

# CURRENT AFFAIRS

**WEEKLY 11<sup>th</sup> August - 17<sup>th</sup> August (2025)**



# WEEKLY UPDATES

DATE :11<sup>th</sup> Aug- 17<sup>th</sup> Aug

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# IQRA

Wisdom leads to success

# POLITY

## Supreme Court on Stray Dogs: Public Safety vs Animal Welfare

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance & Polity:** Judicial interventions, constitutional duties, local governance.
- ✓ **GS Paper III – Environment & Ecology:** Biodiversity, human-animal conflict, zoonotic diseases.
- ✓ **GS Paper IV – Ethics:** Compassion vs. human safety, ethical dilemmas in animal welfare.

### Context

The **Supreme Court**, in a *suo motu* case, has issued comprehensive directions to control the **menace of stray dogs in the National Capital Region (NCR)**. With India housing nearly **1.5 crore stray dogs (2019 Livestock Census)** and accounting for **36% of global rabies deaths**, the issue is both a **public health crisis** and an **ethical dilemma**.

### Key Directions of the Court

- **Dedicated Force:** To ensure immediate pick-up of stray dogs causing public nuisance.
- **Dog Shelters:** Establishment of facilities for accommodation and care.
- **Helpline Creation:** For reporting incidents and ensuring swift response.
- **Vaccine Availability:** Ensuring regular supply of **Anti-Rabies Vaccine (ARV)** and **Rabies Immunoglobulin (RIG)**.
- **Legal Consequences:** Penalties for those obstructing implementation of directions.

### The Problem of Stray Dogs in India

- **Population:** 1.5 crore stray dogs, as per **2019 Livestock Census**.
- **Rabies Threat:** Stray dogs are the **primary source of rabies transmission**.
  - Rabies is a **vaccine-preventable zoonotic viral disease**.
  - India contributes to over **one-third of global rabies deaths**.

### Legal and Judicial Provisions

1. **Statutory Rules**
  - **Animal Birth Control (ABC) Rules, 2023** under the *Prevention of Cruelty to Animals Act, 1960*:
    - Focus on sterilisation.
    - Vaccination to control rabies.
2. **Judicial Pronouncements**
  - **Jallikattu Case, 2014**: SC interpreted Article 21 (Right to Life and Liberty) to extend to **animals**.
  - **People for Elimination of Stray Trouble v. AWBI**: SC suspended the killing of stray dogs, including troublemakers.
3. **Constitutional Mandates**
  - **Article 243W**: Assigns municipalities responsibility to control stray dog populations.
  - **Article 51A(g)**: Fundamental duty of citizens to show **compassion for living creatures**.

### Challenges in Controlling Stray Dog Populations

- **Infrastructure Gaps:**
  - Shortage of sterilisation centres and trained veterinary staff.
  - Inadequate dog shelters.
- **Healthcare Shortcomings:**
  - Low availability of **ARV** and **RIG** in primary healthcare centres.
- **Ethical Dilemma:**
  - Conflict between **animal welfare** and **public safety**.
  - Public anger often clashes with **animal rights advocacy**.

### Analytical Dimensions

1. **Public Health Lens**
  - Rabies control requires a **One Health approach** (integrating human, animal, and environmental health).
  - Success depends on **mass vaccination of dogs**, alongside public awareness.
2. **Governance Perspective**
  - Local bodies under **Article 243W** are central to effective implementation.

- Requires funding support, monitoring mechanisms, and inter-agency coordination.
- 3. **Ethics and Social Justice**
  - Ethical tension between **protecting animals** and **ensuring human safety**.
  - A balanced policy should focus on **coexistence, not extermination**.
- 4. **Comparative Perspective**
  - Countries like **Sri Lanka** and **Thailand** have achieved success via **mass dog vaccination campaigns**.
  - India needs similar nationwide, **sustained interventions**.

### Contemporary Relevance

- Rising urbanisation has increased **human-stray animal conflicts**.
- Judicial directions underscore the need for a **holistic strategy combining sterilisation, vaccination, shelter creation, and citizen awareness**.
- Important for achieving **SDG 3 (Health and Well-being)** and **SDG 15 (Life on Land)**.

### Conclusion – Keywords

The **Supreme Court's intervention** highlights the urgency of addressing the **stray dog menace** through a **balanced approach**—combining **sterilisation, vaccination, shelter infrastructure, and citizen responsibility**. It reflects the need to harmonise **animal rights with public safety**, ensuring a humane yet effective solution.

### UPSC Mains Practice Question

**Q. The Supreme Court's recent directions on stray dog management highlight the tension between animal welfare and public safety. Discuss the legal, ethical, and public health dimensions of the issue, and suggest a balanced strategy for India.**

### Mahadayi River Dispute – Extension of Tribunal's Tenure

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Polity & Governance:** Inter-State disputes, role of tribunals.
- ✓ **GS Paper I – Geography:** Rivers and drainage systems.
- ✓ **GS Paper III – Environment:** Water resources and management.

### Context

- The **Union Government has extended the tenure of the Mahadayi Water Disputes Tribunal (MWDT)** for one more year under the **Inter-State River Water Disputes Act, 1956**.
- The tribunal, constituted in **November 2010**, was mandated to adjudicate disputes over the sharing of **Mahadayi River waters** among **Goa, Karnataka, and Maharashtra**.

### About the Mahadayi (Mandovi) River

- **Origin:** Western Ghats at Khanpur, Belagavi district, Karnataka.
- **Flow:** West-flowing river that drains into the **Arabian Sea** at Panaji, Goa.
- **Names:**
  - Known as **Mahadayi** in Karnataka.
  - Known as **Mhadei** in Goa.
- **Basin Area Distribution:**
  - Goa – **78%**
  - Karnataka – **18%**
  - Maharashtra – **4%**
- **Major Tributaries:** Sarang, Mahainada, Udel, Lohi, Velvota, Bicholim, Mapuce, Nanoda, Khandepar.

### Mahadayi Water Dispute

- **Parties involved:** Goa, Karnataka, Maharashtra.
- **Core Issue:**
  - **Karnataka's demand** to divert water from Mahadayi to Malaprabha basin for drinking water and irrigation.
  - **Goa's objection** citing ecological damage, particularly to biodiversity and estuarine systems.
  - **Maharashtra's claim** for smaller share of water.
- **Tribunal (MWDT):** Constituted in 2010 under the **Inter-State River Water Disputes Act, 1956**.

### Significance of the Dispute

1. **Ecological Concerns:** Goa emphasizes Mahadayi's importance in sustaining **Western Ghats biodiversity**, salinity balance, and riverine ecosystems.
2. **Water Security:** Karnataka justifies its demand based on **scarcity of drinking water** in Hubballi-Dharwad and surrounding districts.
3. **Federal Dimension:** Reflects the challenges of **centre-state and inter-state water governance**.

### Tags in Context

- **Mahadayi River:** A west-flowing river critical to Goa's ecology and Karnataka's water needs.
- **Inter-State River Water Disputes Act, 1956:** The legal framework for constituting water tribunals to resolve disputes between states.

### Contemporary Relevance

- Similar disputes exist (Cauvery, Krishna, Ravi-Beas, etc.), highlighting the **need for permanent water dispute resolution mechanisms**.
- Ongoing debates on **National Water Policy** and **river basin management** make this case crucial for cooperative federalism.

### Conclusion – Keywords

The **Mahadayi dispute** illustrates the intersection of **water security, ecology, and federalism**. Extending the tribunal's tenure shows the difficulty of resolving inter-state disputes, emphasizing the need for **sustainable, equitable, and ecologically sensitive water-sharing frameworks**.

### UPSC Mains Practice Question

**Q. The Mahadayi River dispute highlights the tension between ecological concerns and water security. Discuss the significance of inter-state water dispute tribunals in balancing federalism and sustainability.**

### RUPPs: ECI Clean-up Drive

#### 📌 Syllabus Mapping:

✓ **GS Paper II – Polity & Governance:** Elections, Political Parties, Electoral Reforms.  
✓ **GS Paper II – Constitution:** Role of ECI, Representation of People Act.

### Context

- The **Election Commission of India (ECI)** has identified **476 more Registered Unrecognized Political Parties (RUPPs)** for possible de-listing as part of its effort to **clean up the electoral system**.
- This is a continuation of ECI's drive against "non-serious" political parties that exist on paper but do not actively contest elections.

### About RUPPs

- **Definition:** Political parties **registered with the ECI** but **not recognized** as State or National Parties.
- **Status:** They do not enjoy privileges like reserved symbols, free airtime on public broadcasters, or consultation in electoral reforms.

### Legal Provisions & Guidelines

1. **Registration of Political Parties – Section 29A of RPA, 1951**
  - A political party must register with ECI to contest elections.
  - Application must include party constitution, membership details, internal democracy provisions, etc.
2. **De-registration Issue**
  - **ECI lacks the power to de-register** political parties under the RPA, 1951.
  - Established by **Supreme Court in Indian National Congress vs Institute of Social Welfare (2002)**.
3. **Guidelines for Registration of Political Parties (2011, updated in 2022):**
  - Parties **not contesting elections for 6 consecutive years** can be **removed from the register**.
  - ECI may flag parties suspected of misuse (for tax exemptions, money laundering, or non-serious activities).

### Why RUPPs are a Concern?

- **Proliferation:** Over 2,800 registered political parties in India, but only a few hundred contest elections.
- **Misuse:** Some RUPPs are alleged to exist for **financial irregularities** and to misuse **income tax exemptions** under Section 13A of IT Act.
- **Transparency Issues:** Non-disclosure of donations, funding sources, and lack of accountability.

## Tags in Context

- **Election Commission of India (ECI):** A constitutional body under **Article 324**, responsible for conducting free and fair elections.
- **Registered Unrecognized Political Parties (RUPPs):** Parties that exist in the electoral system without formal recognition as State/National parties, often under scrutiny for misuse.

## Contemporary Relevance

- The clean-up aligns with wider **electoral reforms**, including efforts for **electoral bond transparency, inner-party democracy, and curbing black money in politics**.
- Strengthening accountability of RUPPs ensures **credibility of the electoral process**, reducing chances of **shell parties**.

## Conclusion – Keywords

The regulation of **RUPPs** is crucial for ensuring **electoral integrity, transparency, and accountability**. While recognition strengthens genuine parties, de-listing inactive ones prevents misuse of political privileges. This reform is vital for **deepening democracy and restoring voter confidence**.

## UPSC Mains Practice Question

**Q. Registered Unrecognized Political Parties (RUPPs) are both a sign of vibrant democracy and a challenge to electoral integrity. Discuss the legal, administrative, and political reforms needed to regulate them.**

## OCI Rules Tightened: Revocation on Serious Charges

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Citizenship, Rights of Overseas Indians, Legal Provisions.
- ✓ **GS Paper II – Polity:** Citizenship Act, 1955; Government Policies.
- ✓ **GS Paper II – International Relations:** Diaspora policies, engagement with overseas Indians.

## Context

- The **Union Ministry of Home Affairs (MHA)** has issued a notification under **Section 7D of the Citizenship Act, 1955**, empowering the government to revoke **OCI (Overseas Citizens of India) registration** in cases of **serious criminal charges or convictions**.
- The move aims to safeguard India's **sovereignty, security, and public order**, while tightening diaspora regulations.

## Key Highlights of the Notification

- **Revocation Grounds Expanded:**
  - If an individual is **sentenced to at least 2 years in prison**.
  - If a **charge sheet is filed** against them for an offense carrying **7+ years of imprisonment**.

## About OCI Cards

- **Introduced:** 2005, via amendment to the **Citizenship Act, 1955**.
- **Merger with PIO (2015):** Person of Indian Origin (PIO) scheme merged; all PIO cardholders deemed OCI cardholders.
- **Not Dual Citizenship:** OCI does not grant political rights (voting, contesting elections, holding constitutional offices).

## Grounds for Cancellation of OCI Registration

- Fraudulent registration.
- Disaffection towards the Constitution of India.
- If considered necessary in the interest of:
  - Sovereignty & integrity of India.
  - Security of India.
  - Friendly relations with foreign countries.
  - Public interest.

## Benefits for OCI Cardholders

- **Visa & Residency:** Multiple-entry, multipurpose, lifelong visa for visiting India.
- **Exemption:** No need to register with FRRO/FRO regardless of length of stay.
- **Parity with NRIs:** In **economic, financial, and educational fields**, except for ownership of **agricultural/plantation property**.

### Eligibility for Registration as OCI

Foreign nationals are eligible if they:

- Were citizens of India on **26 January 1950** or thereafter.
- Were eligible to become Indian citizens on **26 January 1950**.
- Belonged to a territory that became part of India after **15 August 1947**.
- Are children, grandchildren, or great-grandchildren of such a citizen.
- Are minor children with one or both parents Indian citizens.
- Are foreign-origin spouses of Indian citizens/OCI cardholders (marriage registered & subsisted ≥2 years).

**Exceptions:** Nationals of **Pakistan, Bangladesh, or other notified countries** are ineligible.

### Tags in Context

- **OCI (Overseas Citizens of India):** A scheme to facilitate India's diaspora engagement without granting dual citizenship.
- **Citizenship Act, 1955:** Governs acquisition, termination, and associated rights of Indian citizenship, including provisions for OCI.

### Contemporary Relevance

- The move reflects India's stricter stance on **diaspora accountability**, particularly in the wake of **terrorism, financial crimes, and anti-India activities abroad**.
- Balances **benefits to global Indians** with the **state's security imperatives**.

### Conclusion – Keywords

The tightening of **OCI rules** underscores India's effort to balance **diaspora integration with national security**. While OCI facilitates strong cultural and economic ties, the government reserves the right to **revoke privileges** in cases that threaten India's **sovereignty, security, and public interest**.

### UPSC Mains Practice Question

**Q. The Overseas Citizens of India (OCI) scheme bridges India with its diaspora but has also raised issues of accountability and security. Critically examine the benefits and challenges of the OCI framework in the context of recent amendments.**

### Section 152 of Bharatiya Nyaya Sanhita (BNS)

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Polity & Governance:** Fundamental rights, constitutional validity of laws, judicial review.
- ✓ **GS Paper III – Security:** Internal security, challenges to sovereignty and unity of India.

### Context

- The **Supreme Court of India** questioned whether the "*potential for abuse*" of **Section 152, BNS** can be used as a valid ground to strike down the provision as **unconstitutional**.
- This issue is significant as it touches upon **free speech vs. state security**, echoing earlier debates around **sedition law (IPC Section 124A)**.

### About Bharatiya Nyaya Sanhita (BNS), 2023

- Replaced the **Indian Penal Code, 1860**.
- Aim: To **modernize India's criminal justice system**, reduce colonial legacy, and make laws more citizen-centric.

### Section 152 of BNS – Key Features

- **Scope:** Covers acts endangering the **sovereignty, unity, and integrity of India**.
- **Punishable Acts:**
  - Through words, signs, or visible representations, a person who excites/attempts to excite:
    - Secession,
    - Armed rebellion,
    - Subversive activities.
- **Punishment:**
  - Imprisonment for **life**, or
  - Imprisonment up to **7 years**, along with fine.
- **Exclusion Clause:**

- Lawful criticism or **disapprobation of Government measures** or administrative action, if aimed at their change through **lawful means**, is *not punishable*.

### Constitutional & Legal Issues

- **Potential Overlap with Freedom of Speech (Article 19(1)(a))**
  - Restriction must be **reasonable** under Article 19(2) – security, sovereignty, integrity, public order.
  - Risk of **chilling effect** on dissent if broadly interpreted.
- **Judicial Scrutiny:**
  - In *Shreya Singhal v. Union of India (2015)*, SC struck down **Section 66A of IT Act** due to vagueness and scope for abuse.
  - Debate: Can *possibility of misuse* itself invalidate Section 152, or should misuse be addressed through **judicial safeguards**?
- **Comparison with Sedition (IPC Section 124A):**
  - Sedition penalized “disaffection against the government.”
  - Section 152 shifts focus from **government disaffection** to **threats against sovereignty & unity**, aligning with **Kesavananda Bharati doctrine (basic structure)**.

### Significance of the Provision

- **Positive Aspects:**
  - Strengthens India's internal security framework.
  - Addresses modern threats – secessionist propaganda, extremist mobilization.
  - Provides constitutional safeguard by exempting lawful dissent.
- **Concerns:**
  - Ambiguous terms like “subversive activities” can be **misinterpreted**.
  - Risk of using the law to curb **political dissent and activism**.
  - Could face the same criticism as sedition law unless applied judiciously.

### Tags Explained

- **BNS (Bharatiya Nyaya Sanhita):** New criminal code enacted in 2023 replacing IPC, aimed at modernization and decolonization of criminal law.
- **Section 152:** Specific provision dealing with acts threatening India's sovereignty, unity, and integrity.

### Conclusion – Keywords

Section 152 BNS represents a **shift from colonial sedition law** to a sovereignty-focused framework. While it aims to balance **national security** and **free speech**, its constitutional validity will depend on judicial interpretation and **safeguards against misuse**.

### UPSC Mains Practice Question

**Q. Section 152 of the Bharatiya Nyaya Sanhita (BNS) is seen as a replacement for the sedition law. Critically analyze its provisions in the light of constitutional safeguards for free speech and national security.**

### National Green Tribunal (NGT)

- ❖ **Syllabus Mapping:**
- ✓ **GS Paper II – Governance, Polity (Statutory Bodies, Tribunals)**
- ✓ **GS Paper III – Environment, Conservation, Pollution, and Sustainable Development**

### Context

- The **Union Environment Ministry** has appointed **2 judicial members and 4 expert members** to the NGT.
- The tribunal was functioning **below its sanctioned strength**, raising concerns over its efficiency in handling environmental litigation.

### About National Green Tribunal (NGT)

#### ◆ Establishment & Legal Basis

- **Established:** 2010 under the **National Green Tribunal Act, 2010**.
- **HQ:** New Delhi, with regional benches in **Bhopal, Pune, Kolkata, Chennai**.
- **Objective:** Speedy and effective disposal of environmental cases, reducing the burden on higher judiciary.

#### ◆ Powers & Jurisdiction

- Has powers of a **Civil Court** under the **Code of Civil Procedure, 1908**.

- **Not bound** by CPC or Indian Evidence Act, 1872.
- Guided by **Principles of Natural Justice**.
- Can provide **relief, compensation, and restitution** in environmental matters.

### ◆ Membership

- **Chairperson:** Must be a **Judge of the Supreme Court** or **Chief Justice of a High Court**.
- **Judicial Members** and **Expert Members** appointed by the Central Government.
- **Tenure:** Members hold office for **5 years, no re-appointment** allowed.

## Significance of NGT

- **Environmental Governance:** Ensures enforcement of environmental rights under **Article 21** (Right to Life).
- **Landmark Judgments:**
  - Banned 10-year-old diesel vehicles in Delhi (2015).
  - Suspended sand mining without clearance.
  - Ordered closure of polluting industries along the Ganga.
- **Speedy Disposal:** Statutorily mandated to dispose of cases within **6 months**.

## Challenges

- **Vacancies & Delay:** Functioning below sanctioned strength affects timely justice.
- **Enforcement Issues:** Orders often face resistance from State Governments & industries.
- **Limited Jurisdiction:** Cannot take up issues outside the seven environmental laws listed in NGT Act.
- **Financial & Infrastructure Constraints.**

### ✓ Conclusion (Keywords):

The NGT is a crucial **judicial innovation** balancing **environmental protection and development needs**, but strengthening its **capacity, jurisdiction, and enforcement mechanisms** remains essential for achieving India's **sustainable development goals (SDGs)**.

## Municipal Corporation & Noida Case

### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance (Local Self-Government, Municipalities)
- ✓ GS Paper II – Polity (Constitutional Provisions, 74th Amendment)

## Context

- The Supreme Court asked the **Uttar Pradesh government** to consider converting the **New Okhla Industrial Development Authority (NOIDA)** into a **Metropolitan Corporation** for **people-centric governance**.
- **Problem:** Noida, despite being part of **Delhi-NCR** and highly urbanized, **does not have an elected local government**. Instead, it is governed by **NOIDA Authority**, created under the *Uttar Pradesh Industrial Area Development Act, 1976*.

## Municipal Corporation

### 1. Definition

- Municipal Corporations are **local self-government institutions** created for **administration of large cities**.
- Established by **state legislatures**, empowered by the **74th Constitutional Amendment Act, 1992**.

### 2. Authorities within a Corporation

- **Council (Legislative Wing):**
  - Consists of elected representatives (councillors).
  - Frames policies and passes resolutions.
- **Standing Committees:**
  - Facilitate smooth functioning of the Council.
  - Handle finances, public works, health, etc.
- **Municipal Commissioner (Executive Authority):**
  - Appointed by the State Government.
  - Responsible for day-to-day administration.

### Constitutional Framework (74th Amendment)

- Part IXA of the Constitution (Articles 243P-243ZG) deals with urban local bodies.
- Provides for three types of municipal bodies:
  - Nagar Panchayat – for transitional areas (rural → urban).
  - Municipality – for smaller urban areas.
  - Municipal Corporation – for larger urban areas/metropolises.
- Ensures democratic decentralisation through elected councils.

### Issues with NOIDA

- Governed by an Industrial Development Authority rather than an elected Municipal Corporation.
- Residents lack direct representation and democratic control.
- Decision-making is bureaucrat-driven, not citizen-driven.

### Significance of Converting NOIDA into a Municipal Corporation

- Democratic Accountability:**
  - Elected representatives ensure citizens' voices are heard.
- Better Service Delivery:**
  - Citizen-centric governance improves sanitation, housing, waste management, and transport.
- Constitutional Mandate:**
  - Aligns with 74th Constitutional Amendment spirit of decentralisation.
- Transparency & Participation:**
  - Ensures public participation in policy-making.

### Conclusion (Keywords)

The Supreme Court's suggestion highlights a critical gap in urban governance in India. Converting NOIDA into a Municipal Corporation would bring democratic legitimacy, transparency, and citizen participation in line with the constitutional mandate of urban local self-government.

## GOVERNANCE

### SDPs for Assam & Tripura: Expanding Peace & Prosperity

#### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance & Social Justice: Welfare schemes, development initiatives for vulnerable communities.
- ✓ GS Paper III – Economy & Security: Regional development, internal security, peace-building in conflict-affected areas.
- ✓ GS Paper I – Indian Society: Tribal communities, marginalised groups, and social transformation.

### Context

The Union Cabinet has approved the inclusion of four new components under the Special Development Packages (SDPs) for Assam and Tripura. The expansion aims to uplift Adivasi, Dimasa, and ULFA-influenced areas in Assam and strengthen socio-economic opportunities for tribal communities in Tripura. This builds on earlier packages for the Bodo and Karbi groups, which yielded positive peace-building outcomes in the North Eastern Region (NER).

### About the SDPs

- Type:** Central Sector Scheme.
- Objective:** To improve the socio-economic conditions of vulnerable and marginalised groups while fostering peace and stability.
- Coverage Areas:**
  - Assam:** Adivasi communities, Dimasa-inhabited areas, and ULFA-affected regions.
  - Tripura:** Tribal communities in socio-economically backward belts.

### Key Focus Areas

- Livelihood and Jobs**
  - Skill development programmes for youth.
  - Support for women's self-help groups (SHGs) and entrepreneurship.

### 2. Education and Healthcare

- Building schools, hostels, and healthcare centres in underserved tribal regions.
- Special focus on girls' education and maternal health.

### 3. Tourism and Infrastructure

- Promoting cultural and eco-tourism in tribal belts.
- Enhancing road connectivity and digital infrastructure.

### 4. Peace-Building and Inclusion

- Builds on previous Memorandum of Settlement (MoS)-based packages for Bodo and Karbi groups.
- Aims to transform post-conflict areas into growth hubs, consolidating peace dividends.

## Analytical Dimensions

### 1. Peace and Development Nexus

- SDPs are not just welfare programmes but tools for conflict resolution.
- By addressing grievances of insurgent groups, they reduce the scope of militancy and foster mainstream integration.

### 2. Socio-Economic Transformation

- Enhances livelihood opportunities for marginalized youth.
- Helps curb migration and radicalisation risks by strengthening local economies.

### 3. Governance and Federalism

- Reflects the Centre-State partnership model in the NER, empowering tribal voices through decentralised implementation.
- District-level committees ensure localised planning.

### 4. Challenges

- Risk of elite capture of benefits if not monitored transparently.
- Ethnic fault lines may persist despite economic development.
- Need for sustainable funding and institutional follow-up beyond package periods.

## Contemporary Relevance

- The SDPs align with India's larger goal of "Act East Policy", enhancing stability in the northeast for better connectivity to Southeast Asia.
- They serve as a model of peace-through-development, where former conflict zones are transformed into engines of growth.
- Strengthens India's counter-insurgency strategy, moving away from force-centric approaches toward development-led peacebuilding.

## Conclusion – Keywords

The Special Development Packages (SDPs) for Assam and Tripura demonstrate how inclusive development policies can serve as instruments of peace-building and social justice. By targeting vulnerable communities and insurgency-affected areas, the scheme strengthens India's vision of an integrated, peaceful, and prosperous Northeast.

## UPSC Mains Practice Question

**Q. Special Development Packages (SDPs) have emerged as an effective tool for peace-building in the Northeast. Critically analyse their role in addressing insurgency-related grievances, with reference to Assam and Tripura.**

## MMDR Amendment Bill 2025: Securing Critical Minerals

### ❖ Syllabus Mapping:

✓ GS Paper II – Governance: Government policies and interventions in economic development.

✓ GS Paper III – Economy: Infrastructure, investment, industrial growth.

✓ GS Paper III – Environment & Resources: Mineral resources, sustainable mining, energy transition.

## Context

The Government of India has introduced the Mines and Minerals (Development and Regulation) Amendment Bill, 2025 in the Lok Sabha. The Bill seeks to bolster India's mineral sector, secure supply chains for critical minerals, and align with the objectives of the National Critical Mineral Mission at a time of global disruptions and import dependence.

## Key Highlights of the Amendments

1. **National Mineral Exploration and Development Trust (NMEDT)**
  - o Renamed from the earlier **National Mineral Exploration Trust (NMET)**.
  - o Expanded mandate to cover **offshore and international exploration** of critical minerals.
  - o **Contribution by leaseholders** increased from **2% to 3% of royalty payable** to fund exploration.
2. **Establishment of Mineral Exchanges**
  - o Creation of **electronic trading platforms** for minerals, concentrates, and processed forms (including metals).
  - o Aimed at fostering a **transparent and dynamic market for price discovery**, similar to commodity exchanges.
3. **Incentivising Critical Mineral Extraction**
  - o Simplifies the inclusion of **new minerals in existing mining leases**.
  - o **No additional royalty payments** required for critical minerals listed in the **Seventh Schedule/Part D of the First Schedule**.
4. **One-Time Lease Area Extension**
  - o Permits limited expansion of lease areas:
    - Up to **10% for deep-seated minerals** (below 200m).
    - Up to **30% for composite licenses**.
5. **Removal of Sale Cap on Captive Mines**
  - o The **50% cap on mineral sales** from captive mines is removed.
  - o **State governments authorised** to permit sale of **old mineral dumps**, unlocking idle resources.

## Analytical Dimensions

### 1. Critical Minerals and Strategic Importance

- Essential for **clean energy transition**, semiconductors, EVs, defence, and high-tech manufacturing.
- Securing domestic and global supply chains reduces reliance on imports from a few dominant suppliers (e.g., China, Congo, Australia).

### 2. Economic Implications

- Mineral exchanges could make India a **global hub for mineral trading**, enhancing investor confidence.
- Lease extensions and relaxed royalty norms encourage **private investment** in deep-seated mineral exploration.

### 3. Governance and Federalism

- Increased contributions to NMEDT ensure **greater exploration funding**.
- Involving **state governments** in authorising mineral dump sales strengthens federal cooperation.

### 4. Environmental and Social Considerations

- Expansion of mining areas must balance with **ecological safeguards** and **community rights** under **Forest Rights Act and PESA Act**.
- Risk of overexploitation if sustainability frameworks are weak.

### 5. Global Comparisons

- Similar initiatives seen in **Australia and Canada**, where mineral exchanges and sovereign funds support exploration of critical minerals.
- India's Bill attempts to replicate such global best practices.

## Contemporary Relevance

- India is transitioning to a **green economy** and requires secure access to **lithium, cobalt, nickel, rare earth elements, and graphite**.
- The Bill strengthens the **National Critical Mineral Mission**, ensuring long-term supply chain resilience.
- It also supports India's ambitions of becoming a **global leader in EVs, renewable energy, and advanced manufacturing**.

## Conclusion – Keywords

The **Mines and Minerals (Development and Regulation) Amendment Bill, 2025** reflects India's proactive step towards **resource security and economic competitiveness**. By expanding exploration, creating transparent markets, and incentivising critical mineral extraction, it ensures India's preparedness for the **energy transition and strategic autonomy**. However, balancing **economic growth with ecological sustainability** will remain a key challenge.

## UPSC Mains Practice Question

**Q. The Mines and Minerals (Development and Regulation) Amendment Bill, 2025 is central to India's Critical Mineral Mission. Discuss its significance for economic resilience and energy transition, while highlighting the environmental and governance challenges it may pose.**

## Sports Governance & Anti-Doping Reforms

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Statutory, regulatory, and quasi-judicial bodies; transparency and accountability.
- ✓ **GS Paper II – Social Justice:** Welfare of youth and promotion of sports.
- ✓ **GS Paper III – Economy & Society:** Institutional reforms, international standards (WADA compliance).

### Context

In August 2025, the **Lok Sabha** passed two significant legislations:

1. **National Sports Governance Bill, 2025** – To regulate sports governance and ensure accountability in sports administration.
2. **National Anti-Doping (Amendment) Bill, 2025** – To grant greater **operational independence** to India's anti-doping bodies, in line with the **World Anti-Doping Agency (WADA)** standards.

These reforms come at a time when India is striving to strengthen its **sports governance framework** and prepare for greater **international sporting presence**.

### National Sports Governance Bill, 2025

#### Key Provisions

1. **Establishment of National Sports Bodies (NSBs)**
  - **National Olympic Committee (NOC)** – Sole governing body for Olympic sports.
  - **National Paralympic Committee (NPC)** – Governs Paralympic sports.
  - **National Sports Federations (NSFs) & Regional Sports Federations (RSFs)** – For specific sports governance.
2. **National Sports Board (NSB)**
  - Empowered to **grant recognition** to any sports organisation as a National Sports Body.
  - **Chairperson & members** appointed by the Central Government.
3. **National Sports Tribunal**
  - Ensures **speedy resolution of sports-related disputes**.
  - **Civil courts excluded** from jurisdiction over tribunal matters.
4. **Election Oversight**
  - A **national panel of electoral officers** (constituted by the Centre) will oversee elections of sports bodies.
5. **Powers of Central Government**
  - May **exempt a national body or affiliates** from provisions of the Bill in **public interest** for promotion of that sport.

### National Anti-Doping (Amendment) Bill, 2025

#### Key Provisions

1. **Operational Independence**
  - Ensures autonomy of **National Anti-Doping Agency (NADA)** and **National Anti-Doping Appeal Panel**.
  - Aligns with **WADA-prescribed standards**.
2. **Appeal Mechanism**
  - The **Central Government** empowered to constitute an **Appeal Panel**.
  - To hear appeals against decisions of the **Disciplinary Panel**.
3. **Legal Alignment**
  - Brings Indian law in line with **World Anti-Doping Code**.
  - Relevant provisions of the Code incorporated into Indian law via the Schedule.

### Analytical Dimensions

#### 1. Governance and Transparency

- Sports bodies in India have faced allegations of **mismanagement and political interference**.
- A statutory governance framework aims to improve **accountability and professionalism**.

#### 2. Dispute Resolution

- The **National Sports Tribunal** ensures quicker resolution, reducing delays and jurisdictional overlaps.
- Limits judicial overreach, while providing specialised dispute redressal.

### 3. International Commitments

- WADA compliance is essential for India's continued participation in **international sporting events**.
- Ensures Indian athletes are not penalised globally due to non-compliance.

### 4. MSME & Youth Development Angle

- By streamlining governance and doping control, the reforms create a **level playing field for athletes**.
- Boosts **India's global sporting image** and enhances investment in sports infrastructure.

### 5. Concerns

- **Excessive centralisation** – Government appointment of NSB members and election oversight may reduce autonomy of sports federations.
- **Appeal mechanism** under Anti-Doping Bill risks potential **conflict of interest**, as government also sets up the appeal panel.
- Balancing **independence of sports bodies** with **public accountability** will remain a challenge.

## Contemporary Relevance

- India's growing stature as a **sports power (Olympics, Paralympics, and Asian Games)** demands **transparent and internationally compliant governance systems**.
- These reforms also align with India's vision of **Fit India Movement, Khelo India Programme, and Sports as Industry**.
- Strengthens athlete protection, fairness, and ethical practices in sports.

## Conclusion – Keywords

The National Sports Governance Bill and the National Anti-Doping (Amendment) Bill, 2025 represent a **structural overhaul of India's sports ecosystem**. By institutionalising **governance reforms, dispute resolution, and doping regulation**, India is taking decisive steps to build a **transparent, credible, and globally competitive sporting environment**.

### UPSC Mains Practice Question

**Q. The National Sports Governance Bill and the National Anti-Doping (Amendment) Bill, 2025 seek to reform India's sports ecosystem. Critically evaluate their role in ensuring accountability, autonomy, and international compliance.**

## Indian Ports Bill 2025: Modernising Maritime Governance

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Centre–State relations, dispute resolution, statutory boards.
- ✓ **GS Paper III – Economy:** Infrastructure, transport, trade facilitation.
- ✓ **GS Paper III – Environment & Security:** Compliance with international conventions (MARPOL, Ballast Water).

## Context

- The **Lok Sabha** has passed the Indian Ports Bill, 2025, replacing the outdated **Indian Ports Act, 1908**.
- The Bill aims to **consolidate port-related laws**, strengthen institutional frameworks, and align with **international maritime safety and environmental standards**.

## Key Highlights of the Bill

### 1. Institutional Framework

- **Maritime State Development Council (MSDC):**
  - Established by the Centre.
  - Union Minister for Ports, Shipping & Waterways → **ex-officio Chairperson**.
- **Statutory Recognition to State Maritime Boards:**
  - Empowered to manage **non-major ports** effectively.

### 2. Dispute Resolution Mechanism

- **Dispute Resolution Committees (DRCs):**
  - Constituted by State Governments.
  - Jurisdiction → **Non-major ports disputes**.
  - Appeals → High Courts (Civil Courts barred).

### 3. Port Tariff and Management

- **Major Ports:** Tariffs fixed by **Board of Major Port Authority** / Company Boards (Companies Act, 2013).
- **Non-major Ports:** Tariffs fixed by **State Maritime Boards**.

### 4. Regulation of Ports

- **New Ports & Port Limits:** Central Government can notify new ports or alter boundaries **in consultation with State Governments**.
- **Mega Ports:** Criteria for classification decided by Centre + State consultation.

### 5. Environmental & Safety Compliance

- Mandatory compliance with **international conventions**:
  - **MARPOL (International Convention for the Prevention of Pollution from Ships)**.
  - **Ballast Water Management Convention**.

## About Ports in India

- **Major Ports:**
  - **12 in total**.
  - Governed by **Major Port Authorities Act, 2021**.
  - Administered by Ministry of Ports, Shipping & Waterways.
- **Non-Major Ports:**
  - **213 in total**.
  - Managed by **State Maritime Boards/State Governments**.

## Contemporary Relevance

- **Modernisation Need:** The 1908 Act was colonial-era and inadequate for modern trade.
- **Centre-State Balance:** Empowers States via maritime boards while ensuring central oversight.
- **Global Trade Competitiveness:** Facilitates India's role in Indo-Pacific maritime trade.
- **Environmental Responsibility:** MARPOL & ballast water compliance → aligns India with global maritime environmental norms.

## Tags in Context

- **Ports:** Critical infrastructure enabling **95% of India's trade by volume**.
- **MARPOL:** UN convention preventing marine pollution from ships; India's compliance boosts global credibility.
- **Maritime Trade:** Backbone of India's export-import economy; crucial for **Blue Economy goals**.

## Conclusion – Keywords

The **Indian Ports Bill, 2025** modernises India's maritime legal framework by strengthening governance, dispute resolution, tariff regulation, and environmental compliance. It balances **Centre-State roles**, enhances **port efficiency**, and aligns India with **international maritime standards**, vital for the **Blue Economy** and **global trade competitiveness**.

## UPSC Mains Practice Question

**Q. The Indian Ports Bill, 2025 seeks to balance Centre-State jurisdiction while strengthening maritime governance. Critically evaluate its significance for India's trade, federalism, and environmental compliance.**

## CAG on Short Transfer of ₹3.69 Lakh Crore Cess Funds

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Issues in public finance, accountability, transparency.
- ✓ **GS Paper III – Economy:** Public finance, taxation, cess utilization.

## Context

- The **Comptroller and Auditor General of India (CAG)** reported that over decades, the Union Government failed to transfer **₹3.69 lakh crore** of cess proceeds to designated reserve funds.
- This practice, termed as "**Short Transfer**", undermines fiscal accountability and the intended purpose of earmarked funds.

### About Short Transfer

- **Definition:** Refers to the failure of the government to transfer the full amount of cess collected into designated reserve/public funds.
- **Process of Cess Collection:**
  - Cess is collected as a **statutory levy** under specific legislations.
  - Initially credited to the **Consolidated Fund of India (CFI)**.
  - Thereafter, it must be transferred to **designated funds** in the **Public Account of India** for utilization towards earmarked purposes.
- **CAG Finding:** Instead of full transfer, significant amounts remained in CFI, thereby not being utilized for their mandated objectives.

### Major Findings – CAG Report

- **Largest Shortfall:**
  - **Oil Industry Development Board (OIDB)** faced the biggest short transfer.
  - Objective: Develop India's oil industry, ensure energy security.
- **Other Affected Funds:** Education Cess, Health Cess, Infrastructure-related cesses, etc., also showed discrepancies.

### Significance of Cesses

- Cesses are **purpose-specific taxes** (unlike general taxes).
- Examples:
  - **Education Cess** – for primary/secondary education funding.
  - **Krishi Kalyan Cess** – for agriculture and rural welfare.
  - **Health & Education Cess** – to fund healthcare/educational schemes.
- Non-transfer violates **fiscal discipline** and **trust of taxpayers**, reducing credibility of earmarked taxation.

### Concerns Raised

- **Fiscal Transparency:** Retaining cess proceeds in CFI masks the actual fiscal deficit.
- **Governance Issue:** Failure to meet statutory obligations weakens accountability.
- **Public Welfare Impact:** Essential sectors like oil development, education, and health lose planned funding.
- **Parliamentary Oversight:** Short transfers bypass scrutiny and reduce efficiency in fund allocation.

### Way Forward

1. **Strict Adherence:** Full transfer of cess proceeds to designated funds.
2. **Transparency Measures:** Annual disclosure of cess collection and utilization.
3. **Parliamentary Scrutiny:** CAG and Public Accounts Committee (PAC) should ensure compliance.
4. **Rationalization of Cesses:** Avoid proliferation of cesses, integrate with GST for efficiency.

### Conclusion – Keywords

The CAG's findings highlight the **need for stronger fiscal transparency, accountability, and efficient fund utilization**. Without adherence to cess transfer obligations, earmarked taxation loses its purpose, impacting **public trust and social sector funding**.

### UPSC Mains Practice Question

**Q. What is meant by "Short Transfer" in the context of cess funds? Discuss its implications for fiscal transparency and public welfare with reference to the recent CAG report.**

### Perpetual Tolling

- ❖ **Syllabus Mapping:**
- ✓ **GS Paper II – Governance (Accountability & Transparency in Infrastructure)**
- ✓ **GS Paper III – Economy & Infrastructure (Road Transport, PPP Models)**

### Context

- The **Public Accounts Committee (PAC)** has criticized the **perpetual tolling system**, where toll collection continues indefinitely, even after recovery of project costs.

### About Perpetual Tolling

#### ◆ Origins

- Introduced via **2008 amendment**, allowing toll collection beyond cost recovery.
- **Formalised in 2023**, institutionalising perpetual tolling as the standard model.

#### ◆ Current Mechanism

- **Toll Rates:** Fixed in **2008** framework, with an annual **3% increment**.
- **Revenue Use:**
  - During concession period: Goes to concessionaire (private contractor).
  - After concession ends: **NHAI** operates toll plazas; revenue transferred to **Consolidated Fund of India (CFI)**.

### Issues with Perpetual Tolling

- **Equity Concerns:** Citizens continue to pay despite project cost recovery.
- **Transparency Deficit:** Lack of independent assessment of cost-recovery timelines.
- **Public Backlash:** Seen as exploitative taxation.
- **Accountability Gaps:** No oversight on actual operation & maintenance (O&M) costs.

### Proposed Solutions

1. **Technology-driven Refund Mechanism**
  - Automatic toll refunds when highways are under maintenance or unfit for travel.
2. **Independent Oversight Authority**
  - To justify toll continuation beyond cost recovery.
3. **Transparent Cost Assessment**
  - Periodic, third-party audits of O&M expenses to ensure fair tolling.

### Significance for Governance

- **Revenue for Infrastructure:** Provides steady inflow for **NHAI and government projects**.
- **User-Pay Principle:** Aligns with PPP model and reduces fiscal burden.
- **Risk of Exploitation:** Without reforms, can lead to **public mistrust** and resistance to infrastructure policies.

#### ✓ Conclusion (Keywords):

The **perpetual tolling system**, though helpful in funding infrastructure, raises concerns about **equity, transparency, and accountability**. Reforms like **automated refunds, independent oversight, and transparent audits** are necessary to ensure **citizen trust and good governance** in road infrastructure management.

## Indian Olympic Association (IOA)

#### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance, NGOs, SHGs, Civil Services, and Sports Bodies
- ✓ GS Paper I – Indian Society (Sports & Cultural Development)

### Context

- The **Indian Olympic Association (IOA)** has formally approved India's **bid to host the 2030 Commonwealth Games**, a major global multi-sport event.
- If successful, this would mark India's second hosting after **Delhi 2010 Commonwealth Games**.

### About IOA

- **Genesis:**
  - Established in **1927** by **Sir Dorabji Tata** (**Founding President**) and **Dr. A.G. Noehren** (**Founding Secretary General**).
  - Officially recognised by the **International Olympic Committee (IOC)** in the same year.
- **Status:**
  - A **non-profit organisation** registered under the **Societies Registration Act, 1860**.
- **Objective:**
  - To **develop, promote, and protect the Olympic Movement in India**.
  - To select athletes and teams for participation in Olympic, Asian, and Commonwealth Games.

- **Governance:**

- Managed by a **32-member Executive Council**, headed by a **President**.
- Works in coordination with the **International Olympic Committee** and **National Sports Federations**.

### Significance of IOA

1. **Sports Governance** – Apex body managing India's international sporting representation.
2. **International Standing** – Ensures India's participation in **Olympics, Asian Games, Commonwealth Games**.
3. **Policy Role** – Acts as a bridge between **Government, Sports Federations, and International Bodies**.
4. **Cultural Diplomacy** – Enhances India's **soft power** through global sports.

### Contemporary Relevance

- India's bid for the **2030 Commonwealth Games** shows its **rising ambition in sports diplomacy**.
- Aligns with India's goals of becoming a **global sporting hub**, following initiatives like:
  - **Khelo India**
  - **Fit India Movement**
  - Expansion of **sports infrastructure & sports science institutions**

### Conclusion (Keywords)

The **Indian Olympic Association (IOA)**, rooted in India's **pre-independence sports movement**, is the **apex custodian of Olympic values** in the country. Its role in securing the **2030 Commonwealth Games** bid represents a **strategic step in sports diplomacy, global visibility, and strengthening India's sporting culture**.

## High-Powered Demography Mission to Tackle Illegal Migration

### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance, Constitution, Polity (Citizenship, Rights, National Security)
- ✓ GS Paper III – Internal Security (Border Management, Migration Issues)
- ✓ GS Paper I – Society (Demography, Migration Trends)

### Context

- On **16 August 2025**, the **Prime Minister announced the High-Powered Demography Mission** aimed at combating **illegal migration** in India, particularly in **sensitive border areas**.
- The mission addresses challenges of **national security, demographic balance, identity fraud, and citizen rights protection**.

### Why Illegal Migration is a Challenge?

- **National Security:** Cross-border infiltration linked to smuggling, terrorism, and insurgency.
- **Demographic Stress:** Alters ethnic composition in border states (e.g., Assam, Tripura, parts of West Bengal).
- **Economic Impact:** Pressure on jobs, land, food, healthcare, and welfare schemes.
- **Social Tensions:** Communal clashes, ethnic conflicts, and political polarization.
- **Identity Fraud:** Use of fake documents for citizenship benefits.

### Key Measures under the Mission

#### ◆ Strengthening Border Management

- **Smart Surveillance:** Drones, sensors, AI-based monitoring.
- **Modernized Fencing:** Laser walls, automated detection systems.
- **Deployment:** Integration with BSF & ITBP command systems.

#### ◆ Legal & Policy Framework

- **National Refugee Law:** Legal distinction between refugees (with humanitarian protection) and illegal immigrants (subject to deportation).
- **NRC/NID Implementation:** Fast-tracking the **National Register of Citizens (NRC)** and issuing **National Identity Cards (NID)**.

#### ◆ Biometric Record-Keeping

- Centralized biometric database for **illegal immigrants/asylum seekers**.
- Prevents **identity theft and misuse of Aadhaar/voter ID**.

### ◆ Diplomatic & International Cooperation

- **Bilateral Agreements:** Negotiating **repatriation pacts** with Bangladesh and Myanmar.
- **Regional Forums:** Leveraging **SAARC & BIMSTEC** platforms.
- **Global Bodies:** Collaborating with **UNHCR (refugees)** and **IOM (migration management)**.

### Significance for India

- **National Security:** Prevents infiltration and terror networks.
- **Demographic Stability:** Preserves cultural and linguistic identity of border states.
- **Rule of Law:** Distinguishes between **genuine refugees** and **illegal migrants**.
- **International Standing:** Shows India's commitment to **human rights & refugee conventions**.
- **Citizen-Centric Governance:** Protects **welfare schemes & resources** for genuine Indian citizens.

### Challenges & Criticism

- **Humanitarian Concerns:** Risk of human rights violations if genuine refugees are denied protection.
- **Political Polarisation:** Citizenship, NRC, and illegal migration debates remain **contentious**.
- **Coordination Issues:** Requires strong centre-state cooperation (e.g., North-East states often oppose unilateral decisions).
- **Diplomatic Sensitivity:** Bangladesh-India relations could be strained.
- **Implementation Capacity:** Huge costs, manpower, and tech integration required.

### Conclusion (Keywords)

The **High-Powered Demography Mission** is a **comprehensive security-cum-governance initiative** balancing **national security, demographic integrity, and humanitarian obligations**. For successful implementation, India must adopt a **multi-pronged strategy** of **strong border management, robust legal frameworks, citizen identification, and international cooperation**.

## INTERNATIONAL RELATIONS

### Armenia–Azerbaijan Peace Deal 2025

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – International Relations:** Bilateral, regional, and global agreements involving India; role of external powers in regional conflicts.
- ✓ **GS Paper I – World History/Current Events:** Cold War legacies and ethnic conflicts.
- ✓ **GS Paper III – Economy & Security:** Strategic trade corridors, energy cooperation, geopolitical significance.

#### Context

On **11 August 2025**, the United States successfully mediated a **peace agreement between Armenia and Azerbaijan**, aiming to put an end to their decades-long rivalry, largely centered around the **Nagorno-Karabakh dispute**. The deal is being seen as a landmark moment for **South Caucasus geopolitics**, with wider implications for **regional connectivity and global diplomacy**.

#### Key Provisions of the Agreement

1. **Cessation of Hostilities:**
  - o Both sides agreed to halt armed conflict and **establish diplomatic relations** for the first time since their independence.
2. **The TRIPP Route (Trump Route for International Peace and Prosperity):**
  - o A new **transit corridor through Armenian territory** connecting Azerbaijan to its exclave **Nakhchivan**.
  - o **Exclusive development rights** granted to the United States, symbolising Washington's deeper entry into South Caucasus affairs.
3. **U.S. Cooperation Deals:**
  - o Both Armenia and Azerbaijan signed **separate agreements with the U.S.** in the fields of **energy, technology, and economic development**.

#### Historical Background of the Conflict

- **Ethnic Dispute:** The central issue has been **Nagorno-Karabakh**, a region inside Azerbaijan with a majority ethnic Armenian population.
- **1980s:** Region attempted to break away from Azerbaijan with Armenia's support.
- **1991:** Following Soviet disintegration, Armenia and Azerbaijan became independent, but the conflict persisted.
- **2020–2023:** Azerbaijan launched military offensives and by 2023 regained full control, leading to the **exodus of ~100,000 Armenians** from Nagorno-Karabakh to Armenia.

### India's Strategic Interest

- Diplomatic Stance:** India welcomed the peace deal as a significant **achievement of diplomacy and dialogue**.
- Armenia Factor:**
  - India has a **Friendship and Cooperation Treaty (1995)** with Armenia—the only one of its kind in the region.
  - Armenia is also a key partner for India's **defense exports** in recent years.
- Azerbaijan Factor:**
  - Azerbaijan lies along the **International North-South Transport Corridor (INSTC)**, which links India with Russia and Europe via Central Asia.
  - Stability in Azerbaijan ensures smoother trade and connectivity prospects.

### Analytical Dimensions

#### 1. Geopolitical Significance

- U.S. securing development rights in TRIPP reflects its **reassertion in Eurasia**, balancing against Russian and Turkish influence.
- The corridor could reduce **dependence on Iran and Russia** for connectivity.

#### 2. Regional Stability

- While the deal promises peace, **ethnic tensions remain unresolved**. Sustainable peace will depend on **power-sharing, minority rights, and local governance** arrangements.

#### 3. India's Balancing Act

- India's ties with **Armenia** (friendly) and **Azerbaijan** (strategic trade partner) require **diplomatic neutrality**, much like India's policy during the Ukraine conflict.

#### 4. Comparative Perspective

- Similar to the **Camp David Accords (1978)** where U.S. mediated Egypt-Israel peace, this deal shows America's use of "**conflict resolution as a tool of strategic entry**".

### Contemporary Relevance

- Strengthens the role of **U.S. as a mediator in Eurasia**, countering China's **Belt and Road Initiative (BRI)**.
- Reinforces India's vision of **connectivity through INSTC** and strengthens its **energy security links**.
- Opens a new chapter in **South Caucasus geopolitics**, where **India, Iran, Russia, Turkey, and the West** will compete for influence.

### Conclusion – Keywords

The **Armenia-Azerbaijan Peace Agreement (2025)** is not just about ending conflict, but about **redrawing the strategic map of Eurasia**. It reflects U.S. ambitions, regional aspirations for stability, and opens **new opportunities for India's diplomacy, energy security, and trade corridors**.

### UPSC Mains Practice Question

**Q. The Armenia-Azerbaijan Peace Agreement (2025) is seen as a "geopolitical reset" in the South Caucasus. Analyse the role of the United States as mediator, and examine the strategic implications of the deal for India.**

### U.S. Sanctions & Global Hegemony

#### ❖ Syllabus Mapping:

- ✓ GS Paper II – International Relations:** Global institutions, foreign policies, U.S. dominance in global order.
- ✓ GS Paper III – Economy:** Global trade, sanctions, and financial systems.
- ✓ GS Paper I – World History/Contemporary Issues:** Cold War legacies, coercive diplomacy.

### Context

A recent **working paper by Dr. Urjit Patel** (former RBI Governor) highlights the role of **economic sanctions as a geopolitical weapon** of the United States. While sanctions are promoted as a non-violent alternative to war, the study points out that their **effectiveness is limited**, yet their usage has expanded significantly, especially under the **Trump Presidency**.

### Sanctions as a Tool of Economic Warfare

- Economic sanctions involve **curbs on trade, shipping, banking, and payment channels**.
- They serve as a **substitute for military intervention**, aligning economic coercion with foreign policy objectives.
- Over the years, U.S. sanctions have targeted oil-rich states like **Venezuela, Iran, Iraq, Libya, Sudan, and Syria**, demonstrating Washington's dominance over global trade and finance.

### Effectiveness of Sanctions: Limited but Expanding

- Despite being widely deployed, sanctions have **limited success rates**.
- Since 2000, of the **687 sanctions imposed**, fewer than **20% achieved their intended goals**.
- This raises questions on their long-term utility but also signals the **dependence of global economies on U.S.-centric financial structures** (e.g., SWIFT).

### Rise of Secondary Sanctions

- **Primary Sanctions:** Target the sanctioned country directly.
- **Secondary Sanctions:** Extraterritorial measures that **penalise third parties** engaging with sanctioned states.
- Examples impacting India:
  - **Chabahar Port, Iran** – Indian investment slowed due to U.S. sanctions.
  - **Oil investments in Russia** – Indian PSUs unable to repatriate **\$900 million dividends** due to U.S./EU payment restrictions.

This reflects the **global outreach of U.S. financial power**, extending beyond bilateral disputes.

### Analytical Dimensions

#### 1. U.S. Hegemony in the Global Order

- Sanctions underscore the “**weaponisation of finance**” where the U.S. leverages its control over the **dollar, global banking, and payment networks**.
- They project soft power but also raise resentment, accelerating efforts for **alternative financial institutions**.

#### 2. Effectiveness Debate

- As per Urjit Patel's findings, sanctions achieve limited success but **create humanitarian crises** (Iraq 1990s, Iran post-2018).
- Often punish common citizens rather than political elites.

#### 3. India's Position

- Sanctions constrain India's strategic projects (Iran, Russia) but also open opportunities for **greater south-south cooperation**.
- Institutions like **BRICS' New Development Bank (NDB)** and **Asian Infrastructure Investment Bank (AIIB)** are seen as “**risk mitigants**”.
- India must balance between **strategic autonomy** and pressures from the Western-led financial system.

#### 4. Changing Financial Architecture

- Countries are experimenting with **de-dollarisation** (use of local currencies in trade).
- China's **Cross-Border Interbank Payment System (CIPS)** and BRICS initiatives are alternatives to U.S.-dominated structures.

### Contemporary Relevance

- The Ukraine conflict (2022 onwards) showed how **Russia's exclusion from SWIFT** altered global finance.
- For emerging economies like India, diversification of partnerships and financial routes is crucial.
- The debate on sanctions ties into larger questions of **multipolarity vs. U.S.-led unipolar dominance**.

### Conclusion – Keywords

Economic sanctions, often hailed as tools of **diplomatic pressure**, have instead become **symbols of U.S. hegemony**, reflecting its dominance in global finance and trade. However, with rising multipolarity, institutions like **BRICS** and **AIIB** present alternatives to reduce vulnerability and enhance **strategic autonomy** for nations like India.

### UPSC Mains Practice Question

**Q. “Economic sanctions have become the new currency of global power projection.” Critically examine the effectiveness of U.S.-led sanctions as a foreign policy tool. In this context, analyse their impact on India and the significance of alternative financial institutions like BRICS and AIIB.**

## India–Bangladesh Port Frictions

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – International Relations:** India–Bangladesh relations, neighborhood policy.
- ✓ **GS Paper III – Economy:** Trade policy, export-import regulations.
- ✓ **GS Paper III – Internal Security:** Border management, illegal migration, radicalization.

### Context

- On 13 August 2025, the **Directorate General of Foreign Trade (DGFT)** imposed new **port restrictions** on imports from Bangladesh under the **Foreign Trade (Development & Regulation) Act, 1992** and **Foreign Trade Policy, 2023**.
- This move comes amid **political instability in Bangladesh**, growing **China–Bangladesh ties**, and recurring **bilateral irritants** like migration and river water disputes.

### Recent Restrictions

- Garments & Jute:** Import of certain readymade garments and jute items restricted **only to Nhava Sheva Port (Maharashtra)**.
- Agri & Food Items:** Ban on export of **fruits, processed foods, etc.** from Bangladesh through land ports of **Assam, Meghalaya, Mizoram, and Tripura**.
- March 2025:** India revoked **transshipment facility** under the 2020 agreement, which allowed Bangladeshi goods to access third countries via Indian land customs stations.

### Other Bilateral Irritants

#### 1. Geopolitical Shifts

- China factor:** First-ever **China–Pakistan–Bangladesh trilateral meet** (Kunming, 2025) raised strategic concerns for India.
- Growing Chinese **infrastructure investments** in Bangladesh (ports, SEZs, energy) challenge India's influence.

#### 2. Political Instability in Bangladesh

- No elected government since the resignation of the Bangladeshi PM in **2024** → weakening of institutional legitimacy.

#### 3. Internal Security Issues

- Illegal Migration:** From Bangladesh and Myanmar (Rohingya influx) → strains on India's **Northeast states**.
- Radicalization & Minority persecution:** Spillover concerns into India's border districts.

#### 4. River Water Disputes

- Teesta River issue** remains unresolved.
- Lack of comprehensive water-sharing framework → friction in drought-prone regions.

### Tags in Context

- India–Bangladesh Relationship:** Strategic partnership under stress due to trade frictions and political instability.
- Directorate General of Foreign Trade (DGFT):** Key regulatory body shaping India's external trade and its compliance with WTO and bilateral agreements.

### Contemporary Relevance

- Neighbourhood First Policy:** Trade frictions may weaken India's regional diplomacy at a time when China is expanding its footprint.
- Act East Policy:** Restrictions through Northeast land ports may slow **connectivity projects** with ASEAN.
- Economic Impact:** Small traders and border communities dependent on cross-border trade may face losses.
- Security Dimension:** Curtailing porous trade routes could help in monitoring **illegal trafficking** of goods and people.

### Conclusion – Keywords

India's port restrictions on Bangladeshi imports reflect a mix of **economic protectionism, security concerns, and geopolitical pressures**. While they may help regulate trade flows and strengthen border security, they risk **straining bilateral ties** and pushing Bangladesh closer to **China's strategic orbit**.

### UPSC Mains Practice Question

**Q. India's recent trade restrictions on Bangladesh reveal the intersection of economics, security, and geopolitics. Critically analyze the implications for bilateral relations and India's regional strategy.**

## India–Singapore Roundtable (ISMR)

### ❖ Syllabus Mapping:

- ✓ GS Paper II – International Relations (India & Neighbourhood + Act East Policy)
- ✓ GS Paper III – Economy, Technology, and Security Issues
- ✓ Essay – Regional Cooperation, ASEAN, Indo-Pacific

### Context

- The India–Singapore Ministerial Roundtable (ISMR) was held to review cooperation and progress under six pillars: **Advanced Manufacturing, Connectivity, Digitalization, Healthcare, Skills Development, and Sustainability.**
- Ministers acknowledged the **private sector's role** and identified **new initiatives** for future cooperation.

## India–Singapore Relations – A Timeline

- **1965:** India recognised Singapore's independence.
- **2005:** CECA (Comprehensive Economic Cooperation Agreement) signed.
- **2015:** Partnership upgraded to **Strategic Partnership**.
- **2024:** Further upgraded to **Comprehensive Strategic Partnership**.
- **2025:** Marks **60 years of diplomatic relations**.



## Dimensions of Bilateral Engagement

### ◆ Trade & Investment

- Singapore is **India's largest ASEAN trade partner** and **6th globally** (2023–24, 3.2% share).
- Major source of **FDI inflows** into India.



### ◆ Digital & Fintech Cooperation

- **UPI-PayNow cross-border payments** operational.
- **RuPay card acceptance** in Singapore.

### ◆ Multilateral Cooperation

- Singapore is a member of **International Solar Alliance, Global Biofuel Alliance**.
- Engages with India in **Indo-Pacific multilateralism** (ASEAN-led forums, Quad outreach).

### ◆ Defence & Security Ties

- **Agni Warrior (Army), SIMBEX (Navy)** – key defence exercises.
- **Access to Changi Naval Base** – vital for India's Indo-Pacific strategy to balance China.

### ◆ People-to-People Ties

- Indian diaspora forms **9% of Singapore's population**.
- **Tamil** recognised as one of the official languages.

## Significance for India

- **ASEAN Bridge:** Strengthens India's trade, connectivity, and counterterrorism links with ASEAN, advancing **Act East Policy** and **Indo-Pacific vision**.
- **Crisis Partnership:** During COVID-19 → Singapore provided **medical aid & oxygen**; India supplied **vaccines (Vaccine Maitri)**.
- **Counterbalancing China:** Singapore's strategic location and naval base access enhance India's presence in **South China Sea & IOR**.
- **Innovation & Sustainability:** Collaboration in **green energy, skill development, healthcare tech** aligns with India's **Amrit Kaal goals**.

### ✓ Conclusion (Keywords):

The **India-Singapore Ministerial Roundtable (ISMR)** highlights the maturing of ties into a **Comprehensive Strategic Partnership**, **strengthening Act East policy, Indo-Pacific outreach, economic resilience, and security cooperation**, making Singapore a pivotal partner in India's regional and global aspirations.

## Permanent Court of Arbitration (PCA)

### ❖ Syllabus Mapping:

- ✓ GS Paper II – International Institutions
- ✓ GS Paper II – Bilateral and Multilateral Treaties (Indus Waters Treaty, 1960)

### Context

- India has **rejected the PCA's award** on issues of **general interpretation of the Indus Waters Treaty (IWT)**.
- The dispute concerns the management and usage of shared river waters between India and Pakistan.

### About Permanent Court of Arbitration (PCA)

- **Nature:** A **treaty-based intergovernmental organization** that facilitates arbitration and other forms of dispute resolution (conciliation, mediation, fact-finding).
- **Genesis:** Established in **1899** by the **Convention for the Pacific Settlement of International Disputes** during the **First Hague Peace Conference**.
- **Headquarters:** Peace Palace, The Hague, Netherlands.
- **Membership:** 125 contracting parties, including **India**.
- **Legal Status:** Functions as an administrative framework for arbitral tribunals, rather than a permanent court in the strict sense.

### Functions of PCA

- Provides a forum for settlement of disputes involving:
  - States,
  - State entities,
  - Intergovernmental organizations, and
  - Private parties.
- Offers **arbitration rules, registry support, and legal expertise** for disputes.
- Covers disputes relating to:
  - Territorial and maritime boundaries.
  - Sovereignty issues.
  - International trade and investment.
  - Human rights and environmental matters.

### PCA and India

- India is a **contracting party** but often prefers **bilateral negotiation and arbitration mechanisms** rather than international adjudication.
- Notable cases involving India at the PCA:
  - **Indus Waters Treaty arbitration** with Pakistan.
  - **Enrica Lexie case (Italy v. India, 2015)** involving Italian marines.
  - **Maritime boundary dispute (Bangladesh v. India, 2014)** under UNCLOS, where PCA acted as registry.

### Significance

- PCA is important as it provides a **neutral, rules-based dispute resolution mechanism**.
- Enhances **international legal order** and reduces reliance on unilateral measures.
- However, enforcement depends on **state consent and compliance**, limiting its effectiveness.

### Criticism

- **Non-binding character:** Awards are binding on parties but lack strong enforcement powers.
- **Sovereignty concerns:** Countries, including India, are reluctant to submit sensitive issues (like water sharing) to international arbitration.
- **Overlapping jurisdictions:** Often overlaps with **ICJ, ITLOS, WTO dispute settlement mechanisms**.

### Conclusion (Keywords)

The PCA represents the world's oldest and most flexible mechanism for **peaceful settlement of international disputes**, but its relevance depends on **state compliance and political will**. India's rejection of the PCA award on the **Indus Waters Treaty** underscores the tension between **international legal institutions and national sovereignty**.

## Global Outlook Council on Water Investments (GOCWI)

### 📌 Syllabus Mapping:

✓ GS Paper II – International Relations & Global Institutions

✓ GS Paper III – Environment, Water Security, and Sustainable Development

### Context

- The **President of South Africa** has announced the launch of the **Global Outlook Council on Water Investments (GOCWI)**.
- It is being introduced as a **G20 Presidential Legacy Initiative** to mobilize resources and political will for water security worldwide.

### About GOCWI

- **Nature:** A high-level international platform aimed at sustaining **political and financial momentum** for global water investments.
- **Institutional Linkage:** Forms a core pillar of the **Global Water Partnership's (GWP) Global Transformation Agenda on Water Investments**.
- **Launch:** Declared during South Africa's G20 Presidency, reflecting its **legacy initiative**.

### Global Water Partnership (GWP)

- **Nature:** A multi-stakeholder action network and intergovernmental organisation.
- **Mandate:** Dedicated to ensuring **equitable, sustainable, and efficient management** of global water resources.
- **Transformation Agenda:**
  - Target: Mobilise **USD 15 billion by 2030** for **water security**.
  - Focus: Investment in infrastructure, technology, and governance to ensure universal access to safe and reliable water.

### Significance of GOCWI

- **Water Security:** Addresses the growing global challenge of **water scarcity, pollution, and inequitable access**.
- **Financing Gap:** Bridges the large gap between **available finance and required investment** for water management.
- **Global Cooperation:** Provides a **political and financial coordination mechanism** at the highest level.
- **Support to SDGs:** Directly contributes to **SDG 6 (Clean Water and Sanitation)** and indirectly to **SDG 13 (Climate Action)** and **SDG 2 (Zero Hunger)**.

### Relevance for India

- India faces **acute water stress**, being home to **18% of global population with only 4% of freshwater resources**.
- Platforms like GOCWI can help:
  - Mobilise **international funding** for water conservation projects.
  - Encourage **technology transfers** in efficient irrigation and water recycling.
  - Support India's **Jal Jeevan Mission, Atal Bhujal Yojana, and Namami Gange Programme**.

### Conclusion (Keywords)

The launch of the **Global Outlook Council on Water Investments (GOCWI)** signifies a step towards **global water governance**, with an emphasis on **sustainable financing, political commitment, and collective action**. For water-stressed countries like India, it opens new avenues for **finance, technology, and international collaboration**.

## Doctors Without Borders (MSF)

### 📌 Syllabus Mapping:

- ✓ GS Paper II – International Organisations, Humanitarian Issues
- ✓ GS Paper II – International Relations (Global NGOs & Humanitarian Diplomacy)
- ✓ GS Paper IV – Ethics & Human Interface (Humanitarian Values, Service to Humanity)

### Context

- MSF is currently bridging **critical healthcare gaps in Iraq**, demonstrating the importance of international humanitarian organisations in post-conflict and fragile regions.

### About MSF

- **Founded:** 1971 in France, in the aftermath of the **Biafra War (Nigeria famine crisis)**.
- **Nature:** An **international, independent medical humanitarian organisation**.
- **Core Mandate:** Deliver **emergency medical aid** quickly, effectively, and impartially in conflict zones, disaster areas, epidemics, and regions excluded from healthcare systems.
- **Recognition:** Awarded the **1999 Nobel Peace Prize** for its pioneering humanitarian contributions across continents.

### Key Principles

- **Neutrality & Impartiality:** Aid is provided regardless of race, religion, gender, or political affiliation.
- **Medical Ethics:** Upholds patient dignity and confidentiality while providing critical care.
- **Testimony (témoignage):** Beyond providing aid, MSF bears witness and speaks out against humanitarian crises and injustice.

### Global Role

- Operates in over **70 countries** across Africa, Asia, and conflict-affected regions.
- Specialises in:
  - Conflict zones (e.g., **Syria, Iraq, Yemen**).
  - Epidemics (**Ebola in West Africa, COVID-19 response**).
  - Refugee and displaced persons camps.
  - Neglected tropical diseases and malnutrition treatment.

### Significance

- **Humanitarian Diplomacy:** Serves as a **soft power actor**, shaping global humanitarian responses.
- **Healthcare Access:** Provides medical services where state systems are absent or collapsed.
- **Advocacy:** Highlights issues like vaccine inequality, refugee crises, and access to essential medicines.
- **India's Engagement:** MSF has worked in **Bihar, Jharkhand, and Kashmir** addressing **malnutrition, kala-azar, and conflict trauma care**.

### Challenges

- **Security Risks:** Aid workers often face violence in war zones.
- **Political Pressures:** Neutrality questioned by warring states.
- **Funding Issues:** Balancing independence with donor dependence.

### Conclusion (Keywords)

MSF embodies **humanitarianism, medical ethics, and neutrality**, playing a critical role in providing **emergency healthcare** to the world's most vulnerable populations. It reflects the spirit of **global solidarity** and upholds the principle of **human dignity in crises**.

## SECURITY & DEFENCE

### Parliamentary Report: India's IOR Strategy

#### ❖ Syllabus Mapping:

- ✓ GS Paper II – International Relations → India & its neighborhood, regional groupings, global governance.
- ✓ GS Paper III – Security → Maritime Security, Strategic Challenges.
- ✓ GS Paper I – Geography → World Physical Geography (Oceans & Coastal systems).

#### Context

- The **Parliamentary Standing Committee on External Affairs** presented its report titled *"Evaluation of India's Indian Ocean Strategy"* in Lok Sabha.
- The report reviews India's **strategic, economic, and ecological stakes** in the Indian Ocean and provides recommendations to strengthen India's maritime posture.

#### Significance of the Indian Ocean

##### 1. Geostrategic Importance

- India: **11,098.81 km coastline, ~1,300 islands, 2.4 million sq. km EEZ.**
- Global: **3rd largest ocean**, 35 littoral states, home to **1/3rd of world's population**.



##### 2. Economic Importance

- India: **~90% of India's trade** & majority of oil imports transit IOR.
- Global:
  - 50% global container traffic.
  - 1/3rd bulk cargo.
  - 2/3rd oil shipments.

##### 3. Ecological Significance

- Warmest ocean → ecologically dynamic.
- Rich biodiversity & fisheries.
- Climate regulator (monsoon systems).

#### Key Challenges

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##### 1. Geopolitical Rivalries

- **China's growing presence:** Belt & Road Initiative, "String of Pearls", Djibouti base, ties with Pakistan.

##### 2. Maritime Security

- **Piracy** (Horn of Africa).
- **Terrorism & trafficking** (arms, drugs, humans).
- **IUU Fishing** (Illegal, Unreported, Unregulated).

##### 3. Infrastructure Gaps

- Limited capacity in small island & coastal states.
- Need for resilient supply chains and port connectivity.

#### Committee Recommendations

- **Upgrade SAGAR → MAHASAGAR**
  - *Security & Growth for All in the Region* → to *Mutual Security, And Sustainable Growth for All in the Region*.
  - Focus on sustainability, maritime trade, and cooperative security.
- **Deepen Multilateral Engagement**
  - Quad, IORA (Indian Ocean Rim Association), BIMSTEC.
  - Broader Indo-Pacific security architecture.
- **Diaspora & Cultural Diplomacy**
  - Use Indian diaspora in IOR states for stronger ties.
  - Leverage cultural connect (Buddhism, Indian Ocean trade heritage).
- **Rules-Based Maritime Order**
  - Support **UNCLOS (United Nations Convention on the Law of the Sea)**.

- Promote **ASEAN centrality** in Indo-Pacific governance.

### ✓ Conclusion (Keywords):

India's IOR strategy must combine **hard power (naval presence)** and **soft power (diplomacy, trade, diaspora)** to counterbalance China while promoting a **rules-based maritime order**.

## Border Security Force (BSF)

### ❖ Syllabus Mapping:

✓ GS Paper II – Governance, Polity (Ministries, Security Forces)

✓ GS Paper III – Internal Security, Role of Security Agencies

### Context

- The **Ministry of Home Affairs (MHA)** has cleared the **first-ever cadre review of the BSF**, aimed at restructuring, modernising, and addressing personnel concerns.
- This move is significant given BSF's role as **the largest border guarding force in the world**.

### About BSF

#### ◆ Genesis & Ministry

- **Formed:** 1965 after Pakistan's attack in Gujarat (Rann of Kutch).
- **Nodal Ministry:** Central Armed Police Force (CAPF) under **MHA**.

#### ◆ Deployment

- Guards India's **Pakistan** and **Bangladesh** borders.
- Deployed in some **Left-Wing Extremism (LWE)**-affected states.
- Has a presence in **UN Peacekeeping missions**.

#### ◆ Roles

##### Peacetime

- Prevent **cross-border crimes** like smuggling, illegal migration, and trafficking.
- Maintain **law and order** and ensure security in border areas.

##### Wartime

- **Hold sectors** until the Army takes over.
- Assist in **offensive operations** alongside the Army.
- Guard **POWs (Prisoners of War)**, protect **supply lines**, and secure **rear areas**.

### Significance of BSF

- **Strategic:** First line of defence against cross-border threats.
- **Largest Border Force:** Around **2.65 lakh personnel** (approx.).
- **Special Operations:** Anti-infiltration in J&K, anti-Naxal operations, flood relief, and disaster management.
- **Modernisation Needs:** Cadre review aims to improve efficiency, technology integration (drones, surveillance systems), and personnel welfare.

### Challenges

- **Manpower Stress:** High deployment along volatile borders.
- **Modernisation Gap:** Need for advanced surveillance technology.
- **Cross-Border Dynamics:** Infiltration, drugs, and arms trafficking remain persistent challenges.

### ✓ Conclusion (Keywords):

The **BSF**, as the world's largest border guarding force, plays a **dual role of peacetime security and wartime resilience**. The cadre review will help strengthen its **institutional capacity, morale, and modernization**—critical for India's **internal security and border management strategy**.

## Project Kusha (PGLRSAM)

### 📌 Syllabus Mapping:

✓ GS Paper III – Science & Technology (Developments in Defence Technology, Indigenisation of Technology)

✓ GS Paper II – International Relations (Strategic Security & Defence Preparedness)

### Context

- After **Operation Sindoor**, the Indian Air Force (IAF) has pressed for accelerated progress on **Project Kusha**, India's ambitious indigenous long-range air defence initiative.

### About Project Kusha

#### ◆ General Overview

- Full Name:** Program Long Range Surface to Air Missile (PGLRSAM).
- Approval:** Cleared in **2022** with a **budget of ₹21,700 crore**.
- Nodal Agency:** **Defence Research and Development Organisation (DRDO)**.
- Objective:** Develop a **long-range indigenous air defence system** capable of neutralising multiple aerial threats (aircraft, UAVs, cruise missiles).

#### ◆ Phase 1 – Interceptor Variants

- M1:** Range up to **150 km**.
- M2:** Range up to **250 km**.
- M3:** Range **350–400 km**.
- Naval Variant:** Range **200–300 km**, designed for **Indian Navy's blue-water operations**.



#### ◆ Phase 2 – Advanced Development

- Target:** **Interceptor missile with range exceeding 600 km**.
- Aim:** Comparable to global long-range systems like **S-400 (Russia)** and **THAAD (US)**.

### Significance for India

#### 1. Strategic Security

- Enhances **multi-layered air defence shield** along with Akash, MR-SAM, S-400.
- Counters **Pakistan's cruise missiles** and **China's long-range drones and aircrafts**.

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#### 2. Indigenisation

- Aligns with **Atmanirbhar Bharat** in defence manufacturing.
- Reduces dependence on **Russian and Israeli imports**.

#### 3. Operational Utility

- Land and naval deployment ensures **jointness** across IAF, Army, and Navy.
- Will act as a deterrent against **high-altitude long-endurance (HALE) UAVs and stealth aircrafts**.

### Challenges Ahead

- Technology Gap:** India still catching up with advanced seekers, propulsion, and guidance systems.
- Timeline Pressure:** Phased rollout must be synchronised with IAF's operational needs.
- Budgetary Constraints:** Sustaining funding amidst multiple parallel defence projects.

### ✓ Conclusion (Keywords):

Project Kusha represents India's bold step towards building a **homegrown long-range air defence system**, strengthening **strategic autonomy, defence preparedness, and indigenisation**. It will serve as a critical pillar in India's **multi-layered air defence architecture**.

### SLINEX-25: India–Sri Lanka Naval Exercise

#### 📌 Syllabus Mapping:

✓ GS Paper II – International Relations (India and its Neighbourhood)

✓ GS Paper III – Security (Maritime Security, Defence Cooperation)

#### Context

- Indian Naval Ships INS Rana (Guided Missile Destroyer) and INS Jyoti (Fleet Tanker) will participate in the 12th edition of SLINEX-25 in Colombo, Sri Lanka.
- The exercise comes at a time when maritime cooperation in the Indian Ocean Region (IOR) is crucial to counter shared security challenges.

#### About SLINEX

- **Full Form:** Sri Lanka–India Naval Exercise.
- **Started:** 2005.
- **Nature:** Bilateral maritime exercise.
- **Frequency:** Annual/regular.

#### Objectives

1. Enhancing interoperability between the two navies.
2. Exchanging best practices in maritime operations.
3. Strengthening maritime domain awareness.
4. Promoting regional security and stability.

#### Significance

1. **Neighbourhood First Policy**
  - o Reinforces India's commitment to building strong relations with immediate neighbours.
2. **MAHASAGAR Doctrine (Mutual and Holistic Advancement for Security and Growth Across Regions)**
  - o Focuses on collective maritime growth and security.
  - o SLINEX contributes to this vision by ensuring open and secure sea lanes.
3. **Strategic Relevance**
  - o The Indian Ocean Region is vital for global energy supply chains.
  - o Cooperation with Sri Lanka counters challenges such as piracy, smuggling, illegal fishing, and potential Chinese influence in the IOR.
4. **Capacity Building**
  - o Provides Sri Lanka with exposure to modern naval practices.
  - o Enhances India's role as a net security provider in the region.

#### Broader Dimensions

- **Regional Cooperation:** Complements other regional maritime exercises like MILAN, Malabar (India-US-Japan-Australia), and BIMSTEC maritime exercises.
- **Geopolitical Context:** Strengthens India–Sri Lanka defence ties at a time when China is increasing its naval footprint in Hambantota and Colombo ports.
- **Maritime Security:** Supports global initiatives like UNCLOS and Indo-Pacific maritime order.

#### Conclusion (Keywords)

SLINEX-25 strengthens India–Sri Lanka maritime cooperation, reflects India's Neighbourhood First and MAHASAGAR vision, and enhances India's role as a net security provider in the Indian Ocean Region

# ECONOMY

## CCI in the Digital Era: Reforms & Challenges

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Regulatory bodies, statutory institutions, transparency, accountability.
- ✓ **GS Paper III – Economy:** Effects of liberalisation, regulation of markets, MSME protection.
- ✓ **GS Paper II – Polity:** Role of Parliament and Committees in strengthening regulatory capacity.

### Context

The **Standing Committee on Finance** has released a report on the **evolving role of the Competition Commission of India (CCI)**, particularly in the context of **digital markets**. The report notes that the **Competition Act, 2002** in its current *ex-post* form is **inadequate to address digital market complexities**, despite reforms under the **Competition (Amendment) Act, 2023**.

### Key Concerns Highlighted

#### 1. Anti-Competitive Practices

- Dominant digital firms resort to **self-preferencing, predatory pricing, and tying/bundling** of services.
- Such practices **stifle innovation** and reduce consumer welfare.

#### 2. Regulatory Limitations

- The Act is **ex-post** (reactive) rather than **ex-ante** (preventive).
- Digital platforms demand **real-time regulatory intervention**.

#### 3. Institutional Capacity Constraints

- CCI suffers from **vacancies** (only 113 out of 195 posts filled).
- Lacks **specialised technical expertise** (AI, algorithms, data analytics).

#### 4. Enforcement Ineffectiveness

- Out of **₹20,350.46 crore penalties imposed**, ₹18,512.28 crore are **stayed or dismissed** by appellate bodies.
- Litigation delays weaken deterrence.

#### 5. Digital Competition Bill Concerns

- **Broad thresholds** (Deal Value Threshold – DVT at ₹2000 crore).
- No **rebuttal mechanism** for companies.
- **Overlap** with the **Digital Personal Data Protection (DPDP) Act**, creating regulatory confusion.

#### 6. MSME Vulnerability

- MSMEs risk **unchecked acquisitions** due to high thresholds.
- May erode India's **startup and innovation ecosystem**.

### Key Recommendations

#### 1. Enforcement Strengthening

- Introduce **25% pre-deposit** for appeals to reduce frivolous litigation.
- Build strong legal teams to defend orders in appellate forums.

#### 2. MSME Safeguards

- Review the **DVT thresholds** for mergers/acquisitions impacting MSMEs.
- Enhance scrutiny of **predatory pricing and platform dominance**.

#### 3. Proactive Regulation

- Expand **market studies** on emerging fields (e.g., AI, algorithmic pricing).
- Integrate **consumer welfare and data privacy** into competition assessments.

#### 4. Institutional Reforms

- Fill sanctioned vacancies and recruit **technical experts in digital economy**.
- Build capacity for **real-time monitoring of digital platforms**.

#### 5. Policy Framework

- Expedite adoption of the **National Competition Policy (NCP)** for coherent regulatory principles.

### Recent Developments in CCI

- **Competition (Amendment) Act, 2023** introduced:
  - **Deal Value Thresholds (DVT)** – captures mergers based on transaction value, not just turnover.
  - **Settlement and Commitment Mechanisms** – faster resolution of cases.
- **Digital Markets Division (DMD)** set up within CCI to monitor **Big Tech practices**.

### About CCI

- **Established:** 2003 under the *Competition Act, 2002*, operational since 2009.
- **Composition:** Chairperson + 6 members appointed by Central Government.
- **Functions:**
  - Prevent practices that harm competition.
  - Promote and sustain competition.
  - Protect consumer interests.
  - Ensure freedom of trade in Indian markets.
  - Advisory role to statutory authorities on competition issues.

### Analytical Dimensions

- **Governance:** Regulatory independence vs. coordination with sectoral regulators (e.g., TRAI, SEBI).
- **Digital Economy:** Ex-post laws inadequate; need **ex-ante codes of conduct** for Big Tech.
- **Consumer Welfare:** Balancing innovation, fair pricing, and data privacy.
- **Global Comparisons:**
  - **EU Digital Markets Act (2022)** – imposes *ex-ante obligations* on digital gatekeepers.
  - **U.S. Antitrust Laws** – stricter scrutiny of Big Tech mergers.
- **India's Path:** Balancing growth of startups with curbing monopoly power of global tech giants.

### Contemporary Relevance

- With India's growing **digital economy (expected to reach \$1 trillion by 2030)**, ensuring **fair competition** is crucial.
- The **Digital Competition Bill** will define the future contours of **regulating Big Tech in India**.
- Strengthening CCI aligns with India's **Atmanirbhar Bharat** and innovation-driven growth agenda.

### Conclusion – Keywords

The **evolving role of the CCI** highlights the urgent need for **capacity building, ex-ante regulation, and digital market expertise**. As India becomes a **digital-first economy**, CCI must transform from a **reactive regulator to a proactive enforcer**, safeguarding **competition, consumer welfare, and innovation ecosystems**.

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### UPSC Mains Practice Question

**Q. "India's Competition Commission is struggling to keep pace with the challenges of regulating Big Tech." Examine the issues highlighted by the Standing Committee on Finance, and suggest reforms to strengthen digital market regulation in India.**

## RBI Simplifies SVRA: Rupee Internationalization

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance & International Relations:** RBI regulations, India's trade diplomacy, bilateral agreements.
- ✓ **GS Paper III – Economy:** External sector, international trade, forex management.
- ✓ **GS Paper I – Geography (World Economic Geography):** Global financial flows, trade corridors.

### Context

The **Reserve Bank of India (RBI)** has simplified the process for opening **Special Vostro Rupee Accounts (SVRAs)** by removing the requirement of **prior approval**. This reform will **speed up rupee-based trade settlements**, deepen financial integration, and further India's push towards **internationalization of the rupee** amidst global supply chain disruptions and dollar dependence.

### Understanding Vostro and Nostro Accounts

- **Vostro Account:** An account held by a **foreign bank** in a **domestic bank**, denominated in the domestic currency.

- Example: Citibank (U.S.) holds an account in SBI (India) in INR → SBI treats it as a **Vostro account**.
- **Nostro Account:** An account held by a **domestic bank** in a **foreign bank**, denominated in the foreign currency.
  - Example: SBI holds an account in Citibank (U.S.) in USD → SBI treats it as a **Nostro account**.

SVRAs allow **foreign banks to settle trade in Indian Rupees**, instead of relying on the U.S. Dollar or other global currencies.

## Internationalization of Currency

**Definition:** The process by which a country's national currency is used beyond its borders for **trade, finance, and reserve management**.

### Benefits of Rupee Internationalization

1. **Reduced Forex Vulnerability**
  - Cuts dependence on U.S. dollar reserves to manage trade shocks.
2. **Financial Market Development**
  - Broadens domestic financial instruments and enhances liquidity.
3. **Economic Autonomy**
  - Governments can issue **sovereign debt in rupees**, avoiding foreign currency borrowing risks.
4. **Reduced Exchange Rate Risk**
  - Exporters/importers can **invoice in INR**, avoiding exposure to currency fluctuations.

## RBI's Latest Step: Simplified SVRA Norms

- **Prior approval requirement removed** → foreign banks can now directly open SVRAs with Indian banks.
- Facilitates **faster bilateral trade settlements** in INR.
- Especially significant amidst **sanctions, dollar volatility, and de-dollarisation trends** globally.

## Other Measures Taken for Rupee Internationalization

1. **Payment Systems**
  - Expansion of **UPI for cross-border transactions**.
2. **Rupee-Denominated Bonds**
  - Introduction of **Masala Bonds**, enabling foreign investors to invest in rupee debt.
3. **Bilateral Currency Agreements**
  - RBI signed MoUs with central banks of **UAE, Indonesia, and Maldives** for local currency trade settlements.
4. **Currency Swap Arrangements**
  - Agreements with other central banks to provide **liquidity support in local currencies**.

## Analytical Dimensions

### 1. Strategic Dimension

- Counters **dollar dominance** and supports India's role in **BRICS de-dollarisation initiatives**.
- Enhances India's leverage in **South-South trade partnerships**.

### 2. Economic Angle

- Boosts exports by reducing costs for trading partners.
- Expands India's role in **Asian and Global Value Chains (GVCs)**.

### 3. Institutional and Governance Challenges

- Need for **strong dispute resolution mechanisms** in rupee trade settlements.
- Ensuring **liquidity and convertibility** for foreign partners holding rupees.

### 4. Global Context

- Similar to China's strategy of **RMB internationalisation**.
- Provides India an opportunity to position the **rupee as an Asian trade currency**.

## Contemporary Relevance

- Amidst **Russia-Ukraine war** and **U.S. sanctions**, rupee-based trade has emerged as an alternative settlement mechanism.
- Strengthens India's efforts under **National Critical Mineral Mission** and **energy security** by facilitating rupee-denominated commodity imports.

### Conclusion – Keywords

The RBI's simplification of **SVRA norms** is a step towards **de-dollarisation, trade facilitation, and currency internationalisation**. However, achieving full rupee internationalisation will require **capital account reforms, stronger financial markets, and global trust in the rupee as a stable reserve currency**.

### UPSC Mains Practice Question

**Q. The RBI's simplification of Special Vostro Rupee Accounts is seen as a step towards internationalisation of the Indian Rupee. Analyse its significance in the context of global trade disruptions, dollar dominance, and India's economic autonomy.**

## Tax Reforms 2025: Simplifying Income Tax

### ❖ Syllabus Mapping:

- GS Paper II – Governance:** Government policy, taxation, and institutional reforms.
- GS Paper III – Economy:** Resource mobilization, tax reforms, ease of doing business.
- GS Paper II – Polity:** Role of Parliament in legislative reforms.

### Context

In August 2025, the **Lok Sabha** passed the **Taxation Laws (Amendment) Bill, 2025** and the **Income-Tax (No.2) Bill, 2025**. Together, these bills aim to **consolidate, simplify, and modernise India's tax regime**, replacing the outdated and complex **Income-tax Act, 1961**.

### Income-Tax (No.2) Bill, 2025

#### Objective

- Over six decades of amendments made the 1961 Act **cumbersome, complex, and litigation-prone**.
- The new Bill seeks to **streamline compliance, modernise provisions, and improve administrative efficiency**.

#### Key Features

1. **Deductions Expanded**
  - Available to **companies** in addition to individuals.
  - **Family pension and gratuity deductions** extended to family members.
2. **MAT & AMT Rationalisation**
  - **Minimum Alternate Tax (MAT)** and **Alternate Minimum Tax (AMT)** separated.
  - **AMT** applies only to **non-corporates** claiming deductions.
  - **LLPs** with only capital gains income exempt from AMT if no deductions are claimed.
3. **Digital Economy Support**
  - Professionals with receipts exceeding **₹50 crore** mandated to use **electronic payment modes**.
4. **Simplified Tax Language**
  - Improved **drafting, clarity, and cross-referencing** for ease of interpretation.
5. **Updated Definitions**
  - Broader definitions for **capital assets, micro & small enterprises, beneficial owner**, etc.

### Taxation Laws (Amendment) Bill, 2025

#### Objective

- To align taxation provisions with **new financial instruments, global developments, and investor needs**.

#### Key Reforms

1. **Unified Pension Scheme (UPS)**
  - Tax exemptions aligned with benefits under the **New Pension Scheme (NPS)**.
2. **Foreign Investment Relief**
  - Direct tax relief provided to the **Public Investment Fund of Saudi Arabia** and subsidiaries.
3. **Search and Assessment Procedures**
  - Streamlining of pending assessments/reassessments in block assessment cases to reduce litigation.

### Analytical Dimensions

#### 1. Tax Simplification and Governance

- A modern tax law improves **ease of compliance** and reduces disputes.
- Reduces scope for **interpretational ambiguities** that plague the 1961 Act.

#### 2. Impact on Businesses

- Rationalisation of MAT/AMT improves **ease of doing business**, especially for **startups, LLPs, and non-corporates**.
- Digital economy provisions strengthen **transparency and formalisation**.

#### 3. Social Security & Inclusivity

- Expansion of deductions (pension, gratuity) reflects a **welfare-oriented approach**.
- Unified Pension Scheme offers consistency in tax treatment, enhancing **retirement security**.

#### 4. Global and Strategic Dimension

- Relief for Saudi Arabia's Public Investment Fund signals India's openness to **foreign capital inflows**.
- Strengthens India's position as a **favourable investment destination**.

#### 5. Challenges

- Implementation and transition from the old Income-tax Act may create **short-term uncertainty**.
- Needs **robust capacity-building in tax administration** to manage new provisions.

### Contemporary Relevance

- Simplification aligns with India's push towards **"Tax Certainty" and "Ease of Doing Business"**.
- Important for attracting **FDI and global investors**, especially in a competitive post-pandemic economy.
- Supports India's goals of **formalisation, digitisation, and economic inclusivity**.

### Conclusion – Keywords

The **Income-Tax (No.2) Bill, 2025** and the **Taxation Laws (Amendment) Bill, 2025** represent a **major tax reform initiative**, streamlining India's income-tax framework. By balancing **tax simplification, digital integration, and investor-friendly measures**, they strengthen India's **fiscal governance and global competitiveness**.

### UPSC Mains Practice Question

**Q. The Income-Tax (No.2) Bill, 2025 and the Taxation Laws (Amendment) Bill, 2025 are seen as watershed reforms in India's taxation system. Critically examine how these reforms balance simplification, welfare, and global investment needs.**

### IBC (Amendment) Bill, 2025: To Select Committee

#### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Parliament, legislative process, regulatory reforms.
- ✓ **GS Paper III – Economy:** Insolvency, investment climate, ease of doing business.
- ✓ **GS Paper III – Security:** Financial stability, banking sector reforms.

### Context

- The **Insolvency and Bankruptcy Code (Amendment) Bill, 2025** has been referred to a **Select Committee of Parliament** for further scrutiny.
- It seeks to **reduce delays, maximize value for stakeholders, and align India's insolvency framework with global best practices**.

### Key Highlights of the Bill

#### 1. Expediting Resolution and Reducing Delays

- **Mandatory NCLT Timelines:**
  - Admission of insolvency cases within **14 days**.
  - Approval of resolution plan within **30 days**.
- **Out-of-Court Creditor-initiated Resolution:**

- Facilitates faster and cost-effective resolution.
- Minimizes business disruption.
- Reduces burden on NCLT.

### 2. Maximizing Value and Protecting Stakeholders

- **Restoring CIRP:**
  - NCLT may restore **Corporate Insolvency Resolution Process (CIRP)** once in exceptional cases, if no resolution plan is approved/rejected.
- Ensures **creditors' interests** are not undermined.

### 3. Enhancing Governance and Compliance

- **Group Insolvency Framework:**
  - Voluntary mechanism to resolve **interconnected stressed entities** within a corporate group.
- **Cross-Border Insolvency:**
  - Introduces a **basic framework** to allow creditors access to overseas assets of distressed firms.
  - Moves India closer to **UNCITRAL Model Law on Cross-Border Insolvency**.

### 4. Clean Slate Principle Reinforcement

- Once a **resolution plan is approved**, all claims against the debtor are extinguished (unless specified).
- Provides **certainty to investors** and promotes business confidence.

## About Insolvency and Bankruptcy Code (IBC), 2016

- **Umbrella legislation** for insolvency resolution of corporates, partnerships, and individuals.
- Ensures "**freedom to exit**" for commercial entities.
- Shifted from "**debtor in possession**" → "**creditor in control**" model.
- Improved India's **Ease of Doing Business ranking** significantly.



## Contemporary Relevance

- Rising **NPA levels** and corporate defaults demand stronger insolvency mechanisms.
- Cross-border provisions are vital for Indian firms with global operations.
- Group insolvency will aid in resolving **conglomerates like IL&FS, Jaypee, etc.**
- Supports India's ambition to become a **global investment hub**.

## Tags in Context

- **IBC (Insolvency and Bankruptcy Code):** Landmark reform of 2016 to streamline insolvency resolution.
- **Corporate Insolvency Resolution Process (CIRP):** The mechanism under IBC for revival or liquidation of stressed companies.
- **Clean Slate Principle:** Ensures fresh start for companies post resolution, boosting investor confidence.

## Conclusion – Keywords

The **IBC (Amendment) Bill, 2025** represents a step towards a **faster, efficient, and globally aligned insolvency regime**. By strengthening timelines, introducing group and cross-border frameworks, and reinforcing creditor confidence, it will enhance **financial stability, business trust, and economic growth**.

## UPSC Mains Practice Question

**Q. Discuss the significance of the IBC (Amendment) Bill, 2025 in strengthening India's insolvency framework. How does it address existing challenges while aligning with global best practices?**

## Cabinet Clears 4 Semiconductor Projects (ISM)

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance & Policy:** Government initiatives in technology.
- ✓ **GS Paper III – Economy:** Infrastructure, industrial growth, Atmanirbhar Bharat.
- ✓ **GS Paper III – Science & Technology:** Semiconductor manufacturing, electronics sector.

### Context

- On 13 August 2025, the **Union Cabinet** approved **four semiconductor projects** under the **India Semiconductor Mission (ISM)**.
- Locations: **Odisha, Punjab, and Andhra Pradesh**.
- With this approval, the total number of sanctioned projects under ISM rises to **10 projects across 6 states**.

### About India Semiconductor Mission (ISM)

- Launched:** 2021.
- Outlay:** ₹76,000 crore.
- Nodal Ministry:** Ministry of Electronics and Information Technology (MeitY).
- Objective:**
  - Strengthen India's position in the **global semiconductor supply chain**.
  - Provide **financial support** to semiconductor fabs, display fabs, packaging & testing units, and chip design startups.
  - Enhance **human resource training** in semiconductor technology.
  - Attract **global companies** to invest in India.

### Mission Focus Areas

- Chip Manufacturing (fabs):** Setting up advanced fabrication plants.
- Testing & Packaging:** Ensuring quality control and backend support.
- Chip Design Ecosystem:** Encouraging startups/MSMEs in semiconductor design.
- Skill Development:** Training engineers in semiconductor technology.
- FDI Attraction:** Bringing **global tech leaders** to India.

### Key Schemes under ISM

- Semiconductor Fabs Scheme:** Up to **50% fiscal support** for fab units.
- Display Fabs Scheme:** Financial assistance of up to **50% of project cost** for display units.
- Design Linked Incentive (DLI) Scheme:** Support for design startups and MSMEs across product development stages.
- SEMICON India Programme:** Flagship global event connecting industry leaders, policymakers, and academia.

### Significance of the Mission

Wisdom leads to success

- Economic Dimension:**
  - India's semiconductor market projected to reach **\$100–110 billion by 2030**.
  - Boosts **electronics manufacturing & exports**, reducing import dependency.
- Geopolitical & Security Dimension:**
  - Reduces reliance on Taiwan (which produces **>60% of global semiconductors**) and China.
  - Ensures **supply chain resilience** amid global chip shortages.
- Technological Advancement:**
  - Supports **5G/6G, AI, IoT, EVs, defence electronics, and space technology**.
  - Fosters **innovation ecosystem** through startups and research institutions.

### Challenges Ahead

- Capital-Intensive Industry:** High setup cost (~\$5–10 billion per fab).
- Technology Transfer:** Dependence on foreign know-how for advanced nodes (<10 nm).
- Global Competition:** Strong competitors like **Taiwan, South Korea, USA, China**.
- Skilled Manpower:** Need for specialized semiconductor engineers and technicians.

### Tags in Context

- Semiconductor:** Backbone of modern digital economy – powering electronics, defence, AI, telecom, and healthcare.
- India Semiconductor Mission (ISM):** Government's flagship programme to establish India as a **global semiconductor hub**.
- SEMICON India Programme:** Platform for **global collaboration & investment** in semiconductor ecosystem.

### Conclusion – Keywords

The approval of new semiconductor projects reflects India's **strategic ambition to achieve self-reliance, strengthen supply chain resilience, and capture the global semiconductor market**. If implemented effectively, ISM could transform India into a **semiconductor powerhouse**, supporting both **Atmanirbhar Bharat** and global technology needs.

### UPSC Mains Practice Question

**Q. The India Semiconductor Mission (ISM) is often termed as India's gateway into the global electronics value chain. Discuss its significance, challenges, and the way forward in achieving India's semiconductor self-reliance.**

## Push and Pull Transactions

### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance → Digital governance, regulatory frameworks.
- ✓ GS Paper III – Economy → Digital economy, fintech, financial inclusion.
- ✓ GS Paper III – Security → Cybersecurity and fraud prevention in digital payments.

### Context

- The National Payments Corporation of India (NPCI) may consider shutting down 'pull' transactions in the future to curb financial frauds.
- This is significant because UPI (Unified Payments Interface) currently supports both **push** and **pull** transactions.

### About Push and Pull Transactions

#### ◆ Push Transactions

- **Definition:** Transaction **initiated by the payer**.
- **Process:** Payer scans a QR code or enters the beneficiary's UPI ID → approves payment.
- **Example:** UPI QR payments, direct fund transfers.
- **Security Aspect:** Safer since the payer consciously initiates the payment.

#### ◆ Pull Transactions

- **Definition:** Transaction **initiated by the beneficiary**.
- **Process:** Beneficiary requests money → payer inputs UPI PIN → payment gets processed.
- **Examples:**
  - **Digital:** UPI mandate-based auto-debits (e.g., OTT subscriptions, EMI payments).
  - **Traditional:** Cheques, debit cards (merchant-initiated).
- **Risk Factor:** Higher fraud potential since unsuspecting users may approve malicious requests.

### NPCI's Concern

- **Fraud Cases Rising:** Many frauds involve tricking users into authorizing pull requests.
- **Proposed Move:** Restrict or gradually phase out pull transactions to strengthen **consumer safety**.
- **Trade-off:** While it reduces fraud, it may affect recurring payment systems and ease of transactions.

### Broader Significance

- **For Digital Economy:** Push transactions strengthen **user control** and trust in UPI.
- **For Cybersecurity:** Reduces avenues for phishing, fraud, and unauthorized debits.
- **For Policy:** Aligns with RBI and NPCI's push for **secure digital payments** under **Digital India** mission.

### ✓ Conclusion (Keywords):

NPCI's move to reconsider **pull transactions** reflects the balancing act between **convenience and security** in India's rapidly expanding **digital payment ecosystem**.

## RBI's FREE-AI Vision for Financial Sector

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance** → Regulatory frameworks, Ethics in governance.
- ✓ **GS Paper III – Economy** → Indian Economy & Inclusive Growth, Financial Sector.
- ✓ **GS Paper III – Science & Tech** → AI applications, Cybersecurity, Ethical AI.

### Context

- RBI committee released **FREE-AI (Framework for Responsible and Ethical Enablement of AI)**.
- Aim → Balance **innovation and risk management** in India's financial sector.

### About FREE-AI Vision

#### 1. Foundational Principles – 7 Sutras

(As per RBI's infographic → safe, fair, accountable, transparent, inclusive, resilient, sustainable).

#### 2. Dual Approach

##### A. Fostering Innovation

- Shared infrastructure for **democratized data & compute access** (linked with **AI Kosh** under IndiaAI Mission).
- **AI Innovation Sandbox** → Testing indigenous financial AI models.
- **AI Policy** for regulatory guidance.
- Institutional capacity building (Boards + workforce).
- **Relaxed compliance** for low-risk AI → boost financial inclusion.

##### B. Mitigating Risks

- Board-approved AI policies by financial institutions.
- AI aspects in **product approvals, consumer protection, audits**.
- Strengthened **cybersecurity & incident reporting**.
- Robust **AI lifecycle governance** (design → deployment → monitoring).
- **Consumer awareness** whenever they interact with AI systems.

### Why FREE-AI Vision Matters

#### 1. AI's Growing Economic Impact

- AI in Indian finance projected:
  - ₹8 lakh crore (~\$97 bn) by **2027** across banking, insurance, payments.
  - ₹1.02 lakh crore (~\$12 bn) for **GenAI** by **2033** (28–34% CAGR).

#### 2. Emerging Complex Risks

- **Data privacy breaches**.
- **Algorithmic bias** in lending/credit scoring.
- **Market manipulation** via AI-driven trading.
- **Cybersecurity vulnerabilities** in digital payments.
- **Governance failures** → systemic risks & loss of trust.

### Global Dimension

- Similar frameworks →
  - **EU AI Act (2024)**: Risk-based classification of AI systems.
  - **US NIST AI Risk Management Framework**.
  - **OECD AI Principles (2019)**: Fairness, accountability, transparency.
- India aligning financial AI regulation with **global best practices**.

### India's Strategic Relevance

- Complements **Digital India** + **IndiaAI Mission** + **Unified Payments Interface (UPI)** ecosystem.
- Strengthens **financial inclusion** by leveraging AI for rural credit, fraud detection, insurance outreach.
- Ensures **trust** in India's fast-growing fintech sector (UPI transactions > 14 billion monthly in 2025).

### Way Forward

- RBI → must ensure regulatory agility (AI evolves faster than laws).
- **Collaboration** → Regulated Entities, fintechs, startups, academia.
- **Capacity Building** → AI literacy for regulators, bankers, and consumers.
- **Ethical Guardrails** → Avoid biases that could deepen financial exclusion.

### ✓ Conclusion (Keywords):

RBI's FREE-AI Vision represents a **balanced regulatory roadmap** for India's financial AI ecosystem. It seeks to combine **innovation, consumer protection, and systemic stability**, making India a **responsible leader in AI-driven financial services**.

## S&P Upgrades India's Credit Rating

### 📌 Syllabus Mapping:

✓ GS Paper III – Indian Economy: Growth, Development, and Investment

✓ GS Paper II – International Economic Institutions & Ratings

### Context

- On **16 August 2025**, S&P Global Ratings upgraded India's **sovereign long-term credit rating** to **BBB** (from **BBB-**) and **short-term rating** to **A-2** (from **A-3**), with a **Stable Outlook**.
- This is **India's first sovereign rating upgrade by S&P since 2007**, when India was elevated to investment grade (**BBB-**).

### Reasons for Upgrade

- **Fiscal Consolidation:** India's commitment to reduce fiscal deficit and improve fiscal discipline.
- **Quality of Public Spending:** Greater emphasis on **capital expenditure** and infrastructure rather than subsidies.
- **Stronger Balance Sheets:** Corporate, financial sector, and external accounts have shown **resilience**.
- **Economic Fundamentals:** Sustained **high GDP growth** relative to global peers.

### About Sovereign Credit Ratings (SCR)

- **Definition:** Independent evaluation of a country's **creditworthiness**, measuring its ability to meet debt obligations.
- **Major Agencies:** S&P, Fitch, Moody's.
- **Rating Grades:**
  - **Investment Grade:** S&P/Fitch: BBB- to AAA; Moody's: Baa3 to Aaa.
  - **Speculative Grade (Junk):** Below these thresholds, with higher default risk.
- **India's Current Status:** BBB is the **lowest rung of investment grade**, but signals **increased investor confidence**.

### Significance of Upgrade

- **Access to Global Capital:** Easier borrowing for India in international markets.
- **Reduced Borrowing Costs:** Lower interest rates for government and corporate bonds.
- **Boost to FDI & FPI:** Greater confidence among foreign investors.
- **Positive Signalling:** Reflects recognition of India's economic resilience and reforms.

### Issues & Criticism of Ratings

- **Bias Allegations:** Global South countries often claim bias in rating methodologies.
- **Conflict of Interest:** Rating agencies are often funded by issuers of bonds.
- **Rating Ceiling:** Corporates within a country generally cannot be rated higher than the sovereign itself, limiting private sector access to global capital.
- **Lag Effect:** Agencies often react **after crises**, rather than predicting them (e.g., 2008 Financial Crisis).

### Conclusion (Keywords)

The **S&P upgrade to BBB** marks an important **milestone for India's macroeconomic credibility**, boosting investor sentiment and access to global capital. However, India must continue **fiscal prudence, structural reforms, and governance strengthening** to secure higher ratings in the future.

## Prime Minister Highlights Next Generation GST Reforms

### 📌 Syllabus Mapping:

✓ GS Paper III – Indian Economy: Resource Mobilization, Taxation, Growth & Development

✓ GS Paper II – Governance: Institutions & Reforms

### Context

- On 16 August 2025, the Prime Minister outlined a **next generation GST reform agenda**, focusing on **structural reforms, rate rationalisation, and ease of living**.
- These proposals have been sent to the **Group of Ministers (GoM)** under the **GST Council** for deliberation.

### Key Pillars of Proposed Reforms

#### 1. Structural Reforms

- Inverted Duty Structure Correction:**
  - Aligning input-output tax rates to avoid accumulation of **Input Tax Credit (ITC)**.
  - Example: Import tariffs on inputs being higher than the tax on final output; or inputs taxed while the final output is tax-exempt.
- Resolving Classification Issues:** Simplify rates, reduce disputes, and improve compliance.
- Stability & Predictability:** Provide long-term clarity on rates to build investor & industry confidence.

#### 2. Rate Rationalisation

- Reduction in Taxes:** Lowering GST rates on **common-use goods** and some **aspirational goods**.
- Reduction in Slabs:** Moving towards a **two-slab GST structure** – Standard and Merit – with special rates only for select items.
- Post-Compensation Cess Reforms:** Use fiscal space from the expiry of the compensation cess to ensure **long-term sustainability** of GST.

#### 3. Ease of Living (Tech-Driven Governance)

- Seamless Registration:** Technology-enabled, paperless registration process.
- Pre-Filled Returns:** Automated return filing to reduce errors and mismatches.
- Faster Refunds:** AI-driven automated processing of refunds, especially for exporters.

### About Goods and Services Tax (GST)

- Introduction:** Enacted in **2017** under the **101st Constitutional Amendment Act**.
- Nature:** Comprehensive indirect tax on supply of goods and services.
- Structure:**
  - CGST & SGST (dual structure).
  - IGST for inter-state transactions.
- Governance:** GST Council – constitutional body for decision-making.

### Significance of Reforms

- Economic Growth:** Simplification and stability will enhance compliance and widen the tax base.
- Industry Confidence:** Rationalised rates help reduce litigation and disputes.
- Global Competitiveness:** Lower compliance burden makes India a more attractive investment destination.
- Consumer Welfare:** Lower rates on essentials improve affordability, supporting inclusive growth.

### Challenges Ahead

- Revenue Neutrality:** States may resist rate cuts fearing revenue loss.
- Federal Balance:** GST Council decisions need consensus; Centre-state frictions may delay reforms.
- Technology Adoption:** Small traders may find adaptation challenging despite ease-of-use initiatives.

### Conclusion (Keywords)

The **Next-Gen GST Reforms** aim to make GST **simpler, predictable, and growth-oriented**, moving closer to the vision of a **“One Nation, One Tax” regime**. Their success will depend on balancing **industry demands, state revenues, and consumer welfare**.

## AGRICULTURE

### Maize Cultivation in India

#### ❖ Syllabus Mapping:

- ✓ GS Paper III – Agriculture, Cropping Patterns, Economy
- ✓ GS Paper III – Energy & Environment (Biofuels and Ethanol Policy)

#### Context

- India's **maize cultivation has surged**, largely driven by the **Ethanol Blending Programme (EBP)** which seeks to reduce dependence on fossil fuels and promote cleaner alternatives.
- Rising demand for **ethanol production** has created new opportunities for farmers and reshaped cropping patterns.

#### About Maize Crop

- Type:** Primarily a **Kharif crop**, though also grown in **Rabi season** in states like Bihar.
- Climatic Conditions:**
  - Temperature: **21°C to 27°C**
  - Soil: **Old alluvial soil** is best suited.
- Uses:**
  - As **food grain** (human consumption).
  - As **fodder** for livestock.
  - As **raw material for industry** (ethanol, starch, oil, etc.).



#### Maize in India

- Major Maize-growing States:**
  - Karnataka** (Top producer)
  - Madhya Pradesh
  - Bihar
  - Tamil Nadu
  - Telangana
  - Maharashtra
  - Andhra Pradesh
- Major Export Destinations (2023-24):**
  - Vietnam
  - Nepal
  - Bangladesh
  - Malaysia
  - Thailand



#### Link to Ethanol Push

- National Biofuel Policy (2018)** and **Ethanol Blending Programme** set ambitious targets (20% ethanol blending by 2025).
- Traditionally, sugarcane and molasses were primary ethanol sources.
- Now, **maize has emerged as a key feedstock** due to:
  - Higher starch yield.
  - Wider cultivation across India.
  - Policy support for diversification of ethanol feedstock.

#### Significance

- Economic:** Boosts farmer incomes and reduces dependence on traditional crops like paddy and wheat.
- Energy Security:** Reduces India's **oil import bill** by substituting ethanol for petrol.
- Environmental:** Cleaner fuel reduces carbon emissions and pollution.
- Trade:** Enhances India's position as both **exporter of maize** and **domestic ethanol producer**.

#### Challenges

- Food vs. Fuel Debate:** Excess diversion of maize for ethanol may affect food and fodder supply.

- **Price Volatility:** Rising demand could push maize prices higher, impacting consumers and poultry feed industry.
- **Storage & Processing Infrastructure:** Need for investment in ethanol plants, silos, and supply chains.

### Conclusion (Keywords)

Maize is transitioning from a **food-fodder crop to a strategic energy crop**, reflecting India's **ethanol-driven energy security push**, while also highlighting the need for a **balanced policy** to ensure food-fuel security.

## SCHEMES AND GOVT POLICIES

### PM E-DRIVE Scheme: Extending India's EV Revolution

#### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Government schemes, environmental governance, policy initiatives.
- ✓ **GS Paper III – Economy & Environment:** Infrastructure, sustainable growth, energy security.
- ✓ **GS Paper III – Science & Technology:** Electric mobility, innovation in clean energy.

#### Context

The Ministry of Heavy Industries has extended the **tenure of the PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE Scheme)** by **two years**, from **31 March 2026 to 31 March 2028**. This scheme is central to India's **electric mobility mission**, enhancing adoption of EVs and promoting sustainable transport infrastructure.

#### About PM E-DRIVE Scheme

- **Type:** Central Sector Scheme.
- **Nodal Ministry:** Ministry of Heavy Industries (MHI).
- **Purpose:** To accelerate **EV adoption**, expand **charging infrastructure**, and strengthen the **domestic EV manufacturing ecosystem**.
- **Target Categories:** Incentivisation of
  - **E-2 wheelers (e-2Ws)**
  - **E-3 wheelers (e-3Ws)**
  - **E-ambulances**
  - **E-trucks**
  - **E-buses and emerging EV categories**

#### Key Components



IQRA

Wisdom leads to success

1. **Subsidies / Demand Incentives**
  - Financial support to consumers for purchasing EVs, making them cost-competitive with conventional vehicles.
  - Covers two-wheelers, three-wheelers, ambulances, trucks, and buses.
2. **Grants for Capital Assets**
  - **Funding for e-buses** to promote green public transport.
  - **Establishment of charging infrastructure** across highways, cities, and rural areas.
  - **Modernisation of MHI testing agencies** to align with global safety and emission standards.
3. **Administrative Support**
  - **Information, Education & Communication (IEC)** campaigns to build awareness about EV adoption.
  - **Support to Project Management Agency (PMA)** for monitoring, evaluation, and timely execution.

#### Significance of the Scheme

- **Environmental Benefits:** Reduces dependence on fossil fuels and helps curb **vehicular pollution**.
- **Economic Growth:** Creates demand for EV manufacturing, boosting **Make in India** and **employment opportunities**.
- **Infrastructure Push:** Expands EV charging stations, enabling mass adoption.
- **Public Health:** Cleaner mobility reduces **urban air pollution**, linked to respiratory diseases.
- **Alignment with NEP and Climate Goals:** Supports India's **Net Zero 2070 commitments** and the **National Electric Mobility Mission Plan**.

### Analytical Dimensions

#### 1. Comparative Perspective

- Similar to **FAME I & II (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles)** but broader in scope, focusing not just on subsidies but also on **ecosystem development**.

#### 2. Challenges

- High cost of EV batteries and dependence on **lithium imports**.
- Limited charging infrastructure in semi-urban and rural areas.
- Consumer hesitancy due to concerns about **range and reliability**.

#### 3. Way Forward

- Promote **battery recycling and indigenous cell manufacturing**.
- Foster **public-private partnerships (PPP)** in charging infrastructure.
- Encourage **R&D in alternative fuels and hydrogen-based mobility**.

### Contemporary Relevance

- As India pushes for **energy transition** and reduces oil import dependence, **EV adoption is crucial**.
- The scheme also links with **urban mobility plans, smart cities, and Atmanirbhar Bharat**, making EVs an **economic and environmental priority**.

### Conclusion – Keywords

The **PM E-DRIVE Scheme** represents a **strategic policy intervention** to accelerate India's EV revolution. By extending its tenure to 2028, the government ensures continuity in support for **innovation, manufacturing, and infrastructure development**, paving the way for a **sustainable, green, and self-reliant transport future**.

### UPSC Mains Practice Question

**Q. Discuss the significance of the PM E-DRIVE Scheme in accelerating India's electric mobility transition. How does it compare with earlier initiatives like FAME, and what challenges need to be addressed for its success?**

### PM Ujjwala Yojana: Expanding Clean Cooking

#### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance & Social Justice:** Welfare schemes for vulnerable sections, government policies.
- ✓ GS Paper III – Economy:** Energy security, inclusive growth.
- ✓ GS Paper II – Polity:** Role of the State in improving public health (Directive Principles).

### Context

The Union Cabinet has approved the **continuation of a targeted subsidy of ₹300 per 14.2 kg LPG cylinder (up to 9 refills annually)** for beneficiaries under the **Pradhan Mantri Ujjwala Yojana (PMUY)** for the financial year **2025-26**. This move reinforces the government's commitment to ensuring **universal access to clean cooking fuel** while reducing the health hazards associated with traditional fuels.

### About PMUY

- Launch:** 2016.
- Nodal Ministry:** Ministry of Petroleum and Natural Gas.
- Objective:** Provide clean cooking fuel (LPG) to **rural and deprived households** to reduce health risks and empower women.
- Beneficiary Criteria:** Adult women from poor households.
- Initial Target:** Release **8 crore LPG connections** by **March 2020** – achieved by **September 2019**.
- Current Coverage:** As of **1 July 2025**, there are **10.33 crore PMUY connections** across India.

### Key Features of the Subsidy Extension

- Amount:** ₹300 per 14.2 kg LPG cylinder.
- Limit:** Up to 9 refills annually.
- Beneficiaries:** PMUY households, particularly women-headed households.
- Rationale:**

- Cushion against rising LPG prices.
- Ensure sustained use of LPG instead of reverting to biomass fuels.

### Significance of PMUY

#### 1. Health Impact

- Reduces exposure to **indoor air pollution**, a major cause of respiratory diseases among women and children.

#### 2. Gender Empowerment

- Women are the **primary beneficiaries**, saving time spent in fuelwood collection and reducing drudgery.
- Enhances **dignity, health, and economic participation** of women.

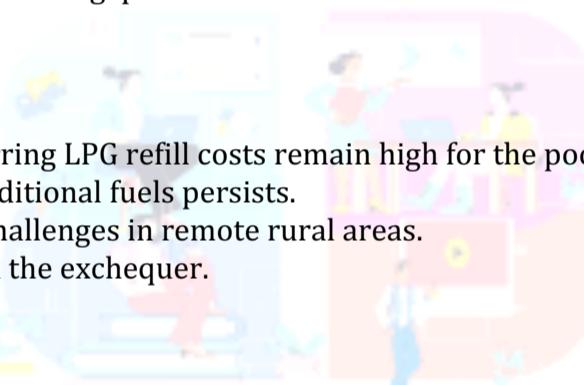
#### 3. Environmental Benefits

- Discourages biomass use, reducing **deforestation** and carbon emissions.
- Aligns with India's **climate commitments (SDG 7 – Affordable and Clean Energy)**.

#### 4. Energy Equity

- Extends the reach of **modern energy services** to marginalized and rural communities.
- Strengthens **energy justice** by bridging rural-urban gaps.

### Challenges in Implementation



- **Affordability Gap:** Even with subsidies, recurring LPG refill costs remain high for the poorest households.
- **Behavioral Barriers:** Cultural reliance on traditional fuels persists.
- **Supply & Access Issues:** Last-mile delivery challenges in remote rural areas.
- **Sustainability of Subsidies:** Fiscal burden on the exchequer.

### Analytical Dimensions

- **Governance Angle:** Reflects the **State's role under Article 47 (DPSP)** in promoting health by discouraging intoxicants and harmful practices.
- **Economic Dimension:** Creates employment in the LPG supply chain while boosting India's energy sector.
- **Social Justice Perspective:** Addresses interlinked issues of **poverty, health, and gender inequality**.
- **Global Perspective:** Aligns with WHO campaigns against indoor air pollution and contributes to **UN SDGs**.

### Contemporary Relevance

- PMUY highlights India's **rights-based welfare approach**, ensuring access to clean energy as a **social justice tool**.
- Critical in rural transformation, improving **public health, women empowerment, and environmental sustainability**.

### Conclusion – Keywords

The Pradhan Mantri Ujjwala Yojana stands as a **flagship social welfare programme** that not only promotes **clean energy access** but also embodies the **triple goals of health, equity, and empowerment**. The continuation of subsidies reinforces its role as a **long-term intervention for inclusive development**.

### UPSC Mains Practice Question

**Q. The Pradhan Mantri Ujjwala Yojana (PMUY) has transformed India's energy equity landscape. Critically evaluate its impact on health, gender empowerment, and environment, while discussing the challenges in ensuring its long-term sustainability.**

### MERITE Scheme: Boosting Technical Education in India

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Government schemes and policies, education reforms.
- ✓ **GS Paper II – Social Justice:** Issues related to education, skill development, and equity.
- ✓ **GS Paper III – Economy:** Human resource development, employment generation.

#### Context

The Union Cabinet has approved **budgetary support** for the **Multidisciplinary Education and Research Improvement in Technical Education (MERITE) Scheme**, a flagship initiative aimed at upgrading India's **technical education ecosystem**. The scheme is aligned with the vision of the **National Education Policy (NEP) 2020**, focusing on innovation, employability, and inclusivity.

#### About MERITE Scheme

- **Type:** Central Sector Scheme.
- **Nodal Ministry:** Ministry of Education.
- **Objective:** Improve the **quality, equity, and governance** in technical education across all States and Union Territories.
- **Duration & Budget:**
  - ₹ 4200 crore for the period 2025-26 to 2029-30.
  - Includes **external assistance of ₹2100 crore from the World Bank** as loan.
- **Beneficiaries:**
  - 275 technical institutions – comprising 175 engineering colleges and 100 polytechnics.

#### Key Features & Focus Areas

1. **Skill Development**
  - Support for **Maker Labs**, skill hubs, and **entrepreneurship incubation centres**.
  - Enhancing employability through **industry-oriented training**.
2. **Equity & Inclusivity**
  - Special focus on **geographically disadvantaged regions**, women, and marginalized groups.
  - Bridges the gap between elite institutions and tier-II/III colleges.
3. **Governance & Quality Assurance**
  - Strengthening institutional governance and **autonomy**.
  - Using **digital monitoring tools, accreditation, and performance-based funding**.
4. **Global Best Practices**
  - Supported by the World Bank, integrating **international academic standards** with Indian requirements.

#### Significance

- **Human Capital Formation:** Strengthens India's **demographic dividend** by upgrading skills for the future workforce.
- **Economic Growth:** Improves **employability and innovation capacity**, critical for a knowledge economy.
- **Alignment with NEP 2020:** Promotes **multidisciplinarity, flexibility, and research orientation** in technical institutions.
- **Global Competitiveness:** Positions India as a hub for **high-quality technical education and research**.

#### Analytical Dimensions

1. **Educational Reform Continuity**
  - Successor to earlier projects like **TEQIP (Technical Education Quality Improvement Programme)**.
  - Builds on past experience, shifting focus to **research, innovation, and equity**.
2. **Socio-Economic Impact**
  - Addresses skill gaps and unemployment challenges.
  - Enhances participation of **women and disadvantaged groups** in STEM.
3. **Challenges**
  - Effective **implementation and monitoring** across diverse states.
  - Ensuring **faculty training and research capacity building**.
  - Preventing **urban-rural disparities** in access to benefits.
4. **Way Forward**
  - Strengthen **industry-academia linkages**.
  - Ensure sustainability beyond World Bank funding.
  - Promote **interdisciplinary R&D** aligned with India's industrial priorities (AI, clean energy, biotechnology).

### Contemporary Relevance

- The MERITE Scheme comes at a time when India aims to become a **global knowledge superpower** and align its workforce with **Industry 4.0** requirements.
- It contributes to **Atmanirbhar Bharat** and **Skill India Mission**, while ensuring **equity and inclusivity** in education.

### Conclusion – Keywords

The **MERITE Scheme** reflects India's commitment to transform its technical education system into a more **inclusive, innovative, and globally competitive framework**. By focusing on **skills, equity, and governance**, it strengthens the foundation for **human resource development and long-term economic growth**.

### UPSC Mains Practice Question

**Q. The MERITE scheme aims to bridge the gap between equity and excellence in technical education. Discuss its potential in transforming India's higher education ecosystem, along with possible challenges in its implementation.**

## SHINE Programme: Next-Gen Health Innovators

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance & Social Justice:** Health sector, education, and human resource development.
- ✓ **GS Paper III – Science & Technology:** Scientific research, innovation in health and biotechnology.
- ✓ **GS Paper IV – Ethics:** Promoting scientific temperament and curiosity.

### Context

The **Indian Council of Medical Research (ICMR)** and the **Department of Health Research** have jointly organized the **Science, Health and Innovation for Nextgen Explorers (SHINE) Programme**. This initiative represents a strategic investment in **youth-driven science outreach**, designed to nurture **future leaders in health, biomedical sciences, and public health**.

### About SHINE Programme

- **Aim:** To introduce school students to health and biomedical research and encourage them to pursue careers in science and public health.
- **Target Group:** Students from **Grades 9 to 12**.
- **Participation:** More than **13,000 students** engaged across India.
- **Activities:**
  - **Guided laboratory tours** – exposing students to real-world biomedical research environments.
  - **Research exhibitions** – showcasing ICMR's ongoing projects and innovations.
  - **Poster walks and interactive sessions** – simplifying complex health research concepts for young learners.

### Significance

#### 1. Educational Impact

- Promotes **scientific curiosity** and **critical thinking** at an early age.
- Helps students understand the **interdisciplinary nature of health sciences**, linking biology, chemistry, physics, and data science.

#### 2. Human Capital Development

- Builds the **pipeline for future researchers, doctors, and health innovators**.
- Ensures India's preparedness for emerging health challenges by investing in the next generation.

#### 3. Public Health Relevance

- Creates awareness among youth about **epidemiology, vaccines, and disease prevention**.
- Empowers students to become **advocates of healthy practices** in their communities.

#### 4. Alignment with National Goals

- Complements the **National Education Policy (NEP) 2020**, which emphasizes **experiential learning, innovation, and research orientation**.
- Supports India's ambition to become a **global leader in biotechnology and healthcare innovation**.

### Analytical Dimensions

- **Governance Perspective:** Demonstrates how **state institutions (ICMR, DHR)** can collaborate to nurture **scientific temperament (Article 51A(h) – Fundamental Duty)**.
- **Ethical Angle:** Promotes curiosity, innovation, and a **sense of responsibility** toward society through science.
- **Economic Dimension:** Long-term investment in youth-led innovation contributes to **India's knowledge economy and global competitiveness**.
- **Comparative Context:** Similar to U.S. NIH's **STEM outreach programmes** and Europe's **Science in Schools initiatives**, SHINE strengthens India's soft power in science education.

### Contemporary Relevance

- With growing health challenges such as **antimicrobial resistance, pandemics, and lifestyle diseases**, cultivating **youth-driven scientific leadership** is crucial.
- SHINE ensures that India is not just **consuming medical technology** but actively **producing innovators and solutions**.

### Conclusion – Keywords

The **SHINE Programme** represents a forward-looking effort to **ignite curiosity, foster innovation, and build future health leaders**. By bridging the gap between **research institutions and classrooms**, it ensures that India's youth are equipped to face **21st-century scientific and health challenges**.

### UPSC Mains Practice Question

**Q. The SHINE Programme aims to nurture India's next generation of health innovators. Discuss its significance in strengthening India's human capital and scientific ecosystem in the context of NEP 2020 and public health priorities.**

## MNRE: Local Supply Chains for Wind Turbines

### ❖ Syllabus Mapping:

- ✓ GS Paper II – **Government Policies & Interventions** (Renewable energy policies)
- ✓ GS Paper III – **Infrastructure, Energy, Environment, Technology**
- ✓ Essay/GS Paper I – **Sustainable Development, Climate Change**

### Context

- The **Ministry of New and Renewable Energy (MNRE)** has updated its wind turbine approval system.
- The **Revised List of Models and Manufacturers (RLMM, 2018)** has been replaced with the **Approved List of Models and Manufacturers (ALMM-Wind)**.

### Key Features of ALMM (Wind)

Wisdom leads to success

1. **Domestic Supply Chains**
  - Mandatory sourcing of key components (blades, towers, gearboxes, generators, special bearings) from **approved Indian suppliers**.
  - Aim: *Boost Atmanirbhar Bharat* in wind energy manufacturing.
2. **Data Localisation**
  - All operational data of turbines must be **stored within India**.
  - **Operational Control Centres** also to be located in India → enhances **cybersecurity & strategic autonomy**.
3. **R&D Centres**
  - Manufacturers must set up **R&D facilities in India within one year**.
  - Objective: Develop turbines designed for **Indian wind conditions**.
4. **Quality Standards**
  - From **September 2026**, **BIS certification** compulsory for all components.
  - Ensures quality, reliability, and performance.
5. **Exemptions**
  - Already-bid projects or captive/open access projects (within 18 months).
  - New manufacturers/models exempt up to **800 MW over 2 years** → to **encourage innovation**.

### India's Wind Energy Sector – Snapshot

- **Global Rank:** 4th largest installed wind power capacity.
- **Contribution:** 4.69% of total electricity generation.
- **Growth:** ~21 GW (2014) → 51.3 GW (June 2025).
- **Potential:** 1164 GW (at 150m hub height, National Institute of Wind Energy).
- **Target:** India aims to supply **10% of global wind energy equipment demand by 2030**.

### Significance of the Move

- **Energy Security:** Reduces dependence on imports, secures local supply chains.
- **Employment Generation:** Boosts domestic manufacturing and R&D jobs.
- **Climate Goals:** Supports India's 500 GW renewable energy target by 2030 under Paris Agreement commitments.
- **Strategic Autonomy:** Data localisation safeguards national interests amid rising cyber threats.
- **Global Competitiveness:** Positions India as a **hub for wind turbine exports**.

### ✓ Conclusion (Keywords):

MNRE's ALMM (Wind) policy represents a **shift from dependence to self-reliance**, ensuring **quality, security, and global competitiveness** in India's wind energy sector, while aligning with India's **net-zero commitments by 2070**.

## PM Viksit Bharat Rozgar Yojana (PMVBRY)

### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance, Policies & Interventions
- ✓ GS Paper III – Economic Development (Employment, Inclusive Growth)
- ✓ Essay / GS I – Social Issues (Youth Employment, Demography)

### Context

- On 16 August 2025, the Prime Minister announced the PMVBRY under the **Ministry of Labour & Employment**, aiming to **create over 3.5 crore jobs in 2 years**.
- The scheme targets **youth employment generation** by incentivising both **employees and employers**.

### Key Features of the Scheme

#### ◆ Part A – Support to First-Time Employees

- **Target Group:** First-time employees registered with **Employees' Provident Fund Organisation (EPFO)**.
- **Incentive:**
  - One-month EPF wage (up to **₹15,000**) in **two instalments**.
  - **1st instalment** after 6 months of service.
  - **2nd instalment** after 12 months + completion of **financial literacy programme**.
- **Eligibility:** Salaries up to **₹1 lakh/month**.
- **Savings Encouragement:** Part of the incentive kept in **savings deposit account** for a fixed term.
- **Payment Mechanism:** **DBT** through **Aadhaar Bridge Payment System (ABPS)**.

#### ◆ Part B – Incentives for Employers

- **Target Group:** Employers hiring new employees (salary  $\leq$  ₹1 lakh/month).
- **Incentive:** Up to **₹3000/month** per employee for **2 years** (sustained employment  $\geq$  6 months).
- **Manufacturing Sector:** Incentives extended for **3rd and 4th years** as well.
- **Payment Mechanism:** Direct transfer into **PAN-linked accounts** of employers.

### Significance

- **Employment Boost:** Addresses post-COVID slowdown & job losses, focusing on the formal sector.
- **Youth Empowerment:** Encourages **first-time employment & savings culture**.
- **Private Sector Participation:** Incentivises firms to expand hiring, especially in **labour-intensive manufacturing**.
- **Skill Development:** Financial literacy component strengthens **economic resilience** of workers.
- **Ease of Doing Business:** Simplifies employer participation via **PAN-linked DBT incentives**.

### Challenges Ahead

- **Implementation Capacity:** Ensuring correct identification of *first-time employees*.
- **Leakages & Misuse:** Preventing **ghost beneficiaries / duplicate EPFO accounts**.
- **Fiscal Burden:** Incentives may strain budgetary resources if not efficiently targeted.
- **Limited Informal Coverage:** Large informal sector (80%+ of workforce) may remain outside.
- **Monitoring:** Sustained employment tracking across sectors will require **robust MIS & audits**.

### Comparative Dimension

- Similar to **Pradhan Mantri Rojgar Protsahan Yojana (PMR PY, 2016–19)** which supported EPFO contributions for new employees.
- Global parallels:
  - **Wage subsidy schemes** in Europe (post-COVID recovery).
  - **JobMaker Hiring Credit** in Australia for youth employment.

### Conclusion (Keywords)

The PMVBRY is a **youth-centric, employment-linked, incentive-based policy** that aligns with India's **demographic dividend and growth ambitions**. Its success will depend on **efficient targeting, digital monitoring, and expansion to informal sectors**, ensuring that job creation translates into **sustainable livelihoods and inclusive growth**.

## Sudarshan Chakra Mission

❖ **Syllabus Mapping:**  
✓ **GS Paper II – Governance, Polity and Security Issues**  
✓ **GS Paper III – Internal Security, Defence Technology, Strategic Autonomy**  
✓ **Essay – National Security, Strategic Preparedness**

### Context

- The Prime Minister recently announced **Mission Sudarshan Chakra**, a comprehensive national security initiative aimed at safeguarding India's **critical civil and defence infrastructure** by 2035.
- The mission symbolizes rapid, precise, and **impactful defensive and counter-offensive capabilities**, drawing inspiration from the **mythological Sudarshan Chakra of Lord Vishnu**.

### About the Sudarshan Chakra Mission

- **Nature of Initiative:**  
A **comprehensive national security programme** designed to protect **vital assets** across sectors—defence, energy, digital infrastructure, nuclear sites, space assets, and critical industries.
- **Timeline:**  
Full operationalisation targeted by **2035**.
- **Core Objectives:**
  - Equip **critical national sites** with **cutting-edge technologies** and **powerful weapon systems**.
  - Develop **rapid, precise, and effective defence responses** against evolving threats.
  - Ensure **strategic autonomy** by reducing dependence on foreign defence systems.
  - Build capability not just to **neutralize enemy attacks**, but also to **deliver decisive counterstrikes**.
- **Symbolism:**  
Much like the **Sudarshan Chakra**, the mission represents **speed, precision, and dominance in defence preparedness**.

### Possible Components (Projected Dimensions)

1. **Technology Upgradation**
  - AI-driven surveillance & cyber defence systems.
  - Drone, hypersonic, and directed-energy weapon deployment.
2. **Critical Infrastructure Protection**
  - Shielding **nuclear plants, dams, space facilities, refineries, defence establishments** from physical and cyber threats.
  - Integrated Command & Control systems for real-time monitoring.
3. **Civil-Defence Integration**
  - Joint protection frameworks for **civilian & military assets** (airports, ports, railways, digital networks).
4. **Strategic Counterstrike Systems**
  - Long-range precision missile systems.
  - Air and missile defence architecture (building on **Project Kusha & S-400 systems**).
5. **Indigenous Development**
  - Collaboration between **DRDO, ISRO, BEL, private defence firms**, under **Atmanirbhar Bharat**.

### Significance

- **Strategic Autonomy:** Reduces overdependence on imports by indigenising cutting-edge security systems.
- **Comprehensive Security:** Covers **cyber, space, air, land and maritime domains**.
- **Countering Regional Threats:** Enhances India's capacity to balance **China's PLA modernisation & Pakistan's hybrid warfare tactics**.
- **Global Power Projection:** Positions India as a **net security provider** in the Indo-Pacific.

- **Civil-Defence Preparedness:** Creates a **national shield** for critical civilian infrastructure (data centres, power grids, refineries, telecom).

### Challenges

- **Resource Intensive:** Huge fiscal and technological investments required till 2035.
- **Inter-Agency Coordination:** Multiple ministries (Defence, Home, Power, IT, Space, Atomic Energy) need synergy.
- **Technology Gaps:** India still lags behind in **hypersonics, advanced cyber weapons, quantum encryption**.
- **Geopolitical Risks:** Arms race dynamics in the Indo-Pacific.

### Conclusion (Keywords)

The **Sudarshan Chakra Mission** represents India's **vision of holistic, multi-domain security architecture**, integrating civil and defence preparedness with **precision technologies**. If executed effectively, it will strengthen **national resilience, deterrence capability, and India's role as a major strategic power by 2035**.

## SOCIETY, SOCIAL JUSTICE AND SOCIAL ISSUES

### Nasha Mukt Bharat Abhiyaan: 5 Years of Anti-Substance Fight

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance & Social Justice:** Health, education, and social sector policies; issues related to vulnerable sections.
- ✓ **GS Paper II – Polity:** Directive Principles of State Policy (Article 47).
- ✓ **GS Paper III – Internal Security:** Drug trafficking, organized crime, and social challenges.

### Context

The year **2025** marks the **5th anniversary** of the launch of the **Nasha Mukt Bharat Abhiyaan (NMBA)**. Since its inception in 2020, NMBA has emerged as a comprehensive initiative aimed at **reducing substance abuse** and rehabilitating affected individuals, while strengthening India's capacity to tackle the **social, economic, and security challenges posed by drug use**.

### About NMBA

- **Nodal Ministry:** Ministry of Social Justice and Empowerment (MoSJE).
- **Genesis:** Launched in **2020** under the **National Action Plan for Drug Demand Reduction (NAPDDR)**.
- **Constitutional Backing:** Article **47 of the Indian Constitution** directs the State to **prohibit consumption of intoxicating substances harmful to health**.
- **Objective:**
  - **Prevention** of substance abuse through awareness.
  - **Treatment** of individuals suffering from drug dependency.
  - **Rehabilitation** of affected persons to restore dignity and livelihood.
- **Coverage:**
  - Initially targeted **272 high-risk districts**.
  - Now expanded to **all districts across India**.

### Strategy: The Three-Pronged Approach

1. **Supply Control**
  - Led by the **Narcotics Control Bureau (NCB)**.
  - Focuses on **curbing illicit cultivation, production, and trafficking**.
2. **Demand Reduction & Awareness**
  - Driven by **MoSJE**.
  - Emphasis on **mass awareness campaigns, community outreach, and youth-focused initiatives**.
3. **Treatment & Rehabilitation**
  - Managed by the **Ministry of Health and Family Welfare (MoHFW)**.
  - Includes **de-addiction centres, counselling services, and livelihood support programmes**.

### Local Implementation Mechanism

- **District Nasha Mukt Committees** established in every district.
- Headed by **District Collectors/Magistrates**.
- Responsible for preparing and executing **localized action plans** with NGOs, civil society, schools, and colleges.

### Analytical Dimensions

#### 1. Public Health Dimension

- Substance abuse impacts **mental and physical health**, raising healthcare costs and burdening families.
- NMBA strengthens **community-based rehabilitation** for long-term recovery.

#### 2. Socio-Economic Impact

- Drug addiction is linked to **poverty, unemployment, and crime**.
- By addressing root causes, NMBA contributes to **inclusive growth and social stability**.

#### 3. Security and Governance Aspect

- Drug trafficking has transnational dimensions, often linked with **terror financing and organized crime**.
- NMBA complements **supply-side enforcement by NCB** with demand-side reduction efforts.

#### 4. Challenges

- **Stigma** prevents many from seeking treatment.
- Unequal access to de-addiction services in **rural and remote regions**.
- Need for **trained counsellors and medical professionals**.

#### 5. Way Forward

- Integrate NMBA with **Skill India and livelihood programmes** for reintegration of rehabilitated individuals.
- Enhance **digital platforms** for awareness and anonymous counselling.
- Strengthen **international cooperation** in line with UN conventions on narcotics control.

### Contemporary Relevance

- The rising trend of **synthetic drugs and opioids** highlights the urgency of strengthening NMBA.
- The campaign also aligns with **India's demographic dividend**, protecting youth from falling into addiction traps.
- As India expands **public health infrastructure**, NMBA remains a critical instrument in ensuring a **healthy, productive, and resilient society**.

### Conclusion – Keywords

IQRA  
Wisdom leads to success

The **Nasha Mukt Bharat Abhiyaan** represents a **holistic, multi-agency effort** to combat substance abuse, reflecting the vision of **Article 47** and the spirit of **social justice**. Its expansion from 272 high-risk districts to nationwide coverage marks a **decisive step in addressing one of India's most pressing social challenges**.

### UPSC Mains Practice Question

**Q. "Drug addiction is as much a social and economic problem as it is a health and security concern." Critically evaluate the effectiveness of the Nasha Mukt Bharat Abhiyaan (NMBA) in tackling substance abuse in India.**

### APAAR ID: Unified Student ID

#### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Education Policy, Government schemes and initiatives.
- ✓ **GS Paper II – Social Justice:** Education, Access, and Inclusion.
- ✓ **GS Paper III – Science & Tech:** Digital governance in education.

### Context

- The **Central Board of Secondary Education (CBSE)** has mandated schools to use the **12-digit Automated Permanent Academic Account Registry (APAAR) ID** for registration of **Classes 9 & 11 students** and for **List of Candidates (LOC)** submission for **Classes 10 & 12** ahead of the **2026 board exams**.

### About APAAR ID

- **Genesis:** Introduced in alignment with the **National Education Policy (NEP) 2020** under the idea of *“One Nation, One Student ID”*.
- **Ministry:** Launched by the **Union Ministry of Education** (MoE) for schools beginning with the **2024-25 academic session**.
- **Structure:** Each student will get a **unique 12-digit lifelong ID**.

### Aim & Significance

- **Unified Academic Identity:** Consolidates academic records, achievements, and extracurricular activities under one digital ID.
- **Portability:** Ensures continuity when students transfer across schools, boards, or states.
- **Digital Governance:** Builds a **centralized academic database** that supports NEP 2020's vision of **digitization and transparency**.
- **Holistic Record:** Tracks scholarships, skill certifications, sports participation, and academic performance in one place.

### Broader Context – NEP 2020 Alignment

- Promotes **digital transformation in education**.
- Enhances **student mobility** across institutions.
- Enables **AI-driven analytics** for policymaking in education.

### ✓ Conclusion (Keywords):

The **APAAR ID** represents a landmark reform in India's education sector, making **student records transparent, portable, and digitally accessible**. It is a step toward **inclusive, tech-driven education governance** and aligns with the broader **Digital India** and **NEP 2020** vision.

## GEOGRAPHY AND DISASTER

### Alaska (USA)

#### 📌 Syllabus Mapping:

- ✓ **GS Paper I – Geography (World Physical Geography)**
- ✓ **GS Paper II – International Relations (USA–Russia, USA Foreign Policy)**
- ✓ **GS Paper III – Security & Strategic Studies (Arctic Geopolitics)**

### Context

- Recently, the **President of USA and Russia met in Alaska** to discuss a possible **ceasefire in the Russia–Ukraine war**.
- This highlights Alaska's strategic position in **Arctic geopolitics**, U.S.–Russia relations, and global security.

### About Alaska

- **Geographical Location:**
  - Non-contiguous U.S. state located at the **northwest extremity of North America**.
  - Bordered by:
    - **North:** Beaufort Sea & Arctic Ocean
    - **South:** Gulf of Alaska & Pacific Ocean
    - **West:** Bering Sea
    - **Northwest:** Chukchi Sea
- **History:**
  - Acquired from Russia under the **Alaska Treaty of 1867** for **\$7.2 million**.
- **Physical Features:**
  - **Arctic Circle:** Nearly one-third of Alaska lies within it.
  - **Permafrost:** About 85% of land underlain by permafrost.
  - **Aurora Borealis (Northern Lights):** Visible across much of Alaska.

### Significance of Alaska

#### 1. Strategic & Geopolitical

- **Proximity to Russia:** Alaska and Russia are separated by the **Bering Strait (approx. 85 km)**, making it geopolitically sensitive.
- **Arctic Region:** As Arctic ice melts, Alaska gains importance for **shipping lanes, military bases, and energy exploration**.

- **US-Russia Relations:** Often serves as a **diplomatic meeting point** due to its midway location.

### 2. Economic Importance

- Rich in **oil, gas, fisheries, and minerals.**
- **Prudhoe Bay oil field** is one of the largest in North America.

### 3. Environmental Importance

- Critical in **climate change studies** due to melting permafrost and glaciers.
- Arctic biodiversity hotspots.

### 4. Cultural Importance

- Native Alaskan communities with unique **Inuit heritage and traditions.**

## Contemporary Relevance

- **Geopolitics:**
  - Rising tensions in **Arctic militarization** with Russia, China, and NATO interest.
  - U.S. aims to project power in Arctic through **Alaskan bases**.
- **Environment & Climate:**
  - **Thawing permafrost** releases methane, accelerating climate change.
  - Melting ice opens **Northern Sea Route (NSR)** near Alaska.
- **India's Angle:**
  - As an **Observer in Arctic Council**, India is keen on Arctic developments for **climate research, shipping routes, and energy security.**

## Conclusion (Keywords)

Alaska is more than just a **remote U.S. state**—it is a **strategic Arctic frontier**, critical for **geopolitics, climate science, and energy security**. Its role in **U.S.-Russia relations**, particularly in contexts like the **Ukraine ceasefire talks**, makes it a **geopolitical hotspot of the 21st century**.

## Tato-II Hydroelectric Project

### ❖ Syllabus Mapping:

- ✓ **GS Paper I – Geography** → Distribution of key natural resources, Hydro projects in Himalayas.
- ✓ **GS Paper II – Governance & Polity** → Centre-State relations in infrastructure projects.
- ✓ **GS Paper III – Economy & Environment** → Energy security, sustainable development, disaster risks in Himalayan ecosystems.

### Context

- The **Cabinet Committee on Economic Affairs (CCEA)** recently approved the construction of **Tato-II Hydroelectric Project (HEP)** in **Shi Yomi District, Arunachal Pradesh**.
- This approval adds to India's broader push for **hydropower capacity expansion** in the Northeast, aligning with the goal of **energy transition and regional development**.

## About Tato-II Hydroelectric Project

- **Installed Capacity:** 700 MW (4 × 175 MW units).
- **Energy Output:** 2,738.06 Million Units (MU) annually.
- **Implementing Agency:** Joint Venture between **North Eastern Electric Power Corporation Ltd. (NEEPCO)** and **Government of Arunachal Pradesh**.
- **Strategic Importance:**
  - Boosts **clean energy capacity** in the Northeast.
  - Strengthens **grid reliability** and supports India's renewable energy targets.
  - Generates local employment and development opportunities in Arunachal Pradesh.

## Other Hydroelectric Projects in Arunachal Pradesh

Arunachal Pradesh has the **highest hydropower potential in India** (around 50,000 MW). Major projects include:

- **Subansiri Lower HEP – 2,000 MW** (largest in Northeast India).
- **Kameng Hydro Power Station – 600 MW.**
- **Heo HEP – 240 MW.**
- **Dibang Multipurpose Project – 2,880 MW** (India's largest proposed hydropower project).

### Significance of the Project

#### 1. For Energy Security:

- Contributes to India's renewable energy target of **500 GW by 2030**.
- Reduces dependence on fossil fuels.

#### 2. For Regional Development:

- Enhances connectivity and infrastructure in remote Himalayan districts.
- Provides royalty and revenue to the Arunachal Pradesh government.

#### 3. For Strategic Concerns:

- Strengthens India's presence in border areas with **China (Tibet region)**.
- Hydropower dams act as a **geostrategic tool** in transboundary river disputes.

### Concerns & Challenges

- **Ecological Fragility:** Project lies in the **Eastern Himalayas**, a **seismically active zone**, prone to earthquakes and landslides.
- **Biodiversity Loss:** May impact Himalayan flora & fauna, tribal livelihoods, and riverine ecology.
- **Social Issues:** Local displacement and tribal rights need sensitive handling.
- **Geopolitical:** Brahmaputra basin disputes with China over upstream dam building.

### ✓ Conclusion (Keywords):

The **Tato-II HEP** reflects India's dual challenge of **energy transition and ecological sustainability**. While it strengthens **renewable capacity and border development**, careful balancing of **environmental safeguards, seismic risks, and local community concerns** will decide its long-term success.

### Western Australia Coral Bleaching Event

#### 📌 Syllabus Mapping:

- ✓ **GS Paper I – Geography** → Flora & Fauna, Geophysical phenomena.
- ✓ **GS Paper III – Environment & Ecology** → Climate change, Biodiversity conservation.

### Context

- Western Australia experienced its **longest, largest, and most intense marine heatwave**, leading to **record coral bleaching**.
- **Ningaloo Reef (UNESCO World Heritage Site)** on Australia's West coast and the **Great Barrier Reef** on the East coast are severely affected.
- This is part of the **fourth global mass coral bleaching event** announced by the **NOAA (2024)**.

### About Corals

- **Living Organisms:** Corals are marine invertebrates that build reefs by secreting calcium carbonate.
- **Symbiotic Relationship:** They host microscopic algae (**zooxanthellae**) in their tissues.
  - Algae provide **nutrients & color** through photosynthesis.
  - Corals provide **shelter & compounds** needed for photosynthesis.

### Coral Bleaching

- **Definition:** Stress response where corals expel zooxanthellae → turn **white (bleached)**.
- **Causes:**
  - **Rising sea temperatures** (climate change).
  - **Pollution & sedimentation** (blocking sunlight).
  - **Ocean acidification** (due to excess CO<sub>2</sub>).
  - Overfishing disrupting ecological balance.
- **Impact:**
  - Loss of food source → coral starvation.
  - Reduced biodiversity → fish & marine ecosystems collapse.
  - Threatens livelihoods of millions dependent on fisheries and tourism.

### Ideal Conditions for Coral Survival

- **Water Temperature:** 23°–29°C (stable, warm).
- **Clean Water:** Low pollution and clear for sunlight penetration.
- **Healthy Marine Life:** Herbivores (parrotfish, turtles) control algae overgrowth.

### Global & Indian Dimension

- **Great Barrier Reef:** Witnessed biggest decline in **four decades**.
- **Ningaloo Reef:** West Australia's biodiversity hotspot now under stress.
- **India's Context:** Coral reefs in **Lakshadweep, Gulf of Mannar, Gulf of Kutch, Andaman & Nicobar** also face bleaching risks.

### Infographic Idea – Types of Corals

1. **Hard Corals (Reef-Building):** Create calcium carbonate skeletons → reef structures.
2. **Soft Corals:** Flexible, non-reef building, often colorful.

### Way Forward

- **Global Action:**
  - Strict climate commitments under **Paris Agreement**.
  - Strengthen **UNEP's Coral Reef Monitoring Network**.
- **National Action (India):**
  - Expand **Coral Reef Task Force (MoEFCC)**.
  - Promote **Marine Protected Areas (MPAs)**.
  - Encourage **community-based reef restoration** projects.

### ✓ Conclusion (Keywords):

Coral bleaching is a stark reminder of **climate change's ecological footprint**. Protecting corals means safeguarding **marine biodiversity, coastal livelihoods, and natural climate buffers**. Without urgent global cooperation, the **world's coral reefs may face irreversible collapse** within this century.

## HISTORY, ART & CULTURE

### Wallacean Hominids – Early Human Migration in Southeast Asia

#### ❖ Syllabus Mapping:

- ✓ **GS Paper I – History & Culture:** Prehistoric archaeology, human evolution.
- ✓ **GS Paper I – Geography:** Physical geography and islands of Wallacea.
- ✓ **GS Paper III – Science & Tech:** Archaeological sciences and anthropological research.

#### Context

Scientists have discovered **possible artefacts of the oldest known Wallacean hominids** on Sulawesi Island, Indonesia. This finding challenges earlier beliefs about human migration patterns and maritime capabilities in prehistory.

#### About Wallacean Hominids

- **Identity:** Early prehistoric humans, primarily linked with **Homo erectus**.
- **Known Settlements (till now):**
  - **Flores Island (Indonesia):** Known for *Homo floresiensis* ("Hobbit humans").
  - **Luzon Island (Philippines):** Early hominin presence dated to ~1.02 million years ago.
- **Sea Travel:** Previously believed incapable of long-distance oceanic voyages.
- **New Finding:** Artefacts from Sulawesi suggest a **wider distribution** and possible **maritime navigation** much earlier than assumed.

#### About Wallacea

- **Naming:** After naturalist **Alfred Russel Wallace**, co-discoverer of the theory of evolution by natural selection.
- **Geographical Location:** Eastern Indonesia, situated between **Borneo & Java (to the west)** and **Australia & New Guinea (to the east)**.
- **Major Islands:** **Sulawesi, Lombok, Flores, Timor, Sumbawa**.
- **Significance:**
  - Biogeographical boundary known as the **Wallace Line** separating Asian and Australasian fauna.
  - A natural laboratory for studying **human migration** and **biodiversity evolution**.

## Significance of the Finding

1. **Prehistoric Migration:** Suggests **earlier and wider dispersal** of hominids in Southeast Asia.
2. **Maritime Capabilities:** Implies early humans may have mastered **basic sea crossings**, challenging assumptions about their limitations.
3. **Anthropological Insight:** Contributes to debates on **human adaptability** and interaction with changing landscapes.
4. **Evolutionary Context:** May help trace connections between **Homo erectus**, **Homo floresiensis**, and modern humans in the region.

## Contemporary Relevance

- Provides insights into **prehistoric climate change adaptation**, useful in understanding human resilience.
- Enhances global interest in **Indo-Pacific archaeology**.
- Adds to India's **comparative anthropology studies**, given shared migration narratives in South and Southeast Asia.

## Conclusion – Keywords

The discovery of Wallacean hominid artefacts in **Sulawesi** reshapes our understanding of **early human migration, seafaring skills, and adaptability**. It underscores Wallacea's role as a **crucial prehistoric corridor** linking Asia with Oceania.

### UPSC Mains Practice Question

**Q. The discovery of Wallacean hominid artefacts in Indonesia's Sulawesi Island challenges long-held assumptions about human migration. Discuss its implications for understanding prehistoric maritime capabilities and human evolution in Southeast Asia.**

## Kakori Train Action (1925): 100 Years of Revolutionary Resolve

### 📌 Syllabus Mapping:

- ✓ **GS Paper I – Modern Indian History:** Freedom struggle, revolutionary movements, important personalities.
- ✓ **GS Paper II – Polity and Governance:** Evolution of political thought, democratic principles.
- ✓ **GS Paper IV – Ethics:** Values of sacrifice, courage, and nationalism in public life.

## Context

On **9th August 1925**, the Kakori Train Action took place near Lucknow, marking one of the most daring revolutionary incidents in India's freedom struggle. The event, executed by members of the **Hindustan Republican Association (HRA)**, symbolised the resolve of young revolutionaries to challenge British colonial exploitation.

## About the Kakori Incident

- **Incident:** The revolutionaries looted the **Number 8 Down-train** running from Shahjahanpur to Lucknow, targeting British government cash meant for administrative use. The funds were to be channelled into **revolutionary activities**.
- **Key Leaders:** Ram Prasad Bismil, Ashfaqullah Khan, Chandrashekhar Azad, Manmathnath Gupta, and Rajendra Lahiri.
- **Objective:** Not mere robbery, but an act of political protest against economic exploitation by the British Raj.

## British Government's Reaction

- **Swift and Harsh Response:** Large-scale arrests followed under the **Kakori Conspiracy Case (1925)**.
- **Punishments:**
  - **Hanged:** Ram Prasad Bismil, Ashfaqullah Khan, Roshan Singh, Rajendra Lahiri.
  - Others faced long-term imprisonment and deportation.
- The repressive measures aimed to crush revolutionary zeal but ended up intensifying anti-colonial sentiment.

## Aftermath & Significance

- **Temporary Setback:** The incident weakened the HRA in northern India, but it was not a decisive blow.
- **Reorganisation:** By 1928, the HRA transformed into the **Hindustan Socialist Republican Association (HSRA)** at Feroz Shah Kotla, Delhi.
- **Strategic Shift:** From a republican dream to a **socialist vision**, reflecting global ideological influences like the **Russian Revolution (1917)**.

## HRA and HSRA: Ideological Evolution

### Hindustan Republican Association (HRA) – Founded 1924, Kanpur

- **Key Leaders:** Ram Prasad Bismil, Ashfaqullah Khan, Sachindra Nath Bakshi, Sachindranath Sanyal, Jogesh Chandra Chatterjee.
- **Principle:** Creation of a **Federal Republic of the United States of India** based on **adult suffrage**.

- **Focus:** Armed struggle as a means to end colonial rule.

### Hindustan Socialist Republican Association (HSRA) – Founded 1928, Delhi

- **Key Leaders:** Bhagat Singh, Sukhdev, Chandra Shekhar Azad, Shiv Verma, Vijay Kumar Sinha.
- **Principle:** Establishment of a **Socialist Republic** ensuring equality and justice.
- **Focus:** Revolutionary socialism combined with anti-imperial struggle.

### Analytical Dimensions

1. **Symbolic Impact**
  - The incident demonstrated that revolutionaries were not criminals but patriots with a clear ideological vision.
  - It inspired future generations, especially Bhagat Singh and his comrades.
2. **British Strategy of Repression**
  - The heavy-handed response highlighted the colonial state's insecurity in the face of youth-led uprisings.
3. **Shift in Revolutionary Ideology**
  - From republican nationalism (HRA) → to **scientific socialism (HSRA)**, mirroring global anti-colonial currents.
4. **Ethical Reflection**
  - The act challenges the moral debate: Was violent revolution justified against systemic colonial exploitation? Thinkers like **Frantz Fanon** later argued that violence often becomes inevitable against oppressive colonial structures.

### Contemporary Relevance

- The Kakori action continues to be remembered as a **milestone of revolutionary nationalism**, underlining themes of:
  - **Sacrifice for a larger cause.**
  - **Youth leadership in freedom movements.**
  - **Evolution of democratic and socialist thought in India's political history.**

### Conclusion – Keywords

The **Kakori Train Action (1925)** was more than a train robbery; it was a **political statement against colonial injustice**, laying the ideological foundation for India's **socialist revolutionary movement**. Despite brutal repression, it highlighted the **indomitable spirit of Indian revolutionaries** and contributed significantly to the legacy of India's freedom struggle.

### UPSC Mains Practice Question

**Q. The Kakori Train Action (1925) marked a turning point in the revolutionary movement in India. Discuss its significance in shaping the ideology of nationalist revolutionaries and its long-term impact on the freedom struggle.**

## ENVIRONMENT & ECOLOGY

### Asiatic Lions: India's Conservation Success Story

#### ❖ Syllabus Mapping:

- ✓ **GS Paper III – Environment and Ecology:** Conservation of flora and fauna, Protected Areas, Species Recovery Programmes.
- ✓ **GS Paper I – Geography:** Biodiversity and ecosystems.
- ✓ **GS Paper II – Governance:** Government policies and international environmental agreements.

### Context

India has achieved remarkable success in wildlife conservation, as reflected in the **rise of the Asiatic lion population from 284 in 1990 to 891 in 2025**, marking a **70% increase in just the last decade**. This growth demonstrates the effectiveness of focused conservation strategies and highlights India's role as a global leader in big cat protection.

### About the Asiatic Lion

- **Habitat:** Thrives in **dry deciduous forests and open grassy scrublands** of the Saurashtra region, Gujarat.
- **Current Range:** Exclusively found in **Gir National Park and Wildlife Sanctuary**, the last natural abode.
- **Conservation Status:**
  - **Vulnerable** – IUCN Red List.
  - **Schedule I** – Wildlife (Protection) Act, 1972.

- **Appendix I – CITES** (Convention on International Trade in Endangered Species).
- **Key Traits:** Slightly smaller than African lions, with distinct longitudinal skin folds on the belly; no fixed breeding season.

### Conservation Efforts

1. **Project Lion (2020)**
  - Focus on **habitat improvement**, technology-led monitoring (radio-collaring, camera traps), and **reducing human-wildlife conflict**.
2. **Greater Gir Concept**
  - Strategy to **expand lion habitats** beyond Gir to include Girnar, Pania, and Mitiyala to reduce overconcentration and risk of epidemics.
3. **Species Recovery Programme**
  - Under the **Integrated Development of Wildlife Habitats (IDWH) scheme**, lions are prioritized alongside tigers and elephants.
4. **International Big Cats Alliance (2023)**
  - Multilateral initiative launched by India to strengthen conservation of **seven big cat species globally**, including lions.

### Barda Wildlife Sanctuary – Emerging Second Home

- **Location:** Porbandar and Devbhumi Dwarka districts, Gujarat.
- **Area:** 192.31 sq. km – relatively small but ecologically rich.
- **Declared:** 1979.
- **Biodiversity:**
  - **Flora:** Gorad, Babul, Dhav, Rayan, Ber, Jamun, Bamboo, etc.
  - **Fauna:** Sambar, chital, chinkara, and smaller carnivores.
- **Significance:** Identified as a **potential second home for Asiatic lions**, critical for reducing dependence on Gir.

### Analytical Dimensions

#### 1. Conservation Success

- Population growth from **near-extinction levels** to **891 lions** shows India's effective blend of **policy, technology, and community participation**.



#### 2. Challenges Ahead

- Overcrowding in Gir raises concerns of **disease outbreaks** (e.g., canine distemper virus).
- Human-lion conflict due to lions straying into villages and farmlands.

#### 3. Ecological and Ethical Balance

- Relocation efforts face resistance due to **political, cultural, and local livelihood concerns**.
- Highlights the dilemma of conservation vs. development in **fragile ecosystems**.

#### 4. India as a Global Model

- The success strengthens India's image as a **pioneer in big cat conservation**, comparable to its success with Project Tiger.
- Aligns with **SDG-15 (Life on Land)** and international biodiversity goals.

### Contemporary Relevance

- Demonstrates that **science-based conservation**, combined with **community participation** and **political will**, can yield results.
- Vital as India navigates the **twin challenges of biodiversity protection and rapid development**.

### Conclusion – Keywords

The rise in the **Asiatic lion population** is a **conservation triumph** for India. However, sustaining this momentum requires **habitat diversification, stronger conflict mitigation, and robust disease management**. India's strategy underscores that conservation success is possible when **policy, people, and science converge**.

### UPSC Mains Practice Question

**Q. "India's conservation policies have transformed the fate of the Asiatic lion, but challenges remain." Discuss the factors behind this success and critically evaluate the future risks and strategies required for long-term survival of the species.**

## Greater One-horned Rhino: India's Conservation Success

### 📌 Syllabus Mapping:

✓ **GS Paper III – Environment & Ecology:** Conservation, endangered species, biodiversity initiatives.

✓ **GS Paper II – Governance:** Government and NGO partnerships in wildlife protection.

✓ **GS Paper I – Geography:** Flora and fauna, natural habitats, biodiversity hotspots.

### Context

A recent **IUCN-TRAFFIC report** has commended India's efforts in **enhanced monitoring and surveillance**, which have **significantly reduced poaching** of the **Greater One-horned Rhino**. This success showcases India's strong conservation mechanisms and collaboration with international organisations for biodiversity protection.

### About TRAFFIC

- **TRAFFIC:** A leading NGO that works globally on **trade in wild animals and plants**, with a dual focus on **biodiversity conservation and sustainable development**.
- **Structure:** Jointly operated by the **World Wide Fund for Nature (WWF)** and the **International Union for Conservation of Nature (IUCN)**.
- Plays a key role in **tracking wildlife trade networks** and advising governments on enforcement measures.

### The Greater One-horned Rhino

#### Features



- **Appearance:** Single horn, thick armor-like skin folds.
- **Diet:** Grass, fruits, aquatic plants, and leaves.
- **Size:** The **largest species among the five rhino species** globally.

#### Range & Habitat

- Found in **India and Nepal**, primarily in:
  - **Kaziranga National Park, Assam** (largest population).
  - Other sanctuaries in Assam, West Bengal, and Uttar Pradesh.
- **Habitat:** **Forests, grasslands, and inland wetlands**.

#### Threats

- **Habitat loss and degradation** due to encroachment, agriculture, and flooding.
- **Loss of genetic diversity**, making them vulnerable to diseases.
- **Poaching** for horns, driven by illegal wildlife trade networks.

### Protection Status

- **IUCN Red List:** *Vulnerable*.
- **CITES:** *Appendix I* – international trade banned.
- **Wildlife Protection Act, 1972:** *Schedule I* – highest level of protection in India.

### Key Indian Conservation Initiatives

1. **National Conservation Strategy for the Indian One-Horned Rhinoceros (2019)**
  - Roadmap to secure and expand rhino habitats in India.
  - Focus on ecological restoration, community participation, and strict enforcement.
2. **Indian Rhino Vision (IRV) 2020**
  - Goal: Increase the rhino population in Assam to **3,000 by 2020** by spreading them across seven protected areas.
  - Implemented in partnership with **WWF-India, Bodo Territorial Council, and Assam Forest Department**.
3. **Enhanced Surveillance Measures**
  - Use of **drones, GPS tracking, and forest patrol strengthening**.
  - Community awareness campaigns to curb local involvement in poaching.

### Analytical Dimensions

#### 1. Success Story of India

- India hosts **~75% of the global Greater One-horned Rhino population**.

- Decline in poaching incidents reflects effective **law enforcement and community engagement**.

### 2. Challenges Ahead

- **Floods in Assam's Kaziranga National Park** often lead to habitat loss and displacement.
- Need to manage **human-wildlife conflict** as rhinos stray into villages.
- **Climate change** may worsen habitat shrinkage.

### 3. International Relevance

- India's rhino conservation efforts contribute to **CITES commitments** and **Convention on Biological Diversity (CBD) targets**.
- Sets an example for other range countries (like Nepal) and for global conservation of other rhino species.

## Contemporary Relevance

- Success in rhino conservation reinforces India's leadership in **biodiversity protection and eco-tourism**.
- Strong link with **SDG 15 (Life on Land)** and global environmental sustainability goals.
- Demonstrates the importance of **state, central, and international cooperation** in combating wildlife crime.

## Conclusion – Keywords

The **Greater One-horned Rhino** has become a **symbol of India's conservation success**, shifting from the brink of extinction to a growing population. Effective policies, community participation, and global collaboration are vital to ensuring its **long-term survival** in the face of new challenges like **climate change and habitat fragmentation**.

## UPSC Mains Practice Question

**Q. "India's conservation efforts have transformed the status of the Greater One-horned Rhino, but future challenges remain." Discuss the success of initiatives like IRV 2020 and the National Conservation Strategy while analysing the role of global cooperation in wildlife protection.**

## UNDP Equator Award: Community-led Biodiversity

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Role of NGOs and UN agencies in development.
- ✓ **GS Paper III – Environment & Ecology:** Biodiversity conservation, sustainable agriculture, climate-resilient practices.
- ✓ **GS Paper I – Society:** Role of women's groups and SHGs in rural empowerment.

## Context

The **Bibi Fatima Women's Self-Help Group (SHG)** from Dharwad district, Karnataka, has won the prestigious **UNDP Equator Initiative Award** for its pioneering efforts in **climate-resilient farming and biodiversity conservation**.

## About the UNDP Equator Initiative Award

- **Nature of Award:**
  - Presented biennially under the **Equator Initiative of UNDP**.
  - Often referred to as the "*Nobel Prize for Biodiversity Conservation*."
- **Objectives:**
  - Recognises **outstanding community initiatives** that integrate biodiversity conservation, poverty reduction, and climate resilience.
  - Provides global visibility and networking opportunities for Indigenous and local communities.
- **Focus Areas:**
  - **Land Degradation Control**
  - **Biodiversity Protection**
  - **Sustainable Livelihoods**

## About Bibi Fatima SHG

- **Location:** Dharwad district, Karnataka.
- **Key Practices:**
  - Introduced **millet-based mixed cropping** on rainfed farms.
  - Promoted **climate-resilient farming systems** suited to dryland agriculture.
  - Integrated **livestock rearing** and **horticulture**.
  - Actively **popularised millets**, aligning with India's millet promotion initiatives (2023 was the *International Year of Millets*).

- **Impact:**
  - Improved household nutrition and food security.
  - Enhanced women's participation in local economy.
  - Contributed to **sustainable agriculture and biodiversity conservation**.

### Significance of the Award for India

1. **Global Recognition:** Highlights India's grassroots innovations in biodiversity and climate resilience.
2. **Empowerment of Women:** Validates the role of **SHGs as agents of change** in rural transformation.
3. **Policy Linkages:** Supports India's priorities under **National Mission on Sustainable Agriculture (NMSA)** and **National Action Plan on Climate Change (NAPCC)**.
4. **Millet Promotion:** Aligns with India's efforts to mainstream **nutri-cereals** for climate-smart agriculture.

### Tags in Context

- **United Nations Development Programme (UNDP):** A UN agency working for sustainable development, poverty eradication, and inclusive growth.
- **UNDP Equator Initiative Award:** A prestigious recognition for local communities that balance **biodiversity conservation and livelihood development**.

### Conclusion – Keywords

The **Bibi Fatima SHG's achievement** illustrates how **local community initiatives, women's leadership, and traditional farming knowledge** can contribute to **climate resilience, food security, and biodiversity conservation** while gaining global recognition.

### UPSC Mains Practice Question

**Q. Community-led initiatives such as the Bibi Fatima Women's SHG demonstrate the convergence of biodiversity conservation, women empowerment, and sustainable agriculture. Discuss the significance of such recognitions like the UNDP Equator Initiative Award for India's rural development and global standing.**

## Etalin Hydropower: Balancing Ecology & Development

### 📌 Syllabus Mapping:

- ✓ **GS Paper I – Geography:** Distribution of natural resources, Himalayas.
- ✓ **GS Paper II – Governance:** Environmental policies and clearances.
- ✓ **GS Paper III – Environment & Ecology:** Conservation, biodiversity hotspots, EIA concerns.
- ✓ **GS Paper III – Economy:** Infrastructure, energy security.

### Context

The **Etalin Hydroelectric Project** in Arunachal Pradesh's Dibang Valley has been recommended for **environmental clearance** by an expert panel of the Union Environment Ministry.

With an installed capacity of **3,097 MW**, it is set to become one of India's largest hydroelectric projects but has also raised strong ecological and biodiversity concerns.

### About the Etalin Hydroelectric Project

- **Location:** Dibang Valley, Arunachal Pradesh.
- **Geographic Zone:** Lies in the **Eastern Himalaya Global Biodiversity Hotspot**.
- **Rivers Involved:**
  - Dams across **Dri and Tangon rivers**.
  - These rivers meet near **Etalin village** to form the **Dibang River** downstream.
- **Capacity:** 3,097 MW through concrete gravity dams.

### Environmental Concerns

1. **Forest Diversion**
  - Nearly **1,175 hectares of forest** to be diverted.
  - Includes ecologically diverse forest types:
    - Sub-tropical pine
    - Wet evergreen & semi-evergreen

- Montane wet temperate
- Moist alpine scrub
- These are critical habitats for rare and endemic species.

### 2. Biodiversity Threats

- The region is home to species like **Mishmi takin, red panda, clouded leopard, hornbills**.
- Risk of fragmentation of **tiger corridors**.

### 3. Hydrological & Seismic Risks

- Located in a **seismically active zone**.
- Alterations in river flow can impact **flood control, downstream ecology, and tribal livelihoods**.

## Significance of the Project

### 1. Energy Security

- Adds **clean, renewable energy** to India's power grid.
- Reduces dependence on fossil fuels, contributing to **India's climate commitments (Net Zero 2070)**.

### 2. Strategic Importance

- Strengthens infrastructure in the **Northeast**, a strategically sensitive region near the China border.

### 3. Economic Growth

- Boosts local employment and infrastructure development.
- May attract investments in **power-intensive industries**.

## Tags in Context

- **Etalin Hydroelectric Project:** India's largest proposed hydropower project, symbolising the development vs. ecology debate.
- **Dibang River:** A crucial river of Arunachal Pradesh, feeding the **Brahmaputra basin** and sustaining downstream agriculture, fisheries, and communities.

## Contemporary Relevance

- Aligns with **India's renewable energy goals** under the Paris Agreement.
- Raises questions of **sustainable development**, as seen in other hydro projects like **Teesta (Sikkim)** and **Subansiri (Assam-Arunachal)**, which faced protests.
- Illustrates the **environment vs. development dilemma** in fragile Himalayan ecosystems.

## Conclusion – Keywords

The **Etalin Project** embodies the challenge of reconciling **energy needs, ecological sustainability, and tribal livelihoods**. A balance between **developmental aspirations and biodiversity conservation** will determine the project's long-term success.

## UPSC Mains Practice Question

**Q. Large hydroelectric projects like the Etalin HEP in Arunachal Pradesh are often seen as both an opportunity for renewable energy growth and a threat to fragile ecosystems. Critically evaluate this statement with reference to India's energy security and ecological balance.**

## Bhagirathi Eco-Sensitive Zone (BESZ)

### ❖ Syllabus Mapping:

✓ **GS Paper III – Environment & Ecology:** Conservation, Eco-sensitive Zones, Environmental governance.

✓ **GS Paper II – Governance:** Role of Supreme Court & MoEFCC in environmental protection.

## Context

- A Supreme Court-appointed panel has warned against the **Char Dham all-weather road widening project** inside the **Bhagirathi Eco-Sensitive Zone (BESZ)**, highlighting the ecological fragility of the Himalayas.

## About BESZ

- **Notification:** Declared in **2012** by the **Ministry of Environment, Forest and Climate Change (MoEF&CC)**; revised in **2018**.
- **Coverage:** Extends across **4179.59 sq. km** from **Gaumukh to Uttarkashi** in Uttarakhand.
- **Objective:** To **preserve the fragile Himalayan ecosystem** while allowing sustainable development.

## Zonal Master Plan (ZMP)

- Mandated by MoEF&CC, to be prepared by **Uttarakhand Government**.

- Based on **watershed approach** integrating:
  - **Forests and Wildlife** management.
  - **Water resources** conservation.
  - **Tourism** regulation.
  - **Energy projects** with ecological safeguards.

### Eco-Sensitive Zones (ESZ) – Background

- **Legal Basis:** Notified under **Environment (Protection) Act, 1986**.
- **Function:** Serve as “**shock absorbers**” for **protected areas**, acting as a **transition zone** between core protected ecosystems and human settlements.
- **Activities Regulated:** Mining, hydro projects, polluting industries, deforestation, etc.

### Concerns with Char Dham Project in BESZ

- **Ecological Fragility:** Risk of landslides, soil erosion, biodiversity loss.
- **River System Threats:** BESZ includes the **Bhagirathi River basin**, a crucial Ganga headstream.
- **Disaster Risk:** The Himalayas are already vulnerable to climate change and extreme rainfall (e.g., Kedarnath floods, Joshimath subsidence).

### Tags (with context)

- **Bhagirathi ESZ** → Declared eco-sensitive region to protect the Ganga's headstream ecosystem.
- **Eco-Sensitive Zones (ESZ)** → Buffer zones under **Environment Protection Act, 1986** to safeguard fragile ecosystems.

### ✓ Conclusion (Keywords):

The **Bhagirathi ESZ** represents the **balancing act between development and ecology** in the fragile Himalayas. Protecting this zone is crucial for **biodiversity conservation, water security, and disaster resilience**, while ensuring that projects like **Char Dham Yatra** infrastructure do not compromise long-term sustainability.

## Blue Pinkgill and Shuttlecock Mushrooms

📌 **Syllabus Mapping:**  
✓ **GS Paper III – Environment & Ecology**  
✓ **GS Paper I – Geography (Flora & Fauna in Indian Forests)**

### Context

- Rare fungi species – **Blue Pinkgill Mushroom** and **Shuttlecock Mushroom** – were recently spotted in **Telangana forests**, marking significant biodiversity findings in the Eastern Ghats and Deccan plateau region.

### About the Newly Spotted Species

#### 1. Blue Pinkgill Mushroom (Entoloma hochstetteri)

- **Native Range:** Originally found in **New Zealand**; first sightings now reported in Telangana.
- **Unique Colour:** Its distinct **blue shade** comes from **azulene pigment** (rare in fungi but common in flowers like chamomile).
- **Location in Telangana:** Identified in **Kadamba Reserve Forest** and **Kagaznagar forest division**, regions known for rich **monsoon-driven fungal diversity**.
- **Ecological Significance:** Potential bio-indicator of forest health and climatic conditions.

#### 2. Shuttlecock Mushroom (Dictyophora indusiata / Phallus indusiatus)

- **Recorded in:** **Kawal Tiger Reserve, Telangana**.
- **Known Range Earlier:** Found in **Western Ghats** and western India – this is the **first confirmed sighting in the Eastern Ghats**.
- **Distinct Feature:** **Crisscross lattice-like netted structure**, resembling a shuttlecock.
- **Ecological Role:** The net structure helps in **efficient spore dispersal** by wind and insects.

### Significance of Discovery

- **Biodiversity Hotspot:** Highlights the underexplored **fungi wealth of Telangana forests**, especially during monsoon.
- **Ecological Role of Mushrooms:**
  - Decomposers in the food chain.
  - Maintain **soil fertility** by recycling nutrients.

- Some fungi have **medicinal and biotechnological uses**.
- **Conservation Value:** Expands the known distribution of rare fungi, contributing to **species mapping and ecological studies** in India.

### Conclusion (Keywords)

The spotting of **Blue Pinkgill** and **Shuttlecock mushrooms** in Telangana showcases India's **hidden fungal diversity**, underscores the importance of **forest ecosystem monitoring**, and reaffirms the need for **systematic biodiversity documentation** in lesser-studied regions like the Eastern Ghats.

## BIOTECHNOLOGY & HEALTH

### Compound 3b – Antibiotic Resistance Breakthrough (IIT-Roorkee)

#### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance & International Relations:** Health policies, international cooperation (WHO, GAP on AMR).
- ✓ **GS Paper III – Science & Technology, Environment:** Biotechnology, medical research, challenges of AMR.
- ✓ **GS Paper III – Economy:** Economic burden of diseases and healthcare.

### Context

Researchers at IIT-Roorkee have developed a promising new **drug candidate (Compound 3b)** that may play a pivotal role in the global fight against **Antimicrobial Resistance (AMR)**. The discovery is being hailed as a significant scientific step, given that AMR is considered one of the **top public health threats of the 21st century**.

### Key Highlights of the Discovery

- **Compound 3b and Meropenem:**
  - Works in combination with **Meropenem**, an existing antibiotic.
  - Specifically targets infections caused by **KPC-2-producing Klebsiella pneumoniae**, a **superbug classified by WHO as a top-priority threat**.
- **Mode of Action:**
  - Compound 3b belongs to the class of **β-lactamase inhibitors**.
  - **β-lactamase enzymes** break the **β-lactam ring**, a core chemical structure in antibiotics such as penicillins, carbapenems, and cephalosporins.
  - By blocking these enzymes, Compound 3b **prevents antibiotics from being degraded**, restoring their effectiveness.
- **Therapeutic Potential:**
  - Shows **strong results in pre-clinical models**.
  - Could provide a **lifeline against resistant infections** where current antibiotics fail.

### Understanding Antimicrobial Resistance (AMR)

#### Meaning

- **AMR occurs when bacteria, viruses, fungi, and parasites evolve resistance to antimicrobial medicines**—making standard treatments ineffective.

#### Global Consequences

- **Health Risks:** Minor infections could once again become fatal.
- **Economic Impact:** According to the **World Bank**, AMR could add **US \$1 trillion to global healthcare costs by 2050**.
- **Food Security Threats:** AMR affects not only human medicine but also agriculture and veterinary care.

#### Causes of AMR

- Industrial discharge from **Active Pharmaceutical Ingredients (APIs)**.
- **Untreated sewage, hospital waste, and landfill leachate**.
- Overuse and misuse of antibiotics in humans, animals, and crops.

#### Global Initiatives

- **One Health Approach:** Integrating human, animal, and environmental health perspectives.
- **WHO's Global Action Plan (2015):** Adopted by all member states to control AMR.
- National efforts: India's **National Action Plan on AMR (2017)** to reduce misuse and improve surveillance.

### Analytical Dimensions

#### 1. Scientific Significance

- Compound 3b represents a **new line of defense** against superbugs.
- Its combination approach (with Meropenem) reflects the **global trend of using drug cocktails** to outsmart bacterial resistance.

#### 2. Public Health Perspective

- AMR has been called a **“silent pandemic”**; new molecules like 3b can delay but not eliminate the threat.
- Emphasis must be on **antibiotic stewardship, hygiene, and prevention**.

#### 3. Economic & Strategic Angle

- AMR is not only a **health crisis but also an economic one**, with projected losses surpassing those of the 2008 financial crisis.
- Scientific innovation provides India an opportunity to **position itself as a leader in affordable healthcare R&D**.

#### 4. Ethical and Governance Issues

- Accessibility: Will the drug be made affordable and available globally?
- Regulation: Stronger policies needed for **industrial waste management and prescription control**.

### Contemporary Relevance

- India, being one of the **largest consumers and producers of antibiotics**, faces a dual challenge of **domestic misuse and pharmaceutical pollution**.
- Discoveries like Compound 3b enhance India's **scientific credibility** and contribute to **global health security**.
- In the larger framework of **SDG 3 (Good Health and Well-being)**, such innovations strengthen efforts toward **universal healthcare**.

### Conclusion – Keywords

Compound 3b marks a **scientific breakthrough in combating AMR**, but it must be coupled with **policy reforms, global cooperation, and responsible antibiotic use**. Without systemic interventions, AMR could undo decades of progress in medicine, making routine surgeries and infections once again life-threatening.

### UPSC Mains Practice Question

**Q. Antimicrobial Resistance (AMR) has been described as a “silent pandemic.” Discuss how innovations such as Compound 3b can contribute to tackling AMR, and examine the broader socio-economic and policy challenges in addressing the issue.**

### Ideonella sakaiensis – Plastic-Degrading Bacteria

#### ❖ Syllabus Mapping:

✓ GS Paper III – Environment & Ecology → Conservation, Pollution, Waste management.

✓ GS Paper III – Science & Technology → Biotechnology and its applications in waste management.

### Context

Wisdom leads to success

- Researchers have identified a bacterium **Ideonella sakaiensis**, capable of **biodegrading PET (Polyethylene Terephthalate)**, one of the most widely used plastics in bottles, containers, and food packaging.

### About Ideonella sakaiensis

- **Discovery:** Found in 2016 near a plastic bottle recycling facility in **Sakai, Japan**.

- **Nature:** A bacterium with the rare ability to **digest PET plastic**.

- **Mechanism:**

- Produces specialized enzymes – **PETase** and **MHETase**.
- These enzymes break down **PET into its monomers** (terephthalic acid and ethylene glycol).
- The bacterium then **utilizes these monomers as a food source**.

### Significance

#### 1. Environmental Impact:

- Offers a biological solution to the global **plastic pollution crisis**.
- Can help degrade **non-biodegradable plastic waste** that accumulates in oceans and landfills.

#### 2. Circular Economy:

- Enables **recycling of PET into raw material**, promoting **resource efficiency**.
- Potential to move from a **linear economy (produce-consume-discard)** to a **circular economy (reuse-recycle)**.

#### 3. Biotechnology & Innovation:

- Genetic engineering can enhance PETase efficiency for **industrial-scale applications**.
- Supports research in **synthetic biology** for waste-to-resource technologies.

### Challenges

- **Scalability:** Natural degradation is **slow**; industrial-level efficiency needs further bioengineering.
- **Selectivity:** Works mainly on PET; does not degrade other plastics like **Polyethylene, Polypropylene, Polystyrene**.
- **Implementation Costs:** Large-scale bioreactors and controlled environments are required.

### Contemporary Dimension

- **Recent Advances:** Scientists are working on **engineered “super enzymes”** (PETase + MHETase fusion proteins) for **faster degradation**.
- **Global Relevance:** Can complement international initiatives like **UN Plastic Pollution Treaty (2024 negotiations)** and India's **Plastic Waste Management Rules, 2016** (amended 2022).

### ✓ Conclusion (Keywords):

Ideonella sakaiensis highlights the **power of microbial solutions** in addressing one of the **21st century's biggest environmental challenges – plastic pollution**. With proper investment in **biotech innovation and scalable waste management systems**, it could be a **game-changer for sustainable development**.

## Animal Stem Cell Biobank – India's First in Veterinary Science

### ❖ Syllabus Mapping:

- ✓ **GS Paper III – Science & Technology:** Biotechnology, stem cell research, applications in medicine and agriculture.
- ✓ **GS Paper III – Economy:** Innovation in livestock and agricultural productivity.
- ✓ **GS Paper II – Governance:** Government initiatives in scientific research and innovation.

### Context

India has inaugurated its **first state-of-the-art Animal Stem Cell Biobank and Laboratory** at the **National Institute of Animal Biotechnology (NIAB), Hyderabad**. This facility marks a significant milestone in **veterinary biotechnology and regenerative medicine**, strengthening India's research ecosystem in livestock healthcare.

### About Animal Stem Cell Biobank

#### Key Features

- **Stem Cell Culture Unit:** For isolation and expansion of animal stem cells.
- **3D Bioprinter:** To design tissues and support **tissue engineering research**.
- **Bacterial Culture Lab:** For studying host-pathogen interactions.
- **Cryostorage Facilities:** Long-term preservation of valuable stem cell lines.

#### Significance

- Focuses on **regenerative medicine** and **cellular therapies for livestock**.
- Provides resources for advanced research in **disease modelling, drug testing, and tissue engineering**.
- Supports development of **cloning technologies and genetic improvement** in animal husbandry.

### Institutional Support

- **Supported by:** National Biopharma Mission (NBM) of the Department of Biotechnology, under BIRAC (Biotechnology Industry Research Assistance Council).
- **About NBM:**
  - Approved in 2017.
  - Industry-Academia Collaborative Mission.
  - Objective: Accelerating **biopharmaceutical development** in India.
  - Strengthens **public-private partnerships** in innovation.

### Analytical Dimensions

#### 1. Scientific Importance

- Animal stem cells can be used to study **disease progression and vaccine development**.
- Promotes research in **xenotransplantation, genetic editing, and reproductive health** of livestock.

### 2. Economic Significance

- Livestock contributes ~4.5% of India's GDP.
- Stem cell-based solutions can reduce losses from **animal diseases**, improving productivity and farmer income.

### 3. Global Competitiveness

- India joins a select group of countries investing in **animal stem cell biotechnology**.
- Enhances India's role in **One Health initiatives** by linking **human, animal, and environmental health**.

### 4. Challenges Ahead

- Ethical and regulatory frameworks for use of **animal genetic resources**.
- Ensuring **affordable access** of innovations to farmers.
- Bridging the gap between **research labs and field-level applications**.

## Contemporary Relevance

- As climate change and emerging diseases threaten animal populations, **stem cell technology** offers tools for **resilience and adaptation**.
- Strengthens India's goals of becoming a **biotech innovation hub**, aligned with **Atmanirbhar Bharat**.
- Promotes **SDG 2 (Zero Hunger)** and **SDG 3 (Good Health and Well-being)** by enhancing food security and public health.

## Conclusion – Keywords

The **Animal Stem Cell Biobank** represents a pioneering step in **veterinary biotechnology**, bridging innovation with agriculture. By combining **regenerative medicine, disease modelling, and tissue engineering**, it strengthens India's commitment to **sustainable livestock development and global biotechnology leadership**.

### UPSC Mains Practice Question

**Q. "The inauguration of India's first Animal Stem Cell Biobank is a milestone in veterinary biotechnology." Discuss its scientific, economic, and ethical significance for India's livestock sector.**

## National Medical Register – Transparency in Healthcare

### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Health policy, institutions, reforms.
- ✓ **GS Paper II – Polity:** Regulatory bodies, NMC Act.
- ✓ **GS Paper III – Science & Tech (Applications in Health):** Data governance, digital health infrastructure.

## Context

IQRA  
Wisdom leads to success

The Union Minister clarified that **registration under the National Medical Register (NMR) is voluntary**. This announcement comes amid discussions on **transparency, duplication removal, and public trust in healthcare professionals**.

## About National Medical Register

- **Legal Basis:** Section 31(1) of the **National Medical Commission Act, 2019**.
- **Maintained by:** Ethics and Medical Registration Board (EMRB).
- **Content:**
  - Name and address of medical practitioners.
  - All recognized medical qualifications.
  - Status of license validity.
- **Purpose:**
  - To serve as a **dynamic, authentic, and single database** of all allopathic registered doctors in India.
  - Avoid duplication of registrations across states.
  - Enable **public access to information** about qualified doctors.

## Features of the Register

1. **Dynamic Database**
  - Continuously updated with new registrations, license renewals, and cancellations.
2. **Accessibility**
  - General public can view basic details.

- Sensitive details restricted to **authorized individuals/institutions** (e.g., hospitals, regulators).

### 3. Digital Health Integration

- Supports government's **Digital Health Mission** and **telemedicine initiatives** by verifying doctors' credentials online.

## Significance

- **Transparency:** Enhances accountability of medical professionals.
- **Public Trust:** Patients can verify if a doctor is legally registered.
- **Regulatory Efficiency:** Prevents duplication between state medical councils and NMC.
- **Policy Use:** Helps in mapping **doctor-population ratios**, identifying shortages, and planning health workforce distribution.

## Challenges

- **Voluntary Registration:** May lead to incomplete data coverage.
- **Data Privacy Concerns:** Balancing **public transparency** and **doctor confidentiality**.
- **Digital Divide:** Ensuring all state councils update data promptly.

## Tags in Context

- **National Medical Register:** Centralized database for allopathic doctors in India.
- **National Medical Commission Act, 2019:** The parent legislation that replaced the **Medical Council of India (MCI)** with **NMC**, aiming at reforms in medical education, ethics, and regulation.

## Contemporary Relevance

- Strengthens **Ayushman Bharat Digital Mission (ABDM)**.
- Supports **telemedicine growth** post-COVID.
- Helps tackle quackery by **weeding out unregistered practitioners**.

## Conclusion – Keywords

The **National Medical Register** is a step toward **healthcare transparency, accountability, and efficient workforce management**. However, for it to be effective, **mandatory registration and stronger digital integration** are essential.

### UPSC Mains Practice Question

**Q. The National Medical Register has been hailed as a tool for transparency in healthcare but criticized for being voluntary. Critically examine its role in strengthening India's health governance.**

## SHRESTH Initiative – Uplifting Marginalised Students

### 📌 Syllabus Mapping:

✓ **GS Paper II – Governance & Health Policy:** Regulatory mechanisms, institutional strengthening.

✓ **GS Paper III – Science & Tech, Economy:** Drug regulation, healthcare quality standards.

## Context

- The Union Health Ministry has launched the **State Health Regulatory Excellence Index (SHRESTH)** to evaluate and enhance the performance of state drug regulatory systems.

## About SHRESTH

- **Proposed by:** Central Drugs Standard Control Organization (**CDSO**).
- **Objective:** To **benchmark** state drug regulatory authorities, driving improvement in drug safety and quality enforcement across India.
- **Approach:** Introduces **indices** to monitor state-level performance, encourage competition, and identify gaps.

## Key Features of SHRESTH

- **Performance Indices based on 5 Themes:**
  1. **Human Resources** – Adequacy, training, and expertise of regulators.
  2. **Infrastructure** – Labs, testing facilities, digital platforms.
  3. **Licensing Activities** – Efficiency and transparency in granting licenses.
  4. **Surveillance Activities** – Monitoring, inspections, and crackdown on spurious drugs.

5. **Responsiveness** – Quick resolution of complaints and adaptability to emerging challenges.

### Significance

- **Uniform Standards:** Ensures states follow consistent **drug safety norms**.
- **Public Health Protection:** Reduces circulation of **spurious/substandard drugs**.
- **Capacity Building:** Improves **skills and resources** of state regulators.
- **Accountability & Transparency:** Encourages **healthy competition** among states, similar to ease of doing business indices.
- **Global Recognition:** Enhances India's credibility in the **pharmaceutical supply chain**, supporting "Pharmacy of the World" status.

### Tags (with context)

- **SHRETH Initiative** → A national index to strengthen drug regulatory systems.
- **Central Drugs Standard Control Organization (CDSCO)** → Apex national regulatory body overseeing drug safety, licensing, and enforcement in India.

### ✓ Conclusion (Keywords):

The **SHRETH Initiative** is a step towards **strengthening drug regulatory governance**, ensuring **drug safety, quality, and accountability** across India. It aligns with the broader vision of **accessible, affordable, and reliable healthcare**, reinforcing India's role in global pharmaceutical standards.

## Envelope Dimer Epitope (EDE) – Dengue Immunity Insight

### 📌 Syllabus Mapping:

✓ GS Paper II – Health & Immunity (Public Health, Disease Control)

✓ GS Paper III – Science & Technology (Biotechnology, Vaccines, Immunology)

### Context

- Researchers have identified **envelope dimer epitope (EDE)** specific antibodies as a breakthrough in understanding **dengue immunity**, with implications for vaccine development and therapeutic interventions.

### About Envelope Dimer Epitope (EDE)

- **Dengue Virus Surface:** The dengue virus has **Envelope (E) proteins** on its outer surface.
- **Dimer Formation:** These E proteins are arranged in **pairs (dimers)**.
- **EDE Structure:** At the **junction of the two E proteins**, a unique **3D structure** is formed, called the **Envelope Dimer Epitope (EDE)**.
- **EDE Antibodies:**
  - Specialized antibodies that target this epitope.
  - **Neutralisation Effect:** They bind to this site and prevent the dengue virus from infecting host cells.

### Significance

1. **Understanding Immunity**
  - EDE antibodies are cross-reactive, capable of neutralising **multiple dengue virus serotypes (DENV-1 to DENV-4)**.
  - Helps explain why **some individuals develop long-lasting immunity** after infection.
2. **Vaccine Development**
  - Traditional vaccines face challenges due to **antibody-dependent enhancement (ADE)**, where partial immunity can worsen reinfection.
  - Targeting **EDE** may provide a **broad-spectrum dengue vaccine**.
3. **Therapeutic Potential**
  - EDE-based monoclonal antibodies could be developed into **therapeutic drugs** for dengue patients.
4. **Public Health Relevance**
  - Dengue remains a **global health threat** with 390 million infections annually.
  - Breakthroughs like EDE can improve **pandemic preparedness** against mosquito-borne viral diseases.

### Conclusion (Keywords)

The discovery of the **Envelope Dimer Epitope (EDE)** provides a **scientific breakthrough** in understanding **dengue virus immunity**. By enabling **cross-serotype neutralisation** and offering a pathway for **broad-spectrum vaccines and therapeutics**, it represents a **transformative step in global dengue control strategies**.

## SCIENCE & TECHNOLOGY

### CATCH Program – AI for Next-Gen Cancer Care

#### ❖ Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Government schemes, health sector reforms, digital governance.
- ✓ **GS Paper III – Science & Technology:** Artificial Intelligence, biotechnology, healthcare innovation.
- ✓ **GS Paper II – Social Justice:** Public health, equitable healthcare access.

#### Context

The **IndiaAI Mission**, a flagship initiative of the **Ministry of Electronics and Information Technology (MeitY)**, has launched the **Cancer AI & Technology Challenge (CATCH) Grant Program**. This programme seeks to accelerate the deployment of **AI-powered cancer solutions** across India, with an emphasis on **scalability, affordability, and clinical validation**.

#### About the CATCH Grant Program

- **Purpose:** To fast-track validation and deployment of AI solutions in cancer care, covering prevention, diagnosis, treatment, and survivorship.
- **Collaboration:** Jointly launched with the **National Cancer Grid (NCG)** – India's largest oncology network, linking **300+ cancer centres** nationwide.
- **Support to Innovators:**
  - Pilot funding up to ₹50 lakhs, milestone-based.
  - Mentorship support from experts in oncology and AI.
  - Access to clinical validation sites via the NCG network.
  - Opportunity to scale solutions across IndiaAI-supported public platforms.

#### Significance

##### 1. Healthcare Transformation

- AI tools can aid in **early detection, personalised treatment planning, and predictive analytics** in cancer care.
- Reduces burden on overstretched oncologists and healthcare facilities.

##### 2. Bridging Gaps in Cancer Care

- India faces rising cancer incidence (1.4 million new cases annually).
- Shortage of trained oncologists and pathologists hampers timely treatment.
- AI-enabled tools can ensure **faster diagnostics in rural and underserved areas**.

##### 3. Digital Health Ecosystem

- Strengthens India's **Digital Health Mission** by integrating AI into **Ayushman Bharat Digital Health Mission (ABDM)** frameworks.
- Encourages **public-private collaboration** in cutting-edge health innovation.

##### 4. Global Competitiveness

- Positions India as a **hub for affordable AI-driven health solutions**, with potential for global deployment, especially in low- and middle-income countries.

#### Analytical Dimensions

- **Governance Perspective:** Reflects India's shift towards **evidence-based, technology-driven health policy**.
- **Economic Angle:** Incentivises Indian startups and researchers in AI-healthcare space, supporting **innovation-led growth**.
- **Ethical Considerations:** Raises issues of **data privacy, algorithmic bias, and equity in access** to advanced cancer care.
- **Comparative Lens:** Similar AI-for-health challenges have been launched in the U.S. and EU, but India's programme uniquely focuses on **low-cost, scalable, and rural-friendly models**.

#### Contemporary Relevance

- Cancer is the **second leading cause of death** in India after cardiovascular diseases.

- The CATCH Grant Programme, by **democratising AI-driven cancer care**, supports India's goals of **Universal Health Coverage (UHC)** and **SDG 3 (Good Health and Well-being)**.
- Comes at a time when **AI regulation and ethics frameworks** are being developed globally, adding urgency to India's innovation ecosystem.

### Conclusion – Keywords

The **CATCH Grant Program** exemplifies the **fusion of AI and public health**, bridging gaps in India's cancer care system. By enabling **innovation, validation, and scale-up**, it holds promise to **redefine cancer treatment pathways** and strengthen India's position as a **global leader in affordable health innovation**.

### UPSC Mains Practice Question

**Q. Artificial Intelligence (AI) is being increasingly deployed in healthcare. Critically examine the potential of initiatives like the CATCH Grant Program in addressing India's cancer burden, while analysing the ethical and regulatory challenges involved.**

## Eutelsat OneWeb – India's Digital Infrastructure Boost

### 📌 Syllabus Mapping:

- ✓ **GS Paper II – Governance:** Digital infrastructure and connectivity.
- ✓ **GS Paper III – Science & Tech:** Space technology and applications.
- ✓ **GS Paper III – Security:** Cybersecurity, national security dimensions.

### Context

- **Nelco (Tata Group company)** has partnered with **Eutelsat OneWeb** to provide **LEO satellite-based broadband connectivity across India**.
- This is significant for bridging India's digital divide, enhancing strategic communication networks, and supporting Digital India goals.

### About Eutelsat OneWeb

- **Parent Company:** Subsidiary of **Eutelsat (France)**.
- **Service:** Provides broadband Internet services through a **Low-Earth Orbit (LEO) satellite constellation**.
- **Orbit Range:** LEO satellites operate at altitudes  $\leq 2,000$  km from Earth.
- **Indian Connection:**
  - **Bharti Enterprises** is a **major investor and shareholder** in OneWeb.
  - Partnership with **Nelco** expands coverage across India.

### Significance of Eutelsat OneWeb in India

#### 1. Digital Connectivity

- Provides **high-speed Internet** in remote and underserved regions.
- Supports India's **BharatNet project** and **last-mile digital inclusion**.

#### 2. National Security

- Enhances **secure communication systems** for defence and disaster management.
- Reduces dependence on foreign Internet infrastructure.

#### 3. Economic Growth

- Enables reliable Internet for **rural enterprises, SMEs, and startups**.
- Boosts sectors like **edtech, telemedicine, fintech, and logistics**.

#### 4. Strategic Technology Advancement

- Strengthens India's role in the **global space-tech ecosystem**.
- Complements ISRO's **satellite programs** and India's **Gaganyaan mission**.

### Challenges

- **Regulatory hurdles:** Licensing and spectrum allocation issues.
- **Cybersecurity risks:** Vulnerability of satellite Internet systems.
- **Affordability:** High infrastructure and subscription costs may limit rural access.

- **Competition:** From Starlink (SpaceX), Amazon's Project Kuiper, and India's own satellite broadband initiatives.

### Contemporary Relevance

- Aligns with India's **National Digital Communications Policy (NDCP)** and **Digital India 2.0** vision.
- Supports **internationalization of Rupee-based trade** via improved financial connectivity.
- Key in achieving **UN SDG 9 (Industry, Innovation & Infrastructure)**.

### Conclusion – Keywords

The **Eutelsat OneWeb–Nelco partnership** is a step toward **universal digital access, rural empowerment, and national security strengthening**. By bridging connectivity gaps, it enhances India's **digital sovereignty, innovation, and global space-tech leadership**.

### UPSC Mains Practice Question

**Q. Satellite Internet through initiatives like Eutelsat OneWeb can be a game-changer for India's digital future. Critically evaluate its opportunities and challenges in the Indian context.**

## EO Satellite Constellation – India's First Commercial Build

### ❖ Syllabus Mapping:

- ✓ GS Paper II – Governance, International Relations (Technology & PPP in space policy)
- ✓ GS Paper III – Science & Technology, Infrastructure, Disaster Management
- ✓ Essay – Emerging Technologies, India's Space Economy

### Context

- The **Indian National Space Promotion and Authorization Centre (IN-SPACe)** has selected a PixxelSpace India-led consortium of four private firms to build India's first fully indigenous commercial Earth Observation (EO) satellite constellation.
- Other consortium members: Piersight Space, Satsure Analytics India, and Dhruva Space.

### About the Programme

#### ◆ Technology Features

- **12 Satellites** with all-weather, day-night imaging capacity.
- Equipped with **panchromatic, multispectral, hyperspectral sensors**, and **Synthetic Aperture Radar (SAR)**.
- High-resolution, frequent, and multi-band monitoring → boosts **geospatial intelligence**.

#### ◆ PPP Model

- **Government Role:** Provides strategic, technical, and policy support.
- **Private Sector Role:** Own and operate EO systems (satellite manufacturing, Indian launches, ground infra, and data commercialisation).

#### ◆ Applications

- **Climate change monitoring**
- **Disaster management** (floods, cyclones, earthquakes, landslides)
- **Agriculture planning & precision farming**
- **Urban planning & infrastructure development**
- **Geospatial intelligence & defence surveillance**

#### ◆ Deployment Tenure

- Full constellation deployment expected within **4 years**.

## India's Private Space Industry – Snapshot

- **Economic Size:** \$8 billion (2025) → projected \$100 billion by 2040 (PwC, ISPA estimates).
- **Rising Private Sector:** Over **200+ space startups** (examples: Pixxel, Skyroot, Agnikul, Dhruva Space).
- **Recent Milestone:** Vikram-S rocket (Mission Prarambh) – India's first private launch (2022).
- **Institutional Support:**
  - IN-SPACe (promotes private participation).
  - Indian Space Policy 2023 (regulatory clarity & stability).

- **FDI liberalisation:** 100% FDI allowed in space manufacturing.
- **₹1,000 crore Venture Capital Fund** for space startups.

### Significance of the Initiative

- **Technological Leap:** First indigenous commercial EO constellation – enhances **self-reliance** in space-based data.
- **Economic Value:** Strengthens India's share in the **global EO data & analytics market**.
- **Security & Strategy:** Improves **border monitoring, maritime surveillance**, and reduces dependence on foreign EO satellites.
- **Climate & Development Goals:** Supports **SDGs, climate resilience, and sustainable agriculture**.
- **Private Sector Boost:** Demonstrates India's shift from an ISRO-dominated ecosystem to a **public-private partnership model**.

### ✓ Conclusion (Keywords):

The launch of India's first commercial EO satellite constellation under a **PPP model** reflects the **Atmanirbhar push in space technology**, enhances **climate resilience, disaster preparedness, and strategic autonomy**, while **unlocking India's \$100 billion space economy potential by 2040**.

## NASA's Orbiting Carbon Observatory (OCO)

### 📌 Syllabus Mapping:

- ✓ GS Paper I – Geography (Climate, Environmental Monitoring)
- ✓ GS Paper III – Environment (Climate Change, Technology, Conservation)
- ✓ GS Paper II – International Relations (Global Climate Policy & Cooperation)

### Context

- The Trump administration announced plans to **shut down NASA's OCO missions**, which play a critical role in **tracking CO<sub>2</sub> levels and monitoring plant health**.
- This raises concerns for **climate science, food security, and policymaking**, as these missions are among the most precise carbon monitoring systems in the world.

### About the Missions

- **Launch History:**
  - OCO-2 launched in **2014**.
  - OCO-3 deployed in **2019** as an instrument aboard the **International Space Station (ISS)**.
- **Technology:**
  - Based on **Hubble-like technology** for precision.
  - Considered the **most sensitive and accurate CO<sub>2</sub> monitoring systems** globally.

### Importance of OCO Missions

#### 1. Carbon Tracking

- Provide global mapping of **CO<sub>2</sub> emissions and absorption**.
- **Findings:**
  - **Amazon Rainforest:** Now emits more CO<sub>2</sub> than it absorbs due to deforestation and wildfires.
  - **Boreal Forests** (Canada, Russia) and **melting permafrost regions:** Act as major CO<sub>2</sub> absorbers.

#### 2. Plant Health Monitoring

- Detect **photosynthesis "glow"**, which indicates plant health.
- Crucial for:
  - Monitoring **drought impacts**.
  - Predicting **food shortages** and agricultural stress.

### Why OCO Shutdown Matters

- **Scientific Gap:** Loss of **high-resolution CO<sub>2</sub> data** essential for IPCC climate models.
- **Policy Impact:** Affects **Paris Agreement monitoring** and **carbon neutrality commitments**.
- **Agriculture & Food Security:** Without OCO, early warning on **crop failures and droughts** weakens.
- **Global Governance:** May reduce U.S. credibility in **climate leadership** and scientific cooperation.

### Contemporary Relevance

- Climate diplomacy is at the center of **COP summits**, and accurate CO<sub>2</sub> data is a strategic resource.
- India has also invested in **ISRO's carbon monitoring satellites** (e.g., **INSAT-3DR, Megha-Tropiques**) but still depends on global data-sharing.
- **Private sector satellites** (e.g., Planet Labs, GHGSat) are emerging alternatives but raise **data sovereignty concerns**.

### Conclusion (Keywords)

The **Orbiting Carbon Observatory (OCO)** missions are **cornerstones of climate monitoring**, offering unparalleled accuracy in tracking **carbon emissions and plant health**. Their potential shutdown highlights the **tension between politics and climate science**, underlining the urgent need for global cooperation, open data sharing, and indigenous capacity building in carbon monitoring.

## Indian Aquanauts – Historic Deep-Dive Milestone

### 📌 Syllabus Mapping:

- ✓ GS Paper III – Science & Technology (Developments & Applications)
- ✓ GS Paper I – Geography (Physical Geography: Oceans, Marine Resources)
- ✓ GS Paper II – Governance (Government Schemes: Missions & Initiatives)

### Context

- On **16 August 2025**, two **Indian aquanauts** successfully dived to **4,025 m and 5,002 m depths** in the **Atlantic Ocean**, aboard the French submersible **Nautile** in collaboration with **IFREMER (France's marine research institute)**.
- This makes **India one of the few nations** capable of deep-sea human exploration.
- The dive is a **precursor to India's Samudrayaan Mission** under the **Deep Ocean Mission**.

### Key Highlights

#### ➲ The Dive

- **Depths achieved:** 4,025 m & 5,002 m.
- **Platform:** French submersible **Nautile**.
- **Collaboration:** IFREMER (France) + National Institute of Ocean Technology (NIOT), Chennai.

#### 🚀 Samudrayaan Mission (Flagship of Deep Ocean Mission)

- **Goal:** Send three Indian aquanauts to **6,000 m depth** by 2027.
- **Vehicle:** **MATSYA-6000**, India's first indigenously developed scientific submersible.
  - **Operational endurance:** 12 hours.
  - **Emergency endurance:** Up to 96 hours.
  - **Fourth-generation deep-sea submersible.**

#### 🌐 Deep Ocean Mission (DOM)

- **Launched:** 2021 (Ministry of Earth Sciences).
- **Budget:** ₹4,077 crore (2021–2026).
- **Objectives:**
  - Develop technologies for **deep ocean exploration**.
  - Support **Blue Economy** (marine resources, energy, biodiversity).
  - Address **climate change** & marine **pollution**.
- **Components:**
  1. **Samudrayaan Submersible** development.
  2. Exploration of **polymetallic nodules** (nickel, cobalt, copper, manganese).
  3. Development of **deep-sea mining technologies**.
  4. Studies on **climate & marine biodiversity**.
  5. Advanced **marine biotechnology**.
  6. Creation of **manpower & infrastructure**.

#### ➲ National Deepwater Exploration Mission (2025)

- Announced by the PM recently.
- Focused on **oil & gas exploration in deep seas**, complementing DOM.

## Significance for India

- **Strategic Autonomy:** Reduces dependence on foreign tech for deep-sea mining & energy.
- **Blue Economy:** Unlocks potential of \$5 trillion economy contribution (fisheries, minerals, biotechnology).
- **Climate Research:** Enhances understanding of ocean's role in **carbon sequestration** & climate regulation.
- **Global Standing:** Places India in elite club with USA, France, Japan, Russia, and China.
- **Technology Push:** Indigenous development boosts **Atmanirbhar Bharat**.

## Challenges

- **Environmental Concerns:** Risk of disturbing fragile deep-sea ecosystems.
- **High Cost & Risks:** Human safety at extreme pressure depths.
- **International Governance:** Need compliance with **UNCLOS** & regulations of **International Seabed Authority (ISA)**.

## Conclusion (Keywords)

The **deep-dive by Indian aquanauts** marks a **watershed moment in India's marine research journey**. With **Samudrayaan & Deep Ocean Mission**, India is steering towards becoming a **deep-sea technology leader**, balancing **economic potential, strategic interests, and environmental sustainability**.



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