultural zones in Brazil, Paraguay, Argentina)

This rainfall sustains ecosystems, agriculture, and river systems across the continent.

Significance of Flying Rivers

1. **Climate Regulation:** Flying rivers help stabilise regional climate, prevent droughts, and maintain humidity levels necessary for the survival of Amazonian biodiversity.
2. **Agricultural Productivity:** The rainfall delivered by these atmospheric rivers supports:

- The **Pantanal wetlands**
- The **La Plata Basin**
- Agricultural regions producing soy, coffee, and cattle
  Thus, they influence food security across South America.

3. **Hydropower Dependency:** Countries like Brazil rely heavily on hydropower. Flying rivers help sustain the flow of rivers feeding major hydroelectric stations.
4. **Global Climate Influence:** The Amazon's moisture recycling also influences weather systems beyond South America, making it an integral component of global climate dynamics.

Threats to the Flying Rivers System

1) **Deforestation:** Eliminating forest cover weakens the biological pump and reduces atmospheric moisture.
2) **Climate Change:** Rising temperatures shift rainfall patterns, disrupting the trade winds and moisture flow.
3) **Forest Dieback:** Loss of forest resilience may trigger a tipping point where the Amazon cannot generate enough transpiration, resulting in long-term drying.

Conclusion

Keywords: Atmospheric Moisture, Transpiration Cycle, Amazon Basin, Hydrological Balance

The phenomenon of flying rivers illustrates how deeply interconnected forests, climate, and human development are. Preserving the Amazon rainforest is not merely an ecological necessity—it is vital for maintaining continental water cycles, supporting agriculture, and stabilising regional climates. Protecting these atmospheric rivers is central to safeguarding South America's environmental and economic future.

MAINS PRACTICE QUESTION

"Explain the concept of 'Flying Rivers' associated with the Amazon rainforest. Discuss their significance for South America's climate and the consequences of their disruption."

Sir Creek Dispute – History & Strategic Value

📌 **Syllabus Mapping:**

- **GS Paper I – Geography: Borders & Physical Features, Coastal Geography**
- **GS Paper II – India–Pakistan Relations, International Boundaries**
- **GS Paper III – Internal Security & Maritime Security**

Introduction

In a recent statement, the Defence Minister of India issued a strong warning to Pakistan against any hostile activity in the **Sir Creek region**, reiterating India's firm stance on safeguarding its territorial and maritime boundaries. The Sir Creek dispute—though often overshadowed by larger India–Pakistan issues—remains one of the most sensitive maritime boundary disagreements in South Asia.

About the Sir Creek Region

1. Geographic Features

- **Sir Creek** is a **96 km long tidal estuary**, often described as a **"shifting or fluctuating tidal channel"**.
- It lies between the **Rann of Kutch in Gujarat (India)** and the **Sindh province of Pakistan**.
- The region is ecologically fragile, with mangroves, creeks, and tidal mudflats.

2. Why It Is Sensitive

- The creek significantly influences **maritime boundary delimitation**, affecting
  - Exclusive Economic Zones (EEZ)
  - Continental Shelf claims
  - Fishing rights
  - Access to strategically important waters
- The area is prone to infiltration and illegal fishing, adding a security dimension.

Historical Origin of the Dispute

1. **Early Conflict (1908):** The dispute dates back to 1908 when the **Ruler of Kutch** and the **Sindh Government** (then both under British India) clashed over **firewood collection rights** in the marshy creek area.
2. **The 1914 Bombay Resolution:** To settle the conflict, the **Bombay Government issued a Resolution in 1914**, but it contained **contradictory clauses**, which later became the core of the dispute:

Paragraph 9

- Positioned the boundary **to the east of the creek**, giving the **entire creek to Sindh**.
- Pakistan today bases its claim on this paragraph.

Paragraph 10

- Invoked the **Thalweg Principle**—typically used for navigable rivers.
- Stated that since Sir Creek is **navigable during most of the year**, the **mid-channel** should form the boundary.
- India uses this clause to support its claim.

3. Resulting Legal Ambiguity

The contradictory nature of the resolution left the boundary unresolved.
This ambiguity leads to differences in:

- Maritime boundary extension into the Arabian Sea
- Fishing zones
- Resource exploration rights

Thus, the dispute persists even today.

Strategic Importance of Sir Creek

1. Maritime Boundary and EEZ Extension: The positioning of the land boundary directly influences how far each country's maritime boundary extends into the Arabian Sea, making it a **high-stakes geopolitical issue**.

2. Security Dimensions

- The area is sensitive due to frequent **infiltration attempts** and **illegal fishing**.
- A contested border creates challenges for naval and coast guard patrols.

3. Economic Potential: The presence of potential **hydrocarbon reserves** along the coast raises economic stakes on both sides.

4. Ecological Significance: The region houses **rich mangrove ecosystems** and forms a crucial breeding ground for marine species.

Conclusion

Keywords: Thalweg Principle, Maritime Boundary, Rann of Kutch, India–Pakistan Border Dispute

Sir Creek may appear geographically small, but its implications are geopolitically significant. The dispute is rooted in colonial-era ambiguities but continues to shape contemporary India–Pakistan maritime relations. With strategic, economic, and environmental stakes involved, the region demands careful diplomacy alongside strong security preparedness.

MAINS PRACTICE QUESTION

"Explain the origins of the Sir Creek dispute between India and Pakistan. Why does this seemingly narrow estuary hold significant strategic importance for both nations?"

Mud Volcanoes of Baratang

📌 **Syllabus Mapping:**

- **GS Paper I – Physical Geography: Volcanoes, Tectonics, Geomorphological Processes**
- **GS Paper III – Disaster Management: Geological Hazards**

Introduction

The **Geological Survey of India (GSI)** is sending a scientific team to **Baratang Island in the Andaman and Nicobar archipelago** to investigate the recent eruption at **India's only active mud volcano**. Although mud volcanoes pose far less danger compared to typical magmatic volcanoes, they offer critical insights into tectonic activity, subsurface gas pressures, and hydrocarbon systems in the region.

What Are Mud Volcanoes?

Nature and Characteristics

- **Mud volcanoes** are geological structures that expel **mud, gases (mainly methane), and water** from beneath the Earth's surface.
- Unlike traditional volcanoes, they **do not release molten lava** or pyroclastic material.
- Eruptions are generally mild, producing warm mud flows across limited areas.

Hazard Profile

- While typically not life-threatening, sudden outbursts can cause **localized ground deformation**, small explosions of gas, and temporary disruption to nearby settlements or ecosystems.

Why Are Mud Volcanoes Found in Andaman & Nicobar?

1. Tectonic Setting: The Andaman and Nicobar Islands lie along the **Indian Plate–Burma Plate subduction zone**, part of the larger **Alpine–Himalayan seismic belt**.

- Constant plate convergence triggers **frequent tremors**, fracturing the crust and allowing gases and fluids to escape upward.
- The region's geology naturally supports the formation of mud volcano systems.

2. Hydrocarbon-Rich Sedimentary Basins: Mud volcanoes commonly occur in areas containing **underground oil and gas deposits**, where organic-rich sediments generate methane and other gases.

Formation Process of a Mud Volcano

Step 1: Gas Generation and Pressure Build-up

- Organic matter deep underground produces gases such as methane.
- Tectonic compression or sedimentary pressure traps these gases beneath impermeable layers.

Step 2: Upward Movement Through Weak Zones

- As pressure increases, gases and fluids rise through **faults, cracks, and fissures** in the Earth's crust.

Step 3: Surface Eruption

- Mud, water, and gas are expelled at the surface, creating **cones or domes**.
- Repeated eruptions over time can build structures several meters high.

Step 4: Post-Eruption Activity

- Mud volcanoes can remain active for decades, showing intermittent eruptions triggered by:
  - Earthquakes
  - Tectonic movements
  - Pressure variations in subsurface gas reservoirs

Significance of Studying Mud Volcanoes

1. **Indicator of Tectonic Activity:** Their eruptions help scientists assess **stress conditions and seismic behaviour** along active plate boundaries.
2. **Hydrocarbon Exploration:** Presence of methane and other gases serves as a clue to **subsurface oil and gas deposits**.
3. **Geological Hazard Assessment:** Helps authorities prepare for sudden gas emissions or ground instability in vulnerable zones.
4. **Ecological and Tourism Value:** Mud volcano sites, especially in Baratang, are unique natural attractions, creating opportunities for **eco-tourism**when managed sustainably.

Conclusion

Keywords: Tectonic Compression, Methane Emission, Subduction Zone, Geological Hazard

Mud volcanoes, though far less destructive than true volcanic eruptions, are important geological indicators of the dynamic processes shaping the Andaman region. The recent Baratang eruption highlights the need for ongoing **geological monitoring, disaster preparedness, and environmental management** to understand Earth's subsurface behaviour and mitigate potential risks.

MAINS PRACTICE QUESTION

"What are mud volcanoes? Explain their formation and discuss why the Andaman and Nicobar region is particularly prone to such geological phenomena."

WMO's Early Warnings for All (EW4All) Initiative

📌 Syllabus Mapping

- **GS Paper III – Disaster Management, Climate Change, Early Warning Systems**
- **GS Paper II – International Institutions (WMO, UNDRR), Global Governance**
- **GS Paper I – Geographical Phenomena, Environmental Hazards**

Introduction

The **World Meteorological Organization (WMO) Congress** has called for rapid scaling and implementation of the **Early Warnings for All (EW4All)** initiative, emphasizing the urgent need for universal access to **multi-hazard early warning systems** in the face of escalating climate-driven disasters. As extreme weather events intensify across the globe, timely warnings have emerged as one of the most cost-effective tools for saving lives, reducing economic losses, and enabling climate-resilient development.

1. Early Warnings for All (EW4All): A Global Climate Resilience Mission

a) Objective: The EW4All initiative aims to ensure that **every individual on the planet** is protected by **multi-hazard early warning systems (MHEWS)** by **2027**.

b) Launch and Global Commitment

- Introduced at **COP27 (2022)** by the **UN Secretary-General**.
- Reflects growing recognition that climate adaptation must prioritize **risk information**, **preparedness**, and **preventive action**.

c) Lead Organizations: The initiative is jointly coordinated by:

- **World Meteorological Organization (WMO)**

- **United Nations Office for Disaster Risk Reduction (UNDRR)**
- **International Telecommunication Union (ITU)**
- **International Federation of Red Cross and Red Crescent Societies (IFRC)**
  This multi-agency leadership ensures technical, communication, community, and disaster governance expertise.

d) Expansion of Coverage

- Initially targeted **30 high-risk countries**.
- Now includes **over 100 nations**, reflecting widespread demand for climate-risk preparedness.

2. The Four Pillars of EW4All

The initiative is structured around four interlinked pillars essential for functional early warning systems:

1. **Risk Knowledge and Assessment**
   - Mapping hazards, vulnerabilities, and exposure.
   - Integrating climate data with socio-economic information.
2. **Detection, Observation, Monitoring, and Forecasting**
   - Upgrading meteorological networks, hydrological stations, and climate models.
3. **Warning Dissemination and Communication**
   - Ensuring clear, actionable, and inclusive messaging through telecom networks, community networks, and digital platforms.
4. **Preparedness and Response Capability**
   - Strengthening emergency planning, evacuation procedures, and community readiness programmes.

These pillars align with the Sendai Framework priority on **"Enhancing Disaster Preparedness for Effective Response."**

3. Understanding Early Warning Systems (EWS)

a) Definition

An **Early Warning System** is an integrated framework combining:

- **Hazard monitoring**
- **Forecasting**
- **Risk assessment**
- **Communication systems**
- **Preparedness and emergency response**

A well-functioning EWS enables communities to take **early, informed, and life-saving action**.

4. Why the World Needs Early Warning Systems

a) Proven Reduction in Disaster Impact

- Issuing warnings **24 hours before** an extreme event can reduce damage by **up to 30%**.
- This includes saving lives, reducing injury, protecting crops, and safeguarding infrastructure.

b) Disparities in Access

- Mortality from disasters is **six times higher** in countries lacking multi-hazard early warnings.
- The number of people affected by disasters is **four times greater** in these regions.
  This highlights the inequity in climate-risk protection between developed and developing nations.

c) Escalating Economic Losses

- Extreme weather events have caused **over US$ 4 trillion in damages since 1970**.
- Increasing climate variability—heatwaves, floods, cyclones, droughts—creates higher economic vulnerability, especially in low-income countries.

d) India's Relevance

India already has:

- **Cyclone early warning systems** considered one of the best globally
- **Heatwave early warning** in several states
- **Flood forecasting systems** under CWC

But gaps remain in:

- Landslide alerts

- Flash flood prediction
- Cloudburst monitoring
- Localised communication to last-mile communities

EW4All can accelerate India's transition to **universal multi-hazard protection**.

5. Why WMO's Call for Speed Matters

- Climate extremes are becoming more **frequent, unpredictable, and intense**.
- Rapid urbanization and infrastructure expansion increase exposure.
- Developing countries face limited technological and financial capacity.
  The WMO Congress emphasized scaling **investment, data-sharing, satellite networks, and capacity-building**, enabling all nations to reach minimum EWS standards by 2027.

Conclusion

The WMO's push for fast-tracking the **EW4All** initiative reflects the rising urgency to safeguard global populations from intensifying climate and hydrometeorological threats. Early warning systems represent one of the most effective and economically efficient tools for reducing disaster losses, especially for vulnerable communities. Achieving universal coverage by 2027 will require stronger international cooperation, digital infrastructure, community preparedness, and sustained national investments in resilience.

Mains Practice Question

Multi-hazard early warning systems are central to climate adaptation strategies. Critically examine the significance of the Early Warnings for All (EW4All) initiative and discuss the global and national challenges in achieving universal early warning coverage by 2027.

HISTORY, ART & CULTURE

The Durand Line – Historical Boundary

📌 **Syllabus Mapping:**

- **GS Paper I – World History: Colonial Boundaries, Geopolitical Divisions**
- **GS Paper II – International Relations: India–Pakistan–Afghanistan Dynamics**
- **GS Paper III – Internal Security: Border Management**

Introduction

Fresh clashes have been reported along the **Durand Line**, the contentious border dividing Afghanistan and Pakistan. The long-standing dispute over this colonial-era boundary continues to shape regional geopolitics, ethnic relations, and security dynamics in South and Central Asia.

What is the Durand Line?

1. Origin and Historical Background

- The **Durand Line**, stretching roughly **2,640 km**, was demarcated in **1893** under an agreement between:
  - **Sir Mortimer Durand**, the Foreign Secretary of British India
  - **Amir Abdur Rahman Khan**, the ruler of Afghanistan
- The boundary was drawn during the period of the **"Great Game"**, when British India sought a buffer against Russian expansion into Central Asia.

2. Purpose of the Agreement

The main objective was to define the **"spheres of influence"** between British India and Afghanistan, not necessarily to establish a modern international border. This distinction later became a major point of disagreement.

Ethnic and Social Implications

1. Division of Pashtun and Baloch Communities

The line **bisected ethnic Pashtun and Baloch populations**, dividing:

- Tribal communities

- Cultural zones
- Traditional trade routes

Regions such as the **Pashtun heartland** were split across the line, creating grievances that persist over a century later.

2. Source of Persistent Afghan Opposition

Successive Afghan governments—monarchical, republican, and even the Taliban—have refused to formally recognise the Durand Line as the legitimate border. They argue that:

- The 1893 agreement was coerced
- It expired after the fall of British rule
- It does not reflect ethnic and historical realities

Pakistan, however, views the Durand Line as an **internationally recognised boundary**, inherited by the modern state after 1947.

Contemporary Relevance

1. Pakistan–Afghanistan Tensions

Border skirmishes continue over:

- Fence construction by Pakistan
- Taliban opposition to border regulation
- Movement controls on Pashtun tribes
- Smuggling and militant crossings

2. Security Challenges

The region witnesses activities of:

- Tehrik-i-Taliban Pakistan (TTP)
- Cross-border insurgent networks
- Illegal trade and trafficking

3. Geopolitical Significance

The Durand Line remains a sensitive point in:

- India–Pakistan–Afghanistan relations
- Counterterrorism strategies
- Regional stability in the Hindu Kush corridor

Conclusion

Keywords: Colonial Boundary, Pashtun Belt, Great Game, Spheres of Influence

The Durand Line is not merely a historical border but a living geopolitical fault line affecting ethnic identities, national security, and diplomatic relations. Its contested legacy underscores the complexities inherited from colonial boundary-making, which continue to shape the political landscape of South Asia.

MAINS PRACTICE QUESTION

"Discuss the historical evolution of the Durand Line and analyse how its contested status continues to influence Afghanistan–Pakistan relations."

Bamiyan Buddhas – Cultural Loss

📌 Syllabus Mapping

- **GS Paper I – Art & Culture (Buddhist Art, Heritage Sites), History of Central Asia**
- **GS Paper II – International Relations, Global Cultural Institutions (UNESCO)**
- **GS Paper IV – Ethics (Cultural Heritage, Human Values)**

Introduction

The Bamiyan Buddhas recently resurfaced in international discussions, drawing attention to their enduring cultural significance and the global concern surrounding the protection of heritage in conflict zones. These monumental statues once stood as iconic representations of Buddhist influence in Central Asia and remain a powerful symbol of both artistic excellence and cultural devastation.

1. About the Bamiyan Buddhas

a) Location: Situated in the **sandstone cliffs of the Bamiyan Valley**, in **central Afghanistan**, a region historically linked to the Silk Route and cross-cultural interactions.

b) Period and Construction

- Built in the **6th century CE** during a period of flourishing Buddhist monastic activity in the region.
- Carved directly into the cliffs, the statues were:
  - **53 metres (Great Buddha)**
  - **35 metres (Smaller Buddha)**
- These structures were part of an elaborate monastic complex containing caves, murals, and stupas.

c) Artistic Significance

- Represented the pinnacle of **Gandharan Buddhist art**, blending:
  - Hellenistic (Greek) styles
  - Indian Gupta influences
  - Persian artistic elements
- Their drapery, proportions, and facial expressions reflect the hybrid cultural milieu of ancient Gandhara.

d) Historical Importance

- Bamiyan served as a major centre for Buddhist learning, attracting monks, scholars, and travellers from:
  - India
  - China
  - Persia
  - Central Asia

Xuanzang, the famous Chinese pilgrim, documented the grandeur of these statues in his 7th-century travel accounts.

2. Destruction in 2001

a) Taliban Action

- In **March 2001**, the Taliban ordered and executed the demolition of both statues using explosives.
- The act sent shockwaves globally as:
  - A significant loss of cultural and historical heritage
  - A violation of global norms protecting cultural sites
  - A symbolic attack on Afghanistan's multicultural past

b) Global Response

- Condemned universally by:
  - UNESCO
  - International governments
  - Cultural preservation bodies
- Sparked global debates on **cultural cleansing**, heritage in conflict areas, and responsibilities of international actors.

3. UNESCO Recognition and Restoration Efforts

a) World Heritage Status

- In **2003**, UNESCO declared the **Cultural Landscape and Archaeological Remains of the Bamiyan Valley** a **World Heritage Site**.
- It is also listed as a **World Heritage Site in Danger**.

b) Preservation & Reconstruction Efforts

- UNESCO has focused on:
  - Stabilizing the cliff faces
  - Preserving mural fragments
  - Digitally reconstructing the statues
- Several proposals, including 3D projection and partial reconstruction, are under consideration, although challenges remain due to:
  - Political instability
  - Lack of local consensus

- Technical limitations

4. Broader Cultural and Geopolitical Context

a) Significance for Buddhist Heritage

- Represents the spread of Buddhism from India to Central Asia and onward to China.
- Symbolizes the fusion of Indian philosophical thought with Central Asian artistic expression.

b) Heritage in Conflict Zones

The destruction highlights:

- Vulnerability of cultural sites to extremist ideologies
- Importance of international legal frameworks such as:
  - **Hague Convention (1954)** for protection of cultural property
- Need for stronger global cooperation to protect heritage during armed conflict.

Conclusion

The Bamiyan Buddhas stand as a stark reminder of both the richness of ancient Buddhist art and the fragility of cultural heritage in conflict settings. Their legacy continues to inspire global efforts toward cultural preservation, interfaith dialogue, and safeguarding humanity's shared history. While the statues no longer physically exist, their historical and cultural significance remains deeply embedded in the collective memory of civilizations.

Mains Practice Question

The destruction of the Bamiyan Buddhas is often cited as one of the gravest cultural losses of the modern era. Discuss the artistic, historical, and geopolitical significance of the Bamiyan Buddhas and evaluate global efforts to protect cultural heritage in conflict zones.

ENVIRONMENT & ECOLOGY

Cold Desert Biosphere Reserve – New UNESCO Site

📌 Syllabus Mapping

- **GS Paper III – Environment, Biodiversity, Conservation Initiatives**
- **GS Paper I – Geography (Physical Geography, Biomes, Himalayan Ecology)**
- **GS Paper II – International Institutions (UNESCO, Global Environmental Governance)**

Introduction

India's unique ecological landscapes received global recognition recently when the **Cold Desert Biosphere Reserve** was officially admitted into the **UNESCO World Network of Biosphere Reserves (WNBR)**. This inclusion marks a significant step in acknowledging India's fragile high-altitude ecosystems and their harmonious coexistence with traditional Himalayan communities. The addition also underscores the global momentum toward protecting ecologically sensitive zones under UNESCO's **Man and the Biosphere (MAB) Programme**.

1. India's Growing Footprint in UNESCO's Global Network

- With the latest designation, India now hosts **13 biosphere reserves** within the UNESCO-recognised network, becoming part of a larger community of **785 sites** globally.
- Notably, **São Tomé and Príncipe** became the **first country to have its entire territory** recognised as a biosphere reserve, demonstrating the rising international commitment to integrated conservation-development frameworks.

2. Understanding the Cold Desert Biosphere Reserve

a) Geographical Span

- India's **first high-altitude cold desert biosphere reserve** extends across:
  - **Ladakh** (Leh and Kargil districts) in the north
  - **Himachal Pradesh** (Spiti Valley and Kinnaur district) in the south
- Situated within the **Trans-Himalayan zone**, it represents one of the coldest, driest biomes within the global network.

b) Protected Areas within the Reserve

The reserve encompasses several ecologically vital sites:

- **Pin Valley National Park**
- **Kibber Wildlife Sanctuary**
- **Chandratal and Sarchu regions**

These spaces collectively protect rare fauna and delicate alpine vegetation, forming critical biodiversity corridors.

3. Biophysical Features

a) Biome Characteristics

- Classified as a **Cold Desert biome**, shaped by:
  - Its **leeward position** behind the Himalayas (rain-shadow effect)
  - Extremely **high altitude**, resulting in low humidity and sparse precipitation
- Temperatures fluctuate drastically, and vegetation is thin due to short growing seasons.

b) Soil Conditions

- Soils are **sandy-loamy**, coarse, and **poor in organic matter**, owing to minimal vegetation and slow decomposition rates.

c) Hydrology

- Meltwater from surrounding glaciers feeds major rivers such as the:
  - **Spiti River**
  - **Pin River**

This glacial hydrology forms the lifeline of local agriculture and settlements.

4. Biodiversity Richness

a) Flora

- Key plant species include **Caragana**, **Ephedra**, **Juniperus**, **Artemisia**, and **Seabuckthorn**.
- **Seabuckthorn** is especially significant for:
  - **Soil binding**
  - **Carbon sequestration**
  - **Livelihood generation** through juice, oils, and herbal products.

b) Fauna

The region hosts iconic high-altitude wildlife:

- **Snow Leopard** – flagship species
- **Himalayan Ibex**
- **Tibetan Argali**
- **Blue Sheep (Bharal)**
- **Eurasian Lynx**
- **Red Fox**
- **Himalayan Wolf**

These species rely on the isolated and rugged terrain, making conservation essential.

5. Cultural Landscape and Human Communities

a) Cultural Heritage

The Cold Desert Reserve is also a seat of vibrant Tibetan Buddhist culture, evident in:

- **Gompas (monasteries)**
- **Chortens (stupas)**
- **Mani Walls**

These structures reflect a long-standing philosophical tradition of harmony between humans and nature.

b) Local Communities

The dominant communities include:

- **Bhotia**
- **Changpa**
- **Spiti tribes**

Their livelihoods centre on:

- **Pastoralism**
- **Yak, goat, and sheep rearing**
- Cultivation of hardy crops like **barley** and **buckwheat**

Their sustainable practices align closely with UNESCO's human-environment synergy principles.

6. UNESCO's World Network of Biosphere Reserves (WNBR)

a) Managed under the MAB Programme

- The **Man and the Biosphere (MAB) Programme**, launched in **1971**, promotes scientific understanding of human–environment interactions.
- WNBR, launched in **1976**, seeks to conserve biodiversity while supporting sustainable development models.

b) Objectives

- Promote research, monitoring, and education
- Foster harmony between people and ecosystems
- Showcase models of **sustainable development**, **cultural preservation**, and **ecosystem management**

7. How a Biosphere Reserve is Designated under MAB

a) Decision-making Authority

- Final approval is granted by the **Director-General of UNESCO** based on the recommendations of the **MAB International Coordinating Council (ICC)**.

b) Evaluation Framework

- Based on:
  - The **Seville Strategy (1995)**
  - The **Statutory Framework of WNBR**

c) Proposal Process

- Member States submit nominations with ecological, cultural, and administrative details.
- Once designated, the site remains under **national sovereignty**, ensuring political and territorial autonomy.

d) Review and Withdrawal

- A **10-year periodic review** assesses effectiveness and compliance.
- UNESCO may **withdraw designation** if standards are not maintained.
- States may also voluntarily remove a site from WNBR.

Conclusion

The inclusion of the Cold Desert Biosphere Reserve in UNESCO's WNBR reinforces India's commitment to conserving ecologically fragile Trans-Himalayan ecosystems and sustaining indigenous cultural landscapes. The recognition not only elevates India's conservation profile globally but also strengthens the integration of sustainable development, traditional ecological knowledge, and high-altitude biodiversity management—key pillars for environmental stewardship in the decades ahead.

Mains Practice Question

Discuss the ecological, cultural, and strategic importance of the Cold Desert Biosphere Reserve and evaluate the significance of its inclusion in UNESCO's World Network of Biosphere Reserves.

IUCN Tiger Green Status Assessment

📌 **Syllabus Mapping**

- **GS Paper III – Environment, Conservation, Biodiversity, Protected Area Management**
- **GS Paper II – International Environmental Institutions (IUCN, CITES)**
- **GS Paper I – Species Diversity, Biogeography**

Introduction

The International Union for Conservation of Nature (IUCN) released its **first-ever Green Status of Species assessment for the Tiger (Panthera tigris)**, providing a new lens to evaluate not merely extinction risk but the **extent of species recovery and conservation impact**. The results categorize the tiger as **'Critically Depleted'**, underlining both historical losses and ongoing pressures on its natural habitats across Asia.

1. Key Outcomes of the Green Status Assessment

a) Conservation Status

- The tiger is classified as **Critically Depleted**, indicating it has lost a substantial portion of its historical range and population.
- The assessment highlights severe threats such as:
  - **Habitat fragmentation and degradation**
  - **Poaching and illegal wildlife trade**
  - **Declining prey base**
  - **Extinctions in several former range countries**

b) Population Trends

- Current estimated global population of **mature individuals**: **2608–3905**.
- Tigers are now **locally extinct in 9 out of the 24 spatial units** evaluated.
- Even within surviving areas, all populations are categorised as **threatened**, pointing to fragile and uneven recovery.

c) Legacy and Future Potential

- **Conservation Legacy:** *High*
  Reflecting decades of global conservation interventions such as Project Tiger, TX2 initiative, and anti-poaching frameworks.
- **Recovery Potential:** *Medium*
  Indicates scope for improvement, but high dependency on sustained ecological and political support.

2. Understanding the IUCN Green Status of Species

a) Concept and Evolution

- Introduced in **2012**, the Green Status framework expands upon the **IUCN Red List**, which primarily assesses extinction risk.
- Since **2020**, it functions as an optional but increasingly influential addition to Red List assessments.

b) Purpose

- Measures **recovery of species**, effectiveness of conservation actions, and future recovery prospects.
- Complements the Red List, which focuses on decline and risk.

c) Assessment Categories

Includes classes such as:

- **Largely Depleted**
- **Moderately Depleted**
- **Slightly Depleted**
- **Fully Recovered**

These categories offer a **positive, action-oriented perspective** on species conservation.

3. How Green Status Defines 'Recovery'

A species is considered **fully recovered** when:

1. It occupies its **entire historical range**, including habitats where it disappeared due to human pressure.
2. It is **viable** across all spatial units, meaning it faces no significant risk of extinction.
3. It performs its **ecological role fully**, such as regulating prey populations and maintaining trophic balance.

Combined, these three dimensions produce a **Green Score** on a **0–100% scale**, representing how close a species is to ecological restoration.

4. Tiger: Ecology, Distribution, and Protection Status

a) Biological Profile

- The tiger (**Panthera tigris**) is the **largest wild cat species** globally.
- Acts as a **keystone predator**, maintaining ecosystem equilibrium.

b) Global Distribution

- Found across multiple Asian countries including: **India, Bangladesh, Bhutan, China, Myanmar, Thailand, Indonesia**, and others.

c) Habitat Diversity: Tigers occupy a broad range of ecosystems:

- **Forests**, **savannas**, **grasslands**, **shrublands**, and **wetlands**.

d) Conservation Status

- **IUCN Red List:** *Endangered*
- **Wildlife Protection Act, 1972:** *Schedule I*
- **CITES Appendix I:** Prohibits international commercial trade.

e) India's Role: India hosts **nearly 75%** of the world's wild tiger population, making national conservation programmes globally significant.

5. Significance of the Assessment

a) A Shift from Extinction Risk to Recovery Metrics

The Green Status framework marks an important transition towards evaluating:

- **Ecological restoration**,
- **Impact of conservation policies**, and
- **Future recovery trajectories**.

b) Implications for India

- Provides scientific evidence to strengthen programmes like **Project Tiger**, **Tiger Reserves Network**, and **Landscape-based Conservation Initiatives**.
- Helps identify priority zones where recovery potential is the highest.

c) Global Conservation Value

- Serves as a model for assessing other charismatic megafauna like elephants, rhinos, and snow leopards.
- Enhances cooperation under platforms such as **Global Tiger Forum (GTF)** and **TX2 Goal**.

Conclusion

The first Green Status assessment for the tiger offers a nuanced understanding of its precarious condition and the progress made through decades of conservation. While the tiger shows **high legacy impact**, its **'Critically Depleted'** status signals the need for sustained ecological restoration, landscape connectivity, stronger anti-poaching mechanisms, and enhanced transboundary cooperation. Ensuring the tiger's recovery is not only a conservation imperative but also a measure of ecosystem health and national biodiversity stewardship.

Mains Practice Question

The IUCN Green Status of Species introduces a new dimension to global conservation efforts. Evaluate the significance of the recent assessment of the tiger and analyse its implications for India's biodiversity and conservation strategies.

DNA-Based Elephant Census (SAIEE 2021–25)

📌 Syllabus Mapping

- **GS Paper III – Environment, Biodiversity, Conservation, Wildlife Protection**
- **GS Paper II – Government Policies & Interventions (Project Elephant)**
- **GS Paper I – Ecology, Biogeography, Species Diversity**

Introduction

India has released the findings of its first-ever **DNA-based elephant population estimation** under the **Synchronous All India Population Estimation of Elephants (SAIEE) 2021–25**, marking a major advancement in wildlife monitoring and conservation science. Conducted by the **Wildlife Institute of India (WII)** under **Project Elephant**, this initiative enhances accuracy in population counts by integrating genetic sampling—a first in India's elephant conservation history.

1. SAIEE: A New Scientific Benchmark

- The SAIEE programme represents a **shift from traditional survey methods** (like dung counts and direct sightings) to **DNA-based identification**, providing more reliable numbers.
- Supported by the **Ministry of Environment, Forest and Climate Change**, it aligns with global best practices in species monitoring.

2. Key Findings of SAIEE 2021–25

a) Population Estimate

- The total population of **Asian Elephants** is estimated at **22,446 individuals**.
- India retains its position as the **largest range country**, hosting **about 60%** of the world's wild elephant population.

b) Distribution Across India

Wild elephants continue to survive mainly in **four major forested landscapes**:

1. **Himalayan Foothills**
2. **Northeastern States**
3. **East-Central India**
4. **Western and Eastern Ghats**

In addition, a **small feral population** exists in the **Andaman Islands**.

c) Regional and State Trends

- The **Western Ghats** support the **largest elephant population**, followed by:
  - **North Eastern Hills**
  - **Brahmaputra Flood Plains**
- At the state level, **Karnataka** hosts the highest population, followed by:
  - **Assam**
  - **Tamil Nadu**
  - **Kerala**

This pattern reinforces the ecological value of the **Shola forests**, **moist deciduous forests**, and **river floodplains** for elephant movement and survival.

3. Threats Highlighted by SAIEE

a) Habitat Shrinkage and Fragmentation

Once-contiguous elephant habitats—especially in the **Western Ghats**—are now being rapidly divided due to:

- Expansion of **coffee and tea plantations**
- **Invasive species** spreading into native forest areas
- **Fencing of agricultural land**
- **Urban and industrial encroachment**
- Large-scale developmental projects (roads, hydropower, mining)

These pressures disrupt ancient migration routes and isolate herds.

b) Rising Human–Elephant Conflict (HEC)

- Conflict intensity has grown sharply in **Central India** and the **Eastern Ghats**, driven by:
  - Crop encroachment into elephant paths
  - Sudden shifts in elephant movement patterns
  - Increasing human activity inside elephant habitats

c) Linear Infrastructure Impacts

- **Highways, railways, transmission lines**, and **canals** break movement corridors.
- Elephants suffer injuries and mortality from:
  - **Electrocution**
  - **Train collisions**
  - Vehicle accidents

d) Climate-Induced Pressures

Though not explicit in the report, increasing studies indicate:

- Changing rainfall patterns
- Water scarcity in dry seasons
  These force elephants to move closer to villages in search of water and food.

4. Recommendations for Strengthening Conservation

a) Restoring and Securing Corridors

- Protecting traditional migratory routes is essential to maintain genetic flow.
- Priority must be given to recognised elephant corridors, especially in:
  - **Nilgiri Biosphere Reserve**
  - **Kaziranga–Karbi Anglong**
  - **East-Central India corridor systems**

b) Habitat Restoration

- Replanting native vegetation
- Removing invasive species
- Expanding forest cover
  These efforts will re-establish safe movement networks.

c) Mitigating Infrastructure Impacts

- Construction of **overpasses**, **underpasses**, and **animal passages**
- Strict guidelines under **Eco-Sensitive Zones (ESZs)**
- Smart planning to avoid fragmenting critical habitats

d) Addressing Human–Elephant Conflict

- Adoption of **early-warning systems**, **solar fencing**, and **community-based protection models**
- Strengthening compensation mechanisms for crop loss
- Promoting participatory conservation with forest communities

5. Asian Elephants: Ecological and Biological Overview

a) Range and Habitat

Asian Elephants inhabit varied ecosystems across **13 range countries** including:

- India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Malaysia, Indonesia, Sri Lanka, etc.
  Their habitats extend from **dry deciduous forests** to **tropical evergreen forests**, **grasslands**, and **wetlands**.

b) Social Behaviour

- Elephants live in **complex matriarchal societies**, where the oldest female leads the herd.
- They have the **longest gestation period** among mammals—**approximately 22 months**.

c) Ecological Role

Elephants act as **ecosystem engineers**, contributing to:

- Creation of **forest pathways**
- Formation of **microhabitats**
- **Seed dispersal** across large areas
- Maintaining **landscape connectivity**

Their presence indicates a healthy forest ecosystem.

6. Conservation Status

Asian Elephants enjoy the highest level of legal protection:

- **IUCN Red List:** *Endangered*
- **Wildlife Protection Act, 1972:** *Schedule I*
- **CITES Appendix I:** Prohibits international trade

Conclusion

The SAIEE assessment marks a notable scientific milestone, shifting India's elephant conservation efforts toward more **accurate, evidence-based management**. While India continues to hold the world's largest Asian Elephant population, rising habitat fragmentation, increasing human–wildlife conflict, and expanding infrastructure pose serious long-term risks. Strengthening ecological corridors, integrating community-driven conservation, and ensuring landscape-level planning will be crucial for securing the future of this keystone species.

Mains Practice Question

The SAIEE 2021–25 marks India's first DNA-based estimation of wild elephants. Critically examine how this scientific approach can transform elephant conservation in India. Discuss the major threats and the policy responses needed for long-term protection.

National Camel Sustainability Initiative

📌 Syllabus Mapping

- **GS Paper III – Environment, Conservation, Livestock Resources, Climate-Resilient Agriculture**
- **GS Paper II – Government Policies, FAO Collaboration, Livelihood Security**
- **GS Paper I – Society, Pastoral Communities, Cultural Traditions**

Introduction

India's camel population—once central to desert livelihoods and transport—has witnessed a drastic decline over the past five decades. To address this ecological and socio-economic crisis, the **Ministry of Fisheries, Animal Husbandry and Dairying**, in partnership with the **Food and Agriculture Organization (FAO)**, has drafted a comprehensive policy paper proposing the **National Camel Sustainability Initiative (NCSI)**. The initiative aims to revive camel-based economies, protect pastoral cultures, and ensure long-term sustainability of camel populations in India's dryland ecosystems.

1. Declining Camel Population: Scale and Reasons

a) **Sharp Population Decline:** India has experienced a **75% reduction** in camel numbers since the 1970s, signalling a critical conservation and livelihood challenge.

b) **Multiple Drivers Behind the Decline**

1. **Reduced Economic Utility**: Mechanisation, motorised transport, and changing agricultural practices have eroded traditional reliance on camels.
2. **Loss of Grazing Lands**: Expansion of agriculture, fencing of commons, invasive species (like Prosopis juliflora), and land conversion have restricted open grazing.
3. **Environmental Stress**: Intensifying **desertification**, altered rainfall patterns, prolonged droughts, and climate stressors have disrupted pasture availability.
4. **Restrictive Legal Frameworks**: State-level bans on camel trade and movement—introduced for protection—have inadvertently harmed pastoral economies.
5. **Weak Market Linkages**: Poor development of value chains for camel milk, camel wool, draft services, and eco-tourism has reduced livelihood incentives.

2. Strategic Recommendations of the Draft Policy Paper

a) National Camel Sustainability Initiative (NCSI)

A flagship programme with multi-dimensional focus, including:

- Camel health and genetic conservation
- Revival of pastoral livelihoods
- Strengthening camel-based enterprises
- Climate-resilient dryland development models

b) Securing Grazing Rights and Commons

- Protecting and restoring **traditional grazing corridors**
- Preventing encroachment on common pastures
- Community-based management of rangelands

c) Strengthening Camel Dairy Value Chains

- Support for camel milk processing units

- Creation of cold-chain infrastructure
- Branding, quality certification, and export development, especially given the growing interest in **camel milk for nutrition and therapeutic uses**

d) Camel-Based Tourism

- Promotion of desert tourism, heritage trails, camel safaris, and cultural festivals
- Linking pastoral arts, crafts, and folk traditions to tourism circuits

e) Veterinary and Genetic Conservation Measures

- Disease surveillance, vaccination, mobile veterinary clinics
- Establishing genetic resource conservation centres for **Dromedary (single-humped)** and **Bactrian (double-humped)** breeds
- Research on drought resilience, nutrition, and reproduction

3. Camel Breeds in India

- **Single-Humped Dromedary** – Predominant in Rajasthan and Gujarat
- **Double-Humped Bactrian** – Found in high-altitude Ladakh, adapted to cold desert conditions

4. Camels: Ecological and Socio-Cultural Relevance

a) Geographical Significance: Around **90%** of India's camels are reared in **Rajasthan** and **Gujarat**, where harsh climatic conditions make them indispensable.

b) Associated Pastoral Communities: Traditional camel-rearing groups include:

- **Raika**
- **Rabari**
- **Fakirani Jat**
- **Manganiyar**

These communities possess extensive traditional ecological knowledge, forming the backbone of camel conservation.

c) Physiological Adaptations

Camels demonstrate remarkable resilience:

- Survive **days without water**
- Travel long distances across arid terrain
- Digest thorny shrubs and sparse vegetation
- Store **fat in humps**, which converts to energy
- Retain water in **blood cells**, enabling endurance and hydration

d) Ecological Role

- **Selective grazing** helps maintain plant diversity
- **Soft-padded hooves** prevent soil compaction
- Reduce spread of invasive species by grazing patterns
- Camel dung enhances soil fertility in arid regions

Thus, camels function as **keystone species in dryland ecosystem stability**.

Conclusion

The proposed **National Camel Sustainability Initiative (NCSI)** reflects a timely intervention to revive a species central to India's desert ecology, pastoral livelihoods, and cultural heritage. Reversing the steep decline in camel numbers will require integrating **grazing rights**, **market development**, **veterinary care**, and **community-led conservation**. As climate change intensifies pressures on arid regions, ensuring camel resilience will be vital for both ecological balance and the socio-economic security of desert communities.

Mains Practice Question

Camel populations in India have witnessed a sharp decline over the decades. Analyse the key challenges affecting camel rearing and critically evaluate how the proposed National Camel Sustainability Initiative (NCSI) can address ecological, economic, and cultural dimensions of camel conservation.

Maitri II – India's New Antarctic Research Station

📌 **Syllabus Mapping**

- **GS Paper III – Environment, Climate Science, Polar Research, Renewable Energy**
- **GS Paper II – International Relations, Global Commons, Antarctic Governance**
- **GS Paper I – Geophysical Phenomena, Cryosphere Studies**

Introduction

India is set to deepen its scientific presence in the Antarctic region with the **Union Finance Ministry's approval for Maitri II**, a next-generation research station to be built in **Eastern Antarctica**. Expected to become operational by **January 2029**, this facility will be India's **fourth permanent base** on the continent and the second to replace ageing infrastructure, reinforcing India's commitment to **polar research, global environmental monitoring, and peaceful scientific cooperation** under the Antarctic Treaty System.

1. Maitri II: Features and Strategic Vision

a) Fourth Indian Research Base in Antarctica: With Maitri II, India strengthens its longstanding polar programme, which currently includes:

- **Dakshin Gangotri (1983)** – now a Supply Base
- **Maitri (1989)** – requires replacement due to ageing
- **Bharati (2012)** – modern station in eastern Antarctica

Maitri II will complement Bharati and modernize India's scientific capacity.

b) A Green, Climate-Resilient Research Facility

- Designed as a **sustainable research base**.
- Powered through **renewable energy systems**:
  - **Solar photovoltaic arrays**
  - **Wind turbine systems**
- Equipped with **automated instruments**, minimizing environmental footprint and enabling round-the-clock data collection.

c) Expected Timelines

- Operational target: **January 2029**
- Will support long-duration expeditions and interdisciplinary scientific missions.

2. Importance of the Antarctic Region

a) Antarctica as a Global Climate Observatory: Often termed a **"natural laboratory"**, Antarctica plays a vital role in:

- Understanding **climate change patterns**
- Studying the **cryosphere**, sea-level rise, and ice dynamics
- Monitoring long-term changes in global atmospheric composition

Ice cores from Antarctica provide records of Earth's climate history spanning **800,000 years**, crucial for IPCC assessments.

b) Reservoir of Natural Resources

- Holds around **75% of the world's freshwater** locked in ice sheets.
- Marine ecosystems contain:
  - Nutrient-rich **edible algae**
  - Over **200 species of fish**
- Mineral traces (iron, copper) have been documented, though extraction is prohibited under the **Madrid Protocol (1991)**.

c) Growing Geopolitical Relevance

- Although the **Antarctic Treaty** prohibits militarization, global competition is rising.
- China has expanded its presence with multiple research stations and **dual-use infrastructures**, raising concerns about strategic signalling.
- Overlapping territorial claims among states (Argentina, Chile, UK, Norway, Australia, France, New Zealand) continue to shape geopolitics.

Maitri II supports India's long-term stakes in **Antarctic governance**, scientific diplomacy, and peaceful cooperation.

3. India's Presence and Initiatives in Antarctica

India's engagement with Antarctica is over **four decades old**, governed by the **Indian Antarctic Act, 2022**, and anchored in robust scientific expeditions overseen by the **National Centre for Polar and Ocean Research (NCPOR)**.

Major Indian Initiatives in Antarctica

- **Indian Antarctic Programme (since 1981)**
- **Multiple Antarctic Expeditions** conducted annually
- **Dakshin Gangotri (1983)** – First Indian base
- **Maitri (1989)** – Operational second base; supports geological and climate research
- **Bharati (2012)** – State-of-the-art station near Larsemann Hills
- **INDIAn Remote Sensing (IRS) studies** for ice-sheet mapping
- **Polar science projects** on aerosols, geomagnetism, and ocean-atmosphere interactions
- **Antarctic Act, 2022** – Provides legal oversight, environmental protection, and regulatory mechanisms for Indian activities.

Maitri II will further strengthen India's role in **scientific diplomacy**, **global cryospheric research**, and **climate modelling**.

Conclusion

Maitri II marks a significant step in India's polar research trajectory, reinforcing its commitment to scientific exploration and environmental stewardship in Antarctica. By incorporating **renewable energy**, **automated observational systems**, and advanced laboratories, the station aligns with global sustainability norms under the Antarctic Treaty System. As climate change accelerates, India's enhanced presence through Maitri II will contribute crucial insights to global climate science, while simultaneously securing India's strategic and scientific interests in the world's last uninhabited frontier.

Mains Practice Question

Discuss the significance of Maitri II in strengthening India's scientific, environmental, and geopolitical engagement in Antarctica. How does the development of a green research base align with global Antarctic governance frameworks?

India's Forest Environmental Accounts under SEEA

📌 Syllabus Mapping

- **GS Paper III – Environment, Forest Conservation, Climate Change, Natural Resource Management**
- **GS Paper II – Government Policies, International Statistical Frameworks (UN-SEEA)**
- **GS Paper I – Environmental Geography, Resource Accounting**

Introduction

The **Ministry of Statistics and Programme Implementation (MoSPI)** has released the **Environmental Accounting on Forest 2025 Report**, marking India's **first dedicated national publication** on forest accounting aligned with the **UN System of Environmental Economic Accounts (SEEA)**. This eighth instalment in the environmental accounting series represents a critical step in integrating forests into national economic decision-making by quantifying changes in forest assets, ecosystem condition, and ecosystem services.

1. Environmental Accounting and the SEEA Framework

a) What is SEEA?

The **UN System of Environmental Economic Accounts (SEEA)**—developed in 2012 by the **United Nations**, **European Commission**, and **FAO**—provides a globally accepted framework for integrating environmental data with economic statistics.

b) India's Adoption

- India officially adopted SEEA in **2018**, enabling MoSPI to standardize measurement of natural capital across states.
- The 2025 report is India's first **exclusively forest-focused** environmental account.

c) Importance of Forest Accounting

Forest accounts help:

- Track changes in forest cover and extent
- Evaluate forest ecosystem health
- Monetize ecosystem services (carbon sequestration, provisioning goods)
- Improve sustainable resource management and climate policy planning

2. Key Findings of the Environmental Accounting on Forest 2025 Report

The report is divided into **four major accounts**: *Physical Asset*, *Extent*, *Condition*, and *Service Accounts*. Collectively, these represent the most comprehensive national-level forest accounting exercise undertaken in India.

A. Physical Asset Account

a) Forest Cover Changes (2010–11 to 2021–22)

- Net increase of **17,444.61 sq. km**
- Percentage rise: **22.50%**
- Total forest cover: **7.15 lakh sq. km**, accounting for **21.76%** of India's geographical area

b) Top Gainers

- **Kerala**
- **Karnataka**
- **Tamil Nadu**
  These states have benefited from afforestation programmes, agroforestry expansion, and community-led forestry initiatives.

B. Extent Account

a) Forest Extent (2013–2023)

- Net increase of **3,356 sq. km**
- Major reason: **reclassification and boundary rationalization** within *Recorded Forest Areas (RFA)*.

b) Leading States in RFA Addition

- **Uttarakhand**
- **Odisha**
- **Jharkhand**

These changes reflect administrative improvements in mapping and land-use documentation.

C. Condition Account

a) What It Measures: Assesses ecosystem quality using indicators like **Growing Stock**, which refers to the *volume of usable wood present in living trees*.

b) Growing Stock Trends (2013–2023)

- Increase of **305.53 million cubic metres**
- Overall growth: **7.32%**

c) Top Contributors

- **Madhya Pradesh**
- **Chhattisgarh**
- **Telangana**

These states possess extensive dry and moist deciduous forests that respond strongly to regeneration and conservation interventions.

D. Service Accounts

This section quantifies the **economic value of ecosystem services** provided by forests.

1. Provisioning Services: Includes timber, bamboo, fuelwood, medicinal plants, and other non-timber forest products (NTFPs).

- Contribution rose to **~0.16% of India's GDP (2021–22)**
- Top States:
  - **Maharashtra**
  - **Gujarat**
  - **Kerala**

These states have strong forest-based industries and community forest networks.

2. Regulating Services: Focuses on **carbon retention**, climate regulation, water recharge, soil conservation, and habitat maintenance.

- Value reached **~2.63% of GDP (2021–22)**
- Top States:
  - **Arunachal Pradesh**

- **Uttarakhand**
- **Assam**

Their extensive Himalayan and northeastern forests provide major carbon sinks critical for India's climate commitments.

3. Significance of the 2025 Report

a) Supports Climate Commitments: Helps track progress toward India's **NDC targets**, particularly the carbon sink goal.

b) Enhances Forest Governance

- Informs state-level forest management and budgeting.
- Enables better monitoring under the **Green India Mission** and **Compensatory Afforestation Fund Management**(CAMPA).

c) Integrates Ecosystems into National Accounting: Shifts India toward **natural capital accounting**, essential for sustainable development planning.

d) Evidence-Based Decision Making: Allows policymakers to assess trade-offs between land use, biodiversity conservation, and economic needs.

Conclusion

The **Environmental Accounting on Forest 2025 Report** marks a transformative approach to forest governance in India by aligning national forest data with international SEEA standards. The substantial rise in forest cover, improvements in ecosystem condition, and increasing valuation of ecosystem services reveal India's progress in natural resource management. However, sustaining these gains will require continued afforestation, improved forest quality, and enhanced monitoring systems that recognize forests as vital natural capital.

Mains Practice Question

Natural capital accounting is becoming central to environmental governance. Critically analyse the key insights from the Environmental Accounting on Forest 2025 Report and discuss how SEEA-based forest accounts can strengthen India's sustainable development and climate policy.

India's First Legally Binding GEI Target Rules

📌 Syllabus Mapping

- **GS Paper III – Climate Change, Environmental Governance, Carbon Markets, Pollution Control**
- **GS Paper II – Government Policies, Regulatory Frameworks, International Climate Commitments (Paris Agreement)**
- **GS Paper I – Economic Geography (Industrial Emissions, Resource Use Patterns)**

Introduction

In a landmark step towards establishing a regulated carbon market and enforcing industrial climate accountability, India has notified its **first legally binding Greenhouse Gas Emission Intensity (GEI) Target Rules, 2025**. These rules mandate specific emission-intensity reduction targets for selected carbon-intensive industries, aligning the country's domestic mitigation efforts with its **Nationally Determined Contributions (NDCs)** under the Paris Agreement.

1. What Is Greenhouse Gas Emission Intensity (GEI)?

GEI measures the **quantity of greenhouse gases emitted per unit of product output**.
For example:

- GHG emissions per tonne of **cement**,
- Per tonne of **aluminium**,
- Per tonne of **paper**.

This metric focuses on **efficiency** rather than absolute emissions, allowing sectors to grow while reducing emissions per output unit.

2. Scope of the GEI Target Rules, 2025

a) Sectors Covered: The first phase targets **four high-emission industrial sectors**:

1. **Aluminium**
2. **Cement**
3. **Pulp & Paper**
4. **Chlor-alkali**

These sectors account for a significant share of India's industrial carbon footprint.

b) Baseline Year: All reductions will be measured against a **2023–24 baseline**.

c) Legally Binding Obligations

- Each notified facility must reduce GEI **per unit of product**, not merely total emissions.
- This pushes industries toward **process efficiency, clean energy adoption, and technological upgrades**.

3. Legal and Institutional Framework

1. **Issued Under:** The rules emerge from the **Carbon Credit Trading Scheme (CCTS), 2023**, India's first national carbon market mechanism.
2. **Compliance Authority:** **Central Pollution Control Board (CPCB)** will ensure adherence, oversee reporting, and initiate action for non-compliance.
3. **Carbon Credit Issuance:** **Bureau of Energy Efficiency (BEE)** will issue certified carbon credits to entities that overachieve emission targets.

4. How the GEI Rules Work: Mechanism Explained

a) If an Entity Performs Better

- Facilities that emit **less than their assigned target** earn **tradable carbon credit certificates**.
- These credits can be sold to other industries in the **domestic carbon market**.

b) If an Entity Fails to Meet Targets

They must:

1. **Buy additional carbon credits**, OR
2. **Pay environmental compensation**, calculated as *twice the average carbon credit price* for that compliance year.

c) Transparency Measures

- Mandatory registration and disclosure on the **Indian Carbon Market Portal**.
- Improves traceability, monitoring, and public accountability.

5. Significance of GEI Target Rules

a) Operationalizing India's Carbon Market: The rules activate the compliance component of the **CCTS**, paving the way for a functioning **domestic carbon trading ecosystem**.

b) Market-Based Climate Action: Incentivizes industries to adopt:

- Cleaner fuels
- Energy-efficient technologies
- Green hydrogen
- Renewable integration

c) Aligning with India's NDCs: Helps India meet its targets to:

- Reduce the **emission intensity of GDP by 45% by 2030**
- Enhance domestic capacity to implement low-carbon pathways.

d) Revenue for Environmental Infrastructure: Environmental compensation collected from non-compliant units supports:

- Market infrastructure
- Capacity building
- Monitoring mechanisms

e) Industrial Transformation: Encourages modernization of high-emission sectors through:

- Waste heat recovery
- Electrification of processes
- 24x7 renewable power adoption
- Circular economy solutions

f) Strengthening National and Global Credibility: Moves India closer to international best practices, improving investor confidence and enabling participation in future global carbon markets.

6. Understanding the Carbon Credit Trading Scheme (CCTS), 2023)

a) Purpose: Establishes India's **first domestic carbon market** to lower industrial emission intensity in alignment with NDCs.

b) Legal Basis: Notified under the **Energy Conservation Act, 2001**, reinforcing statutory backing for climate governance.

c) Structure

- Includes:
  - **Compliance mechanism** for energy-intensive industries
  - **Voluntary offset system** for other entities
- Provides a dual pathway for both mandatory and voluntary climate action.

Conclusion

The notification of India's first **Greenhouse Gas Emission Intensity (GEI) Target Rules** marks a major advancement in market-led climate governance. By linking industrial performance to tradable carbon credits, the rules aim to simultaneously strengthen competitiveness, lower emissions, and operationalize a transparent carbon market. As India moves toward its 2070 net-zero vision, the GEI framework provides a strong regulatory foundation to steer carbon-heavy sectors toward deep decarbonization.

Mains Practice Question

India's GEI Target Rules, 2025 represent a major step in operationalizing the domestic carbon market. Critically examine how legally binding emission-intensity targets can shape industrial decarbonization and support India's long-term climate commitments.

Rising Ozone Pollution – Delhi–NCR Worst Hit

📌 Syllabus Mapping

- **GS Paper III – Environment, Air Pollution, Climate Change, Health and Agriculture Impacts**
- **GS Paper II – Governance (CPCB, Environmental Standards)**
- **GS Paper I – Atmospheric Phenomena**

Introduction

A recent assessment by the **Central Pollution Control Board (CPCB)** has revealed alarming levels of **ground-level ozone pollution** across India, with the **Delhi–National Capital Region (NCR)** emerging as the most severely affected, followed by the **Mumbai Metropolitan Region (MMR)**. The findings highlight an expanding air-quality challenge, particularly in urban and peri-urban environments where ozone formation is driven by a complex interaction of emissions, climatic conditions, and urban heat.

1. Understanding Ozone (O_3): A Dual-Natured Gas

a) What is Ozone?

- Ozone is a **triatomic form of oxygen (O_3)**.
- It exists in two major layers:
  - **Stratospheric Ozone (Good Ozone):** Forms a protective shield that filters **UV-B radiation**, safeguarding life.
  - **Tropospheric Ozone (Bad Ozone):** A harmful pollutant formed at ground level through chemical reactions.

b) Regulatory Standards in India

- **8-hour average limit: 100 µg/m³**
- **1-hour limit: 180 µg/m³**
  Crossing these thresholds has been increasingly common during summer months and high-heat episodes.

2. Ground-Level Ozone (GLO): Formation and Behaviour

a) Nature of GLO

- Ground-level ozone is a **secondary pollutant**.
- Unlike primary pollutants (e.g., PM2.5), it is **not emitted directly**; rather it forms in the atmosphere.

b) Formation Mechanism

Created through **photochemical reactions** between:

- **Nitrogen oxides (NOx)**

- **Volatile Organic Compounds (VOCs)**
  in the presence of **sunlight**.

c) Key Anthropogenic Sources

- Vehicular emissions (major contributor in urban India)
- Thermal power plants
- Industrial activities
- Residential burning
- Agricultural residue burning

d) Natural Sources

- Soil emissions of **NOx**
- Wildfire-related pollutants such as **carbon monoxide (CO)** and **biospheric methane**

e) Atmospheric Lifespan

- Short-lived: persists for **hours to weeks**, yet can travel long distances under wind influence.

3. Why Delhi–NCR and Mumbai Are Worst Affected

1. **High NOx and VOC Load:** Dense vehicular traffic, industrial clusters, and ongoing construction create ideal precursor conditions.
2. **Urban Heat Island Effect:** Urban surfaces retain heat, accelerating photochemical reactions.
3. **Stagnant Weather Patterns:** Low wind speeds, high solar radiation, and heatwaves intensify ozone formation episodes.
4. **Regional Transport of Pollutants**
   - Pollutants from adjoining states—especially from stubble burning and industrial belts—contribute to ozone peaks.
   - These factors combine to create a persistent **ozone formation cycle**, particularly during summer months.

4. Impacts of Ground-Level Ozone

a) Health Impacts: Ground-level ozone:

- **Aggravates bronchitis**
- **Triggers asthma attacks**
- Causes **respiratory irritation** and reduced lung function
- Increases emergency room visits during high-ozone days

Children, elderly, and those with pre-existing lung conditions face the greatest risk.

b) Climate Impacts

- Ozone is a **potent short-lived climate pollutant (SLCP)**.
- It absorbs radiation, contributing to **near-surface warming**.
- Major component of **photochemical smog**, especially in urban regions.

c) Impacts on Agriculture and Ecosystems

- Impairs **photosynthesis**
- Reduces **crop productivity**
- Disrupts ecosystem functioning
- Particularly harmful to sensitive crops such as wheat, soybeans, and cotton

India, being an agrarian economy, faces significant yield losses under rising ozone levels.

5. Emerging Concerns and Policy Imperatives

a) **Seasonal Ozone Peaks:** Heatwaves and prolonged summers under climate change are intensifying ozone formation.
b) **Monitoring Gaps:** Ozone levels vary significantly across the day; many Indian cities lack continuous real-time monitoring stations.
c) **Need for Multi-Pollutant Approach:** Controlling PM2.5 alone is insufficient; ozone requires targeted reduction in NOx and VOC emissions.

Conclusion

The recent CPCB findings underline the growing threat posed by **ground-level ozone**, particularly across high-density urban corridors such as Delhi–NCR and MMR. As a secondary pollutant shaped by both emissions and climate dynamics, controlling ozone requires **integrated urban planning**, stringent **NOx/VOC**

controls, advanced **photochemical modelling**, and public health preparedness. Addressing ozone pollution is therefore essential not only for improving air quality but also for strengthening climate resilience and safeguarding agricultural productivity.

Mains Practice Question

Ground-level ozone is emerging as a major air pollutant in Indian cities. Analyse the causes behind rising ozone levels and discuss their implications for health, climate, and agriculture. Suggest a comprehensive strategy for mitigation.

Gokul Reservoir & Udaipur Lake – New Ramsar Sites

📌 Syllabus Mapping

- **GS Paper III – Environment, Wetland Conservation, Biodiversity, Ramsar Convention**
- **GS Paper I – Physical Geography (Fluvial Landforms: Oxbow Lakes)**
- **GS Paper II – International Environmental Treaties (UNESCO, Ramsar Convention)**

Introduction

India has expanded its network of internationally recognised wetlands with the inclusion of **Gokul Reservoir** and **Udaipur Lake** in Bihar as new **Ramsar Sites**. These designations highlight the ecological significance of the state's oxbow lake systems and reinforce India's growing commitment to conserving wetland ecosystems under the **Ramsar Convention**. With these additions, India now hosts **93 Ramsar Sites** covering **1,360,719 hectares**, strengthening its position as one of the countries with the largest number of protected wetlands globally.

1. Bihar's New Ramsar Sites: Ecological Importance

a) Gokul Reservoir (Buxar District)

- Located along the **southern bank of the Ganga River**.
- Functions as a biodiverse wetland supporting:
  - Aquatic plants
  - Fish species
  - Migratory and resident birds
- Its proximity to the Ganga enhances its hydrological connectivity and ecological productivity.

b) Udaipur Lake (West Champaran District)

- Falls within the **Udaipur Wildlife Sanctuary**, adding to the region's ecological richness.
- A major wintering habitat for **migratory waterbirds**, including:
  - **Pochard (Aythya ferina)** – globally vulnerable species
- The lake supports wetland vegetation, marshes, and shallow-water ecosystems vital for bird foraging and breeding.

c) Bihar's Growing Network

Before this expansion, Bihar had three listed Ramsar Sites:

1. **Kabar Jheel (Kabar Taal)** – Begusarai
2. **Nagi Bird Sanctuary** – Jamui
3. **Nakti Bird Sanctuary** – Jamui

The addition of two more strengthens biodiversity conservation in the Gangetic plains.

2. Understanding Oxbow Lakes (Fluvial Geomorphology)

Both new Ramsar sites are **oxbow lakes**, formed through river meandering processes.

Mechanism (Infographic explained in text)

1. **Initial Meander Formation**
   - Rivers flowing through alluvial plains develop **sinuous curves**.
   - **Erosion** occurs on the outer bend (cut bank), while **deposition** happens on the inner bend (point bar).
2. **Neck Cut-Off Process**
   - Over time, continued erosion narrows the **neck** of the meander.
   - During peak flow or flooding, the river **cuts through the neck**, shortening its route.
3. **Formation of an Oxbow Lake**
   - The abandoned meander loop becomes isolated from the main channel.
   - This crescent-shaped waterbody is known as an **oxbow lake**, typically nutrient-rich and biologically productive.

Oxbow lakes are crucial wetlands for:

- Fish breeding
- Bird habitats
- Floodwater storage
- Groundwater recharge

Thus, their conservation brings both ecological and hydrological benefits.

3. Ramsar Convention: Global Framework for Wetland Conservation

a) Background

- Adopted in **1971** in *Ramsar, Iran*.
- Functions as an **intergovernmental treaty under UNESCO**.

b) Objective

Provides a framework for:

- **Conservation**,
- **Wise use** of wetlands,
- **International cooperation** among member states.

c) Criteria for Ramsar Designation

A wetland must meet *at least one* of nine criteria, including:

- Supporting **20,000+ waterbirds**
- Hosting vulnerable, endangered, or critically endangered species
- Maintaining biological diversity
- Supporting fish species at critical life stages

d) India's Participation

- India ratified the Convention in **1982**.
- India has built one of the fastest-growing Ramsar networks in Asia.

4. Significance of New Ramsar Listings

a) **Biodiversity Conservation:** The recognition helps protect rare and migratory species dependent on Gangetic wetlands.
b) **Wetland Management and Monitoring:** Ramsar designation brings stronger monitoring, restoration, and integrated management plans under the **Wetlands (Conservation and Management) Rules, 2017**.
c) **Boost to Eco-Tourism and Local Livelihoods:** Sustainable wetland tourism can benefit local communities while ensuring conservation.
d) **Climate and Hydrological Benefits:** Oxbow lakes help regulate:
   - Flood flows
   - Water storage
   - Microclimate stability
   - Groundwater recharge
e) **Strengthening India's International Commitments**Supports global goals related to **SDG 6 (Water)**, **SDG 13 (Climate Action)**, and **SDG 15 (Life on Land)**.

Conclusion

The designation of **Gokul Reservoir** and **Udaipur Lake** as new Ramsar Sites enhances Bihar's ecological profile and strengthens India's commitment to wetland conservation. As climate change intensifies hydrological variability across the Gangetic basin, safeguarding oxbow lakes becomes essential for protecting biodiversity, supporting livelihoods, and sustaining ecological resilience. Effective management, backed by scientific monitoring and community participation, will be central to preserving these vital ecosystems.

Mains Practice Question

What is the ecological significance of oxbow lakes in the Gangetic floodplains? Discuss the importance of the recent Ramsar designation of Gokul Reservoir and Udaipur Lake in strengthening wetland conservation in India.

Global Forest Resources Assessment 2025

📌 Syllabus Mapping

- **GS Paper III – Environment, Forest Resources, Climate Change, Carbon Stock, FAO Reports**
- **GS Paper II – International Organisations (FAO, GEO), Global Environmental Governance**
- **GS Paper I – World Geography: Forest Types, Biomes**

Introduction

The **Food and Agriculture Organization (FAO)** has released the **Global Forest Resources Assessment (GFRA) 2025**, an authoritative global reference on forest status and trends published every five years. Unveiled during the **Global Forest Observations Initiative (GFOI) Plenary in Bali**, the assessment provides a comprehensive picture of global forest extent, deforestation patterns, natural regeneration, and forest carbon stocks. The findings offer critical insights for forest governance, climate mitigation, and sustainable land management.

1. Institutional Context: GFOI and GEO

a) Global Forest Observations Initiative (GFOI)

- A flagship programme of the **Group on Earth Observations (GEO)**.
- Supports countries in using **Earth observation technologies** for forest monitoring, REDD+ implementation, and greenhouse gas inventories.

b) Group on Earth Observations (GEO)

- GEO is a **multilateral partnership** of governments, academic institutions, civil society, and private-sector actors.
- Focus: Harness **Earth intelligence** for informed decision-making on climate, forests, water, disasters, and agriculture.
- **India is a member** of GEO, contributing to global environmental monitoring and satellite-based data sharing.

2. Key Global Findings from GFRA 2025

a) Forest Extent

- Global forests cover **4.14 billion hectares**, approximately **32% of the world's land surface**.
- Distribution:
  - **Tropical forests:** Nearly **half** of the global total
  - **Boreal forests:** Second largest
  - **Temperate and subtropical** domains follow

b) Regional Forest Distribution

- **Europe** holds the **largest forest area** globally, accounting for **25%** of the world's forest cover.
- Significant variation exists across continents due to climate, land-use pressures, and conservation practices.

c) India's Forest Extent

- India has moved **up one rank to 9th position globally** in terms of total forest area.
- India holds **2% of global forest extent**, reflecting sustained domestic afforestation and conservation efforts.
- The country also ranks **5th worldwide in rubber plantation area**, highlighting its expanding agroforestry sector.

3. Deforestation, Expansion, and Regeneration Trends

a) Deforestation Rate

- Global deforestation has **declined significantly**:
  - **2015–2025:** 10.9 million hectares per year
  - **1990–2000:** 17.6 million hectares per year
- This downward trend reflects improved forest governance, stronger policies, and restoration pledges under global climate agreements.

b) Natural Regeneration

- More than **90%** of global forests are **naturally regenerating**, indicating that ecological processes remain dominant in global forest maintenance.
- This underscores the role of natural ecosystems in sustaining biodiversity and carbon sequestration.

4. Forest Carbon Stock and Climate Implications

a) Global Carbon Stock

- Forests hold an estimated **714 gigatonnes (Gt)** of carbon.
- Distribution of forest carbon:
  - **Soil:** Largest reservoir
  - **Living biomass (trees and vegetation):** Second largest
  - **Litter and deadwood:** Remaining proportion

b) Climate Relevance

- Stable or rising carbon stocks indicate forests' continued role as **carbon sinks**, bolstering global mitigation efforts.
- Protection of forest soils becomes essential, given their dominating share of stored carbon.

5. Major Global Forest Disturbances

a) Subtropical Forests

- Experience high incidence of **fire**, including wildfires intensified by climate change and land-use activities.

b) Temperate and Boreal Forests

- Affected mainly by:
  - **Insect infestations**
  - **Diseases**
  - **Extreme weather events** (storms, heatwaves, freezing events)

These disturbances directly affect forest productivity, carbon balance, and biodiversity.

6. Implications for India

a) Policy and Restoration

- India's improved ranking suggests effective implementation of programmes such as:
  - **Green India Mission**
  - **Compensatory Afforestation Fund (CAMPA)**
  - **Joint Forest Management (JFM)**
  - State-driven afforestation initiatives

b) Climate Commitments

- Enhanced forest area and carbon stock support India's **NDC target** of creating an additional carbon sink of **2.5–3 billion tonnes of CO_2 equivalent**.

c) Need for Monitoring and Landscape-Level Management

- Climate-induced disturbances (forest fires in Western Ghats, Himalayan diseases, invasive species) demand continuous monitoring and technological integration via Earth observation tools.

Conclusion

The **GFRA 2025** highlights both encouraging global progress in slowing deforestation and persistent vulnerabilities from climatic disturbances. India's improved ranking and growing forest extent demonstrate the effectiveness of its national afforestation and agroforestry policies. However, sustaining these gains will require integrating **Earth observation technologies**, enhancing ecosystem resilience, and ensuring community participation in forest conservation. As global climate risks grow, forest resources remain central to carbon sequestration, biodiversity preservation, and sustainable development.

Mains Practice Question

Discuss the major findings of the Global Forest Resources Assessment (GFRA) 2025. How do these findings reflect global forest trends, and what implications do they hold for India's forest governance and climate commitments?

IUCN World Conservation Congress 2025 – Key Decisions

📌 Syllabus Mapping

- **GS Paper III – Environment, Biodiversity, Conservation Governance, International Treaties**
- **GS Paper II – International Organisations, Multilateral Environmental Agreements**
- **GS Paper I – Ecology and Bio-technology (Synthetic Biology)**

Introduction

The **International Union for Conservation of Nature (IUCN)** concluded its **World Conservation Congress 2025** in Abu Dhabi, UAE. Convened once every four years, the Congress serves as the premier global platform for shaping conservation priorities and environmental governance. At its core lies the **Members' Assembly**, IUCN's highest decision-making authority, which adopts motions that guide global conservation policy and influence national environmental frameworks.

1. Understanding the IUCN World Conservation Congress

a) Nature and Purpose

- Brings together governments, civil society, indigenous groups, academics, and conservation experts.
- Aims to set global biodiversity goals, strengthen implementation mechanisms, and support countries in meeting commitments under frameworks such as the **Kunming–Montreal Global Biodiversity Framework (GBF)**.

b) Governance Structure *(Infographic content incorporated)*

- Headquarters: **Gland, Switzerland**.
- Established in **1948**, IUCN is the **largest global environmental network**, comprising **1400+ members**, including states, NGOs, and research organizations.
- Key bodies:
  - **World Conservation Congress** – supreme policy authority
  - **IUCN Council** – governing body between Congress sessions
- Instruments:
  - **IUCN Red List**, **World Heritage Outlook**, **World Database on Protected Areas (WDPA)**.

India is a member of IUCN and actively participates in its conservation frameworks.

2. Major Resolutions and Outcomes of the 2025 Members' Assembly

a) Abu Dhabi Call to Action

A central outcome urging accelerated global conservation efforts in **five critical domains**:

1. **Nature as the foundation for human well-being** – Recognising ecosystems as pillars of health, livelihoods, and disaster resilience.
2. **Strengthening multilateralism** – Enhancing cooperation under global agreements such as GBF, UNFCCC, and Ramsar Convention.
3. **Advancing justice, equity, and inclusion** – Emphasizing indigenous peoples' rights, equitable access to natural resources, and gender-inclusive conservation.
4. **Scaling up knowledge and technological innovation** – Promoting AI, Earth observation, genomic tools, and digital biodiversity monitoring.
5. **Mobilising resources for climate and nature** – Calls for increased climate finance, biodiversity funds, and public–private partnerships.

This roadmap reflects the shift towards **integrated nature-climate action**.

b) Expansion of IUCN Membership

- Over **100 new members** joined the union.
- Notably, **six sovereign states** were admitted:
  Armenia, Tajikistan, Marshall Islands, Gabon, Tuvalu, and Zimbabwe.

Their inclusion expands representation from Asia, Africa, and small island developing states—key regions for conservation and climate vulnerability.

c) First-ever Global Policy on Synthetic Biology and Nature Conservation

A landmark decision acknowledging both the opportunities and risks of emerging biotechnologies.

Potential Benefits

- Restoration of lost genetic diversity
- Genetically informed species recovery
- Local eradication of **invasive alien species**
- Improved disease resistance in vulnerable species

Potential Risks

- **Unintended ecological cascades**
- Genetic contamination
- Disruption of food webs
- Governance and ethical concerns

The policy establishes principles for **risk assessment, precaution, transparency, and global regulatory cooperation**.

d) Recognition of "Ecocide" as an International Crime

- The Congress formally supported the recognition of **ecocide**—deliberate and severe environmental destruction—as a crime under the **International Criminal Court (ICC)**.
- This move aims to deter large-scale environmental harm by:
  - Corporations
  - Armed actors
  - Illegal extractive operations

It strengthens the global movement for **environmental justice** and accountability.

3. Broader Implications of the 2025 Congress

a) Strengthening the Global Biodiversity Framework (GBF): Resolutions reinforce commitments to halt biodiversity loss by 2030 and restore ecosystems by 2050.

b) Linkages with Climate Negotiations

The Congress outcomes complement climate negotiations by integrating:

- Nature-based solutions
- Blue carbon ecosystems
- Restoration-based mitigation strategies

c) New Environmental Governance Tools

Focus on data-driven decision making via:

- Satellite-based observation
- AI-enabled species monitoring
- Open-access biodiversity databases

d) Relevance for India

For India, the Congress provides:

- Scientific insights for species recovery plans
- Legal frameworks for addressing biopiracy, invasive species, and synthetic biology
- Enhanced global cooperation for protected area expansion

Conclusion

The **IUCN World Conservation Congress 2025** in Abu Dhabi marks a pivotal moment for global environmental governance. Through forward-looking resolutions—ranging from synthetic biology governance to the recognition of ecocide—the Congress underscores the urgent need for integrated, ethically grounded, and science-driven conservation action. As climate change accelerates biodiversity loss, the decisions from Abu Dhabi strengthen collective resolve to safeguard ecosystems, empower communities, and uphold multilateralism.

Mains Practice Question

Critically examine the major outcomes of the IUCN World Conservation Congress 2025. How do the resolutions adopted—such as the Abu Dhabi Call to Action, synthetic biology policy, and recognition of ecocide—reshape global conservation governance?

IUCN Red List 2025 – Status of Indian Birds

📌 Syllabus Mapping

- **GS Paper III – Environment, Biodiversity, Species Conservation, Climate Change**
- **GS Paper II – International Organisations (IUCN), Global Environmental Governance**
- **GS Paper I – Ecology and Biogeography**

Introduction

The latest update to the **IUCN Red List of Threatened Species**, released during the **IUCN World Conservation Congress 2025**, has revised the conservation status of several species worldwide. For India, this update is particularly significant as the status of **12 native bird species** has been modified—**eight downlisted**, indicating encouraging conservation progress, while **four species have been uplisted**, highlighting emerging ecological threats to open natural ecosystems.

1. Changes in Conservation Status of Indian Bird Species

a) Species Uplisted (Increased Threat Level)

The following four Indian bird species have moved to higher threat categories:

1. **Indian Courser** – Uplisted to **Near Threatened**
2. **Indian Roller** – Uplisted to **Near Threatened**
3. **Rufous-tailed Lark** – Uplisted to **Near Threatened**
4. **Long-billed Grasshopper-warbler** – Uplisted to **Endangered**

These species are highly dependent on **open natural ecosystems**, including:

- Grasslands
- Semi-arid and desert landscapes
- Agricultural fallows
- Hilly scrublands
- Dry croplands

The uplisting reveals rising ecological pressures in landscapes often undervalued in conservation policy.

2. Threats to Open Natural Ecosystems in India

f) **Infrastructure Expansion:** Unregulated installation of **transmission lines**, **wind turbines**, and **solar parks** increases collision risk and causes habitat alteration.
g) **Agricultural Intensification:** Shifts to high-input cropping, monocultures, pesticides, and loss of fallow periods diminish habitat suitability.
h) **Invasive Species:** Spread of invasive shrubs and trees disrupts open habitats, altering microclimate and plant composition.
i) **Misguided Afforestation**

- **Conversion of grasslands into woodlands** under plantation drives disrupts ecosystems that naturally sustain low tree density.
- This is a critical concern as grasslands are often misclassified as “wastelands”.

Collectively, these pressures threaten multiple species adapted to India’s open landscapes, many of which are already declining.

3. About the IUCN Red List of Threatened Species

a) Background: Established in **1964**, the Red List is the **world’s most comprehensive assessment** of global species conservation status.

4. Global Trends in the 2025 Red List Update

a) Sharp Decline in Bird Populations Globally

- Over **half of bird species worldwide** are experiencing population decline.
- Principal drivers include:
  - **Habitat loss and fragmentation**
  - **Agricultural expansion and intensification**
  - **Commercial logging**
  - Climate-driven ecological disruptions

b) Ecological Importance of Birds

Birds are essential **ecosystem service providers**, functioning as:

- **Pollinators**
- **Seed dispersers**
- **Natural pest controllers**
- **Scavengers**, reducing disease spread
- **Ecosystem engineers** shaping vegetation structure

Their decline indicates broader ecological imbalance.

5. Status of Arctic Marine Mammals

a) Increasing Threat to Arctic Seals

Three Arctic seal species have moved closer to extinction due to:

- **Rapid sea ice loss**
- **Rising ocean temperatures**
- Changing prey distribution

As **keystone species**, seals influence:

- Marine food webs
- Nutrient recycling
- Predator-prey dynamics

Their decline signals accelerating ecological stress in polar ecosystems.

6. A Rare Conservation Success: Green Sea Turtle

- **Green Sea Turtle** has improved from **Endangered → Least Concern**.
- This success is attributed to:
  - Strict protection of nesting beaches
  - Regulation of fisheries
  - International collaboration under **CITES**
  - Community-led conservation

It demonstrates that long-term, targeted conservation interventions can reverse declines.

Conclusion

The 2025 IUCN Red List update reveals a complex global conservation picture—**promising recoveries in some species**but **deepening threats to many others**, especially those dependent on fragile open ecosystems and climate-sensitive habitats. For India, the uplisting of key grassland and scrubland bird species underscores the urgent need to prioritize **grassland conservation**, regulate **infrastructure expansion**, and adopt **ecosystem-appropriate land management**. Maintaining biodiversity resilience will require harmonizing development with ecological stewardship at both national and global levels.

Mains Practice Question

The 2025 update to the IUCN Red List revises the status of several Indian bird species. Analyse the major ecological threats affecting open natural ecosystems in India and discuss their implications for bird conservation. Suggest policy measures to address these challenges.

BIOTECHNOLOGY & HEALTH

Nobel Prize (Medicine) 2025 – Peripheral Immune Tolerance

📌 Syllabus Mapping

- **GS Paper III – Science & Technology, Biotechnology, Human Health, Immunology**
- **GS Paper II – Health Governance, Medical Research, Nobel Prize Contributions**
- **GS Paper I – Human Physiology (Immune System)**

Introduction

The **2025 Nobel Prize in Physiology or Medicine** has been jointly awarded to **Mary E. Brunkow**, **Fred Ramsdell**, and **Shimon Sakaguchi** for their pioneering discoveries on **peripheral immune tolerance**. Their work has radically transformed modern immunology by explaining how the body prevents harmful immune attacks against its own tissues, while still defending against external pathogens. These discoveries underpin major medical advances in autoimmune diseases, transplantation, and cancer immunotherapy.

1. Understanding Immune Tolerance

The immune system must strike a **delicate balance**:

- **Identify and eliminate pathogens**, and
- **Avoid attacking the body's own cells**.

To maintain this balance, the body relies on two complementary systems:

1. **Central Tolerance**
2. **Peripheral Tolerance**

2. Central Tolerance: First Line of Self-Protection

a) Site of Action – The Thymus

- T cells mature in the **thymus**, where they undergo selection.
- Immature T cells that mistakenly recognize "self" proteins are eliminated through a strict screening process.

b) Why Central Tolerance Is Not Enough

Despite this filtering, **some self-reactive T cells escape** into the bloodstream.
These cells are potentially dangerous and can trigger autoimmunity if not regulated in time.

3. Peripheral Tolerance: The Body's Second Security Layer

a) Discovery by Shimon Sakaguchi: Sakaguchi identified a unique class of T cells—**Regulatory T cells (Treg cells)**—that act as immune system moderators.

b) Function of Regulatory T Cells

- Patrol the body outside the thymus (the **periphery**).
- Detect self-reactive T cells that escaped central tolerance.
- **Suppress their harmful activity**, protecting healthy tissues.

Treg cells therefore function as **"immune security guards."**

4. FOXP3 Gene: The Master Controller of Regulatory T Cells

a) Discovery by Mary Brunkow and Fred Ramsdell

They identified the **FOXP3 gene**, a transcription factor that controls the **development and functioning** of regulatory T cells.

b) FOXP3 Mutations and IPEX Syndrome

- Mutations in FOXP3 prevent Treg cells from forming properly.

- This causes **IPEX syndrome (Immune dysregulation, Polyendocrinopathy, Enteropathy, X-linked)**.
- The body launches attacks on its *own* tissues, resulting in severe autoimmune disorders in infants.

This discovery established the **genetic basis** of peripheral immune tolerance.

5. Broader Medical Applications of the Discoveries

A. Autoimmune Diseases

Examples include:

- Type 1 diabetes
- Rheumatoid arthritis
- Multiple sclerosis
- Autoimmune skin disorders

Therapeutic Insight

Boosting **regulatory T cells** can calm excessive immune responses and prevent the immune system from attacking healthy tissue.

B. Organ Transplantation

- Treg cell therapies help prevent **organ rejection**.
- Could reduce dependence on long-term immunosuppressive drugs.

C. Cancer Treatment

Treg cells also have a **negative side** in cancer biology:

- Tumours often accumulate large numbers of regulatory T cells.
- These suppress immune cells that could kill cancer cells.

Therapeutic Insight: Cancer immunotherapy aims to **block or reduce Treg cells** in the tumour environment, enabling a stronger anti-cancer response.

6. Understanding T Cells: Key Components of Adaptive Immunity

a) Cytotoxic T Cells: Destroy virus-infected cells and tumour cells.

b) Helper T Cells: Coordinate the immune response by signaling other immune cells.

c) Regulatory T Cells (Treg Cells)

- Control excessive immune reactions.
- Prevent autoimmunity.

d) T-Cell Receptors (TCRs): All T cells carry **TCRs**, which act as sensors to detect foreign antigens or abnormalities in the body.

7. Significance of the Nobel-Winning Discovery

a) Conceptual Breakthrough

- Established the biological pathways that prevent autoimmunity.
- Provided the molecular foundation of peripheral immune regulation.

b) Therapeutic Revolution

Enabled innovations in:

- **Autoimmune disease treatment**
- **Transplantation medicine**
- **Cancer immunotherapy**
- **Precision genetic therapies**

c) Future Directions

- Gene-editing strategies targeting **FOXP3**
- Treg-cell-based personalised therapies

- Improved cancer immunomodulation
- Safer organ transplant protocols

These discoveries lay the foundation for the next era of **immune engineering**.

Conclusion

The 2025 Nobel laureates have fundamentally reshaped our understanding of immune tolerance. Their work reveals how the body prevents attacks on itself while maintaining the ability to fight infections—a discovery with immense implications for the treatment of autoimmune diseases, cancer, and organ transplantation. The insights into **Regulatory T cells** and the **FOXP3 gene** continue to steer both basic immune research and clinical innovation, marking a transformative milestone in modern medicine.

Mains Practice Question

Explain the concept of peripheral immune tolerance and discuss how the discovery of regulatory T cells and the FOXP3 gene has transformed approaches to autoimmune diseases, organ transplantation, and cancer treatment.

Nobel Prize (Chemistry) 2025 – MOFs & Porous Materials

📌 Syllabus Mapping

- **GS Paper III – Science & Technology, Nanotechnology, Material Science, Applications of Chemistry**
- **GS Paper II – Contributions of Nobel Laureates, Scientific Research and Innovation**
- **GS Paper I – Basic Science Concepts (Atomic Structure, Chemical Bonding)**

Introduction

The **2025 Nobel Prize in Chemistry** has been awarded to **Susumu Kitagawa**, **Richard Robson**, and **Omar M. Yaghi**for their pioneering contributions to the creation and development of **Metal–Organic Frameworks (MOFs)**—a groundbreaking class of crystalline porous materials. Their work has transformed material chemistry by enabling highly customizable structures capable of trapping, storing, and releasing a wide range of molecules. MOFs represent one of the most versatile material families with far-reaching applications across energy, environment, food sciences, and industry.

1. What Are Metal–Organic Frameworks (MOFs)?

a) Structural Components

MOFs are hybrid crystalline materials composed of:

- **Metal Ions or Clusters** (e.g., copper, zinc) – the *connecting nodes*
- **Organic Ligands** (carbon-based molecules) – the *linkers or bridges*

When metal nodes bond with organic linkers, they form an extended **one-, two-, or three-dimensional framework**.

b) Structural Analogy

- **Metals = Bricks**
- **Organic linkers = Pillars**
  When arranged periodically, they create **cavities or molecular "rooms."**

c) Inspiration from Diamond Structure

The concept originated from analysing **diamond's tetrahedral architecture**, where each carbon bonds with four others. Scientists applied the same geometric logic by substituting carbon with **metal nodes** and covalent bonds with **coordination bonds**, creating highly porous architectures.

2. Key Features of MOFs

a) **Extraordinary Porosity:** One gram of MOF can possess an **internal surface area equal to two football fields**, making them among the most porous materials known.
b) **Tunable Pore Size:** By altering the metal or the organic linker, the **size, shape, and chemical environment** of the pores can be precisely adjusted.
c) **High Absorption Capacity:** MOFs can selectively absorb gases, liquids, or pollutants based on pore design.
d) **Modular and Customizable:** Thousands of MOFs can be synthesized with tailored properties, enabling vast application diversity.
e) **Superior to Traditional Porous Materials**

Compared to zeolites and activated carbon, MOFs offer:

- Larger pore volume
- Higher tunability
- Greater molecular selectivity

This makes them valuable for advanced industrial and environmental applications.

3. Key Applications of MOFs

A. Water Harvesting from Dry Air: A major technological breakthrough for arid and desert regions.

Why Needed?

- Desert air has extremely low humidity.
- Traditional condensation-based water extraction is inefficient.

How MOFs Help

- Their cavities trap water molecules even at low humidity.
- Gentle heating releases collected water efficiently.

This provides a sustainable pathway for **clean drinking water** in water-scarce regions.

B. Food Preservation: Fruits and vegetables naturally release ethylene gas, speeding spoilage after harvest.

MOFs in Food Packaging

- MOFs absorb ethylene and reduce its concentration around produce.
- Extends shelf life and reduces post-harvest losses—critical for India's vast agricultural supply chains.

C. Environmental Remediation

MOFs can be engineered to trap:

- **PFAS ("forever chemicals")**
- **Antibiotics**
- **Heavy metals**
- **Industrial pollutants**

Their molecular precision allows targeted pollutant removal from water bodies.

D. Rare-Earth Element (REE) Recovery

- MOFs facilitate **selective extraction** of rare earths like neodymium or europium from wastewater or mining effluent.
- A significant development for clean-energy technologies reliant on REEs.

E. Gas Storage and Separation

MOFs can store and separate:

- **Hydrogen** (clean energy)
- **Methane** (natural gas storage)
- **Carbon dioxide** (carbon capture and storage)

These applications support:

- Green hydrogen economy
- Decarbonization strategies
- Industrial emission reduction

4. Significance of the Nobel-Winning Work

a) Revolution in Material Chemistry: MOFs introduced a **new class of designer materials**, enabling unprecedented control over molecular interactions.

b) Global Environmental Impact: From **carbon capture** to **clean water harvesting**, MOFs align with sustainability goals and climate resilience frameworks.

c) Industrial Transformation

- Safer storage of gases
- Cleaner manufacturing
- Efficient chemical catalysis

d) Scientific Advancement: Their modularity has opened research frontiers in:

- Energy storage
- Nanotechnology
- Quantum materials
- Smart membranes

The laureates' foundational work continues to inspire new generations of material chemists.

Conclusion

The development of **Metal–Organic Frameworks** is one of the most influential achievements in modern chemistry. By creating porous, customizable, and highly functional molecular architectures, the 2025 Nobel laureates have enabled transformative applications in energy, water, environment, and industry. MOFs exemplify how fundamental chemical innovation can deliver **sustainable, scalable, and strategic solutions** to some of the world's most pressing challenges.

Mains Practice Question

Explain the structure and key properties of Metal–Organic Frameworks (MOFs). Discuss how MOF-based technologies can address challenges related to water scarcity, food preservation, environmental remediation, and clean energy.

Rising Non-Communicable Diseases – GBD Insights

📌 Syllabus Mapping

- **GS Paper II – Health, Governance, Welfare Policies**
- **GS Paper III – Disease Burden, Lifestyle Diseases, Public Health, Demography**
- **GS Paper I – Societal Changes, Urbanization and Lifestyle Transformations**

Introduction

The latest **Global Burden of Disease (GBD) Report**, released by the **Institute for Health Metrics and Evaluation (IHME)** at the World Health Summit in Berlin, indicates a profound epidemiological transition in India. **Non-Communicable Diseases (NCDs)** now constitute the dominant contributor to India's disease burden, surpassing infectious and maternal–child health concerns. This highlights a shift from acute, communicable diseases to long-term, lifestyle-related, and chronic illnesses driven by social, economic, and demographic changes.

1. Key Findings of the GBD Report

a) Global Shift Toward NCDs

- NCDs accounted for **1.80 billion DALYs (2023)**, up from **1.45 billion (2010)**.
- Nearly **two-thirds of global DALYs** now come from NCDs.
- Infectious diseases have declined due to expanded immunization, sanitation improvements, and better access to healthcare.

b) Leading Contributors to NCD Burden

- **Ischaemic heart disease**
- **Stroke**
- **Diabetes mellitus**

These remain the top causes of disability and premature death at the global level.

c) Fastest Growing Categories

- **Anxiety disorders**
- **Depressive disorders**
- **Diabetes**

Mental-health-related NCDs show the highest rise in age-standardized rates, reflecting modern stressors and psychosocial pressures.

2. Drivers of Rising NCD Burden in India

A. Epidemiological & Demographic Transition

- Rapid urbanisation and ageing have increased chronic disease prevalence.
- Expansion of tier-1 and tier-2 cities has altered living patterns, dietary habits, and physical activity.

B. Lifestyle and Behavioural Factors

a) Dietary Transition

- Shift from **traditional fibre-rich diets** to **processed, calorie-dense foods** high in sugar, salt, and unhealthy fats.
- Proliferation of fast-food culture and delivery apps deepens unhealthy eating patterns.

b) Physical Inactivity

- Sedentary jobs, motorised mobility, and screen addiction contribute to obesity, hypertension, and metabolic disorders.

c) Tobacco and Alcohol Use

- Tobacco use—especially in rural areas—drives cancer and respiratory diseases.
- Rising alcohol consumption impacts liver disease, mental health, and cardiovascular risks.

C. Environmental Risk Factors

a) Air Pollution

- India faces severe urban and rural pollution due to biomass burning, vehicles, industries, and fossil fuels.
- High **PM2.5 exposure** contributes to chronic obstructive pulmonary disease (COPD), heart disease, and stroke.

D. Biological Factors

- Rising **overweight/obesity**, hypertension, high cholesterol, and genetic predisposition heighten NCD risk across all age groups.

E. Psychosocial and Mental Health Stressors

- High stress, workplace burnout, social isolation, job insecurity, and social media–driven anxiety ("**FOMO culture**") intensify unhealthy habits and worsen NCD vulnerabilities.

F. Socioeconomic Determinants

- Income growth, consumerism, and gaps in health literacy shape lifestyle behaviour.
- Unequal access to nutritious food and healthcare widens disparities in NCD burden.

3. Impact of NCDs on India

a) Leading Cause of Mortality: NCDs account for **63–65% of all deaths** in India, particularly:

- Cardiovascular diseases (CVDs)
- Cancers
- Chronic respiratory diseases
- Diabetes

b) Rising Premature Mortality: A large share of deaths occur between **ages 30–70**, affecting India's productive workforce.

c) Long-Term Morbidity: NCDs lead to chronic disability, reduced quality of life, and prolonged dependence on healthcare systems.

d) Economic Burden

- India is projected to lose **USD 4.58 trillion by 2030** due to NCDs and mental illnesses (World Economic Forum).
- Productivity losses slow GDP growth and widen income inequality.

e) Pressure on Health Infrastructure

Demand for:

- Chronic disease clinics
- Diagnostics
- Long-term pharmaceutical therapy
- Rehabilitation services
  continues to increase monotonically.

f) Hindrance to SDGs

NCDs directly impede:

- **SDG 3 (Good Health and Well-Being)**
- **SDG 1 (No Poverty)** due to catastrophic health expenditure
- **SDG 5 (Gender Equality)**
- **SDG 10 (Reduced Inequalities)**

4. Government Measures to Address NCDs

A. Disease-Specific Programmes

- **NP-NCD**: Strengthens infrastructure, screening, and awareness.
- **NPCDCS (2010)**: Targets cancers, cardiovascular diseases, diabetes, and stroke.

B. Community-Based Screening

- Screening individuals aged 30+ for **diabetes, hypertension, oral cancer, breast cancer, and cervical cancer**.

C. Strengthening Health Infrastructure

- District-level NCD centres, cardiac care units, and day-care chemotherapy units.
- Integration of NCD services into **Ayushman Bharat – Health and Wellness Centres**.

D. Lifestyle and Behaviour Change Initiatives

- **Eat Right India** (safe and healthy diets).
- **Fit India Movement** (promoting physical activity).
- **International Yoga Day** (stress reduction and holistic health).

E. Fiscal and Policy Measures

- High **GST (40%)** on sugary beverages.
- Tobacco control laws under **NTCP**, pictorial warnings, and taxation.

5. Way Forward

A. Health Promotion

- Behaviour-change communication on diet, exercise, tobacco cessation, alcohol moderation, and stress management.

B. Early Detection and Preventive Care

- Universal screening for hypertension, diabetes, and cancers at the community level.
- Strengthening frontline workers and digital health tools.

C. Strengthening Healthcare Systems

- Expand NCD clinics, referral networks, palliative care, and telemedicine.
- Build capacity in chronic disease management.

D. Fiscal and Regulatory Tools

- Taxation on tobacco, alcohol, ultra-processed foods, and high-salt/high-sugar products.
- Mandatory nutritional labelling and marketing restrictions.

E. Sustainable Financing

- Ensure uninterrupted supply of diagnostics and essential medicines.
- Align national targets with **SDG 3.4**—reducing premature NCD mortality by one-third by 2030.

F. Leveraging Digital Health

- Use of the **National Digital Health Mission**, AI-based diagnostics, teleconsultation platforms, and health registries for monitoring NCD trends.

Conclusion

India's rising NCD burden reflects profound socio-economic and demographic transitions. While progress has been made in communicable diseases, the rapid growth of chronic disorders demands an equally robust response—integrating lifestyle reforms, primary healthcare strengthening, digital innovations, and sustained policy commitment. Addressing NCDs is vital for India's economic resilience, social equity, and progress toward the SDGs.

Mains Practice Question

Non-Communicable Diseases are emerging as the leading public health challenge in India. Analyse the key drivers behind the rising NCD burden and suggest a comprehensive multi-sectoral strategy to address this challenge.

Antimicrobial Resistance (AMR) – Silent Global Crisis

📌 Syllabus Mapping

- **GS Paper II – Health, Governance, WHO Reports, International Health Regulations**
- **GS Paper III – Science & Tech, Biotechnology, Disease Burden, Public Health Challenges**
- **GS Paper I – Socio-Economic Determinants of Health**

Introduction

The **World Health Organization (WHO)** released the **Global Antibiotic Resistance Surveillance Report 2025**, revealing alarming trends in global and regional antimicrobial resistance. AMR—widely described as a **"silent pandemic"**—is accelerating faster than the development of new antibiotics, posing a major threat to global health, food systems, economic stability, and the future of modern medicine. India remains one of the most affected countries, reflecting systemic gaps in antibiotic stewardship and healthcare practices.

1. Key Findings of the WHO Report

a) Rising Antibiotic Resistance

- In **2023**, nearly **1 in every 6 bacterial infections** worldwide was resistant to available antibiotics.
- Over **40% of tracked bacteria–drug combinations** showed increased resistance between 2018 and 2023.

b) Gram-Negative Bacteria: The Highest Threat

Resistance was highest among **gram-negative bacteria**, especially:

- **E. coli**
- **Klebsiella pneumoniae**
  These pathogens are notoriously difficult to treat due to multiple resistance mechanisms.

c) Geographic Hotspots

AMR prevalence was highest in:

- **Southeast Asia**
- **Eastern Mediterranean Region**

These regions face challenges such as unregulated antibiotic access, dense populations, and poor water–sanitation systems.

d) India-Specific Findings

- China, India, and Pakistan together accounted for **41% of global bloodstream infection reports**.
- High prevalence of drug-resistant infections in hospitals reflects gaps in infection control, sanitation, and antibiotic misuse.

e) Improved Surveillance

Participation in **WHO's GLASS (Global Antimicrobial Resistance and Use Surveillance System)** has increased nearly **four-fold** since 2016, expanding global monitoring capacity.

2. What is Antimicrobial Resistance (AMR)?

a) Meaning: AMR occurs when **bacteria, viruses, fungi, or parasites mutate** and become capable of surviving drugs meant to eliminate them.

b) Superbugs: Pathogens that become resistant to most available antimicrobials are known as **superbugs**.

c) Consequences

- Standard treatments become ineffective
- Infections persist longer
- Risk of **severe illness**, complications, disability, and death increases
- Procedures like surgery, chemotherapy, and dialysis become riskier

d) Natural and Accelerated Process

- While resistance occurs naturally, it is **significantly accelerated** by human factors, including misuse of antibiotics, poor sanitation, and overuse in agriculture.
- WHO identifies AMR among the **top ten global public health threats**.

3. Why AMR is a Global Health Threat

A. Rising Mortality and Morbidity

- AMR caused **1.27 million direct deaths** in 2019.
- Contributed to nearly **5 million deaths** worldwide.
  These numbers are projected to rise sharply.

B. Economic Impact

- AMR could cut global GDP by **USD 3 trillion annually by 2030** due to healthcare costs and productivity losses.

C. Threat to Modern Medicine

AMR undermines:

- Organ transplants
- Caesarean sections
- Cancer chemotherapy
- Complex surgeries
- Basic post-operative care

As antibiotics fail, medical care becomes costlier and riskier.

D. Impact on Food Security

- Resistant infections affect livestock and crops.
- Productivity falls, raising food prices and threatening livelihoods.

4. Key Drivers of AMR (Anthropogenic + Environmental)

a) Overuse and Misuse of Antibiotics

- Self-medication
- Over-the-counter sales
- Excessive prescription in healthcare settings
- Inappropriate fixed-dose combinations

b) Poor Sanitation and Hygiene

- Contaminated water sources
- Inadequate waste management
- Limited infection-control measures in hospitals

c) Overuse in Animal Husbandry and Agriculture

- Antibiotics used as growth promoters
- Non-therapeutic use in poultry, aquaculture, and dairy

d) Pharmaceutical Waste

- Disposal of untreated antibiotic residues into rivers and soil

e) Global Connectivity

- Travel and migration accelerate cross-border spread of resistant pathogens.

5. Measures Taken to Combat AMR

A. National Measures

1. National Programme on AMR Containment

- Initiated in the 12th Five-Year Plan
- Led by **National Centre for Disease Control (NCDC)**
- Focuses on surveillance and appropriate antibiotic use.

2. National Action Plan on AMR (2017)

- Adopts a **One Health** approach
- Coordinates ministries across human health, animal health, food safety, and environment.

3. Drugs and Cosmetics Rules (Schedule H1)

- Certain antibiotics sold **only with a valid prescription**.

4. Red Line Campaign

- Labels medicines with a red line to discourage uninformed antibiotic use.

5. State-Level Initiatives

- **Operation AMRITH (Kerala):** Prevents OTC sale of antibiotics.
- Bans on irrational Fixed Dose Combinations (FDCs).

B. Global Measures

1. Global Action Plan (GAP) on AMR, 2015

- Endorsed by World Health Assembly
- Provides global roadmap for AMR control.

2. Quadripartite Joint Secretariat on AMR

Includes:

- WHO
- FAO
- UNEP
- WOAH

This ensures coordination across human, animal, and environmental health sectors.

3. UN Political Declaration on AMR (2024)

Targets include:

- **10% reduction in AMR-related deaths**
- **70% of antibiotics use should come from WHO 'Access' category**

4. Other Initiatives

- **World Antimicrobial Awareness Week**
- **AWaRe classification** for rational antibiotic use

- Laboratory strengthening across developing regions

6. Way Forward

A. Strengthening One Health Framework

Integrated surveillance across:

- Human health
- Veterinary medicine
- Environmental systems

B. Infection Prevention and Control (IPC)

- Improved hospital hygiene
- WASH infrastructure
- Vaccination coverage
- Wastewater treatment

C. Antimicrobial Stewardship

- Evidence-based prescribing
- Reducing use of “Watch” antibiotics
- Promoting “Access” antibiotics first
- Hospital-based stewardship teams

D. Strengthening Regulations

- Strict enforcement of Schedule H1
- Crackdown on OTC antibiotic sales
- Oversight on pharmaceutical effluents

E. Digital Surveillance and Data Systems

- Expand GLASS participation
- Collect AMR data from underserved regions
- Strengthen microbiology labs

F. Agricultural Reforms

- Ban non-therapeutic use in livestock
- Promote alternatives like probiotics and vaccines

G. Universal Health Coverage

- Reduce out-of-pocket expenditure
- Improve access to quality care and diagnostics

Conclusion

AMR threatens global health security, economic stability, food systems, and sustainable development. It undermines decades of medical progress and risks a post-antibiotic era where minor infections become life-threatening. A **coordinated One Health approach**, alongside strong regulatory mechanisms, antimicrobial stewardship, improved diagnostics, and global cooperation, is essential to safeguard the efficacy of life-saving antimicrobial medicines for future generations.

Mains Practice Question

Antimicrobial Resistance is emerging as a major global health emergency. Analyse the key drivers behind AMR and evaluate the national and international efforts needed to contain this “silent pandemic.”

SCIENCE & TECHNOLOGY

Nobel Prize (Physics) 2025 – Macroscopic Quantum Tunnelling

📌 Syllabus Mapping

- **GS Paper III – Science & Technology, Quantum Mechanics, Quantum Computing, Emerging Technologies**
- **GS Paper II – Research & Innovation, Global Scientific Achievements**
- **GS Paper I – Fundamental Physics (Quantum Behaviour, Atomic Structure)**

Introduction

The **2025 Nobel Prize in Physics** has been awarded to **John Clarke**, **Michel H. Devoret**, and **John M. Martinis** for experimental discoveries that revealed **macroscopic quantum mechanical tunnelling** and **energy quantisation within an electric circuit**. Their pioneering work demonstrated that quantum phenomena—once thought to be confined to atoms and subatomic particles—can manifest in engineered macroscopic systems composed of billions of electrons. This breakthrough laid the foundation for **superconducting qubits**, now central to quantum computing.

1. Background: Quantum Behaviour at Microscopic vs. Macroscopic Scales

a) Nature of Quantum Physics : Quantum physics governs the behaviour of:

- Electrons
- Atoms
- Nuclei
- Subatomic particles

At this scale, matter exhibits **wave–particle duality**, producing unique effects such as:

- **Energy quantisation**
- **Quantum tunnelling**
- **Interference**
- **Superposition**

b) Why the 2025 Nobel Work Is Important

Ordinary macroscopic objects (balls, stones, circuits) do not normally show quantum behaviour because:

- Decoherence due to environmental disturbances
- Collective interactions suppress quantum effects

The Nobel laureates showed that **quantum phenomena can be preserved and studied in macroscopic electrical systems**, dramatically extending the boundaries of quantum physics.

2. Quantisation of Energy: A Fundamental Quantum Principle

a) What It Means: At the microscopic scale, systems absorb or release energy only in **discrete packets (quanta)**.

Analogy:

- Like standing only on fixed rungs of a ladder—not between them.
- Electrons, atoms, and molecules occupy **fixed energy levels**.

b) Why It Matters for Circuits: Demonstrating energy quantisation in electric circuits confirms that **man-made systems can mimic the energy states of atoms**, enabling artificial atoms used today in quantum computing.

3. Quantum Tunnelling: Crossing Barriers Without Energy

a) **Classical View:** A cricket ball thrown at a wall always bounces back.
b) **Quantum View:** A quantum particle can sometimes "pass through" a barrier even when it lacks the classical energy to do so.
c) **Natural Example:** **Alpha decay** in radioactive nuclei occurs when particles **tunnel through** the nuclear potential barrier.
d) **Significance**

Quantum tunnelling is central to:

- Semiconductor devices (e.g., tunnel diodes)
- Scanning tunnelling microscopy
- Nuclear fusion processes

The laureates demonstrated this phenomenon **on a macroscopic scale**, which was once considered impossible.

4. The Breakthrough Experiment: Josephson Junction-Based Macroscopic Quantum System

a) Experimental Setup (1984–85, UC Berkeley): The team constructed a circuit based on a **Josephson Junction**, consisting of:

- Two superconductors
- Separated by a thin insulating layer

b) Key Observations

1. **Macroscopic Quantum Tunnelling**
   - The circuit, initially at zero voltage, unexpectedly shifted to a **finite voltage due to tunnelling** out of the zero-voltage state.
   - This implied that **billions of electrons behaved collectively as a single quantum object**.
2. **Energy Quantisation in the Circuit**
   - They observed discrete energy levels—analogous to atomic spectra—within the macroscopic system.

c) Why This Was Revolutionary: The Josephson Junction acted as an **"artificial atom"**, behaving exactly like a quantum particle but on a human-engineered scale.

This opened the path toward creating:

- **Superconducting qubits**
- **Quantum circuits**
- **Quantum simulators**

5. Significance of the Discovery

a) Extending Quantum Mechanics to the Macroscopic World: Their experiments confirmed that:

- Quantum rules are **universal**, not limited to microscopic objects.
- It is possible to engineer systems that maintain **quantum coherence** on larger scales.

b) Basis for Superconducting Quantum Computers

Superconducting qubits—used by:

- Google Quantum AI
- IBM
- Rigetti
- D-Wave

—directly rely on Josephson junction physics and quantised energy states demonstrated by the laureates.

c) Impact on Other Technologies

- **Quantum computing:** qubits, gates, entanglement
- **Quantum sensors:** ultra-sensitive magnetometers
- **Quantum metrology:** voltage standards using Josephson effects
- **Quantum cryptography:** secure communication systems

d) Advancement in Quantum Theory

Their work deepened our understanding of:

- Decoherence
- Macroscopic quantum states
- Quantum dissipation
- Environmental coupling

6. Related Development: Quantum Echoes Algorithm by Google Quantum AI

a) **Achievement:** Google's *Willow* processor (105 qubits) demonstrated the **Quantum Echoes algorithm**, achieving the **first verifiable quantum advantage**.
b) **Performance:** Nearly **13,000× faster** than leading classical supercomputers.
c) **Principle:** The algorithm operates like a **quantum echo**, analogous to how bats use returning sound waves to locate prey.
d) **Importance**

This achievement brings quantum computation closer to:

- Drug discovery
- Materials design
- Quantum sensing
- Optimization problems

The groundwork for such breakthroughs traces back to the foundational physics demonstrated by the 2025 Nobel laureates.

Conclusion

A century after the birth of quantum mechanics, the 2025 Nobel laureates have shown that **quantum behaviour is not limited to the microscopic realm**. Their experiments on macroscopic quantum tunnelling and energy quantisation revolutionized both theoretical understanding and technological applications. These discoveries form the bedrock of modern quantum computing, quantum sensing, and next-generation quantum technologies poised to transform science and industry.

Mains Practice Question

Discuss the significance of the 2025 Nobel Prize in Physics in demonstrating macroscopic quantum phenomena. How have Josephson Junction–based discoveries advanced the development of superconducting qubits and modern quantum technologies?

AstroSat – A Decade of Multi-Wavelength Astronomy

📌 Syllabus Mapping

- **GS Paper III – Space Technology, Indigenization, Scientific Research**
- **GS Paper I – Universe, Astronomy, Scientific Developments**
- **GS Paper II – International Collaboration in Science & Technology**

Introduction

India's first dedicated space-based observatory, **AstroSat**, has completed a decade since its launch in 2015, marking a significant milestone in India's space-science capabilities. It remains one of the few observatories in the world capable of conducting **simultaneous multi-wavelength observations** of celestial objects, ranging from ultraviolet to high-energy X-rays. The mission has positioned India among a select group of nations with advanced space astronomy infrastructure.

1. About AstroSat

a) Mission Overview

AstroSat is a **multi-wavelength astronomy satellite** designed to observe cosmic sources in:

- **Optical wavelengths**
- **Ultraviolet (UV) spectrum**
- **Soft and hard X-ray bands**

This capability allows holistic investigation of astrophysical processes that often emit radiation across multiple energy scales.

b) Launch Details

- **Launch Date:** 28 September 2015
- **Vehicle:** PSLV-C30
- **Launch Site:** Satish Dhawan Space Centre, Sriharikota
- **Orbit:** 650 km circular Low Earth Orbit
- **Designed Life:** 5 years (successfully operational beyond a decade)

c) Spectral Range

AstroSat spans an extensive energy window of **0.3 keV to 100 keV** and includes near- and far-UV bands—making it one of the few missions with such **broad spectrum coverage**.

2. Key Scientific Instruments

AstroSat houses several highly sensitive payloads:

- **Large Area X-ray Proportional Counter (LAXPC)** – Studies rapid variability in X-ray sources.
- **Ultra-Violet Imaging Telescope (UVIT)** – High-resolution imaging in near and far UV.
- **Cadmium Zinc Telluride Imager (CZTI)** – Hard X-ray imaging and gamma-ray burst detection.
- **Soft X-ray Telescope (SXT)** – Observes soft X-ray emissions from astronomical sources.
- **Scanning Sky Monitor (SSM)** – Identifies transient X-ray sources.

These instruments allow coordinated observations of the same object across multiple wavelengths—crucial for studying dynamic cosmic events.

3. Scientific Objectives and Achievements

A) Understanding High-Energy Cosmic Processes

AstroSat studies:

- Neutron stars
- Black hole binaries
- Accretion processes
- Supernova remnants

This offers insights into **extreme gravitational, magnetic, and radiation environments**.

B) Measuring Magnetic Fields of Neutron Stars

Its X-ray instruments help determine the magnetic field strength of neutron stars, contributing to understanding:

- Stellar evolution
- Pulsar behaviour
- Magnetar activity

C) Mapping Star-Formation Regions

Through UVIT, AstroSat observes:

- Star-forming nebulae
- Young stellar populations
- Interstellar medium structures

These observations support new insights into **galactic evolution and star-formation rates**.

D) Detecting X-Ray Transients

AstroSat's monitoring of the sky identifies:

- Gamma-ray bursts
- X-ray novae
- Flaring binaries
- Short-lived high-energy phenomena

Such transient events reveal crucial details about exotic astrophysical objects.

E) Deep Ultraviolet Universe Survey

UVIT has conducted deep-field UV surveys enabling:

- Detection of faint galaxies
- Study of early universe star formation
- Identification of rare astronomical sources

4. India's Other Astronomy Missions and Observatories

(a) XPoSat

- India's first mission dedicated to **X-ray polarimetry**.
- Studies polarization properties of high-energy sources.

(b) Aditya-L1

- India's first solar observatory stationed at the **Sun–Earth L1 point**.
- Continuous monitoring of the solar corona and space weather.

(c) Indian Astronomical Observatory (IAO), Hanle

- High-altitude facility with infrared, optical and gamma-ray telescopes.

(d) Kodaikanal Solar Observatory

- Historic solar observatory with over a century of sunspot record data.

These facilities enhance India's capability in both space and ground-based astronomy.

5. Significance of AstroSat

a) Strengthens Scientific Leadership: AstroSat placed India among the global leaders in **multi-wavelength astronomy**, alongside missions such as NASA's Chandra and ESA's XMM-Newton.

b) Demonstrates Indigenous Scientific Capability: From payload development to mission operations, AstroSat showcases India's growing **self-reliance in advanced space science**.

c) Enhances Research and Academic Outputs

- Enabled high-impact astrophysics research.
- Supported Indian universities and institutes through accessible data archives.

d) Promotes Global Collaboration

- Data shared with international researchers.
- Joint scientific publications with global observatories.

AstroSat has thus enhanced India's global scientific footprint.

Conclusion

AstroSat's decade-long journey symbolizes India's rising technological maturity in space-based astronomy. Its multi-wavelength observation capability has significantly advanced our understanding of high-energy cosmic phenomena, star formation, and transient events. As India expands its astrophysics portfolio—with XPoSat, Aditya-L1, and future space telescopes—AstroSat stands as a milestone achievement reflecting scientific ambition, global collaboration, and indigenous innovation.

Mains Practice Question

Discuss the scientific significance of India's AstroSat mission. How has its multi-wavelength capability advanced astrophysical research and strengthened India's global position in space science?

RDI Scheme – Guidelines & Special Purpose Fund

📌 Syllabus Mapping

- **GS Paper III – Science & Technology, R&D, Innovation Ecosystem, Investment Models**
- **GS Paper II – Governance, Regulatory Bodies, Public–Private Partnerships**
- **GS Paper I – Economic Development, Industrial Growth**

Introduction

The Executive Council of the **Anusandhan National Research Foundation (ANRF)** has approved the **Guidelines** and the creation of a **Special Purpose Fund (SPF)** to operationalise the **Research, Development and Innovation (RDI) Scheme**, marking a major step in strengthening India's long-term innovation, technology development, and private sector participation. This initiative represents one of India's largest-ever investments in R&D financing and aims to catalyse the transition from laboratory-scale research to high-impact, market-ready technologies.

1. Anusandhan National Research Foundation (ANRF)

a) Establishment

- Formed under the **ANRF Act, 2023**.
- Functions as India's apex body to provide **strategic direction, funding oversight, and policy guidance** for national scientific research.

b) Mandate

- Strengthen India's R&D landscape.
- Enhance industry–academia collaboration.
- Promote mission-driven innovation and high-end research ecosystems.

c) Structural Integration

- The **Science and Engineering Research Board (SERB)**, established under the 2008 Act, has been **merged** into ANRF to streamline funding mechanisms and reduce fragmentation.

2. The Research, Development and Innovation (RDI) Scheme

a) About the Scheme

- Approved by the Union Cabinet on **1 July 2025**.
- Establishes a **₹1 lakh crore RDI Fund**, one of the largest innovation funds in the Global South.

b) Nodal Ministry: Department of Science & Technology (DST).

c) Objective: Push India towards **frontier technologies**, accelerate product development, and attract large-scale private sector investment in R&D.

3. Two-Tier Funding Architecture of the RDI Scheme

A. Special Purpose Fund (SPF)

- Positioned within **ANRF** as the **first-level custodian** of the RDI Fund.
- Ensures:
  - Seamless fund flow
  - Compliance
  - Efficient governance
  - Transparent allocation mechanisms

The SPF acts as a dedicated financial structure for long-term innovation.

B. Second-Level Fund Managers (SLFMs)

These entities manage project-specific investments and include:

1. **Alternate Investment Funds (AIFs):** Venture capital and private equity structures focusing on deep-tech, clean energy, AI, and other frontier sectors.
2. **Development Finance Institutions (DFIs):** Provide catalytic financing for high-risk R&D ventures.
3. **Non-Banking Financial Companies (NBFCs):** Offer structured financing to emerging technology enterprises.
4. **Focused Research Organizations (FROs)**

Examples:

- **Technology Development Board (TDB)**
- **Biotechnology Industry Research Assistance Council (BIRAC)**
- **IIT Research Parks**

These institutions bridge the **lab-to-market** gap through incubation, prototyping support, and industry linkages.

4. Funding Structure and Coverage

a) Cost Coverage: The scheme can finance **up to 50% of assessed project cost**, but only for **transformative RDI projects**.

b) Technology Maturity Level: Applicable for projects at **Technology Readiness Level (TRL) 4 and above**, i.e.:

- Proof-of-concept validated
- Prototype development
- Pilot or field demonstrations
- Pre-commercial technologies

c) Exclusions: The fund **does not support grants or short-term loans**, signalling a shift toward **investment-oriented R&D**rather than traditional grant-based funding.

5. Significance of the RDI Scheme and SPF

A. Boost to Indigenous Innovation

The scheme strengthens India's technological capabilities in emerging sectors such as:

- Semiconductors
- Biotechnology
- Clean energy
- Quantum technologies
- Advanced materials

B. Private Sector Participation

By adopting fund-manager models, the scheme incentivises:

- Corporate R&D investment
- Deep-tech startups
- Industry–academia collaborations

This aligns with global models such as DARPA (USA) and Horizon Europe.

C. Reducing Import Dependence

Funding support for indigenous technology development contributes to:

- **Technological sovereignty**
- Improved industrial competitiveness
- Reduced reliance on foreign R&D pipelines

D. Accelerating Commercialisation

The involvement of AIFs, DFIs, and NBFCs signals a move toward:

- Market-ready solutions
- Scalable innovation
- Strengthened tech-startup ecosystem

E. Strengthening India's R&D Ecosystem

- Enhances coordination between ministries, universities, research labs, and industries.
- Helps India move toward spending **2% of GDP on R&D**, aligning with global innovation leaders.

Conclusion

The approval of guidelines and the formation of the **Special Purpose Fund** under the RDI Scheme mark a transformative moment for India's innovation ecosystem. By combining structured financing, institutional coordination, and private sector-led technology development, India is positioned to accelerate breakthroughs in frontier technologies and strengthen economic competitiveness. The ANRF-led architecture is poised to reshape the national R&D landscape for the coming decade.

Mains Practice Question

Evaluate the significance of the Research, Development and Innovation (RDI) Scheme and the Special Purpose Fund (SPF) in strengthening India's innovation ecosystem. How will the ANRF-led funding structure enhance private sector participation and long-term technological self-reliance?