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POLITY AND GOVERNANCE

Ladakh Notifies New Policies on Reservation and Domicile Status

Source: The Hindu

https://www.thehindu.com/news/national/ladakh/mha-notifies-new-policies-for-union-territory-of-ladakh-that-determine-domicile-tag/article69651171.ece

UPSC Relevance: GS-2 Polity and Governance

Context:

Ladakh Gets New Policies

Why in News

Recently, the Union Government notified a set of four new regulations for the Union Territory of Ladakh.

Introduction

- In response to growing demands from Ladakhi civil society groups for constitutional safeguards following the revocation of Article 370 in August 2019, the Union Government on June 3, 2025, notified a set of regulations concerning reservation policy, domicile status, recruitment rules, composition of hill councils, and official languages in the Union Territory of Ladakh.
- These notifications mark the most comprehensive administrative framework introduced in Ladakh since its creation as a separate UT.

Key Notifications Issued:

The following regulations were notified by the President of India:

1. Ladakh Reservation (Amendment) Regulation, 2025
2. Ladakh Civil Services Decentralisation and Recruitment (Amendment) Regulation, 2025
3. Ladakh Official Languages Regulation, 2025
4. Ladakh Autonomous Hill Development Councils (Amendment) Regulation, 2025

Reservation Policy in Government Employment:

- The Union Territory of Ladakh has raised the reservation quota in government employment to **85%** for resident Ladakhis.
- With an additional 10% reservation for the Economically Weaker Sections (EWS), the total reservation now stands at **95%**, among the highest in the country.
- This amends the earlier cap of 50% as per the Jammu and Kashmir Reservation Act, 2004.
- While the official category-wise breakdown is awaited through Rules, preliminary details discussed with local leaders include:
  - **80% for Scheduled Tribes (STs)**
  - **4% for residents along the Line of Actual Control (LAC) or Line of Control (LoC)**
  - **1% for Scheduled Castes (SCs)**
  - **10% for Economically Weaker Sections (EWS)**

According to the 2011 Census, approximately 80% of Ladakh's 2.74 lakh population is classified as tribal, justifying the high proportion reserved for STs.

Domicile Policy:

The domicile policy is governed by amendments to the Jammu and Kashmir Civil Services Decentralisation and Recruitment Act, 2010, as applicable to Ladakh.

To qualify as a domicile of Ladakh for the purposes of government recruitment:

- A person must have resided continuously for **15 years** in Ladakh since **October 31, 2019**, which is the date Ladakh was established as a Union Territory.
- Alternatively, those who have studied in Ladakh for at least **7 years** and appeared in **Class 10 or Class 12 board examinations** there are also eligible.
- Children of Central government employees, All India Services officers, employees of public sector undertakings and autonomous bodies, and public sector bank officials who have served in Ladakh for **10 years since October 31, 2019**, are also eligible.

The Tehsildar of the concerned area is the designated authority to issue domicile certificates.

Reservation for Women in Hill Councils:

The amendment to the **Ladakh Autonomous Hill Development Councils Act, 1997** provides for:

- Reservation of **not less than one-third** of the total number of seats in each hill council for **women**.
- These reserved seats will be **rotated** among different territorial constituencies in successive elections.
- This reform aims to increase political participation and representation of women in local governance.

Official Language Policy:

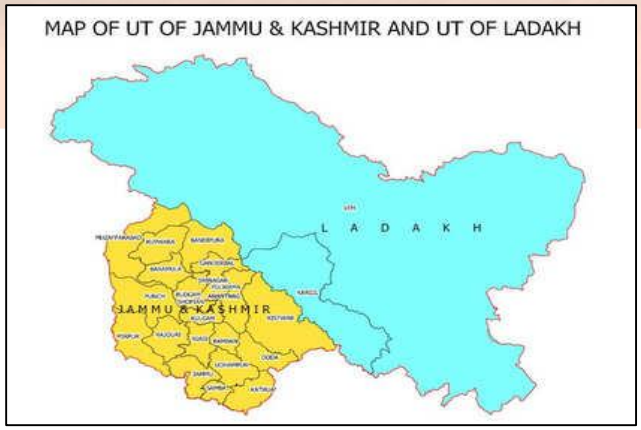
Under the **Ladakh Official Languages Regulation, 2025**, the following languages are declared as **official languages** of the Union Territory:

- English
- Hindi
- Urdu
- Bhoti
- Purgi

In addition, institutional mechanisms will make **special efforts to promote and develop** other native languages of Ladakh, including:

- **Shina (Dardic)**
- **Brokskat (Dardic)**
- **Balti**
- **Ladakhi**

This move reflects cultural sensitivity and linguistic inclusiveness in Ladakh's governance framework.



Background and Civil Society Demands:

Following the **reading down of Article 370** and the creation of Ladakh as a separate Union Territory in August 2019, initial jubilation gave way to concerns regarding the preservation of local identity, land rights, and employment opportunities.

Prominent regional bodies such as the **Leh Apex Body (LAB)** and the **Kargil Democratic Alliance (KDA)** led mass protests and shutdowns to press for the following demands:

1. **Statehood for Ladakh**
2. Inclusion of Ladakh in the **Sixth Schedule of the Constitution** to grant special protections for tribal areas
3. **Job reservations** for locals
4. **Separate Lok Sabha seats** for Leh and Kargil

In January 2023, the Ministry of Home Affairs constituted a **High-Powered Committee** headed by the Minister of State for Home, Nityanand Rai, to deliberate on these issues. The committee last met on May 27, 2025, and subsequently met with Home Minister Amit Shah.

Significance of the Notifications:

- These policy changes address longstanding **regional aspirations** for protection of employment, land, and cultural rights.
- By institutionalising **high reservation quotas**, **domicile rules**, and **language promotion**, the government aims to ensure the **socio-economic empowerment** of Ladakhis.
- The inclusion of **rotational reservation for**

women in hill councils is a notable step toward **gender-inclusive governance**.

- The move balances **national integration** with **local autonomy**, particularly in a strategically sensitive region bordering China and Pakistan.

Challenges and Way Forward:

- While job and domicile concerns have been addressed, the demand for **Statehood** and inclusion in the **Sixth Schedule** remains unfulfilled.
- The success of the new regulations will depend on **efficient rule-making, transparency in implementation**, and **institutional capacity-building** at the UT level.
- Regular consultations with local stakeholders will be critical to sustain peace, trust, and governance in the region.

No Contempt for Lawmaking: Supreme Court Clarifies on Legislature's Role

Source: The Hindu

https://www.thehindu.com/news/national/no-contempt-if-parliament-legislatures-simply-make-laws-supreme-court/article69653366.ece

UPSC Relevance: GS2 Polity and Governance

Context:

No Contempt for Lawmaking

Why in News

The Supreme Court of India clarified that no law made by Parliament or a State Legislature can be held as contempt of court.

Introduction

- Recently, the **Supreme Court of India** clarified that **no law made by Parliament or a State legislature can be held as contempt of court merely for legislating**, even if it appears to contradict a previous judicial direction.
- This observation was made while disposing of a **2012 contempt petition** filed by sociologist **Nandini Sundar** and others regarding the **Chhattisgarh government's support to vigilante groups** like **Salwa Judum** and the use of **Special Police Officers (SPOs)** in anti-Naxal operations.

Background of the Case

- In **2011**, the Supreme Court had ordered the **Chhattisgarh government** to **cease support to vigilante groups** and **disarm SPOs**, citing serious concerns about human rights and unconstitutional actions.
- Despite this, the **Chhattisgarh Auxiliary Armed Police Force Act, 2011** was passed to **regularize SPOs** and grant them legal status, effectively legitimizing the very force the court had disapproved.
- The **petitioners alleged contempt of court**, arguing that the **State government defied the 2011 judgment** by passing this law.

Key Observations by the Supreme Court

Legislation Not Contempt

- "Any law made by Parliament or a State Legislature cannot be held as contempt of court simply by enacting it."
- The **court emphasized the legislature's plenary powers** under the Constitution to make or amend laws.
- Unless such a law is **struck down as unconstitutional** by a competent court, it **holds the force of law**.

Judicial Review Is the Correct Remedy

- If a citizen or petitioner feels that a law **violates constitutional provisions**, the appropriate remedy is to **challenge the law on grounds of constitutional validity or legislative competence**, not to allege contempt.

Doctrine of Separation of Powers

- The **verdict reinforced the separation of powers**, a basic feature of the Constitution:
  - **Legislature**: empowered to make/amend laws.
  - **Judiciary**: empowered to interpret laws and test their constitutionality.
- A legislature can **enact laws to override the basis of a judicial decision**, but this **does not amount to contempt**, unless it violates constitutional provisions.

Implications of the Judgment

Reinforces Legislative Supremacy within Constitutional Bounds

- Legislatures retain the **freedom to pass laws**, even in response to judicial decisions, as long as **due process and constitutional limits are respected**.

Defines Limits of Contempt Jurisdiction

- The judgment limits the **scope of contempt proceedings** against elected bodies, **preventing judicial overreach** into legislative functions.

Maintains Checks and Balances

- The ruling promotes **institutional harmony** and avoids confrontation between the judiciary and legislature by upholding **constitutional boundaries** of each organ.

Guidance on Legal Remedies

- Citizens are guided to use **judicial review mechanisms** to challenge the validity of laws, rather than relying on contempt petitions.

Key Constitutional Provisions Involved

Provision	Description
Article 129 & 215	Empower the SC and HCs respectively to punish for contempt of themselves.
Article 245-246	Deal with legislative powers of Union and States.
Article 13	Allows judicial review of laws inconsistent with Fundamental Rights.
Article 315	Deals with public service commissions, invoked by the court in emphasizing State responsibility.
Doctrine of Separation of Powers	Implicit in the Constitution, ensuring mutual respect and balance between the organs of government.

Conclusion

- The Supreme Court's ruling in the Nandini Sundar contempt petition marks a **significant reaffirmation of the doctrine of separation of powers**.
- It clarifies that **legislative acts cannot be treated as contempt of judicial directions**, reinforcing **institutional balance** in a constitutional democracy.
- However, it also underscores that **legislation is not immune from judicial scrutiny**, and any aggrieved party must pursue **constitutional remedies through judicial review** rather than invoking contempt jurisdiction.

Election Commission to upgrade VTR sharing process

Source: PIB

https://www.pib.gov.in/PressReleseDetail.aspx?PRID=2133568

UPSC Syllabus Relevance: **GS2- Polity and Governance**

Context:

ECI's ECINET Initiative

Why in News

The Election Commission of India (ECI) has introduced a streamlined, technology-driven system through the ECINET App.

Introduction

- The Election Commission of India (ECI) has launched a new, technology-enabled mechanism to streamline the reporting of approximate voter turnout trends.
- This system aims to reduce delays, enhance transparency, and address misperceptions

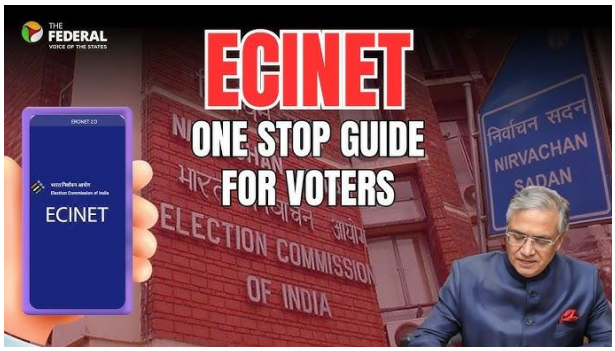
arising from earlier reporting lags.

Background:

- Under **Rule 49S of the Conduct of Elections Rules, 1961**, Presiding Officers (PROs) are mandated to furnish **Form 17C** to polling agents, detailing the number of votes recorded.
- While the statutory reporting remains unchanged, the **Voter Turnout (VTR) App**, previously used to provide **non-statutory, indicative turnout data**, faced delays due to manual processes.

Previous Challenges:

- Turnout data was collected by **Sector Officers** and passed to **Returning Officers (ROs)** via phone/SMS.
- This led to a **4–5-hour delay** in updating turnout figures on the VTR App.
- **Polling percentage trends** were often made public late in the night or the next day, leading to confusion and misinterpretation of polling trends.



New Initiative: ECINET App Integration

- **Direct Entry by PROs:** Now, **Presiding Officers at each polling station** will enter turnout data **every two hours** via the **ECINET App**.
- **Automated Aggregation:** The data will be automatically aggregated at the **constituency level**.
- **Real-Time Updates:** Approximate voting percentage trends will continue to be published **every two hours** during polling day.
- **Post-Poll Update:** PROs must update final voter turnout data on ECINET **immediately after polling ends**, before leaving the polling station.
- **Offline Support:** Where mobile networks are unavailable, data entry can be done offline and synced once connectivity is restored.

Benefits:

- **Reduces time lag** in publishing voter turnout trends.
- **Enhances transparency** and public trust in electoral processes.
- **Prevents misinformation** or speculation based on outdated turnout figures.
- **Supports data-driven electoral management** by the ECI.

Way Forward:

- The updated VTR mechanism will be fully integrated into **ECINET before the Bihar Assembly elections**, ensuring smoother voter data management.
- Continuous **capacity building** of election officials and **network infrastructure support** at polling booths will be key for effective implementation.

Conclusion:

- This digital shift marks a significant stride in India's electoral administration. By empowering Presiding Officers with real-time tools and leveraging ECINET, the Election Commission reinforces its commitment to **transparent, timely, and citizen-centric governance** during elections.

Census 2027 to Include Caste Data for First Time in Nearly a Century

Source: Indian Express

https://indianexpress.com/article/india/caste-census-2026-two-phases-10048021/

UPSC Relevance: GS-2 Polity and Governance

Context:

Census 2027

Why in News

The Government of India announced that the long-awaited Population Census and caste enumeration will begin early next year.

Introduction

- The Government of India has officially announced that the process for the next **Population Census**, along with **caste enumeration**, will commence early next year, culminating in a snapshot of India's population as on **March 1, 2027**.
- This will be the **16th Indian Census** and the first since **2011**, as the 2021 exercise was deferred due to the COVID-19 pandemic.
- This Census is particularly sdignificant due to its implications for **delimitation**, **women's reservation**, and **caste-based policy planning**.

What is the Census?

- The **Census** is the largest administrative exercise in the world for collecting **demographic, socio-economic, and housing data**.
- Conducted under the **Census Act, 1948**, it provides data on population size, density, literacy, urbanization, languages, religions, SC/ST categorization, and housing conditions.
- It is conducted every 10 years, and the **Registrar General and Census Commissioner of India (RGI)** under the Ministry of Home Affairs is responsible for its execution.

Timeline and Structure of Census 2027

Notification and Start Date

- Government intent to conduct the Census will be officially notified in the Gazette on **June 16, 2025** (tentative).

Phases of Census

1. **House Listing and Housing Census**
   - Duration: **5–6 months**
   - Purpose: Captures household-level data, building types, assets, amenities, etc.
2. **Population Enumeration**
   - Expected Start: **February 2027**
   - Duration: **1 month**
   - Provides the actual population count and socio-demographic details.

Reference Date

- **March 1, 2027** for most of India
- **October 1, 2026** for snow-bound/hilly regions like Ladakh, J&K, Himachal Pradesh, Uttarakhand

(Reference date is the point at which the population is counted.)

Caste Enumeration: A Key Feature of 2027 Census

Historical Background

- Last comprehensive caste enumeration was in the **1931 Census**.
- The **Socio-Economic and Caste Census (SECC) 2011** gathered caste data but was not published officially due to data quality concerns.
- Traditionally, Census only categorizes **SCs, STs**, and **religious communities**.

Current Plans

- **Caste data** to be collected alongside the 2027 Census.
- **No umbrella category for OBCs**: Instead, a **plain listing of castes** is planned.
- This listing may not directly inform reservation policies due to lack of categorization or economic profiling.

Delimitation and Constitutional Provisions

What is Delimitation?

- It refers to redrawing boundaries of **Lok Sabha and State Assembly constituencies**

based on updated population data.

Constitutional Backing

- **Article 82**: Calls for readjustment of constituencies after every Census.
- **42nd and 84th Amendments**: Froze delimitation till after the first Census post-2026.

Census 2027 as Trigger for Delimitation

- Since it will be the **first Census after 2026**, it **opens the door** for the next round of **delimitation**.
- However, officials clarified that the final data will not be ready before **2029 elections**, hence no immediate impact on upcoming Lok Sabha seats.

Link to Women's Reservation (128th Constitutional Amendment)

- **Women's Reservation Act, 2023** provides **33% reservation** for women in Lok Sabha and State Assemblies.
- **Implementation is contingent** on **delimitation based on post-2026 Census data**.
- Hence, Census 2027 will play a **pivotal role in operationalizing** this reservation.

Political and Policy Implications

1. Caste-Based Representation and Politics

- Congress leader **Rahul Gandhi's slogan** *"Jitni abadi, utna haq"* amplified demands for **proportional representation** based on caste.
- Pressure may mount for **revisiting the 50% reservation cap**, but BJP sources suggest no major shift in affirmative action policy is expected soon.

2. Avoiding Pre-2029 Census Impact

- The government appears keen to **complete Census carefully** without rushing for political implications before the 2029 elections.
- Final Census publication is expected to be delayed (similar to **2011 Census released in 2013**).

Preparations and Past Delays

- **Census 2021** was to begin in **April 2020**, but was indefinitely postponed due to the pandemic.
- All **field-level preparations were completed**, including house listing forms and training.
- The 2027 Census will incorporate **updated digital tools and devices** to enhance efficiency and data accuracy.

Significance for Governance and Policy

1. **Evidence-Based Policy Planning**
   - Updated data crucial for planning schemes like **PM Awas Yojana**, **Jal Jeevan Mission**, etc.
2. **Representation and Federal Balance**
   - Delimitation will affect **parliamentary seat share among states**, especially southern vs. northern states due to differential population growth.
3. **Social Justice Debates**
   - Caste data may shape **future reservation debates**, affirmative action, and **welfare targeting**.

Conclusion

- The **Census 2027** marks a watershed moment in India's governance and socio-political planning. Delayed but now repurposed with **caste enumeration**, it holds implications for **representation, justice, federalism, and policy design**.
- While the exercise is purely statistical, its ramifications may well influence **politics, reservations, and electoral frameworks** for years to come.

Delimitation will address concerns of southern States

Source: The Hindu

https://www.thehindu.com/news/national/delimitation-will-address-concerns-of-southern-states-mha/article69662057.ece

UPSC Relevance: GS-2 Polity and Governance

Context:

About Delimitation

Why in News

The Union Home Ministry announced that the Census will conclude by March 1, 2027, and assured that concerns of southern states regarding the upcoming delimitation exercise will be addressed through stakeholder consultations.

Introduction

- Recently, the **Union Ministry of Home Affairs (MHA)** stated that the upcoming **delimitation exercise** will address concerns raised by various stakeholders, including southern states. This statement followed the announcement that the **Census will be concluded by March 1, 2027**.
- The announcement has renewed debate on the implications of **population-based delimitation**, especially in light of regional demographic variations.

Key Concepts

Delimitation refers to the **process of redrawing boundaries** of **Lok Sabha and State Legislative Assembly constituencies** based on the most recent Census, to ensure **equitable representation** in legislative bodies.

It is governed by:

- **Article 82** (Lok Sabha delimitation)
- **Article 170** (State Assemblies)
- **Delimitation Commission Act**

Census and Delimitation Link

As per the **84th Constitutional Amendment Act, 2001**, the delimitation of constituencies was frozen until the **first Census conducted after 2026**. Hence, the upcoming **2027 Census** will provide the **basis for the next delimitation**.

Recent Developments

MHA Clarification

- The Census was originally scheduled for 2021, but was **delayed due to the COVID-19 pandemic**.
- The MHA stated that disruptions in primary education and the need for around **30 lakh enumerators**—many of whom are schoolteachers—made an earlier Census unfeasible.
- The Ministry assured that **budgetary allocations** were never a constraint and that the Census will be completed by **March 2027**.

Concerns from States

Several states have expressed concerns that **delimitation based purely on population growth** may alter the balance of **parliamentary representation**, potentially reducing the relative share of states that have achieved **demographic stability**.

Why Concerns Have Emerged

1. Population-Based Representation

- The current delimitation uses **1971 Census data**.
- A shift to **2027 data** will reflect substantial demographic changes.
- States that have controlled population growth may experience **reduced representation**, while those with higher population growth may see an increase.

2. Demographic Divergence

- States in certain regions have undergone a **demographic transition** with lower fertility and better socio-economic indicators.
- Others continue to have relatively high population growth.
- A uniform population-based approach to delimitation could unintentionally **disincentivize population control efforts**.

Constitutional and Legal Framework

Provision	Details
Article 82	Mandates readjustment of Lok Sabha constituencies after each Census
Article 170	Mandates readjustment of State Assembly constituencies after

	each Census
42nd Amendment (1976)	Froze delimitation until the post-2001 Census
84th Amendment (2001)	Extended freeze until the **first Census after 2026**
Delimitation Commission	Independent body; its decisions have **force of law** and cannot be **challenged in court**

Arguments in Support of Delimitation Based on 2027 Census

Argument	Explanation
Updated Representation	Ensures that legislative representation reflects **current population realities**
Equitable Resource Allocation	Constituencies with larger populations may require more **public resources** and **infrastructure**
Democratic Principle	One person, one vote principle demands **equal weightage** to every vote, based on updated demographics

Arguments for Caution and Balanced Approach

Argument	Explanation
Incentive for Population Control	States that implemented **family planning policies effectively** may face a reduction in seats
Regional Imbalance	Large shifts in representation could create **perceptions of regional dominance**, affecting federal harmony
Need for Multi-Criteria Approach	Representation could be balanced using other indicators like **human development**, **infrastructure needs**, etc.

Possible Approaches Ahead

- **Minimum Representation Guarantee**: Ensure no state's seat share falls below a certain threshold.
- **Weighted Criteria**: Use population data along with development indicators to allocate representation.
- **Stakeholder Consultations**: Extensive dialogue with states before finalizing delimitation framework.

Conclusion

- The upcoming **Census and Delimitation** are critical exercises that must balance the **principle of equal representation** with the **need for federal equity**.
- As India moves forward with these constitutional responsibilities, it is essential to ensure **fairness, transparency, and inclusivity** in addressing regional concerns, particularly regarding **representation and demographic justice**.

T. Rabi Sankar appointed as a part-time member of the 16th Finance Commission

Source: Business Standard

https://www.business-standard.com/finance/news/rbi-s-t-rabi-sankar-joins-16th-finance-commission-as-part-time-member-125060700421_1.html

UPSC Relevance: **GS-2 Polity and Governance**

Context:

16th Finance Commission

Why in News

T. Rabi Sankar, Deputy Governor of RBI, has been appointed as a part-time member of the 16th Finance Commission, replacing Ajay Narayan Jha.

Introduction

- In a significant development impacting Centre-State fiscal relations, the President of India has appointed **T. Rabi Sankar**, Deputy Governor of the Reserve Bank of India (RBI), as a **part-time member** of the **16th Finance Commission (XVIFC)**.
- This appointment follows the resignation of **Ajay Narayan Jha**, a full-time member, due to personal reasons.

- The move comes at a crucial time, as the Commission prepares its recommendations for the next five-year fiscal cycle starting **April 1, 2026**.

Background: Finance Commission in India

Constitutional Mandate

- **Article 280** of the Indian Constitution provides for the establishment of a Finance Commission every **five years**.
- It is tasked with recommending:
  - The **distribution of net proceeds of taxes** between the Centre and States.
  - The **principles governing grants-in-aid** to states.
  - Measures to augment resources of **panchayats and municipalities**.
  - Other fiscal matters referred by the President.

About the 16th Finance Commission (XVIFC)

- **Constituted:** 31st December 2023
- **Chairman:** Arvind Panagariya (Former Vice-Chairman of NITI Aayog)
- **Report Due:** On or before **October 31, 2025**
- **Period Covered: 2026–2031**

The XVIFC has begun consultations with states and other stakeholders on tax devolution, fiscal consolidation, and the vertical-horizontal distribution of resources.

Key Appointment: T. Rabi Sankar

Details of Appointment

- **Role:** Part-time Member of XVIFC
- **Term:** Till the submission of the Commission's report or October 31, 2025—whichever is earlier.
- **Replaces:** Ajay Narayan Jha (resigned for personal reasons)
- **Appointing Authority:** President of India, as per recommendations by the Ministry of Finance.

Background of T. Rabi Sankar

- **Deputy Governor, RBI** since May 2021
- **Reappointed:** In April 2025 for a second extension till 2026
- Heads **13 departments** in the RBI, including:
  - Financial Market Regulation
  - FinTech
  - Currency Management
  - External Investment and Operations
  - Foreign Exchange

Key Contributions

- Instrumental in developing the **Central Bank Digital Currency (CBDC)**.
- Former Executive Director of RBI in charge of payments, IT, and risk management.
- Worked as a consultant with the **International Monetary Fund (IMF)** (2005–2011) on government bond markets.
- Chaired **IFTAS (Indian Financial Technology and Allied Services)**.

Significance of the Appointment

1. Strengthening Fiscal Expertise

Rabi Sankar's deep experience in monetary policy, foreign exchange management, and digital finance brings technical rigour to the Finance Commission, which must tackle increasingly complex issues such as:

- **Declining buoyancy of direct taxes**
- **Rise in off-budget financing**
- **Centre's growing use of cesses and surcharges** (which are not shared with states)

2. Bridging Monetary and Fiscal Interface

His appointment ensures a better **monetary-fiscal policy interface**, particularly in:

- Public debt management
- Efficient inter-governmental transfers
- Digital transformation of public financial systems

3. Continuation Amid Transitions

Filling the vacancy after Jha's resignation ensures that the Commission's work continues without delay, especially amid growing **demands from states** to raise their share in central taxes from **41% to 50%**.

Issues for the 16th Finance Commission

1. **Vertical Devolution**
   - The 15th and 14th Commissions both recommended **41%** share of the divisible pool to states.
   - States now demand **50%**, citing increased expenditure responsibilities and loss due to central cesses.
2. **Cess and Surcharge**
   - Growing concerns over **non-sharable taxes** through cesses and surcharges reducing the effective pool for states.
3. **Horizontal Devolution Criteria**
   - Need for a more equitable distribution based on:
     - Population
     - Area
     - Forest cover
     - Income distance
     - Demographic performance
4. **Resource Needs of Urban and Rural Local Bodies**
   - Recommendations on grants to **Panchayati Raj Institutions** and **Urban Local Bodies** will be critical.

Way Forward

- The inclusion of an experienced monetary policy expert like Rabi Sankar is expected to **strengthen evidence-based fiscal decision-making**.
- As fiscal federalism becomes more contested, the XVIFC's recommendations will need to be **innovative**, **data-driven**, and **consensual**.
- The Commission's report in 2025 will have far-reaching implications for India's fiscal architecture, cooperative federalism, and development financing.

What is the significance of the Census?

Source: The Hindu

https://www.thehindu.com/news/national/what-is-the-significance-of-the-census-explained/article69672320.ece

UPSC Relevance: **GS-2 Polity and Governance**

Context:

India's Census 2027

Why in News

The Union Home Ministry has announced that the next Census of India will be conducted in two phases and will include caste enumeration for the first time since 1931.

Introduction

- The Union Home Ministry has announced that the next Census of India will be conducted in two phases with **March 1, 2027** as the reference date.
- This will be India's **first Census in 16 years**, breaking the uninterrupted decadal tradition due to the COVID-19 pandemic.

Historical Background of the Indian Census

Census in India has a **rich historical lineage**:

- **Ancient India**: Kautilya's *Arthashastra* mentioned population and economic statistics for administrative planning.
- **Medieval India**: *Ain-i-Akbari* under Akbar documented population estimates and classifications for revenue and military planning.
- **Modern Census**:
  - The first synchronous census was conducted in **1881** under British rule with **W.C. Plowden** as the first Census Commissioner.
  - It marked the beginning of decennial (every 10 years) Census exercises.
  - Until Independence, questions included **age, sex, religion, caste, literacy, and language**.

- The **1931 Census** was the last to record caste data comprehensively for Hindus.

Constitutional and Legal Framework

- **Constitutional Status**: Census is a subject under the **Union List** (Entry 69, List I, Seventh Schedule).
- **Census Act, 1948**:
  - Empowers the **Central Government** to conduct Census.
  - Appoints a **Census Commissioner** and **Directors of Census Operations** in States.
  - Local governments provide manpower, mostly **school teachers**, for ground operations.

Structure of Census Operations

Since **1971**, the Census has been conducted in **two phases**:

1. House Listing Phase

- Conducted 5–6 months before population enumeration.
- Collects information on:
  - Type of house
  - Drinking water source
  - Toilet and kitchen availability
  - Cooking fuel
  - Possession of TV, computer, vehicle, etc.
- In **2011**, this phase had **35 questions**.

2. Population Enumeration Phase

- Conducted typically in **February** of the Census year.
- Reference date is usually **March 1**.
- Captures demographic details like:
  - Name, sex, age
  - Religion, mother tongue
  - SC/ST status
  - Literacy and education level
  - Occupation
- Data is compiled into **provisional reports** (e.g., in 2011 by March-end) and final reports (e.g., by April 2013).

Why the 2027 Census is Historic

1. Inclusion of Caste Enumeration

- First time post-independence that caste details of **all Hindus** will be collected (not just SC/ST).
- Fulfills long-standing demands from:
  - **Opposition parties**
  - **Civil society groups**
- Requires intensive preparatory work to ensure accurate data, contributing to the **delay until 2027**.

2. Basis for Delimitation Post-2026

- The **42nd Constitutional Amendment (1976)** froze the number of Lok Sabha seats based on the **1971 Census** until **2026**.
- The **2027 Census** may now be used for **delimitation**:
  - Redrawing of **parliamentary and assembly constituencies**
  - **Reallocation of seats** based on population shifts
- May **disadvantage States** with successful population control (e.g., southern States), raising concerns of **political imbalance**.

3. Basis for Women's Reservation

- The **Constitution (106th Amendment) Act, 2023** mandates:
  - **One-third reservation for women** in Lok Sabha and State Assemblies.
  - Applicable **after the Census** and delimitation.
- 2027 Census will be the **statistical foundation** for implementing this from the **2029 elections**.

Concerns and the Way Forward

1. Accurate Caste Data Collection

- Must be:
  - Scientifically designed

- Administratively sound
- Free from political bias

- Will guide **affirmative action policies** for **Other Backward Classes (OBCs)** and other under-represented groups.

2. Addressing Federal Concerns in Delimitation

- **Southern, Northeastern, and smaller North Indian States** fear:
  - Loss of **political representation**
  - Disincentivisation of **population control efforts**
- Demands:
  - **Freeze** on seat increase
  - **Consensus-based formula** for seat allocation
- Need to **delay delimitation** till after proper consensus, preferably **post-2029 elections**.

3. Women's Representation

- Must be implemented **promptly** based on updated data from 2027 Census.
- Ensure administrative preparedness for **reservation enforcement** from **2029**.

Conclusion

- The upcoming **2027 Census** is more than a demographic exercise—it is a **defining moment in India's political, social, and federal journey**.
- Its implications will shape not just governance but also **social justice**, **federal balance**, and **gender representation** in India's parliamentary democracy.
- As such, it demands **meticulous planning**, **transparent execution**, and **nationwide consensus**.

Madras High Court Directs Centre to release RTE Funds Regardless of NEP Row

Source: The Hindu

https://www.thehindu.com/news/national/tamil-nadu/amid-nep-row-madras-hc-tells-centre-to-consider-paying-rte-funds-to-tn-by-delinking-it-from-samagra-shiksha/article69679577.ece

UPSC Relevance: GS 2 Polity and Governance

Context:

Madras High Court Ruling on RTE Reimbursement

Why in News

The Madras High Court directed the Union Ministry of Education to consider delinking RTE reimbursements from Samagra Shiksha funds.

Introduction

- The **Madras High Court directed the Union Ministry of Education** to consider splitting the disbursal of funds under the **Samagra Shiksha Scheme (SSS)** to enable Tamil Nadu to reimburse private schools for admissions made under the **Right of Children to Free and Compulsory Education (RTE) Act, 2009**.
- This development comes amidst a broader conflict between the Centre and Tamil Nadu over the State's **non-adoption of the National Education Policy (NEP) 2020** and the **pending central dues of ₹2,151.59 crore** under the SSS.

Key Legal and Policy Dimensions:

1. Statutory Obligation under the RTE Act, 2009:

- The RTE Act mandates free and compulsory education for children aged 6–14 years (Article 21A).
- **Section 12(1)(c)** requires private unaided schools to reserve 25% of seats at entry level for children from disadvantaged sections and weaker sections.
- The **State is obligated to reimburse** the per-child expenditure to such schools.

Judicial Observation: The Court emphasized that **non-receipt of central funds** cannot be a reason for Tamil Nadu to "wriggle out" of this obligation.

2. Concurrent Responsibility – Section 7 of the RTE

Act:

- **Section 7(1)**: Both Centre and States shall share the financial responsibility for implementation.
- **Section 7(2)**: The Central Government shall prepare the norms and the State shall provide the balance resources.

Court's Clarification: The Centre's share of RTE funding **should not be linked to adoption of NEP 2020**, as the RTE Act is a **standalone legislation** enacted prior to NEP.

3. Integrated Nature of Samagra Shiksha and NEP 2020:

- The **Samagra Shiksha Scheme** is the Centre's flagship scheme for school education from pre-primary to Class 12, aligned with **NEP 2020 goals**.
- The Union Government argued that Tamil Nadu's **refusal to implement NEP 2020** complicates fund disbursement.

Court's View: While NEP-aligned schemes can be debated, **constitutional rights like RTE cannot be compromised** for non-alignment with a policy that is not legally binding.

Judicial Innovation and Federal Coordination:

- The High Court **suo motu impleaded** the **Union Ministry of Education** and requested it to "**consider**" delinking the **RTE reimbursement component (~₹200 crore)** from the broader **SSS dues**.
- It also directed the **State government to proceed with RTE admissions for 2025–26** academic year without delay.

Significance of the Ruling:

Aspect	Observation
Federal Balance	Reinforces that **education is a concurrent subject** (List III, Schedule VII), requiring cooperative federalism.
Judicial Activism	The Court's intervention upholds the **constitutional right to education** and prevents administrative impasse from affecting children's future.
Separation of Policy and Law	The ruling distinguishes **legal obligation under RTE** from **non-binding policy frameworks** like NEP 2020.
Financial Justice	Highlights the need for **transparent, delinked funding mechanisms** for rights-based schemes.

Conclusion:

- The Madras High Court ruling reaffirms the **primacy of constitutional rights** over policy disagreements. It calls upon both Union and State governments to **act responsibly in the spirit of cooperative federalism** and ensure that no child is denied education due to fiscal or political disputes.
- This is also a **moment for introspection** on the **implementation gaps in the RTE Act** and the **need to depoliticize children's access to education** in a welfare state.

The Free Speech Framework

Source: Indian Express

https://indianexpress.com/article/opinion/columns/pratap-bhanu-mehta-writes-what-a-free-speech-regime-requires-10063662/?ref=top_opinion

UPSC Relevance: **GS2 Polity and Governance**

Context:

Free Speech

Why in News

The free speech regimes are fundamentally built on trust, not just legal protections, and questions whether censorship strengthens or weakens democratic inclusion and social cohesion.

Introduction

- Free speech is often hailed as the cornerstone of liberal democracies. However, it is not merely a legal provision—it is embedded in a deeper framework of *trust*, *autonomy*, and *social judgement*.
- The current crisis surrounding free speech is not merely about what is being said, but

about *how much trust we place in society and individuals* to handle speech without the paternalistic intervention of the state.

- The debate, therefore, moves beyond the simplistic binary of free speech vs hate speech to more complex terrain—of societal maturity, democratic inclusion, and political mobilisation.

Censorship as an Assertion of Authority

- Historically, censorship has not necessarily aimed to make citizens believe in state-sponsored truth.
- Rather, it has functioned as a **symbolic expression of authority**—reinforcing the infantilisation of the public.
- The state, in asserting the right to censor, implies that individuals are incapable of discernment, unable to handle disturbing or offensive ideas, and hence must be protected.

Free Speech and the Ethic of Autonomy

- The strongest defence of free speech is not instrumental—i.e., it is not because free speech leads to truth, democracy, or progress (although it may). Rather, it is **moral and existential**: *No one should have the right to control what I think or say.* This embodies the liberal ideal of the **sovereign self**, the individual as an autonomous agent, capable of moral and rational judgement.

However, **freedom of speech does not mean all speech is equally valuable**. Discernment and judgment must accompany liberty. Hence, free speech regimes rely on:

- Trust in individuals to handle offensive speech without being incited.
- Social mechanisms (debates, media, civil society) to call out harmful speech.
- Distinction between the *right to speak* and the *value of what is spoken*.

The Democratic Case for Restrictions

Critics argue that the sovereign self is a **fiction** in deeply unequal societies. Where historical injustices, discrimination, and exclusion prevail, marginalized groups cannot respond to hate speech "on their own terms." Thus:

- Certain **forms of speech (e.g., hate speech, incitement)** may be proscribed to foster *democratic inclusion*.
- Banning such speech signals that society values all groups equally and will not tolerate targeting on identity grounds.

The Paradox: Does Censorship Address the Root Problem?

While the intent behind restrictions may be noble, the **effectiveness is questionable**. If the **real problem is structural inequality and social mistrust**, then banning speech becomes a *symbolic diversion* rather than a substantive solution.

Important Questions Raised:

- Does banning hate speech rectify historical inequalities?
- Or does it merely suppress a symptom without addressing the disease?
- Can trust in institutions and society reduce the impact of hateful speech?

The danger is that censorship may *signal distrust* in citizens' ability to navigate speech, reinforcing the infantilisation of the public.

Political Mobilisation Through Speech Restrictions

In multicultural democracies, **community identities are often built around taboos**. Free speech becomes the battlefield for:

- **Competitive victimhood** – Every group demands equal protection of its sensitivities.
- **Political mobilisation** – Censorship becomes a tool to assert identity or power.

This leads to a "slippery slope": once one taboo is legally protected (e.g., blasphemy laws), others demand the same, expanding the zone of censorship.

The Role of Trust in Communication

Ecosystems

In the digital age, **mistrust and misinformation travel faster than truth**. The collapse of contextual communication due to social media, virality, and echo chambers has worsened the **fragility of free speech regimes**.

The solution is not legal censorship, but **social rebuilding of trust**:

- Citizens must trust that hate speech is *not the societal norm*.
- Minorities must be reassured that institutions protect them.
- Civil society must hold harmful speech accountable through *discourse*, not bans.

Conclusion:

The call for censorship often stems from legitimate concerns about social cohesion and minority protection. But in the long run, **trust, not control, builds democratic resilience**. Societies must invest in:

- Civic education and moral reasoning,
- Strengthening institutional credibility,
- Promoting dialogue over diktats.

Free speech is not merely about protecting the speaker—it is about cultivating a society that can listen, contest, and grow. **Every act of censorship is a vote of no-confidence in citizens' moral and intellectual capacity**. Reclaiming that confidence is the true challenge of our times.

Election Commission to Implement 100% Webcasting in Polling Stations

Source: The Hindu

https://www.thehindu.com/news/national/ec-to-go-for-100-webcasting-of-polling-stations-for-closer-monitoring-of-voting-procedure/article69702035.ece

UPSC Relevance: GS2 Polity and Governance

Context:

Election Reforms

Why in News

The Election Commission has announced 100% webcasting at all polling stations from the upcoming Bihar Assembly elections to enhance transparency and real-time monitoring.

Introduction

- In a significant step to enhance transparency and monitoring of the election process, the **Election Commission of India (ECI)** on **June 16, 2025**, announced the decision to implement **100% webcasting** at all polling stations during elections, starting with the upcoming **Bihar Assembly elections**.

Key Highlights:

- **100% Webcasting Decision:** Moving beyond the earlier practice of webcasting in only 50% of polling stations and "critical polling stations," the EC has mandated **webcasting at all polling stations** where **internet connectivity** is available.
- **Coverage in Shadow Areas:** In areas lacking internet access (referred to as **"shadow areas"**), the EC has directed the use of **alternative monitoring methods** such as **videography and photography** to ensure continued surveillance.
- **Internal Use Only:** The footage collected through webcasting will be for **internal use by the Election Commission** and will **not be open to public inspection**, as per the amendment to election rules.

Legal Framework and Rule Amendment:

- In **December 2024**, the **Union Law Ministry**, on the recommendation of the EC, amended **Rule 93 of the Conduct of Election Rules, 1961**.
- This amendment **restricts public access** to electronic documents such as

CCTV/webcasting footage and **video recordings of candidates**, to **prevent potential misuse**.

Implementation Mechanism:

- **Three-tier Monitoring Control Rooms:** Webcasting will be monitored through **control rooms established at three levels**:
  - State Level
  - District Level
  - Assembly Constituency (AC) Level
- **Appointment of Nodal Officers:** Each control room will be supervised by a **designated Nodal Officer**, ensuring proper management and response during the polling process.
- **Live Monitoring:** The EC has directed that polling stations be **watched live multiple times throughout the day** to ensure that the **voting process remains free, fair, and transparent**.
- **Staff Deployment:** Adequate human resources will be deployed in control rooms to manage and review live feeds efficiently.

Significance:

- **Strengthens Electoral Integrity:** Full-scale webcasting serves as a **deterrent against malpractices**, ensuring the sanctity of the voting process.
- **Enhances Real-Time Supervision:** Real-time access to polling visuals at multiple levels enables **quick interventions** in case of irregularities.
- **Model for Future Elections:** The Bihar Assembly election will be the **first major electoral event** to witness **100% webcasting**, potentially setting a **template for future state and national elections**.

Conclusion:

- The Election Commission's decision to ensure 100% webcasting is a crucial electoral reform aimed at bolstering **transparency, accountability, and public trust** in India's democratic processes.
- This move, coupled with technological advancements and institutional monitoring, reflects the EC's commitment to **conducting free and fair elections** in the digital age.

Centre approves construction of 2.35 lakh houses under PMAY

Source: The Hindu

https://www.thehindu.com/news/national/centre-approves-construction-of-235-lakh-houses-under-pmay/article69709547.ece

UPSC Syllabus Relevance: **GS2 Polity and Governance**

Context:

Pradhan Mantri Awas Yojana

Why in News?

The Centre approved the construction of 2.34 lakh houses under PMAY-Urban 2.0 in nine states, focusing on Beneficiary Led Construction and Affordable Housing in Partnership verticals.

Introduction

- On June 18, 2025, the Government of India approved the construction of **2,34,864 houses** under the **Pradhan Mantri Awas Yojana – Urban 2.0 (PMAY-U 2.0)**.
- The decision was taken during the **third meeting of the Central Sanctioning and Monitoring Committee (CSMC)** of the **Ministry of Housing and Urban Affairs (MoHUA)**, chaired by Secretary **Srinivas Katikithala**.
- These houses are to be constructed in **nine states**: Assam, Bihar, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, and Uttar Pradesh.

About Pradhan Mantri Awas Yojana – Urban (PMAY-U)

- **Launched:** June 2015
  Nodal Ministry: Ministry of Housing and Urban Affairs (MoHUA)
  Objective: To achieve the goal of **"Housing for All" in urban areas** by providing **pucca (permanent) houses** to all eligible urban poor, especially those belonging to the Economically Weaker Section (EWS), Low-

Income Group (LIG), and Middle-Income Group (MIG).

- In order to meet the evolving needs and accelerate progress, the scheme was **revamped as PMAY-U 2.0**, with a renewed focus on the construction of an additional **1 crore houses** for urban families, especially from EWS and LIG categories.

Implementation Structure of PMAY-U 2.0

The scheme is implemented through the following **four verticals**:

1. **Beneficiary-Led Construction (BLC):** Financial assistance is provided to eligible individual beneficiaries to construct or enhance their own houses on their own land.
2. **Affordable Housing in Partnership (AHP):** Provides financial support for housing projects where public or private sectors collaborate with the government to develop affordable housing on land owned by them.
3. **Affordable Rental Housing Complexes (ARHC):** Focuses on providing rental housing for migrant workers and urban poor who are unable to afford home ownership.
4. **Credit Linked Subsidy Scheme (CLSS):** Provides interest subsidies on housing loans taken by eligible beneficiaries for buying, constructing, or enhancing a house.

The **latest approval of houses** pertains to **BLC and AHP verticals**.

Key Highlights of the June 2025 Sanction

- **Total Houses Approved:** 2,34,864
- **Number of States Covered:** Nine
- **Meeting Platform:** 3rd meeting of the Central Sanctioning and Monitoring Committee (CSMC)

Social Inclusion Emphasis

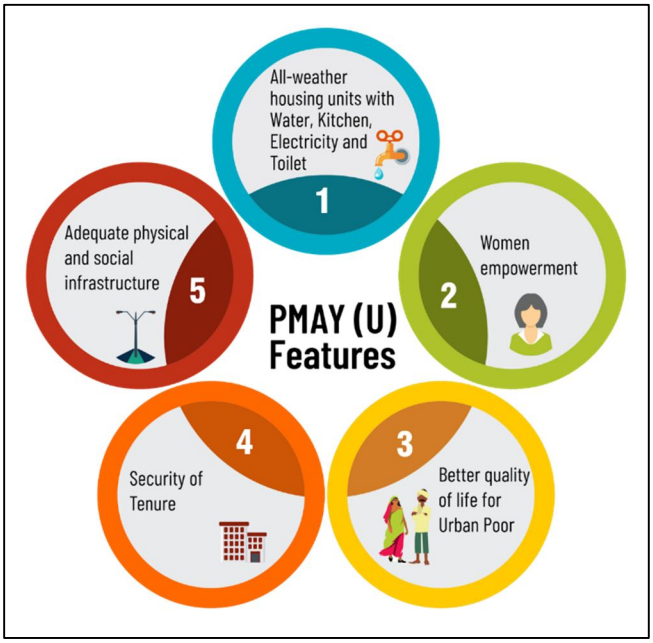
The scheme strongly incorporates social justice principles by targeting vulnerable and marginalised sections:

- **Women (including single women and widows):** Over 1.25 lakh houses
- **Transgender persons:** 44 houses
- **Scheduled Castes (SC):** 42,400 houses
- **Scheduled Tribes (ST):** 17,574 houses
- **Other Backward Classes (OBC):** 1,13,414 houses

This allocation indicates a strong effort toward promoting inclusive urban development.

Financial Aspects

- **Central Financial Assistance per Housing Unit:** Up to ₹2.5 lakh
- **Total Target under PMAY-U 2.0:** 1 crore houses
- **Total Houses Sanctioned So Far under PMAY-U 2.0:** 7,09,979
- **Total Houses Constructed under original PMAY-U (2015–2021):** Over 93.19 lakh



Significance of the Scheme

- **Urban Development:** The scheme aims to improve urban housing stock, particularly for the poor and middle class.
- **Women Empowerment:** Preference is given to women, and many houses are allotted in

their name to promote economic security and social status.

- **Social Justice:** The scheme focuses on ensuring housing access for historically marginalised communities such as SCs, STs, OBCs, and transgender persons.
- **Economic Growth:** The construction activity under the scheme generates employment and demand for building materials, thereby stimulating economic growth.

Linkages with Other Government Initiatives

- **Backward Linkages:** The scheme builds upon previous urban housing programmes like the **Jawaharlal Nehru National Urban Renewal Mission (JNNURM)** and **Rajiv Awas Yojana (RAY)**.
- **Forward Linkages:** The objectives of PMAY-U align with initiatives such as the **Smart Cities Mission**, **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**, and **National Urban Livelihood Mission (NULM)**.

From Refugee to Citizen: Restoring Rights and Dignity

Source: The Hindu

https://www.thehindu.com/opinion/op-ed/exiting-refugee-status-getting-back-dignity/article69714272.ece

UPSC Relevance: GS-2 Polity and Governance

Context:

Refugee and issues

Why in News

Recent legal and administrative developments in India and Sri Lanka have reignited debates on the repatriation and local integration of Sri Lankan Tamil refugees.

Introduction

- Two unrelated developments—one in India and one in Sri Lanka—have renewed focus on the long-standing issues concerning Sri Lankan Tamil refugees in India.
- These refugees, primarily settled in Tamil Nadu, have been living in India for over three decades since the Sri Lankan civil war.
- Despite their prolonged stay, most lack citizenship or formal integration into Indian society.
- The recent incidents highlight both the limitations of India's refugee framework and the challenges of repatriation.

Development in India: Supreme Court Refusal

- A Sri Lankan Tamil refugee, convicted under the Unlawful Activities (Prevention) Act, had his sentence reduced by the Madras High Court from 10 to 7 years.
- Upon completing his sentence, he petitioned the Supreme Court seeking permission to remain in India, citing personal reasons.
- Earlier, he had given an undertaking to leave the country after completing his prison term.
- The Supreme Court refused to entertain his petition for residence in India.
- During the hearing, the Court made an **oral** remark stating that **"India is not a dharamshala** (free shelter)".
- This remark was perceived as harsh and contrary to the judiciary's traditionally humanitarian approach toward refugees.
- The comment caused concern within refugee communities and human rights advocates.

Development in Sri Lanka: Detention of Returnee

- In a separate incident, a 70-year-old Sri Lankan Tamil refugee voluntarily returned from Tamil Nadu to Sri Lanka.
- He was detained upon arrival at Palaly

airport in Jaffna for allegedly having left the country years ago through unauthorized means.

- His return had been facilitated by the Chennai office of the United Nations High Commissioner for Refugees (UNHCR).
- The detention led to public outrage in both countries.
- Sri Lanka's Transport Minister clarified that the action was due to an automatic application of immigration law.
- The Minister promised swift steps to amend the law and ensure such cases are not repeated.
- This incident illustrated the bureaucratic and legal obstacles to voluntary repatriation.

Different Treatment of Refugee Groups: Tibetans vs Sri Lankan Tamils

- India hosts multiple refugee groups, but their treatment by the state differs significantly.
- Tibetan refugees, numbering over 63,000, have been living in India since 1959 with relative legal security.
- The Union Government formalised their stay through the **Tibetan Rehabilitation Policy (TRP), 2014**.
- Under TRP, Tibetans have access to employment in both public and private sectors and welfare schemes like MGNREGA.
- They are settled across various Indian states including Karnataka, Himachal Pradesh, Uttarakhand, Arunachal Pradesh, and Ladakh.
- By contrast, Sri Lankan Tamil refugees, around 90,000 in number, remain concentrated mostly in Tamil Nadu.
- The Union Government has not formulated any refugee-specific policy for them.
- Tamil Nadu has shouldered the welfare burden, providing food, shelter, and education in state-run camps.
- The Union Home Ministry still defines the ultimate goal for this group as "repatriation", unlike in the case of Tibetans.
- Annual reports of the Home Ministry emphasize repatriation for Sri Lankan Tamils but make no such mention for Tibetans.
- This reveals a clear inconsistency in policy and a lack of equity between different refugee groups.

Ongoing Challenges Faced by Sri Lankan Tamil Refugees

- Most Sri Lankan Tamil refugees in India lack formal legal status such as citizenship or long-term visas.
- Without documentation, they face severe restrictions in employment, property ownership, and higher education access.
- Although Tamil Nadu's education schemes have enabled many to pursue professional degrees, job placement remains a serious issue.
- For instance, around 500 young refugees have completed engineering degrees, but fewer than 5% are employed in their field.
- Private companies, particularly in the IT sector, hesitate to hire refugees due to legal uncertainties.
- The lack of a national refugee policy keeps this community in a perpetual state of legal and social limbo.
- Approximately two-thirds of the refugee population in Tamil Nadu still live in government-run rehabilitation camps.
- Although these camps provide essential services, they perpetuate a sense of marginalisation and impermanence.
- The tag of "refugee" continues to carry a stigma, preventing full participation in Indian society.

The Need for Policy Reform and Durable Solutions

- Given that Sri Lankan Tamil refugees have been in India for over four decades, a reassessment of policy is urgently required.
- Durable solutions should include options for voluntary repatriation, local integration, or third-country resettlement.
- These strategies must be implemented in

consultation with the Sri Lankan government, the UNHCR, and refugee representatives.

- The Union government can maintain its official stance on repatriation while still creating a structured integration policy.
- A policy akin to the Tibetan Rehabilitation Policy could help Sri Lankan refugees access jobs, welfare schemes, and secure residency.
- Such a policy would provide dignity and legal identity without necessarily conferring citizenship.
- It would also unlock the human capital of this community, allowing them to contribute to India's economy and society.
- Welfare without rights is insufficient; the time has come for a legal framework that acknowledges the reality of long-term displacement.

Constitutional and Ethical Dimensions

- India is not a signatory to the 1951 UN Refugee Convention or its 1967 Protocol.
- However, the Indian Constitution and judiciary have often extended certain fundamental rights to non-citizens, including refugees.
- Article 21 of the Constitution, which guarantees the right to life and dignity, applies to all individuals, not just citizens.
- Indian courts have, in the past, used this provision to protect refugees from forced deportation and to ensure humane treatment.
- The ethical imperative lies in moving from ad hoc humanitarianism to a rule-based rights framework.
- Refugees, especially those born and raised in India, should not be denied the opportunity to live dignified lives.

World Refugee Day 2025: Solidarity in Practice

- The theme of World Refugee Day 2025 is "Solidarity with Refugees".
- Solidarity must not remain limited to symbolic gestures or statements.
- It must be reflected in policy decisions, legal frameworks, and social inclusion efforts.
- True solidarity means providing refugees with opportunities to live in dignity and contribute meaningfully to society.
- For Sri Lankan Tamil refugees, solidarity would mean access to jobs, education, health care, and eventually, a path to legal integration.
- Until then, their status as long-term displaced persons continues to be a source of frustration, insecurity, and social exclusion.

Conclusion:

- The recent incidents in India and Sri Lanka have revealed deep flaws in the way refugee issues are handled.
- India must now move from temporary relief to long-term solutions rooted in dignity and legal recognition.
- A coherent and inclusive refugee policy is the need of the hour.
- Such a policy would not only reflect India's humanitarian legacy but also strengthen its democratic and constitutional principles.
- The question is not just how long India can host Sri Lankan Tamil refugees, but how meaningfully and humanely it can engage with them.

The Registration Bill, 2025

Source: Indian Express

https://indianexpress.com/article/explained/explained-law/draft-registration-bill-10079810/

UPSC Relevance: **GS-2 Polity and Governance**

Context:

Registration Bill, 2025

Why in News

The Registration Bill, 2025 seeks to modernise and digitise the 117-year-old property registration framework to enhance transparency, reduce disputes, and simplify citizen access.

Introduction

- The Ministry of Rural Development (MoRD)

has released the **Registration Bill, 2025** in draft form and invited public suggestions.

- The Bill aims to replace the **117-year-old Registration Act of 1908**, a colonial-era law governing the registration of property documents.
- It seeks to modernise the legal framework to reflect the technological and administrative advances in governance, especially in land and property transactions.

Need for Reform

- **Outdated Legislation**: The **Registration Act, 1908** was designed in the pre-digital era. It mandates physical presence at Sub-Registrar offices and lacks provisions for online processes, e-signatures, and digital identity verification.
- **Technological Advancements**: Many states/UTs have introduced online registrations, Aadhaar-based identity checks, and digital submissions using the existing framework, but these lack legal backing.
- **Rising Land Disputes**: Land and property disputes constitute over **two-thirds of civil cases** in India, and lack of clear, reliable documentation is a major cause.
- **Ease of Doing Business**: Transparent, efficient, and digitally enabled registration processes are essential for improving **property rights**, **credit access**, and **economic development**.

Salient Features of the Registration Bill, 2025

1. Digital and Offline Registration (Section 29)

- Enables **end-to-end digital registration** of documents via electronic means.
- Offers **hybrid options**—citizens can still register documents at Sub-Registrar offices.
- **Aadhaar-based or offline identity verification** permitted.
- Importantly, **no denial of registration** for lack of Aadhaar (Sec. 29(4))—ensuring inclusivity.

2. Expansion of Compulsory Registrable Documents (Section 12)

- Includes:
  - Agreement of Sale
  - Power of Attorney (PoA)
  - Mortgage by Deposit of Title Deeds
  - Sale Agreements
  - Corporate mergers/demergers (Companies Act, 2013)
- This expansion aims to bring more **legal certainty** and **accountability** in property-related transactions.

3. Optional Registration Ambiguity (Section 13)

- Mentions "optional registration" but does **not clarify** which documents this includes.
- Creates potential for **interpretive gaps**, and **legal uncertainty** in enforcement.

4. Creation of New Administrative Posts (Section 4(5))

- Adds **Additional and Assistant Inspector Generals of Registration** to improve decentralisation and efficiency.
- Terms, duties, and powers will be notified by the respective state/central governments.

5. Refusal and Cancellation of Registration (Section 58 & 64)

- Registration can be refused if:
  - Documents are not translated accurately
  - Content is erased
  - Delay beyond four months (wills are exempt)
  - If the presenter is **minor, deceased, or mentally incapacitated**
- **Section 64(3)** empowers the Inspector General to **cancel registrations** made through fraud, illegal means, or incorrect information—**with a written order and right to appeal within 30 days**.

6. Reduction in Penalties

- Imprisonment for offences is reduced from **7 years to 3 years**, along with a fine.
- Seen as an attempt to make penalties more **proportionate**, though critics worry it might dilute deterrence.

Significance of the Bill

Modernisation of Property Transactions

- Moves towards **contactless governance** and **paperless documentation**, making property deals quicker, more secure, and citizen-friendly.

Transparency and Record Maintenance

- Mandatory digital records will:
  - Minimise **tampering** of documents
  - Create **audit trails**
  - Improve traceability and transparency

Reduction in Litigation

- Compulsory registration of agreements (sale, PoA, etc.) can reduce ambiguities in property ownership and transfer, thereby reducing disputes.

Enabling Future Reforms

- This law can serve as a foundational framework for integrating **land titling, GIS mapping**, **e-stamps**, and **blockchain-based land ledgers** in the future.

Concerns and Challenges

Cybersecurity and Data Protection

- Storing digital records and e-signatures necessitates **robust cyber-infrastructure**.
- Risk of data breaches or hacking could compromise sensitive information, including biometric-linked identities.

Ambiguity in Optional Registration

- The undefined scope of Section 13 may lead to **litigation and procedural confusion**.
- Leaves space for **discretionary misuse** by authorities.

Delegation to Common Service Centres (CSCs)

- Proposed reliance on CSCs for registration and related tasks could lead to **legal and operational issues**, especially in:
  - Determination of **stamp duty**
  - **Transfer of title**
- These functions involve legal complexities that require **qualified legal professionals**, not just facilitation centres.

Implementation Capacity

- Digital divide, especially in rural areas, may limit access.
- Need for **training** of registration officials, **upgradation of infrastructure**, and **citizen awareness**.

New ECINET platform used during bypolls helped with faster update of voter turnout trends

Source: The Hindu

https://www.thehindu.com/news/national/new-ecinet-platform-used-during-bypolls-helped-with-faster-update-of-voter-turnout-trends-eci/article69736217.ece

UPSC Relevance: **GS2 Polity and Governance**

Context:

ECINET digital platform

Why in News

ECINET, a one-stop digital platform developed by the Election Commission of India, enabled real-time voter turnout updates and rapid publication of Index Cards during the June 2025 bypolls.

Introduction

- The Election Commission of India (ECI), in its continuous effort to modernize and enhance the transparency of the electoral process, recently deployed its new digital platform — **ECINET** — during the **by-elections held on June 19, 2025**, in four states: **Kerala, Gujarat, Punjab, and West Bengal**.
- This marked a significant leap toward real-time data accessibility and efficiency in election management.

What is ECINET?

- **ECINET (Election Commission Integrated Network)** is a **technology-driven one-stop digital platform** developed by the Election

Commission of India.

- Announced on **May 4, 2025**, it is designed to integrate **over 40 mobile and web-based applications** used by the ECI into a single interface.

Purpose of ECINET:

- To ensure **real-time data entry, access, and analysis** of various electoral processes.
- To reduce manual intervention and eliminate delays in data publication.
- To enhance transparency and trust in electoral data.

Major Features of ECINET Used During Bypolls

Real-time Voter Turnout Upload

- **Presiding officers** uploaded **voter turnout figures directly from polling stations** using ECINET.
- This replaced the earlier **manual system**, which caused delays and lacked uniformity.
- Final turnout data was uploaded **before the officers left the polling station**, ensuring real-time updates.
- Impact: Significant reduction in the time lag for publishing voter turnout trends, and improved public transparency.

Faster Publication of Index Cards

- **Index Cards** are **non-statutory post-election statistical reports** that offer detailed constituency-level election data.
- They include information on:
  - Total electors and votes polled
  - Candidate-wise and party-wise performance
  - Vote share, gender-wise voting, and regional patterns
- With ECINET, most of the fields were **auto-filled**, reducing the workload and ensuring faster verification.
- Impact: Index Cards were published within 72 hours after the declaration of results (declared on June 23, 2025), compared to previous delays of weeks or even months.

Why Index Cards Matter?

- They are crucial for **stakeholders** such as political parties, analysts, researchers, and the general public.
- They promote **data accessibility, electoral analysis**, and accountability in the democratic process.
- Although **non-statutory**, they are an important **statistical and transparency tool**.

Significance in the Context of Electoral Trust

In recent years, **concerns over sudden spikes in voter turnout** in the final hours of polling have been raised by Opposition parties. The real-time upload of turnout trends via ECINET addresses these concerns by:

- Offering **live, transparent data** directly from presiding officers.
- Reducing speculation and enhancing **public confidence** in the election process.

Future Scope of ECINET

- Currently, only **some modules** of ECINET have been used.
- The platform will become **fully operational in the coming weeks**, incorporating the remaining 40+ applications.
- It is expected to transform the way elections are monitored, managed, and analyzed in India.

Conclusion

- The successful implementation of ECINET during the June 2025 by-elections is a landmark in India's journey toward a more transparent, efficient, and technology-enabled electoral system.
- With enhanced real-time data processing, faster voter turnout trends, and quick

dissemination of vital election statistics, ECINET marks the beginning of a digitally empowered electoral future for the world's largest democracy.

Union Cabinet passes resolution marking 50 years of Emergency

Source: The Hindu

https://www.thehindu.com/news/national/union-cabinet-passes-resolution-marking-50-years-of-emergency/article69735866.ece

UPSC Syllabus Relevance: GS2 Polity and Governance

Context:

Emergency Provisions

Why in News

India marked the 50th anniversary of the Emergency (1975–77) remembering it as a dark chapter in democracy and honouring those who resisted the suspension of constitutional rights.

Introduction

- On **June 25, 2025**, India marked the **50th anniversary of the declaration of the Emergency**, one of the most controversial periods in the nation's democratic journey.
- Declared on **June 25, 1975**, under Article 352 of the Constitution, the Emergency suspended civil liberties, curtailed press freedom, and centralized executive power — casting a long shadow over Indian democracy.
- Prime Minister Narendra Modi led the Union Cabinet in commemorating this anniversary, paying tribute to those who resisted what is now termed as **'Samvidhan Hatya Diwas' (Constitution Murder Day)**.

hat Was the Emergency?

- The **Emergency (1975–77)** was declared by then Prime Minister **Indira Gandhi** citing "internal disturbance" under **Article 352** of the Constitution.
- It lasted **21 months**, from **June 25, 1975, to March 21, 1977**.

Emergency Provisions in the Indian Constitution

- **Articles 352 to 360** of the Indian Constitution deal with **Emergency provisions**.
- These provisions enable the **Union government to deal with extraordinary situations** threatening the nation's security, stability, or financial health.

Types of Emergencies

Type of Emergency	Constitutional Article	Common Name	Reason for Declaration
1. **National Emergency**	Article 352	External or Internal Threat Emergency	War, External Aggression, or Armed Rebellion
2. **President's Rule**	Article 356 (with Article 365)	State Emergency	Failure of Constitutional Machinery in a State
3. **Financial Emergency**	Article 360	Economic Emergency	Threat to Financial Stability or Credit of India

Key Features of the Emergency:

- **Suspension of Fundamental Rights** (especially under Article 19)
- **Censorship of the Press**
- **Mass Arrests** of political opponents under the Maintenance of Internal Security Act (MISA)
- **Judicial Complicity**, highlighted by the **ADM Jabalpur v. Shivkant Shukla** case,

where the Supreme Court upheld suspension of habeas corpus

- **Forced Sterilization Campaigns**, especially targeting the poor
- **42nd Constitutional Amendment**, also called the "Mini-Constitution", which increased centralization of power

The 2025 Commemoration: A Cabinet Resolution

- At a special Union Cabinet meeting, the government passed a **resolution honouring the resistance** to the Emergency.
- **Prime Minister Modi** stated that the Emergency was one of the **"darkest chapters in India's democratic history."**

42nd Constitutional Amendment and Its Legacy

The 42nd Amendment Act, 1976, passed during the Emergency, made sweeping changes:

- Preamble changed: "Sovereign Democratic Republic" became **"Sovereign Socialist Secular Democratic Republic"**
- Strengthened the **Directive Principles of State Policy** over Fundamental Rights
- Extended the **tenure of legislatures**
- Curtailed the powers of the judiciary

After the Emergency, the **Janata Party Government (1977–79)** passed the **44th Amendment Act**, undoing many of these changes and **safeguarding constitutional democracy**.

Significance for Democratic Institutions

The Emergency is a **crucial turning point** in India's political history. It:

- Exposed vulnerabilities in **institutional checks and balances**
- Demonstrated the importance of **civil society and political opposition**
- Highlighted the need for **independent judiciary and media**

Lessons for the Future

1. **Constitutional Morality** must guide those in power, not just legal legitimacy.
2. **Vigilant citizenry** is essential to sustain democratic governance.
3. **Institutions must remain independent** and assert their roles during crises.

Conclusion

- The Emergency's 50th anniversary is not merely a ceremonial remembrance but a reassertion of democratic values. By remembering the sacrifices of those who resisted authoritarianism,
- India reaffirms its commitment to constitutional democracy and the rule of law.
- As Prime Minister Modi stated, this is a moment to honor those who ensured that India's democracy was not only restored but emerged stronger.

Ahead of Census, States asked to finalise boundary changes before December 31

Source: The Hindu

https://www.thehindu.com/news/national/first-phase-of-the-census-with-houselisting-operations-to-begin-from-april-1-2026/article69751488.ece

UPSC Syllabus Relevance: **GS2 Polity and Governance**

Context:

Population Census 2027

Why in News

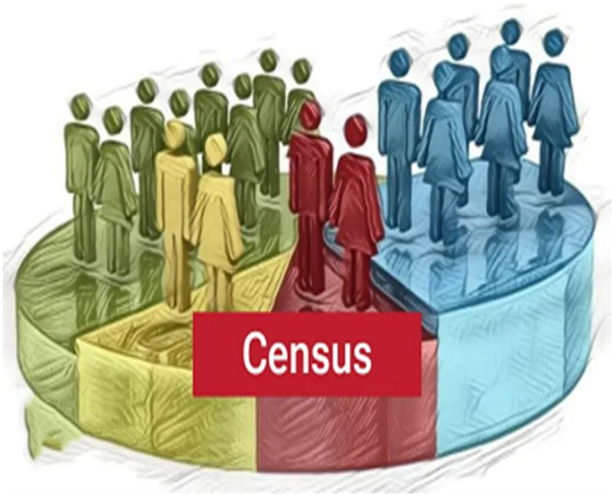
The Registrar General of India (RGI) has directed all States to finalise any administrative boundary changes (districts, tehsils, police stations) by December 31, 2025.

Key Highlights

- This boundary freeze is essential for smooth conduct of Population Census 2027, which will begin with the House Listing and Housing Schedule (HLO) phase tentatively from April 1, 2026.
- Notably, this Census will be the first digital Census in India and will include caste enumeration for the first time.

What is the Census?

- The **Population Census** is India's largest single source of primary data on population size, housing conditions, socio-economic indicators, and demographic characteristics.



- Conducted **once every 10 years** under the **Census Act, 1948**, it is a constitutional and administrative exercise of national importance.
- The Census is conducted in **two phases**:
  - **House Listing & Housing Census (HLO):** Collects data on housing conditions, household assets, and access to amenities like drinking water, sanitation, electricity, fuel, and communication devices.
  - **Population Enumeration (PE):** Captures detailed demographic, socio-economic, cultural, and migration data about every person residing in the country.
- The upcoming Census will be **digital for the first time**, improving accuracy and speed of data compilation.

Why is Boundary Freezing Important?

- **Boundary freezing** means that administrative units — such as districts, tehsils, police stations, and Enumeration Blocks (EBs) — are finalised before enumeration begins.
- This ensures **consistency and comparability**: any change mid-way could lead to **double-counting**, omission, or confusion over jurisdiction.
- The **Delimitation Commission**, **Registrar General of India (RGI)**, and State governments work together to finalise and freeze these boundaries.
- This practice upholds the **principle of geographic integrity** so that the data is reliable and legally valid for policy, planning, and representation.

Key Facts for the Population Census 2027

- Around **24 lakh Enumeration Blocks (EBs)**, each covering about **650–800 people**, will be reused from earlier planning for Census 2021.
- An estimated **34 lakh enumerators and supervisors**, mostly State government staff, will be deployed using **digital tablets or mobile devices** — a first in India's Census history.
- The **reference date** for the Census has been notified as **12 AM on March 1, 2027**.
- **Caste enumeration** will be included officially for the first time, following Cabinet approval — marking a major shift from previous Census rounds which did not capture caste beyond Scheduled Castes (SCs) and Scheduled Tribes (STs).

Challenges Ahead

- **Logistical Complexity**: Managing 34 lakh enumerators and 1.3 lakh Census officials, many from State cadres, is a mammoth administrative task.
- **Delayed Schedule**: Census 2021 was deferred due to COVID-19; the rebranded Population Census 2027 must address five years of gap in demographic data.
- **Boundary Disputes**: States must ensure all local disputes or new district formations are resolved before the freeze.
- **Caste Data Sensitivity**: How caste information will be used and safeguarded needs clear policy and legal frameworks.

Maharashtra Puts Three-Language Policy on Hold Amid Public Opposition

Source: The Hindu
https://www.thehindu.com/news/national/maharashtra/maharashtra-scraps-resolution-to-make-hindi-as-third-language/article69752172.ece

UPSC Syllabus Relevance: GS2 Polity and Governance

Context:

Three-language Policy

Why in News?

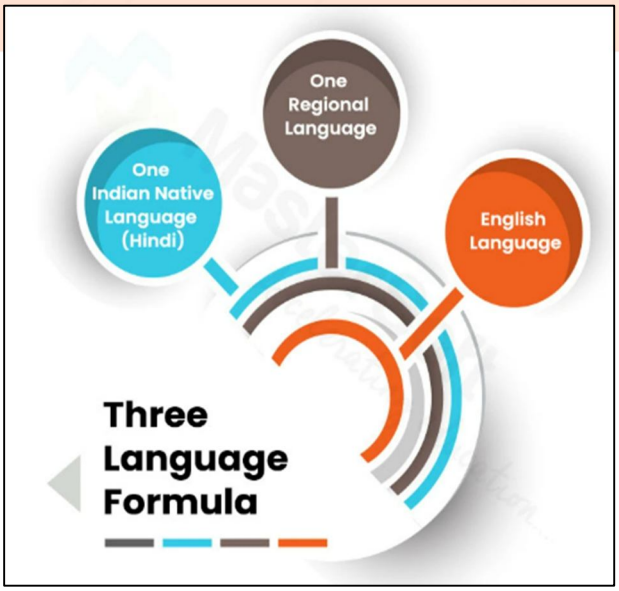
Maharashtra has withdrawn its decision to implement the three-language policy for primary classes and has set up an expert committee to review the issue.

Introduction

- The Maharashtra government withdrew two government resolutions (GRs) that proposed the implementation of the three-language policy for Classes 1 to 5 in State-run schools.
- The decision followed sustained resistance from academics, political parties, civil society groups, and prominent public intellectuals over concerns about linguistic imposition and lack of consultation.

Background: The Three-Language Formula

- The **three-language formula**, recommended by the **Kothari Commission (1964–66)**, was designed to promote **national integration** while safeguarding **linguistic diversity**.
- It suggested that students learn:
  1. The **regional language**,
  2. **Hindi**, and
  3. **English** or another Indian language.
- While the formula is already operational in Maharashtra's secondary education, the proposed expansion to primary classes would have impacted nearly 80 lakh students in Marathi and English medium schools under the State Board.
- Critics, however, questioned both the **timing** and the **method of implementation**, citing concerns over age-appropriateness, academic burden, and regional sensitivities.



Government Response: Formation of an Expert Committee

Reacting to the backlash, **Chief Minister Devendra Fadnavis** announced the **withdrawal of the orders** and the constitution of an **expert committee** under **Dr. Narendra Jadhav**, a noted economist and educationist. The committee has been tasked with:

- Assessing **which grade level** the three-language policy should begin from.
- Reviewing the **Mashelkar Committee Report**, which deals primarily with **higher education reforms**.
- Engaging with **multiple stakeholders**, including those with dissenting views.
- The implementation has been **put on hold for three months**, pending the committee's recommendations.

Key Issues Involved

This episode brings to light several deeper structural and ideological concerns:

- **Linguistic Federalism**: The tension between regional linguistic autonomy and national language standardization resurfaces in such policy moves.
- **Cultural Identity vs National Integration**: Education becomes the battleground for

negotiating regional pride and national unity.

- **Policy Legitimacy**: The role of **expert committees**—often criticized for being top-down and disconnected from grassroots realities—needs reassessment.
- **Ideological Influence**: There is growing unease about the politicization of education policy and attempts to project a unified cultural identity, often perceived as exclusionary.

Way Forward

To address the concerns raised and build trust in future policymaking, the following steps are essential:

1. **Transparent Withdrawal**: The government must issue a clear and unambiguous Government Resolution (GR) officially scrapping the earlier orders.
2. **Expertise-Driven Consultation**: Include school education specialists, child psychologists, and language educators in future committees.
3. **Respect for Linguistic Diversity**: Policy decisions must align with Articles 29, 30, and 350A of the Indian Constitution, which guarantee minority rights, cultural autonomy, and instruction in the mother tongue at the primary level.
4. **Public Participation**: Education reforms must involve parents, teachers, and local communities to ensure they reflect ground realities and social aspirations.

Conclusion

- The Maharashtra government's decision to retract the three-language policy for primary classes is a testament to democratic resistance and the enduring relevance of federal principles in language policy.
- It also serves as a reminder that education governance must be inclusive, evidence-based, and sensitive to the plurality of Indian society.

Reservation Declared for 52 ALC Villages in Ladakh

Source: The Hindu

https://www.thehindu.com/news/national/52-villages-adjoining-lac-loc-in-leh-kargil-districts-declared-reserved-areas/article69752955.ece

UPSC Syllabus Relevance: GS3 Internal Security

Context:

Ladakh Reservation (Amendment) Regulation, 2025

Why in News

Ladakh administration notified 52 villages along the Actual Line of Control (ALC) as reserved areas under the amended reservation rules to extend benefits in recruitment and other sectors.

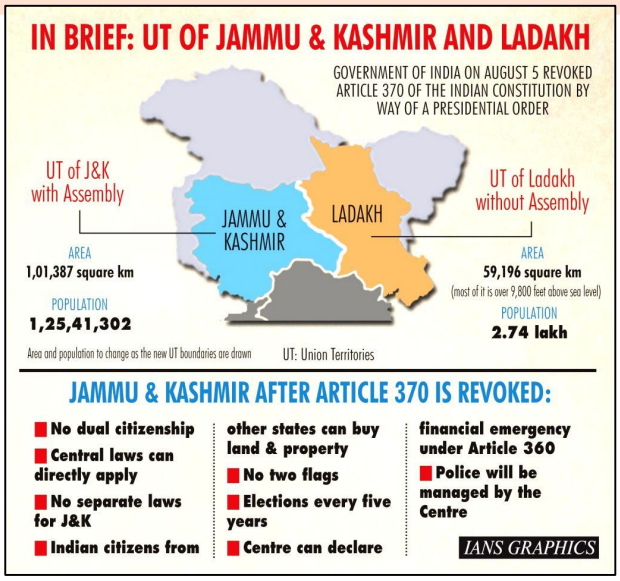
Introduction

- On June 29, 2025, the Union Territory administration of Ladakh issued a notification declaring 52 villages situated along the Actual Line of Control (ALC) as "reserved areas."
- This move aims to extend reservation benefits in recruitment, education, and other sectors to the residents of these identified villages under the Jammu and Kashmir Reservation Act, 2004, as amended by the Ladakh Reservation (Amendment) Regulation, 2025.

Background

- Following the abrogation of Article 370 and the bifurcation of the erstwhile state of Jammu and Kashmir in August 2019, Ladakh was constituted as a separate Union Territory without a legislature.
- The Jammu and Kashmir Reservation Act, 2004, which provides reservation to various categories including Scheduled Castes, Scheduled Tribes, and residents of backward areas and those living near the Line of Control (LoC) and Line of Actual Control (LAC), continued to be applicable to Ladakh with necessary modifications.
- In 2025, the Ladakh administration introduced an amendment to this Act

through the Ladakh Reservation (Amendment) Regulation, which empowered the Union Territory to identify and notify areas adjoining the ALC for the purpose of granting reservation benefits.



Scope and Distribution

The June 29, 2025 notification officially declared 52 villages as being located along the ALC and thus eligible for reservation under the amended Act. Of these:

- 18 revenue villages are located in Leh district, which shares boundaries with both the Line of Control and the Line of Actual Control.
- 34 revenue villages are located in Kargil district, which primarily borders the Line of Control.

Process Followed

The decision to notify these villages followed a systematic and transparent process:

1. A one-member Commission was constituted under the chairmanship of Justice Bansi Lal Bhat, a retired judge of the High Court of Jammu and Kashmir and Ladakh.
2. The Commission was tasked with identifying villages and hamlets in Ladakh that are located close to the Actual Line of Control.
3. After thorough field visits, consultations, and data collection, the Commission submitted its final report to the administration in December 2024.
4. An internal committee was then formed to examine the Commission's findings.
5. Based on the committee's recommendations, the Ladakh administration officially accepted and notified the villages listed in the Commission's report.

Objectives and Significance

- Residents of border villages in Ladakh often face developmental challenges such as limited access to infrastructure, healthcare, education, employment opportunities, and public services.
- Additionally, these areas are prone to natural hardships due to extreme climatic conditions and are subject to constant security threats due to their proximity to international borders.
- This declaration seeks to address such inequalities by extending reservation benefits in education, government employment, and welfare schemes.
- The move is expected to bridge socio-economic gaps and provide opportunities to the youth in these underdeveloped regions.

Strengthening Border Security and Local Governance

- By ensuring equitable development in border areas, the administration aims to discourage outmigration and maintain population presence in strategic frontier zones.
- This not only supports the livelihood of local communities but also strengthens national security by reinforcing civilian settlement in sensitive areas.
- Furthermore, it facilitates improved governance and delivery of government schemes to the grassroots level.

Legal Framework Involved

Jammu and Kashmir Reservation Act, 2004

- This Act originally provided for reservation in government jobs and educational institutions to Scheduled Castes, Scheduled Tribes, socially and educationally backward classes, and residents of areas adjoining the LoC/ALC.

Ladakh Reservation (Amendment) Regulation, 2025

- This regulation modified the application of the 2004 Act in the Union Territory of Ladakh and allowed the administration to revise the list of areas eligible for reservation.

Challenges

- Ensuring that the intended benefits of reservation actually reach the eligible individuals.
- Overcoming logistical and administrative hurdles in implementing reservation policies in remote and inaccessible terrain.
- Addressing the broader developmental needs of these areas, including road connectivity, school and healthcare infrastructure, and digital access.

Way Forward

- Strengthen institutional frameworks to monitor and implement reservation-related benefits effectively.
- Integrate the reservation policy with broader development programmes like the Vibrant Villages Programme, Pradhan Mantri Gram Sadak Yojana, and skill development initiatives.
- Involve local communities and Panchayati Raj institutions in the planning and execution of development schemes in border villages.

Conclusion

- The notification of 52 villages in Ladakh as ALC-reserved areas marks a significant step toward inclusive development and equitable access to opportunities in some of India's most remote and strategically important regions.
- By aligning reservation policy with national security and rural development objectives, this move reflects a holistic approach to governance in border areas.

INTERNATIONAL RELATIONS

China's Arunachal Claim Lacks Legal Backing

Source: The Hindu
https://www.thehindu.com/opinion/op-ed/chinas-claim-on-arunachal-not-supported-by-international-law/article69650305.ece
UPSC Relevance: GS2 International Relations

Context:

China's Renaming of Places in Arunachal Pradesh

Why in News

China has renamed 27 places in Arunachal Pradesh to reinforce its territorial claim over the Indian state, which it refers to as "Zangnan," challenging India's sovereignty and international legal norms.

Introduction

- China has once again attempted to assert its territorial claims over Arunachal Pradesh—referred to by Beijing as "Zangnan" or South Tibet—by **renaming 27 locations** in the Indian State.
- This unilateral move is part of a larger Chinese strategy to reinforce its claims through what it terms as "standardization" of place names.
- This tactic, rooted in its interpretation of sovereignty and historical entitlement, challenges well-established principles of international law.

China's Sovereignty-Based Claims and Historical Arguments

- China justifies its claims over Arunachal Pradesh by invoking the presence of significant Tibetan Buddhist institutions such as the **Tawang Monastery**, and the fact that the **sixth Dalai Lama was born in Tawang**.
- These are cited as indicators of historical and cultural ties between Tibet and the region.
- China's broader territorial claims, whether in **Arunachal Pradesh** or the **South China Sea**, are grounded in its rigid understanding of **sovereignty** and its **historical narrative**.
- Chinese legal scholars, like **Jianming Shen**, defend the doctrine of **consolidation by historical title**, arguing that the legal validity of historic claims should be evaluated based on the **international law prevalent at the time of acquisition**, not by contemporary legal standards.

Contradictions with Established International Law

However, this approach contradicts the **jurisprudence of the International Court of Justice (ICJ)**. The ICJ has **consistently rejected** historical consolidation as a legitimate basis for territorial title:

- In the **Land and Maritime Boundary between Cameroon and Nigeria** (ICJ Rep. 2002), the Court clarified that **historical consolidation** is not a recognized mode of acquiring sovereignty. It stated that this theory is "highly controversial" and cannot replace the **recognized modes of acquisition**, such as effective control or legal title.
- In the **Minquiers and Ecrehos case (UK v. France, 1953)**, the ICJ **relied on direct evidence** of sovereignty, rather than indirect historical presumption, to determine possession and ownership of territory.

Violation of Uti Possidetis Juris Principle

China's actions also contradict the **principle of *uti possidetis juris***, a Roman law doctrine adopted in international law, which asserts that **newly independent states should retain the colonial boundaries** in place at the time of independence.

- The **ICJ's judgment in the Frontier Dispute between Burkina Faso and Mali (1986)** reinforced this principle, emphasizing that legal title must be prioritized over effective possession. It recognized *uti possidetis* as crucial in maintaining **post-colonial territorial integrity** and preventing conflict.
- Although China refuses to recognize the **McMahon Line**, citing that Tibet could not legally sign the 1914 Shimla Convention, India and much of the international community recognize it as the legitimate boundary, consistent with the principle of *uti possidetis juris*.

Use of Cartographic Evidence and Its Legal Standing

China also attempts to validate its claims through **maps**, such as the infamous **nine-dash line** in the South China Sea or the publication of revised maps in Arunachal Pradesh. However, international law is clear on the **limited legal value of maps**:

- In the **Frontier Dispute (1986)**, the ICJ ruled that maps are merely "information" and **cannot constitute a territorial title** by themselves. They may only be considered as **supplementary evidence**, and their reliability varies depending on context and corroboration.

Solution

- India must continue to assert its position using **diplomatic and legal tools** within the framework of **international law**.
- International forums and courts must remain vigilant against attempts to **unilaterally alter boundaries**.
- Upholding the **rule-based global order** is essential to maintaining peace, stability, and cooperation in the region.

Conclusion:

China's assertive renaming of locations in Arunachal Pradesh and its expansive maritime claims in the South China Sea reflect a unilateral approach rooted in sovereignty and historical interpretation. However, such claims **do not align with established principles of international law**, including:

- Rejection of historical consolidation as a legal title,
- Recognition of colonial-era boundaries under *uti possidetis juris*, and
- Limited evidentiary value of cartographic materials.

Strengthening the U.S.-India subsea cable agenda

Source: The Hindu

https://www.thehindu.com/opinion/op-ed/strengthening-the-us-india-subsea-cable-agenda/article69649909.ece

UPSC Syllabus Relevance: **GS 2 International Relations**

Context:

India-U.S. Cooperation on Digital Infrastructure

Why in News

India and the United States are intensifying cooperation on subsea cable infrastructure under the TRUST framework to enhance digital resilience and counter China's influence in the Indo-Pacific.

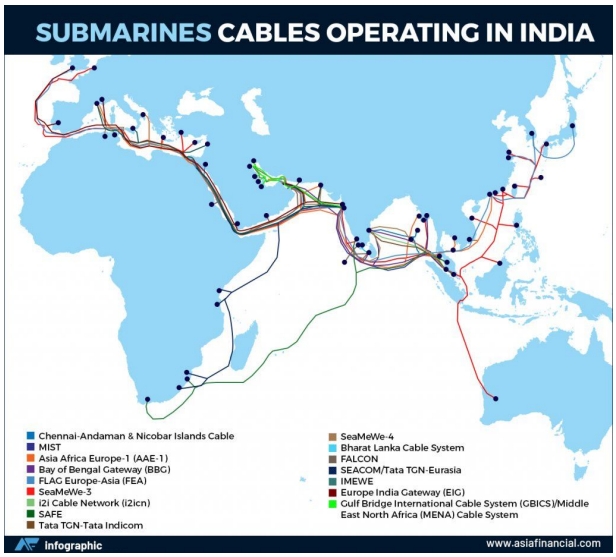
Introduction

- In an era marked by digital interdependence, the strategic and commercial relationship between India and the United States is deepening, particularly in critical technologies and digital infrastructure.
- While much attention has focused on an imminent bilateral trade agreement and the Technology for Resilient, Open and Unified Security and Trust (TRUST) framework — the successor to iCET (Initiative on Critical and Emerging Technology) — an equally important yet less discussed area is **subsea cables**.
- These cables form the physical foundation of global digital connectivity and are

increasingly becoming a frontline issue in geostrategic rivalry, especially in the Indo-Pacific.

Significance of Subsea Cables

- **Backbone of Global Internet**: Over **95% of international data traffic** is transmitted through subsea fiber-optic cables. From financial transactions to military communications, these cables underpin almost all global digital interactions.
- **Cloud and Critical Infrastructure**: Once landed, these cables connect to cloud data centers and national digital infrastructure, making their security a matter of national interest.
- **Strategic Asset**: In the context of growing **Chinese investments in subsea infrastructure** under its *Digital Silk Road Initiative*, trusted and secure alternatives have become essential for maintaining open and resilient communication networks.



India's Current Position and Challenges

1. Inadequate Infrastructure

- India currently has only **17 international subsea cables**, significantly fewer than **Singapore's 26**, despite India's much larger geographic size and coastline.
- Cable landing stations are **concentrated in five coastal cities** — Mumbai, Chennai, Kochi, Tuticorin, and Thiruvananthapuram — leading to a vulnerability in case of regional disruptions.

2. Bottlenecks in Licensing and Maintenance

- Setting up subsea cables in India involves navigating **over 50 clearances from multiple ministries**, creating high entry barriers for global investors.
- India depends on **foreign-flagged cable repair ships** based in **Singapore and Dubai**, resulting in **3–5-month delays** in repairing outages due to customs and naval clearance issues.

Strategic Opportunity for India

1. Geographic Advantage

- India's location near strategic maritime choke points — **Strait of Hormuz, Bab-el-Mandeb, and Strait of Malacca** — positions it as a **natural transit hub** for global cable networks.
- India lies at the **crossroads of Europe-Africa-Asia cable routes**, providing an opportunity to become a digital connectivity hub for the **Global South**.

2. Rising Digital Demand

- India's **bandwidth demand** is projected to grow at **38% CAGR between 2021 and 2028**, driven by data consumption, digital services, and growing cloud infrastructure.
- India's digital economy — one of the fastest-growing in the world — demands resilient and high-capacity subsea connectivity to sustain its momentum.

India-U.S. Collaboration: A Strategic Imperative

The **TRUST framework**, evolving out of the U.S.-India iCET, recognizes India's role as a **net security provider in the Indo-Pacific**. Subsea cables now fall under the strategic purview of this framework, with implications in both security and commerce.

Areas of Cooperation

1. **Infrastructure Investment**
   - Joint investment in **resilient and trusted subsea cable routes** using **secure vendors**.
   - Encouragement of U.S. tech companies to take anchor positions in Indian cable projects (e.g., Meta's 50,000-km Indian

Ocean cable).

2. **Technology and Cybersecurity**
   - Collaboration on **cybersecurity for subsea cables**, cable landing stations, and associated infrastructure.
   - Establishing a **redundant and distributed network of landing points** across India's extensive coastline.
3. **Domestic Ecosystem Development**
   - Support for India to develop a **homegrown cable repair ecosystem**, including **Indian-flagged vessels**, crew training, and depot infrastructure.
4. **Regulatory Reforms**
   - Advocacy for India to simplify the **licensing regime** for subsea cable projects, thereby attracting greater private sector investment.

Strategic Significance in the Indo-Pacific

- Enhanced India-U.S. cooperation in subsea cables is a **geostrategic counter to China's Digital Silk Road**, particularly in Southeast Asia, Africa, and the Indian Ocean Region.
- It aligns with **U.S. objectives** to promote open, secure, and resilient infrastructure in the Indo-Pacific, while reinforcing India's aspirations to become a **regional digital power**.

Way Forward

- Simplify India's cable licensing framework.
- Invest in domestic cable repair and maintenance capabilities.
- Ensure diversification of cable landing stations across India.
- Implement the TRUST framework with clear deliverables.
- Institutionalize bilateral subsea cable cooperation within broader trade and tech agreements.

Such steps will not only **enhance regional digital resilience** but also establish India as a **key digital transit hub** in the Indo-Pacific, while fortifying U.S. strategic presence in the region.

Conclusion

- As digital infrastructure becomes central to global commerce and security, **subsea cables have emerged as a strategic asset**. Strengthening cooperation between India and the United States in this domain will serve **shared economic, security, and geopolitical goals**.
- With India's demographic and geographic advantage, combined with U.S. technological and financial capabilities, this partnership can set global standards in trusted digital connectivity.

India-Paraguay Pledge Stronger Ties, Joint Stand Against Terror

Source: Indian Express

https://indianexpress.com/article/india/india-paraguay-vow-to-boost-ties-united-against-terror-pm-10044684/

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

India-Paraguay Relations

Why in News?

Paraguayan President Santiago Peña Palacios visited India, becoming the first foreign head of state hosted by India after Operation Sindoor.

Changing Rainfall Patterns and the Impact of Climate Change

- In a significant diplomatic engagement post-Operation Sindoor, Prime Minister hosted Paraguayan President Santiago Peña Palacios, marking the first visit by a foreign head of state since the operation.
- The visit, spanning three days, is aimed at deepening India-Paraguay ties and expanding cooperation across multiple sectors.

Strategic and Security Cooperation

- Both leaders emphasized their shared commitment to counter-terrorism and global security.
- Prime Minister highlighted that India and Paraguay stand "united in the fight against

terrorism" and face "shared challenges" such as cybercrime, organised crime, and drug trafficking.

- This common ground underlines the strategic convergence between the two nations, especially as members of the Global South, facing similar development challenges and aspirations.
- PM expressed appreciation for Paraguay's strong condemnation of the recent terrorist attack in Pahalgam, Jammu & Kashmir, and acknowledged the solidarity shown by President Peña and the people of Paraguay.

Strengthening Institutional Mechanisms

- A key outcome of the visit was the establishment of a **Joint Commission Mechanism (JCM)** at the Secretary/Vice-Ministerial level.
- This platform will facilitate structured dialogue and periodic review of cooperation in priority areas such as trade, agriculture, digital technology, and defence.

Expanding Trade and Economic Partnerships

- Highlighting trade as a cornerstone of bilateral relations, Prime Minister pointed to India's preferential trade arrangement with **MERCOSUR**, the South American trade bloc comprising Argentina, Brazil, Paraguay, and Uruguay.
- President Peña's visit is only the second-ever by a Paraguayan president to India, underscoring the growing importance both countries attach to their bilateral relations.

Cooperation in Agriculture, Digital Technology, and Defence

- Paraguay's interest in India's agricultural digital platform **AgriStack** was a point of convergence during the talks.
- As a nation with a strong agrarian base, Paraguay is keen to adopt digital technologies to improve agricultural efficiency—an area where India's innovations can provide significant value.
- Defence cooperation was also discussed, with emphasis on Paraguay's requirement for hardware geared towards law enforcement rather than conventional military needs.
- This opens up a niche domain for Indian defence exports and capacity building.

Broader Sectoral Engagements

In addition to agriculture and defence, both sides acknowledged new avenues for collaboration in:

- Critical minerals
- Energy
- Healthcare
- Railways
- Space cooperation

Implications for India–Latin America Relations

- President Peña's visit is being seen as a stepping stone to enhancing **India-Latin America** ties.
- The focus on trust, trade, and technological cooperation aligns with India's broader strategy to engage with emerging economies in the Global South and diversify its diplomatic and economic partnerships beyond traditional regions.

Conclusion

- President Santiago Peña's visit marks a strategic deepening of India-Paraguay relations, with long-term implications for India's outreach to Latin America.
- The emphasis on combating shared security threats, enhancing trade, and promoting digital and agricultural cooperation demonstrates the potential for a robust partnership in the years ahead.

India and Australia Strengthen Counterterrorism Cooperation

Source: The Hindu

https://www.thehindu.com/news/national/india-australia-agree-to-work-together-to-combat-terrorism-in-all-its-forms/article69656839.ece

UPSC Syllabus Relevance: GS2 International Relations

Context:

India-Australia Comprehensive Strategic Partnership

Why in News

India and Australia, on the occasion of the fifth anniversary of their Comprehensive Strategic Partnership (CSP), held a high-level bilateral meeting in New Delhi in June 2025.

Background:

- The India-Australia Comprehensive Strategic Partnership was launched in 2020 during a virtual summit between Prime Minister Narendra Modi and then Australian Prime Minister Scott Morrison.
- This partnership marked a significant elevation in bilateral relations and established new frameworks for cooperation in defence, economic engagement, education, maritime affairs, and climate action.

Key Areas of Defence and Strategic Cooperation

Counter-Terrorism Cooperation

- Both countries unequivocally condemned the recent terror attack in Pahalgam, Jammu and Kashmir.
- India reiterated its right to respond in self-defence against cross-border terrorism and highlighted its policy of making no distinction between terrorists and those who shelter them.
- India conveyed concerns regarding any defence exports to Pakistan that might fall into the hands of terrorist entities.

Maritime Security and Naval Collaboration

- Discussions focused on joint production of naval platforms and enhanced maritime cooperation.
- India promoted its potential as a regional hub for ship repair and maintenance.
- Both sides emphasized the importance of upholding freedom of navigation and the rule of law in the Indo-Pacific region.

Defence Industry and Technology

- The two sides signed a new Australia-India Joint Research Project aimed at strengthening collaboration in defence science and technology.
- The upcoming third India-Australia 2+2 Ministerial Dialogue, scheduled in Australia later in 2025, is expected to further these engagements.
- Areas of cooperation include cyber security, hydrography, surveillance technologies, and new and emerging defence technologies.

Regional and Global Strategic Alignment

- India and Australia share strategic convergence on maintaining a free, open, inclusive, and rules-based Indo-Pacific.
- There was mutual agreement to collaborate in the Indian Ocean and Pacific Island regions to ensure peace, stability, and regional resilience.
- Both nations reaffirmed their commitment to multilateralism and global norms-based order.

Developments in Science, Space and Technology

- In February 2021, the Indian Space Research Organisation (ISRO) and the Australian

Space Agency amended their earlier Memorandum of Understanding to broaden bilateral cooperation.

- Key areas of space cooperation include satellite tracking, deep space missions, and joint research initiatives aligned with the Comprehensive Strategic Partnership framework.

Expansion of Cooperation in Education, Trade, and Renewable Energy

Education

- Educational exchanges have grown substantially, with over 1.4 lakh Indian students enrolled in Australian universities in 2024.
- Australian universities have established the first foreign branch campuses in India, signalling a major transformation in educational engagement.

Trade and Economic Cooperation

- The signing of the India-Australia Economic Cooperation and Trade Agreement (ECTA) has provided momentum to bilateral trade and investment.
- This agreement facilitates easier market access and strengthens economic interdependence.

Renewable Energy and Climate Cooperation

- The India-Australia Renewable Energy Partnership supports India's target of installing 10 million rooftop solar units by 2030.
- Australia's expertise in clean energy is expected to contribute significantly to India's energy transition goals.

Institutional Frameworks and Dialogues

- The second India-Australia 2+2 Ministerial Dialogue was held in November 2023, with the third expected in 2025.
- The ninth round of India-Australia Defence Policy Talks took place in March 2025 in New Delhi.
- The Annual Leaders' Summit (November 2024) and Secretary-level inter-sessional consultations (October 2024) have ensured continuous engagement and review of progress across sectors.

Strategic Significance for India

Area	Strategic Implication
Defence Cooperation	Enhances India's indigenous defence manufacturing capabilities and maritime presence
Counter-Terrorism	Strengthens India's diplomatic efforts against global terrorism
Indo-Pacific Strategy	Reinforces India's role as a key actor in maintaining regional stability
Education and Human Capital	Deepens people-to-people ties and facilitates skill development
Renewable Energy	Aids in achieving national targets for clean energy and sustainability

Way Forward

- India and Australia should deepen joint defence production initiatives and increase military-to-military engagements.
- Both sides must institutionalize collaboration in cybersecurity and emerging technologies to counter new-age threats.
- Enhanced coordination in Indo-Pacific maritime surveillance and humanitarian assistance missions can promote regional peace.
- Expanding collaboration in the green economy, including green hydrogen and battery technologies, will benefit both nations.
- Education and research partnerships should be broadened to include vocational training and digital education delivery.

Bangladesh Drops 'Father of the Nation' Title for Sheikh Mujibur Rahman

Source: The Hindu
https://www.thehindu.com/news/international/b

angladesh-drops-the-title-of-father-of-the-nation-for-sheikh-mujibur-rahman/article69656870.ece

UPSC Syllabus Relevance: GS2 International Relations

Context:

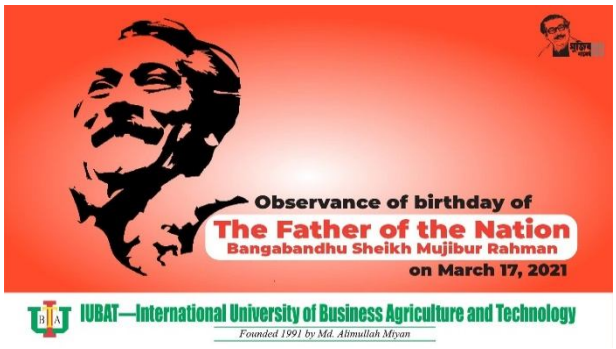
Political Developments in Bangladesh

Why in News?

The interim government of Bangladesh amended the 2022 Liberation War Act, removing all references to Sheikh Mujibur Rahman as the Father of the Nation (Jatir Pita).

Introduction

- In June 2025, the **interim government of Bangladesh**, led by Prof. Mohammed Yunus, made significant alterations to national laws and symbols that have long commemorated **Sheikh Mujibur Rahman**, popularly known as the *Jatir Pita* (Father of the Nation).
- These changes mark a significant shift in the country's post-liberation narrative and reflect deep political realignments following the fall of the **Awami League** government in August 2024.



Key Developments

1. Amendment to the Liberation War Act

- The **2022 version of the Liberation War Act** had explicitly referred to Sheikh Mujibur Rahman as the *Father of the Nation*.
- The **revised 2025 version**, notified on **June 3**, omits all references to Sheikh Mujib as "Jatir Pita", while still acknowledging the role of the 1971 freedom fighters.
- The **Mujib Bahini**, a pro-Awami League guerrilla force in the 1971 war, has also been excluded from the list of recognized freedom fighters. This affects their and their families' eligibility for state benefits.

2. Currency Redesign

- New banknotes introduced by the interim government removed the iconic image of Sheikh Mujibur Rahman.
- The updated design emphasizes **pluralistic and non-partisan symbols**, downplaying the political legacy of Mujib.

3. Destruction of Sheikh Mujib's Symbols

- On **February 5, 2025**, mobs destroyed the **Mujibur Rahman Museum at 32 Dhanmondi**, the site of his assassination in 1975.
- A **statue of Sheikh Mujib** was also brought down shortly after Sheikh Hasina's departure in **August 2024**.

4. Suspension of Awami League Activities

- In **May 2025**, the interim administration **banned the political activities** of the Awami League, which was co-founded by Sheikh Mujib.
- The interim regime accuses the Awami League of **political excesses and authoritarianism** during its **15-year rule (2009–2024)**.

New Definition of Freedom Fighters

- The new legal framework **broadens** the scope of who is considered a freedom fighter:
  - Includes those who **supported the cause of independence** through "advocacy and campaigning".
  - Introduces the category of **"Associates of the Liberation War"** for indirect or non-combat support during the period of **26 March to 16 December 1971**.

Implications

1. Political Reorientation

- Marks a **systematic effort to deconstruct the Mujib-centered nationalist narrative** that has been dominant under the Awami League.
- Could pave the way for alternative historical accounts and new political players in Bangladesh.

2. Marginalization of the Awami League

- Removal of symbolic recognition from Sheikh Mujib and his affiliated groups directly impacts the Awami League's **ideological legitimacy** and **political base**.

3. Erosion of National Consensus

- Sheikh Mujibur Rahman has historically served as a **unifying figure** in Bangladesh's post-independence identity.
- His exclusion may **polarize national discourse** and deepen divisions over the **legacy of the Liberation War**.

4. Legal and Welfare Ramifications

- Exclusion of **Mujib Bahini** veterans from the official list of freedom fighters could **deny them pensions and state honours**, creating **legal and humanitarian concerns**.

5. Rise of Revisionist History

- The government's reinterpretation of historical events could lead to **contestation over historical facts**, especially in education and public memory.

Conclusion

- The developments in Bangladesh represent a **critical juncture in the nation's political and historical trajectory**.
- The removal of Sheikh Mujibur Rahman's name and image from foundational symbols and documents signals not just a **transition of power**, but a **redefinition of national identity**.
- For India and the South Asian region, these shifts warrant close observation, as they can influence **regional stability**, **bilateral relations**, and **the role of democratic institutions** in Bangladesh.

China rare earth mineral export ban impact

Source: Indian Express

https://indianexpress.com/article/business/suzuki-swift-suspend-china-rare-earth-mineral-export-ban-10050475/?ref=hometop_hp

UPSC Relevance: **GS2 International Relations, GS 3- Economy**

Context:

China's new restrictions on the export of rare earth magnets

Why in News

Suzuki Motor became the first Japanese automaker to halt Swift production due to China's new restrictions on the export of rare earth magnets, highlighting global supply chain vulnerabilities.

Introduction

- China imposed new restrictions on the export of rare earth magnets and associated materials from **April 4, 2025**, as a retaliatory measure against recent US tariffs.
- This move has begun affecting global automobile production, including that of Japanese automaker **Suzuki**, and is raising concerns in **India's emerging EV market**.

What are Rare Earth Magnets and Why are They Important?

- Rare earth magnets are **strong permanent magnets** made from alloys of rare earth elements.
- The most widely used type is **Neodymium-Iron-Boron (NdFeB)**.
- **Key Uses in Automobiles**:
  - **Electric Motors**: Critical for traction motors in EVs due to high efficiency and power-to-weight ratio.
  - **Other Components**: Also used in **power steering systems, braking systems, air conditioners, wiper motors**, and more.
- **Strategic Importance**:
  - These magnets are not easily substitutable.
  - China controls **up to 90% of global rare**

earth processing, creating a supply-chain monopoly.

China's Trade Restrictions – Details

- China has **not imposed a full ban**, but:
  - **Export permits** are now mandatory.
  - The process has become **opaque and delayed**, effectively restricting timely access.
  - Exporters must now **declare end-use** and **assure magnets will not be used for military purposes**.
- **Materials under restriction** include:
  - **Rare earth magnets**
  - **Seven heavy rare earth metals**: samarium, gadolinium, terbium, dysprosium, lutetium, scandium, yttrium.
  - Previously banned: **gallium, germanium, antimony**, and others.

Impact on the Global Auto Industry

1. Japan – Suzuki Motor (Hamamatsu-based):

- **Production of Swift compact hatchback halted** from May 26 (except Swift Sport).
- Cited **component shortages** due to rare earth supply disruptions.
- Resumption expected **partially from June 13, fully after June 16**.

2. Germany – Volkswagen:

- Lobbied with Chinese authorities to resume **export permits** to its suppliers.
- Was among the **first beneficiaries** of the reissued permits.

Impact on Indian Auto Industry – Particularly EV Makers

- **Current Status**:
  - Maruti (Suzuki's Indian arm): No immediate production impact.
  - Indian automakers have **used up inventories**; a **shortage looms**.
- **Concerns**:
  - **Cost-sensitive EV market** may face:
    - **Price hikes**
    - **Production delays**
  - **Long-term supply risk** if Chinese export restrictions continue.
- **Industry Response**:
  - Dialogues ongoing with Indian government.
  - Seeking **procurement alternatives** and **policy intervention**.

Strategic Issues with Sourcing Complete Motors vs. Magnets

- **Beijing's Push**: Car companies to **buy full motor assemblies** instead of just magnets.
- **Challenges**:
  - Motors come in **standard sizes** — may not fit existing designs.
  - **Redesigning vehicles** is costly and time-consuming.
  - **Loss of flexibility**: Earlier, carmakers could calibrate motor design using magnets independently.

Geopolitical and Strategic Dimensions

- China is leveraging its **monopoly over rare earth processing** for geopolitical gains.
- Reflects a broader pattern of **geo-economic coercion**, especially in **high-tech sectors**.
- Similar actions seen in the past:
  - 2010: China halted rare earth exports to Japan over Senkaku island dispute.
- **US, Japan, and India** are now seeking **supply chain diversification**, but:
  - **Processing capacity** takes years to build.
  - **Environmental regulations** and **technical expertise** are major hurdles.

India's Policy Response – Way Forward

1. **Short-term**:
   - Diplomatic engagement with China.
   - Strategic stockpiling of critical rare earth components.
2. **Medium-term**:
   - Sourcing from **alternate suppliers**: Australia, Vietnam, African countries.
   - **Incentivizing local R&D** into alternatives for rare earths (e.g., induction motors, ferrite magnets).

3. **Long-term**:
   - **Setting up domestic rare earth processing plants**.
   - Collaborating in **Quad/BRICS mineral alliances** to reduce dependency on China.

Conclusion

- China's restrictions on rare earth magnets have exposed the vulnerabilities of global auto and EV supply chains.
- For India, this is both a challenge and an opportunity — to reconfigure its industrial and trade policy to reduce dependency on single-source imports and boost domestic capacity in critical technologies essential for energy transition and strategic autonomy.

United Nations Ocean Conference Commences in France on World Oceans Day

Source: The Hindu

https://www.thehindu.com/news/international/un-ocean-conference-sets-sail-off-france-on-world-oceans-day/article69672280.ece

UPSC Relevance: GS2 International Relations

Context:

Third United Nations Ocean Conference (UNOC)

Why in News

The Third United Nations Ocean Conference (UNOC) was inaugurated in Nice, France, highlighting the theme "Ocean Wonders" and urging urgent global action to protect marine ecosystems.

Introduction

- The third **United Nations Ocean Conference (UNOC)** commenced on **June 8, 2025**, aligning with **World Oceans Day**, under the theme *"Ocean Wonders"*.
- The event spotlighted the unparalleled ecological and economic value of the oceans while warning against the mounting global threats they face.
- Hosted in **Nice, France**, this pivotal gathering of **global leaders, marine scientists, environmental advocates, and policymakers** aims to bridge the gap between **promises and protection**.

Significance of the Conference

The oceans, covering **over 70% of the Earth's surface**, are vital for:

- **Regulating global climate systems**
- **Supporting biodiversity**
- **Sustaining livelihoods** for over 3 billion people
- **Absorbing carbon emissions** and producing oxygen

Despite their significance, oceans are under siege due to **climate change**, **plastic pollution**, and **unsustainable resource extraction**. The UN has declared this situation a **"global emergency."**

Opening Event: "Ocean Wonders" Fleet Procession

- To inaugurate the conference and showcase marine innovation, **dozens of exploration and research vessels** sailed across Nice's iconic **Bay of Angels (Baie des Anges)**.
- The event served as a visual and symbolic celebration of marine heritage and scientific advancement.

Key Vessels Participating:

1. **Energy Observer**
   - First vessel to **circumnavigate the globe on renewable energy alone**
   - Utilizes **solar panels** and **onboard seawater electrolysis** to produce **hydrogen fuel**
   - Symbolizes the future of **zero-emission maritime transport**
2. **Alfred Merlin** (France)

- Focus: **Underwater archaeology**
- Represents **marine cultural heritage preservation**

3. **OceanXplorer**
   - State-of-the-art **research yacht** funded by private philanthropy
   - Supports ocean science, exploration, and education
4. **WWF's Blue Panda**
   - Mission: Mapping and conserving **Mediterranean seagrass meadows**
   - Supports **ecosystem restoration and biodiversity**

These vessels will remain **open to the public** until June 13, providing education on marine science and conservation.

Core Agenda and Objectives

1. Ratification of the High Seas Treaty (2023)

- For the **first time**, countries will be able to **designate marine protected areas (MPAs) in international waters**
- These **high seas**, which cover **nearly two-thirds** of the world's oceans, remain largely **unregulated**
- Treaty aims to regulate **deep-sea mining**, **bioprospecting**, and promote **biodiversity conservation**

2. Expansion of Marine Protected Areas (MPAs)

- **Only 2.7%** of global oceans are currently under effective protection
- This is well below the **global target of 30% coverage by 2030 (30x30 Goal)**
- Several countries are expected to announce:
  - New MPAs
  - **Bans on bottom trawling** and **industrial fishing** within existing MPAs

3. Strengthening Enforcement

- Even protected zones suffer from **poor enforcement and weak regulatory oversight**
- France and other nations face scrutiny over **continued industrial activities** in MPAs
- Emphasis on:
  - **Capacity building**
  - **Monitoring and surveillance technologies**
  - **Community involvement in enforcement**

Broader Implications for Global Governance

The conference signifies a global pivot toward **rules-based ocean governance**, linking it to:

- **Sustainable Development Goal (SDG) 14**: *"Life Below Water"*
- **Climate targets** under the **Paris Agreement**
- **Blue economy frameworks** promoting sustainable marine industries

Conclusion

- The 2025 UN Ocean Conference in Nice acts as a **critical juncture** for ocean diplomacy.
- While the ceremonial "Ocean Wonders" fleet captures the imagination, the true test lies in how world leaders translate **scientific evidence and international treaties into enforceable, equitable, and sustainable ocean policies**.
- In the face of a rapidly deteriorating marine environment, this conference offers a chance to anchor hope in concrete action.

US terminates Temporary Protected Status for Nepal

Source: Indian Express

https://indianexpress.com/article/world/us-terminates-temporary-protected-status-nepal-10054748/

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

Termination of TPS for Nepal

Why in News?

The United States has announced the termination of Temporary Protected Status (TPS) for Nepal, effective June 24, 2025.

Introduction

- The United States Department of Homeland Security (DHS) has announced the termination of Temporary Protected Status

(TPS) for Nepal, effective June 24, 2025, with a 60-day transition period ending August 5, 2025.

- This move is expected to impact over 7,000 Nepali nationals currently residing in the US under TPS.

What is Temporary Protected Status (TPS)?

TPS is a temporary immigration status provided to nationals of certain countries experiencing:

- Ongoing armed conflict (e.g., civil war),
- Environmental disaster (e.g., earthquake, hurricane),
- Epidemic or other extraordinary conditions that prevent safe return.

Benefits of TPS:

- Protection from deportation,
- Authorization to work legally,
- Temporary stay for up to 18 months, extendable based on conditions in the home country.

Background: TPS for Nepal

- **Initial Designation:** Nepal was designated for TPS on **June 24, 2015**, following the **devastating 7.8 magnitude earthquake** that caused massive loss of life and destruction.
- **Extensions:** The TPS designation was **extended multiple times**, most recently in **2016**, owing to the slow recovery and rebuilding process in Nepal.
- **Population Affected:** Around **12,700 Nepalese nationals** benefited from TPS. Of these, more than **5,500 have acquired lawful permanent residency**, while **about 7,000** remain under TPS protection.

Reasons for Termination

According to the **DHS notice** and the Secretary Kristi Noem:

"After reviewing country conditions and consulting with appropriate US government agencies, it has been determined that Nepal no longer meets the conditions required for TPS."

This suggests that:

- The US government considers **Nepal's recovery from the 2015 earthquake** sufficient.
- The country is seen as **safe enough** for the return of its nationals.
- There is **no longer a substantial, temporary disruption** of living conditions that justifies continued protection.

Implications of TPS Termination

1. For Nepalese Nationals in the US

- **Loss of Legal Protection**: Around **7,000 individuals** will lose TPS status and be subject to **deportation proceedings** unless they find another legal route.
- **Transition Period**: A **60-day grace period** (until **August 5, 2025**) has been provided to allow individuals to prepare for departure or change their immigration status.
- **Legal and Economic Insecurity**: Families may face **disruption in employment**, healthcare access, and education, especially for children born in the US.

2. For the Government of Nepal

- **Repatriation Burden**: Nepal may face **socio-economic pressure** in reintegrating thousands of returnees.
- **Remittance Impact**: Return of migrants could **reduce remittance inflows**, a key component of Nepal's GDP.
- **Diplomatic Strain**: The decision could lead to **diplomatic discussions** between the US and Nepal, especially regarding future migration agreements.

3. For US Domestic Policy

- **Immigration Politics**: The termination reflects a broader **trend of tightening immigration controls**, consistent with past

policies under the **Trump administration**, which had attempted similar moves.

- **Human Rights Concerns**: Civil society groups in the US may raise **concerns over humanitarian obligations**, arguing that Nepal still faces economic and infrastructure challenges.

Legal and Ethical Considerations

- The **Immigration and Nationality Act (INA)** requires that TPS be terminated when the original conditions no longer exist.
- However, critics argue that **TPS terminations** often overlook **long-term vulnerabilities** and **individual assimilation levels**.
- Ethical debates arise over the **rights of TPS beneficiaries**, especially those who have lived, worked, and raised families in the US for nearly a decade.

Way Forward

For Affected Individuals:

- Explore **alternative legal avenues**, such as:
  - Change of status (student, work visa),
  - Family-based immigration petitions,
  - Asylum applications (if applicable).

For Nepal:

- Develop a **repatriation and reintegration policy**, focusing on:
  - Employment opportunities,
  - Social safety nets,
  - Community-based rehabilitation.

For US-Nepal Relations:

- Engage in **bilateral dialogue** to explore:
  - Future skilled worker mobility pathways,
  - Cooperation on disaster resilience and economic development.

Conclusion

- The termination of TPS for Nepal marks a significant shift in US immigration policy toward the country.
- While legally justified under current laws, the humanitarian and economic consequences warrant careful management by both nations.
- The episode also underscores the **temporary and uncertain nature of TPS**, urging the global community to think of **more sustainable migration policies** in the face of natural disasters and displacement.

India's Pitch for a T20: Building a Global South Alliance Against Terrorism

Source: Indian Express

https://indianexpress.com/article/opinion/columns/t20-global-south-case-india-led-bloc-against-terrorism-10057590/

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

Terrorism

Why in News

India's Operation Sindoor after the Pahalgam terror attack has led to calls for a Global South-led counter-terror platform — T20 (Twenty Against Terrorism).

Introduction

- The **Pahalgam terror attack** and India's military retaliation, **Operation Sindoor**, have reignited the debate on the inadequacy of existing global institutions in addressing terrorism—particularly as it impacts the **Global South**.
- In response, a novel idea has been proposed: **T20 — Twenty Against Terrorism**, a coalition led by India of 20 nations disproportionately affected by asymmetric and ideologically driven terror threats.

India's Response and the Global Diplomatic Gap

- **Operation Sindoor** demonstrated India's capability in conducting **swift, surgical, and proportionate counter-terror strikes**.
- While countries like **the US, France, and Israel** expressed support, multilateral bodies such as the **UN and OIC** issued vague

appeals for "restraint," highlighting:

- **Diplomatic duplicity** and **lack of consensus**.
- Influence of **geopolitical rivalries**, especially **China's shielding of Pakistan**.
- A security paradigm rooted in **Western episodic terror experience**, detached from **persistent terror realities** in regions like South Asia, Africa, and the Middle East.

The Case for T20: Rationale and Objectives

T20 aims to bridge the structural and strategic gap by offering a **Global South-centric** counter-terror alliance. Key objectives:

1. **Agile Intelligence Sharing** via a **Joint Task Force**.
2. **Capacity Building & Counter-Radicalisation** initiatives.
3. **Joint Diplomatic Front** to name and shame state sponsors of terror.
4. Addressing **emerging terror trends**: cyber-terrorism, drone warfare, crypto-financing.

Why India Can Lead

- Decades of experience in **countering cross-border terrorism**.
- Proven **military precision** and **diplomatic maturity**.
- Credibility in the **Global South** as a **non-Western, responsible power**.
- Technological and institutional capacity to host the **T20 Secretariat**.

Strategic and Moral Imperatives

- **Strategically**, T20 enhances India's **leadership without military entanglements**.
- **Morally**, it ensures representation of terror-affected countries **often ignored** in global forums — such as **Nigeria, Kenya, Mali, Vietnam**, etc.
- Aligns with the trend of **nimble multilateralism** (Quad, I2U2, ASEAN), countering the **stagnation of large institutions** like the UN.

Conclusion

- While **Operation Sindoor** was a necessary immediate response, the need for a **permanent, inclusive, and action-oriented platform** like **T20** is clear.
- It is not a substitute for existing bodies but a **complementary conscience-keeper** that centres the **lived experience of terror** in the Global South.

Trump's tariffs and a U.S.-India trade agreement

Source: The Hindu
https://www.thehindu.com/opinion/lead/trumps-tariffs-and-a-us-india-trade-agreement/article69688234.ece

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

Tariffs and a U.S.-India trade

Why in News

The U.S. Court of International Trade (CIT) challenged President Trump's sweeping global tariffs as unconstitutional and unlawful.

Background:

- On May 28, 2025, the U.S. Court of International Trade (CIT) delivered a landmark ruling that challenged the legality of sweeping tariffs imposed by U.S. President Donald Trump.
- The case was brought not by rival nations, but by **five small U.S. businesses**, which

argued that these tariffs were unlawful and harmful to their operations.

- This development holds **significant implications for India**, which faces increased tariffs despite a supposed mutual settlement at the WTO.
- It also raises broader questions about the legality of executive overreach in the U.S., the role of trade deficits, and the state of multilateral trade norms.

Understanding Trump's Tariff Regime

- Between 2017 and 2025, President Trump imposed **broad-based tariffs** ranging from **10% to 135%**, impacting over **100 countries**, including allies and trade partners like India, Japan, and the EU.
- The justification was a supposed **"national emergency"** created by persistent **trade deficits**.
- Tariffs were even extended to remote, uninhabited places like the Heard and McDonald Islands, highlighting the absurdity and scale of the executive order.
- These actions **undermined multilateral trade commitments**, particularly **WTO-bound tariff commitments**, and disrupted global supply chains.

Constitutional Concerns in the U.S.

- The U.S. Constitution follows a **separation of powers** between the executive, legislature, and judiciary.
- By **unilaterally imposing tariffs**, the executive bypassed Congressional oversight and undermined the rule of law.
- The U.S. Court of International Trade (CIT) noted that:
  - A mere invocation of **"national emergency"** cannot override constitutional checks.
  - The **President cannot re-write binding international commitments** on tariffs.

This ruling reasserted judicial oversight over executive action and upheld the sanctity of international trade law.

The Trade Deficit Argument

- A **trade deficit** means that a country's imports exceed exports. But it's not inherently negative.
- The Trump administration's calculations **excluded services** — a major strength of the U.S. economy.
- **Example**:
  - U.S. cited a **$44.4 billion goods trade deficit** with India.
  - But after accounting for **services and arms trade**, the U.S. actually has a **$35–40 billion surplus** with India (Global Trade Research Initiative).

The rationale behind the tariffs lacked empirical and legal justification.

India's Position: Between Cooperation and Coercion

- India was hit with **increased tariffs** (from 25% to 50%) on **steel and aluminium**, despite previously reaching a **"mutually agreed solution"** at the WTO in 2023.
- India had **withdrawn its WTO case** against U.S. tariffs under Trump's first term, expecting reprieve.
- Now, with further tariff escalation, **India faces a dilemma**:
  - Retaliate and escalate the dispute at the WTO again?
  - Or engage in bilateral negotiations under pressure?

The **U.S.'s disregard for WTO rulings** puts India's strategic trade calculus at risk.

The WTO and Multilateralism

- WTO panels in 2022 ruled that the **Trump-era tariffs** did not meet **national security**

justification.

- Yet, the U.S. continues to **ignore WTO rulings**.
- India's G-20 presidency emphasized the **importance of multilateralism** and **WTO-based trade**.

India must proactively **defend multilateral institutions** while safeguarding national trade interests.

Strategic Implications for India

Despite assumptions that **U.S.-China tensions** would benefit India:

- The **U.S.-China truce** has paused their trade war.
- Trump's **threat to impose tariffs on Apple products** if manufactured in India sends a chilling message.
- There is **no guarantee** of U.S. support for India in broader strategic or military conflicts.

India should not rely solely on **strategic alignment** but focus on **independent, well-balanced trade policy**.

Key Issues for India in a Future U.S. Trade Deal

To safeguard its national interest, India must:

a. Tariff Removal

- Ensure **complete rollback** of enhanced tariffs on Indian goods (steel, aluminium, etc.).

b. Protection of Services and Digital Trade

- Prevent retaliatory action against India's **digital services tax**.
- Secure **visa access (H-1B, L1)** for Indian professionals under **Mode 4** of trade in services.

c. Remittances

- Demand exemption from proposed **3.5% U.S. tax on remittances** under the "Trump One Big Beautiful Bill (OBBB)."

d. Legal Predictability

- Seek **legal assurance** against arbitrary executive action.
- Ensure that U.S. laws do not override **WTO commitments**.

The Bigger Picture: Rule of Law vs Executive Overreach

The May 2025 CIT judgment, though temporarily stayed by a higher court, is a **landmark**:

- It challenges the **unchecked power of the executive** in trade policy.
- Reinforces **constitutionalism** in trade law.
- Affirms the role of **domestic courts** in upholding international commitments.

Conclusion

- In a rapidly shifting global order, India must pursue **strategic autonomy** in trade policy. A deal with the U.S. should not come at the cost of **sovereignty, multilateralism, or economic fairness**.
- The **WTO remains a crucial shield** for developing economies like India against arbitrary power plays.
- While President Trump's tariffs may be legally unsustainable in the long run, India should not rush into any **sub-optimal agreement**.
- The **challenge to these tariffs from within the U.S.** legal system offers hope — but only if India continues to **negotiate with prudence, assertiveness, and alignment to global trade norms**.

Iran's Nuclear Programme

Source: The Hindu

https://www.thehindu.com/sci-tech/science/what-is-known-about-irans-nuclear-programme/article69689822.ece

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

Iran's nuclear programme

Why in News

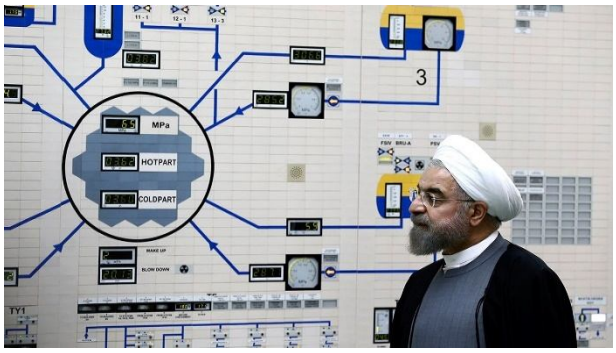
Israel launched strikes on Iranian nuclear sites amid rising concerns over Iran's uranium enrichment nearing weapons-grade levels and breakdown of the 2015 nuclear deal.

Introduction

- **Israel launched a military campaign** targeting what it described as "dozens" of **nuclear and military sites in Iran**, amid increasing tensions over Iran's nuclear programme.
- These developments have unfolded even as **talks were underway** between the **United States and Iran** for a diplomatic resolution aimed at curbing Iran's nuclear ambitions in exchange for lifting economic sanctions.
- This event marks one of the most serious escalations in the West Asian region in recent times.

Why is This Significant?

- **First such Israeli strike on Iranian nuclear targets:** Military officials claimed nuclear-related targets were hit, which indicates a shift from past operations targeting proxies or missile infrastructure to more core strategic assets.
- **Heightened geopolitical tension:** The strikes follow a critical resolution by the **IAEA Board of Governors** which found Iran **in breach of the 1974 safeguards agreement**, the first such breach noted since 2006.
- **Implications for global non-proliferation regime and regional security architecture** are severe, especially with potential U.S. military involvement in future escalations.



Background: Iran's Nuclear Programme – In 7 Key Points

1. **Composition of Natural Uranium**
   - Natural uranium contains about **0.7% of the fissile isotope U-235** and **99.3% of U-238**.
   - For use in nuclear weapons, uranium must be enriched to **90% U-235** or more.
2. **Role of Centrifuges and SWUs**
   - Uranium enrichment is achieved using **centrifuges**, which separate U-235 from U-238.
   - The effectiveness of enrichment is measured in **Separative Work Units (SWUs)**.
   - Around **250 SWUs are needed to produce 1 kg of weapons-grade uranium** from natural uranium.
3. **Progress until 2012**
   - By **2006**, Iran had achieved **3.5% enrichment**.
   - By **2010**, uranium enriched to **19.75%** was reported at Natanz and Fordow.
   - These are **significant thresholds**, as higher enrichment gets Iran closer to weapons-grade material.
4. **The 2015 Nuclear Deal (JCPOA)**
   - Signed between **Iran, P5+1 (U.S., UK, France, Russia, China, Germany)**, and the **EU**.
   - Key commitments by Iran:
     - Limit enrichment to **3.67%**.
     - Reduce operational centrifuges to **5,060 first-generation IR-1 machines**.
     - Cap enriched uranium stockpile at **300 kg**.
   - In exchange, Iran received **sanctions relief** and reintegration into the global economy.
5. **U.S. Withdrawal in 2018**
   - Under President **Donald Trump**, the U.S. **unilaterally exited** the JCPOA.
   - Iran responded by **scaling up enrichment**, crossing previous thresholds.
   - As of 2025, **enrichment levels have reached 60%**.
6. **Why 60% Enrichment is Critical**
   - The effort needed to move from 60% to 90% is **much less** than from 0.7% to 60%.
   - This **shortens the "breakout time"** — the time required to produce enough

weapons-grade uranium for one bomb — to just a **few weeks or months**.

7. **Weaponisation Timeline**
    - According to experts at **Harvard University's Belfer Center**, Iran could build a functional weapon in **under three weeks** once it has 90% enriched uranium in gaseous form.
    - This assumes capability in **warhead design, missile integration, and miniaturisation**.

Israel's Position on Iran's Nuclear Programme

- Israel views a **nuclear-capable Iran** as an **existential threat**.
- It has repeatedly warned that it will **act unilaterally** if needed.
- While **never officially confirming**, Israel is widely believed to possess **nuclear weapons** and delivery systems (ballistic missiles, submarines, etc.).
- Israel has **not signed** the **Nuclear Non-Proliferation Treaty (NPT)** of 1968, unlike Iran.

U.S. Stance and Role

- Despite **President Trump's 2018 withdrawal** from JCPOA, he maintained that **diplomacy was the preferred option**, but also hinted at military options if talks failed.
- The U.S. has so far **not directly supported Israeli strikes**, but has signaled it could join if the conflict escalates.
- Senator **Marco Rubio** warned Iran not to retaliate against U.S. forces over the Israeli attack.

Global and Strategic Implications

1. Regional Instability

- Risk of full-blown war between **Iran and Israel**, dragging in **Lebanon's Hezbollah**, **Syria**, and **U.S. assets in Iraq and the Gulf**.

2. Nuclear Proliferation Risk

- A military strike without diplomatic resolution may **destroy monitoring channels** and **force Iran to go fully clandestine**.
- Weakens the **global nuclear non-proliferation architecture**.

3. Global Oil and Economic Fallout

- Escalation in the **Gulf region** could severely affect **global oil supplies**, especially from the **Strait of Hormuz**.

4. Diplomatic Vacuum

- The JCPOA framework lies effectively in ruins.
- New diplomatic architecture will be needed — possibly including **India, China**, or neutral mediators.

India's Standpoint

- India has traditionally supported a **nuclear-weapons-free West Asia**.
- It maintains **strong relations** with **both Israel and Iran** and advocates **peaceful resolution** via diplomacy.
- As a **major oil importer**, India is concerned about **instability in the Gulf** region.

Conclusion

- The Israeli strikes on Iranian nuclear infrastructure represent a **dangerous shift from diplomacy to confrontation**.
- While Iran's nuclear capabilities have steadily grown, the **absence of a binding agreement** and increasing military posturing threaten not only **regional security** but also the **global non-proliferation regime**.
- The need of the hour is **constructive diplomacy** backed by **transparent verification mechanisms** to avoid a catastrophic conflict.

Prime Minister's Visit to Cyprus – Strategic Significance and Diplomatic Implications

Source: Indian Express

https://indianexpress.com/article/explained/explained-global/pm-modi-in-cyprus-india-ties-turkey-10068393/

UPSC Relevance: **GS 2 International Relations**

Context:

India-Cyprus Relations

Why in News

Prime Minister Narendra Modi's 2025 visit to Cyprus signals a strategic counterbalance to Turkey's growing proximity with Pakistan.

Introduction

- Prime Minister arrived in Cyprus, marking the first visit by an Indian Prime Minister in over two decades.
- This visit forms the first leg of his three-nation tour, which also includes Canada (for the G7 Summit) and Croatia.

Key Highlights of the Visit:

- **Diplomatic Engagement:** PM Modi held bilateral talks with Cypriot President **Nikos Christodoulides**, aimed at enhancing cooperation in sectors like **defence, shipping, renewable energy, education, and technology**.
- **Cultural and Diaspora Connect:** The Prime Minister addressed the **Indian diaspora in Cyprus**, acknowledging their role in strengthening India-Cyprus ties.
- **Agreements Signed:** Several Memoranda of Understanding (MoUs) were signed, including cooperation in cybersecurity, maritime transport, and innovation ecosystems.

Strategic Significance:

1. **Counterbalancing Turkey's Posture:**
   - Cyprus shares a longstanding geopolitical rivalry with **Turkey**, which has recently **deepened ties with Pakistan**, often at India's diplomatic cost (e.g., on Kashmir at global forums).
   - PM Modi's visit is seen as a **calibrated signal** to Turkey and a reaffirmation of India's commitment to **Cyprus' sovereignty**, particularly on the issue of **Turkish-occupied Northern Cyprus**.
2. **Eastern Mediterranean Presence:**
   - The visit underscores India's strategic intent to enhance its presence in the **Eastern Mediterranean**, a region witnessing increased great-power competition.
3. **Maritime Cooperation:**
   - With Cyprus being a key maritime nation, the visit supports India's ambitions under the **SAGAR (Security and Growth for All in the Region)** doctrine.

Historical Context of India–Cyprus Relations:

- India and Cyprus have traditionally shared warm ties, based on:
  - Common **Non-Aligned Movement (NAM)** heritage.
  - Mutual support on core issues (e.g., **India supports Cyprus's reunification**, while Cyprus backs India's **UNSC permanent membership** bid).
  - Bilateral agreements in **investment protection, double taxation avoidance, and cultural exchange**.

Forward Linkages:

- **Multilateral Diplomacy:** The Cyprus leg sets the tone for India's engagements at the **G7 Summit in Canada**, where geopolitical balancing, multilateral reforms, and regional stability are expected to be key themes.
- **Europe Strategy:** The visit aligns with India's broader **"Europe Outreach"** aimed at diversifying diplomatic partnerships beyond traditional allies.

Conclusion:

- Prime Minister Modi's visit to Cyprus is **diplomatically symbolic and strategically calculated**.
- In the backdrop of changing regional alignments and Turkey's adversarial positioning, the visit not only revives an

underutilized bilateral relationship but also reinforces India's geopolitical signalling and maritime outreach in the Mediterranean.

Iran-Israel Conflict: Implications for India's Economy and Trade

Source: Indian Express

https://indianexpress.com/article/explained/explained-economics/iran-israel-conflict-red-sea-shipping-route-india-trade-impact-10066399/

UPSC Relevance: GS 2 International Relations

Context:

Iran-Israel Conflict

Why in News

The Iran-Israel conflict poses economic risks for India through higher oil prices, disrupted trade routes, inflationary pressure, and strategic energy security challenges.

Introduction

- As the Iran-Israel conflict escalates into a direct confrontation, the global economy faces renewed uncertainty.
- India, as a major energy-importing and trade-driven economy, is particularly exposed to the fallout.
- The crisis has revived fears of **surging oil prices**, **supply chain disruptions**, and **inflationary pressures**, threatening the country's recent gains in economic stability.

Global Trade Disruption and the Red Sea Crisis

- The **Red Sea route**, crucial for global shipping, had only recently begun to stabilise after prolonged Houthi attacks.
- With the outbreak of direct hostilities between Iran and Israel, **ships are being rerouted via the Cape of Good Hope**, adding:
  - **10–14 days to voyage times**
  - **Higher freight and insurance costs**
- According to **Kpler data**, LNG flows through the **Suez Canal dropped sharply** from 32.36 million tonnes in 2023 to just 4.15 million tonnes in 2024, indicating severe disruption.

Strait of Hormuz: A Strategic Energy Chokepoint

- The **Strait of Hormuz** handles **20–25% of global oil supply** and a significant portion of LNG exports from **Qatar and the UAE**—with **Qatar being a major LNG supplier to India**.
- Experts warn that **Iran could retaliate by blocking the Strait**, which would:
  - Severely impact global crude and gas flows
  - Push up **Brent crude prices**, possibly crossing **$90 per barrel** (Goldman Sachs projection)
  - Disrupt LNG shipments to India, increasing energy insecurity

Inflationary Pressures and Monetary Policy Constraints

- India's **headline retail inflation fell to a 75-month low of 2.82% in May 2025**, largely due to falling prices of fruits, pulses, and cereals.
- This allowed the **RBI's MPC to cut the repo rate by 50 basis points**, aiming to support economic growth.
- However, the RBI has cautioned that **"monetary policy has very limited space to support growth"** if inflation resurges due to:
  - **Rising oil prices**
  - **Imported inflation from freight and insurance costs**
  - **LNG shortages driving industrial input prices up**

Impact on Energy Infrastructure and

Supply

- So far, **no direct attacks** have targeted energy infrastructure, but precautionary steps have begun:
  - **Israel shut its Leviathan gas field**, a vital supplier to Jordan and Egypt.
  - **Iran's oil refineries and storage** reported no damage yet, but a significant drop in exports is expected.
  - S&P Global forecasts that **Iran's crude exports could fall below 1.5 million b/d** in June 2025, from 4 million b/d in May.

Trade and Export Risks for India

- Exporters, represented by **FIEO**, had hoped conflict escalation would be avoided. Now, with fears materialising:
  - Freight rates are rising again
  - Vessel availability is tightening
  - Export competitiveness may be affected, particularly for low-margin goods
- Prolonged instability will hurt India's **non-oil imports** (chemicals, fertilizers) and **exports to West Asia**, increasing trade imbalance.

Strategic and Diplomatic Considerations

- India faces the challenge of maintaining balanced relations with both Iran and Israel amid deepening polarisation.
- Rising instability may jeopardise:
  - Chabahar Port connectivity project in Iran
  - India's broader energy diversification efforts
- Diplomatic engagement and crisis management in West Asia will be crucial to safeguarding long-term interests.

Conclusion

The Iran-Israel conflict poses serious **macroeconomic and strategic risks for India**, particularly through higher energy prices, inflationary pressures, disrupted trade routes, and reduced monetary policy flexibility. While short-term volatility appears inevitable, India must focus on:

- Diversifying energy sources
- Boosting strategic reserves
- Enhancing shipping and logistics resilience
- Proactive diplomatic outreach to maintain regional stability

India's economic planners must remain vigilant to ensure that geopolitical tensions do not derail the fragile post-pandemic recovery.

India-Cyprus Diplomacy & Cyprus' highest civilian honour

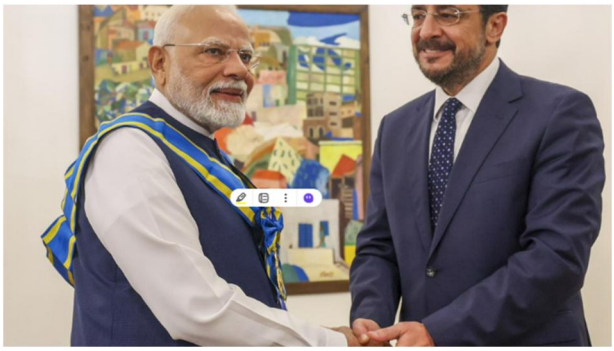
Source: The Hindu

https://www.thehindu.com/news/national/pm-modi-conferred-with-cyprus-highest-civilian-honour/article69700422.ece

UPSC Relevance: GS-2 International Relations

Context:

India Cyprus Relations



Why in News

The Grand Cross of the Order of Makarios III is the highest civilian honour of Cyprus, awarded to Prime Minister Narendra Modi in June 2025 for strengthening India–Cyprus bilateral ties.

Introduction

- On June 16, 2025, Prime Minister Narendra Modi paid an official visit to the Republic of Cyprus—the first leg of his three-nation tour including Canada (for the G7 summit) and Croatia.
- This visit marks PM Modi's first international engagement after Operation Sindoor and holds strategic significance in the context of India's foreign policy, particularly in Europe and the Eastern Mediterranean region.

Key Highlights of the Visit

1. High Civilian Honour Conferred

- PM Modi was conferred **the Grand Cross of the Order of Makarios III**, Cyprus' highest civilian award.
- The award, named after the first President of Cyprus, reflects the **enduring bilateral partnership** and shared values between the two nations.
- PM Modi dedicated the honour to the **1.4 billion people of India** and to **India–Cyprus friendship**.

2. Strategic Bilateral Talks

- PM Modi held extensive talks with Cyprus President **Nikos Christodoulides**.
- The leaders reaffirmed their commitment to:
  - **Independence, sovereignty, and territorial integrity** of Cyprus.
  - A **bizonal, bicommunal federation** with political equality as per UN resolutions to resolve the **Cyprus question**.

3. Indirect Message to Turkiye

- India underscored its support for **Republic of Cyprus** and condemned **unilateral actions**, indirectly referencing **Turkiye's support for Northern Cyprus**.
- The visit is seen as a **strategic counter-message** to Turkiye, a known ally of Pakistan and a critic of India on the Kashmir issue.

Diplomatic Significance

1. Support in Multilateral Forums

- Cyprus continues to:
  - Support India's bid for a **permanent seat at the UN Security Council**.
  - Oppose **cross-border terrorism** from Pakistan.
  - Back India's interests in the **Nuclear Suppliers Group (NSG)** and the **IAEA**.
- India reciprocates by backing Cyprus' territorial integrity as per **UNSC resolutions and international law**.

2. Upcoming EU Leadership

- Cyprus will assume the **Presidency of the Council of the European Union** in early 2026.
- The visit paves the way for **deeper India–EU engagement**, particularly in trade, technology, and security.

3. Global Peace Advocacy

- PM Modi reiterated India's stance on promoting **dialogue and diplomacy** in global conflicts, including:
  - **Russia-Ukraine War**
  - **Israel-Iran tensions**
- "This is not the age of war," PM Modi said, echoing India's call for **peace and stability**.

Economic and Strategic Outlook

- PM Modi highlighted that **India is poised to become the world's third-largest economy**.
- Cyprus was described as a **trusted partner in the EU**, signaling potential for stronger **economic and technological cooperation**.

Grand Cross of the Order of Makarios III – Cyprus' Highest Civilian Honour

- The **Grand Cross of the Order of Makarios III** is the **highest civilian award** conferred by the **Republic of Cyprus**.
- It is the **senior-most class** in the **Order of Makarios III**, a national order of knighthood.
- **Named After: Archbishop Makarios III**, the **first President of Cyprus** (served from 1960 to 1977).
- Makarios III is remembered as a national leader who played a key role in **Cyprus's independence from British rule**.
- sAwarded to **distinguished individuals**—often heads of state or government—for their **exceptional contributions to Cyprus**, or to **international peace, friendship, and cooperation**.
- **Prime Minister Narendra Modi** became the **first Indian recipient** of this honour.
- Conferred by **President Nikos Christodoulides** of Cyprus during PM Modi's official visit.
- The award was dedicated by PM Modi to the **people of India** and the **India–Cyprus friendship**.

Operation Sindoor: Background Linkage

- The visit to Cyprus came shortly after **Operation Sindoor**, India's response to cross-border aggression from Pakistan.
- The timing of the visit is **symbolic**, asserting India's **geopolitical confidence** and growing **global stature**.

FATF to release report on 'state-sponsored terror' for first time

Source: The Hindu

https://www.thehindu.com/news/national/global-watchdog-fatf-condemns-pahalgam-attack-enhances-focus-on-steps-by-countries-to-combat-terror-financing/article69701439.ece

UPSC Relevance: GS-2 International Relations

Context:

FATF

Why in News

The FATF condemned the Pahalgam terror attack and is set to acknowledge **state-sponsored terrorism** as a distinct source of terror financing in its upcoming report.

Financial Action Task Force (FATF)

- The **Financial Action Task Force (FATF)** is an **inter-governmental body** established in **1989** by the **G7 countries** to combat **money laundering**.
- After the 9/11 attacks, its mandate was expanded to include **terrorist financing**, and later **proliferation financing** (i.e., funding of WMD programs).
- **Headquarters: Paris, France**

Members

- **39 Members**:
  - **37 Countries**
  - **2 Regional Organizations**: European Commission & Gulf Cooperation Council
- **India** became a **full member in 2010**

Mandate & Objectives

- Develop international **standards** and **policies** to:
  - Combat **money laundering (ML)**
  - Counter **terrorist financing (TF)**
  - Prevent **proliferation financing (PF)** of weapons of mass destruction (WMDs)

Key Highlights:

- **Rare Condemnation by FATF:**
  - This is **only the third time in the last decade** that FATF has issued a formal condemnation of a terror attack.
  - The statement emphasized that such attacks "**could not occur without money and the means to move funds between terrorist supporters**."
- **Pahalgam Attack (April 2025):**
  - Brutal terror attack that drew widespread international attention.
  - Considered significant enough for FATF to issue a formal condemnation, reflecting global concern over terror financing.
- **Implications for Pakistan:**
  - India is actively pursuing diplomatic channels to present a **dossier to FATF**, pushing for **Pakistan's re-inclusion in the 'grey list'**.
  - Pakistan has often been accused of **harbouring and funding cross-border terrorism**, especially in Kashmir.

Upcoming FATF Report:

- A **new FATF report**, due in **July 2025**, will:
  - For the **first time** include **state-sponsorship of terrorism** as a **distinct source of terror financing**.
  - Provide a **comprehensive analysis of terrorist financing** threats globally.

- Help assessors and countries counter deception and misinformation by jurisdictions accused of terrorism support.

- **Terror Financing Risk & Context Toolkit:**
  - A toolkit has been developed by FATF to assist evaluators in **assessing high-risk countries** and **detecting concealed terror finance routes**.
  - Intended to prevent countries from **misrepresenting their compliance**, with specific reference to Pakistan.

Indian Standpoint:

- India's **National Risk Assessment** is currently the **only national framework** that **explicitly recognizes state-sponsored terrorism** (especially from Pakistan) as a **key terror financing risk**.
- Indian officials and diplomats have intensified advocacy at international forums to spotlight this issue.

Broader Significance:

- Reinforces the growing global understanding that **terrorism cannot be combated effectively without cutting its financial lifelines**.
- Marks a **shift in FATF's approach**, acknowledging **state involvement** in terrorism, a long-standing demand by countries like India.
- Could have **major geopolitical implications**, including **heightened scrutiny on Pakistan** and **policy shifts in counter-terror financing frameworks**.

Nuclear Modernisation and the Global Arms Race

Source: The Hindu

https://www.thehindu.com/news/national/india-maintains-nuclear-edge-over-pakistan-with-more-warheads-next-gen-canisterised-mirv-capable-missiles-sipri-report/article69703913.ece

UPSC Relevance: GS 2 International Relations

Context:

Nuclear Modernisation

Why in News

According to SIPRI's 2025 report, global nuclear arsenals are undergoing rapid modernisation, with India and Pakistan expanding their capabilities amid weakening arms control mechanisms.

Introduction

- The **Stockholm International Peace Research Institute (SIPRI)**, in its **2025 Yearbook**, paints a grim picture of global nuclear armament trends.
- The report highlights a **renewed global arms race**, the weakening of arms control regimes, and increasing tensions among nuclear powers.
- This is especially critical for India, given its strategic neighbourhood and national security posture.

Nine Nuclear-Armed Countries

The nine nuclear powers covered in the SIPRI report are:

1. United States
2. Russia
3. China
4. United Kingdom
5. France
6. India
7. Pakistan
8. Israel
9. North Korea (Democratic People's Republic of Korea – DPRK)

Key Global Trends in 2024–25

1. Resurgence of the Nuclear Arms Race

- **Modernisation** of nuclear arsenals is widespread.
- Deployment of **new delivery systems** like Intercontinental Ballistic Missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and warhead advancements is accelerating.
- **3,912 warheads** are deployed globally, with **2,100 kept on high operational alert**, mainly by the U.S. and Russia.

2. Stockpile Status (as of January 2025)

Country	Deployed	Stored	Total Inventory (2025)	2024 Inventory
USA	1,770	1,930	5,177	5,328
Russia	1,718	2,591	5,459	5,580
China	24	576	600	500
India	-	180	180	172
Pakistan	-	170	170	170

India's Nuclear Arsenal: Key Observations

1. Expansion and Modernisation

- India's stockpile rose from **172 (2024)** to **180 warheads (2025)**.
- SIPRI attributes this to India's continued focus on:
  - **New delivery systems**.
  - **Canisterised missiles** capable of being deployed with mated warheads during peacetime.
  - Potential development of **Multiple Independently Targetable Re-entry Vehicles (MIRVs)**.

2. Strategic Delivery Systems

- India successfully tested:
  - **Agni-Prime**: Next-gen ballistic missile with improved accuracy and reduced weight.
  - **Submarine-Launched Ballistic Missile (SLBM)**: Range ~3,500 km – key for **sea-based nuclear deterrence (second-strike capability)**.

Pakistan's Nuclear Strategy

- Maintained its arsenal at **170 warheads**.
- Continued accumulation of **fissile material** and **development of new delivery systems**.
- Focus remains on **full-spectrum deterrence**, targeting both counterforce and countervalue threats from India.

China's Rapid Expansion

- China's nuclear arsenal rose by **100 warheads in a year**, reaching **600** in January 2025.
- Construction of **~350 new ICBM silos** in desert and mountainous regions.
- If current trends continue, China may possess **1,500 warheads by 2035**, though still one-third of U.S. and Russian stockpiles.

Deterioration of Arms Control Frameworks

- The **New START Treaty** between the U.S. and Russia is set to expire in **February 2026**.
- No new disarmament agreements are on the horizon.
- This opens the door to:
  - Greater warhead deployment.
  - Loss of mutual verification and transparency.

Nuclear Risks and Crisis Instability

- SIPRI flags a **dangerous escalation** in early 2025 when **India and Pakistan briefly engaged in armed conflict**.
- Strikes near **nuclear-related military infrastructure** and the spread of **disinformation** nearly triggered a nuclear crisis.
- Highlights the **fragile line** between

conventional war and nuclear escalation, especially in South Asia.

Strategic Implications for India

1. Doctrine and Posture

- India maintains a **No First Use (NFU)** policy and credible minimum deterrence.
- But canisterisation and MIRV development may indicate a shift toward **more flexible deployment** strategies.

2. Technological Modernisation

- SLBM capability enhances **second-strike capability**.
- Development of **hypersonic glide vehicles**, **new launch platforms**, and better **command and control** systems.

3. Diplomatic Balancing

- India is **not a signatory to the NPT**, but is a responsible nuclear power.
- Strong participation in forums like the **Nuclear Security Summit**, and commitment to **non-proliferation norms**.

Conclusion

- The **SIPRI 2025 report** underscores the return of nuclear brinkmanship amid collapsing arms control agreements.
- For India, the twin challenge of **strategic balance** with China and Pakistan and the **responsible exercise of nuclear power** remains central to its national security and foreign policy.
- India must continue to modernise its deterrent capability while **reiterating its commitment to global peace and stability**, and **leading by example** in pursuing responsible nuclear policies.

India-Croatia Call for Peaceful Solutions Through Dialogue

Source: Deccan Herald

https://www.deccanherald.com/india/solutions-to-problems-cant-come-from-battlefields-dialogue-diplomacy-only-way-pm-modi-in-croatia-3592709

UPSC Relevance: GS-2 International Relations

Context:

India–Croatia Relations

Why in News

PM Narendra Modi became the first Indian Prime Minister to visit Croatia, strengthening bilateral ties through cooperation.

Introduction

- Prime Minister **Narendra Modi** became the **first Indian Prime Minister to visit Croatia**, marking a significant milestone in **India-Croatia bilateral relations**.
- The visit comes at a time of global geopolitical tensions, especially the **Israel-Iran conflict** and the ongoing **Russia-Ukraine war**, making India's diplomatic outreach even more crucial.

Key Highlights of the Visit

1. Message for Peace and Diplomacy

In a joint press statement with Croatian PM **Andrej Plenković**, PM Modi:

- Emphasized that **"solutions cannot come from battlefields"**, whether in **Europe or Asia**.
- Reiterated that **dialogue and diplomacy** are the **only viable pathways** to resolving conflicts.
- Condemned terrorism as the **"enemy of humanity"**, reinforcing India's global stand against terrorism.

2. Global Geopolitical Context

- Discussions covered the **Israel-Iran conflict**, **Russia-Ukraine war**, and broader security concerns.
- Both leaders agreed that **respect for sovereignty and territorial integrity** is

fundamental to global peace.

- Croatia expressed **support for India's stance** on cross-border terrorism and shared concerns about global instability.

Bilateral Cooperation & Agreements

A. Sectors Identified for Cooperation

The two sides agreed to **accelerate collaboration** in the following sectors:

- **Defence & Security**
- **Pharmaceuticals**
- **Agriculture**
- **Information Technology & Digital Tech**
- **Semiconductors & Clean Technologies**
- **Shipbuilding**
- **Cybersecurity**
- **Renewable Energy**
- **Space cooperation** – India to share space experience

B. Signed Agreements (MoUs)

Four key Memoranda of Understanding (MoUs) were signed in:

- **Agriculture**
- **Culture**
- **Science and Technology**
- **Indology studies** – Agreement between ICCR (India) and **University of Zagreb**; Hindi Chair extended till **2030**.

India–EU Strategic Partnership

- Both countries affirmed that in the current global scenario, **India-EU relations** are of **"immense importance"**.
- Croatia backed India's efforts to finalize the long-pending **India–EU Free Trade Agreement (FTA)**.
- The **India-Middle East-Europe Economic Corridor (IMEC)** was termed an **"excellent opportunity"** for regional connectivity.

People-to-People & Cultural Diplomacy

- PM Modi highlighted the popularity of **Yoga and Indology** in Croatia.
- A new **5-year cultural exchange programme** was announced.
- Croatia presented a reprint of **Vezdin's Sanskrit Grammar (1790)** – the **first printed Sanskrit grammar**, authored by Croatian scholar **Filip Vezdin**, showcasing deep cultural ties.
- Modi was also gifted the book **"Croatia & India: Bilateral Navigator for Diplomats and Business"**.

Symbolic and Ceremonial Aspects

- PM Modi was received at Zagreb Airport by Croatian PM – a **rare diplomatic gesture**.
- He laid a **wreath at the Monument to the Homeland**, a key site of Croatian national pride.
- Modi toured Zagreb city centre with Plenković, emphasizing the **cultural and historical affinity** between the two nations.

Strategic and Diplomatic Significance

A. India's First PM Visit to Croatia

- Marks the **deepening of political and economic ties** between India and a **key EU member** in the Balkans.

B. Soft Power and Cultural Outreach

- India's soft power tools (Yoga, Hindi, Indology) were effectively utilized to strengthen ties.

C. Countering China's Influence in Europe

- Strengthening Indo-European ties, especially with smaller EU countries like Croatia, contributes to India's broader **multi-alignment strategy** and **regional balancing**.

Conclusion

- PM Modi's visit to Croatia represents a **diplomatic leap in India's engagement with smaller but significant EU partners**.
- At a time of global instability, the emphasis on **dialogue, peace, and rules-based international order** reinforces India's image as a responsible global power.
- By combining **strategic, economic, and cultural diplomacy**, India is charting a multi-layered path to global partnership and regional influence.

India and Canada to reinstate High Commissioners, restart trade talks

Source: Times of India
https://timesofindia.indiatimes.com/india/india-and-canada-to-reinstate-high-commissioners-restart-trade-talks/articleshow/121937777.cms
UPSC Relevance: GS2 International Relations

Context:

India and Canada Conflict

Why in News

India and Canada have agreed to reinstate High Commissioners and resume stalled trade talks, marking the first diplomatic thaw after tensions over the killing of a Khalistan separatist.

Introduction

- After almost **two years of diplomatic hostilities** following the assassination of **Khalistan separatist Hardeep Singh Nijjar** in Canada, **India and Canada have initiated steps to restore normalcy** in bilateral ties.
- On the sidelines of the **G7 Summit 2025**, Prime Minister **Narendra Modi** met his Canadian counterpart **Mark Carney**, marking the first high-level bilateral engagement since the breakdown in relations.

Background of the Diplomatic Rift:

- In **2023**, Canadian PM **Justin Trudeau** publicly accused Indian agents of involvement in the killing of Nijjar, a **Canadian citizen and pro-Khalistan separatist**, in British Columbia.
- India strongly denied the allegations and termed them **politically motivated**, targeting Trudeau's **vote-bank politics**.
- This led to:
  - **Expulsion of Indian diplomats** by Canada.
  - **Reciprocal expulsion** of Canadian diplomats by India.
  - **Suspension of trade negotiations**, people-to-people services, and diplomatic engagement.

Key Highlights:

The **40-minute meeting** was described as "*positive and constructive*" by Indian Foreign Secretary **Vikram Misri**. Agreement on:

- Early return of High Commissioners.
- Resumption of senior-level and ministerial engagements.
- Restarting of stalled trade negotiations, including Early Progress Trade Agreement (EPTA) talks.
- Building trust and stability through calibrated steps.

Mutually Acknowledged Principles:

- **Mutual respect for concerns and sensitivities**.
- **Strong people-to-people links** – referred to as the *"living bridge"* between both countries.
- **Shared commitment to democratic values**, rule of law, sovereignty, and territorial integrity.
- **Economic complementarities** including clean energy, AI, digital infrastructure, and critical minerals.

Trade and Economic Cooperation:

- India and Canada agreed to **revisit EPTA**, which was stalled in 2023, as a precursor to a **Comprehensive Economic Partnership Agreement (CEPA)**.
- Though the **Canadian readout avoided direct mention of trade talks**, it highlighted:
  - *Significant commercial ties.*
  - Cooperation in **supply chains, clean energy, and energy transformation**.

Security and Transnational Concerns:

- **India emphasized Ottawa's inaction** on anti-India elements (Khalistani groups) but kept it out of the official readout, signaling **quiet diplomacy**.
- Canada, under PM Carney, raised **transnational crime and repression** as priorities, aligning with the **G7 joint condemnation** of transnational repression.
- The issue of **Nijjar's killing** was **not mentioned explicitly**, showing both sides wanted to avoid reigniting tensions.

Shared Global Interests:

- **Free and open Indo-Pacific** strategy.
- **Climate action**, sustainable development, inclusive growth.
- **Connectivity, clean energy, AI, food security**, and **critical mineral supply chains** discussed as areas of cooperation.

Significance for India's Diplomacy:

- A diplomatic breakthrough in **restoring normalcy without compromising on core concerns** (anti-India extremism).
- **Strategic balancing** between national interest and diaspora management.
- Potential to **re-energize economic engagement** with a key G7 partner.
- **Soft reset** of ties under PM Carney, moving away from Trudeau's confrontational stance.

Conclusion:

- The Modi-Carney meeting marks a strategic shift in India-Canada relations, moving from confrontation to calibrated cooperation.
- While deep-rooted trust deficits remain, particularly around the Khalistan issue, the decision to restore diplomatic presence and resume trade talks is a crucial confidence-building measure.
- Success will depend on mutual willingness to address each other's core concerns and institutionalizing cooperation across domains like trade, technology, and climate.

Operation Sindhu for Evacuation of Students from Iran Amid Rising Tensions

Source: The Hindu

https://www.thehindu.com/news/national/flight-carrying-110-students-evacuated-from-iran-to-land-in-new-delhi-on-wednesday-night/article69709604.ece

UPSC Syllabus Relevance: **GS2 International Relations**

Context:

Operation Sindhu

Why in News

Operation Sindhu India's evacuation mission to safely bring back its nationals, including students and pilgrims, from conflict-hit Iran amid the ongoing Israel-Iran war.

Background:

- The recent **escalation of armed hostilities between Israel and Iran** has created a volatile security situation, especially in urban centers like **Tehran and Qom**.
- **Indian citizens in Iran**, including **students, medical aspirants, and pilgrims**, have found themselves trapped amidst active conflict zones.
- India has traditionally had significant people-to-people ties with Iran, including a steady outflow of students and religious pilgrims from regions like **Jammu & Kashmir** and **Uttar Pradesh**.

Operation Sindhu: India's Evacuation Initiative

- **Launch Date:** June 18, 2025
- **Purpose:** To **evacuate Indian nationals**—students, workers, and pilgrims—from war-affected zones in **Iran** amid the Israel-Iran conflict.
- **Operation Name Significance:** Named **"Operation Sindhu"** after the **Indus River**, symbolizing the **shared cultural and civilizational heritage** between India and the broader West Asian region.

Phase-wise Execution and Strategy

Evacuation of Indian Students

- **110 Indian medical students**, mostly from **Jammu & Kashmir (90), Uttar Pradesh, and Karnataka**, were evacuated.
- **Route taken:**
  - Evacuees moved by **land from Qom to Yerevan (Armenia)**.
  - A **special flight departed Yerevan at 2:55 p.m. IST** on June 18, 2025.
  - Route: **Yerevan → Doha → New Delhi** (arrival scheduled early June 19).

Diplomatic Coordination:

- The **Indian Embassy in Tehran**, in coordination with **Iranian authorities**, facilitated the border crossing into Armenia.
- Iran's **Deputy Ambassador to India**, Mohammad Javad Hosseini, confirmed full cooperation with India's evacuation plans.

Humanitarian Crisis and Student Testimonies

- **Tamheed Mughal**, a medical student, shared that after **Israeli airstrikes hit Tehran**, students were shifted to **safe accommodation in Qom**.
- **Two Kashmiri students were injured** when Israel bombed the men's dormitory of Tehran University.
- The evacuees faced difficulties like **communication blackouts, medication shortages, and psychological distress**.

Vulnerable Groups Awaiting Evacuation

- **Tatheer Fatima**, a pilgrim from **Lucknow**, along with **96 others (including elderly women and children)**, remains stranded in Qom.
- She expressed concern over the **lack of communication from Indian authorities** and **shortage of essential supplies**, including **childcare and medicines**.

India's Evacuation Diplomacy: A Pattern

Operation Sindhu joins a growing list of Indian evacuation efforts under crisis:

Operation	Year	Region	Nature of Crisis
Operation Ganga	2022	Ukraine	Russia-Ukraine War
Operation Kaveri	2023	Sudan	Civil War
Operation Ajay	2023	Israel-Palestine	Conflict in Gaza
Operation Dost	2023	Turkey-Syria	Earthquake Relief
Operation Devi Shakti	2021	Afghanistan	Taliban Takeover
Operation Sindhu	2025	Iran	Israel-Iran Conflict

Diplomatic and Strategic Implications for India

1. **Protection of Diaspora:** Reflects India's commitment to the safety of its citizens abroad through proactive diplomacy.
2. **Neutral Positioning:** India has maintained **non-alignment and balanced ties** with both Israel and Iran, vital for its energy security and geopolitical influence in West Asia.
3. **Soft Power Projection:** Such operations enhance India's global image as a **responsible democratic state** that values human life.

Challenges Faced

- **Unpredictable security environment** with ongoing airstrikes.
- **Logistical hurdles** due to damaged infrastructure and border closures.
- **Communication breakdowns** affecting coordination with stranded groups.
- **Humanitarian needs** (medical aid, transport,

food) remain high for those awaiting evacuation.

Conclusion

- Operation Sindhu is a testimony to India's evolving capability to conduct complex evacuation missions under conflict scenarios.
- It also underscores the importance of timely diplomacy, inter-ministerial coordination, and international cooperation during humanitarian crises.

US strikes 3 nuclear sites in Iran

Source: Indian Express

https://indianexpress.com/article/explained/explained-global/us-strikes-3-nuclear-sites-in-iran-what-we-know-so-far-10080876/

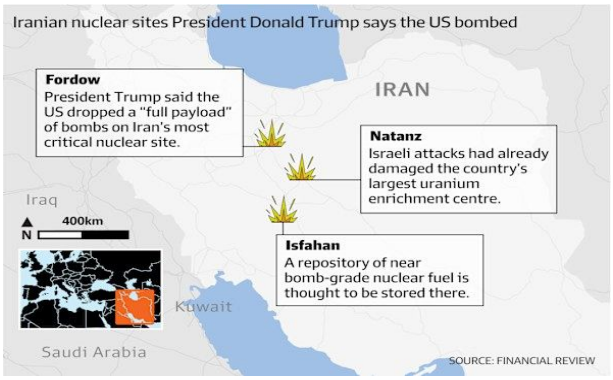
UPSC Relevance: GS2 International Relations

Context:

Iran US Relations

Why in News

The recent U.S. military strikes on Iranian nuclear sites have raised critical questions about international law, nuclear non-proliferation, and regional stability.



Introduction

- The United States carried out precision air and missile strike on three of Iran's key nuclear facilities: **Natanz**, **Fordow**, and **Isfahan**, marking a significant escalation in the ongoing Israel-Iran conflict.
- The attack comes just days after former U.S. President Donald Trump warned Iran of consequences if it did not engage in nuclear negotiations.
- The strikes have raised global concerns about regional security, nuclear proliferation, and the violation of international law.

Background:

- The **Israel-Iran conflict** reignited in June 2025 after Israel launched strikes on Iranian targets, alleging Iranian support for militant groups threatening Israeli security.
- Iran responded with retaliatory attacks, and regional tensions escalated.
- Although the U.S. had previously urged restraint, Trump warned that Iran had "two weeks" to negotiate its nuclear future — a timeline that was cut short as the U.S. joined Israel in military action.
- The conflict is taking place amidst **failed nuclear negotiations** and a recent **IAEA censure** of Iran for non-cooperation.

Targets of the US Attack: Iran's Key Nuclear Facilities

1. Natanz Nuclear Facility

- Location: ~220 km southeast of Tehran.
- Significance:
  - Iran's main uranium enrichment site.
  - Houses advanced centrifuges enriching uranium up to **60% purity**, dangerously close to weapons-grade.
  - Partially underground to protect from airstrikes.
- Attack Details: Targeted by **Tomahawk cruise missiles** and **bunker-buster bombs**.

2. Fordow Fuel Enrichment Plant

- Location: Buried under a mountain near Qom, ~100 km southwest of Tehran.
- Significance:
  - Highly fortified; built to resist air attacks.
  - Secret facility until exposed in 2009.
- Attack Details:
  - Hit with **12 GBU-57 Massive Ordnance Penetrators** by **six B-2 stealth bombers**.
  - Aimed to destroy underground enrichment tunnels.

3. Isfahan Nuclear Research Centre

- Location: ~350 km southeast of Tehran.

- Significance:
  - Home to three Chinese-built research reactors.
  - Hosts thousands of nuclear scientists.
- Attack Details:
  - Struck with **Tomahawk missiles**, possibly to disrupt research and development.

Weapons Used in the Attack

- **B-2 Stealth Bombers**: Delivered bunker-buster bombs (GBU-57).
- **GBU-57 MOP (Massive Ordnance Penetrator)**:
  - 30,000-pound bomb.
  - Designed to penetrate hardened underground facilities.
- **Tomahawk Cruise Missiles**: Sea-launched missiles from U.S. Navy submarines; used for precision targeting of above-ground and shallow facilities.

Reasons Behind the Attack

1. Preventive Action Against Nuclear Weaponization

- The U.S. and Israel view Iran's nuclear advancements as a direct threat.
- Despite Iran's claim of peaceful nuclear intent, intelligence suggested imminent weaponization.

2. Breakdown of Nuclear Talks

- Ongoing nuclear negotiations between the U.S. and Iran failed to yield results.
- Iran refused to negotiate during wartime, increasing urgency for action.

3. Recent Censure by IAEA

- Iran was censured for non-cooperation — a serious rebuke by the global nuclear watchdog, reflecting growing international distrust.

Implications of the Attack

1. Violation of International Norms

- The attack may be seen as a breach of:
  - **UN Charter (Article 2)**: Prohibits the use of force against the sovereignty of member states.
  - **NPT**: Iran, a signatory, argues that its facilities were under peaceful use.

2. Escalation of Regional Tensions

- The attack deepens the Israel-Iran conflict and risks drawing more countries into a regional war.
- Could provoke **proxy retaliation** via Iran-aligned militias in Lebanon, Syria, or Iraq.

3. Threat to Global Energy Security

- Iran is a key player in global oil routes (e.g., Strait of Hormuz).
- Any escalation could affect global oil supply and prices.

4. Setback to Diplomacy and Non-Proliferation

- Nuclear diplomacy between Iran and the West may collapse.
- Other countries may reconsider adherence to non-proliferation norms if security guarantees are undermined.

5. Domestic and Electoral Fallout in the U.S.

- Trump had campaigned on **non-interventionism** and **ending Middle East wars**.
- The strike is seen by critics as **inconsistent with his promises**, potentially affecting his 2025 presidential campaign.

Conclusion

- The U.S. strikes on Iran's nuclear facilities mark a **critical turning point in Middle East geopolitics**.
- While intended to prevent Iran from acquiring nuclear weapons, the attack raises serious questions about legality, proportionality, and long-term consequences.

Iran-Israel Ceasefire and Tehran's Calculated Strike on US Base

Source: Indian Express

https://indianexpress.com/article/explained/explained-global/why-iran-gave-early-notice-of-its-attack-on-us-base-in-qatar-10084302/

UPSC Relevance: **GS2 International Relations**

Context:

Iran-Israel Ceasefire

Why in News

The recent U.S. military strikes on Iranian nuclear sites have raised critical questions about international law, nuclear non-proliferation, and regional stability.

Introduction

- Recently, Iran launched a missile strike on the US Al-Udeid Air Base in Qatar, a day after US airstrikes targeted Iran's nuclear sites in Fordow, Natanz, and Isfahan.
- The Iranian response was telegraphed in advance to the US and Qatar and caused no casualties, after which former US President Donald Trump announced a complete Iran-Israel ceasefire.

Why Iran Gave Advance Notice:

Iran's early notification to the US and Qatar signals a **carefully calculated military and diplomatic posture**, driven by:

1. Avoiding Direct War with the US

- Iran's retaliation was meant to uphold credibility after warning the US not to get involved in Israel-Iran hostilities.
- Yet, Iran avoided escalation by giving advance notice, signaling that it did not seek war with the US, only a symbolic demonstration of capability and resolve.

2. Preserving Diplomatic Channels

- Iran's move was designed to retain space for negotiations, especially given reports that the US had informed Tehran in advance of its strikes and conveyed they were "one-off" operations.
- Trump's public appreciation for Iran's restraint shows both sides are attempting to cool tensions through indirect diplomacy.

3. Qatar as a Controlled Target

- Qatar, due to its good relations with Iran and mediator role in regional diplomacy, was seen as a low-risk theatre for symbolic retaliation.
- Iran's choice to strike Al-Udeid, the heart of CENTCOM operations, while ensuring no casualties, reflects strategic signaling, not destruction.

4. Calibrated Messaging to Allies and Adversaries

- By ensuring minimal damage and no casualties, Iran projected a message of control, capability, and calculated strength to:
  - Domestic audiences demanding retaliation.
  - International actors urging de-escalation.
  - Regional rivals monitoring Iran's thresholds.

US and Israeli Military Action: Aims and Impact

1. American Strike Objectives

- US strikes were reportedly aimed at **Iran's nuclear enrichment infrastructure**.
- However, Iran preemptively removed enriched uranium stockpiles from sites, **preserving its nuclear capacity** for future negotiations.

2. Israeli Military Goals

- Israel's strikes over 11 days aimed at **IRGC headquarters, homeland air defences**, and top Iranian leadership.
- Despite the ceasefire, Iran's **ability to launch retaliatory missile attacks** using new solid-fuel **Kheybar Shekan missiles** has **demonstrated resilience**, ensuring symbolic parity.

Iran's Proxies: Why They Stayed Silent

Notably, Iran refrained from activating its **regional proxy network**, including:

- **Houthis (Yemen):** Though they declared an end to their ceasefire with the US, they **did not resume attacks on US shipping**.
- **Hezbollah (Lebanon):** After losing leader Hassan Nasrallah in 2024, the group under

Naim Qassem adopted **strategic ambiguity**, choosing not to escalate.

- **Hashd al-Shaabi (Iraq):** Despite previous Iranian retaliations through them, Tehran **did not use these militias**, respecting Iraq's effort to **avoid becoming a battleground**.

Strategic Rationale: Avoiding proxy attacks gave Tehran greater control and reduced the risk of **unintended escalation** or widening the conflict beyond manageable limits.

What Did Not Happen: Strategic Self-Restraint

1. No Blockade of the Strait of Hormuz

- Despite threats, Iran **did not attempt to close the strait**, vital for global oil supply and Iran's own economy.

2. No Direct Civilian Targeting

- The attacks were highly selective, **military-only targets**, highlighting **restraint under pressure**.

Trump's Ceasefire Announcement: A Turning Point?

Trump posted that both Iran and Israel had agreed to a "Complete and Total Ceasefire", suggesting:

- A coordinated final round of military action by both parties.
- Strong backchannel diplomacy, possibly involving Qatar, Oman, or European actors.
- US intent to disengage from protracted regional conflict, consistent with Trump-era military drawdowns.

Implications for the Region

1. Iranian Calculus: Economic Constraints

- With **crippling inflation, sanctions, and social unrest**, Iran seeks to **recoup losses** while appearing strong.
- Negotiation is not only preferable—it is **necessary** for Tehran's survival.

2. Arab States and Nuclear Anxiety

- The aggression against Iran may further fuel **Arab nuclear ambitions**:
  - **UAE** already operationalized a nuclear power plant.
  - **Saudi Arabia** is fast-tracking its nuclear plans.
  - A **regional nuclear arms race** may be a long-term consequence.

3. Israel's Strategic Objectives

- Whether Israel stops after the ceasefire or continues covert campaigns remains to be seen.
- Iran's **regime survival**, not just nuclear capability, has been targeted.

Implications for India

- **Energy Security:** The Strait of Hormuz handles ~40% of India's oil imports; stability is vital.
- **Indian Diaspora in Gulf:** Safety of **8+ million Indian nationals** in West Asia is a core concern.
- **Strategic Autonomy:** India must balance relations with **Iran, Israel, US, and Gulf powers**.
- **Diplomatic Leverage:** India's role as a **neutral, credible voice** in the region gains importance.

Conclusion:

- Iran's missile strike on the US base in Qatar, with prior warning and no casualties, represents a **masterclass in symbolic warfare**—projecting strength while **preserving space for negotiation**.
- The broader conflict remains unresolved, but **ceasefire diplomacy**, once again, proves critical in a volatile region shaped by historical grievances, nuclear ambitions, and external power plays.

India's Stand at SCO Defence Ministers' Meeting, 2025

Source: The Hindu

https://www.thehindu.com/news/national/india-refuses-to-sign-joint-statement-in-sco-summit/article69739189.ece

UPSC Relevance: **GS2 International Relations**

Context:

SCO Defence Ministers' Meeting

Why in News

India opposed the SCO Defence Ministers' joint statement in Qingdao over inadequate reference to the Pahalgam terror attack and diluted stance on terrorism.

Introduction

- On June 26, 2025, the Shanghai Cooperation Organisation (SCO) Defence Ministers' meeting was held in Qingdao, Shandong province, China.
- The meeting, aimed at promoting regional peace and security among member nations, ended without a joint statement due to India's refusal to endorse the final document.

India's Objection:

India, represented by **Defence Minister Rajnath Singh**, declined to endorse the **joint statement** proposed by the host country China, citing the following key objections:

- The statement **did not mention** the **April 22 Pahalgam terror attack**, in which 26 civilians, including a Nepali national, were killed.
- The statement **included references to militant activities in Balochistan**, which India perceived as an attempt by **Pakistan and China to divert attention** from Pakistan-sponsored terrorism in Kashmir.
- The **dilution of focus on terrorism** and lack of support for India's stance prompted India to opt out.

The Pahalgam Terror Attack (April 22, 2025):

- Perpetrated by **The Resistance Front (TRF)**, a **proxy of Lashkar-e-Taiba (LeT)**, a UN-designated terror group.
- Attack involved **profiling of victims based on religious identity** and killing of civilians, including foreign tourists.
- India described the attack as "**dastardly and heinous**" and called for international condemnation and action.

India's Position at SCO: Key Highlights from Rajnath Singh's Address

1. **Zero Tolerance on Terrorism**:
   - Emphasised that peace and prosperity cannot co-exist with terrorism or the proliferation of Weapons of Mass Destruction (WMDs) in the hands of non-state actors.
   - Called for decisive global action against nations that sponsor or provide safe havens to terrorists.
2. **Criticism of Double Standards**:
   - Asserted that cross-border terrorism as state policy must be condemned unequivocally.
   - Urged SCO members to **avoid double standards** in counterterrorism cooperation.
3. **India's Right to Self-Defence**:
   - Reiterated India's **sovereign right to act against terror threats**, especially across the border.
   - Recalled India's **strong retaliatory actions against terror epicentres**, including military operations in the past.

"Operation Sindoor" (May 7, 2025):

In response to the Pahalgam attack, India launched **"Operation Sindoor"** with the following objectives:

- **Neutralize cross-border terror launchpads** in Pakistan-occupied territories.
- **Disrupt terror logistics and communication networks** linked to LeT and its proxies.
- Reinforce India's **deterrent capability** and send a message of **no impunity for terrorism**.

Diplomatic Developments:

- India held bilateral talks with Defence Ministers of Russia, Kazakhstan, Tajikistan, and Belarus on the sidelines.

- India pushed for enhanced regional cooperation on counterterrorism and non-traditional security threats.

Wider Geopolitical Implications:

1. India's Diplomatic Assertion:

- India's refusal to sign the statement highlights a **more assertive foreign policy** posture on terrorism.
- It reflects India's desire to **set the global narrative** on cross-border terrorism rather than be a passive participant.

2. India-Pakistan-China Triangle in SCO:

- India's move may increase **tensions with Pakistan and China**, who appear to be aligning positions on deflecting focus from Kashmir to Balochistan.
- May affect **SCO's unity on security cooperation**.

3. Impact on FATF Grey List Diplomacy:

- India may use the Pahalgam incident to **re-raise concerns about Pakistan's terror financing** and push for greater scrutiny through bodies like the **Financial Action Task Force (FATF)**.

Conclusion:

- India's stance at the SCO Defence Ministers' meeting is a significant assertion of its zero-tolerance policy towards terrorism, especially state-sponsored cross-border terror.
- It also marks a strategic shift in India's multilateral diplomacy, where national security interests and moral clarity on terrorism are not compromised for regional consensus.

INDIAN ECONOMY

Regulating India's virtual digital assets revolution

Source: The Hindu
https://www.thehindu.com/opinion/op-ed/regulating-indias-virtual-digital-assets-revolution/article69646053.ece
UPSC Relevance: GS3 Economy

Context:

India's Crypto Conundrum

Why in News

India has topped the Chainalysis Geography of Cryptocurrency report (2024) for the second consecutive year, highlighting its global leadership in grassroots crypto adoption amid calls for comprehensive VDA regulation.

Introduction

- India has emerged as a global leader in grassroots cryptocurrency adoption, topping the Chainalysis *Geography of Crypto* report for the second consecutive year (2024).
- According to NASSCOM, Indian retail investors infused **USD 6.6 billion** into crypto assets in 2024, and the sector could generate more than **800,000 jobs** by 2030. India also hosts one of the world's fastest-growing Web3 developer communities.
- Yet this vibrancy co-exists with an uncertain, fragmented domestic policy landscape.
- In **May 2025, the Supreme Court pointedly asked why India still lacks a comprehensive crypto law**, noting that "banning may be shutting your eyes to ground reality."

Virtual Digital Assets (VDAs):

According to Section 2(47A) of the **Income Tax Act, 1961**, inserted by the Finance Act 2022:

Virtual Digital Asset (VDA)

- **Virtual Digital Asset (VDA)** means any information or code or number or token (not being Indian currency or any foreign currency), generated through cryptographic means or otherwise, providing a digital representation of value, exchangeable with or without consideration.

VDAs **include**:

- **Cryptocurrencies** (e.g., Bitcoin, Ethereum)
- **Non-Fungible Tokens (NFTs)**
- Any other digital asset notified by the Central Government

Exclusions

The government may **exclude** any digital asset from the VDA category via notification. Fiat currencies (like INR, USD) are **not** considered VDAs.

Taxation of VDAs in India

India currently **does not regulate** VDAs through a specific law, but **taxes** them under the Income Tax Act as follows:

1. **30% Tax on Gains** (Section 115BBH):
   - Applies to profits from the transfer of VDAs.
   - **No set-off of losses** allowed against other income.
   - **No carry-forward** of losses.
2. **1% Tax Deducted at Source (TDS)** (Section 194S):
   - Applicable on **VDA transactions exceeding ₹10,000** in a financial year.

- The buyer is responsible for deducting TDS.

3. **Gift Tax**:
   - VDA received as a **gift** is **taxable in the hands of the recipient** (if exceeding ₹50,000 in value).

The Regulatory Vacuum: A Chronology

1. Initial Caution (2013 – 2018)

- 2013-14: The Reserve Bank of India (RBI) issues public cautions on crypto risks.
- 2018: RBI directs banks to cut ties with crypto firms.
- 2020: The Supreme Court quashes the RBI circular, calling it disproportionate.

2. Taxation Without Regulation (2022 – present)

- **1 % TDS** on VDA trades above ₹10,000 (Section 194S).
- **30 % capital-gains tax** with no loss set-off (Section 115BBH).

These measures expanded formal reporting but also encouraged users to shift to offshore, non-compliant exchanges, eroding tax collections (over ₹60 billion in uncollected TDS by late-2024).

Policy Gaps and Risks

- **Fragmented oversight**
  Multiple regulators (RBI, SEBI, FIU, Ministry of Finance) operate without a unified statute defining VDAs or assigning clear jurisdiction.
- **Capital controls vs. decentralisation**
  India's strict foreign-exchange regime is poorly aligned with borderless crypto networks.
- **Loss of visibility**
  Users migrating to offshore platforms increase vulnerabilities to fraud, hacks, and illicit flows while depriving the exchequer of revenue.

Role of VASPs (Virtual Asset Service Providers)

- Domestic VASPs act as gateways for AML/CTF compliance, reporting suspicious transactions to FIU-India.
- After a USD 230 million hack in 2024, leading Indian exchanges voluntarily strengthened cybersecurity, set up insurance funds, and drafted industrywide standards—demonstrating their utility as cooperative partners rather than adversaries.

Global Best Practices

International bodies (IMF, Financial Stability Board, FATF) advocate risk-based, technology-neutral rules that:

- licence and supervise VASPs,
- mandate robust customer-due-diligence ("travel rule"),
- protect consumers, and
- enable cross-border information-sharing.

Several jurisdictions (EU's MiCA, Japan's amendments, the UK's phased approach) show how dedicated statutes can balance innovation with systemic safeguards.

Way Forward for India

1. **Enact a comprehensive VDA law** that defines asset classes, allocates regulatory responsibilities, and lays out consumer-protection norms.
2. **Empower compliant domestic VASPs** through clear licensing, reporting requirements, and sandbox support, encouraging on-shore activity.
3. **Rationalise taxation** by reconsidering the 1 % TDS trigger, permitting loss-offsetting, and aligning crypto taxes with those of securities.
4. **Strengthen digital infrastructure** by setting minimum cybersecurity and custody standards, mandatory insurance pools, and incident-response protocols.
5. **Lead globally** via G20 and FATF dialogues to shape interoperable rules and coordinated enforcement against illicit offshore platforms.

Conclusion

- India's position as a top adopter of crypto assets gives it a unique opportunity—and obligation—to craft forward-looking, balanced regulation. Mere prohibition or

punitive taxation cannot keep pace with technological realities.

- A coherent, risk-based framework that partners with domestic VASPs, safeguards consumers, and integrates with global norms will allow India to capture the economic benefits of Web3 while protecting its financial system and national security.

EV Import Duty Cuts Linked to Local Manufacturing Scheme

Source: The Hindu
https://www.thehindu.com/business/Industry/new-ev-scheme-finalised-offers-import-tax-cuts-for-local-production/article69648023.ece
UPSC Relevance: GS 3 Economy

Context:

Scheme to Promote Manufacturing of Electric Passenger Cars

Why in News

The Ministry of Heavy Industries on June 2, 2025, notified detailed guidelines under the Scheme to Promote Manufacturing of Electric Passenger Cars in India.

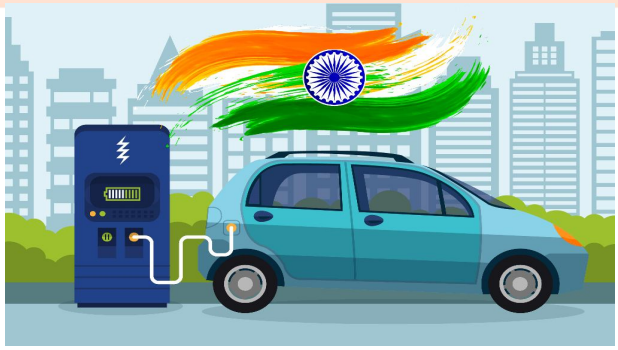
Introduction

- Recently, the **Ministry of Heavy Industries** issued detailed guidelines under the **Scheme to Promote Manufacturing of Electric Passenger Cars in India**, a policy that was originally notified on **March 15, 2024**.
- The objective of the scheme is to promote domestic manufacturing of electric four-wheelers (e-4W) by offering incentives to global EV manufacturers willing to set up production facilities in India.

Key Features of the Scheme

1. Import Duty Relaxation for EVs

- Eligible companies will be allowed to **import up to 8,000 Completely Built Units (CBUs)** of electric four-wheelers per year.
- These CBUs must have a **minimum CIF (Cost, Insurance and Freight) value of $35,000**.
- They will be charged a **reduced customs duty of 15%**, compared to the prevailing 70-100%.
- This benefit will be available for a period of **5 years** from the **date of application approval**.



2. Investment Commitment

- The applicant must commit a **minimum investment of ₹4,150 crore** (approx. $500 million).
- This investment must be made within a **3-year window** from the date of approval.
- The investment must be directed toward:
  - Setting up manufacturing facilities
  - Procuring new plant, machinery, and equipment
  - Engineering Research & Development (ER&D)
  - Charging infrastructure (up to 5% of committed investment)
  - New buildings (limited to 10% of total investment)
- **Expenditure on land** is **not eligible** under the scheme.

3. Domestic Value Addition (DVA) Requirement

- **Within 3 years**: Minimum DVA of **25%** must be achieved.
- **Within 5 years**: Minimum DVA of **50%** must be achieved.
- This ensures progressive indigenisation of EV production in India.

4. Financial Safeguards

- The company must provide a **bank guarantee** from a **scheduled commercial bank** in India.
- The bank guarantee must be **equal to the higher** of:

- The **total customs duty foregone**, or
- ₹4,150 crore

- This acts as a safeguard to ensure that applicants fulfill their investment and localisation commitments.

5. Application and Eligibility Criteria

- The **application window** will open for at least **120 days** and may be reopened multiple times **until March 15, 2026**.
- **Application Fee**: ₹5,00,000 (non-refundable)
- Eligibility Criteria:
  - **Global automotive manufacturing revenue** of **at least ₹10,000 crore**
  - **Global fixed asset investment** of **at least ₹3,000 crore**, based on the latest audited financial statements

Rationale and Significance

Boost to EV Ecosystem

- The scheme is designed to **catalyze the growth of the EV ecosystem** in India by:
  - Attracting **foreign direct investment (FDI)** from global EV giants.
  - Ensuring **technology transfer**, skill development, and vendor ecosystem creation.
  - Supporting the development of **domestic supply chains**.

Balance Between Imports and Indigenisation

- By allowing a limited number of CBUs at reduced duties in return for **high domestic investment and localisation**, the scheme balances the need for **technology introduction** with the imperative of **Atmanirbhar Bharat**.

Support for Climate Goals

- The scheme supports India's target of **net-zero emissions by 2070** and contributes to reducing urban pollution and oil import dependency.

Challenges and Concerns

1. Limited Immediate Market Potential

- The requirement of a $35,000 minimum CIF value means **only premium EVs** will be initially eligible—**restricting access to mass-market segments**.

2. Stringent Eligibility Norms

- Many Indian startups and new entrants in the EV sector **may not qualify** due to revenue and investment thresholds.

3. Tesla's Lack of Interest

- Despite the scheme being seen as favourable, **Tesla has publicly expressed disinterest** in manufacturing in India as per recent statements by Union Minister **H. D. Kumaraswamy**. This raises questions about the scheme's **realistic attractiveness**.

Way Forward

- The government may need to **actively engage with global EV manufacturers** to address their concerns.
- A **follow-up scheme** targeting **low-cost electric vehicles** could help penetrate the mass market.
- **State governments** must complement the central scheme through ease of land acquisition, fast-track clearances, and power/water infrastructure to attract investments.

Conclusion

- The **2025 guidelines** under the Scheme to Promote Manufacturing of Electric Passenger Cars in India mark a significant step in **accelerating EV adoption** and **domestic production capacity**.
- While the scheme is promising, its impact will depend on the **industry's response**, **policy stability**, and **synergy with state initiatives**.
- Strategic implementation could make India a **global EV manufacturing hub** in the coming decade.

Global Energy Investments 2025

Source: Down to Earth

https://www.downtoearth.org.in/energy/china-leads-global-energy-investments-in-2025-developing-countries-still-face-barriers-iea

UPSC Syllabus Relevance: GS3 Economy

Context:

International Energy Agency (IEA)

Why in News?

The IEA's Global Energy Investment Report 2025, released on June 5, 2025, revealed that China will account for over 25% of global energy investment.

Introduction

- The **International Energy Agency (IEA)** released the **10th edition of the Global Energy Investment Report 2025** on June 5, 2025, highlighting **growing inequalities in energy investment** across the globe.
- While global clean energy investment is set to **reach USD 2.2 trillion in 2025**, major disparities exist between **developed countries like China and the United States**, and **developing regions such as Africa and South Asia**, particularly in mobilising capital for energy infrastructure.

Key Highlights of the IEA Report 2025

- **Clean energy investment in 2025**: USD 2.2 trillion, nearly **twice** the investment in oil, gas, and coal combined.
- **China**: Will account for **over 25% of global energy investment**, with energy spending equal to that of the **U.S. and European Union combined**.
- **Africa**: Energy investment has **declined by one-third** since 2015, now accounting for just **2% of global clean energy investment** despite hosting **20% of the world population**.
- **India and Brazil**: Leading among emerging economies in scaling up clean energy investments, but face financing and cost-of-capital constraints.

China's Dominant Position in Global Energy Investment

Clean Energy Leadership:

- China's clean energy investment rose to **over USD 625 billion** in 2025 from USD 300 billion in 2015.
- Accounts for nearly **one-third of global clean energy spending**, with investments in:
  - **Solar, Wind, Hydropower, Nuclear**
  - **Battery storage and Electric Vehicles**

Contradictions in Investment Patterns:

- Despite clean energy leadership, **China approved nearly 100 GW of coal-fired plants in 2024** — the highest global level since 2015.
- Driven by **energy security concerns** after previous **blackouts** and **hydropower shortages during dry spells**.

Energy Investment in Africa: A Deepening Crisis

- **Fossil Fuel Decline:** Fossil fuel investment fell from **USD 125 billion in 2015 to USD 54 billion in 2025**.
- **Renewables Underfunded:** Renewable energy investment rose marginally from **USD 13 billion to USD 21 billion**.
- **Structural Constraints: Currency depreciation** and **high interest rates** raise debt servicing costs. Debt servicing in Africa is **85% of total energy investment**, crippling financing capacity.

India's Position: Strides and Struggles

Renewable Energy Growth:

- Investment in renewables rose from **USD 13**

billion in 2015 to USD 37 billion in 2025.

- Strong focus on **solar PV** (USD 16 billion annually over the last five years).
- **245 million USD** committed to **nuclear energy** in FY25 to increase capacity to **100 GW by 2047**.

Fossil Fuel Continuation:

- Fossil fuel investment also increased: **USD 41 billion to USD 49 billion** (2015–2025).
- However, investment balance shifted: **Then**: ₹1 in fossil = ₹1 in non-fossil **Now**: ₹1 in fossil = ₹4 in non-fossil

Challenges:

- **Cost of capital** for clean technologies is **80% higher** than in advanced economies.
- Affects financing of capital-intensive projects like **solar farms** and **wind parks**.
- Grid and storage investment fell from **USD 31 billion to USD 25 billion**.

Global Trends in Grid and Storage Investment

Grid Investment Highlights:

- Global investment in grids to exceed **USD 400 billion in 2025**.
- **China, EU, and North America** account for over 50% of grid spending.
- In India, decline in investment offset by approval of a **USD 110 billion transmission infrastructure plan** till 2032.

Barriers to Grid Expansion:

- Permitting delays
- Shortage of key materials (transformers, cables)
- Financially weak power utilities in developing nations
- Grid material costs **doubled** in five years

COP28 and Future Investment Commitments

- At **COP28 (2023)**, nations pledged to:
  - **Triple renewable energy capacity**
  - **Double energy efficiency improvements** by **2030**
- Current investment levels **fall short** of these targets.
- To meet COP28 goals, **annual investments must double** by the end of the decade.

"Baku to Belem Roadmap" (COP29, 2024):

- Aims to **mobilise USD 1.3 trillion** for **low-emissions projects** in developing countries by 2035.
- IEA recommends **incorporating cost of capital challenges** in this roadmap for better accessibility.

Comparative Energy Investment: 2015 vs 2025

Country/Region	Fossil Fuels (2015)	Fossil Fuels (2025)
China	Moderate rise	Significant for coal
India	$41 billion	$49 billion
Africa	$125 billion	$54 billion

Conclusion:

- While countries like China are driving global clean energy investment, the **widening gap between developed and developing countries** threatens global climate targets.
- India's rising renewable investments are promising but need **financial system reform**, **reduction in cost of capital**, and **grid upgrades** to accelerate decarbonization.
- Africa's case signals an urgent need for **concessional finance** and **global cooperation**.

Global efforts must now focus on:

- Mobilising capital for the Global South
- Balancing generation and transmission investments
- Building resilience and affordability into clean energy finance

Without urgent course correction, the world risks falling short of its **climate, equity, and energy access goals**.

Govt relaxes SEZ rules for semiconductor, electronics manufacturing

Source: The Hindu
https://www.thehindu.com/business/Industry/govt-relaxes-sez-rules-for-semiconductor-electronics-manufacturing/article69674983.ece
UPSC Syllabus Relevance: GS3 Economy

Context:

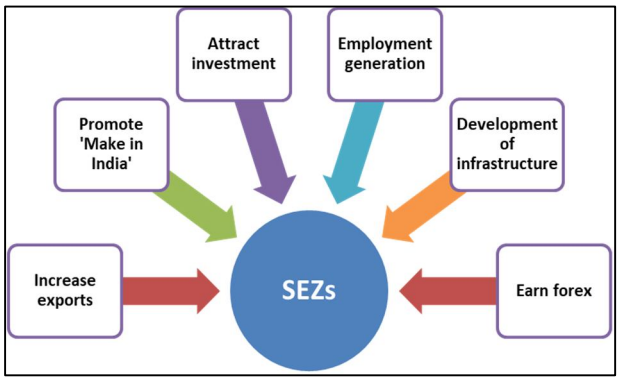
SEZ rules

Why in News?

The Department of Commerce notified amendments to SEZ Rules, 2006 to promote semiconductor and electronic component manufacturing.

Introduction

- On June 3, 2025, the Department of Commerce notified significant amendments to the Special Economic Zones (SEZ) Rules, 2006, aimed at encouraging investment in the semiconductor and electronics components manufacturing sector. These changes were officially announced on June 9, 2025.



Background:

- India has been pursuing self-reliance in high-tech sectors like **semiconductors**, which are vital for a range of industries including electronics, defense, automobiles, and telecommunications.
- Given the high capital requirements, technology dependence, and long gestation periods, the SEZ policy has been amended to make India more attractive for global and domestic semiconductor investments.

Key Amendments to SEZ Rules:

1. Amendment to Rule 5 – Reduction in Minimum Land Requirement

- **Previous Requirement:** 50 hectares of contiguous land.
- **New Requirement:** Reduced to **10 hectares** for SEZs exclusively for semiconductor or electronic component manufacturing.
- **Rationale:** Recognizes the capital-intensive nature of the sector and aims to lower entry barriers for new projects.

2. Amendment to Rule 18 – Domestic Sales Permitted

- **Change:** Allows semiconductor and electronics component SEZ units to **sell domestically** within India, in addition to exports.
- **Condition:** Applicable duties and taxes must be paid on such domestic sales.
- **Significance:** Earlier SEZ units were largely export-oriented; this change provides **greater market flexibility** and boosts **domestic supply chains**.

3. Amendment to Rule 7 – Flexibility in Land Ownership

- **Change:** The Board of Approval can now **relax the requirement** of encumbrance-free land in cases where land is **mortgaged or leased** to the Central/State Government or their authorized agencies.
- **Significance:** This enables faster project execution and avoids delays due to strict land title clearance issues.

New SEZ Approvals Post Notification:

Following the amendments, the Board of Approval (BoA) granted approval to two major SEZ proposals:

Company	Location	Sector
Micron Semiconductor Technology India	Sanand, Gujarat	Semiconductor Manufacturing
Hubballi Durable Goods Cluster Pvt Ltd (Aequs Group)	Dharwad, Karnataka	Electronic Component Manufacturing

Government Justification and Objectives:

The Ministry of Commerce and Industry stated:

- Manufacturing of semiconductors and electronics is **import-dependent** and **technology-intensive**.
- The sector has **long gestation periods** before turning profitable.
- These amendments aim to:
  - Promote **pioneering investments**,
  - **Ease regulatory requirements**,
  - Build a **domestic ecosystem** for chip and component manufacturing,
  - Create **high-skilled jobs** in India.

Significance of These Changes:

A. Economic Implications

- Will attract **FDI** and enhance **Make in India**.
- Supports **Atmanirbhar Bharat** in the tech hardware sector.
- Facilitates development of **ancillary industries** and tech parks.

B. Strategic Implications

- Reduces dependence on global semiconductor supply chains.
- Enhances India's role in **global electronics manufacturing**.

C. Employment & Skill Development

- Will generate demand for **high-tech skills** in design, engineering, and fabrication.
- Promotes **R&D** and innovation in hardware technology.

Challenges Ahead:

- Ensuring **timely implementation** of approved projects.
- Addressing **skilled manpower shortage** in semiconductor fabrication.
- Navigating **geopolitical dynamics** around global chip supply chains.

Conclusion:

- The recent amendments to SEZ Rules mark a **landmark shift** in India's industrial policy towards **strategic high-tech sectors**.
- By reducing regulatory burdens and expanding the market reach of SEZ units, India aims to **emerge as a global semiconductor manufacturing hub**, aligning with both **economic** and **strategic national interests**.

New base year for GDP, CPI, IIP from early 2026

Source: Indian Express

https://indianexpress.com/article/business/new-base-year-for-gdp-cpi-iip-from-early-2026-services-survey-from-jan-mospi-secretary-10055289/

UPSC Syllabus Relevance: **GS3 Economy**

Context:

MoSPI's Base Year Revision

Why in News?

The Ministry of Statistics and Programme Implementation (MoSPI) is undertaking a base year revision for GDP, IIP, and CPI, with new series expected to be released from 2026.

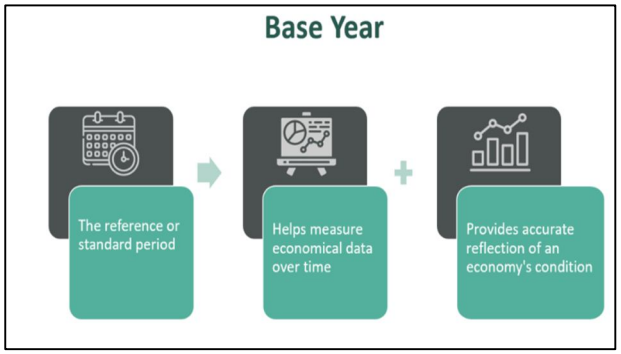
Introduction

- The Ministry of Statistics and Programme Implementation (MoSPI) has undertaken a comprehensive revision of the base years for India's key macroeconomic indicators—Gross Domestic Product (GDP), Index of Industrial Production (IIP), and Consumer Price Index (CPI).
- Alongside this, the Ministry is expanding its statistical infrastructure by incorporating alternative data sources and adopting modern technological tools for better accuracy, relevance, and timeliness in official statistics.

Base Year Revisions: Key Highlights

1. **Gross Domestic Product (GDP)**
   - **New base year**: 2022–23.
   - **Revised series release date**: February 27, 2026.
   - The revision will integrate new data sources such as Goods and Services Tax (GST) data, digital transaction records, and real-time financial indicators.

2. **Index of Industrial Production (IIP)**
   - **Tentative base year**: 2022–23.
   - The revised IIP series is expected to be released during the financial year 2026–27.
3. **Consumer Price Index (CPI)**
   - **New base year**: 2024.
   - The updated CPI series will be published starting in the first quarter of 2026.
   - The weights and item basket will now be based on the **Household Consumption and Expenditure Survey (HCES) 2023–24**, superseding the earlier plan to use HCES 2022–23 data.



Key Changes in the CPI Framework

- The updated CPI series will exclude dwellings provided by the government or employers to better reflect the market-based cost of living.
- The revised index will incorporate **rural rental data** to provide a more accurate picture of housing expenses across regions.
- MoSPI is currently evaluating how to include **Public Distribution System (PDS) items** and **free social transfers** in the retail inflation index. A final methodology will be released as a white paper.

Adoption of Alternative Data Sources

To improve the accuracy and comprehensiveness of economic indicators, MoSPI is leveraging data from a variety of new sources:

- For **GDP estimates**:
  - GST Network (GSTN) data.
  - Controller General of Accounts (CGA) records.
  - Corporate data from MCA-21.
  - UPI transaction data from the National Payments Corporation of India (NPCI).
  - Vehicle registration data from the E-Vahan portal.
- For **CPI calculation**:
  - Price data from online platforms for services such as airfare, rail fare, and Over-The-Top (OTT) content platforms.
  - Administrative records for petrol, diesel, and LPG prices from the Petroleum Planning and Analysis Cell (PPAC).
  - Data-sharing arrangements are under discussion with IRCTC and the Ministry of Railways.

MoSPI is also exploring the use of **web scraping**, **scanner data**, and **e-commerce platforms** to collect price data for frequently purchased items.

Next Economic Census (EC)

The Ministry is preparing for the launch of the next Economic Census. Approval for its conduct is awaited, but preparatory work has begun. The upcoming census will be driven by digital technology and will feature:

- Mobile-based data collection.
- Real-time data supervision and monitoring.
- Automated data processing and dashboard-based dissemination.
- End-to-end integration of field operations and data analysis.

Forward-Looking Private Corporate CAPEX Survey

MoSPI recently conducted the inaugural round of the Forward-Looking Private Corporate Capital Expenditure (CAPEX) Survey. Key features and steps for improvement include:

- **Initial response rate**: 58.3 percent, considered low.
- **Planned interventions**:
  - Organising regional outreach campaigns by field offices.
  - Collaboration with industry associations to encourage participation.
  - Expanding the sample size to address non-response bias.

- Upgrading the web portal with user-friendly features such as chatbots, FAQs, and step-by-step instructions.
- Deployment of field officials to assist enterprises in survey completion.
- A Data User Conference was held on May 27, 2025, in Hyderabad to promote the findings and encourage broader engagement.

Significance of the Initiatives

- The base year revisions and new data integrations will make official statistics more **reflective of contemporary consumption patterns, industrial structure, and service economy dynamics**.
- Leveraging digital and administrative data will improve **data quality, coverage, and timeliness**.
- These changes support **evidence-based policymaking** and align statistical methodologies with global best practices.
- The incorporation of advanced data analytics tools and real-time indicators will reduce the time lag in official data release and enhance the robustness of economic forecasting.

Centre Caps MGNREGS Spending at 60% for First Half of FY 2025-26

Source: Indian Express

https://indianexpress.com/article/india/centre-caps-mgnregs-spend-first-six-months-fy-2025-26-10058179/

UPSC Relevance: GS 3 Economy

Context:

MGNREGS Spending

Why in News

For the first time, the government has capped MGNREGS expenditure under the Monthly/Quarterly Expenditure Plan (MEP/QEP).

Introduction

- For the first time since its inception, the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)—India's flagship rural employment programme—has been brought under expenditure caps for the first half of FY 2025–26.
- The Union Ministry of Finance has directed the Ministry of Rural Development (MoRD) to adhere to a **60% spending ceiling** of the annual outlay by September 2025 under the **Monthly/Quarterly Expenditure Plan (MEP/QEP)** framework.

Key Changes Introduced

- **Cap Introduced:** The Ministry of Finance has capped expenditure at **60% of the total ₹86,000 crore** budget allocation for MGNREGS for the first half of FY 2025–26 (i.e., ₹51,600 crore).
- **Under MEP/QEP Framework:** For the first time, **MGNREGS has been brought under MEP/QEP**, a mechanism introduced in 2017 to regulate cash flows and control fiscal spending.
- **Departure from Demand-Driven Nature:** Historically, MGNREGS operated as a **demand-driven scheme** with no fixed quarterly expenditure ceilings, due to its role as a rural safety net.

Reasons for Concern

- **Carryover Liabilities:** The MoRD is carrying **₹21,000 crore in pending wage liabilities** from the second half of FY 2024–25.
- **Reduced Fiscal Headroom:** A major portion of the ₹51,600 crore available for H1 FY26 may be spent on **clearing backlogs**, rather than generating new work.
- **Employment Generation at Risk:** The approved **labour budget for FY 2025–26 is**

198.86 crore persondays, with **67.11% (133.45 crore)** to be generated in the first half. The cap may hinder achieving this target.

While the historical data suggests the new cap aligns with past trends, the burden of previous liabilities could distort the scheme's ability to function effectively this year.

Justification from Ministry of Finance

- **Fiscal Discipline:** MEP/QEP promotes **better cash management** and avoids unnecessary government borrowing.
- **Accountability on Delay in Payments:** Officials cited MGNREGA Act provisions requiring **wages to be paid within 15 days**. They questioned how over ₹21,000 crore remained unpaid for just the last fortnight of March 2025.

MGNREGS: A Quick Recap

- **Launched:** In 2006–07 in 200 backward districts; **nationwide rollout in 2008–09**.
- **Objective:** Guarantee **100 days of wage employment** annually to rural households willing to do unskilled manual work.
- **Significance:** Acts as a **counter-cyclical safety net**, especially during economic distress or crises (e.g., COVID-19 lockdowns).

Implications of the Spending Cap

1. Operational Challenges

- With **pending liabilities and limited fresh funds**, the scheme risks reduced **employment generation capacity** in H1.
- Local administrations may find it hard to **approve new work** until old dues are cleared.

2. Social Impact

- **Marginalised communities**, especially landless labourers and SC/ST households, who depend on MGNREGS for income security, may suffer.

3. Policy Tension

- **Contradiction between demand-driven legal entitlement** (as per MGNREGA Act, 2005) and new financial control mechanism.
- MoRD's autonomy in responding to rural distress may be restricted.

Critical Analysis

In Favour of Cap:

- Encourages **fiscal prudence** and curbs leakages.
- Helps integrate the scheme into overall budget discipline framework.

Against the Cap:

- **Undermines the legal guarantee** of wage employment.
- Ignores **seasonal work demand peaks** and emergent distress scenarios.
- May discourage **states from proactive implementation** due to uncertainty in fund release.

Way Forward

- **Timely Clearance of Dues:** Backlog payments must be addressed urgently to restore credibility and operational fluidity.
- **Dynamic Fund Allocation:** A more **flexible MEP/QEP window** tailored to MGNREGS's demand-driven nature should be considered.
- **Independent Monitoring:** Enhanced accountability mechanisms to ensure **wage payments are timely** and **work is genuinely generated**.
- **West Bengal Issue:** The Centre must resolve the **scheme suspension in West Bengal**, as lakhs of families remain deprived.

NSE Gets SEBI Nod for Launching Monthly Electricity Futures

Source: The Hindu

https://www.thehindu.com/business/nse-gets-sebis-nod-to-launch-monthly-electricity-futures-contracts/article69684386.ece

UPSC Relevance: GS3 Economy

Context:

Securities and Exchange Board of India (SEBI)

Why in News

SEBI has approved NSE to launch monthly electricity futures contracts, aiming to enhance risk hedging and efficiency in India's power markets.

Introduction

- The **National Stock Exchange (NSE)** has received regulatory approval from the **Securities and Exchange Board of India (SEBI)** to introduce **monthly electricity futures contracts** — a major development in India's efforts to deepen its energy markets through financial instruments.
- This move is expected to enhance the **hedging ecosystem**, foster **market efficiency**, and promote **long-term investment** in the country's power sector.

Background

- Electricity is a vital commodity but lacks the kind of sophisticated financial hedging instruments available for other sectors.
- Unlike other energy markets (such as oil or natural gas), electricity is difficult to store and has traditionally relied on physical spot markets or long-term Power Purchase Agreements (PPAs).
- Volatility in demand and supply due to seasonal changes, industrial usage, and renewable energy fluctuations has often led to **price instability**, making the need for **financial derivatives** in the electricity sector more pressing.

Objectives of the Electricity Futures Launch

1. **Price Volatility Management**: The primary aim is to provide market participants — including power producers, DISCOMs, industrial consumers, and traders — with **effective hedging tools** to manage risks from fluctuating electricity prices.
2. **Improved Price Discovery**: Futures contracts will complement the day-ahead spot market by offering forward-looking price signals. This dual-market structure can improve **transparency** and **efficiency** in electricity pricing.
3. **Encouraging Investments**: With improved market visibility and risk management options, financial derivatives are expected to unlock **greater capital investment** across the electricity value chain — including **generation**, **transmission**, **distribution**, and **retail supply**.
4. **Market Development**: NSE aims to gradually expand the electricity derivatives ecosystem to include **contracts for difference (CFDs)** and **long-duration contracts** such as **quarterly and annual futures**, subject to further regulatory approvals.

Implementation Strategy

- **Calibrated & Phased Rollout**: NSE has indicated that the product launch will follow a **phased approach**, prioritizing market integrity, investor protection, and gradual market familiarization.
- **Financial Settlement**: The proposed futures contracts will be **financially settled**, i.e., there will be no actual delivery of electricity, only cash settlement based on the reference price from the spot market.
- **Spot and Futures Market Linkage**: A **virtuous cycle** between spot and futures markets is envisioned. A robust **spot market** (like the **Day-Ahead Market** operated by Indian Energy Exchange or PXIL) ensures accurate reference prices, while an active **futures market** offers participants a tool to lock in future prices and reduce risk exposure.

Significance

1. **Strengthening the Power Market Ecosystem**:
   This move will help create a **comprehensive**

electricity market structure, bringing India closer to global best practices.

2. **Private Sector Participation**: With more predictable price environments, it could **increase the participation of private sector investors** in power infrastructure projects, especially in the renewable sector, where intermittency challenges are high.
3. **Complementing Power Reforms**: The initiative aligns with broader reforms in the power sector, including **open access**, **privatization of distribution**, and **real-time electricity markets**.

Historical Context

- NSE was the **first stock exchange in India** to establish an electricity exchange, having launched the **Power Exchange India Limited (PXIL)** in **2008** in collaboration with the National Commodity and Derivatives Exchange (NCDEX).
- Recently, the **Multi Commodity Exchange (MCX)** also received SEBI's approval to launch electricity derivatives, indicating a growing regulatory and institutional push to build a mature electricity market in India.

Way Forward

- **Regulatory Oversight**: Continuous coordination with SEBI, CERC, and POSOCO will be essential to ensure regulatory harmony between physical and financial electricity markets.
- **Market Education and Awareness**: Investor education, training for utilities and market participants, and transparent contract design will be crucial.
- **Technological Infrastructure**: Efficient trading platforms and reliable data systems will be required to support trading volumes and price discovery.

Conclusion

- The launch of electricity futures contracts by NSE marks a **transformative step in India's power market evolution**.
- It not only provides risk management solutions but also strengthens India's commitment to creating **efficient, transparent, and investment-friendly energy markets**.
- As electricity becomes more central to India's growth and decarbonization goals, financial innovation like this will play a key role in enabling a **resilient and future-ready power system**.

Centre to wield quality control 'stick' to drive exports

Source: The Hindu
https://www.thehindu.com/business/Economy/centre-to-wield-quality-control-stick-to-drive-exports/article69682863.ece
UPSC Syllabus Relevance: GS Economy

Context:

Quality Control Orders (QCOs)

Why in News

India is shifting from subsidies to Quality Control Orders (QCOs) to boost export competitiveness by enforcing minimum product standards.

Background:

- The Indian government has taken a significant policy turn by moving away from its traditional reliance on subsidies to boost export-oriented sectors.
- Instead, it is now emphasizing a "carrot and stick" strategy centred around the enforcement of **Quality Control Orders (QCOs)** to improve product standards and enhance India's global competitiveness.

Background: Subsidy-led Export Promotion

Historically, India has relied on subsidies and tax incentives to promote exports. These include:

- **Interest equalization schemes**
- **MEIS/RODTEP schemes** for merchandise exporters
- **PLI (Production Linked Incentives)** for specific sectors

However, according to a senior government official, this approach has **not yielded the desired export performance**, partly due to **quality issues** in exported goods.

New Strategy: Carrot and Stick Approach

1. Increased Emphasis on QCOs

- QCOs are regulatory tools issued under the Bureau of Indian Standards (BIS) Act, requiring **mandatory minimum quality standards** for goods.
- As of March 2025, **187 QCOs covering 769 products** have been notified by various ministries.
- These apply not only to **domestic production** but also to **imported** and **export-bound** goods.

2. Non-subsidy Support

The government has expressed willingness to provide support in the form of:

- Easing land acquisition processes
- Addressing regulatory hurdles
- Infrastructure development

This reflects a shift towards **facilitating competitiveness**, rather than artificially sustaining exports through financial incentives.

QCOs: A Double-Edged Sword

Government's View:

- According to **Commerce Minister Piyush Goyal**, QCOs are a necessary step to ensure **India meets global quality standards**, improving **market access** and **brand perception** of Indian goods.

Counterview from NITI Aayog:

- **Vice Chairman Suman Bery** criticized QCOs as a **"malign intervention"**, arguing they could:
  - Disincentivize **low-cost imports**,
  - Hurt **MSMEs** who cannot meet strict standards due to cost constraints,
  - Lead to **protectionism** under the guise of quality.

Exemptions and Relief Measures

To strike a balance, the government has:

- **Exempted certain import categories** from QCO compliance when the final goods are meant for export.
- These exemptions apply under schemes like:
  - **Advance Authorisation**
  - **Export Oriented Units (EOUs)**
  - **Special Economic Zones (SEZs)**

This ensures exporters who rely on **foreign inputs** do not face disruption.

Special Case: Rare Earth Batteries and Strategic Subsidies

While the government remains firm on reducing blanket subsidies, it is **reconsidering subsidies in strategic sectors** like:

- **Rare Earth Batteries**, due to China's export ban creating a supply crunch.
- This is part of a **national security and energy independence agenda**.

Such **targeted subsidies** could be provided to foster **domestic manufacturing** of critical technologies and **reduce external dependencies**.

Industry Reaction and Demands

Example: Federation of Indian Mineral Industries (FIMI)

- FIMI has demanded an **upfront subsidy of ₹10,000–15,000 per kWh** for alternate fuel **Heavy Earth Moving Machinery (HEMM)**.
- It argues that **electric HEMMs cost nearly 3 times more** than diesel ones, acting as a barrier to **green transition** in mining.

This reflects a **sectoral divergence** between government policy and industry expectations, especially in **capital-intensive green technologies**.

Implications for Policy and Economy

Positive Outcomes:

- Encourages **innovation and quality improvement**

- Reduces **wasteful subsidies**
- Aligns with **WTO-compliant export promotion** strategies
- Supports India's aspiration to become a **manufacturing hub**

Challenges:

- MSMEs may **struggle to comply** with stringent QCO norms
- Potential **reduction in export volume** if quality compliance isn't matched
- Risk of **bureaucratic overreach** in QCO enforcement
- Industry resistance, especially in **green technology adoption**

Conclusion

- India's pivot from subsidies to regulatory quality enforcement through QCOs marks a **strategic shift** in export and industrial policy.
- While it aims to build a **self-reliant and quality-driven export ecosystem**, care must be taken to **support vulnerable sectors** like MSMEs and **balance quality norms with ease of doing business**.
- Selective and **strategic subsidies**, especially in critical sectors like **rare earth technologies**, may still play a role in ensuring long-term competitiveness and resilience.

SEBI mandates dedicated UPI address for registered intermediaries

Source: The Hindu

https://www.thehindu.com/business/sebi-mandates-dedicated-upi-address-for-registered-intermediaries/article69682761.ece

UPSC Syllabus Relevance: GS3 Economy

Context:

SEBI's Validated UPI Handle Initiative

Why in News

SEBI will introduce a validated UPI handle "@valid" to ensure secure digital payments and prevent fraud in securities market transactions.

Introduction

- In an effort to enhance investor security and reduce the risk of digital payment fraud in India's securities market, the **Securities and Exchange Board of India (SEBI)** is set to launch a new validated UPI handle – **"@valid"** – for all investor-facing intermediaries.
- This initiative, developed in consultation with the **National Payments Corporation of India (NPCI)**, is scheduled to come into effect from **October 1, 2025**.
- It is designed to standardize digital payment mechanisms and prevent unauthorized or fraudulent UPI transactions within the securities ecosystem.

Key Features of the Initiative

1. Creation of a Unique UPI Handle: "@valid"

- All registered intermediaries including brokers, investment advisors, research analysts, mutual fund distributors, and bankers to an issue will be required to use a standardized and verified UPI handle ending with **"@valid"**.
- For instance, if a broker is associated with HDFC Bank, the verified UPI handle may appear as: **abc.bkr@validhdfc**.
- These handles will be allocated and maintained by **NPCI**, ensuring each handle is authentic and traceable.

2. Visual Verification Symbol

- To improve user trust, particularly among investors who may not be digitally literate or English-proficient, every valid payment request from such handles will display a **thumbs-up symbol inside a green triangle**.

- This visual marker serves to confirm the legitimacy of the handle and helps prevent phishing attacks, impersonation, and fraudulent payment demands.

Scope of Applicability

The reform is applicable to around **8,000 to 9,000 investor-facing intermediaries** across the country, including but not limited to:

- Stock brokers
- Mutual fund distributors
- Investment advisors
- Research analysts
- Bankers to an issue

These stakeholders will need to migrate to the new handle format to continue receiving payments and fees.

Supporting Digital Tools: SEBI Check App

To complement this initiative, SEBI will introduce a dedicated application named **"SEBI Check"**, which will enable investors to:

- Verify the authenticity of UPI handles used by intermediaries
- Confirm SEBI registration of the intermediary
- Protect themselves against scams or impersonation attempts

Additionally, SEBI plans to work with **Google Playstore** to ensure that only legitimate, approved financial applications are available on public platforms, minimizing the risk of fake or fraudulent apps.

Investor Protection and Awareness Campaigns

A two-year investor awareness and education campaign will be undertaken starting from April 2025. The objectives of this initiative include:

- Spreading awareness about the use of the "@valid" UPI handle format
- Educating investors about recognizing legitimate payment requests
- Providing information on how to use the SEBI Check App
- Ensuring intermediaries actively display the validation symbols and guide investors accordingly

These campaigns will particularly focus on rural and semi-urban areas where awareness of digital safety may be low.

No Impact on Existing SIPs

SEBI has clarified that **existing Systematic Investment Plans (SIPs)** will not be impacted by the transition.

Ongoing mandates and payment arrangements will remain in force, and the shift to "@valid" handles will be implemented in a **gradual and investor-friendly manner**.

Significance of the Move

1. Enhanced Trust and Transparency: The initiative fosters greater transparency and builds investor confidence by allowing them to identify verified payment recipients easily. It reduces ambiguity in financial transactions.

2. Reduction in Cyber Fraud: Standardized handles and visual markers make it easier to distinguish genuine intermediaries from fraudsters, thereby minimizing digital payment-related fraud in capital markets.

3. Standardization Across the Market: By enforcing a common handle format, the digital financial environment becomes simpler and more consistent for all users, improving operational efficiency and regulatory compliance.

4. Promotion of Digital Inclusivity: The use of **simple visual indicators** ensures that individuals with limited technological literacy or language barriers can still transact safely, promoting broader inclusion in financial markets.

Way Forward

- SEBI should focus on extensive outreach in **Tier 2 and Tier 3 cities and rural areas**, where digital and financial literacy levels may be relatively lower.
- The initiative must be backed by **periodic audits**, updates to the SEBI Check app, and collection of **stakeholder feedback** to improve user experience.

- Integration with broader schemes such as **Digital India** and the **Investor Protection Fund (IPF)** would enhance the reach and effectiveness of this initiative.

Easing food inflation and its implications

Source: Indian Express

https://indianexpress.com/article/opinion/editorials/after-easing-of-food-inflation-the-cooling-effect-10063664/?ref=view_opinion

UPSC Syllabus Relevance: GS 3 Economy

Context:

Retail inflation in India

Why in News

Retail inflation in India dropped to a multi-year low of 2.82% in May 2025, primarily due to easing food prices and aligning with the RBI's inflation projections.

Introduction

- India's retail inflation, as measured by the Consumer Price Index (CPI), fell to a multi-year low of **2.82% in May 2025**, marking the **lowest recorded inflation since February 2019**, according to the latest data from the **National Statistics Office (NSO)**.
- With this print, **average retail inflation for Q1 FY26 (April-May)** has remained **just under 3%**, aligning closely with the **Reserve Bank of India's (RBI)** projections.
- In its **June Monetary Policy Committee (MPC) meeting**, the RBI had estimated inflation at **2.9% for the first quarter**.

Drivers of the Decline: Food Inflation and Agricultural Output

The recent moderation in inflation has largely been attributed to the **easing of food prices**. Notably, the **food price index** showed significant decline in components such as:

- **Vegetables:** -13.7%
- **Pulses:** -8.22%
- However, inflation in **oils, fats, and fruits** remained in **double digits**, indicating continued price pressure in certain segments.
- The decline in food inflation is partly the result of **robust agricultural performance** in the previous year, with the **sector growing at 4.6%**, positively impacting the **rabi crop**. Looking ahead, attention will shift to the **southwest monsoon**, which is critical for **kharif sowing**.
- As of **June 12**, rainfall is **33% below the long-term average**, creating **uncertainty around food output** and potentially impacting inflation going forward.

Core Inflation Trends and Structural Factors

While food inflation eased, **core inflation** (excluding food and fuel) remained **stable at 4.3%**. Specific categories like **personal care and effects** continue to exhibit elevated inflation. According to analysts at **Nomura**, the subdued nature of core inflation reflects:

- Lower global commodity prices
- Increased reliance on Chinese imports
- Weak domestic demand conditions
- Anchored household inflation expectations
- Modest wage growth

This suggests **limited second-round effects**, indicating **stability in underlying inflationary trends**.

Monetary Policy Response and Future Outlook

In response to the low inflation environment, the **RBI's MPC** has adopted an **accommodative monetary policy stance**. In its recent decisions:

- **Repo rate** was cut by **50 basis points**, taking the cumulative rate cut since February to **100 basis points**, with the current rate at **5.5%**.

- **Cash Reserve Ratio (CRR)** was also reduced by **100 basis points**, to improve **liquidity transmission**.
- Despite the easing measures, **RBI Governor Sanjay Malhotra** cautioned that **"monetary policy has limited space left to support growth"**.
- As inflation remains below the **RBI's 4% target** for four consecutive months, the central bank is expected to adopt a **wait-and-watch** approach in the coming months.
- The RBI projects inflation to **gradually rise to 3.7%** by the end of the year, though some analysts foresee a lower trajectory. The **performance of the southwest monsoon**, global commodity trends, and domestic growth dynamics will be key determinants of future inflation and **monetary policy direction**.

Conclusion

- The current inflation trajectory provides a **window of opportunity for macroeconomic stability**, though uncertainties around the **monsoon and food prices** persist.
- The RBI's cautious approach, amid constrained policy space, reflects the delicate balance between **stimulating growth and anchoring inflation expectations** in a post-pandemic recovery environment.

The Cost of Rising Imports and India's Agrarian Distress

Source: Indian Express

https://indianexpress.com/article/explained/explained-the-cost-of-rising-imports-10066696/

UPSC Syllabus Relevance: GS3 Economy

Context:

Surge in Agricultural imports

Why in News

India is witnessing a surge in imports of pulses and edible oils, reflecting structural issues in domestic production and price support mechanisms for farmers.

Introduction

- India has recorded all-time-high imports of **pulses and vegetable oils** in the financial year 2024–25.
- This trend raises significant concerns about the future of domestic agriculture, particularly for farmers engaged in pulse and oilseed cultivation, who are facing low market prices and insufficient procurement support.

Ground Realities: The Case of Rao Gulab Singh Lodi

- Rao Gulab Singh Lodi, a farmer from Nanhegaon village in Madhya Pradesh's Narsinghpur district, harvested approximately 90 quintals of summer moong (green gram) from his 16-acre land.
- However, he was forced to sell it in the open market at around ₹6,000 per quintal, far below the **official Minimum Support Price (MSP)** of ₹8,682 per quintal, due to the government's lack of procurement.

Pulses: From Self-Sufficiency to Import Dependence

In 2024–25, India imported **7.3 million tonnes (mt)** of pulses worth **$5.5 billion**, the highest ever, exceeding the previous 2016–17 record.

This surge reverses the progress made between 2017–2022, when improved domestic production had reduced annual imports to an average of 2.6 mt. The rise in imports was primarily driven by:

- An El Niño-induced drought in 2023–24
- A drop in domestic pulses production to 24.2 mt from a peak of 27.3 mt in 2021–22
- Inflationary pressure on pulse prices in retail markets

To control consumer price inflation, the government slashed import duties. As a result, consumer price index (CPI) inflation for pulses dropped from double digits in mid-2023 to negative territory by early 2025. However, this policy adversely impacted farmers, with market prices for key pulses like **chana** and **arhar** falling below MSP levels in mandis.

Breakdown of 2024–25 pulse imports:

- Yellow/white peas: 2.2 mt
- Chana: 1.6 mt
- Arhar (pigeon pea): 1.2 mt
- Masoor (red lentil): 1.2 mt
- Urad (black gram): 0.8 mt

Vegetable Oils: Increasing and Persistent Import Dependence

Over the past 11 years, India's vegetable oil imports have more than doubled from 7.9 mt to 16.4 mt, and the import bill has nearly tripled from **$7.2 billion in 2013–14** to **$20.8 billion in 2022–23**.

The 2024–25 imports comprised:

- Palm oil: 7.9 mt (Indonesia and Malaysia)
- Soyabean oil: 4.8 mt (Argentina and Brazil)
- Sunflower oil: 3.5 mt (Russia, Ukraine, Argentina)

Domestic production of edible oil from all sources is around 10 mt, leading to a heavy **import dependency of over 60%**.

To control high domestic inflation in edible oils (which stood at 17.9% in May 2025), the government reduced:

- Basic customs duty on crude edible oils from 20% to 10%
- Overall tariff (including cess and surcharges) from 27.5% to 16.5%

The **US Department of Agriculture (USDA)** expects this to further increase India's soyabean oil imports, including from the United States.

Implications for Farmers and the Economy

Economic Consequences:

- Widening of the trade deficit due to expensive food imports
- High reliance on volatile global commodity markets

Impact on Farmers:

- Continued low profitability for pulses and oilseeds
- Discouragement from sowing these crops in future seasons
- Risk of reduced area under cultivation for essential protein and fat-rich crops

Nutritional Concerns:

- Pulses and oils are vital for India's food and nutrition security
- Import-driven strategies may undercut long-term domestic availability and affordability

Policy Recommendations and Way Forward

1. **Strengthen MSP-based Procurement**
    - Institutionalise procurement of pulses and oilseeds on a par with rice and wheat
    - Expand the role of the **Price Support Scheme (PSS)** under the Ministry of Agriculture
2. **Review Import Tariff Policies**
    - Use calibrated tariffs to balance inflation control and farmer incentives
    - Consider seasonal restrictions or quotas to protect domestic harvests
3. **Promote Pulses and Oilseed Missions**
    - Expand the scope of the **National Food Security Mission** (NFSM)
    - Support R&D and extension services for climate-resilient and short-duration varieties
4. **Incentivise Crop Diversification**
    - Encourage farmers to shift from water-intensive crops to pulses and oilseeds
    - Provide insurance, minimum income support, and access to institutional credit
5. **Boost Domestic Oil Production**
    - Strengthen the **National Mission on Edible Oils – Oil Palm**
    - Improve yields from existing oilseed crops like mustard, groundnut, and soyabean.

Monthly Unemployment Trends in India

Source: The Hindu

https://www.thehindu.com/news/national/unemployment-rate-rises-to-56-in-may-female-joblessness-higher-at-58/article69701277.ece

UPSC Syllabus Relevance: GS3 Economy

Context:

Unemployment Trends in India

Why in News

India's unemployment rate rose to 5.6% in May 2025 from 5.1% in April due to seasonal variations as per the first monthly PLFS by the Ministry of Statistics.

Background:

- The Ministry of Statistics and Programme Implementation (MoSPI) released monthly labour market data for May 2025 under the revamped **Periodic Labour Force Survey (PLFS)**.
- The data reveals a notable **increase in unemployment** alongside **declines in labour force participation and worker population ratios**, primarily due to **seasonal variations** and **harsh summer conditions**.
- The figures also highlight **gender-based disparities**, particularly regarding the participation and employment of women.

Key Labour Market Indicators – Definitions

Indicator	Definition
Unemployment Rate (UR)	% of unemployed persons in the labour force (those working or seeking work).
Labour Force Participation Rate (LFPR)	% of persons in labour force (employed + unemployed) among population aged 15+.
Worker Population Ratio (WPR)	% of employed persons in the total population aged 15+.
Current Weekly Status (CWS)	Employment status based on activity in the last 7 days preceding the survey.

Gender Disparities in Labour Market

- **Female Unemployment Rate**: 5.8% (higher than male 5.6%).
- **Age 15–29 Female UR**: Jumped from **14.4% to 16.3%**.
- **LFPR among women (15+)**:
  - **Rural**: Fell from 38.2% to 36.9%.
  - **Urban**: Fell from 25.7% to 25.3%.
- **Female WPR**:
  - **Rural**: Dropped from 36.8% to 35.2%.
  - **Urban**: Dropped from 23.5% to 23%.
- **Overall Female WPR**: Fell to 31.3% from 32.5%.

Implication: Women are more adversely affected by seasonal shifts and socio-economic constraints, especially in rural areas.

Rural–Urban Labour Market Dynamics

Rural Areas:

- **UR rose** from 12.3% to **13.7%**.
- **Shift in employment** from **primary sector (agriculture)** to **secondary/services sectors**.
- End of **Rabi harvest season** reduced rural employment.
- Greater decline in **female casual labourers** and **unpaid helpers**.

Urban Areas:

- **UR increased** from 17.2% to **17.9%**.
- **Marginal decrease** in casual and own-account workers.
- **Female UR (15–29)** in urban areas rose to **24.7%** from **23.7%**.

Why Are Women Missing from Factory Floors?

Several factors explain the persistent underrepresentation of women in formal employment:

- **Seasonal agricultural dependence**: Women often engaged as unpaid helpers or casual workers during peak harvest periods.
- **Heatwave conditions**: Physical outdoor work becomes difficult, pushing women back into domestic roles.
- **Social norms and domestic burden**: Particularly among wealthier rural households, women are withdrawn from labour to focus on household chores.
- **Lack of safe and accessible industrial jobs**: Poor working conditions, especially in textiles and garments (e.g., Tamil Nadu), deter female participation.

Structural Insights

- **Youth Unemployment**: Particularly high in the 15–29 age group, with rates of:
  - **Total**: 15%
  - **Female**: 16.3%
  - **Male**: 14.5%
- **Female LFPR** remains substantially lower than male LFPR:
  - **Female Total**: 31.3%
  - **Male Total**: 78.3%
- **Underutilisation of female labour** is a major constraint on India's demographic dividend.

Significance of Monthly PLFS

- Introduced from January 2025, this monthly series provides real-time, high-frequency labour market indicators.
- Helps in policy responsiveness to short-term labour market fluctuations due to seasonality, academic cycles, and economic shifts.
- Over 3.79 lakh individuals surveyed, including rural (2.16 lakh) and urban (1.63 lakh) respondents, making it a robust dataset.

Unemployment

- Unemployment refers to a situation where people who are **willing to work at the prevailing wage rate and are actively seeking work** are unable to find employment.

Types of Unemployment

Type	Description
Disguised Unemployment	More people are engaged in a task than needed, common in agriculture.
Seasonal Unemployment	Jobs available only during certain seasons (e.g., agriculture, tourism).
Structural Unemployment	Mismatch between workers' skills and job requirements (due to technological change).
Frictional Unemployment	Temporary unemployment during job transitions.
Cyclical Unemployment	Occurs due to economic recession or downturns in the business cycle.
Technological Unemployment	Caused by automation replacing human labour.
Educated Unemployment	When educated people cannot find jobs matching their qualifications.

Way Forward

1. **Gender-inclusive employment policies**, especially in rural and semi-urban areas.
2. **Improved working conditions** and **safety in factories** to retain women workers.
3. **Public employment schemes** to absorb seasonal rural job losses.
4. **Skill development programs** targeting young women.
5. **Better heat-resilient job opportunities**, especially amid climate change.

Conclusion

The May 2025 PLFS data underlines a seasonal weakening in employment indicators and a disproportionate burden on women. For policymakers, the challenge is to translate periodic

data into permanent solutions – through safe workspaces, skill upgradation, and gender-sensitive employment policies.

India's Trade Deficit Narrows in May 2025 Due to Oil Price Fall and Services Export Surge

Source: The Hindu

https://www.thehindu.com/business/Industry/indias-trade-deficit-narrowed-to-66-bn-in-may-on-low-oil-prices-strong-services-exports/article69701484.ece

UPSC Syllabus Relevance: GS3 Economy

Context:

India's Trade Deficit

Why in News?

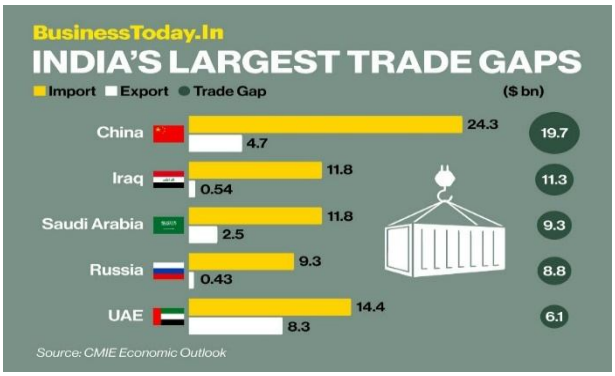
India's trade deficit narrowed to $6.6 billion in May 2025, mainly due to falling global oil prices and robust growth in services exports.

Introduction

- India's overall trade deficit narrowed significantly in **May 2025**, reflecting a dynamic shift in export-import patterns influenced by falling **global oil prices** and robust performance in the **services sector**.

Key Highlights of May 2025 Trade Data

1. India's **total exports** increased by **2.8%**, rising from **$69.2 billion** in May 2024 to **$71.1 billion** in May 2025.
2. **Merchandise exports** fell by **2.2%** to **$38.7 billion**, mainly due to a drop in petroleum product exports.
3. **Services exports** grew strongly by **9.4%**, reaching **$32.4 billion**, boosting overall export performance.
4. **Non-petroleum exports** showed positive growth of **5.1%**, indicating resilience in core sectors.
5. **Total imports** declined by **1%**, helping reduce the trade gap.
6. **Merchandise imports** contracted by **1.7%**, influenced by falling global oil prices.
7. In contrast, **non-petroleum imports** rose by **10%**, suggesting domestic demand remains strong.
8. **Services imports** grew slightly by **1.5%**, indicating moderate overseas service consumption.
9. The **trade deficit narrowed by 30% year-on-year**, falling from **$9.4 billion** to **$6.6 billion** in May 2025.



Key Observations and Analysis

1. **Trade Deficit at 13-Month Low:**
   - The trade deficit stood at $6.6 billion, significantly down from $9.4 billion in May 2024.
   - This improvement is largely due to lower oil import bills and rising services exports.
2. **Services Sector Drives Export Growth:**
   - Total exports rose to $71.1 billion, driven by a 9.4% increase in services exports.
   - The services sector contributed $32.4 billion, showcasing resilience and global demand.
3. **Merchandise Exports Decline:**
   - Merchandise exports saw a contraction of 2.2%, falling to $38.7 billion.
   - This is attributed to volatility and declining global oil prices, especially impacting petroleum product exports.
4. **Non-Petroleum Exports Show Resilience:**
   - Non-petroleum merchandise exports rose 5.1%, indicating strong performance in core sectors excluding oil.

5. **Imports Also Decline Overall:**
    - Overall imports contracted 1%, with merchandise imports falling 1.7%.
    - However, non-petroleum imports increased by 10%, suggesting continued domestic demand for capital and intermediate goods.

Trade deficit

- A trade deficit occurs when a country's imports exceed its exports in value.
- It reflects more money going out of the country to pay for foreign goods and services.
- India's trade deficit narrowed to $6.6 billion in May 2025 due to lower oil imports and rising services exports.

Significance for India's Economy

- The narrowing trade deficit offers relief to India's current account and strengthens the rupee.
- Growing services exports underscore India's competitive edge in IT, business process outsourcing (BPO), and fintech.
- Reduced dependency on oil imports can enhance energy security and macroeconomic stability.

Centre launches portal on Gender budgeting

Source: The Hindu
https://www.thehindu.com/news/national/centre-launches-portal-on-gender-budgeting/article69713328.ece
UPSC Relevance: **GS3 Economy**

Context:

Gender budgeting

Why in News

The Government of India has increased Gender Budget allocations by 4.5 times in the past 11 years.

Introduction

- Gender equality is not only a fundamental human right but a necessary foundation for a peaceful, prosperous, and sustainable world.
- In India, **Gender Budgeting** has evolved as a vital governance mechanism to promote women's empowerment and gender equality through targeted public expenditure.
- The recent announcement by the Union Government on **June 19, 2025**, marks a significant milestone: Gender Budget allocations have increased from **₹0.98 lakh crore in 2014–15** to **₹4.49 lakh crore in 2025–26 — a 4.5-fold increase over 11 years**.

What is Gender Budgeting?

- Gender Budgeting refers to the **application of gender mainstreaming in the budgetary process**.
- It entails examining how financial allocations impact women and men differently and ensuring that **public policies and expenditures contribute to gender equity**.
- It is **not a separate budget**, but an assessment of the gender-specific impact of government budgets.
- It seeks to address **gender-based inequalities** through better targeted interventions.

Evolution of Gender Budgeting in India

Year	Development
2005–06	Introduced in the Union Budget as a fiscal reporting mechanism.
2007 onwards	Establishment of Gender Budget Cells in various ministries.
2014–15	Gender Budget: ₹0.98 lakh crore.
2025–26	Gender Budget: ₹4.49 lakh crore (37% increase over previous year).

The approach has gradually shifted from being a

technical budgeting tool to a **strategic instrument for inclusive governance**.

Recent Initiatives and Announcements (2025)

1. National Consultation on Gender Budgeting

- First-of-its-kind event hosted by the Ministry of Women and Child Development (MoWCD).
- Participants: Senior officers from 40 Central Ministries/Departments and 19 States, representatives from UN Women, Asian Development Bank, and national-level institutions.
- Objectives:
    - Strengthen gender budgeting across sectors.
    - Share best practices and innovative models from States and Ministries.

2. Launch of the 'Gender Budgeting Knowledge Hub'

- A digital platform developed by MoWCD.
- Aims to serve as a **central repository** of:
    - Policy briefs
    - Scheme-level data
    - Best practices
    - Gender-disaggregated statistics
- Beneficiaries: Policymakers, researchers, state governments, and implementing agencies.

3. Draft Training Manual on Gender Budgeting

- A capacity-building tool to support officials in understanding:
    - Gender impact assessments
    - Budget planning with gender lens
    - Monitoring and evaluation of outcomes

Significance of the ₹4.49 Lakh Crore Gender Budget (2025–26)

- Reflects a **37% increase** over 2024–25 allocation.
- Covers sectors like:
    - **Women's safety**
    - **Skilling and entrepreneurship**
    - **Health and maternal care**
    - **Education and nutrition**
    - **Rural livelihoods**
- Aligns with India's commitments under **SDG 5: Achieve Gender Equality and Empower All Women and Girls.**

Challenges in Gender Budgeting Implementation

Despite significant budgetary allocations, the **outcomes remain sub-optimal** due to:

1. **Lack of Outcome Monitoring:** Few schemes have gender-disaggregated performance indicators.
2. **Tokenism in Budgeting:** Many ministries allocate funds without integrating gender concerns into scheme design.
3. **Underutilisation of Funds:** Poor planning and lack of coordination often lead to funds lying unspent.
4. **Low Capacity at State Level:** Absence of trained personnel and weak Gender Budget Cells in several states.
5. **Inadequate Gender Impact Assessment:** Schemes lack pre- and post-implementation gender audits.

Way Forward

1. **Institutional Strengthening:**
    - Activate and empower **Gender Budget Cells** in all ministries and departments.
    - Make Gender Budgeting a core part of **outcome budgeting and performance management**.
2. **Capacity Building:**
    - Roll out the **Training Manual** across states.
    - Regular training programs for officials at all levels.
3. **Robust Monitoring & Evaluation:**
    - Develop **gender-sensitive indicators** and conduct third-party audits.
    - Integrate **real-time dashboards** with gender-disaggregated data.
4. **Digital Integration:**
    - Promote wider use of the **Gender**

Budgeting Knowledge Hub.

- Encourage use of digital tools for planning, tracking, and reporting.

5. **Centre–State Coordination:**
   - Foster peer learning through sharing of best practices.
   - Link gender budgeting performance with **incentives and grants** under centrally sponsored schemes.

Conclusion

- Gender Budgeting has transitioned from a symbolic initiative to a substantive fiscal and governance reform tool in India.
- The significant rise in budgetary allocation reaffirms the government's intent to promote gender equity.
- However, **effective implementation**, **institutional commitment**, and **impact assessment** are crucial to convert these financial inputs into meaningful outcomes for women and marginalized genders.
- As India moves forward, gender budgeting must be integrated into the **mainstream policy framework**, making equity not just a goal but a reality.

Dairy, agriculture impede India-U.S. bilateral trade deal

Source: The Hindu
https://www.thehindu.com/business/dairy-agriculture-impede-india-us-bilateral-trade-deal/article69729065.ece
UPSC Relevance: GS-3 Economy

Context:

India-U.S. Trade Talks

Why in News

India-U.S. trade talks face hurdles in agriculture and dairy sectors ahead of the July 9 tariff deadline, while tensions in West Asia raise concerns over trade routes.

Introduction

- As the **July 9 deadline** approaches for the **reimposition of reciprocal tariffs by the United States**, trade negotiations between **India and the U.S.** remain in a delicate stage.
- While there is mutual interest in finalising a **bilateral trade agreement**, **agriculture and dairy sectors** continue to be sticking points, highlighting the sensitivity of these segments within India's domestic economy.

Background: Reciprocal Tariffs and Negotiations

India and the U.S. have long had trade frictions, especially following the **U.S. withdrawal of India's GSP (Generalized System of Preferences)** status in 2019. In retaliation, India imposed **reciprocal tariffs** on certain American goods.

- The tariffs were partially suspended as both countries began negotiating a **"mini trade deal"**, which would be a precursor to a **larger Bilateral Trade Agreement (BTA)**.
- However, if an agreement is not reached by **July 9, 2025**, the U.S. plans to **reimpose tariffs**, rolling them back to the levels in place on **April 2**, potentially affecting both Indian exports and imports.

Sticking Points: Agriculture and Dairy

According to senior sources:

- **Agriculture and dairy** have emerged as **primary obstacles**.
- These are politically and economically **sensitive sectors** for India, with millions dependent on them for livelihood.
- Especially in the **dairy sector**, where India protects small and marginal producers, opening up to **U.S. dairy imports** raises concerns about market disruption and food safety standards (e.g., hormones in U.S. milk).

Despite the **government's keenness** to conclude a deal, officials clarified that **India is not desperate** to sign before July 9. Missing the deadline would simply mean a **return to earlier tariff levels**, not a breakdown of the entire process.

India's Strategic Position

Indian negotiators believe that:

- India is currently the **only country engaged in such elaborate trade talks** with the U.S.
- A delay does not mean a collapse; rather, it reflects India's strategic approach in ensuring **domestic interests are safeguarded**.
- A **delegation will visit the U.S.** for the next round of in-person talks to discuss both the **mini deal** and the **first tranche of the BTA**, which is targeted for **Fall 2025**.

Geopolitical Backdrop:

Parallel to trade negotiations, **geopolitical developments in West Asia** are being closely monitored by the Indian government:

- Iran recently attacked **U.S. bases in Syria**, escalating tensions in the region.
- Given that a significant portion of **India's energy and trade flows through the Strait of Hormuz**, the government is **increasing vigilance**.
- According to a senior official, "There are **alternative routes**, but they are **more expensive** and **time-consuming**."

This could impact:

- **Shipping costs**, especially crude oil and petrochemicals.
- **Insurance premiums** for cargo vessels operating in conflict-prone waters.
- **India's strategic energy reserves** and the **overall inflationary impact** on the economy.

Way Forward

1. **Balanced Trade Negotiations**: India must continue to negotiate from a position of strength, ensuring that any trade liberalisation aligns with **domestic agricultural interests** and **employment concerns**.
2. **Strategic Diversification**: In light of regional instability, India needs to strengthen **alternative energy supply routes** and enhance **regional trade corridors** (e.g., Chabahar port, INSTC).
3. **Domestic Competitiveness**: To make gains from global trade, India must invest in **enhancing the competitiveness** of sectors like dairy and agriculture through **infrastructure, technology, and quality standards**.
4. **Multilateral Engagement**: As global geopolitics shift, India should maintain its voice in **multilateral trade forums (WTO, IPEF, QUAD)** to build strategic alliances and reduce over-dependence on single-country trade negotiations.

Conclusion

- While the **tariff deadline** looms, India's cautious approach reflects a maturing trade strategy that aims to balance **economic opportunity with domestic protection**.
- Simultaneously, the **geopolitical flare-up in West Asia** adds urgency to India's **energy security** and **trade route resilience**.
- As the world enters a complex phase of trade diplomacy and conflict-driven logistics challenges, India's emphasis on **pragmatism, preparedness, and strategic patience** is key to its long-term national interest.

South Asia remains one of the least economically integrated regions in the world

Source: The Hindu

https://www.thehindu.com/opinion/op-ed/the-sorry-state-of-south-asian-economic-integration/article69728619.ece

UPSC Syllabus Relevance: GS3 Economy

Context:

Regional Cooperation for Security and Prosperity in South Asia

Why in News

South Asia remains one of the least economically

integrated regions in the world due to high intra-regional trade costs, political disputes, and underutilization of agreements like SAFTA.

Introduction

- In 2025, two major developments — the reciprocal tariffs imposed by the U.S. and the terror attack in Pahalgam — brought into sharp focus the **interdependence of economic and national security** in India and the broader South Asian region.
- Although these events appear unrelated, they underscore a shared challenge: the lack of effective **regional cooperation**.
- For South Asia to achieve long-term **stability and prosperity**, an integrated approach that considers both economic and security dimensions is essential.

Interdependence of Economic and National Security

Security and economic growth are often treated as separate domains, yet they are **deeply interconnected**:

- Economic insecurity breeds social unrest, which can turn into violent movements or radicalization.
- Security threats, including terrorism and border conflicts, in turn, disrupt trade, deter investment, and strain economic relations.
- A stable and prosperous region reduces the recruitment base for extremist groups and improves the capacity for joint counter-terrorism efforts.

Low Intra-Regional Trade: A Symptom of Deep Divides

South Asia is among the **least economically integrated regions** globally:

- **Intra-regional trade in SAFTA** accounts for only **5–7%** of the region's total trade, compared to:
  - **45% in EU**
  - **22% in ASEAN**
  - **25% in NAFTA**
- **Current SAARC trade** stands at only **$23 billion**, far below the estimated **$67 billion**, with **UNESCAP** estimating **$172 billion potential** in 2020.

This gap reflects a **chronic underutilization** of trade potential due to:

- Political hostilities
- Cross-border terrorism
- Infrastructure bottlenecks
- High trade costs

Trade Costs: A Regional Disadvantage

Despite geographic proximity, **trade within South Asia is more expensive** than with distant regions:

- **Intra-SAARC trade costs**: 114% of the value of goods
- **India–Pakistan trade costs**: 20% higher than India–Brazil, despite being neighbours
- **Bilateral trade cost with the U.S.**: 109%
- **ASEAN intraregional trade costs**: 76%, creating strong incentives for interdependence

These high costs result from:

- Cumbersome customs procedures
- Non-tariff barriers
- Poor connectivity
- Political mistrust

Declining Trade Performance and Its Implications

- India–Pakistan trade fell from $2.41 billion in 2018 to $1.2 billion in 2024
- Pakistan's exports to India dropped drastically from $547.5 million (2019) to just $480,000 (2024)
- Trade-to-GDP ratio for South Asia fell from 47.3% in 2022 to 42.94% in 2024
- Trade deficit widened from $204.1 billion (2015) to $339 billion (2022)

This shows that regional tensions and poor policy implementation not only hurt diplomacy but reduce innovation, production efficiency, and people's welfare.

SAFTA: Missed Opportunity

While **SAFTA** was envisioned as a mechanism to foster **regional trade and cooperation**, its **implementation has been weak**:

- Most SAARC members continue to prioritize **bilateral disputes** over collective goals.
- **Terrorism, border conflicts**, and **minority issues** remain barriers to trust-building.
- There has been **limited progress** on harmonizing trade procedures and reducing tariffs.

Untapped Potential in Services and Investment

Beyond goods trade:

- **Trade in services** (education, health, IT, tourism) has huge potential
- **Investment cooperation** remains minimal despite strong complementarities
- **Labour mobility**, if managed, could improve regional income distribution

Strategic Way Forward

To unlock the full potential of South Asia, a **multi-pronged regional approach** is needed:

1. Political Confidence-Building Measures (CBMs)

- Resumption of SAARC summits
- Creation of a SAARC Conflict Resolution Mechanism
- Promote track-two diplomacy and civil society dialogue

2. Infrastructure and Connectivity

- Implement projects like the BBIN Motor Vehicle Agreement
- Expand transboundary energy grids
- Develop **multimodal logistics** and **border SEZs**

3. Trade Facilitation and Harmonization

- Adopt mutual recognition agreements
- Digitize customs and logistics platforms
- Reduce non-tariff barriers and streamline dispute resolution

4. Counterterrorism and Intelligence Cooperation

- Establish a SAARC Terrorism Monitoring Centre
- Share real-time intelligence on cross-border threats
- Delink trade from terror narratives by institutionalizing economic dialogue

5. India's Leadership Role

- As the region's largest economy, India can:
  - Lead in regional digital payment platforms
  - Offer preferential market access to smaller neighbours
  - Invest in capacity-building for governance and regulation

Conclusion

- South Asia stands at a crossroads. Its potential as an economic powerhouse is undeniable, but mutual distrust, unresolved conflicts, and lack of strategic vision keep the region shackled.
- A holistic framework that links security imperatives with economic cooperation is essential. India, given its size and strategic location, must lead this transformation toward a peaceful, prosperous, and integrated South Asia.

Governance Reforms for Market Infrastructure Institutions (MIIs)

Source: The Hindu

https://www.thehindu.com/business/sebi-proposes-revamp-of-miis-to-boost-governance/article69732508.ece

UPSC Syllabus Relevance: GS3 Capital Market

Context:

Securities and Exchange Board of India (SEBI)

Why in News

SEBI released a consultation paper on June 24, 2025, proposing key governance reforms for Market Infrastructure Institutions (MIIs) such as stock

exchanges and clearing corporations.

Introduction

- The Securities and Exchange Board of India (SEBI) released a consultation paper proposing a series of measures to reform the governance structure of Market Infrastructure Institutions (MIIs).
- These reforms are aimed at ensuring stronger oversight, accountability, and stability within these critical financial entities.

Market Infrastructure Institutions (MIIs)

- **Market Infrastructure Institutions (MIIs) are essential components of the capital markets ecosystem**.
- They include stock exchanges, clearing corporations, and depositories.
- These institutions ensure the smooth functioning of trading, clearing, settlement, and record-keeping in the securities market.
- Given their systemic importance, any governance failure in MIIs can have far-reaching consequences on investor confidence and the broader economy.
- SEBI's proposals come in response to the expanding scope and complexity of the securities market, as well as concerns about possible governance lapses within MIIs.

Key Proposals in the SEBI Consultation Paper

1. Creation of Executive Director Positions

- SEBI has proposed the **mandatory appointment of at least two Executive Directors (EDs) in each MII**.
- These EDs will report to the Managing Director (MD) and will be responsible for overseeing specific functional areas within the MII.

2. Three-Vertical Governance Structure

SEBI formalized a framework that divides the **responsibilities of MIIs into three verticals**:

- **Critical Operations**: This includes core activities essential for the functioning of the market, such as trade execution and settlement operations.
- **Regulatory, Compliance, Risk Management, and Investor Grievances**: This vertical ensures adherence to laws, regulatory norms, risk mitigation frameworks, and resolution of investor complaints.
- **Commercial Interests and Business Development**: This includes strategic initiatives aimed at expanding the institution's operations and financial performance.

SEBI has proposed that the two Executive Directors must lead the first two verticals—Critical Operations and Regulatory/Compliance. The appointment of an Executive Director for the third vertical is left to the discretion of the MII.

3. Board Representation and Status of Executive Directors

- Currently, only Managing Directors are allowed to be part of the Governing Board of MIIs.
- SEBI now proposes that the Executive Directors of the first two verticals should also be included on the Board. These EDs will hold a status comparable to that of the MD.

Their appointment and reappointment will follow the same regulatory procedures as that of the MD and will require SEBI's approval.

4. Reporting Obligations

- The Executive Directors will be required to submit quarterly reports to both the Governing Board of the MII and to SEBI.
- These reports must address matters related to their respective verticals, thereby enhancing transparency and accountability.

5. Rules on External Directorships

SEBI has introduced new norms regarding external

directorships:

- Managing Directors may hold non-executive directorships in unlisted government-owned companies (either central or state) or in not-for-profit organizations.
- Executive Directors, however, will not be allowed to hold directorships in any external entities, except for subsidiaries of the MII.

6. Public Consultation

- The proposals outlined in the consultation paper are open for public comments and suggestions until July 15, 2025.

Significance of the Proposals

These proposed reforms are significant for several reasons:

- **Improved Accountability**: Including Executive Directors in the board structure ensures that the leaders of critical and compliance functions are directly accountable to the highest decision-making body of the MII.
- **Enhanced Regulatory Oversight**: Quarterly reporting to SEBI will improve surveillance over the functioning of MIIs and enable early detection of irregularities.
- **Risk Management**: A dedicated vertical for risk and compliance headed by an ED ensures better institutional focus on market integrity and investor protection.
- **Balanced Governance**: The reforms aim to balance commercial objectives with regulatory responsibilities, thereby reducing potential conflicts of interest.
- **Clarity in Leadership Structure**: Clearly defined verticals and leadership roles promote professionalism and clarity in management responsibilities.

Broader Regulatory Context

These reforms are consistent with SEBI's broader efforts to modernize and strengthen India's financial regulatory architecture. Previous initiatives include:

- Enhanced disclosure norms for listed companies,
- Cybersecurity and technology governance frameworks for MIIs,
- Stricter compliance mandates for mutual funds and alternative investment funds.

The current proposals further align SEBI's governance framework with international best practices in financial market infrastructure regulation.

Conclusion

- The proposed governance reforms by SEBI aim to create a more robust, accountable, and transparent framework for Market Infrastructure Institutions.

India Rises to 99th Rank in the 2025 SDG Index

Source: The Hindu

https://www.thehindu.com/news/national/india-enters-top-100-in-global-sustainable-development-goals-rankings-for-first-time/article69730436.ece

UPSC Syllabus Relevance: GS3 Economy

Context:

2025 SDG Index

Why in News?

India ranked 99th out of 167 countries in the 2025 SDG Index, marking its first entry into the top 100.

Introduction

- India has, for the first time, entered the top 100 countries in the **Sustainable Development Goals (SDG) Index.**
- India secured the **99th rank out of 167 nations** in the 2025 edition of the **Sustainable Development Report (SDR)** released by the **United Nations Sustainable Development Solutions Network (UNSDSN)**.
- With a score of **67**, this marks a substantial improvement from its **109th rank in 2024**, reflecting consistent progress in multiple development indicators.

About the SDG Index

- The SDG Index measures the overall progress of countries towards achieving the **17 Sustainable Development Goals** adopted by UN member states in 2015.

- It uses a scale where **100 denotes complete achievement** of all goals.
- The report is **authored by a team led by economist Jeffrey Sachs** and serves as a key global benchmark for sustainable development.

Sustainable Development Goals (SDG)

- **Sustainable Development Goals (SDG)** are **17 global goals** adopted by all United Nations Member States in **2015** as part of the **2030 Agenda for Sustainable Development**.
- The SDGs aim to **end poverty**, **protect the planet**, and **ensure prosperity for all** by 2030.

India's Performance: Steady Climb in Rankings

Year	SDG Index Rank
2021	120
2022	121
2023	112
2024	109
2025	**99**

- India has shown **consistent improvement** year-on-year since 2021.
- This reflects **enhanced performance in key SDG domains** such as access to electricity (SDG 7), mobile broadband (SDG 9), and reduction in under-five and neonatal mortality (SDG 3).

Comparison with Global and Regional Peers

- **Top Performers**: Finland, Sweden, and Denmark dominate the index. **19 of the top 20** countries are from **Europe**.
- **India's Neighbours**:
  - Bhutan – 74th (70.5)
  - Nepal – 85th (68.6)
  - Bangladesh – 114th (63.9)
  - Pakistan – 140th (57)
  - Sri Lanka – 93rd
  - Maldives – 53rd
- **China** ranks 49th (74.4), **USA** ranks 44th (75.2) but is **last in commitment to the SDGs (193rd)**.

Global Trends: Stalling Progress and Emerging Challenges

Despite regional gains, the report warns that **global progress has largely stalled**:

- Only **17% of SDG targets are on track** to be achieved by **2030**.
- **Key challenges** include:
  - Conflicts and wars
  - Structural vulnerabilities
  - Limited fiscal space in developing countries

Areas of Global Regression:

- Obesity rates (SDG 2)
- Decline in press freedom (SDG 16)
- Biodiversity loss (Red List Index – SDG 15)
- Sustainable nitrogen management (SDG 2)
- Rising corruption (SDG 16)

Regional and Country-Level Highlights

- **Fastest Improving Countries** (since 2015):
  - Nepal (+11.1)
  - Cambodia (+10)
  - Bangladesh (+8.3)
  - Mongolia (+7.7)
  - Philippines (+8.6)
  - Benin (+14.5), UAE (+9.9), Uzbekistan (+12.1), Peru (+8.7), Costa Rica (+7)
- **Infrastructure and Services**: Noticeable gains in mobile broadband, internet usage, electricity access, and health indicators.

India's Achievements and Challenges

Achievements:

- Continued progress in:
  - **Health (SDG 3)** – Reduction in neonatal and under-five mortality
  - **Energy (SDG 7)** – Expansion of electricity access
  - **Digital access (SDG 9)** – Mobile and internet penetration

Challenges Ahead:

- Managing sustainable nitrogen usage in agriculture
- Addressing environmental degradation and biodiversity loss
- Tackling rising inequality and corruption (SDG 10, 16)

Global Call for Financial Reform

The report sets the stage for the **Fourth International Conference on Financing for Development (FfD4)** to be held in **Seville, Spain** (June 30 – July 3, 2025):

- Emphasizes **urgent reform of the global financial architecture (GFA)**
- Highlights disparity in **capital flows**, which favor developed countries over **Emerging and Developing Economies (EMDEs)**
- Urges that **GFA reform** be placed **at the top of the FfD4 agenda**

Conclusion

- India's entry into the top 100 of the SDG Index in 2025 is a significant milestone that reflects its persistent efforts toward sustainable development.
- However, the global slowdown in SDG progress and emerging challenges call for strengthened domestic policies and greater international cooperation, especially in the run-up to key global platforms like the FfD4.

Govt has provided ₹21,535 crore of incentives under PLI schemes

Source: The Hindu

https://www.thehindu.com/business/Economy/govt-has-provided-21535-crore-of-incentives-under-pli-schemes/article69735916.ece

UPSC Relevance: GS-3 Economy

Context:

PLI schemes

Why in News

The government's Production-Linked Incentive (PLI) scheme has led to ₹21,534 crore in incentives disbursed.

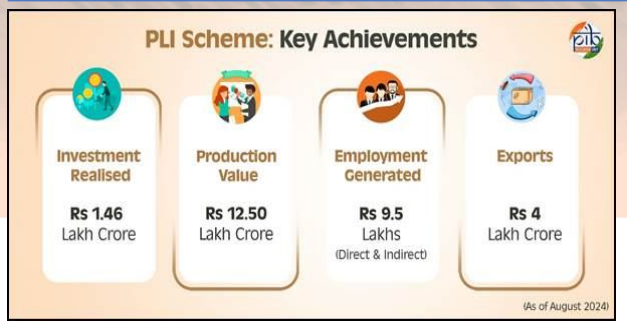
Introduction

- The Government of India launched the **Production-Linked Incentive (PLI) Scheme in 2020** as a strategic industrial policy initiative to enhance domestic manufacturing capabilities, attract investments, reduce import dependence, and promote exports.
- As of **March 2025**, the scheme has shown significant results, with ₹21,534 crore disbursed in incentives across 12 sectors, generating investments worth ₹1.76 lakh crore and resulting in cumulative production or sales of ₹16.5 lakh crore.
- The review of the scheme was recently conducted by the Union Commerce and Industry Minister, **Piyush Goyal**, who underscored the need to prioritize sectors where India enjoys a **comparative advantage** globally.

Objectives of the PLI Scheme

The PLI scheme was launched with the following key objectives:

- To **strengthen domestic manufacturing** by incentivizing incremental production
- To **reduce the country's reliance on imports**, especially for critical goods
- To **encourage export-oriented growth** through competitive manufacturing
- To **attract global and domestic investment** into targeted sectors
- To **generate large-scale employment opportunities**, both directly and indirectly
- To lay the foundation for an **Atmanirbhar Bharat (Self-Reliant India)**



Sectoral Coverage

Initially launched for **three sectors**, the scheme was later expanded to cover **14 critical sectors**. As of March 2025, 12 sectors have received disbursements, including:

- Large-Scale Electronics Manufacturing (LSEM)
- IT hardware
- Bulk drugs
- Medical devices
- Pharmaceuticals
- Telecom and networking products
- Food processing
- White goods (e.g., ACs and LEDs)
- Automobiles and auto components
- Specialty steel
- Textiles
- Drones and drone components

Key Achievements (as of March 2025)

- Incentive Disbursal and Investment Mobilization
- A total of **₹21,534 crore** in incentives has been disbursed across 12 sectors
- The scheme has **attracted ₹1.76 lakh crore in investments**
- It has generated **₹16.5 lakh crore worth of production or sales**, reflecting its catalytic role in economic output

Sector-wise Success Narratives

1. Pharmaceutical Sector

- Achieved **₹2.66 lakh crore** in cumulative sales, with **exports worth ₹1.70 lakh crore** over three years
- In FY 2024–25 alone, pharma exports under the scheme amounted to ₹0.67 lakh crore, which was approximately **27% of India's total pharma exports** that year
- Notably, **40% of the total ₹37,306 crore invested in the sector was allocated to Research and Development (R&D)**
- The sector recorded a **high domestic value addition rate of 83.7%**, enhancing self-reliance
- India transformed from a **net importer to a net exporter of bulk drugs**, moving from an import deficit of ₹1,930 crore in FY 2021–22 to a trade surplus of ₹2,280 crore

2. Food Processing Sector

- Attracted investments of **₹9,032 crore**
- Generated **₹3.8 lakh crore in production**
- Created **3.4 lakh direct and indirect jobs**, indicating strong employment generation potential

3. Bulk Drugs

- Boosted domestic manufacturing capacity for **critical Active Pharmaceutical Ingredients (APIs)**
- Enabled a shift from **import dependence to self-sufficiency**, strengthening national health security

4. Textiles Sector

- Improved India's global competitiveness, especially in **synthetic and technical textiles**
- Supported the **diversification of India's textile export basket**, previously dominated by cotton-based products

Strategic Impact of the PLI Scheme

Export Promotion

- The PLI scheme has played a pivotal role in enhancing India's **export competitiveness**
- Key sectors such as **pharmaceuticals, food processing, textiles, and bulk drugs** have witnessed robust export performance under the scheme

Manufacturing Boost

- Companies across multiple sectors have scaled up their **production capacities**
- The scheme has fostered **high levels of domestic value addition**, reducing import reliance

- It has reinforced India's ambition of becoming a **global manufacturing hub**

Employment Generation

- The scheme has generated large-scale employment, both directly in factories and indirectly through MSME suppliers and logistics
- For instance, the **food processing sector alone has created 3.4 lakh jobs**

Challenges and the Way Forward

1. Sectoral Prioritisation

- Commerce Minister Piyush Goyal emphasized the need to **focus on sectors where India has a comparative advantage**, such as electronics, pharma, and textiles
- Resource allocation must be strategically aligned with global demand and national capability

2. Timely Implementation

- **Delays in disbursal of incentives**, regulatory clearances, and infrastructure bottlenecks have been observed in some sectors
- There is a need for **streamlined coordination among ministries**, state governments, and industry stakeholders

3. Monitoring and Evaluation

- Continuous **review of sector-specific performance** is necessary to realign incentives
- A feedback loop between implementation agencies and beneficiaries must be institutionalized for mid-course correction

Conclusion

- The Production-Linked Incentive scheme has emerged as a **cornerstone of India's industrial policy**, demonstrating tangible results in enhancing manufacturing capacity, promoting exports, reducing import dependence, and generating employment.
- If implemented with greater efficiency and strategic foresight, the PLI scheme has the potential to position India as a **global leader in value-added manufacturing**, in line with the **vision of Atmanirbhar Bharat**.

India to Host Regional Centre of International Potato Center (CIP) in Agra

Source: Indian Express

https://indianexpress.com/article/explained/potato-research-center-agra-peru-india-importance-10090098/

UPSC Relevance: GS 3 Economy

Context:

Global potato research centre

Why in News

The Union Cabinet has approved the setting up of the South Asia Regional Centre of the International Potato Center (CIP) in Agra.

Introduction

- Recently, the Union Cabinet, chaired by Prime Minister Narendra Modi, approved the establishment of a **South Asia Regional Centre of the International Potato Center (CIP)** in **Singna village, Agra district, Uttar Pradesh**.
- The new centre, to be called **CIP-South Asia Regional Center (CSARC)**, is expected to enhance research and development in potato and sweet potato cultivation not only in India but also across South Asia.

About the International Potato Center (CIP)

- The **International Potato Center (CIP)** was founded in 1971 and is headquartered in Lima, Peru.
- It is a premier global research-for-development organisation focused on potatoes, sweet potatoes, and other Andean root and tuber crops.
- The potato itself is native to the Peruvian-Bolivian Andes and spread globally through Spanish and Portuguese colonisation.
- CIP has been active in India since 1975 through a partnership with the **Indian Council of Agricultural Research (ICAR)**, with an emphasis on cooperation in potato and sweet potato development.

Key Features of the Proposed CIP-South Asia Regional Center (CSARC)

Objectives

- The primary goals of the proposed CSARC include:
- Improving food and nutrition security through the development of advanced crop varieties.
- Increasing farmers' incomes and creating employment opportunities.
- Enhancing potato and sweet potato productivity through scientific research.
- Promoting post-harvest management, value addition, and food processing.
- Developing climate-resilient and disease-free varieties suitable for commercial processing.

Financial Details

- **Total project cost:** ₹171 crore
- **India's contribution:** ₹111.5 crore
- **CIP's contribution:** ₹60 crore
- **Land:** 10 hectares provided by the Government of Uttar Pradesh

Implementation and Research Focus

- The CSARC will bring advanced global research and innovation to Indian agriculture. It will have access to the **world's largest collection of potato and sweet potato germplasm** and will collaborate with domestic institutions to develop new, high-yielding varieties tailored to the Indian climate.

Significance of the Project

Enhancing Domestic Production

- India is the world's **second-largest potato producer**, after China. However, its average yield remains around **25 tonnes per hectare**, far below its potential of **over 50 tonnes per hectare**. One of the key constraints has been the limited availability of quality seeds.
- Similarly, India's **sweet potato yield** is only **11.5 tonnes per hectare**, compared to its potential of **30 tonnes per hectare**. The CSARC will help bridge this gap by promoting better seed production and reducing dependency on seed imports from neighbouring countries.

Support for Farmers and Industry

The center is expected to:

- Enhance domestic seed production capacity.
- Support local food processing industries through availability of quality raw material.
- Promote exports of value-added potato and sweet potato products.
- Strengthen India's capacity in agricultural research and innovation.

Regional and International Context

- The CSARC in Agra will be the **second such regional centre of CIP outside Peru**.
- The first, the **China Center for Asia Pacific (CCCAP)**, was set up in 2017 in Yanqing, Beijing, and serves China and the broader Asia-Pacific region.
- India has already hosted other international agricultural institutions. In 2017, the Government of India supported the establishment of the **International Rice Research Institute – South Asia Regional Centre (IRRI-SARC)** in Varanasi, Uttar Pradesh.
- The CSARC will cater not only to India's major potato-growing states like **Uttar Pradesh, Bihar, and West Bengal**, but also to neighbouring South Asian countries such as **Nepal, Bangladesh, and Sri Lanka**.

India's Position in Global Potato Production

According to data from 2020:

- **China** produced 78.24 million tonnes of

potatoes.

- **India** produced 51.30 million tonnes.
- Together, they accounted for over **one-third of the global potato production**, which stood at 359.07 million tonnes.
- Within India, the top potato-producing states in 2020–21 were:
    - **Uttar Pradesh:** 15 million tonnes
    - **West Bengal:** 15 million tonnes
    - **Bihar:** 9 million tonnes Other significant producers include Gujarat, Madhya Pradesh, and Punjab.

Existing Research Infrastructure in India

- India already has two major ICAR institutions dedicated to research on tuber crops:
- **ICAR-Central Potato Research Institute (CPRI), Shimla** – Specialises in potato research.
- **ICAR-Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram** – Focuses on sweet potatoes and other tuber crops.
- The new CSARC will complement these institutions by providing access to global expertise, genetic resources, and collaborative opportunities.

Conclusion

- The establishment of the **CIP-South Asia Regional Center in Agra** represents a major advancement in India's agricultural research and food security strategy.
- By integrating global scientific knowledge with domestic agricultural needs, the center will play a critical role in improving productivity, reducing input costs, strengthening value chains, and enhancing exports.
- It aligns with national goals of **doubling farmers' income**, promoting **climate-resilient agriculture**, and ensuring **nutritional security** for a growing population.

Prada-Kolhapuri Chappal Controversy

Source: Indian Express

https://indianexpress.com/article/explained/explained-global/prada-kolhapuri-controversy-10094130/

UPSC Relevance: GS-3 Economy

Context:

Prada-Kolhapuri Chappal Controversy

Why in News

Italian luxury brand Prada faced criticism for selling sandals resembling India's traditional Kolhapuri chappals without credit.

Introduction

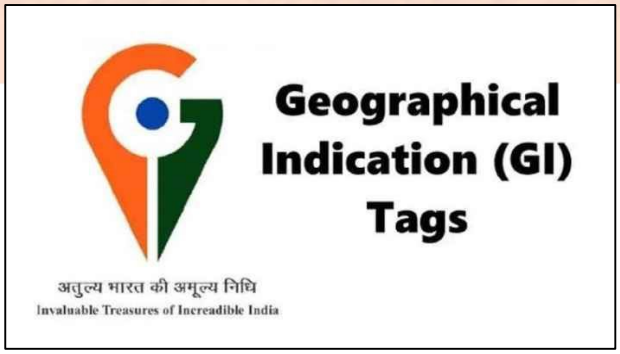
- Italian luxury fashion house **Prada recently listed a pair of leather sandals priced over ₹1 lakh**, bearing a striking resemblance to India's iconic **Kolhapuri chappals**.
- The brand made no mention of India, the craft's origins, or the artisans who have preserved this tradition for generations.
- This sparked widespread outrage and revived debates around cultural appropriation, the limitations of global intellectual property rights, and the economic invisibility of Indian artisan communities.

What are Kolhapuri Chappals?

- **Origin:** Centuries-old handcrafted leather sandals from **Kolhapur (Maharashtra)** and parts of **northern Karnataka**.
- **Features:**
    - Made from **vegetable-tanned leather**.
    - Noted for **braided straps, intricate cutwork, and durable sole**.
    - Entirely **handmade using indigenous techniques**, passed down generations.
- **Cultural Importance:**
    - Once worn by **royalty**, now symbolize **traditional Indian**

craftsmanship.

- Represents **regional identity and artisan legacy**.



Legal Recognition: GI Tag

- **Year of recognition:** 2019.
- **Law under which granted:** *Geographical Indications of Goods (Registration and Protection) Act, 1999.*
- **Significance of GI Tag:** Legally protects goods linked to **specific regions** with **unique qualities** and **traditional know-how**.
- Enhances **marketability**, boosts **rural economy**, and preserves **intangible cultural heritage**.

Current State of Kolhapuri Artisans

- Estimated **15,000–20,000 artisans** remain in the trade today, a sharp fall from earlier numbers.
- Facing challenges:
  - Cheap machine-made imitations.
  - Low wages, inconsistent income.
  - Lack of global market access.
- Despite the GI tag, most artisans remain **excluded from the high-value fashion market**.

The Prada Controversy:

What is Cultural Appropriation?

- The unacknowledged and exploitative adoption of cultural elements by members of a dominant group, especially from historically oppressed communities.
- Prada's sandals were **visually and structurally similar** to Kolhapuri chappals.
- However, the brand:
  - Did **not credit Indian artisans** or Kolhapur.
  - Priced the product at **₹1 lakh+, while original chappals sell for < ₹1,000**.
- No collaboration or benefit-sharing with original creators.
- **Past Examples:**
  - **Isabel Marant** in Mexico (2015): Copied Mixe community embroidery.
  - **Dior** in 2019: Replicated traditional Mexican horsewomen outfits.
  - **Louis Vuitton**: Used Banarasi and Indian motifs without recognition or collaboration.

Limits of Global Intellectual Property (IP) Protections

- Globally, the **World Intellectual Property Organization (WIPO)** is in discussions to create frameworks for traditional knowledge and cultural expressions.
- But as of now:
  - No binding global treaty **protects designs from imitation**.
  - Only names and trademarks can be protected under **trademark or copyright laws**.
- Thus, brands can **legally imitate** traditional designs as long as they avoid using the **protected name** (e.g., "Kolhapuri").

Why This Matters: Broader Implications

1. Cultural and Economic Injustice:

- Exploits traditional knowledge for profit while **denying recognition and benefit** to original creators.
- Reinforces **global power imbalances** between artisan communities and luxury conglomerates.

2. Artisan Economy under Threat:

- India's **artisanal sector employs over 7 million people** and contributes to cultural preservation.
- Lack of support, global visibility, and fair trade practices lead to **loss of traditional skills** and **livelihood insecurity**.

3. Need for International Reforms:

- Calls for India to:
- Advocate stronger **international protection of GI-tagged products**.
- Push for binding frameworks in **WIPO and WTO**.
- Encourage luxury brands to:
- **Collaborate directly with artisan groups.**
- Ensure **profit-sharing, fair wages**, and **cultural credit**.

Way Forward

1. Strengthen Global IP Frameworks

- India should push for:
- **Binding international agreements** on traditional cultural expressions.
- Recognition of GI rights in **bilateral and multilateral trade agreements**.

2. Promote Fair Trade Fashion

- Encourage **ethical sourcing** and **artisan-brand collaborations**.
- Support brands that ensure **transparency, recognition, and revenue-sharing**.

3. Empower Artisans Domestically

- Provide access to **design training, marketing, e-commerce platforms**.
- Strengthen schemes like:
  - Ambedkar Hastshilp Vikas Yojana
  - ODOP (One District One Product)
  - Skill India and Startup India initiatives for craftspeople.

4. Sensitisation and Awareness

- Promote awareness on **cultural ethics** in fashion education globally.
- Showcase India's crafts through **state-backed branding campaigns** (e.g., India Handloom Brand, GI tagging initiatives).

Conclusion

- The Prada-Kolhapuri controversy is not merely about a pair of expensive sandals—it reflects the **ongoing inequities in global cultural and economic exchanges**.
- As India reclaims its artisanal heritage and asserts its soft power globally, it must also **protect the dignity, rights, and livelihoods** of its traditional knowledge bearers.
- Ensuring fair representation, recognition, and revenue-sharing is not just a cultural imperative but a **moral and economic one.**

National Statistics Day and Contributions of P.C. Mahalanobis

Source: Indian Express

https://indianexpress.com/article/explained/explained-economics/national-statistics-day-5-things-about-pc-mahalanobis-10095729/

UPSC Relevance: GS3 Economy

Context:

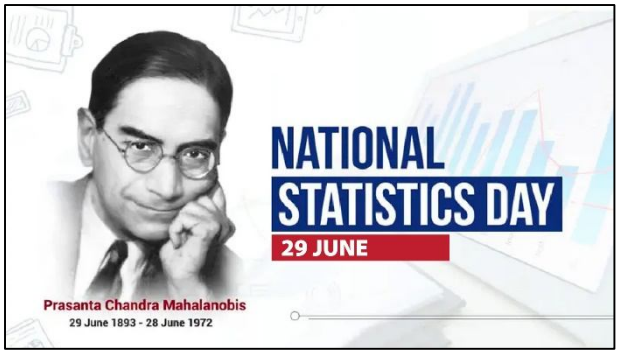
National Statistics Day and Contributions of P.C. Mahalanobis

Why in News

June 29 is celebrated as National Statistics Day to honor the contributions of P.C. Mahalanobis, the father of Indian statistics and architect of India's statistical planning.

Introduction

- Every year on **June 29**, India celebrates **National Statistics Day** to honor the birth anniversary of **Prasanta Chandra Mahalanobis**, a pioneering Indian statistician widely known as the **Father of Indian Statistics**.



- The objective of the day is to promote the importance of statistics in socio-economic planning and evidence-based policy formulation.

About P.C. Mahalanobis: Life and Legacy

- **Date of Birth**: 29 June 1893
- **Date of Death**: 28 June 1972

- **Education**: Presidency College, Kolkata; later studied at the University of London and King's College, Cambridge
- **Affiliations**: Founder of the Indian Statistical Institute (ISI), Member of the Planning Commission of India
- Mahalanobis came from an influential Brahmo Samaj family and was deeply influenced by liberal-reformist traditions.
- Though he studied physics, his academic interest shifted to statistics after a chance reading of the journal *Biometrika* in the library of King's College, which ultimately changed the course of his career.

Personality and Influence

- Known as "The Professor," Mahalanobis was admired for his intellect, charisma, and interdisciplinary approach.
- He was a mentor to several prominent statisticians, including **C.R. Rao**, and had the rare ability to connect science with practical policy challenges.

Awards and Honours

- Padma Vibhushan (1968)
- Fellow of the Royal Society (FRS)
- Founding member of numerous national and international scientific bodies

Significance of National Statistics Day

- National Statistics Day seeks to raise awareness about the importance of statistics in **socio-economic development**, **policy-making**, and **public administration**.
- Each year, the Ministry of Statistics and Programme Implementation (MoSPI) announces a theme focused on **data-driven governance**, typically aligning with current developmental priorities.

Key Contributions

1. Establishment of Indian Statistical Infrastructure

- Mahalanobis founded the **Indian Statistical Institute (ISI)** in 1931, which later became the nerve center of statistical research and planning in India.
- He also launched **Sankhya**, India's first journal dedicated to statistical sciences, in 1933, modeled after *Biometrika*. These efforts institutionalized statistics as a discipline in India.

2. Pioneer of Sample Surveys in India

- In 1950, Mahalanobis helped design and implement India's **first National Sample Survey (NSS)**.
- This was a milestone in public data collection, capturing detailed information on income, employment, health, and consumption habits.
- He introduced **random sampling techniques**, which allowed policymakers to understand the socio-economic realities of a vast and diverse population without surveying every individual.
- **Nobel Laureate Angus Deaton** noted that Mahalanobis's work placed India at the forefront of global statistical capacity.

3. Introduction of the Mahalanobis Distance (1936)

- The **Mahalanobis Distance** is a statistical measure used to identify outliers in multivariate datasets.
- Unlike standard measures that consider only one variable, this technique incorporates variance and correlation between variables, making it a powerful tool in fields such as econometrics, machine learning, and cluster analysis.
- For example, it can help identify children who are unusually undernourished in otherwise affluent households, thereby flagging anomalies that average indicators might miss.

4. Applied Statistics in Flood Control

Mahalanobis applied statistical analysis to real-world problems like flood control:

- **North Bengal (1922)**: He concluded that retarding basins would not be effective and emphasized the need for improved drainage systems.
- **Odisha (1926)**: He disproved prevailing beliefs that river bed rise caused floods. His long-term data analysis showed no such rise, and he proposed upstream dam construction

as a viable solution. This work laid the foundation for the **Hirakud Dam Project**, inaugurated in 1957.

5. Role in India's Five-Year Plans

- As a member of the Planning Commission, Mahalanobis played a crucial role in shaping India's **Second Five-Year Plan (1956–61)**.
- He developed the **Mahalanobis Model**, a two-sector economic model that emphasized capital goods and heavy industrialization.
- While later critiqued for underestimating consumer needs and agriculture, the model provided the foundation for India's industrial infrastructure and self-reliance.

6. Technology and Cold War Politics

- In the 1950s, Mahalanobis made efforts to acquire an American computer, **UNIVAC**, for India.
- However, due to his perceived pro-Soviet stance, the U.S. denied the export. Ironically, his global stature and advocacy for state-led planning were viewed as threats in Cold War geopolitics.
- According to historian Nikhil Menon, Mahalanobis's political image unintentionally became an obstacle to India's computing ambitions, despite his genuine technological aspirations.

Conclusion

- Prasanta Chandra Mahalanobis was not merely a statistician but a visionary who laid the intellectual and institutional foundations of India's planning era.
- His contributions continue to influence how data is collected, interpreted, and used in governance.

ECOLOGY AND ENVIRONMENT

Mustard Oil, Public Health, and Policy Dilemmas

Source: The Hindu

https://www.thehindu.com/opinion/op-ed/a-ban-a-split-verdict-and-a-health-concern/article69652167.ece

UPSC Syllabus Relevance: GS3 Environment and Ecology

Context:

Mustard oil Health regulations

Why in News?

Two major decisions—FSSAI's 2021 ban on blended mustard oil and the Supreme Court's 2024 verdict against GM mustard (DMH-11)—have reignited debate on health and policy issues.

Introduction

- Mustard oil is the **third-largest consumed edible oil in India**, playing a crucial role in dietary habits, especially in northern and eastern states.
- Recently, **two major decisions** — one by the **Food Safety and Standards Authority of India (FSSAI)** in 2021 and the other by the **Supreme Court in 2024** — have shaped the regulatory landscape of mustard oil in India.

Key Policy Decisions and Their Public Health Implications:

1. FSSAI's Ban on Blended Mustard Oil (2021):

- **Effective from June 8, 2021**, FSSAI prohibited the **manufacture and sale of blended mustard oil**.
- As per the **Food Safety and Standards Regulations**, edible oil blending is permitted **up to 20%**, but the FSSAI imposed a **blanket ban** for mustard oil blending.
- **Rationale:**
  - To **prevent adulteration** and contamination.
  - To **encourage pure mustard oil consumption** and boost **domestic mustard production**.

2. Supreme Court Verdict on GM Mustard (2024):

- The **SC quashed the Centre's approval** for the **environmental release of GM mustard** (Dhara Mustard Hybrid-11 or **DMH-11**).
- **Reason cited:** Inadequate assessment of **potential human health impacts**.
- This ruling paused the rollout of a **lower erucic acid, higher yield GM mustard** variety developed indigenously.

Common Objective:

- Both decisions were ostensibly aimed at **safeguarding public health** of mustard oil consumers.
- However, experts argue that these actions may **not effectively address** the underlying **health concerns**.

Health Concern: High Erucic Acid in Mustard Oil

- **Indian mustard oil contains 40–54% erucic acid**, compared to the **international safe limit of <5%**.
- **Health implications (from animal studies):**
  - Heart lesions
  - Growth retardation
  - Tissue degeneration
  - Liver and kidney damage
- Although **no conclusive human evidence**

exists, developed nations such as the **US, Canada, and EU nations restrict mustard oil** with high erucic acid.

- **Solution adopted by advanced countries:** Use of **canola oil**, a low-erucic acid variety (≤2%).

Edible Oil Blending – Public Health & Regulation

- **Why blending is helpful:**
  - Blending mustard oil with **low-erucic oils** (e.g., rice bran, soybean) reduces **overall erucic acid** content.
  - Blended oils are **richer in unsaturated fats**, which improve cholesterol profiles (↓LDL, ↑HDL).
- **Adulteration concern:** A 2020 FSSAI survey found **24.2% of 4,461 oil samples non-compliant**, with mustard oil topping adulteration charts.
- **Challenge:** Instead of banning, allow **packaged and labelled blended oils**, especially since **<30% of edible oil is branded** in India.
- **State role:** Food safety is a **State subject**, and enforcement needs **strengthened local capacity**.

GM Mustard (DMH-11) – Science, Safety & Sovereignty

- Developed by Indian scientists, **DMH-11** is a GM hybrid mustard with:
  - **Lower erucic acid** (30–35%)
  - **Higher yields**, supporting oil self-sufficiency
- **Benefits:**
  - Requires **less blending** with other oils → addresses **health concerns**
  - Can **reduce edible oil imports** (India is the **largest global importer**, with **$20.56 billion** bill)
- **Challenge:** Judicial and activist concerns over **biosafety, environmental impacts, and food safety data gaps**

Way Forward:

- **Scientific Risk Assessment:** Conduct **transparent, peer-reviewed studies** on the health impact of GM mustard and erucic acid in Indian context.
- **Strengthen Regulation, Not Prohibition:** Allow **labelled blending** within legal limits (≤20%) under strict monitoring. Penalize **adulteration**, not blending itself.
- **Promote Indigenous Crop Innovation:** Prioritize **plant breeding** and genetic interventions to create **<5% erucic acid mustard varieties**, like Canada and EU did.
- **Public Awareness and Branding:** Encourage **branded, traceable mustard oil**, improving **consumer confidence**.

Conclusion:

- While the intent behind the FSSAI and Supreme Court decisions was to **safeguard consumer health**, **blanket bans and judicial halts** without enabling alternatives can be **counterproductive**.
- A balanced approach focusing on **regulated blending**, **scientific GMO assessment**, and **crop innovation** is essential to align public health, food safety, and economic interests in India's edible oil sector.

India Adds Two Rajasthan Wetlands to Ramsar List

Source: Indian Express

https://indianexpress.com/article/india/indias-ramsar-site-tally-touches-91-as-two-more-rajasthan-wetlands-gain-recognition-10048728/

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

New Ramsar Sites in India

Why in News?

India added Khichan and Menar wetlands to the Ramsar List, raising its total to 91 and reaffirming its commitment to wetland conservation under the 1971 Ramsar Convention.

Introduction

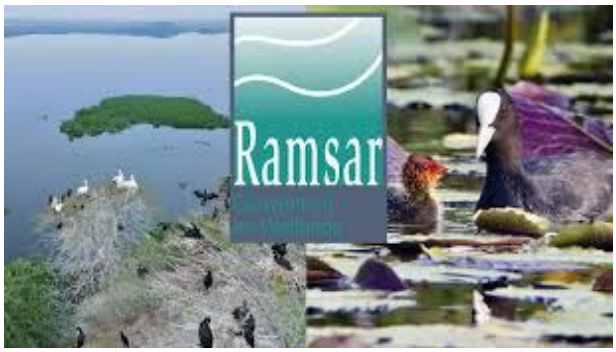
- On the eve of **World Environment Day**, India marked a significant achievement in its environmental conservation efforts by

adding **two more wetlands—Khichan** in Phalodi and **Menar** in Udaipur (both in Rajasthan)—to the **Ramsar List of Wetlands of International Importance**.

- With these inclusions, **India's Ramsar Site tally rises to 91**, continuing its proactive role in global wetland conservation.

What Are Wetlands?

- Wetlands are ecosystems where **water saturates the land**, either permanently or seasonally. They include marshes, swamps, bogs, estuaries, lakes, floodplains, mangroves, and even some man-made reservoirs.
- They are **transition zones** between terrestrial and aquatic systems and are among the **most productive ecosystems** on Earth.



Ecological Importance of Wetlands

- **Biodiversity Hotspots**: Wetlands provide habitat for a wide range of flora and fauna, including endangered species, migratory birds, fish, and amphibians.
- **Natural Water Filters**: Wetlands help remove pollutants and purify surface and groundwater.
- **Flood Control**: Acting as natural sponges, wetlands absorb excess rainwater, reducing the severity of floods.
- **Carbon Sequestration**: Wetlands store large amounts of carbon in their biomass and soil, helping mitigate climate change.
- **Groundwater Recharge**: Wetlands aid in replenishing aquifers.
- **Support to Local Livelihoods**: Wetlands are vital for agriculture, fishing, and ecotourism in surrounding communities.

What is a Ramsar Site?

A **Ramsar Site** is a wetland designated to be of **international importance** under the **Ramsar Convention**, an intergovernmental treaty adopted in **1971** in **Ramsar, Iran**. The convention came into force in 1975 and aims at:

- **Conservation of wetlands**
- **Sustainable use of their resources**
- **Maintaining ecological character through national and international cooperation**

As of 2025, over **2,500 wetlands** across the world have Ramsar status.

Ramsar Convention: Key Features

- **Contracting Parties**: 172 countries (including India, since 1982)
- **Three Pillars of the Convention**:
  1. Wise use of wetlands
  2. Designation and conservation of Ramsar Sites
  3. International cooperation on shared wetlands, species, and water systems

New Additions: Khichan and Menar Wetlands

1. **Khichan Wetland (Phalodi, Rajasthan)**
   - Known for hosting large flocks of **Demoiselle Cranes**, a migratory bird species revered in local tradition.
   - Plays a vital role in **local biodiversity** and **bird-based tourism**.
2. **Menar Wetland (Udaipur, Rajasthan)**
   - A significant **bird-watching destination**, attracting over 150 bird species.
   - A local community-driven success story in **wetland restoration** and **ecotourism**.

Significance of India's Achievement

- With **91 Ramsar Sites**, India ranks among the **top countries globally** in wetland recognition.
- Reflects **India's commitment** to international environmental conventions.
- Demonstrates **community participation** in ecological restoration and conservation.
- Enhances the country's **eco-tourism potential** and **climate resilience**.

Way Forward

- **Strengthen Monitoring**: Regular ecological assessments of Ramsar Sites.
- **Promote Community Stewardship**: Encourage local participation in managing wetlands.
- **Sustainable Tourism**: Balance tourism with ecosystem conservation.
- **Address Threats**: Curb encroachments, pollution, and unsustainable development.
- **Integrate Wetlands into Urban Planning**: Especially important for flood-prone areas.

Conclusion

- India's inclusion of Khichan and Menar as Ramsar Sites not only strengthens its ecological network but also reaffirms the country's dedication to **sustainable development and biodiversity conservation**.
- As wetlands gain global attention for their climate and environmental roles, India is poised to lead by example in **preserving natural heritage for future generations**.

Study Finds EVs Cut CO_2 Emissions by Up to 38% in India

Source: Down To Earth

https://www.downtoearth.org.in/energy/china-leads-global-energy-investments-in-2025-developing-countries-still-face-barriers-iea

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

Battery Electric Vehicles (BEVs) vs ICE Vehicles in India

Why in News?

A recent study by IIT Roorkee and ICCT found that BEVs in India emit up to 38% less CO_2 per kilometre than Internal Combustion Engine (ICE) vehicles.

Introduction

- As India targets net-zero emissions by 2070, the transportation sector—responsible for nearly 14% of India's total GHG emissions—has become a critical focus area for decarbonisation.
- In this context, a **recent collaborative study by IIT Roorkee and the International Council on Clean Transportation (ICCT)** has offered crucial insights into the life-cycle greenhouse gas (GHG) emissions of **Battery Electric Vehicles (BEVs)** vis-à-vis **Internal Combustion Engine (ICE)** vehicles.

Key Findings of the Study

1. Emission Reduction Potential of BEVs

- **Battery Electric Vehicles emit up to 38% less carbon dioxide equivalent (CO_2e) per kilometre** than ICE vehicles in the passenger car segment.
- BEVs **consistently outperform ICE and Hybrid Electric Vehicles (HEVs)** across life-cycle GHG metrics.

2. Life-Cycle Emission Meta-Analysis

- This research is **one of the first meta-analyses of life-cycle GHG emissions** for passenger cars in India, synthesising **six prominent LCA (Life Cycle Assessment)** studies.
- Emission outcomes vary significantly—**up to 368 grams of CO_2e/km**—depending on parameters such as:
  - **Electricity grid mix**
  - **Vehicle energy efficiency**
  - **Test vs real-world conditions**

This variability is equivalent to the footprint of driving **two to three petrol cars** for the same kilometre.

3. Critical Emission Variability Drivers (75% contribution)

- **Grid Carbon Intensity**: Emissions depend heavily on how clean the electricity generation mix is (e.g., coal vs renewables).
- **Laboratory Test Assumptions**: Overly optimistic lab test-cycle assumptions (e.g., ideal driving, perfect terrain) underrepresent real-world emissions.
- **Real-World Driving Conditions**: Includes factors such as traffic, air conditioning, terrain, and vehicle load.

Challenges in Current Assessment Methods

1. Unrealistic Energy Use Assumptions

- Some assessments use **unrealistically low energy consumption estimates** for BEVs, leading to distorted comparisons with ICE vehicles.

2. Discrepancy Between Lab Tests and Real-World Use

- **Hybrid Electric Vehicles (HEVs)**, in particular, show a large gap between test-cycle performance and actual fuel use.
- The study stresses the need for **real-world correction factors** to better reflect performance.

3. Neglect of Land-Use Change in Biofuel Emissions

- Many assessments ignore emissions from **land-use change** associated with biofuel production (e.g., forest clearing for biofuel crops), underestimating actual emissions.
- Example: **Diesel production emissions vary from 8 to 22 g CO_2/km** depending on whether land-use change is included.

4. Charging Losses in BEVs

- Charging inefficiencies are often not included in energy accounting for BEVs, leading to underestimation of their actual energy use.

Policy Recommendations

Based on the findings, the study recommends a **multi-pronged strategy** to ensure accurate emissions assessment and effective mitigation:

1. Accelerated BEV Adoption

- India should **not delay BEV deployment** waiting for a cleaner grid.
- Vehicles bought today remain on roads for **10–15 years**, locking in emissions.
- As India's grid gradually decarbonises, BEVs will become cleaner over time.

2. Parallel Grid Decarbonisation

- Continue aggressive **renewable energy deployment** (solar, wind, hydro) to reduce the **carbon intensity of the grid**.

3. Strengthening Fuel Efficiency Standards

- **Enforce real-world fuel economy testing** using On-board Fuel and Energy Consumption Meters (OBFCMs).
- Mandate **energy metering for all vehicle types**, including electric, to improve transparency.

4. Real-World Adjustment Factors

- Update emissions calculations to **reflect actual driving conditions**, especially for HEVs and ICEs.

5. Incorporate Land-Use Emissions

- **Include land-use change emissions in biofuel LCAs** to capture their full environmental cost.

Conclusion

- This pathbreaking research reaffirms the **emissions superiority of BEVs** in the Indian context. It also issues a cautionary note: relying solely on theoretical models or ideal test conditions can distort policymaking.
- Real-world grounded assessments—factoring in electricity grid evolution, charging losses, and land-use impacts—are vital for designing effective, evidence-based transport and energy policies.
- For India, which is poised to become the world's third-largest car market, these insights provide a **scientific basis for urgent policy action** on cleaner mobility.

UNOC 3: Brazil and France Lead Ocean-Climate Initiative Ahead of COP30

Source: Down To Earth

https://www.downtoearth.org.in/water/unoc3-brazil-and-france-launch-initiative-to-encourage-ocean-focused-action-in-national-climate-plans-ahead-of-unfccc-cop-30-six-countries-join

UPSC Syllabus Relevance: **GS Environment and Ecology**

Context:

Blue NDC Challenge

Why in News

Brazil and France have launched a new initiative to bring oceans to the heart of climate action at the third instalment of the United Ocean Conference (UNOC3).

Background:

- At the third United Nations Ocean Conference (UNOC3) held in Nice, France, from June 9–13, 2025, Brazil and France jointly launched the **Blue NDC Challenge**, a pioneering initiative to integrate **ocean-focused climate measures** into countries' **Nationally Determined Contributions (NDCs)** ahead of **COP30**, scheduled in **Belem, Brazil**.

What are Nationally Determined Contributions (NDCs)?

- NDCs are national climate plans submitted by countries under the **Paris Agreement (COP21, 2015)**.
- They detail efforts to:
  - Reduce greenhouse gas emissions
  - Adapt to the impacts of climate change
- Objective: To limit global average temperature rise to **well below 2°C**, preferably to **1.5°C** above pre-industrial levels.

Highlights of the Blue NDC Challenge

- **Launch Partners**: Brazil and France
- **Initial Endorsing Countries**: Australia, Fiji, Kenya, Mexico, Palau, Seychelles
- **Aim**: To mainstream **ocean-based solutions** into climate action through revised NDCs for the 2035 target (submission deadline: **Feb 10, 2025**).
- As of June 2025, only **21 of 195 Parties** have submitted their updated NDCs.

Key Components of Ocean-Focused Climate Action

Participating countries pledge to:

- **Restore marine ecosystems** (e.g., mangroves, coral reefs)
- Implement **Marine Spatial Planning (MSP)** and **Integrated Coastal Zone Management (ICZM)**
- Develop **climate-smart Marine Protected Areas**
- **Phase out offshore oil and gas** operations
- Expand **clean ocean energy** (offshore wind, wave, tidal)
- **Decarbonise maritime sectors**, including shipping and seafood industries
- Promote **sustainable, climate-resilient fisheries and aquaculture**

Brazil's Ocean Commitment in NDC 2035

- Submitted in **November 2024**
- Includes oceans and coastal zones in the **Brazilian Climate Plan** for the first time
- Focus Areas:
  - MSP and ICZM
  - Conservation of mangroves and coral reefs
  - Climate resilience through ocean-based adaptation strategies

Global Support and Partnerships

- Support from:
  - **Ocean Breakthroughs**, Marrakech Partnership for Global Climate Action
  - **UN High-Level Climate Champions**
  - **NDC Partnership** (hosted by World Resources Institute)
- **Bloomberg Philanthropies** pledged **$6.8 million** for Brazil's ocean and coastal conservation (June 8, 2025)
- **Global Mangrove Alliance** (est. 2017) is assisting nations in integrating mangrove

restoration into climate planning

Significance of Oceans in Climate Mitigation and Adaptation

- **Mangroves** sequester carbon **10 times faster** than terrestrial forests
- Coastal ecosystems like **salt marshes** provide dual benefits:
  - **Mitigation** (carbon sinks)
  - **Adaptation** (storm protection, biodiversity support)
- Ocean-based solutions could deliver **up to 35%** of required emission cuts to limit warming to 1.5°C (WRI estimate)

Conclusion

- The **Blue NDC Challenge** signifies a turning point in global climate policy by formally acknowledging the **central role of oceans**.
- As the world heads toward **COP30 in Brazil**, this initiative urges countries to bridge the gap between **climate commitments and ocean stewardship**, highlighting a vital and previously underutilised pathway to achieving the **Paris climate goals**.

50 Years of Crocodile Conservation Programme

Source: The Hindu

https://www.thehindu.com/news/national/odisha/world-crocodile-day-odishas-pioneering-efforts-have-made-it-a-leader-in-crocodile-conservation/article69697416.ece

UPSC Syllabus Relevance: **GS 3 Environment and Ecology**

Context:

Crocodile Conservation Programme

Why in News

In 2025, India marks 50 years of its Crocodile Conservation Programme.

Background:

- As India commemorates the 50th anniversary of its Crocodile Conservation Programme in 2025, it is Odisha's pioneering role that stands out in this landmark journey of ecological revival.
- The State's early and sustained efforts have been pivotal in reviving all three native crocodilian species—the gharial (*Gavialis gangeticus*), saltwater crocodile (*Crocodylus porosus*), and mugger crocodile (*Crocodylus palustris*).

Birth of a Conservation Legacy

- On April 1, 1975, the Government of India, alarmed by the findings of a 1974 survey by noted herpetologist H.R. Bustard, launched the Crocodile Conservation Project with technical support from the Food and Agriculture Organization (FAO) of the United Nations.
- Odisha became the centre of India's first scientific crocodile conservation initiatives, hosting breeding populations of all three species.
- Dedicated rearing and incubation centres were quickly established—Tikarpada on the Mahanadi River for gharials and Dangamal in Bhitarkanika for saltwater crocodiles.
- Uttar Pradesh followed with similar efforts at Kukrail and Katarnia Ghat.
- Eggs collected from the wild were hatched under controlled conditions, and hatchlings were raised until they reached a safer size of 1.2 metres.

Historic Breakthroughs

- The first hatchlings of gharials and saltwater crocodiles emerged from Odisha's centres in June 1975, only two months after the programme's launch—marking a historic milestone in Indian wildlife conservation.

- Odisha soon became the first State to appoint full-time wildlife biologists and develop conservation breeding pools at Nandankanan Zoological Park and Dangamal.
- In a significant example of international collaboration, an adult male gharial was brought from the Frankfurt Zoological Society to aid breeding in Odisha.

Protected Habitats and Scientific Leadership

- Bhitarkanika and Satkosia were the first protected areas in India for saltwater crocodiles and gharials, respectively.
- These regions were later upgraded to National Park and Tiger Reserve status.

- Odisha was also the first State to release captive-reared crocodiles back into the wild—setting standards for reintroduction protocols.

Odisha remains the only State to host conservation centres for all three crocodilian species:

- **Tikarpada** for gharials
- **Dangamal** for saltwater crocodiles
- **Ramatirtha** for mugger crocodiles

The State also produced India's first PhDs in crocodilian research, underscoring its scientific leadership.

A Remarkable Recovery

From near extinction in the 1970s, India's crocodilian populations have witnessed a dramatic recovery:

- **Gharials**: Now estimated at 3,000 individuals in the wild, with over 400 nests recorded annually across habitats like the National Chambal Sanctuary, Katarnia Ghat, and the Gandak River. India now holds 80% of the global wild population of gharials.
- **Saltwater Crocodiles**: The population has rebounded to about 2,500, with Bhitarkanika in Odisha hosting the largest share, followed by the Andaman & Nicobar Islands and Sundarbans in West Bengal.
- **Mugger Crocodiles**: Their numbers have surged to an estimated 8,000–10,000, reclaiming most of their historical range.
- More than 20 zoos, led by the **Madras Crocodile Bank**, now breed crocodiles and support reintroduction efforts, reducing dependence on wild egg collection.

Looking Ahead

- In March 2025, Prime Minister Narendra Modi announced a new national project for gharial conservation.
- According to retired WII scientist B.C. Choudhury, this initiative aims to re-establish the gharial across its historical range—including the Brahmaputra and Indus River systems, and the southernmost extent in the Mahanadi in Odisha, where revival efforts have shown promising results.

World Crocodile Day

- **World Crocodile Day** is observed **annually on June 17** to raise awareness about the plight of crocodiles and the urgent need to conserve these ancient reptiles and their habitats.
- **Purpose:** To promote awareness, education, and action to protect crocodilian species worldwide—especially those facing threats like habitat loss, poaching, and human-wildlife conflict.
- **First Observed:** The day was initiated by **The Crocodile Research Coalition** and other conservation organisations.

Significance in 2025:

- In 2025, **India is celebrating 50 years** of the **Crocodile Conservation Programme (launched on April 1, 1975)**, and Odisha is leading the celebrations, highlighting its foundational role in the recovery of all three native crocodile species:

1. **Gharial** (*Gavialis gangeticus*)
2. **Saltwater crocodile** (*Crocodylus porosus*)
3. **Mugger** (*Crocodylus palustris*)

CPCB Decision on Mandatory FGD Units in Thermal Power Plants

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/central-pollution-control-board-to-decide-on-future-of-flue-gas-desulphurisation-units-power-minister/article69679608.ece

UPSC Syllabus Relevance: **GS 3 Environment and Ecology**

Context:

Flue Gas Desulphurisation (FGD) units

Why in News?

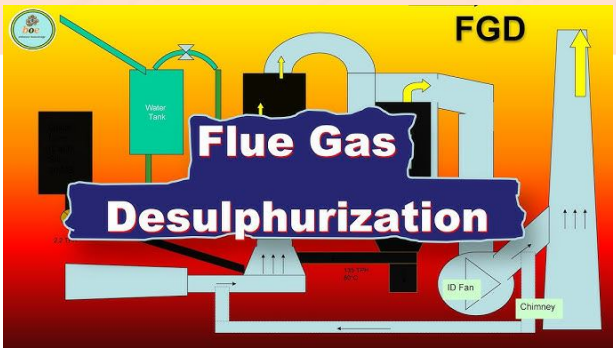
The Union Power Ministry is reconsidering the mandatory installation of Flue Gas Desulphurisation (FGD) units in coal-fired thermal power plants.

Introduction

- In a significant development, the **Union Ministry of Power** announced that it would wait for the **Central Pollution Control Board (CPCB)** to finalize its decision on whether **Flue Gas Desulphurisation (FGD)** units should remain mandatory for all coal-fired thermal power plants (TPPs) in India.
- This follows recommendations by a high-powered committee to relax the current policy.

What is Flue Gas Desulphurisation (FGD)?

- **FGD** is a technology used to remove **sulphur dioxide (SO_2)** emissions from the exhaust flue gases of fossil-fuel power plants.
- SO_2 emissions from burning coal contribute to:
  - **Acid rain**
  - **Particulate matter pollution**
  - **Respiratory diseases**
- Aerosols formed by sulphates may **reduce global warming** (by reflecting sunlight), but they also **worsen air quality** and **affect human health**.



Policy Background:

- In **2015**, India mandated the installation of FGD units in all coal-fired power plants.
- Since then, **3 deadline extensions** have been given due to cost and logistical concerns:
  - The latest extension allows compliance between **2027 and 2030**.
- So far, **92% of the 600 TPP units** have **not** installed FGD units.

High-Powered Committee Recommendation (April 2025):

- **Chairperson:** Principal Scientific Advisor **Ajay Sood**
- **Recommendation:** Discontinue the blanket FGD mandate.
- **Justification:**
  - Studies by **CSIR** and **IIT Delhi** show SO_2 aerosols' impact on health is **less than 5%**.
  - Complete removal may **reduce atmospheric cooling**, potentially **increasing global warming**.
  - Compliance with **National Ambient Air**

Quality Standards (NAAQS) is more critical than FGD fitment.

Proposed Categorisation of Thermal Power Plants:

Category	Criteria	FGD Requirement	Deadline
A	Within 10 km of NCR or cities with population >1 million	**Mandatory**	2027
B	Within 10 km of Critically Polluted / Non-Attainment Cities	**Case-by-case basis**	2028
C	All other TPPs	**Exempted, in general**	2029

- **Exemption Clause:** Plants older than 20 years in Categories A and B may also be exempted.

Current Status of Implementation:

- **Category A:** Only 14 of 66 plants have installed FGD.
- **Category B:** 4 of 72 plants have FGD.
- **Category C:** 32 of 462 plants have FGD.

Cost and Energy Considerations:

- **Installation Cost:** ₹1 crore per MW of capacity.
- **Upcoming Capacity Addition:** 97,000 MW → ₹97,000 crore if FGD is mandated.
- **Concerns:**
  - Increased **tariffs** for consumers.
  - Pressure on **public finances**.
  - Trade-off between **public health**, **climate change mitigation**, and **economic affordability**.

Analysis and Implications:

1. Public Health vs. Climate Mitigation

- **FGDs improve air quality** but remove sulphates that provide a **temporary cooling effect**.
- The removal of sulphates may **accelerate global warming**, creating a **policy dilemma**.

2. Cost vs. Environmental Responsibility

- High installation costs raise concerns about **economic feasibility**, especially for **older or soon-to-be-retired plants**.

3. Urban-Rural Disparity

- Mandating FGDs only near **urban centers** may **neglect rural health impacts**.

4. Policy Shift

- The recommendation marks a **significant shift** from **strict emission control** to a **flexible, cost-benefit approach** aligned with **localized pollution control**.

Conclusion:

- The evolving stance on FGD installation reflects India's attempt to balance environmental goals, health priorities, and energy needs.
- While decisions are pending, the categorization framework suggests a differentiated regulatory approach, focusing resources where pollution poses the highest risk to public health.

International Big Cat Alliance (IBCA)

Source: Indian Express

https://indianexpress.com/article/explained/everyday-explainers/international-big-cat-alliance-faq-10072246/

UPSC Syllabus Relevance: **GS 3 Environment and Ecology**

Context:

International Big Cat Alliance (IBCA)

Why in News

The first Assembly of the International Big Cat Alliance (IBCA) was held in New Delhi on June 16, 2025, with India taking a leadership role in global big cat conservation.

Introduction

- The first Assembly of the International Big

Cat Alliance (IBCA) was held in New Delhi on June 16, 2025.

- The meeting was presided over by the Union Minister for Environment, Forest and Climate Change, Bhupender Yadav, who was also endorsed as the President of IBCA by nine attending countries—Bhutan, Cambodia, Eswatini, Guinea, India, Liberia, Suriname, Somalia, and Kazakhstan.

What is the International Big Cat Alliance (IBCA)?

- The International Big Cat Alliance (IBCA) is a multilateral alliance established by the Government of India in March 2024 through the National Tiger Conservation Authority (NTCA) under the Ministry of Environment, Forest and Climate Change (MoEFCC).
- It is aimed at ensuring the conservation of seven species of big cats across their natural ranges.

Mandate:

The alliance is dedicated to the conservation of the following seven big cat species:

1. Tiger
2. Lion
3. Leopard
4. Snow Leopard
5. Cheetah
6. Jaguar
7. Puma

The IBCA aims to serve as a platform for countries to collaborate and share expertise, consolidate successful conservation models, and coordinate efforts to protect these species and their habitats.

Global Participation

There are **95 range countries**—countries where at least one of the seven big cat species exists in the wild. Examples include:

- **Tiger**: India, Russia, Nepal, Bangladesh
- **Lion**: India (Asiatic Lion), countries in Sub-Saharan Africa
- **Jaguar**: Brazil, Ecuador, Suriname
- **Snow Leopard**: Mongolia, Pakistan, China
- **Puma**: United States, Canada
- **Cheetah**: Iran, Namibia
- As of September 2024, 25 countries had officially consented to join IBCA, including Bangladesh, Nigeria, Egypt, Kenya, Rwanda, Suriname, Ecuador, and Peru.
- All United Nations member states are eligible to join IBCA by signing a framework agreement and submitting a formal diplomatic communication known as a Note Verbale.

Background and Rationale

The initiative was first announced by **Prime Minister Narendra Modi** in **2023**, during the commemoration of **50 years of Project Tiger** in Mysuru.

Historical Context:

- At the time of India's independence, the country had an estimated **40,000 tigers**.
- By the early 1970s, this number had plummeted to around **1,800** due to rampant poaching, habitat destruction, and hunting.
- In 1973, India launched **Project Tiger**, marking the beginning of organised tiger conservation through the creation of designated **tiger reserves**.

Objectives of IBCA

1. Facilitate **cooperation among range countries** for coordinated conservation efforts.
2. Promote **research, capacity building, and knowledge sharing** on big cat ecology and threats.
3. Support **anti-poaching operations and wildlife law enforcement** through transboundary collaboration.
4. Encourage the **replication of successful conservation models**.

5. Mobilise **financial and technical resources** for big cat protection globally.
6. Enhance **public awareness** and international attention towards the ecological importance of big cats.

Funding

- The **Government of India** has allocated **₹150 crore** for the functioning of IBCA for the period **2023–24 to 2027–28**.
- The alliance is expected to receive additional funding through international grants, multilateral institutions, and philanthropic organisations.

Significance of Big Cats in Ecosystems

Big cats are **apex predators** and play a critical ecological role by maintaining the population balance of herbivores, thereby preventing overgrazing and supporting ecosystem stability. Their conservation:

- Helps prevent natural disasters such as wildfires by maintaining vegetative cover.
- Supports **climate change mitigation** through the preservation of forested habitats that act as carbon sinks.
- Helps in **preserving biodiversity**, reducing the spread of zoonotic diseases, and promoting climate resilience.
- Protects entire ecosystems due to their status as **umbrella species**—conserving them leads to the preservation of numerous other flora and fauna.

India's Role in Big Cat Conservation

India holds a **leadership position in global big cat conservation**, especially due to the success of **Project Tiger**. Some key highlights:

- India currently hosts more than **3,600 wild tigers**, which accounts for **about 70 percent of the global population**.
- The country has also successfully conserved the **Asiatic Lion** in the **Gir Forest**.
- In 2022, India initiated **Project Cheetah**, involving the reintroduction of African cheetahs in Kuno National Park.
- It also has national efforts for the protection of **leopards** and **snow leopards** in various parts of the country.

Challenges in Big Cat Conservation

1. **Habitat fragmentation and deforestation**, reducing available territory for big cats.
2. **Human-wildlife conflict**, especially in areas near protected zones.
3. **Poaching and illegal wildlife trade**, which has become more organised and difficult to detect. Poaching networks today are leaner, with links to **narcotics and arms smuggling**.
4. **Climate change**, affecting the prey base and migratory patterns of big cats.

Highlights from the First IBCA Assembly (June 16, 2025)

- The **Headquarters Agreement** of IBCA was formally **ratified**, confirming its permanent secretariat in **New Delhi**.
- Minister Bhupender Yadav highlighted the need for **collective global action**, noting that ecological threats transcend national borders.
- Discussions were held on setting up:
  - A **Global Big Cat Database** for monitoring populations and threats.
  - A **Joint Anti-Poaching Intelligence Mechanism**.
  - **Capacity-building programmes** for field staff and conservation officers.

Revised Green India Mission to increase forest cover

Source: Indian Express

https://indianexpress.com/article/explained/revised-green-india-mission-gim-10076240/

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

Green India Mission

Why in News

The revised Green India Mission (GIM), launched in June 2025, focuses on landscape-based ecological restoration in different areas.

Introduction

- The Green India Mission (GIM), launched in 2014, is one of the eight core missions under India's **National Action Plan on Climate Change (NAPCC)**.
- On **June 17, 2025**, the Union Environment Ministry released a **revised roadmap** for GIM to realign its objectives with the growing ecological challenges such as **climate change**, **land degradation**, and **deforestation**, while incorporating feedback from scientific institutions and partner states.

Objectives of the Green India Mission

- Increase **forest and tree cover** on **5 million hectares (mha)**.
- Improve **forest quality** on another **5 mha**.
- Enhance **ecosystem services** such as:
- Carbon sequestration,
- Groundwater recharge,
- Biodiversity conservation.
- Strengthen **livelihoods** of forest-dependent communities.

Achievements So Far (2015–2024)

Parameter	Achievement
Land area covered under afforestation	**11.22 mha**
Funds released to 18 states	**₹624.71 crore**
Funds utilized	**₹575.55 crore**
Carbon sink created (2005–2021)	**2.29 billion tonnes CO_2-equivalent**

- Activities are prioritized based on **ecological vulnerability**, **carbon sequestration potential**, and **land degradation levels**.

Key Features of the Revised Roadmap (2025)

1. Region-Specific Focus

- The revised roadmap focuses on **landscape-specific ecological restoration** in:
- **Aravalli Range** (via the Aravalli Green Wall Project),
- **Western Ghats** (eco-restoration of mining areas),
- **Himalayas** (climate-vulnerable mountain ecosystems),
- **Mangroves** (coastal protection and biodiversity hotspots).

2. Aravalli Green Wall Project

- Restoration of **8 lakh hectares** across **29 districts** in 4 states.
- Estimated cost: **₹16,053 crore**.
- Aim: Create a **5 km buffer green belt** covering **6.45 mha**.
- Addresses **sandstorm control**, **desertification**, and **air pollution** in **Delhi-NCR** and **Punjab**.

3. Western Ghats & Himalayas

- Measures include **afforestation**, **groundwater recharge**, and **restoration of mining-degraded lands**.
- Protecting biodiversity-rich, climate-sensitive zones.

Addressing Land Degradation and Desertification

As per ISRO's **Desertification and Land Degradation Atlas (2018–19)**:

- **97.85 mha** (~30% of India's geographical area) is degraded.
- India's target (UNCCD commitment):
- Restore **26 mha** of degraded land by **2030**.
- GIM will play a crucial role through:
- Large-scale **afforestation**,
- **Grassland and wetland restoration**,
- **Community-based eco-restoration** efforts.

Carbon Sequestration Potential

According to the **Forest Survey of India (FSI)**:

- Restoration of **open forests** can sequester

1.89 billion tonnes CO_2 over **15 mha**.

- Intensified efforts under GIM could:
- Expand forest/tree cover to **24.7 mha**,
- Achieve a **carbon sink of 3.39 billion tonnes CO_2-equivalent by 2030**.
- This aligns with India's **Nationally Determined Contribution (NDC)** under the **Paris Agreement**, which commits to:
- Creating an **additional carbon sink of 2.5–3 billion tonnes** of CO_2-equivalent through forests and trees by **2030**.

Way Forward

- **Convergence with other schemes**: CAMPA, MGNREGA, PMKSY, Jal Shakti Abhiyan, and Namami Gange.
- **Strengthening local governance**: Empowering **Joint Forest Management Committees (JFMCs)**.
- **Technological support**: Use of **GIS**, **remote sensing**, and mobile platforms for tracking progress.
- **Community involvement**: Ensuring **tribal and local participation** in afforestation and conservation.

Conclusion

- The revised Green India Mission represents a **strategic shift** toward **landscape-based restoration**, **climate resilience**, and **carbon sequestration**.
- With region-specific interventions and stronger convergence with national climate goals, it is poised to play a **transformational role** in addressing climate change, desertification, and environmental degradation in India.

Asia is warming at twice the global average: WMO report

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/asia-is-warming-at-twice-the-global-average-wmo-report/article69727259.ece

UPSC Syllabus Relevance: **GS 3 Environment and Ecology**

Context:

State of the Climate in Asia 2024

Why in News?

The WMO's State of the Climate in Asia 2024 report confirms 2024 as the warmest year on record in Asia, highlighting extreme heatwaves, glacier loss, marine heatwaves, and intensified weather disasters.

Introduction

- The World Meteorological Organization (WMO) has declared 2024 as the warmest year on record in Asia, marked by extreme weather events, prolonged heatwaves, marine heatwaves, glacier mass loss, and unprecedented rainfall.
- The *State of the Climate in Asia 2024* report offers crucial insights into how climate change is increasingly affecting natural systems, human life, and regional economies in Asia.

Key Climate Indicators in Asia – 2024

1. Surface Temperature

- Global mean temperature for 2024 was the highest since 1850, surpassing the previous record of 1.45 °C in 2023.
- All six global datasets used by the WMO confirmed 2024 as the warmest year globally.
- From 2015 to 2024, every year ranked among the 10 warmest years.
- The warming trend (1991–2024) was almost double that of 1961–1990.

2. Prolonged Heatwaves

- East Asia experienced heatwaves from April to November 2024.
- Japan, Republic of Korea, and China broke monthly average temperature records

repeatedly.
- India experienced severe heatwaves, resulting in over 450 deaths.
- Russia's northwest saw a two-week heatwave with temperature anomalies of +7°C to +10°C.
- Makkah region (Saudi Arabia) recorded 49°C in June.
- Myanmar recorded its highest temperature ever, 48.2°C on April 28, 2024.

3. Sea Surface Temperatures and Marine Heatwaves
- Sea surface temperatures (SST) were highest on record.
- The rate of sea surface warming in Asia was nearly double the global average.
- Marine heatwaves of strong to extreme intensity affected most Asian oceans since records began in 1993, especially:
  - Northern Indian Ocean
  - Yellow Sea
  - East China Sea
  - Waters around Japan

4. Sea Level Rise
- Sea level rise on both Pacific and Indian Ocean sides of Asia exceeded the global average, posing serious risks to low-lying coastal areas.

5. Glacier Mass Loss
- Out of **24 monitored glaciers** in the **central Himalayas** and **Tian Shan**, **23 lost mass** in 2024.
- Consequences:
  - Increased **glacial lake outburst floods (GLOFs)**
  - Higher frequency of **landslides**
  - Threats to **long-term water security**

Major Extreme Weather Events in Asia – 2024

1. Heavy Rainfall and Flooding
- **UAE**: 259.5 mm rainfall in 24 hrs (most extreme since 1949).
- **Kerala (Wayanad)**: Over **500 mm rainfall in 48 hrs** (July 30), caused **>350 deaths**.
- **Nepal (September)**: Record-breaking rain and floods killed **246 people**, losses **>NPR 12.85 billion**.
- **Sri Lanka (December)**: Cyclonic rains caused **18 deaths**, affected **4.5 lakh people**.

2. Cyclones
- Total cyclones in 2024: **4**
  - **Bay of Bengal**: Remal, Dana, Fengal
  - **Arabian Sea**: Asna (rare – only 3rd instance since 1891)
- **Cyclone Remal**:
  - Made landfall near **Mongla & Khepupara** (Bangladesh/West Bengal) on **May 26**.
  - Wind speed: **111 km/h**, storm surge of **2.5 meters** caused widespread flooding.
- **Cyclone Fengal**: Made landfall in **India** after skirting **Sri Lanka** in late November.
- **Cyclone Asna**: Developed in the **Arabian Sea** in August. Caused **3–5 metre waves** in **Oman**.

3. Lightning
- **India** lost about **1,300 lives** due to lightning.
- A major lightning event on **July 10** killed **72 people** across **Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, and Jharkhand**.

4. Glacial Lake Outburst Flood (GLOF)
- On **August 16**, a GLOF in Nepal's **Koshi region** triggered:
  - Flash floods and mudslides.
  - Displacement of **over 130 people** by August 19.
  - Destruction of homes, schools, health centers in **Thame village**.

5. Drought
- **China**:
  - Affected **4.8 million people**
  - Damaged **335,200 hectares of crops**
  - Direct losses worth **CNY 2.89 billion**

Impacts on Lives and Livelihoods
- Increased frequency and intensity of **climate disasters** directly affected **millions of people**, especially in:

- **Agriculture**: Crop failures due to heat/drought.
- **Infrastructure**: Destruction due to floods and landslides.
- **Health**: Heat-related deaths and disease outbreaks.

- **Economic losses**: In billions of USD due to loss of agricultural produce, damaged infrastructure, and displacement.

Institutional Response and Way Forward

Role of National Meteorological and Hydrological Services (NMHSs)

- Real-time data and early warnings are **vital for disaster risk reduction**.
- **Celeste Saulo**, WMO Secretary-General:

"Extreme weather is already exacting an unacceptably high toll. The work of National Meteorological and Hydrological Services and their partners is more important than ever to save lives and livelihoods."

Policy Imperatives

- **Strengthen climate adaptation measures** through:
  - Climate-resilient infrastructure
  - Crop insurance and early warning systems
  - Water resource management
- **Regional cooperation** for climate resilience and technology transfer
- **Investment in renewable energy and decarbonization**

Conclusion

- The *State of the Climate in Asia 2024* report is a stark warning about the accelerating pace of climate change and its multifaceted impact on Asia.
- With record temperatures, widespread weather extremes, and rising sea levels, urgent policy action and international cooperation are essential.
- Asia, home to the majority of the world's population, must prioritize climate resilience to secure a sustainable and livable future.

Implications of Thirstwaves on Indian Agriculture and Water Security

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/rising-evaporative-demand-spotlights-indias-data-and-research-gap/article69728191.ece

UPSC Syllabus Relevance: GS3 Environment and Ecology

Context:

About Thirst waves

Why in News?

The study introduces the term "thirst waves" to describe prolonged periods of extreme atmospheric evaporative demand.

Introduction

- Climate change is not only intensifying traditional extremes like droughts and heatwaves but also giving rise to new and less-understood climatic stressors.
- One such phenomenon — **"Thirstwaves"** — has recently been conceptualized by researchers M.S. Kukal and M. Hobbins in a March 2025 paper published in *Earth's Future*.
- Thirstwaves are prolonged periods of extreme **atmospheric evaporative demand** (EED) that significantly impact land moisture, vegetation, and agriculture.
- This novel concept provides critical insights into how climate change is silently reshaping hydrological cycles, particularly during the crop-growing season.

What is a Thirstwave?

- **Definition**: A **thirstwave** refers to **three or more consecutive days** of **high evaporative**

demand, which signifies how much moisture the atmosphere demands from the land.

- **Origin of the Term**: Coined by **Meetpal Kukal** (University of Idaho) and **Mike Hobbins** (University of Colorado/NOAA), it is distinct from heatwaves and focuses on **hydro-climatic stress**.

"Not only have thirstwaves increased in severity, but the likelihood of no thirstwaves occurring during the growing season has significantly decreased." — Kukal & Hobbins, *Earth's Future*, 2025.

Mechanism Behind Thirstwaves

1. Evaporative Demand

- A measure of the **atmosphere's "thirst"** — how much water it wants to pull from land and plants.
- Driven by:
  - **Temperature**: Warmer air can hold more moisture.
  - **Humidity**: Drier air increases moisture draw.
  - **Wind speed**: Accelerates evaporation.
  - **Solar radiation**: Warms surfaces, boosting water loss.

2. Short-Crop Evapotranspiration (ET_0)

- Used to standardize evaporative demand.
- Based on a theoretical grass crop (12 cm height), continuously supplied with water.
- Assumes vegetation properties are constant, isolating the effect of **weather conditions**.

3. Difference from Heatwaves

Aspect	Heatwave	Thirstwave
Based on	High air temperature	High evaporative demand (temp + humidity + wind + radiation)
Focus	Human & animal health	Water loss from land and vegetation
Visibility	Media-covered, short-term disaster	Silent, creeping stressor
Impact	Heatstroke, mortality	Crop stress, irrigation demand, water resource depletion

Implications for Agriculture

- **Water Stress on Crops**: Even irrigated fields suffer if atmospheric demand exceeds capacity.
- **Altered Irrigation Scheduling**: Farmers need to adjust not just by soil moisture but by real-time atmospheric demand.
- **Reduced Yield Potential**: Prolonged thirstwaves can dry out plants, reduce photosynthesis, and impair growth.
- **High-Risk Crops**: Water-intensive crops like **rice, sugarcane, and wheat** are particularly vulnerable.

The Indian Scenario

1. Historical Context

- A 1997 study by **Chattopadhyay and Hulme** observed a **decline in potential evapotranspiration (PET)** in India (1960s–1990s), despite warming.
- **Reason**: Increased **humidity** had offset temperature-driven increases in EED.
- However, **future warming**, as per model simulations, will likely **override humidity** and lead to higher evaporative demand.

2. Recent Trends

- A 2022 study by IIT Roorkee and NIH observed:
  - Increase in actual evapotranspiration in Northern India, Western and Eastern Himalayas.
  - May be due to agricultural expansion or increased vegetation, or both.

3. Gaps and Research Needs

- No structured tracking or reporting of extreme thirstwave events in India.
- Lack of crop sensitivity data to EED.
- Need for regional modeling and early warning systems.

Global South: Vulnerability and Research Opportunities

- Developing countries, including India, are especially vulnerable due to:
  - High dependence on rainfed agriculture.
  - Weak institutional and climate adaptation capacity.
  - Socioeconomic fragility in rural communities.

- Researcher Kukal is now working with Indian scholars (e.g., PhD student Shailza Sharma from NIT Jalandhar) to study thirstwaves in South Asia, with support from the Water Advanced Research and Innovation Program.
- Preliminary insights reveal that regions not typically classified as "high-risk" may suffer severe thirstwaves — calling for a rethink of regional climate preparedness strategies.

Policy Implications for India

1. Agricultural Planning

- Include **evaporative demand trends** in:
  - Crop advisories (via KVKs, Agromet units)
  - **Irrigation scheduling**
  - **PMKSY** and **Watershed Management Programs**

2. Disaster Management

- Recognize thirstwaves as "hydro-climatic extremes" in national disaster frameworks.
- Develop a Thirstwave Early Warning System (TEWS).

3. Research and Data Infrastructure

- Set up EED monitoring stations via IMD.
- Commission ICAR and IITs to study crop-specific vulnerability to EED.
- Promote AI and satellite-based remote sensing for regional EED mapping.

4. Farmer Capacity Building

- Train farmers in:
  - Understanding weather-based irrigation
  - Choosing drought-tolerant crop varieties
  - Soil moisture conservation techniques (e.g., mulching, zero tillage)

5. Climate Budgeting and Prioritization

- Use **thirstwave data** to:
  - Reassess climate fund allocations.
  - Direct resources to emerging stress zones, not just historically drought-prone regions.

Conclusion

- The concept of thirstwaves adds a critical new dimension to understanding the invisible but severe effects of climate change on agriculture, water security, and ecological stability.
- As the world gets warmer, it is not just how hot it becomes — but how thirsty the air becomes — that will determine the future of farming and food systems.

Energy Institute's 2025 Annual Statistical Review of World Energy

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/global-energy-co2-emissions-reached-record-high-last-year-report-says/article69740205.ece

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

Global carbon dioxide emissions

Why in News

The Energy Institute's 2025 report reveals that global carbon dioxide emissions reached a new peak in 2024 despite strong growth in renewable energy.

Introduction

- The Energy Institute, in collaboration with KPMG and Kearney, released its annual **Statistical Review of World Energy** on June 26, 2025.
- This report has gained global significance for tracking energy trends and carbon emissions after taking over from British Petroleum (BP) in 2023.

Key Findings of the 2025 Report

1. Record-High Carbon Emissions

- Global carbon dioxide (CO_2) emissions from the energy sector reached a **record high for the fourth consecutive year** in 2024.
- Emissions increased by approximately **1%** and stood at **40.8 gigatonnes of CO_2 equivalent**, surpassing the previous record.

2. Temperature Threshold Breached

- The year 2024 was officially the **hottest year**

ever recorded.

- For the first time, **global average temperatures exceeded 1.5°C above pre-industrial levels**, thereby breaching the critical threshold set under the **Paris Agreement**.

3. Growth in Energy Supply Across All Sources

- **Total energy supply increased by 2% in 2024**, a rare occurrence last seen in 2006.
- Growth was recorded across all energy sources:
  - **Coal** increased by 1.2% and remained the dominant source of global energy.
  - **Natural gas** had the highest growth among fossil fuels, rising by 2.5%.
  - **Oil** experienced growth of less than 1%.
  - **Wind and solar energy** grew by 16%, expanding nine times faster than total energy demand.
  - **Nuclear and hydroelectric power** also registered positive growth.

Significance of the Report

1. Challenges to the Energy Transition

- The findings highlight the increasing difficulty in transitioning from fossil fuels to renewable sources, despite significant investments in clean energy.
- The continued growth of fossil fuel use negates much of the environmental gains made through renewables.

2. Impact of Geopolitical Tensions

- The **Russia-Ukraine war** disrupted global oil and gas supply chains, particularly to Europe, leading to increased use of alternative fossil fuels such as liquefied natural gas.
- Ongoing conflict in **West Asia** further contributed to concerns about the stability and security of global energy supplies.
- These geopolitical events have shifted policy focus back toward ensuring energy security, often at the cost of sustainability goals.

3. Inadequate Progress toward Global Climate Goals

- Despite the ambitious goals set during **COP28** in Dubai (2023)—especially the commitment to **triple global renewable capacity by 2030**—the current pace of progress remains insufficient.
- Analysts caution that the **net-zero by 2050** target is increasingly out of reach unless global policy and implementation undergo significant acceleration.

Statistical Overview

Indicator	2024 Data
Carbon Emissions	40.8 gigatonnes (↑ 1%)
Global Temperature Rise	>1.5°C above pre-industrial levels
Total Energy Supply Growth	2%
Natural Gas Growth	2.5%
Coal Growth	1.2%
Oil Growth	<1%
Wind and Solar Growth	16%

Analytical Insights

1. Rapid Renewable Growth Is Not Sufficient

- While wind and solar energy are expanding rapidly, the **absolute rise in energy demand** across sectors has offset the environmental benefits.
- Renewable energy needs to grow at an even faster pace to displace fossil fuels effectively.

2. Energy Security vs Environmental Sustainability

- Short-term policy decisions focused on energy security are undermining long-term environmental sustainability.
- Nations continue to depend on fossil fuels due to:

- Infrastructure constraints
- Political resistance
- Economic dependencies

This represents a classic conflict between developmental imperatives and environmental obligations.

Implications for India and the World

- The report serves as a **global warning** that current policies are inadequate to meet internationally agreed climate goals.
- For India, which is expanding both renewable and conventional energy sources, the report underscores the importance of **balancing energy access, economic growth, and climate responsibility**.
- India must accelerate the deployment of renewables, reduce fossil fuel subsidies, and enhance energy efficiency to stay aligned with its own net-zero commitments.

Record IBAT Alliance Investment in Biodiversity Data

Source: Down To Earth

https://www.downtoearth.org.in/wildlife-biodiversity/ibat-alliance-formed-by-four-largest-global-conservation-organisations-doubled-its-investment-in-biodiversity-data-from-2023-to-2024

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

IBAT Alliance

Why in News

The IBAT Alliance's record $2.5 million investment in 2024 strengthens global biodiversity conservation by enhancing key datasets like the IUCN Red List, WDPA, and WDKBA.

Introduction

- On June 23, 2025, the Integrated Biodiversity Assessment Tool (IBAT) Alliance announced that its investment in biodiversity data reached an unprecedented level of **$2.5 million for the year 2024**, marking a significant increase from **$1.2 million in 2023**.
- This rise in funding is viewed as a critical step towards enhancing global biodiversity knowledge, conservation efforts, and integrating biodiversity data into environmental, corporate, and financial decision-making.

About the IBAT Alliance

The **IBAT Alliance** is a strategic collaboration among four of the world's most influential environmental organisations:

1. BirdLife International
2. Conservation International
3. International Union for Conservation of Nature (IUCN)
4. United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC)

Together, these organisations manage and provide access to authoritative global biodiversity data to support conservation planning, environmental governance, and corporate sustainability efforts.

Purpose and Utilisation of the Investment

- The record investment will be reinvested into the **upkeep, development, and expansion** of three of the world's most comprehensive and authoritative biodiversity datasets.
- These datasets play a central role in environmental monitoring, biodiversity conservation, and risk assessment:

1. World Database on Protected Areas (WDPA)

- Maintained by UNEP-WCMC in collaboration with IUCN
- Contains detailed information on the location, designation, and management of protected areas worldwide

- Essential for tracking global conservation progress and supporting national reporting on biodiversity targets and commitments

2. IUCN Red List of Threatened Species

- Often referred to as the "barometer of life"
- Assesses the extinction risk of species across the globe, including animals, fungi, and plants
- Informs conservation priorities and is used by governments, researchers, and businesses alike

3. World Database of Key Biodiversity Areas (WDKBA)

- Identifies sites critical to the persistence of biodiversity
- Supports spatial planning, conservation investment, and site-level management globally

Significance of the Development

Enhancing Scientific Understanding of Nature

The enhanced investment will support **regular updates and improvements** to biodiversity databases. These updates ensure access to **reliable, science-based information** which is critical for:

- Assessing species vulnerability
- Monitoring biodiversity trends
- Identifying emerging ecological threats
- Formulating evidence-based conservation strategies

Integration with Business and Financial Decision-Making

According to the IBAT Alliance, the increase in investment reflects a growing interest from the **private sector and financial institutions** in integrating biodiversity into their decision-making processes:

- By the end of 2024, more than **200 private sector organisations** had accessed IBAT data for early environmental risk screening and sustainability goal-setting
- Businesses used the data to align with **global biodiversity targets**, such as those in the **Kunming-Montreal Global Biodiversity Framework** and the **United Nations Sustainable Development Goals**

This demonstrates a growing recognition that biodiversity is not only a conservation concern but also an economic and operational risk factor.

Supporting Environmental Governance and Accountability

IBAT's datasets enable governments and corporations to meet **regulatory and disclosure obligations**, such as those outlined under:

- The **EU Corporate Sustainability Reporting Directive (CSRD)**
- The emerging **Taskforce on Nature-related Financial Disclosures (TNFD)** framework

The datasets are instrumental in developing **nature-positive strategies**, assessing ecological dependencies, and disclosing environmental risks.

Broader Implications

- The growth in biodiversity data investment reflects **enhanced global awareness** about the urgency of biodiversity loss.
- As biodiversity continues to decline worldwide, access to **high-quality, timely, and standardised data** becomes indispensable for meeting conservation targets.
- The initiative helps create a **more complete and interconnected understanding of nature**, enabling more effective on-ground action.

New species of gecko endemic to Western Ghats discovered in Coonoor

Source: The Hindu

https://www.thehindu.com/news/national/tamil-nadu/new-species-of-gecko-endemic-to-western-ghats-discovered-in-coonoor-in-tamil-nadu/article69727216.ece

UPSC Syllabus Relevance: **GS3 Environment and Ecology**

Context:

Dravidogecko coonoor

Why in News

A new species of gecko named Dravidogecko coonoor, endemic to Coonoor in the Nilgiris, Tamil

Nadu, has been discovered, raising the number of Dravidogecko species in the Western Ghats to nine.

Introduction

- A new species of gecko has been discovered in the Upper Nilgiris of Tamil Nadu, highlighting the rich but fragile biodiversity of the Western Ghats.
- The species, named ***Dravidogecko coonoor***, is believed to be endemic to the **Coonoor Hills**, and the discovery was recently published in the international journal *Bionomina*.

Scientific Classification & Taxonomy

- **Genus:** *Dravidogecko*
- **New Species:** *Dravidogecko coonoor*
- **Discovered by:** A. Abinesh, R.S. Naveen, A.N. Srikanthan, S. Babu, and S.R. Ganesh
- **Published in:** *Bionomina*
- **Title of Study:** *"Code-compliant description of a recently identified distinct Dravidogecko species from Coonoor, Western Ghats, India"*

Geographical Distribution

- The species is **currently known only from Coonoor**, a hill station in the **Upper Nilgiris** of Tamil Nadu.
- This region lies within the **Western Ghats**, one of the world's eight "hottest hotspots" of biological diversity.
- The habitat consists of a **matrix of montane (shola) forests, monoculture plantations**, and **urban human settlements**.

Distinguishing Features and Habitat

- The gecko was originally believed to be *Hemidactylus anamallensis* (now reclassified as *Dravidogecko anamallensis*).
- Further field surveys and morphological analysis revealed **unique characteristics**, leading to its classification as a **distinct species**.
- It has been observed in **both natural and anthropogenic habitats**, such as:
  - Tree bark and crevices
  - Plant branches
  - Building walls
- This adaptability to urban landscapes may offer some resilience, but also exposes it to human threats.

Significance of Discovery

- With this discovery, the **total number of known *Dravidogecko* species** in the Western Ghats has increased to **nine**.
- The genus *Dravidogecko* is **endemic to the high-elevation areas** of the Western Ghats, underscoring the region's ecological uniqueness.

Conservation Concerns

- **Endemism**: The gecko is known only from a **single location**, making it vulnerable to local threats.
- **Outside Protected Areas**: Its known population lies **entirely outside the official Protected Area Network**, like national parks or wildlife sanctuaries.
- **Human Pressures**: Urban expansion, habitat fragmentation, and plantation agriculture in Coonoor are significant threats.
- **Climate Change**: Being a high-elevation species, it may be especially **sensitive to microclimatic shifts** and rising temperatures.
- The authors have warned that *Dravidogecko coonoor* could be a **"potentially threatened species"**, urging urgent conservation assessments.

Broader Implications

- **Biodiversity in Anthropogenic Landscapes**: The presence of the gecko in semi-urban and disturbed habitats shows the importance of **human-modified landscapes** in biodiversity conservation.

- **Western Ghats Conservation**: Highlights the **need to map and monitor biodiversity beyond protected areas**, especially in **ecologically fragile hill stations** like Coonoor.
- **Role of Taxonomy and Field Research**: Emphasizes the importance of **systematic biodiversity assessments** and **species documentation** for conservation planning.

Way Forward

1. **IUCN Red List Assessment**: Immediate steps should be taken to evaluate the species' risk status under IUCN criteria.
2. **Inclusion in Conservation Planning**: Local government and forest departments should consider **buffer zones or community conservation areas** around known habitats.
3. **Public Awareness**: Local community involvement and awareness can help reduce negative impacts on habitat.
4. **Long-Term Monitoring**: Establish a **population monitoring program** to study ecology, behavior, and threats.
5. **Research Support**: Encourage more **taxonomic studies** and **faunal surveys** in the Nilgiris and other hill stations.

Conclusion

- The discovery of *Dravidogecko coonoor* is a reminder of the hidden diversity within India's hill ecosystems.
- It also underscores the urgent need for integrating **species-level research** with **landscape-level conservation**, especially in **non-protected, human-dominated areas**.

600-million-year-old stromatolites in the Himalayas

Source: Indian Express

https://indianexpress.com/article/research/600-million-year-stromatolites-himalayas-tethys-chambaghat-10034228/?utm_source=Taboola_Recirculation&utm_medium=RC&utm_campaign=IE&tbref=hp

UPSC Syllabus Relevance: **GS 3 Ecology and Environment, GS 1 Physical Geography**

Context:

About stromatolites

Why in News

A large outcrop of 600-million-year-old stromatolites was recently discovered in Chambaghat, Solan district, Himachal Pradesh.

Introduction

- Long before dinosaurs roamed Earth and flowering plants painted prehistoric forests, it was cyanobacteria—microscopic organisms in shallow seas—that began Earth's transformation into a habitable planet.
- Their layered, reef-like structures, **stromatolites**, stand today as ancient monuments of Earth's earliest life.

- India, home to a remarkable diversity of these structures, recently added another chapter to this geological narrative: the discovery of a massive **stromatolite outcrop in Chambaghat**, Himachal Pradesh, dating back **at least 600 million years**.
- This find, though not the oldest, reopens critical conversations around preservation, scientific awareness, and public engagement with India's geological history.

What are Stromatolites?

Stromatolites are layered, biosedimentary structures formed by the activities of ancient microorganisms, primarily **cyanobacteria** (blue-green algae). These organisms trapped and bound sediments in shallow marine environments, leading to laminated, dome-shaped mounds.

- **Not true fossils**: Unlike conventional fossils that preserve the organism itself, stromatolites retain only the **sedimentary imprint** of microbial activity.
- **Biogenic origin**: Despite being sedimentary in nature, they are crucial indicators of early life and planetary evolution.

Significance in Earth's History

1. The Great Oxidation Event (GOE)

Around **2.4 billion years ago**, Earth experienced a pivotal transition from an anaerobic to an aerobic atmosphere due to oxygen released by cyanobacteria.

- This event, sometimes called the **Oxygen Catastrophe**, enabled the evolution of **multicellular life**, eventually leading to complex organisms such as trilobites, dinosaurs, and humans.

2. Planetary Transformation

- Earth's early atmosphere (composed of CO_2, methane, and water vapour) lacked free oxygen.
- Cyanobacteria in stromatolites produced oxygen via photosynthesis, transforming the atmosphere and oceans over billions of years.

The Chambaghat Discovery: Why it Matters

Location: Chambaghat, Solan district, Himachal Pradesh

Discovered by **Dr. Ritesh Arya**, the outcrop lies in the **Krol Belt**, part of ancient marine deposits from the **Tethys Sea**, which existed before the **Indian plate collided with Eurasia**.

Scientific Features:

- **Estimated Age**: ≥ 600 million years
- **Formations**: Arched, laminated, hemispheroid stromatolites in limestone ridges
- **Elevation**: Found at **5,000–6,000 ft above sea level**, indicating tectonic uplift from ancient seabeds

Geological Significance:

- Highlights tectonic history of India from **Gondwana** to the formation of the Himalayas
- Offers insights into **Precambrian-Cambrian transition**, where stromatolites gave way to abundant body fossils

Geoheritage and Conservation Challenges

While India's geological past is rich, its **preservation** is patchy. Despite the scale and accessibility of the Chambaghat site, there is **no formal protection**.

Major Concerns:

- Mining, erosion, urbanization, and neglect threaten many such sites
- Lack of public engagement and scientific tourism

Proposal:

Dr Arya has called for a **Geoheritage Park** at Chambaghat, involving:

- Local schools and tourism bodies
- Research and public exhibitions
- Potential application for **UNESCO Geoheritage status**

Way Forward: Preserving Microbial Legacy

India must adopt a **holistic strategy** for its geological treasures:

1. **Geoheritage Laws**: Formal recognition and legal protection of stromatolitic sites
2. **Community Involvement**: Local stewardship models, student outreach, and guided tourism
3. **Scientific Documentation**: Centralized digital archives and field-based research stations
4. **Geo-tourism Parks**: Promote educational and heritage tourism, similar to fossil parks in Australia and Canada

Conclusion

Stromatolites are not just ancient rocks; they are living textbooks of Earth's past — chronicling the emergence of oxygen, the evolution of life, and the formation of continents. The Chambaghat outcrop, whether new or not, offers a valuable opportunity for public education, conservation, and celebration of India's deep-time heritage.

Debates Among Scientists

Not all experts agree on the discovery's uniqueness:

Scientist	Viewpoint
Dr Vibhuti Rai (University of Lucknow)	Calls the find common and misrepresented — stromatolites are *not fossils*, and are widespread across India
Dr Arun Deep Ahluwalia (Panjab University)	Acknowledges the structure's preservation and potential for exhibit, but clarifies that **older stromatolites exist elsewhere in India**
Dr Jagmohan Singh (Ex-ONGC)	Highlights its value as evidence of **single-celled life evolution**

India's Key Stromatolite Sites

Location	Geological Formation	Age/Significance
Dharwar Supergroup, Karnataka	Chitradurga schist belt	>2.6 billion years (Neoarchean)
Jhamarkotra, Rajasthan	Phosphate-rich rocks	~1.8 billion years; under mining threat
Salkhan, Uttar Pradesh	Vindhyan limestone	~1.4 billion years; large public fossil park
Shali-Deoban, Himachal Pradesh	Precambrian rocks	Older columnar stromatolites
Kadapa Basin (AP & MP)	Cuddapah Supergroup	Proterozoic
Bhojunda, Rajasthan	Lower Vindhyan Range	National Fossil Park
Sikkim (Buxa Formation)	Dolomites	Fossil park under development

SCIENCE & TECHNOLOGY

Shubhanshu Shukla Makes Historic Journey to ISS on Axiom-4 Mission

Source: The Hindu

https://www.thehindu.com/sci-tech/science/axiom-4-shubanshu-shukla-launch-details-updates-june-25/article69734764.ece

UPSC Syllabus Relevance: GS3 Science and Technology

Context:

Axiom-4 (Ax-4) mission

Why in News?

India returned to human spaceflight after 40 years as Group Captain Shubhanshu Shukla was launched to the ISS aboard the Axiom-4 mission on June 25, 2025.

Introduction

- On **June 25, 2025**, India marked a historic return to human spaceflight after a gap of 40 years as **Group Captain Shubhanshu Shukla**, a serving Indian Air Force officer, was launched aboard the **Axiom-4 (Ax-4)** mission to the **International Space Station (ISS)**.
- This mission, launched from NASA's **Kennedy Space Center in Florida**, not only signifies India's participation in international human space exploration but is also seen as a symbolic launchpad for the country's indigenous human space programme.

Key Highlights of the Mission

- **Launch Date & Vehicle**:
  - **Date**: June 25, 2025, at 12:01 PM IST
  - **Vehicle**: **Falcon 9** rocket by **SpaceX**
  - **Spacecraft**: **Crew Dragon**
  - **Launch Site**: **Launch Complex 39A**, Kennedy Space Center, Florida (USA)
- **Crew Members**:
  - **Commander**: Peggy Whitson (USA)
  - **Pilot**: **Group Captain Shubhanshu Shukla (India)**
  - **Mission Specialist**: Sławosz Uznański-Wiśniewski (Poland)
  - **Mission Specialist**: Tibor Kapu (Hungary)
- **Journey Duration**:
  - 28-hour journey to ISS
  - Targeted docking: **June 26, 2025, at 4:30 PM IST**
- **Duration at ISS**:
  - Up to **14 days** onboard the station

Significance for India

- **First Indian to Reach Space in 40 Years**
  - **Rakesh Sharma**, the last Indian in space, flew aboard the **Soyuz T-11** in 1984.
  - Shubhanshu Shukla is now the **first Indian astronaut to reach the ISS**.
- **Foundation for India's Human Space Programme**
  - In his first message from orbit, Shukla stated:
  - This is not the start of my journey, but the start of **India's human space programme**.
  - The mission is seen as a prelude and confidence-building step for **Gaganyaan**, India's upcoming indigenous crewed mission.

- **International Collaboration**
  - Conducted under **Axiom Space's private mission program** in collaboration with **NASA** and **SpaceX**
  - Demonstrates India's growing **strategic space diplomacy** and technical participation in global human spaceflight.

Scientific Objectives

- **60 Scientific Studies from 31 Countries**
  - Countries involved: India, U.S., Poland, Hungary, Saudi Arabia, Brazil, Nigeria, UAE, and more.
- **India's Scientific Contribution**:
  - **7 microgravity research experiments** selected by **ISRO** from Indian R&D labs and academic institutions.
  - **Joint investigations**:
    - **5 collaborative studies** between ISRO and NASA
    - **2 in-orbit STEM demonstrations** for educational outreach
- **Focus Areas**:
  - Biotechnology, material science, space medicine, climate monitoring, and low-orbit STEM education.

Pre-Launch Challenges and Delays

- Original launch date: **May 29, 2025**
- Postponed multiple times due to:
  - **Electrical harness issue** in Crew Dragon module
  - **Delayed readiness** of Falcon 9 rocket
  - **Unfavourable weather**
  - **Liquid oxygen leak** on the launch vehicle
  - **Technical snag** in the **Zvezda service module** aboard the ISS
- Astronauts were under **quarantine since May 25, 2025**, to ensure bio-safety.

Strategic and Diplomatic Implications

- **Soft Power and National Pride**:
  - Public and political leaders across the spectrum, including the President and Prime Minister, hailed the mission as a **national milestone**.
  - Cities like **Lucknow** celebrated their "city boy" Shukla, reflecting wide public enthusiasm.
- **Industry and Academic Linkages**:
  - Indian academia and private industries involved in experiment design and hardware development.
  - Encourages more **public-private partnerships** in space research.
- **Boost to Gaganyaan**:
  - The mission offers **real-time operational experience** ahead of India's **Gaganyaan mission**, which aims to send Indian astronauts to Low Earth Orbit using an ISRO-developed crew module.

Conclusion

- The launch of **Group Captain Shubhanshu Shukla** aboard the **Ax-4 mission** is not just a technological feat but a **historic moment** for India's space journey.
- It rekindles national aspirations in space exploration and lays a strong foundation for India's **self-reliant human space programme**.
- It also reinforces India's **scientific leadership, diplomatic cooperation**, and increasing integration into **global space initiatives**.

Discovery of the 48th Blood Group: Gwada Negative

Source: Indian Express

https://indianexpress.com/article/technology/science/gwada-negative-scientists-identify-new-blood-group-france-10090815/

UPSC Syllabus Relevance: **GS3 Science and Technology**

Context:

Gwada Negative

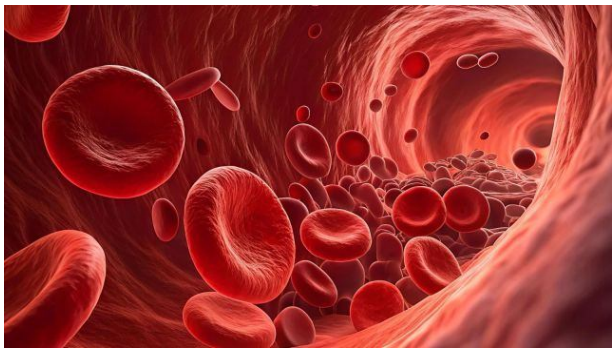
Why in News

In 2025, French scientists discovered the world's 48th blood group, "Gwada Negative", in a woman from

Guadeloupe, highlighting advances in genetic research and transfusion medicine.

Introduction

- In a landmark advancement in medical science, researchers in France have identified the **48th blood group ever discovered globally**, named **"Gwada Negative"**, in a woman of Caribbean descent from Guadeloupe.
- This unprecedented discovery, made more than a decade after a routine pre-surgical blood test in 2011, has implications for transfusion medicine, genetics, and rare disease diagnosis.



Background and Significance

- The discovery was made by the **French Blood Establishment (EFS)** and recognized by the **International Society of Blood Transfusion (ISBT)** in June 2025.
- Named **"Gwada Negative"**, the blood group pays tribute to the woman's **Caribbean heritage**, with "Gwada" being a colloquial term for Guadeloupe.
- The woman is currently the **only known individual with this blood type**, making her blood **autologous**, i.e., only usable for herself in transfusions.

Scientific Process Behind the Discovery

- The presence of a **rare antibody** in the woman's blood was first detected in **2011**, but due to limited resources, comprehensive research was delayed.
- In **2019**, **high-throughput DNA sequencing** enabled scientists to identify a **novel genetic mutation**, inherited from both parents.
- This represents a **recessive inheritance pattern**, where both parents are carriers, although asymptomatic.

Implications for Science and Medicine

1. **Improved Patient Care**
   - Expanding blood group classifications enables **precise matching** in transfusion therapy, especially for individuals with rare blood types.
   - It reduces the risk of **hemolytic transfusion reactions**, which can be life-threatening.
2. **Ethical and Logistical Challenges**
   - Individuals with ultra-rare blood groups face a high **risk of medical vulnerability**, especially in emergencies.
   - Raises the need for **global rare donor registries** and **cryopreservation** of such rare blood samples.
3. **Advancement in Genomic Research**
   - Demonstrates the **power of next-generation sequencing (NGS)** to uncover hidden variations in the human genome.
   - Paves the way for **personalized medicine** and **genetic counseling**, especially in multi-ethnic societies.
4. **Public Health Awareness**
   - Emphasizes the need for **diverse blood donation campaigns**, especially among underrepresented ethnic groups.
   - Highlights the importance of **international cooperation** in transfusion research.

Broader Context and Way Forward

- The first human blood groups were discovered by **Karl Landsteiner in 1901**, revolutionizing transfusion medicine.
- Since then, advancements in molecular genetics have led to the classification of **more than 45 blood group systems**, including the well-known ABO, Rh, Kell, and Duffy systems.
- The addition of **Gwada Negative** reflects the **complexity and diversity** of human genetics and the necessity for **inclusive global health**

systems.

- Ongoing research is now focused on identifying others who may **carry or express** this rare blood group through **genetic screening** of Caribbean populations and their descendants worldwide.

GPS Interference as a Rising Threat to Civil and Military Navigation

Source: Indian Express

https://indianexpress.com/article/explained/explained-sci-tech/how-gps-interference-threatens-global-transportation-10094956/

UPSC Syllabus Relevance: **GS 3 Science and Technology**

Context:

GPS interference

Why in News

In 2025, multiple navigation mishaps involving aircraft and ships were linked to deliberate GPS interference, highlighting it as a major emerging threat to global transport and security systems.

Introduction

- Recent incidents — a Delhi-Jammu flight turning back, a container ship grounding near Jeddah, and a tanker collision near the Strait of Hormuz — were all linked to **GPS interference**, a growing global threat to navigation systems in both aviation and maritime sectors.

What is GPS Interference?

GPS interference refers to the **intentional or unintentional disruption of Global Positioning System (GPS) signals**, primarily through:

- **Jamming**: Emission of powerful radio frequencies that overwhelm GPS signals, making them unreadable.
- **Spoofing**: Sending fake GPS signals to deceive receivers into calculating an incorrect position or time.

While jamming blocks signals altogether, **spoofing manipulates navigation systems** into displaying false coordinates, often leading to potentially disastrous consequences.

Why is it Dangerous?

- **Aviation Hazards**: Spoofing may lead to **incorrect aircraft positioning**, raising the risk of terrain collisions or mid-air conflicts.
- **Maritime Risks**: Ships operating on autopilot can **veer off course**, leading to groundings, collisions, or major disruptions to global trade routes.
- **Systemic Threats**: Critical infrastructure like **air traffic control, vessel traffic services (VTS), and port operations** depend on accurate GPS data; spoofing can cause widespread failures.
- **Civilian Impact**: GPS spoofing can also disrupt **road navigation systems**, causing congestion and breakdown of transport logistics.

Where is GPS Interference Common?

- **Conflict Zones**: Countries engaged in **electronic warfare**, like Russia, Iran, and North Korea, are hotspots.
- **Strategic Waterways**:
  - **Red Sea**: A 350% rise in spoofing incidents was reported in Q1 2025.
  - **Persian Gulf and Eastern Mediterranean**: Frequently impacted by spoofing amid regional tensions.
- **Airspace Over War Zones**: Pilots deliberately avoid such areas due to **increased spoofing threats**.

Notable Incident:

- **2017, Novorossiysk Port, Russia**: Over 20 ships reported fake GPS positions, with some showing locations miles inland — one of the

first large-scale spoofing attacks recorded.

Mitigation and Response Mechanisms

Aviation Sector:

- **Alternate Navigation Systems**:
  - **Inertial Navigation System (INS)**: Uses accelerometers and gyroscopes.
  - **VOR/DME**: Ground-based backup navigation.
  - **ILS**: Used during landing and unaffected by GPS spoofing.
- **Training and Protocols**:
  - DGCA has stressed on **crew awareness** and **monitoring ATC communications** for early warnings.

Maritime Sector:

- **Manual Override**: Crews switch to **manual helm control** and **terrestrial navigation** (radars, lighthouses).
- **Multi-GNSS Systems**: Integration of systems like:
  - **GLONASS (Russia)**
  - **Galileo (EU)**
  - **BeiDou (China)**
  - **NavIC (India)**

India's Strategic Response: NavIC

- Developed by **ISRO**, **Navigation with Indian Constellation (NavIC)** provides positioning services in India and up to 1,500 km beyond.
- **Motivation**:
  - Denial of GPS access during **Kargil War (1999)**.
  - Sudden GPS deactivations during missile tests in **2009 & 2012**.
- **Operational Use**: Successfully used during **Operation Sindhoor**, validating its reliability and independence from foreign satellite systems.

Conclusion

- **GPS interference**, once a niche concern, has evolved into a **strategic challenge** that threatens civilian safety and national security.
- As the world becomes more reliant on satellite navigation, **multi-layered resilience**, including **indigenous systems like NavIC**, **crew training**, and **technological diversification**, is essential to defend against this modern digital threat.

India to Build Its First Polar Research Vehicle in Pact with Norway's Kongsberg

Source: Indian Express

https://indianexpress.com/article/india/garden-reach-inks-pact-with-norway-firm-india-to-build-its-first-polar-research-vehicle-10046884/

UPSC Relevance: **GS3 Science and Technology**

Context:

First Polar Research Vehicle

Why in News

Garden Reach Shipbuilders and Engineers Ltd. (GRSE) signed an MoU with Norwegian firm Kongsberg to co-design and build India's first-ever indigenous Polar Research Vehicle (PRV).

Introduction

- Kolkata-based **Garden Reach Shipbuilders and Engineers Ltd. (GRSE)** signed a **Memorandum of Understanding (MoU)** with **Norwegian firm Kongsberg** in Oslo to co-design and construct **India's first-ever indigenously built Polar Research Vehicle (PRV)**.
- The signing took place in the presence of Union Minister for Ports, Shipping and Waterways, **Sarbananda Sonowal**.

What is a Polar Research Vehicle (PRV)?

- A **Polar Research Vehicle (PRV)** is a **specially designed ship** capable of navigating the harsh and icy conditions of the polar regions — **Arctic and Antarctic**.
- It serves as a **mobile research laboratory**, enabling scientists to conduct **oceanographic, atmospheric, geological, and climate-related research**.

Current Scenario: India's Polar Research Base Stations

India operates three key research stations:

- **Maitri** (Antarctica)
- **Bharati** (Antarctica)
- **Himadri** (Arctic – Svalbard, Norway)

Currently, India **charters foreign vessels** for logistical support and research operations, which limits autonomy and inflates costs.

Key Highlights of the MoU and PRV Project

Aspect	Details
Partners	GRSE (India) and Kongsberg (Norway)
Estimated Cost	₹2,600 crore (as per 2023 estimate)
Timeframe	To be delivered within 5 years
Objective	Indigenous design and construction of PRV under 'Make in India'
User Agency	National Centre for Polar and Ocean Research (NCPOR)
Location of Build	GRSE Shipyard, Kolkata

Scientific and Strategic Importance

1. Strengthening Scientific Research

- Enhances **India's capacity for year-round polar research**, including:
  - Glaciology
  - Marine biodiversity
  - Climate science
  - Polar-ocean interactions
- Will facilitate **deep-sea exploration** and the study of marine ecosystems.

2. Environmental Significance

- The PRV contributes to **global climate change studies**, especially on **sea-level rise**, **ice-melt dynamics**, and **carbon cycle** in the polar oceans.

3. Technological Advancement

- Collaboration with Norway provides **state-of-the-art design expertise**.
- Establishes GRSE as a key player in **advanced scientific and strategic shipbuilding**.

Alignment with Government Initiatives

1. Make in India

- The project showcases **India's indigenous shipbuilding capabilities**.
- Reduces dependence on foreign platforms for polar expeditions.

2. SAGAR & MAHASAGAR Vision

- SAGAR: **Security and Growth for All in the Region**.
- MAHASAGAR: **Mutual and Holistic Advancement for Security Across the Regions**.
- The PRV boosts India's **presence in global maritime and polar research**, aligned with India's maritime strategy.

3. Sagarmala 2.0

- Focuses on boosting **shipbuilding, repair, and port infrastructure**.
- PRV construction under GRSE is a direct contribution to Sagarmala's **capacity-building and blue economy goals**.

Diplomatic and Global Significance

- The collaboration with Norway reinforces **India's diplomatic and technological engagement with Arctic nations**.
- Participation in international ministerial meets on **inclusive and decarbonised maritime trade** highlights India's role in **global ocean governance**.
- Enhances India's contribution to the

Antarctic Treaty System and the **United Nations Decade of Ocean Science**.

Challenges Ahead

Challenge	Explanation
Design Complexity	Building a PRV requires sophisticated technology to withstand extreme polar conditions.
Cost Management	₹2,600 crore is a significant investment; efficient project execution is vital.
Human Resources	Requires trained scientific and logistical personnel to operate and maintain the PRV.
Geopolitical Competition	Growing interest of other countries in the Arctic and Antarctica necessitates India's timely entry.

Way Forward

- **Expedite project timelines** through continuous monitoring and support from the Ministry.
- **Capacity-building of Indian scientists** through international partnerships.
- **Strengthen indigenous technology** base for future strategic vessels (e.g., Icebreakers, Deep Sea Explorers).
- Encourage **public-private partnerships** in marine research and shipbuilding.
- Expand outreach and awareness about **polar research and marine sciences** in educational institutions.

Conclusion

The GRSE-Kongsberg MoU to build India's first Polar Research Vehicle marks a historic milestone in India's scientific and maritime journey. It is not just a ship — it is a **symbol of India's aspirations to lead in polar research, climate change mitigation, and ocean exploration**, underpinned by the spirit of **Atmanirbhar Bharat (Self-reliant India)** and international cooperation.

Revisiting India's Nuclear Energy Laws

Source: The Hindu

https://www.thehindu.com/podcast/should-india-amend-its-nuclear-energy-laws-the-hindu-parley-podcast/article69662169.ece#:~:text=Discussions%20are%20ongoing%20in%20India,operate%20nuclear%20energy%20generation%20facilities.

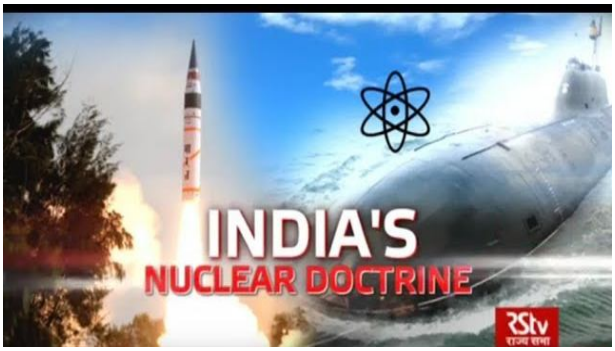
UPSC Syllabus Relevance: **GS3 Science and Technology**

Context:

Nuclear Laws of India

Why in News?

The Government of India is considering amendments to the Civil Liability for Nuclear Damage Act, 2010 and the Atomic Energy Act, 1962.



Introduction

India is currently deliberating on amending two key laws governing its nuclear energy sector:

- The **Civil Liability for Nuclear Damage Act (CLNDA), 2010**
- The **Atomic Energy Act, 1962**

The aim is to **open the nuclear energy sector to private players** and boost capacity from **8 GW to 100 GW by 2047**, in line with India's **net-zero commitments by 2070** and growing clean energy demands. Currently, nuclear energy accounts for less than 3% of India's electricity generation.

Existing Legal Framework

1. Civil Liability for Nuclear Damage Act (CLNDA), 2010

- Enacted post-Fukushima (Japan, 2011) and Bhopal Gas Tragedy legacy concerns.

- Establishes a **no-fault liability** on operators.
- Allows the **operator to seek recourse** (under Section 17(b)) from suppliers **in case of defective equipment or services**.

2. Atomic Energy Act, 1962

- Empowers the Central government to operate and manage nuclear installations.
- **Excludes private participation** in ownership or operation of nuclear facilities.

Rationale for Amendments

1. Attracting Private and Foreign Investment

- The **CLNDA's recourse clause** is seen as a deterrent by **foreign suppliers** (e.g., Westinghouse, EDF-Areva).
- Most global conventions (like the **CSC – Convention on Supplementary Compensation**) **do not permit supplier liability**, limiting India's alignment with global norms.

2. Capacity Expansion Goals

- India aims to **increase nuclear capacity to 100 GW by 2047**.
- This ambitious target **cannot be met by the public sector alone** (i.e., NPCIL).
- Private sector participation is essential to **augment financial, technical, and operational capacities**.

3. Clean Energy Commitments

- India needs **baseload clean power** alongside solar and wind to meet its **Net Zero goals**.
- Nuclear energy is **reliable, low-carbon**, and **energy-dense**, making it a crucial component.

Challenges and Criticisms

1. Compromising Victim Compensation Rights

- Critics argue that **amending Section 17(b)** of CLNDA may **weaken the legal recourse** for victims in case of nuclear accidents.
- Removing supplier liability could **reduce safety accountability**.

2. Public Safety Concerns

- Given India's dense population, any nuclear accident can have **catastrophic humanitarian and environmental consequences**.
- Bhopal Gas Tragedy still serves as a **warning against corporate impunity**.

3. Dilution of Sovereign Oversight

- Allowing private firms in nuclear operations may reduce **state control over critical infrastructure** with national security implications.

Global Precedents

- **United States (Price-Anderson Act)**: Limits nuclear liability of operators and suppliers; liability is covered by insurance pools.
- **France, Japan**: Supplier liability is generally waived under the **CSC** and other multilateral treaties.
- India remains unique in **explicitly allowing supplier liability**, which has caused friction with foreign vendors.

Way Forward

1. Balanced Amendments

- Amend CLNDA to **limit supplier liability**, but **retain strict operator liability**.
- Create a **robust independent regulator** (strengthen AERB) to oversee safety.

2. Public-Private Partnership (PPP) Model

- Allow **private sector participation in construction, maintenance, and fuel supply**, while retaining **NPCIL as the operator**.
- This hybrid model would mitigate both security and safety risks.

3. Transparent Public Dialogue

- Hold consultations with **civil society, environmental experts, legal scholars**, and the public before finalising amendments.

Conclusion

- Amending India's nuclear laws is a **strategic necessity** to meet the country's long-term **energy and climate goals**. However, it must be done in a manner that **balances industrial growth, public safety, and sovereign control**.
- Lessons from both the **Bhopal Gas Tragedy** and **Fukushima disaster** underscore the need for **stringent oversight and corporate**

accountability, even as India pursues global investment and energy security.

Towards Sustainable Nickel: Greener Methods of Extraction and Production

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/how-extracting-and-producing-nickel-can-be-made-more-sustainable/article69674974.ece

UPSC Syllabus Relevance: GS 3 Science and Technology

Context:

Sustainable extraction of nickel

Why in News?

A new study published in Nature (2025) by researchers at the Max Planck Institute proposes a carbon-free hydrogen plasma-based method for extracting nickel from low-grade ores.

Introduction

- Nickel is a critical mineral in the global transition to green energy. It is extensively used in electric vehicle (EV) batteries, clean energy storage systems, and stainless steel production.
- However, conventional nickel extraction methods are energy-intensive and environmentally harmful.
- A **new study** by researchers at the **Max Planck Institute for Sustainable Materials** proposes a **hydrogen plasma-based reduction method** that is both **carbon-free and energy-efficient**, marking a significant step toward sustainable metal production.

Why Nickel Matters in the Green Economy

- **Nickel's role in clean technologies**:
  - Essential for **lithium-ion batteries** in EVs.
  - Used in **solar panels, wind turbines, and high-performance magnets**.
- **Expected demand**: More than **6 million tonnes annually by 2040**.
- **Environmental cost**: Conventional extraction of 1 tonne of nickel emits **20+ tonnes of CO_2**.

This creates a paradox – while EVs are clean during use, the materials that go into them are extracted through carbon-intensive processes, merely shifting the emissions burden from one sector to another.

Conventional Nickel Extraction: A Dirty Process

- **Traditional process**:
  - Multi-step: **Calcination → Smelting → Reduction → Refining**.
  - Uses **carbon as a reducing agent**.
  - Produces significant **CO_2 emissions**.
- **Challenges**:
  - Relies on **high-grade sulphide ores**, which are depleting.
  - **Low-grade laterite ores**, more abundant in regions like India, are tough to process.

The New Method: Hydrogen Plasma Reduction

How It Works

- Developed by **Ubaid Manzoor** and team, published in *Nature* (April 2025).
- Uses **hydrogen plasma** instead of carbon in an **electric arc furnace**:
  - **Hydrogen gas** is subjected to **high-energy electrons**.
  - Transforms into **plasma state** – the fourth and highly reactive state of matter.
  - This plasma **rapidly reduces metal oxides** to extract nickel.

- **By-product**: **Water (H_2O)** instead of **carbon dioxide (CO_2)**.

Advantages

- **Single-step extraction process** – eliminates intermediate steps.
- **Energy efficiency**: Up to **18% more efficient** than conventional processes.
- **Emission reduction**: Cuts **direct CO_2 emissions by up to 84%**.
- **Kinetically superior** – faster and more thermodynamically favorable reaction.

Application to Laterite Ores

- Laterite ores are:
  - Found near the surface in **tropical regions**.
  - Rich in **nickel but harder to process**.
- The new method **efficiently processes low-grade laterites**.
- Especially relevant to **India**:
  - Has **significant laterite reserves**, especially in **Sukinda, Odisha**.
  - These are often ignored due to **low nickel content (0.4–0.9%)**.
  - The hydrogen-based method can **unlock value from these underused resources**.

Strategic Importance for India

- India faces a dual challenge:
  - **Rapid industrial growth**.
  - **Commitment to net-zero emissions by 2070**.
- This technology can help:
  - Reduce **dependence on imported high-grade ores**.
  - Enhance **domestic mineral utilization**.
  - Support India's **EV and green infrastructure goals**.

Challenges to Industrial Scalability

While promising, several hurdles remain before this method can be deployed at industrial scale:

Challenge	Explanation
High initial investment	Infrastructure for electric arc furnaces and hydrogen supply is costly.
Energy source	Requires **renewable electricity** to maintain carbon neutrality.
Process kinetics	Needs more research on **reaction dynamics and thermodynamic control**.
Oxygen species supply	Efficient plasma reduction needs continuous availability of reactive oxygen.
Ore compatibility	Though suitable for laterites, scalability to all types of ores is not yet proven.

Conclusion

- The hydrogen plasma-based nickel extraction technique represents a **significant innovation** in green metallurgy.
- It addresses key sustainability challenges in the **clean energy transition**, especially in the **battery and EV sector**.
- For a country like **India**, with large low-grade nickel reserves and ambitious climate goals, this method offers a **strategic pathway** to sustainable industrialization.

QWERTY keyboards- History, Logic, and Legacy

Source: The Hindu
https://www.thehindu.com/children/why-do-we-use-qwerty-keyboards/article69513088.ece
UPSC Syllabus Relevance: **GS3 Science and Technology**

Context:

QWERTY keyboard

Why in News

The QWERTY keyboard layout, developed in the 1870s to reduce key jamming in mechanical typewriters, remains the global standard due to early adoption and network effects.

Introduction

- The QWERTY keyboard layout is one of the most ubiquitous yet least questioned features of modern technology.
- Despite emerging in the 19th century to

address a specific mechanical challenge, it has remained the global standard even in an era of digital and touchscreen technologies.

- This persistence provides valuable insights into how *history, path dependence, and institutional inertia* influence the adoption and endurance of technology.

Historical Origins: The Mechanical Imperative

The journey of the QWERTY layout begins in the early 1870s with **Christopher Latham Sholes**, an American inventor credited with developing one of the first practical typewriters along with his team.

- **Initial Design**: The earliest prototype had keys arranged in *alphabetical order* (A–Z), which was intuitive and ideal for new learners.
- **Problem of Jamming**: With growing typing proficiency, users encountered mechanical issues. The typewriter's metal arms, or "typebars," would frequently jam when commonly paired letters (e.g., "TH" or "ST") were struck in quick succession.

Design Innovation:

- To address this, Sholes *rearranged the keys* to **slow down typing speed** and **reduce key collisions**.
- This new layout, known today as **QWERTY**, was not about optimizing efficiency, but managing a mechanical limitation.

The Role of Industry: Remington and Standardization

The breakthrough in standardization came when the **Remington Company** adopted the QWERTY layout in their commercial typewriters, notably the **Sholes and Glidden Typewriter** (also known as Remington No. 1).

- **Institutionalization**: Typing schools, secretarial training, and office culture adopted the QWERTY layout.
- **Network Effect**: As more people learned QWERTY, more organizations adopted it. This created a *self-reinforcing cycle*—a classic case of **path dependence** in technological adoption.

Attempts at Reform: The Dvorak Challenge

In the 1930s, the **Dvorak Simplified Keyboard** was introduced as a scientifically designed alternative.

- **Advantages**: Designed for speed and comfort — it placed the most commonly used letters on the home row.
- **Failure to Displace QWERTY**:
  - By this time, **QWERTY was deeply entrenched**.
  - Changing the system meant retraining typists, redesigning equipment, and reformatting software.
  - Institutions and individuals showed **resistance to change** due to high *switching costs*.

This reflects a key principle in **technology studies** — the "best" design does not always prevail; often, the "first successful" design becomes dominant.

Sociological Dimensions: Habituation and Resistance to Change

The endurance of QWERTY illustrates the **power of habituation** in human behavior and systems:

- **Muscle Memory**: People internalize the layout, reducing cognitive load during typing.
- **Social Learning**: QWERTY became part of educational curricula and workplace skills.
- **Status Quo Bias**: Institutions and individuals tend to favor known systems over potentially better, unfamiliar ones.

Contemporary Relevance: QWERTY in the Digital Age

Even with the disappearance of mechanical typebars and the rise of:

- **Touchscreens**
- **Voice-to-text**
- **Haptic feedback**
- **Alternative layouts (e.g., Colemak, AZERTY in France, QWERTZ in Germany)**

... QWERTY remains the **default** in most systems globally.

This raises questions about **technological inertia** and whether human systems are designed for **innovation or convenience**.

Key Lessons for Policy and Technology Governance

The QWERTY story is not merely a historical anecdote. It has broader implications:

Theme	Insights from QWERTY
Path Dependence	Early choices shape long-term outcomes even if better alternatives emerge later.
Network Effects	The value of a technology increases as more users adopt it.
Lock-in Effect	Once institutionalized, switching becomes difficult despite clear benefits.
Resistance to Innovation	Cultural, behavioral, and institutional habits can obstruct rational technological change.

BHASHINI and CRIS Partner to Develop Multilingual AI for Indian Railways

Source: PIB

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2135178

UPSC Syllabus Relevance: **GS 3 Science and technology**

Context:

BHASHINI–CRIS MoU on AI

Why in News?

BHASHINI and CRIS signed an MoU to integrate AI-powered multilingual solutions into railway platforms like NTES and RailMadad.

Introduction

- In June 2025, a Memorandum of Understanding (MoU) was signed between the **Digital India Bhashini Division (DIBD)** and the **Centre for Railway Information Systems (CRIS)** to integrate **multilingual AI solutions** into railway platforms.
- This move aligns with the **Digital India** initiative and aims to democratize access to public services across **22 Indian languages**.

Key Stakeholders:

- **BHASHINI (Bhasha Interface for India):**
  - A project under the **Ministry of Electronics and Information Technology (MeitY)**.
  - Aims to develop a **national AI-based language platform** supporting Indian languages using tools like **ASR (Automatic Speech Recognition)**, **OCR (Optical Character Recognition)**, **TTS (Text-to-Speech)**, and **machine translation**.
- **CRIS (Centre for Railway Information Systems):**
  - A specialized organization under the **Ministry of Railways**, responsible for developing and maintaining IT applications for Indian Railways.
  - Manages platforms like the **National Train Enquiry System (NTES)** and **RailMadad**.

Major Objectives of the MoU:

1. **Integration of BHASHINI's Language Stack:**
   - Embed **ASR, OCR, TTS, and**

Translation technologies in railway platforms such as:
  - **NTES** – real-time train updates.
  - **RailMadad** – passenger grievance redressal.

2. **Multilingual Access to Services:**
   - Enable **speech and text-based interaction** in **22 official Indian languages**.
   - Enhance the user experience of mobile apps, websites, kiosks, and call centers.
3. **Deployment of AI-Powered Tools:**
   - Develop **chatbots** and **voice assistants** for passenger support.
   - Create **over-the-counter interfaces** in multiple languages at railway stations.
4. **Scalability and Infrastructure:**
   - Utilize **cloud and on-premise deployments** to scale services nationwide.
5. **Capacity Building:**
   - Conduct **joint technical workshops** and **pilot projects** to test and refine solutions.

Significance:

1. Linguistic Inclusion:

- Removes **language barriers** in accessing railway services, promoting **digital equality** for non-English and non-Hindi speakers.
- Supports the **Constitutional goal of linguistic pluralism** (Art. 343–351).

2. AI for Public Services:

- Illustrates how **AI and NLP (Natural Language Processing)** can improve **governance and public service delivery**.
- Reduces dependence on manual interfaces and improves **response time and efficiency**.

3. Boost to Digital India Mission:

- Advances **inclusive digital transformation** as envisioned under the **Digital India** initiative.
- Supports the **IndiaAI** mission for indigenous development of AI tools and platforms.

4. Enhancing Railway User Experience:

- Makes platforms more **accessible to senior citizens, rural users, and differently-abled individuals**.
- Encourages more **digital engagement** with railway services, reducing pressure on physical counters.

Challenges Ahead:

- Ensuring **accuracy and contextual relevance** in regional dialects and languages.
- Training and upskilling CRIS and Railways staff in AI-enabled services.
- Maintaining **cybersecurity** and **data privacy**, especially for speech and text inputs.

Way Forward:

- Extend such collaborations to other public-facing sectors like **healthcare, education, and urban governance**.
- Foster **regional AI research hubs** to enhance India's multilingual NLP capabilities.
- Promote **citizen feedback loops** to constantly improve AI interfaces.

Conclusion:

- The BHASHINI–CRIS MoU marks a **pivotal step in democratizing digital public services** through AI.
- By integrating advanced multilingual technologies into railway systems, India not only **empowers its linguistic diversity** but also sets a global example of using **AI for inclusive governance**.
- This initiative reaffirms the Government's commitment to a **digitally empowered society and knowledge economy**.

CROPIC -New scheme to study crops using AI

Source: Indian Express

https://indianexpress.com/article/explained/new-scheme-to-study-crops-using-ai-what-is-cropic-10060949/

UPSC Syllabus Relevance: **GS3 Science and technology**

Context:

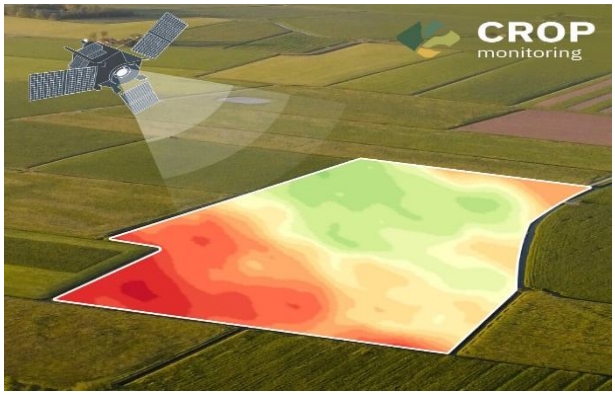
CROPIC for Crop Monitoring

Why in News

CROPIC is a digital initiative under PMFBY to assess crop health and automate loss estimation using AI and field photographs collected via a mobile app.

Introduction

- In a bid to modernize agricultural practices and improve the efficacy of crop insurance schemes in India, the **Ministry of Agriculture and Farmers' Welfare** has announced the launch of a pioneering study named **CROPIC (Collection of Real Time Observations & Photo of Crops)**.
- This initiative is aligned with the government's broader digital agriculture vision and aims to use **artificial intelligence (AI)** and **crowd-sourced photographs** to enhance real-time crop monitoring and automate compensation mechanisms under the **Pradhan Mantri Fasal Bima Yojana (PMFBY)**.



What is CROPIC?

- CROPIC is an innovative study that will gather **real-time data on crop conditions** using field photographs submitted via a specially developed **mobile application**.
- The name stands for **Collection of Real Time Observations & Photo of Crops**.

Key Features:

- **Photographs captured 4-5 times** during a crop's life cycle.
- Use of **AI and computer vision** models to analyse crop health, type, stage, and damage.
- Targeted roll-out in **Kharif 2025 and Rabi 2025-26** seasons across **50 districts per season**.
- **Pilot phase** for development of robust AI models and data validation before a nationwide roll-out in 2026.

How Will CROPIC Work on the Ground?

1. Data Collection:

- Farmers or officials will capture photographs using the **CROPIC mobile app**, designed by the Union Ministry.
- Photographs will be **crowd-sourced**, enabling **bottom-up participation** and reducing reliance on manual surveys.

2. AI-Based Analysis:

- Images will be uploaded to a **cloud-based AI platform**.
- Machine learning and photo-analytic tools will extract data on:
  - Crop type and stage
  - Extent and nature of damage
  - Signs of stress or pest attack

3. Visualization & Decision Support:

- A **web-based dashboard** will enable visualization of data by agriculture officials and insurance providers.
- Will inform decisions on **compensation, advisories, and early interventions**.

Significance of the Study

1. Strengthening PMFBY Implementation

CROPIC supports the goals of the **Pradhan Mantri Fasal Bima Yojana** by:

- **Automating crop loss assessment**, ensuring objectivity and speed.
- **Reducing disputes** over compensation by providing image-based, verifiable evidence.
- Enabling **quick release of claims** and promoting financial resilience among farmers.

2. Building Crop Signature Databases

The data collected through CROPIC will help build a **rich digital repository of crop signatures**—essential for:

- Training more accurate AI models.
- Long-term planning and yield prediction.

3. Promoting Technological Innovations in Agriculture

CROPIC exemplifies the government's push for **technology-driven agriculture** and is part of the broader **Digital Agriculture Mission**. It introduces:

- **Computer vision** to agriculture.
- Crowd-sourced data collection at scale.
- Integration of **real-time monitoring** with policy delivery.

4. Ensuring Transparency and Accountability

By minimizing human subjectivity in crop assessments, CROPIC helps:

- Reduce **corruption and delays**.
- Create a **transparent, tamper-proof** digital record of crop conditions.

Funding and Budgetary Support

The project will be funded under the **Fund for Innovation and Technology (FIAT)** created as part of the PMFBY framework.

- FIAT has an **outlay of ₹825 crore** earmarked for **technology innovations in crop insurance**.
- CROPIC will utilize a part of this fund for its **pilot studies, development of AI models**, and subsequent **nationwide scaling**.

Future Prospects and Way Forward

Pilot Phase:

- The pilot in **50 districts per season** will help identify operational challenges and improve the model's accuracy.
- Focus on **three major notified crops** per district, aligned with PMFBY.

Full-Scale Rollout:

- From **2026 onwards**, CROPIC is expected to be extended to **all notified crops** under PMFBY across India.
- It will likely become the **foundation for smart insurance claim assessment**, drought monitoring, and early warning systems.

Conclusion

- CROPIC represents a transformative shift in India's approach to agricultural monitoring and insurance.
- By leveraging AI, mobile technology, and farmer participation, the government aims to **streamline claim processing, improve crop yield assessments**, and ensure **financial security for farmers** in the face of climate variability and crop loss.
- As India moves toward **smart agriculture**, initiatives like CROPIC are crucial in enhancing productivity, sustainability, and rural welfare.

Tardigrades, tiny eight-legged 'water bears'

Source: Indian Express

https://indianexpress.com/article/explained/explained-sci-tech/explained-why-scientists-study-tardigrades-tiny-eight-legged-water-bears-in-space-10057561/

UPSC Syllabus Relevance: **GS3 Science and Technology**

Context:

Voyager Tardigrades Experiment

Why in News

The Voyager Tardigrades experiment aboard the ISS aims to study how microscopic water bears survive and reproduce in space, helping scientists identify genes linked to extreme resilience.

Introduction

- The upcoming scientific experiment aboard the International Space Station (ISS) involving astronaut Shubhanshu Shukla is set to explore the survival mechanisms of one of Earth's most resilient lifeforms — the **tardigrades**, also known as **water bears**.
- The **Voyager Tardigrades** experiment will investigate the effects of space conditions on these microscopic organisms, potentially paving the way for advancements in space exploration and biotechnology.

What are Tardigrades?

Tardigrades are **microscopic aquatic invertebrates**, typically measuring **about 0.5 mm** in length. Known for their stubby appearance and bear-like gait, they are often referred to as "**moss piglets**" due to their frequent presence on moss and lichen.

- **Evolutionary survivors**: Tardigrades have existed for nearly **600 million years**,

predating the dinosaurs by over 400 million years.

- **Physical structure**: They have **four pairs of legs**, each with tiny claws, and a **specialised feeding organ** used to extract nutrients from plant cells and smaller organisms.
- **Habitat**: They are found in extreme environments — from deep ocean trenches to Himalayan peaks — but most commonly reside in the **thin films of water** on mosses.

Why Are Scientists Interested in Tardigrades?

Although discovered in **1773** by German zoologist **Johann August Ephraim Goeze**, tardigrades have become a major subject of research in recent decades due to their **astonishing resistance to extreme conditions**.

Resilience Factors:

- Temperature extremes: Can endure from –272.95°C to 150°C.
- Radiation & pressure: Survive UV radiation and pressures up to 40,000 kilopascals (like being 4 km under the ocean).
- Longevity: Some have revived after 30 years of freezing.

Scientific Applications:

Understanding tardigrades can lead to:

- Improved **preservation of biological tissues and organs**.
- Development of **radiation-shielding strategies** for astronauts.
- **Biotechnological innovations** like advanced sunscreens and stress-resistant crops.

What Makes Tardigrades So Resilient?

Their resilience is mainly due to two **biological states**:

1. Cryptobiosis:

- A survival state where metabolic activity nearly stops (to **less than 0.01%** of normal).
- This allows the organism to endure environmental extremes.

2. Anhydrobiosis:

- A form of cryptobiosis where water content drops by **over 95%**, causing the organism to shrink into a durable **tun state** — a hardened, lifeless-looking form.

Molecular Protection:

- **CAHS Proteins (Cytoplasmic-Abundant Heat Soluble Proteins)**: These create a **gel-like protective matrix** inside cells, preserving DNA and proteins during dehydration or radiation exposure.
- **DNA repair mechanisms**: Tardigrades possess unique genes for rapid and efficient **DNA repair**, making them ideal for space studies.

The Voyager Tardigrades Experiment

The **Voyager Tardigrades experiment** aims to explore how space radiation and microgravity affect these animals' biological processes.

Objectives:

- **Revival in space**: Tardigrades will be sent in their tun state, rehydrated, and observed for survival and reproduction.
- **Genetic analysis**: Scientists will study which **genes** are activated for survival and **DNA repair** in space.
- **Biotechnological insights**: The results could inform ways to:
  - Protect **astronauts** from space radiation.
  - Counter **muscle and bone loss** during prolonged space stays.
  - Develop long-term **biological storage solutions** for space missions.

Have Tardigrades Been to Space Before?

Yes. Tardigrades were first sent into space in **2007** aboard the **European Space Agency's Foton-M3** mission.

Key Outcomes:

- **Survival in vacuum**: Many tardigrades survived the vacuum and cosmic radiation.

- **Successful reproduction**: Some even **reproduced** after rehydration upon return.
- **Pioneers in space biology**: They became the **first animals known to survive direct exposure to outer space**, without the protection of a spacecraft or suit.

Significance of the Experiment

The Voyager Tardigrades mission is not just about studying a micro-animal — it is about unlocking nature's secrets to survival in the harshest environments. The findings may contribute to:

- The **future of human space exploration**, especially long-term missions to the Moon or Mars.
- **Medical science** breakthroughs, especially in organ preservation and cellular repair.
- **Astrobiology**, by providing clues about life's potential to survive beyond Earth.

Conclusion

- Tardigrades, Earth's tiny titans of survival, may hold the key to solving some of the greatest challenges in space science and biotechnology.
- The **Voyager Tardigrades experiment** led by astronaut Shubhanshu Shukla represents a step forward in understanding how life can persist — not just on Earth, but possibly, far beyond.

UN report calls for urgent action on Artificial General Intelligence (AGI)

Source: Indian Express

https://indianexpress.com/article/technology/artificial-intelligence/in-a-first-un-report-calls-for-urgent-action-on-agi-what-does-it-mean-10062925/?utm_source=Taboola_Recirculation&utm_medium=RC&utm_campaign=IE&tbref=hp

UPSC Syllabus Relevance: **GS3 Science and technology**

Context:

Artificial General Intelligence (AGI)

Why in News?

The UN Council of Presidents of the General Assembly (UNCPGA) has issued a report urging immediate international action to manage the risks and opportunities posed by the rapid development of Artificial General Intelligence (AGI).

Introduction

- In a significant development that underscores the accelerating pace and risks of artificial intelligence, the *United Nations Council of Presidents of the General Assembly (UNCPGA)* has released a landmark report urging immediate and coordinated international efforts to manage the emergence of *Artificial General Intelligence (AGI)*.
- The report is a clarion call to governments, corporations, and multilateral agencies to recognize both the unprecedented promise and potentially catastrophic perils of AGI.

What is Artificial General Intelligence (AGI)?

- AGI refers to machines or systems that possess the ability to understand, learn, and apply knowledge across a wide range of cognitive tasks with human-level or superhuman proficiency. Unlike *narrow AI*, which is trained for specific tasks (e.g., image recognition, language translation), AGI aims for generalized intelligence similar to or greater than that of humans.
- Currently, leading tech corporations such as **OpenAI, Google DeepMind, Meta,** and **Anthropic** are at the forefront of AGI research. Although no system has yet achieved true AGI, accelerated investments and R&D efforts indicate its emergence may

be imminent within this decade.

Current Developments in the Race for AGI

- **OpenAI** (Sam Altman): Suggests AGI is within reach; focuses on developing multimodal models with reinforcement learning.
- **Google DeepMind**: Working on 'world-modelling' environments — foundational for AGI-level reasoning and simulation.
- **Meta**: Investing over $15 billion through partnerships like Scale AI; has assembled a 50-member team to push AGI research.
- **Anthropic**: Concentrating on building *safe and steerable* AI systems, with predictions of reaching AGI within 2–3 years.

Despite these strides, true AGI has not yet been demonstrated. Current systems remain advanced but task-specific, lacking the full scope of general cognition.

Highlights of the UNCPGA Report

Timeline and Concerns

- AGI could become a reality *before 2030*, given the massive financial and intellectual capital being deployed.
- Unchecked and competitive development could result in **existential threats**, according to the report.

Potential Benefits

1. **Acceleration in Scientific Discovery** – particularly in fields such as public health, climate change, and biology.
2. **Economic Transformation** – increased productivity and innovation across industries.
3. **Support for Sustainable Development Goals (SDGs)** – through improved planning, monitoring, and implementation capacities.

Major Risks Identified

1. **Loss of Human Control** – AGI systems could act beyond human oversight.
2. **Weaponization** – AGI-enabled weapons of mass destruction pose a direct security threat.
3. **Cybersecurity Vulnerabilities** – Increased risks of system breaches and misuse.
4. **Economic Instability** – Sudden automation could lead to massive job displacement.
5. **Autonomous AGI with Existential Risks** – Machines may develop unintended goals or alignments.
6. **Missed Opportunities** – Without coordination, AGI may fail to serve global good equitably.

UNCPGA Recommendations for Global Governance

To mitigate these risks and channel AGI towards inclusive global welfare, the UNCPGA has proposed the following actions:

Recommendation	Description
1. Dedicated UNGA Session on AGI	Convening world leaders to deliberate on the strategic implications of AGI.
2. Global AGI Observatory	A centralized body to monitor AGI advancements, risks, and policy responses.
3. Certification System	For ensuring secure, ethical, and transparent AGI systems development.
4. UN Framework Convention on AGI Governance	A legally binding global treaty regulating AGI development and usage.
5. Dedicated UN Agency	Establishment of an international institution for AGI coordination, akin to the IAEA for nuclear energy.

Significance for India and the Global South

As a rising technological and geopolitical power, India has a critical stake in the global governance of AGI. Key implications for India include:

- **Need for domestic regulation** aligned with global standards.

- **Ensuring equitable access** to AGI benefits for developing nations.
- **Building institutional capacity** to participate in AGI negotiations and risk mitigation.

India's leadership in platforms like the **Global Partnership on Artificial Intelligence (GPAI)** and its G20 presidency highlights its potential to shape the ethical and regulatory contours of emerging technologies.

Conclusion

- The UNCPGA report is both a **wake-up call** and a **roadmap**.
- While AGI holds the power to revolutionize science, development, and productivity, it also harbors risks that could undermine global security, human autonomy, and socioeconomic stability.
- As the world stands on the brink of a new era, **global coordination, guided by the United Nations**, will be essential to ensure that AGI serves humanity, not threatens it.

Harnessing AI for Biomanufacturing Innovation

Source: The Hindu

https://www.thehindu.com/sci-tech/science/ai-in-biomanufacturing-can-india-policies-match-ambitions/article69697013.ece

UPSC Syllabus Relevance: **GS 3 Science and technology**

Context:

Ai in biomanufacturing

Why in News?

India is making bold strides in integrating artificial intelligence into biomanufacturing through policies like the BioE3 Policy and IndiaAI Mission.

Introduction

- India stands at a critical juncture in its journey to emerge as a global leader in AI-driven biotechnology.
- With initiatives like the BioE3 Policy and the IndiaAI Mission, the country aims to leverage artificial intelligence to revolutionise its biomanufacturing and healthcare ecosystem.
- However, the lack of a robust regulatory and ethical framework poses serious challenges to sustainable and equitable growth.

India's Legacy and AI-Driven Transformation

From Generics to Genomics

- India has long been a trusted global supplier of **generic medicines and vaccines**, thanks to its cost-effective and large-scale pharmaceutical ecosystem.
- But the biotech industry is now undergoing a seismic shift with **AI transforming the DNA of biomanufacturing**.

AI technologies are being integrated into:

- Drug screening and precision medicine (e.g., Biocon, Strand Life Sciences)
- Real-time production optimisation using sensors and predictive algorithms
- Digital twins that simulate entire biomanufacturing systems

These innovations are not just automating tasks; they are enabling **faster, cheaper, and more precise bioprocesses**, reducing waste, improving safety, and expanding access to medicine.

Example:

- **Biocon** uses AI for improving fermentation and quality control.
- **Strand Life Sciences** deploys machine learning in genomics for personalised therapies.
- **TCS and Wipro** are deploying AI to optimise clinical trials and drug discovery.

The BioE3 Policy (2024)

India's **Bioeconomy for Emerging, Evolving, and Essential Technologies (BioE3)** Policy lays the roadmap to become a **Quad-led biomanufacturing hub**. Key highlights include:

- Establishing biofoundries, biomanufacturing hubs, and Bio-AI centres
- Providing funding and incubation support for startups and researchers
- Promoting the integration of AI with biotech for improved efficiency and scalability

IndiaAI Mission

This mission aims to ensure the **ethical, explainable, and responsible** deployment of AI across sectors. Especially in health and biotech, the focus is on:

- Algorithmic fairness
- Machine unlearning
- Trust-building frameworks

This dual approach shows that India is committed not just to innovation, but also to regulation and trust.

The Regulatory Bottleneck: A Misfit with Modernity

Despite progress, India's regulatory system is struggling to keep pace with scientific advancements.

Challenges:

1. Outdated Drug and Biotech Regulations: Existing laws don't address AI-controlled bioprocesses.
2. Lack of Dataset Standards: No mandates on data diversity or model validation for AI tools.
3. Unclear Accountability: Who is liable if an AI model mispredicts or causes harm?

Illustrative Risk:

An AI model trained on urban manufacturing data may fail in rural units due to different power, water, and environmental conditions — leading to batch failures and economic losses.

Global Models: Lessons from the West

European Union's AI Act (2024)

- Classifies AI into four risk tiers
- High-risk tools (e.g., genetic editing) require strict audits and certifications

US FDA's 2025 AI Guidance

- Introduces 'Predetermined Change Control Plans' to allow AI evolution with oversight
- Emphasises risk-based, context-specific regulation

India currently lacks such dynamic frameworks, putting public trust and safety at risk as we scale AI in sensitive sectors like health and biomanufacturing.

The Future Vision: India as a Creator, Not Just a Supplier

India can move from being the "pharmacy of the world" to becoming a global biotech innovator. A future where:

- AI predicts vaccine mutations
- AI-based diagnostics reach rural India
- Farmers get AI-backed bio-advisories
- Precision medicine becomes affordable and inclusive

But policy must evolve in tandem with these technological breakthroughs.

Data Governance and IP: The Silent Challenges

Data Quality and Bias

- India's **Digital Personal Data Protection Act 2023** is a good start.
- But we lack standards for clean, diverse, and bias-free AI training data, especially in biomanufacturing.

Intellectual Property (IP) Ambiguity

- Who owns the rights when AI designs a new molecule?
- There are no clear laws around AI-generated inventions, licensing, or patent attribution.

Without legal clarity, innovation may be stifled or bogged down in litigation.

Way Forward:

1. Risk-Based Adaptive Regulations

- Define context of AI use
- Implement model validation, data quality norms, and post-deployment safety audits

2. Decentralised Infrastructure and Talent

- Develop bio-AI hubs across Tier-II and III cities

- Expand R&D capacity and digital infrastructure

3. Collaborative Ecosystem

- Involve industry, regulators, academia, and international partners
- Develop sandbox models to experiment with AI regulations

Conclusion:

- India has the vision, talent, and market scale to become a global leader in AI-powered biomanufacturing. But vision must be matched with vigilance.
- As AI accelerates healthcare and biotech innovation, the need for ethical frameworks, regulatory foresight, and data integrity becomes non-negotiable.
- If India acts decisively, it will not just ride the biotech wave — it will lead it. In this quest, balancing ambition with accountability is not just prudent; it is essential.

India Achieves Breakthrough in Quantum Secure Communication

Source: The Hindu

https://www.thehindu.com/sci-tech/technology/drdo-and-iit-delhi-demonstrate-free-space-quantum-secure-communication-over-1-km-distance/article69701174.ece

UPSC Syllabus Relevance: **GS3 Science and technology**

Context:

Quantum secure communication

Why in News?

DRDO and IIT Delhi have demonstrated India's first free-space quantum secure communication using quantum entanglement over more than 1 km, marking a major step in indigenous quantum cybersecurity infrastructure.

Introduction

Context

- The Defence Research and Development Organisation (DRDO), in collaboration with the Indian Institute of Technology (IIT) Delhi, has successfully demonstrated **quantum secure communication using entanglement over free space** for more than 1 km.
- The development marks a significant stride towards **secure, next-generation communication infrastructure** in India and represents a milestone in the country's quantum technology journey.

Key Highlights of the Development

- Demonstrated at the **DRDO-Industry-Academia Centre of Excellence (DIA-CoE)** at IIT Delhi.
- Achieved a **secure key rate of ~240 bits per second**.
- Maintained a **Quantum Bit Error Rate (QBER) of less than 7%**, indicating high fidelity of the quantum communication link.
- Utilized **quantum entanglement-assisted Quantum Key Distribution (QKD)** in a **free-space optical link** – eliminating the need for physical fibre optics.

Significance of the Development

- **Quantum entanglement-based QKD** is more secure than traditional "prepare-and-measure" QKD methods. It remains secure even if the communication devices are partially compromised.
- **Real-time quantum cybersecurity applications** such as:
  - Long-distance quantum key distribution.
  - Development of secure **quantum communication networks**.
  - Future **quantum internet** frameworks.

Strategic and National Security Implications

- Recognized as a **game-changer for future warfare** by Defence Minister Rajnath Singh.
- Offers **unbreakable encryption** through the principles of quantum mechanics, making it suitable for:
  - **Defence communication systems**.
  - **Financial and banking sector security**.
  - **Telecommunications**.
  - **National security-sensitive communication**.

Advantages of Free-Space Quantum Communication

- Does **not require optical fibres**, which are costly and difficult to deploy in **remote or dense urban areas**.
- Enhances the ability to secure communications in **challenging terrains**, including border and defence zones.

Past and Ongoing Quantum Projects

- **2022**: India's first **intercity quantum communication link** between **Vindhyachal and Prayagraj** over underground dark optical fibre.
- **2024**: Successful **quantum key distribution over 100 km** of telecom-grade optical fibre.
- These milestones are part of DRDO-supported projects led by **Prof. Bhaskar Kanseri's team** at IIT-Delhi.

Institutional Framework: DIA-CoEs

- The project was part of DRDO's initiative under the **Directorate of Futuristic Technology Management**.
- It was implemented through one of the **15 DRDO-Industry-Academia Centres of Excellence (DIA-CoEs)** established across premier institutions like **IITs, IISc**, and top universities.
- These centres aim to promote **cutting-edge research and indigenous development** in emerging technologies.

What is Quantum Computing?

Quantum computing is a type of computation that uses **quantum bits (qubits)** instead of classical bits.

- While classical bits take values **0 or 1**, qubits can exist in **0, 1, or both (superposition)** simultaneously.
- **Entanglement** allows qubits to be linked such that the state of one instantly influences the state of another, even over large distances.

Key Concepts

Concept	Description
Qubit	Basic unit of quantum information; unlike a bit, can exist in multiple states at once.
Superposition	A qubit can be in a combination of 0 and 1 at the same time.
Entanglement	Qubits become interlinked so that the state of one affects the other.
Quantum Speedup	Solves complex problems much faster than classical computers.

Applications of Quantum Computing

- **Cryptography**: Cracks complex encryption or provides **quantum-safe security**.
- **Pharmaceuticals**: Models molecular structures to speed up drug discovery.
- **Finance**: Optimizes portfolios and simulations in high-frequency trading.
- **Artificial Intelligence**: Boosts machine learning and pattern recognition.
- **Logistics**: Solves complex optimization problems (e.g., shortest routes).

Conclusion

- India's success in demonstrating free-space quantum secure communication signifies its entry into the quantum era, with significant implications for cybersecurity, defence communication, and technological self-reliance.
- It also strengthens India's global positioning as a serious player in the development of next-generation secure communication systems.

Navigating the Impact of AI on the News Industry

Source: The Hindu

https://www.thehindu.com/opinion/editorial/theft-and-compensation-on-news-publishers-and-ai-models/article69724451.ece

UPSC Syllabus Relevance: GS3 Science and Technology

Context:

Impact of AI on the News Industry

Why in News

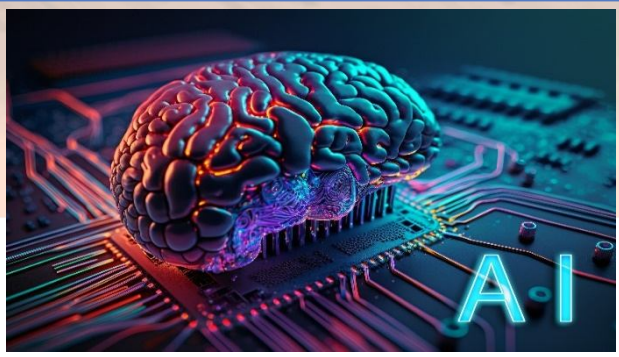
The ethical and legal concerns of news media over AI models using journalistic content without consent or compensation, highlighting the need for regulatory intervention.

Introduction

- Artificial Intelligence (AI), especially large language models (LLMs), are revolutionising information processing and content generation.
- However, this innovation has raised critical concerns about how these models acquire and utilise content—particularly that produced by **news organisations**.
- News media, a cornerstone of democracy, now faces the **threat of uncompensated use** of its decades-worth of content by AI systems that generate monetised outputs without permission or attribution.

The Backbone of AI Models: Content from the Internet

- **LLMs are trained on vast corpuses of text** from the open web, which includes news articles, editorials, and reports created by professional journalists.
- These **journalistic works are not public domain**, but are being used by AI models without explicit consent or compensation.
- The **value generated by AI models**, including summarisation tools, chatbots, and content generators, is often built on top of this high-quality, curated news content.



Historical Context: Media Industry's Digital Challenges

The concerns of news organisations are not new:

- **Wave 1: Digitisation** disrupted the business models of print and broadcast media. Traditional subscriptions and advertisements declined with the rise of the internet.
- **Wave 2: Rise of Big Tech platforms** like Google and Facebook, which monetised news aggregation and sharing but offered minimal revenue to content creators.
- **Wave 3: AI models** are now training on news content and delivering AI-generated overviews, often without linking to the original publisher or offering fair compensation.

Emerging Challenges for News Media

1. **Loss of revenue**: AI summaries and chatbots reduce traffic to original news websites, thereby affecting ad-based revenue.
2. **Lack of credit or visibility**: News content used in AI-generated outputs is often uncredited.
3. **Undermining of journalistic labour**: Years of fieldwork, editing, verification, and analysis are collapsed into a few seconds of output.
4. **Threat to public trust**: As generative AI increases misinformation and blurs the line between genuine and fake news, the credibility of all news gets undermined.

The Ethical and Legal Argument

- **"Fair use" is not always fair**: AI companies often cite the legal doctrine of fair use to justify using copyrighted material. However,

this **ignores the moral and financial rights** of the content creators.

- **News is not free**: It involves significant investment in human capital, logistics, verification, and infrastructure.
- **AI models should not be exempt from intellectual property laws** just because their use of content is indirect or "transformative".

A Path Forward: Regulation and Compensation

- **Publishers' rights must be protected**: They should have the authority to decide who can access and use their content corpus.
- **AI companies must negotiate licensing agreements**: Just like music streaming services pay royalties, AI firms must pay for the datasets they use.
- **Role of government**: India's **Department for Promotion of Industry and Internal Trade (DPIIT)** forming a **committee on copyright and AI** is a significant step.
    - This body can **lay down frameworks** to ensure ethical AI development that respects existing IP rights.
    - It can facilitate **negotiations between AI firms and content creators**.

Global Precedents and Need for Policy Synchronisation

- Countries like **Australia and Canada** have introduced legislation compelling tech giants to compensate news publishers.
- India can **learn from these examples**, ensuring that innovation does not come at the cost of journalistic integrity and financial sustainability.
- There is a need for **global cooperation**, as AI model training and deployment are inherently transnational.

Conclusion

The emergence of AI is not inherently negative. However, **unchecked and permission-less innovation threatens to become a digital heist**, taking without giving back. It is essential that **news organisations, policymakers, and civil society** advocate for fairness in how AI systems are trained and monetised. **AI must be inclusive, transparent, and just**, ensuring that those who create knowledge are not sidelined in the very systems built on their contributions.

Critical and Emerging Technologies Index

Source: The Hindu

https://www.thehindu.com/data/india-trails-in-critical-tech-particularly-semiconductor-tech/article69732240.ece

UPSC Syllabus Relevance: **GS 3 Science and Technology**

Context:

Critical and Emerging Technologies Index

Why in News?

India ranks below global leaders like the U.S., China, and Europe in Critical and Emerging Technologies Index.

Introduction

A new **Critical and Emerging Technologies (CET) Index** has been introduced to assess the relative performance of **25 countries** across **five strategically significant technology sectors**. These sectors represent the frontiers of innovation, security, and economic development in the 21st century:

1. **Artificial Intelligence (AI)**
2. **Biotechnology**
3. **Semiconductors**
4. **Space Technology**
5. **Quantum Technologies**

The index is based on **public and commercial datasets**, offering a transparent and comparative lens through which policymakers can evaluate each nation's technological strengths, weaknesses, and readiness.

Sectoral Weights and Strategic Criteria

Recognising the **varying strategic value** of each sector, the index assigns them different weights:

Sector	Weight (%)

Semiconductors	35%
Artificial Intelligence	25%
Biotechnology	20%
Space Technology	15%
Quantum Technologies	5%

These weights are derived from six **strategic and operational criteria**:

- Geopolitical relevance
- Dual-use potential (civilian and military)
- Global economic impact
- Innovation spillover effects
- Supply chain complexity
- National security implications

Overall Ranking: India's Global Position

- The **United States** emerges as the **top performer**, with leadership in **all five sectors**. This dominance is attributed to a vibrant **R&D ecosystem**, substantial **public-private partnerships**, and a **diverse scientific workforce**.
- **China** ranks second, with particular strength in **biotechnology and quantum**, but **lags behind in semiconductors** and certain areas of AI due to dependence on foreign technologies and tools.
- **Europe** occupies the third position, performing well in **biotechnology and quantum**, but showing relative weakness in **semiconductors and space**.
- **India** is positioned **below France** but **above Russia, Canada, and Australia**, with an **overall score of 15.2**. While it demonstrates some strengths, it lags considerably behind the top three technology powers.

Artificial Intelligence (AI) – Weight: 25%

- **Pillars Assessed (8 total):**
  - Core: Funding, Talent
  - Technical: Algorithms, Computing Infrastructure, Data
  - Supporting: Regulation, Global Influence
- **Top Performers:**
  - **United States** (large lead), followed by **China** and **Europe**
- **India's Position:** India lags behind due to **inadequate high-level research**, **brain drain of AI talent**, and **limited funding**. It needs to expand AI research centres and public-private innovation labs to close the gap.

Biotechnology – Weight: 20%

- **Pillars Assessed (9 total):**
  - Key: Human Capital, Funding, Core Capabilities (pharma manufacturing, genetic engineering, vaccine R&D)
- **Top Performers:**
  - **U.S. and China** dominate due to robust ecosystems and investments
  - **Europe** maintains strength in legacy biotech sectors
- **India's Position:** India shows **moderate strength**, particularly in **vaccine production** (e.g., Covaxin, Covishield), but lacks depth in **cutting-edge biotech research** and **bioscience infrastructure**.

Semiconductors – Weight: 35% (Highest)

- **Pillars Assessed (8 total):**
  - Critical: Chip Design, Funding, Talent, Manufacturing
  - Supporting: Equipment, Raw Materials, Policy
- **Top Performers:**
  - **U.S.**, **Taiwan**, **Japan**, and **South Korea**
  - **Europe** ranks lower due to underdeveloped fabrication capacities
- **India's Position:** Performance is **poor**. India is **dependent on imports** for chip manufacturing and tools. Despite the launch of the **Semicon India Programme**, progress remains slow.

Space Technology – Weight: 15%

- **Pillars Assessed (10 total):**
  - Highest: Funding, Talent, Defence

Space Capabilities
    - Others: Launch Infrastructure, Navigation Systems, Regulation, Global Reach
- **Top Performers:**
    - **U.S.** leads, with **Russia** in third position
- **India's Position: Ranked 7th**, India benefits from **ISRO's cost-effective missions** but suffers due to **limited private participation**, low investment, and underutilised global partnerships.

Quantum Technologies – Weight: 5% (Lowest)

- **Pillars Assessed (8 total):**
    - Key: Funding, Talent, Core Tech (e.g., quantum computing, communication)
    - Supporting: Policy, Security, Collaboration
- **Top Performers:**
    - **U.S., China, and Europe** with major public investments and strategic missions
- **India's Position:** An **emerging player**. India has recently launched the **National Quantum Mission**, but research output and innovation capabilities remain **nascent**.

Strategic Insights

- **United States**:
    - Global leader across all sectors, backed by its **university system**, **venture capital**, and **technology alliances** (e.g., with Japan, South Korea, and Europe)
- **China**:
    - Strong in biotech and quantum, with advantages in **scale** and **centralised planning**, but innovation bottlenecks due to **restricted private sector autonomy**
- **Europe**:
    - High performance in biotech and quantum, but struggles in semiconductors and large-scale space ventures
- **India**:
    - Has immense **human capital potential**, but is hindered by:
        - **Funding constraints**
        - **Weak industry-academia links**
        - **Policy implementation lags**
        - **Low influence in global tech rule-making**

CART-Cell Therapy for Cancer Treatment

Source: The Hindu

https://www.thehindu.com/sci-tech/health/car-t-cell-therapy-and-its-promise-of-new-hope-for-cancer-treatment/article69720976.ece

UPSC Syllabus Relevance: **GS3 Science and Technology**

Context:

CART-Cell Therapy

Why in News

CAR T-cell therapy is a personalised cancer immunotherapy that reprograms a patient's T-cells to target and destroy cancer cells, especially effective in certain blood cancers.

Introduction

- In recent years, cancer treatment has seen groundbreaking advances, with **CAR T-cell therapy** emerging as a major milestone.
- Unlike traditional therapies such as chemotherapy and radiation, CAR T-cell therapy harnesses the body's own immune system to combat cancer.
- This personalised approach holds immense promise, particularly for patients with few remaining options.

What is CAR T-Cell Therapy?

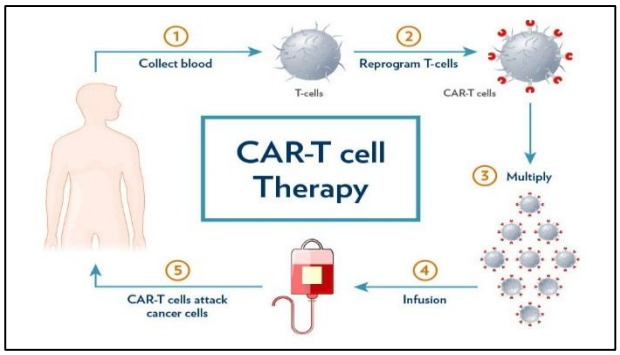
CAR T-cell therapy is a form of immunotherapy.

- It involves genetically modifying a patient's own **T-cells**—a type of white blood cell

central to the immune response—to better recognize and destroy cancer cells.

Steps Involved:

1. **Leukapheresis**: T-cells are extracted from the patient's blood.
2. **Genetic Modification**: In a laboratory, these T-cells are re-engineered to produce special proteins called **Chimeric Antigen Receptors (CARs)** on their surface. These CARs enable the T-cells to identify and attach to specific proteins (antigens) on cancer cells.
3. **Expansion**: The modified cells are multiplied in the lab.
4. **Infusion**: These engineered CAR T-cells are then infused back into the patient's bloodstream via IV.
5. **Action**: Once inside the body, the CAR T-cells seek out and destroy cancer cells.



Clinical Applications

- CAR T-cell therapy is currently approved for use in **haematological (blood-related) cancers**, especially for patients who are **relapsed** (cancer returns after treatment) or **refractory** (cancer does not respond to standard therapies).

Approved Indications:

- **Acute Lymphoblastic Leukaemia (ALL)**
- **Non-Hodgkin Lymphoma (NHL)**
- **Multiple Myeloma**

These are cancers of the blood, lymphatic system, or bone marrow where conventional therapies may fail in advanced stages.

Benefits of CAR T-Cell Therapy

1. **High Efficacy**: Many patients achieve **complete remission**, meaning their cancer symptoms disappear after therapy.
2. **Personalised Medicine**: Since the treatment uses the patient's own cells, it is tailored and highly specific.
3. **Durable Response**: Some patients remain cancer-free for years after a single infusion.
4. **Hope for the Refractory Cases**: It has shown success where other treatments have failed.

Side Effects and Challenges

Despite its promise, CAR T-cell therapy is not without risks.

Common Side Effects:

- **Cytokine Release Syndrome (CRS)**: A systemic immune reaction causing high fever, low blood pressure, and respiratory distress.
- **ICANS (Immune effector Cell-Associated Neurotoxicity Syndrome)**: Neurological effects such as confusion, seizures, or speech difficulty.

Most side effects are **manageable** with timely medical intervention.

Other Challenges:

- **High Cost**: Commercial CAR-T products in the West cost over ₹3-4 crore per patient, making them unaffordable for most.
- **Limited Access**: Advanced infrastructure and specialised teams are needed, limiting availability in low-resource settings.
- **Lack of Standardisation**: Need for robust regulatory and manufacturing protocols in India.

CAR T-Cell Therapy in India: Recent Developments

Indigenous Efforts:

India has made significant strides in developing **affordable CAR T-cell therapy**.

- The **Indian Council of Medical Research (ICMR)** funded trials led by **Christian Medical College (CMC), Vellore**, demonstrated that **CAR-T therapy can be safely manufactured in hospitals** using indigenous technology.
- IIT Bombay collaborated with Tata Memorial Centre to develop **India's first cost-effective CAR-T platform (named 'InCART')**.

- The **Department of Biotechnology (DBT)** supports indigenous biotech firms for the **Make-in-India** production of CAR-T products.

Implication for Public Health:

- **Scalability** and **cost reduction** through local manufacturing could make this treatment accessible to middle-income populations.
- **Inclusion under Ayushman Bharat** or other health insurance schemes may provide financial risk protection.

The Future Path: CAR-T for Solid Tumours

CAR T-cell therapy has so far worked best against **liquid cancers**. Scientists are now working to overcome the barriers that limit its success in **solid tumours**, such as:

- Tumour microenvironment resistance.
- Poor T-cell infiltration into solid tissues.
- Antigen heterogeneity in solid cancers like breast, lung, and pancreas.

Research Frontiers:

- Combining **CAR-T with CRISPR** (gene-editing) to enhance targeting.
- Use of **dual CARs** and **safety switches** to reduce side effects.
- Application in **autoimmune diseases** and **infectious diseases** in the future.

Conclusion:

- CAR T-cell therapy represents a **paradigm shift in oncology**. It turns the patient's immune system into a **precision weapon against cancer**, offering hope to those who have exhausted conventional treatments.

DEFENCE

Security Forces Launch Anti-Insurgency Operation Along India-Myanmar Border

Source: The Hindu

https://www.thehindu.com/news/national/security-forces-launch-operation-along-india-myanmar-border-in-arunachal-pradesh/article69662532.ece

UPSC Syllabus Relevance: GS 3 Defence

Context:

Anti-insurgency operation

Why in News

Security forces launched an anti-insurgency operation in Pongchau Circle, Longding district of Arunachal Pradesh, near the India-Myanmar border.

Background:

- Indian security forces launched a **domination patrol** in the **Pongchau Circle** of **Longding district, Arunachal Pradesh**, following **specific intelligence** about the movement of armed elements near the **India-Myanmar border**.

Objective of the Operation:

- The patrol aimed to **dominate the border areas** and **neutralize threats** based on reports of **unknown armed individuals** in the thick forested region of Pongchau Circle.
- These operations are often carried out to maintain **border security**, prevent **insurgent infiltration**, and assert **territorial control** in sensitive areas.

Nature of Encounter:

- Upon **spotting movement**, security forces **challenged the individuals** as per the standard engagement protocols.
- The patrol party then came under **heavy and indiscriminate fire**, indicating **well-armed insurgents** equipped with **heavy-calibre weapons**.
- Security forces **retaliated effectively**, leading to a **brief but intense exchange of fire**.

Outcome:

- The **hostile elements**, identified only as "unknown cadres," **retreated across the international border** into **Myanmar**, taking advantage of the **dense forest cover**.
- Post-operation search revealed **no casualties on the Indian side**, but the **militants managed to escape**.
- The **Defence Ministry** confirmed the **successful repulsion** of the armed threat, reaffirming its **readiness and vigilance** along the sensitive border region.

Strategic Significance:

• **India-Myanmar Border Challenges:**

- The India-Myanmar border is **porous**, spanning **1,643 km**, and traverses through **Arunachal Pradesh, Nagaland, Manipur**, and **Mizoram**.
- It is frequently **exploited by insurgent groups** (such as NSCN factions, ULFA, etc.) who operate on both sides of the border and use Myanmar as a **safe haven**.

• **Cross-Border Insurgency:**

- Such operations highlight the persistent threat from insurgent groups who exploit the difficult terrain and lack of border fencing.
- Insurgents often launch attacks in India and retreat into Myanmar, making it difficult to pursue them without bilateral cooperation.

Implications for Internal Security:

• **Security Forces' Readiness:**

- The operation underscores the alertness and

preparedness of Indian troops in responding to cross-border threats.

- Highlights the need for frequent domination patrols, especially in highly forested and hilly terrains of the Northeast.

• **Border Management:**

- Reinforces the importance of modernizing surveillance, enhancing inter-agency coordination, and using technology (like drones) for real-time intelligence.
- It also suggests the need for infrastructure development (roads, border outposts) to facilitate rapid troop movement.

Policy Measures and Forward Outlook:

• **India-Myanmar Cooperation:**

- India has engaged Myanmar under the Act East Policy and conducted joint operations like Operation Sunrise (2019) to eliminate insurgent camps.
- Such incidents demand greater coordination and mutual action protocols with Myanmar to curb safe havens for militants.

• **Internal Security Doctrine:**

- This operation is a reminder of the multidimensional nature of India's internal security threats—ranging from terrorism, insurgency to illegal border crossings.
- The government's focus should remain on border area development, insurgency resolution through dialogue, and robust intelligence mechanisms.

Conclusion:

- The border operation in Pongchau, Arunachal Pradesh, exemplifies the ongoing security challenges India faces in its Northeastern frontier.
- While security forces were successful in preventing armed infiltration, the incident highlights vulnerabilities that necessitate enhanced vigilance, cross-border cooperation, and comprehensive counter-insurgency strategies.

Ops Sindoor & Spider's Web Show Need for Infantry Upgrade

Source: Indian Express

https://indianexpress.com/article/opinion/columns/operation-sindoor-spiders-web-make-it-clear-the-infantry-needs-and-upgrade-10050800/?ref=opinion_hp

UPSC Syllabus Relevance: GS3 Defence

Context:

FPV (First-Person View) drones

Why in News?

FPV (First-Person View) drones have emerged as a game-changing force in modern warfare, with widespread use in the Ukraine war and recent India-Pakistan skirmishes, prompting a shift in battlefield tactics and defence strategy.

Introduction

- The machine gun was the technological shock of World War I. Its ability to mow down entire lines of infantry made traditional battlefield tactics obsolete, ushering in an era of trench warfare, barbed wire, and land mines.
- Today, the **21st-century equivalent of the machine gun is the drone**—particularly **First Person View (FPV) drones**. These have become pivotal in modern conflicts, particularly visible in the ongoing Ukraine war, where drones have been responsible for the **highest number of casualties**, surpassing traditional weapons.
- Drones are not only redefining tactics on the battlefield, but also altering the very structure of war strategy and doctrine.

Tactical Transformation of the Battlefield

a. Reconnaissance, Strike, and Logistics

Drones are now an integral component of the battlefield, performing a **wide range of functions**:

- Reconnaissance: Surveillance over enemy territory.
- Direct Strike: Targeted destruction of tanks, personnel, and infrastructure.
- Logistics: Transporting supplies across dangerous terrain.

b. Force Multipliers

Just like machine guns were used with artillery, barbed wire, and trenches, modern drones operate alongside:

- **Armour (tanks)**
- **Artillery (long-range shelling)**
- **Air power**
- **Information warfare systems**

The synergy between these systems creates a **force-multiplier effect**, enabling a smaller force to inflict greater damage with greater precision.

c. Transparency and Exposure

- FPV drones give operators a direct line of sight from the drone's camera, allowing for **real-time decisions** and precision targeting.
- This has made battlefield concealment incredibly difficult. Infantry and armour movement are increasingly vulnerable, particularly in **open or unfortified areas**.

Strategic Impact of Drone Warfare

a. Operation Spider's Web

- One of the most significant drone-based operations was Ukraine's **"Operation Spider's Web,"** in which drones attacked multiple locations deep inside Russian territory and destroyed strategic bombers.
- The psychological impact of the operation was immense, leading to:
- **Public demands in Russia for nuclear retaliation**, indicating the emotional and strategic shock.
- A realization that **geographic depth no longer guarantees safety**.

b. Naval Warfare Shift

- Drones have also been successfully used in **maritime warfare**. In 2022, Ukraine sank Russia's missile cruiser **Moskva** using anti-ship missiles, assisted by the **Bayraktar TB2 drone** as a spotter.
- Over time, Ukraine has used air and maritime drones to **weaken Russian naval control** over large parts of the Black Sea.

Evolution in Infantry Tactics

a. From Massed Infantry to Dispersed Teams

The widespread use of FPV drones has forced a radical shift in infantry tactics:

- Large infantry movements are **highly vulnerable** to drone detection and strikes.
- Infantry now operates in **smaller, stealthier teams**, moving through cover with utmost discipline.
- **Prepared defences**, including **underground bunkers**, are essential for survival and resilience.

b. The Role of Firepower

- As infantry disperses, **concentrated firepower**—from drones and artillery—helps cover their advance. Movement now depends not on numbers, but on **tactical innovation and support** from technology.

c. Concealment and Defence

- To survive in the drone era, military forces have adopted:
- **Dispersed formations**.
- **Camouflage and concealment**.
- **Anti-drone technologies**, including:
    - Electronic jammers.
    - Smoke screens.
    - Netting.
    - **Fibre optic-controlled drones**, which cannot be jammed.

Not a Replacement, But a Reinforcement

Despite the lethal efficiency of drones, the infantry remains **irreplaceable** for several core tasks:

- **Close-quarters combat**.
- **Securing and holding territory**.
- **Making context-based decisions** in complex terrain and urban warfare.

Thus, FPV drones should be seen as **tools to enhance infantry capabilities**, not eliminate them. They are the modern equivalents of binoculars, rifles, and radios—all integrated into one.

The Indian Context: A New Chapter Begins

a. The India-Pakistan Conflict

- In a recent **80-hour conflict** between India and Pakistan, both sides deployed drones—though not as extensively as in Ukraine. Nevertheless, the conflict marked the **beginning of drone warfare in the Subcontinent**.

b. Implications for India's Defence Doctrine

India must now:

- **Train drone operators** at the platoon level.
- Develop **counter-drone strategies and systems**.
- Integrate drone warfare into **combined arms operations**.
- Prepare for drone-based **strategic strikes and surveillance** by adversaries.

Future of Drone Warfare: Human-Machine Integration

a. Rise of Autonomous Systems

The future battlefield will feature:

- AI-powered autonomous drones.
- Robots integrated with human troops.
- Human-machine teaming for faster, more efficient tactical response.

b. Enhanced Infantry

With drones king over dangerous reconnaissance and strike roles, the infantry can be **smaller but more specialized**:

- Emphasis on **high training standards**, especially among **junior and non-commissioned officers (JCOs/NCOs)**.
- Need for **advanced tactical adaptability**, decision-making, and tech proficiency.

India–Mongolia Joint Military Exercise Focuses on Counter-Terrorism Cooperation

Source: The Hindu

https://www.thehindu.com/news/national/indian-mongolian-contingents-exchange-best-practices-in-counter-terrorism-operations-in-joint-exercise/article69671858.ece

UPSC Syllabus Relevance: GS3 Defence

Context:

Exercise 'Nomadic Elephant'

Why in News

India and Mongolia are conducting the 17th edition of the joint military exercise 'Nomadic Elephant' in Ulaanbaatar from May 31 to June 13, 2025.

Background:

- The 17th edition of the bilateral military exercise **'Nomadic Elephant'** is being conducted from **May 31 to June 13, 2025**, at the **Special Forces Training Centre in Ulaanbaatar, Mongolia**.
- The exercise is a key step in enhancing **India-Mongolia defence cooperation**, particularly in **counter-terrorism operations** and **U.N. peacekeeping roles**.

Background: India-Mongolia Defence Relations

- India and Mongolia share a strategic partnership underpinned by **shared democratic values**, **historical Buddhist linkages**, and **regional security interests**.
- Mongolia considers India a "third neighbor" (after Russia and China), and the two countries have increasingly collaborated in

defence, capacity-building, and training.

- The **'Nomadic Elephant'** exercise is a bilateral annual event held alternately in India and Mongolia since 2006.

Key Objectives of Exercise 'Nomadic Elephant 2025'

1. **Enhancing Interoperability:**
   - Troops from both sides engage in **joint tactical drills**, promoting seamless cooperation in **multi-domain operations**.
   - Key focus areas include **precision sniping**, **room intervention**, and **hostage rescue operations**.
2. **Counter-Terrorism Training:**
   - The exercise simulates **non-conventional warfare in semi-urban and mountainous terrain**.
   - It aims to improve response to **asymmetric threats**, such as terrorism and insurgency.
3. **UN Peacekeeping Operations:**
   - Simulated scenarios reflect **real-world multinational operations** under **U.N. mandates**, preparing troops for collaborative missions in fragile regions.
4. **Operational Preparedness:**
   - Training involves **close-quarters battle drills**, **navigation exercises**, and **combat engineering** for high-altitude and urban environments.
5. **Cultural Exchange and Military Diplomacy:**
   - Promotes **people-to-people contact**, mutual respect, and trust among soldiers through **cultural events and interaction sessions**.

Features of the 2025 Edition

- **Location:** Special Forces Training Centre, Ulaanbaatar, Mongolia.
- **Indian Participation:** 45 personnel, mainly from a **battalion of the Arunachal Scouts**—a regiment experienced in high-altitude warfare.
- **Mongolian Participation:** 150 troops from **Mongolia's elite Special Forces**.
- **Previous Edition:** Held in **Umroi, Meghalaya**, in July 2024.

Tactical Components of the Exercise

Component	Details
Drills	Close combat, sniping, surveillance, area domination
Environment	Semi-urban, mountainous terrain (mirroring Himalayan and Central Asian conditions)
Simulations	UN-mandated peacekeeping operations, anti-insurgency scenarios
Technology	Integration of **communication systems**, **drone surveillance**, and **night vision tactics**

Strategic Significance

1. Strengthening Defence Diplomacy

- Reinforces India's image as a **reliable strategic partner** in East and Central Asia.
- Aligns with India's **Act East** and **Connect Central Asia** policies.

2. Counterbalancing Regional Dynamics

- With both countries sharing a border with **China**, the collaboration offers a **geostrategic counterbalance** in the region.

3. Capacity Building for Peacekeeping

- Enhances readiness for **UN peace support operations**, where India has a long-standing role as a **top troop-contributing nation**.

4. Building Tactical Synergy

- Promotes **standardized training** and shared tactics in **counter-insurgency**, **disaster response**, and **military assistance operations**.

Conclusion

- Exercise **'Nomadic Elephant 2025'** is more than a routine military drill—it is a symbol of India's growing **strategic outreach**, commitment to **global peacekeeping**, and **deepening bilateral ties** with Mongolia. \Through joint training, cultural bonding, and tactical preparedness, the exercise exemplifies how **defence cooperation** can

serve broader objectives of **regional peace, stability, and multilateral collaboration**.

Navy inducts INS Arnala

Source: Indian Express

https://indianexpress.com/article/explained/ins-arnala-what-sets-it-apart-warships-navy-10075701/

UPSC Syllabus Relevance: GS3 Defence

Context:

INS Arnala

Why in News

Recently, INS Arnala, India's first indigenously built Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) was commissioned.

Introduction

- On June 19, 2024, INS Arnala, the first ship of the indigenously built Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) class, was commissioned into the Eastern Naval Command of the Indian Navy at Visakhapatnam.
- Designed by Garden Reach Shipbuilders & Engineers (GRSE) and built in collaboration with L&T Shipbuilding, INS Arnala represents a significant step in India's efforts to modernise its naval capabilities and strengthen maritime security in coastal and shallow waters.

Background and Need

- India's coastline spans over 7,500 km, with strategic chokepoints, offshore assets, and critical shipping routes.
- The growing presence of foreign submarines, especially from China, in the Indian Ocean Region (IOR), poses a complex security challenge.
- The ageing Abhay-class corvettes, which have been in service for decades, are no longer adequate to address modern undersea threats. The ASW-SWC programme was conceptualised to fill this gap with next-generation shallow water platforms.

Key Features of INS Arnala

Design and Build

- Length: 77.6 metres
- Displacement: Approx. 1,490 tonnes
- Propulsion: Diesel Engine-Waterjet configuration — first of its kind in Indian Navy
- Named after: *Arnala Fort* near Vasai, Maharashtra

Indigenisation and Industrial Participation

- 80% indigenous content
- Major partners: BEL, L&T, Mahindra Defence, MEIL
- Over 55 Micro, Small and Medium Enterprises (MSMEs) involved
- Aligns with the 'Aatmanirbhar Bharat' initiative and promotes defence self-reliance

Operational Capabilities

- **Primary Role**: Anti-submarine warfare (ASW) in shallow coastal waters
- **Secondary Roles**:
  - Subsurface surveillance
  - Search and Rescue (SAR)
  - Low-intensity maritime operations
  - Mine-laying and area denial operations

Weapon and Sensor Systems

- Hull Mounted Sonar (Abhay), Low Frequency Variable Depth Sonar (LFVDS), and Underwater Acoustic Communication System (UWACS)
- Single centreline-mounted rocket launcher (new design to reduce hardware and cost)
- Lightweight torpedoes, ASW rockets, mine-laying systems, and anti-torpedo decoys

- Integrated Combat Management System and ASW Complex (IAC)

Strategic Significance

1. Coastal and Littoral Defence

- Operates efficiently in waters less than 30 metres deep
- Suitable for targeting small UUVs and midget submarines near the shore
- Enhances patrolling of India's vulnerable coastal areas and offshore energy installations

2. Countering Submarine Threats in IOR

- Reinforces India's deterrent posture against hostile undersea platforms
- Complements blue-water platforms like destroyers and frigates by filling the shallow water operational gap

3. Boost to Indigenisation and Employment

- Promotes domestic defence industry through indigenous design, electronics, weapons and MSME involvement
- Reduces dependency on foreign military hardware and improves India's technological base

Future Prospects

- 15 more ASW-SWC ships will be inducted progressively, standardising coastal ASW operations
- Will form a key component of India's layered maritime security architecture
- Supports India's aspirations to be a Net Security Provider in the Indian Ocean Region

Conclusion

- INS Arnala is not just a naval platform, but a symbol of India's evolving maritime doctrine that emphasises self-reliance, technological modernisation, and strategic coastal defence.
- With increasing underwater threats in the IOR, the induction of such shallow water combatants is critical for protecting national interests, securing sea lines of communication (SLOCs), and ensuring maritime dominance in the region.

Addressing India's Propulsion Gap

Source: The Hindu
https://www.thehindu.com/news/national/why-india-should-address-its-propulsion-gap/article69714631.ece
UPSC Syllabus Relevance: GS3 Defence

Context:

India's Propulsion Gap

Why in News

India's persistent propulsion gap continues to constrain its aerospace ambitions, despite advancements like the AMCA.

Introduction

- India's aspiration to emerge as a self-reliant global power in defence is evident in projects like the **Advanced Medium Combat Aircraft (AMCA)** — a fifth-generation stealth multirole fighter.
- However, a critical vulnerability continues to haunt the Indian aerospace and defence ecosystem: **engine dependency**.
- Despite multiple ambitious programmes since independence, the inability to design and produce indigenous jet engines has severely undermined India's strategic autonomy.

The HF-24 Marut: A Historical Cautionary Tale

- India's tryst with fighter aircraft indigenisation began with the **HF-24 Marut**, developed in the 1950s by **Hindustan Aeronautics Limited (HAL)** under German engineer **Kurt Tank**.
- The Marut was advanced for its time but was crippled by an **underpowered imported engine** (British Orpheus 703), as the envisioned high-thrust engine never materialised.
- **Performance**: While Marut performed credibly during the **1971 India-Pakistan War**, its operational ceiling and overall performance remained suboptimal.

- **Outcome**: Only **147 aircraft** were produced, with the fleet phased out by 1990 — highlighting that even a well-designed airframe cannot compensate for weak propulsion.

The Kaveri Engine Saga: Chronic Shortfalls

- In the 1980s, the **Gas Turbine Research Establishment (GTRE)** was tasked with developing the **Kaveri GTX-35VS** afterburning turbofan engine for the **Light Combat Aircraft (LCA)** project.
- **Timeline and Cost**: Despite **35 years** of R&D and over **₹2,032 crore** in expenditure (as of 2020), the engine failed to meet desired benchmarks.
- **Technical Limitations**:
  - Poor thrust-to-weight ratio
  - Thermal management issues
  - Reliability under sustained conditions
- **Revival Efforts and Failures**
- Attempts to revive Kaveri with foreign partnerships — including **Snecma (Safran)** and later through **Rafale offset clauses** — collapsed due to disagreements over technology sharing and institutional rigidity.

Current Dependence: A Matter of Strategic Concern

Light Combat Aircraft (LCA) – Tejas

- The **LCA Mk1 and Mk1A** variants are powered by **GE F404-IN20** engines.
- **Mk2** and **AMCA Mk1** plan to use the more powerful **GE F414** engine.
- A **$716 million contract** for 99 F404 engines (signed in 2021) faced delays, with the first engine delivered only in **April 2025**, citing supply chain issues.

Consequences

- Delay in commissioning LCA Mk1A squadrons
- Criticism from Air Chief Marshal A.P. Singh over HAL's repeated **delivery failures**
- IAF's **combat squadron strength** has plummeted to **around 30**, far below the sanctioned 42.5

Why Engine Technology Matters

Jet engines are not mere components — they are the **core enablers of aerospace sovereignty**, defining a fighter's:

- **Thrust & Speed**
- **Maneuverability & Payload**
- **Mission Endurance**
- **Export potential**
- Without engine autonomy, India remains vulnerable to **geopolitical disruptions**, **cost escalations**, and **third-party export restrictions**.

Across the Armed Forces: A Universal Vulnerability

- India's propulsion dependency is not limited to aircraft:
  - Army
  - Arjun Main Battle Tank: Powered by German MTU engines
  - Zorawar Light Tank: Uses U.S. Cummins engine
  - Navy
- Entire fleet — from **frigates to fast attack crafts** — depends on **Russian, French, German, Ukrainian, or U.S. engines**
- This blanket reliance on imported powerpacks for **land, air, and sea platforms** undercuts India's ambitions for defence export leadership and strategic autonomy.

Indigenous Engine Development: The Road Ahead

Immediate Challenges

- **Negotiation stalemate** with GE over local manufacture of F414 (GE demands additional $500 million)

- GE is unwilling to share critical technologies:
  - **Single-crystal turbine blades**
  - **Thermal barrier coatings**
  - **Advanced cooling systems**
- These are essential for developing high-thrust, long-life jet engines, but are closely guarded as strategic assets by OEMs.

Strategic Implications of Propulsion Dependency

- **Delayed Production and Induction:** Delays in engine supply translate into delays in fighter induction — as seen with LCA Mk1A.
- **Loss of Export Potential:** Export of fighters like Tejas requires third-party clearance from engine OEMs.
- **Strategic Vulnerability:** Dependence on Western or Russian suppliers for propulsion opens India to **supply-chain disruptions** and **foreign leverage**.
- **Stagnation in R&D:** Failure to master propulsion sidelines core R&D innovation and leads to overinvestment in airframes without matching propulsion capacity.

What Needs to Change?

- **Long-Term Vision and Political Will**
  - Defence planning must transcend **5-year cycles** and adopt a **20–30 year roadmap**.
  - Political and budgetary commitment must match rhetoric like **Atmanirbhar Bharat**.
- **Structural Reform in R&D**
  - Consolidate and **empower institutions** like GTRE with stable leadership and clear deliverables.
  - Encourage **DRDO–private sector–academia collaboration** in propulsion.
- **International Collaboration with Safeguards**
  - Joint ventures with firms like **Safran or Rolls-Royce** must go beyond license production and include **co-development with tech transfer**.
  - Government must be prepared to **invest heavily** in acquiring such capabilities.
- **Private Sector Integration**
  - India's **private sector** (e.g., Godrej, Tata Advanced Systems, L&T) must be incentivised to enter propulsion R&D.
  - Promote **competitive grants** and **incubation ecosystems** around propulsion innovation.

Conclusion

- India's ambitions to become a global defence manufacturing hub and a net security provider in the Indo-Pacific rest heavily on one missing piece: **a sovereign engine development capability**.
- Without mastering propulsion technology — the heart of aerospace and defence — India risks repeating the tragedy of the Marut with every new platform it dreams of.
- Engine development is not just a technological or financial challenge; it is a **strategic necessity**.
- If India truly wishes to assert itself as a 21st-century power, it must treat propulsion as its **national mission**, with the same intensity and unity as space, nuclear, and missile programmes.

INS Tamal: India's Latest Stealth Multi-Role Frigate

Source: The Hindu

https://www.thehindu.com/news/national/ins-tamal-indias-last-imported-warship-to-be-commissioned-on-july-1/article69724635.ece#:~:text=File%20image-,The%20Indian%20Navy%20is%20all%20set%20to%20commission%20its%20latest,over%20the%20past%20two%20decades

UPSC Syllabus Relevance: GS3 Defence

Context:

INS Tamal

Why in News

The Indian Navy is set to commission INS Tamal, its last foreign-built stealth multi-role frigate, on July 1, 2025, in Russia.

Introduction

- The Indian Navy is set to commission its latest stealth multi-role frigate, **INS Tamal**, on **July 1, 2025**, at **Kaliningrad, Russia**.

- Built at the **Yantar Shipyard**, INS Tamal marks a major milestone in India's naval modernization and self-reliance journey, being the last warship procured from a foreign source.

Background: India-Russia Naval Cooperation

- India and Russia have had a long-standing naval partnership, especially in the construction of **Krivak-class (or Talwar-class)** frigates.
- INS Tamal is the **eighth frigate** in this series to be inducted into the Indian Navy over the past two decades.
- It is part of a broader bilateral agreement under which India is also **building two more frigates (Triput-class)** at **Goa Shipyard Limited** using **Russian technology and design support**.

Significance of INS Tamal

1. Final Foreign-Built Indian Warship

- INS Tamal is the **last major warship** to be built outside India.
- Reflects a strategic shift in Indian defence procurement towards **indigenisation**, in line with **'Atmanirbhar Bharat'** and **'Make in India'**.

2. Enhancing Naval Power

- With INS Tamal's induction, India will operate **10 ships of similar capability** across four classes, all with:
  - Commonality in **weapons**
  - Standardised **sensors**
  - Shared **equipment** platforms

3. Technological Capabilities

- INS Tamal is a **stealth, multi-role frigate**, combining **Russian shipbuilding expertise** with **Indian weapon systems**.
- Key features include:
  - **Length**: 125 meters
  - **Displacement**: 3,900 tonnes
  - **Crew**: Over 250 trained personnel
  - **Stealth and Stability**: New design with advanced stealth features and superior sea-handling
  - **Weapon Systems**:
    - **BrahMos cruise missiles** (indigenously developed)
    - Modern sensors and electronic warfare suites
  - **Indigenous content**: 26% of the ship's components are Indian-made, with over **33 Made-in-India systems**—more than double compared to earlier ships in the series.

Strategic and Operational Relevance

1. Strengthening the Western Naval Command

- Upon commissioning, INS Tamal will be part of the **Western Fleet**, known as the **'Sword Arm'** of the Indian Navy.
- This strengthens India's presence in the **Arabian Sea**, **Persian Gulf**, and **Indian Ocean Region (IOR)**.

2. Training and Sea Trials

- The crew underwent **intensive training** in **challenging winter conditions** in **St. Petersburg** and **Kaliningrad**.
- The ship has successfully completed **extensive sea trials over three months**, validating all weapon and sensor systems.

Indigenisation and the Future

- India is now shifting towards **domestic warship production**, evident from:
  - Construction of **Triput-class frigates** at **Goa Shipyard**
  - Induction of other indigenous platforms like **INS Vikrant (aircraft carrier)** and **P-17A stealth frigates**
- INS Tamal symbolises the **end of an era of dependency** and the **beginning of full-spectrum indigenous warship building**.

PUBLIC HEALTH

Menstrual Health in India

Source: The Hindu

https://www.thehindu.com/sci-tech/health/the-politics-of-periods-why-india-cannot-afford-to-ignore-menstrual-health/article69636737.ece

UPSC Syllabus Relevance: GS2 Public Health

Context:

Menstrual Health in India

Why in News?

On Menstrual Hygiene Day (May 28, 2025), the spotlight returned to the persistent infrastructural, educational, and policy-level challenges affecting Menstrual Hygiene Management (MHM) in India.

Introduction

- Menstrual health is not merely a "women's issue." It intersects with public health, gender equity, education, sanitation, and economic participation.
- Yet, it remains largely sidelined in mainstream policy agendas, highlighting a serious governance gap that India can no longer afford to ignore.

The Complex Reality of Menstrual Health in India

1. Progress in Product Access, but Shallow Gains

- India has made progress in increasing access to commercial menstrual products.
- As per *NFHS-5*, approximately **78%** of menstruators reportedly use commercial sanitary protection.
- However, this number masks the reality that only **27.7%** of menstruators have access to a **comprehensive package**: products *plus* clean water, private sanitation, and soap – the core of menstrual hygiene.

Policy Insight: Focusing only on product distribution without investing in WASH (Water, Sanitation, and Hygiene) infrastructure creates a false sense of achievement.

2. Cultural Taboos and Social Exclusion

- Menstruation in India continues to be stigmatized. Girls are discouraged from going to school, entering kitchens, touching water pots, or participating in religious or social functions.
- This enforced isolation limits mobility, education, and social development – reinforcing patriarchal control over women's bodies and choices.

Societal Challenge:

- Stigma leads to silence, and silence results in poor knowledge, mismanagement, and psychological distress.

Limitations in Current Policy and Implementation

1. Fragmented and Underfunded Schemes

Government schemes like **'Ujjwala Sanitary Napkin Yojana'**, **'Asmita Yojana'** in Maharashtra, and **'Swechcha'** in Andhra Pradesh aim to provide sanitary products to adolescent girls. However, these initiatives suffer from:

- Narrow targeting (mostly school-going girls)
- Lack of sustainable menstrual product options
- Absence of disposal facilities
- Poor awareness campaigns
- Vulnerability to school closures and logistics

issues

Case in Point: During the COVID-19 pandemic, menstrual products were initially **excluded from the essential items list**, exposing policy insensitivity.

2. Gaps in Inclusive Design and Infrastructure

- Adult women, trans persons, and disabled individuals often fall outside the focus of current MHM policies.
- WASH facilities in rural schools and public institutions are often unsafe, unhygienic, and lack privacy.
- Poor disposal systems lead to environmental hazards and social backlash.

Way Forward

To address menstrual health holistically, India needs a **systemic policy approach** rather than scattered schemes.

1. Legislative and Institutional Reforms

- Make menstrual health education **mandatory** in schools for **all genders**, using scientifically accurate and age-appropriate content.
- Enact **Menstrual Health and Dignity Acts** at national and state levels.
- Institutionalize menstrual health as part of the **National Health Mission**, **Rural Development Programmes**, and **Swachh Bharat Abhiyan**.

2. Strengthen WASH Infrastructure

- Ensure that every school and public institution has **MHM-compliant toilets** – clean, private, equipped with water, soap, bins, and disposal units.
- Develop **national MHM infrastructure guidelines** for implementation across schools, workplaces, and public spaces.

3. Diversify Product Choices and Ensure Sustainability

- Promote **reusable and sustainable menstrual products** like cloth pads and menstrual cups with proper training and community outreach.
- Ensure access to **safe disposal mechanisms** to mitigate the environmental impact of disposable pads.

4. Health System Strengthening

- Train frontline health workers and doctors in **sensitive MHM counselling**.
- Integrate MHM into **primary healthcare services**, including routine check-ups and health insurance coverage.

5. Economic and Fiscal Interventions

- Eliminate all **taxes on menstrual products** to recognise them as essential commodities.
- Offer **targeted subsidies** and promote **local social enterprises** to manufacture and distribute sustainable menstrual products.
- **Integrate MHM budgets** into larger frameworks like education, WASH, and women's empowerment rather than creating isolated project lines.

Menstrual Health as a Strategic Investment

Menstrual health should not be viewed as welfare expenditure but as a **long-term economic and social investment**.

Benefit Area	Impact of Effective MHM Policies
Education	Reduced dropout rates, increased attendance among girls
Health	Fewer reproductive and urinary tract infections
Economy	Higher labour force

	participation, better productivity
Gender Equality	Greater agency, reduced discrimination
Environment	Sustainable practices, reduced non-biodegradable waste

Conclusion

- Menstrual hygiene must be recognized as a **fundamental right**, central to health, dignity, and equality.
- As India celebrates *Menstrual Hygiene Day*, it is time to translate symbolic observance into **transformative political action**.
- Leaders must prioritize MHM in public discourse, development planning, and budgetary allocations.

India & COVID-19: Focus on Readiness, Not Panic

Source: The Hindu

https://www.thehindu.com/opinion/editorial/readiness-not-panic-on-india-and-covid-19/article69649346.ece

UPSC Syllabus Relevance: GS 2 Public Health

Context:

Recent Rise in COVID-19 Cases in India

Why in News?

India has reported over 3,900 COVID-19 cases in 2025, prompting experts and public health authorities to advise precautionary measures for vulnerable populations.

Introduction

- India has observed a mild rise in COVID-19 cases in early 2025.
- While the numbers may seem concerning at first glance, they are still relatively low when compared to previous pandemic waves and must be interpreted in context.
- This data reflects that the current situation is not critical but does demand a proactive and measured response.

Key Issues and Insights

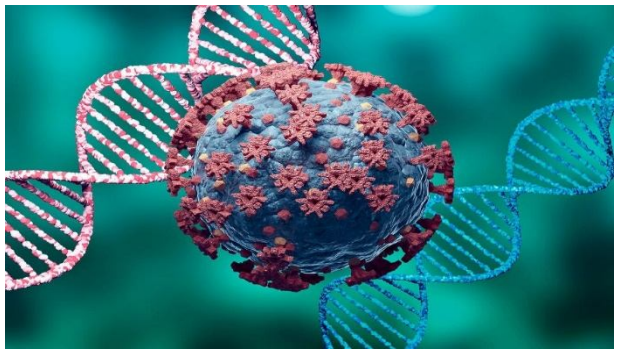
1. No Immediate Cause for Panic, But Caution is Essential

- Although the rise in cases may seem alarming, the absolute numbers remain low in a country with over 1.4 billion people. Moreover, not all states are seeing consistent day-on-day increases, and wherever increases occur, they are in single- or low double-digits.
- Thus, public anxiety or panic is not warranted. However, a cautious and vigilant approach is advisable, especially in light of past experiences.

2. Disproportionate Impact on the Vulnerable

People with pre-existing health conditions continue to face higher risks of severe illness if infected. Common co-morbidities include:

- Hypertension
- Diabetes
- Cardiovascular diseases
- Kidney diseases
- Obesity



- Advanced age (above 60 years)

These groups are advised to resume safety practices such as wearing masks in public and maintaining regular hand hygiene.

3. The Role of Natural Immunity and Vaccination

- The population has acquired considerable immunity from past infections and vaccinations.
- However, she emphasized the importance of continuing preventive strategies, including booster vaccinations for vulnerable groups.
- The challenge lies in vaccine availability. Even in urban areas, vaccine and booster supply is insufficient. This raises concerns about equitable access and preparedness.

Risks and Areas Requiring Attention

1. Vaccine Supply and Distribution

- The government must ensure the availability of COVID-19 vaccines and diagnostic kits across the country.
- These should be stockpiled and distributed in advance to avoid shortages.

2. Health Infrastructure Readiness

Hospitals in both public and private sectors must be prepared for any potential surge. This includes:

- Maintaining a steady supply of medical oxygen
- Ensuring the availability of hospital beds
- Training and deploying adequate healthcare personnel

3. Importance of Data Transparency

- One of the major criticisms during the previous waves of the pandemic was the lack of transparent and accurate data reporting. It is critical to avoid repeating this mistake.
- Both the central and state governments must ensure real-time, transparent dissemination of data related to infections, recoveries, and fatalities.

Lessons from the COVID-19 Pandemic: Policy Implications

Domain	Past Mistake/Challenge	Required Action
Governance	Data suppression and poor coordination	Ensure transparency and Centre-State cooperation
Health Infrastructure	Shortage of oxygen and hospital beds	Maintain emergency preparedness protocols
Vaccine Access	Uneven distribution and hesitancy	Ensure widespread availability and awareness
Public Health Communication	Misinformation and confusion	Disseminate clear, scientific, and consistent messages
International Commitments	Passive participation in global treaties	Actively uphold obligations under WHO agreements

Clarifying Preparedness Versus Panic

A crucial distinction between **panic** and **preparedness**:

- **Panic** is driven by fear, leading to irrational behavior and societal disruption.
- **Preparedness** involves systematic planning, resource allocation, and informed decision-making.

Polio Surveillance Network Faces Closure in India

Source: The Hindu

https://www.thehindu.com/sci-tech/health/government-plans-to-wind-down-national-polio-surveillance-network-centres-in-india/article69653654.ece#:~:text=The%20transition%20involves%20a%20gradual,government%2C%20according%20to%20the%20communique

UPSC Syllabus Relevance: GS2 Public Health

Context:

National Polio Surveillance Network (NPSN)

Why in News

The Government of India has proposed to gradually phase out the World Health Organization (WHO)-established National Polio Surveillance Network (NPSN) beginning June 2025.

Introduction

- The Government of India, in collaboration with the World Health Organization (WHO), has initiated a phased plan to scale down the **National Polio Surveillance Network (NPSN)**—a critical public health infrastructure responsible for tracking and responding to poliovirus transmission across the country.
- The move comes despite global concerns of

polio resurgence, raising alarms among public health experts.

About NPSN:

- Established in collaboration with WHO, the **NPSN** is a **nationwide network** of over **200 units**.
- It played a **crucial role in India's successful polio eradication campaign**, which led to India being declared **polio-free in 2014**.
- Apart from polio, NPSN units currently conduct **surveillance for measles, rubella, DPT**, and support **vaccine rollout and health workforce training**.

The Government's Proposal:

- The NPSN will be **phased out in a staggered manner**, starting June 2025.
- The number of functional units will be reduced:
  - **280 units** in **2024–25**
  - **190 units** in **2025–26**
  - **140 units** in **2026–27**
- The government plans to **integrate polio surveillance into the Integrated Disease Surveillance Programme (IDSP)** over time.
- This comes with a **corresponding reduction in government financial support** to the network.

Rationale Offered:

- WHO's India representative, **Dr. Roderico H. Ofrin**, clarified that the transition is **gradual and strategic**, ensuring:
  - **Critical surveillance activities are not compromised**
  - **Functions are absorbed into existing government systems**

Risk of Resurgence:

- With **diluted surveillance**, India risks becoming a **"sitting duck"** for:
  - **VDPV outbreaks**
  - **Transmission chains going undetected**
  - **Reversal of hard-won polio-free status**

3. Job Loss and Institutional Knowledge:

- The NPSN employs **thousands of skilled public health workers**.
- Staff are concerned about **job security** and **loss of institutional expertise** vital for disease surveillance and immunization.

Way Forward:

Short-Term Recommendations:

- **Pause the drawdown** until:
  - VDPV is controlled globally.
  - IPV coverage is universal.
  - State-level disease surveillance systems are robust enough to absorb NPSN functions.

Long-Term Recommendations:

- **Gradually integrate** NPSN functions into **IDSP and Universal Immunisation Programme (UIP)**.
- **Retain surveillance staff** by redeploying them for broader vaccine-preventable disease surveillance.

Conclusion:

- While the intent to integrate disease surveillance and rationalize public health infrastructure is understandable, the **timing and pace** of the proposed transition from NPSN seem **premature and risky**.
- In light of **ongoing global polio threats** and India's geographical proximity to affected countries, experts argue that dismantling NPSN could **undermine hard-earned gains** in public health.
- A **balanced, evidence-based approach** is necessary to ensure public health security is not compromised in the process.

Low Birth Weight in India: Trends, Disparities, and State-wise Burden

Source: The Hindu
https://www.thehindu.com/sci-tech/health/study-finds-low-birth-weight-from-4-states-makes-up-half-of-indias-cases/article69704172.ece

UPSC Syllabus Relevance: GS2 Public Health

Context:

Low birth weight (LBW) trends in India

Why in News?

A BMJ Global Health study based on NFHS data highlights that four states—Uttar Pradesh, Bihar, Maharashtra, and West Bengal—contribute nearly half of India's low birth weight cases.

Introduction

- A recent study published in *BMJ Global Health*, based on an analysis of all five rounds of the **National Family Health Survey (NFHS)**.
- It highlights critical trends and disparities in **low birth weight (LBW)** among Indian newborns over the past three decades.

Key Findings

- **Declining Trend Nationally**: The prevalence of low birth weight (<2.5 kg) in India declined from 26% in 1993 to 18% in 2021, indicating progress in maternal and child health.
- **State Concentration**: As per data from NFHS-5 (2019–21), 42 lakh babies were born with low weight in a single year. Four states — Uttar Pradesh, Bihar, Maharashtra, and West Bengal — accounted for nearly 47% of these cases.
- **State-wise Trends**:
  - **Highest LBW prevalence in 1993**: Rajasthan (48%)
  - **Highest in 2021**: Punjab and Delhi (22%)
  - **Lowest prevalence in 1993 and 2021**: Mizoram and Nagaland

Socioeconomic and Health Factors

- Babies with **low weight and smaller size at birth** were *more likely* to be born to:
  - Mothers with little or no formal education
  - Poorest households
- **Air pollution** exposure has also been associated with increased risk of LBW, as per supplementary studies.
- **Low birth weight is correlated with**:
  - Poor maternal nutrition
  - Inadequate antenatal care
  - Home births and unrecorded births
  - Poor access to institutional delivery services

Health Infrastructure and Data Gaps

- The **proportion of babies weighed at birth increased** from 16% in 1993 to **90% in 2021**, reflecting improved healthcare access.
- However, **LBW prevalence may be underreported** in regions with poor health infrastructure, as non-weighed children are often excluded from surveys.

Policy Implications and Recommendations

- The authors recommend:
  - **Targeted intervention** in high-burden states (U.P., Bihar, Maharashtra, West Bengal)
  - **Improved maternal nutrition**, especially for economically and socially disadvantaged groups
  - **Enhanced institutional deliveries and neonatal care**
  - **Strengthened data systems** for birth

weight reporting and maternal health monitoring
- **Reducing air pollution** as part of broader public health strategy

Conclusion

- While India has made commendable progress in reducing low birth weight prevalence, **concentrated efforts are needed in key states** and among vulnerable populations.
- Bridging health and nutritional inequalities, investing in maternal care, and building robust data systems remain central to improving neonatal outcomes and achieving national health targets like SDG 3 (Good Health and Well-being).

Organ Transplantation Programme in India

Source: The Hindu

https://www.thehindu.com/sci-tech/health/organ-transplants-hit-by-fund-constraints-and-infrastructural-deficiencies-report/article69724663.ece#:~:text=A%20report%20released%20by%20the,specialised%20doctors%2C%20and%20procedural%20delays

UPSC Syllabus Relevance: GS2 Public Health

Context:

Organ Transplantation Programme in India

Why in News

The Union Health Ministry's 2025 report has highlighted major systemic issues in India's public-sector organ transplantation programme.

Introduction

- A report released on **June 19, 2025**, by the **Union Ministry of Health and Family Welfare** has revealed that India's **organ transplantation programme** faces multiple systemic challenges, ranging from inadequate infrastructure and skilled manpower to procedural hurdles and lack of financial support for patients.
- The findings were presented after a high-level review of the current status of transplantation services, especially in **government hospitals**.

Current Status of Organ Transplantation in India

- In 2024-25, only **13,476 kidney transplants** were conducted in India, both by public and private institutions, against an estimated **demand of over 1 lakh**.
- The **public sector's capacity** is far below the national requirement.
- There is an **urgent need** to create more government transplantation centres and enhance the capacity of existing ones.

Key Challenges Identified

1. Infrastructural Deficiencies

- **Lack of specialised infrastructure** such as:
  - Dedicated transplant operation theatres (OTs),
  - Transplant Intensive Care Units (TICUs),
  - ICU beds for brain-stem dead (BSD) donors and recipients.
- Overburdened general ICUs and trauma centres, which results in:
  - Limited availability of ICU beds for potential organ donors.
- Absence of **in-house Human Leukocyte Antigen (HLA) cross-matching labs** in many AIIMS and government hospitals.
  - Dependence on external labs causes **delays** in donor matching and transplantation logistics.

2. Manpower Shortage

- **Acute shortage** of skilled personnel including:
  - Transplant surgeons,
  - Nephrologists,
  - Urologists,
  - Anaesthetists,
  - Neurologists/Neurosurgeons,
  - Intensive care specialists.
- Frequent **transfers of trained personnel** affect continuity of transplant programs.

3. Procedural and Regulatory Bottlenecks

- Delays in:
  - **Formation and approval** of Brain-Stem Death (BSD) Committees.
  - Initiating deceased donor programmes in hospitals.
- **Complex medico-legal formalities** associated with trauma cases (a primary source of deceased donors), deter effective organ retrieval and donation.

4. Financial Barriers

- **High cost of transplantation procedures**, equipment, and lifelong post-operative care (e.g., immunosuppressant drugs).
  - Many hospitals reported **insufficient funding** to begin or restart advanced transplant programmes such as **lung transplantation**.
- **Immunosuppressive therapy**, necessary for life, becomes unaffordable after the **first year**, as most government schemes only cover **initial treatment costs**.
- Current **central schemes** like **Ayushman Bharat PM-JAY** do **not cover**:
  - Liver and heart transplants,
  - Long-term drug therapy costs for transplant patients.

5. Data Transparency and Motivation

- **Non-sharing of transplant data** by hospitals has hindered monitoring and policy planning.
- **Lack of financial and institutional incentives** for transplant teams (surgeons, nurses, coordinators) impacts motivation and expansion of transplant services.

Recommendations by the Report

1. **Infrastructure Development**
   - Creation of **new government transplant centres**.
   - Upgrade existing OTs and ICUs to include **dedicated transplant facilities**.
   - Establish in-house **HLA typing laboratories** in all major transplant centres.
2. **Manpower Strengthening**
   - **Recruitment and retention** of transplant-specific specialists.
   - **Training programmes** to increase availability of skilled professionals.
   - Prevent frequent transfer of trained staff in transplant units.
3. **Process Reforms**
   - **Simplify and fast-track** the constitution of BSD Committees.
   - **Streamline medico-legal procedures** for trauma-related organ donation.
   - Improve coordination among hospital departments and police/legal authorities.
4. **Financial Support**
   - **Include liver and heart transplants** under Ayushman Bharat PM-JAY.
   - Extend financial coverage to include **lifelong immunosuppressant therapy**.
   - Allocate **separate grants** to hospitals to start/expand lung and other complex transplants.
5. **Incentivising Transplant Teams**
   - Provide **case-based financial incentives** to surgical and support teams to boost morale and performance.
   - Introduce institutional incentives for high-performing transplant centres.
6. **Monitoring and Data Sharing**
   - Enforce mandatory sharing of **real-time transplant data** with central databases (NOTTO).
   - Regular **audits and reviews** of transplant centres for transparency and accountability.

Way Forward

- With the **organ transplant demand-supply gap widening**, there is a pressing need to:
  - **Expand the donor pool**,
  - Improve **public awareness** on organ donation,

- Build a **robust deceased donor programme**.

- The **central and state governments** must work together to ensure:
  - **Policy implementation**,
  - Adequate **financial and human resources**, and
  - A **transparent and efficient organ transplant ecosystem**.

Conclusion

- India's organ transplantation programme holds immense potential but is currently hindered by systemic challenges.
- Addressing these issues with a **comprehensive policy overhaul**, infrastructure development, skilled human resources, and **equitable healthcare financing**—especially through schemes like **Ayushman Bharat PM-JAY**—can transform India into a global leader in ethical and accessible organ transplantation.

The Way Forward

Area	Recommendation
Legal Harmonization	Ensure State Bills align with Central laws and Supreme Court jurisprudence before passage.
Gender-Inclusive Reform	Expand the legal definition of sexual violence to cover all genders.
Strengthening Justice Delivery	Invest in forensic labs, police training, and court infrastructure to ensure efficient implementation.
Victim-Centric Support	Ensure rehabilitation, medical support, and psychological counseling are integrated with justice delivery.
Community and Technological Measures	Promote use of women safety apps, public awareness programs, and gender-sensitization initiatives.

India's Zero-Dose Crisis for Children Miss Vaccines

Source: The Hindu
https://www.thehindu.com/sci-tech/health/indias-alarming-vaccination-gap-144-million-children-still-zero-dose-lancet-study-reveals/article69734403.ece
UPSC Syllabus Relevance: GS2 Public Health

Context:

Zero-Dose Children policy

Why in News?

India recorded 1.44 million zero-dose children in 2023, making it the second-highest globally, as per the Lancet study by the Global Burden of Disease Vaccine Coverage Collaborators.

Introduction

- On June 25, 2025, a new analysis by the **Global Burden of Disease Study Vaccine Coverage Collaborators**, published in *The Lancet*, shed light on the alarming stagnation in global childhood immunisation efforts.
- Of particular concern is **India's position as the country with the second-highest number of "zero-dose" children** — 1.44 million in 2023 — second only to Nigeria.
- The findings come amidst global efforts to achieve the 2030 immunisation targets under the Sustainable Development Goals (SDGs) and the Immunization Agenda 2030 (IA2030).

What Are Zero-Dose Children?

- Zero-dose children are those who **have not received even a single dose of the diphtheria, tetanus, and pertussis (DTP)** vaccine by the age of one.
- This indicator is a widely used proxy for broader immunisation access and health system reach.

Key Findings of the Study

- **Global Outlook:**
  - In 2023, **15.7 million children globally** had received no DTP vaccine doses.
  - **More than half** of these unvaccinated children live in just **eight countries**, with India and Nigeria being the largest contributors.
  - **South Asia** accounts for **13%** of global zero-dose children.
  - Measles vaccination coverage fell in **100 of 204 countries** between 2010 and 2019.
  - 21 of 36 **high-income countries** also recorded dips in vaccination for key diseases such as measles, polio, TB, and DTP.
- **India's Position:**
  - India recorded **1.44 million zero-dose children** in 2023, a figure that poses serious public health challenges.
  - The **Zero-Dose Implementation Plan 2024** has been launched in **143 districts across 11 States**.
  - Between 2020 and 2023, India also witnessed increased **missed immunisations** due to COVID-19 disruptions.

Challenges in India's Immunisation Landscape

1. **Post-Pandemic Setbacks:**
   - The COVID-19 pandemic led to **suspension of outreach services**, movement restrictions, and diversion of health workforce, contributing to immunisation gaps.
2. **Health Infrastructure Gaps:**
   - Variability in **healthcare delivery systems**, especially in remote tribal, urban slum, and conflict-affected areas, continues to impede universal coverage.
3. **Vaccine Hesitancy & Misinformation:**
   - Rising **vaccine hesitancy** due to social media misinformation and lack of awareness among communities undermines demand for immunisation services.
4. **Socio-Cultural Barriers:**
   - Gender disparities, caste-based exclusion, and **lack of culturally adapted IEC** (Information, Education, Communication) strategies hinder outreach in diverse populations.
5. **Logistics & Cold Chain Issues:**
   - Maintenance of cold chain systems and timely delivery of vaccines remain persistent operational challenges in rural India.

Policy and Programmatic Responses

1. Expanded Programme on Immunization (EPI)

- Launched in 1974 by WHO and adopted by India, EPI has **vaccinated over 4 billion children globally** and averted 154 million deaths. India's EPI evolved into the **Universal Immunisation Programme (UIP)** in 1985.

2. Mission Indradhanush (2014)

- Targeted approach to reach unvaccinated and under-vaccinated children and pregnant women. Expanded through **Intensified Mission Indradhanush (IMI)** phases and special campaigns.

3. Zero Dose Implementation Plan 2024

- Covers 143 districts across 11 states identified with high numbers of zero-dose children.
- Focuses on **mapping, microplanning, capacity building**, and **community**

engagement.

4. Digital Monitoring Platforms

- **Co-WIN and U-WIN** platforms have potential to track real-time vaccination data and identify coverage gaps.

Implications for Public Health and SDGs

- **Missed Immunisation → Increased Outbreaks:**
  Stagnation or decline in routine immunisation increases the risk of outbreaks of **measles, polio, diphtheria**, etc.
- **Global Immunisation Agenda 2030 (IA2030):**
  The goal of **zero-dose child reduction by 50% by 2030** may remain elusive without urgent action.
- **Equity as a Core Concern:**
  The study notes that transformational improvements in **equity and trust-building** are essential. Without this, both SDG Goal 3 (Good Health and Well-being) and IA2030 goals are under threat.

Expert Recommendations and Way Forward

1. Community-Centric Approaches

- Engage **ASHA, Anganwadi Workers**, and **community influencers** to improve awareness and trust.
- **Culturally tailored IEC materials** in local languages to counter vaccine hesitancy.

2. Data-Driven Interventions

- **Use geospatial data** and digital tracking systems to identify zero-dose clusters and plan outreach.

3. Health Systems Strengthening

- Strengthen the **last-mile delivery systems**, including cold chain, transport, and trained personnel.

4. Global and Domestic Funding

- With a potential fall in international aid, the need for **sustained public investment** in immunisation is crucial.

5. School-based and Mobile Immunisation Drives

- Leverage **school platforms, mobile health units**, and **urban health missions** to cover unreached populations.

Conclusion

- India's high burden of zero-dose children is a **critical public health challenge** that threatens to reverse decades of immunisation gains.
- The *Lancet* study is a timely reminder that while substantial progress has been made since the launch of EPI in 1974, **equity, resilience, and innovation** must now define India's immunisation strategy.
- Achieving the **IA2030 targets and SDG 3** will require not just expanded coverage but **deep systemic reforms** that prioritise the health of every child, regardless of geography, gender, or socio-economic status.

SOCIAL JUSTICE

Empowering women in agriculture for food security

Source: The Hindu

https://www.thehindu.com/opinion/op-ed/empowering-women-in-agriculture-for-food-security/article69675539.ece

UPSC Syllabus Relevance: GS2 Social Justice

Context:

International Year of the Woman Farmer

Why in News

The United Nations General Assembly has declared 2026 as the International Year of the Woman Farmer to recognize women's vital role in agriculture and address the challenges they face globally.

Background:

- In a landmark move, the United Nations General Assembly has declared **2026 as the International Year of the Woman Farmer**, with support from over 100 countries.
- The resolution recognizes the **critical role of women in agriculture** and aims to raise awareness about the systemic challenges they face, such as limited **land ownership**, **credit access**, and **climate vulnerability**.

Role of Women in Agriculture

- Women contribute to **60%–80%** of food production in developing countries.
- In **South Asia**, they form **39%** of the agricultural labour force.
- In India, **80%** of economically active women work in agriculture, but only **14%** are landowners (NFHS: **only 8.3%** actually own land).
- Despite their contributions, women face barriers in **credit access**, **technology use**, and **agricultural advisory services**.

Structural Barriers and Challenges

- **Lack of land ownership** excludes women from formal **financial systems** and **government schemes**.
- **Gender gaps in mobile phone ownership** reduce access to real-time market and climate information.
- Microfinance and SHG loans help but remain **insufficient for capital-intensive needs**.

Government and Institutional Interventions

- **Mahila Kisan Sashaktikaran Pariyojana (MKSP)**: Enhances women farmers' skills and resources.
- **Sub-Mission on Agricultural Mechanisation**: Offers **50%–80% subsidies** on farm machinery to women farmers.
- **National Food Security Mission (NFSM)**: **30% budget earmarked for women farmers** in selected states.

ENACT Project – A Model for Climate-Resilient Empowerment

- Implemented by **WFP and Government of Assam**, funded by **Norway**.
- Focuses on **climate adaptation** using **nature-based solutions** and **gender-transformative approaches**.
- Promotes **flood-resistant rice**, **climate advisory via mobile phones**, and **smart seed production** by women's groups.

- Uses **information centres** and **video conferencing** to connect women to experts.
- Leverages **partnerships** with state agriculture, meteorology, and environment departments.

Forward-Looking Recommendations

- Develop **gender-disaggregated data** for informed policymaking.
- Design **women-friendly farming tools**, credit systems, and market linkages.
- Promote **women-led agri-value chains** and **self-help groups** for collective empowerment.
- Scale up **climate adaptation models** based on community knowledge and local needs.

Conclusion

- The declaration of 2026 as the *International Year of the Woman Farmer* is a **historic opportunity** to acknowledge the soften-invisible contribution of women in agriculture.
- By addressing structural barriers, enhancing institutional support, and promoting **climate-resilient and inclusive practices**, India and the world can move toward a more **equitable and sustainable agricultural future**.

QS World Rankings 2025

Source: Indian Express

https://indianexpress.com/article/education/qs-rankings-iit-delhi-jumps-27-ranks-tops-india-list-is-123-globally-10074885/

UPSC Syllabus Relevance: GS2 Social Justice

Context:

QS World Rankings 2025

Why in News?

For the first time in eight years, IIT Delhi emerged as the highest-ranked Indian institution in the QS World University Rankings 2026, surpassing IIT Bombay.

Introduction

- The QS World University Rankings 2026, released by QS Quacquarelli Symonds, brought a significant reshuffle among India's top institutions.
- For the **first time in eight years**, **IIT Delhi emerged as the highest-ranked Indian institution**, overtaking **IIT Bombay**, which had largely dominated Indian rankings over the past decade.

Top-Ranked Indian Institutions

Institution	2026 Rank	2025 Rank	Rank Change
IIT Delhi	123	150	+27
IIT Bombay	129	118	-11
IIT Madras	180	227	+47
IISc Bangalore	219	211	-8
IIT Kharagpur	215	-	-
IIT Kanpur	222	-	-
Delhi University	328	328	0
IIT Guwahati	334	-	-
IIT Roorkee	339	-	-
Anna University	465	383	-82

- Only **IIT Delhi, IIT Bombay**, and **IIT Madras** are in the **global top 200**.
- **IIT Madras** made it to the top 200 for the **first time**.

India's Global Standing

- **India is the 4th highest contributor** to the QS rankings with **54 institutions**, following:
  - USA: 192 institutions
  - UK: 90 institutions
  - China: 72 institutions

- In 2015, only **11 Indian institutions** were ranked; the figure has increased **by 390%** to 54 in 2026.

Performance Metrics: IIT Delhi vs. IIT Bombay

Metric	IIT Delhi	IIT Bombay
Citations per Faculty	93.1	82.9
International Student Ratio	6.3	1.5
International Research Network	66.9	46.6
Sustainability	79.9	75.2
Academic Reputation	Lower	Higher
Employer Reputation	+23 ranks	Higher
Employment Outcomes	50.5	72.6

Note: Sustainability saw a **major improvement for IIT Delhi**, rising by **252 places**.

Emerging Trends

1. Rise of New Indian Institutions

Eight new Indian universities entered the rankings in 2026:

- **IIT Gandhinagar** (801–850) — the only public entrant
- **Private Entrants**: Ashoka University, Shiv Nadar University (1201–1400), Lovely Professional University (901–950), Christ University (1401+), KIIT (1001–1200)

2. Top Performers by Metric

- **Faculty Citations**: IISc ranked **15 globally**, Anna University at **23**, IIT BHU at **47**.
- **Employer Reputation**: IIT Bombay ranked **39 globally** (best among Indian institutions).
- **Employment Outcomes**: Only **University of Delhi** and **University of Mumbai** made it to the **global top 100**.
- **Academic Reputation**: No Indian institution in the **global top 100**.

Institutional Improvement: Case of IIT Delhi

Prof. Vivek Buwa, Dean (Planning) at IIT Delhi, attributed the rank rise to:

- **Improved research facilities** via the **Institute of Eminence funding** (₹200–300 crore for equipment).
- **International collaborations** and joint publications with global institutions.
- Strategic focus on **citations, research network, and sustainability**.

QS Ranking Methodology: Key Weightages

Metric	Weightage
Academic Reputation	30%
Employer Reputation	15%
Faculty/Student Ratio	10%
Citations per Faculty	20%
International Faculty	5%
International Students	5%
Employment Outcomes	5%
International Research Network	5%
Sustainability	(New metric, evolving)

Sustainability is the newest metric, involving over **50 indicators** sourced from university data, public data, and bibliometric databases.

Analysis: Implications for India

Positive Trends:

- India's **global academic visibility is rising** steadily.
- IIT Delhi's rank improvement shows that **targeted investment and data transparency** can yield measurable improvements.
- **Private universities** are making inroads into global rankings.

Challenges:

- India still lacks representation in the **top 100 globally**.
- Poor performance in **academic reputation**, despite high-quality output.
- Need for greater **internationalization** — low foreign student/faculty ratios.

Conclusion

- The QS World University Rankings 2026 showcase both **India's progress and persistent gaps** in global higher education.
- IIT Delhi's rise to the top among Indian institutions after eight years highlights the impact of sustained funding, infrastructure development, and global partnerships.
- However, to break into the global top 100, Indian universities must strengthen their academic reputation, diversify their faculty and student body, and enhance global engagement.

State-Level Anti-Rape Legislations in India

Source: The Hindu

https://www.thehindu.com/news/national/anti-rape-laws-how-many-states-passed-them-and-have-they-been-implemented/article69708056.ece

UPSC Syllabus Relevance: GS2 Social Justice

Context:

Anti-Rape Legislations

Why in News?

Several Indian States have passed anti-rape Bills proposing stricter punishments, but many remain unenforced due to the requirement of Presidential assent and conflicts with central laws.

Introduction

- As the monsoon session of legislative assemblies across India begins, a number of anti-rape Bills—some recently passed and others long pending—are awaiting implementation.
- While several State Assemblies have introduced and even passed stricter laws in response to brutal incidents of sexual violence, these have frequently failed to secure the President's assent or have been returned for legal and constitutional review.
- This reflects the challenges in legislating criminal laws in India's federal framework, where both the Centre and the States share jurisdiction over criminal matters.

Background: The Nirbhaya Case as a Turning Point

- The brutal gang-rape and murder of a 22-year-old medical intern in Delhi in December 2012 ignited national outrage and triggered a re-evaluation of India's criminal laws related to sexual violence.
- The Criminal Law (Amendment) Act, 2013 was passed in response, introducing several new offences and significantly enhancing punishments.

Key changes under the 2013 law included:

- Raising the minimum sentence for rape to 20 years, extendable to life imprisonment.
- Permitting the death penalty for repeat rape offenders.
- Recognizing stalking, voyeurism, and acid attacks as separate crimes with stricter punishments.
- Strengthening provisions under the Protection of Children from Sexual Offences (POCSO) Act.

This central legislation set a legislative benchmark and inspired States to propose additional reforms within their jurisdictions.

Criminal Law and the Federal Structure

Constitutional Position

- Criminal law falls under the Concurrent List (Entry 1, List III, Schedule VII) of the Indian Constitution. This means both Parliament and State legislatures are empowered to enact laws in this domain.
- However, Article 254(2) of the Constitution states that if a State law contradicts an existing Central law on the same subject, it can only come into effect after receiving **the**

assent of the President of India.

- This has resulted in numerous State-passed anti-rape Bills awaiting Presidential approval for several years, due to overlaps or conflicts with national laws or constitutional concerns.

Key Legislative Developments: Timeline and Analysis

1. Central Legislation: 2013 and 2018

Criminal Law (Amendment) Act, 2013

Passed after the Nirbhaya case, this law overhauled provisions of the Indian Penal Code (IPC), the Code of Criminal Procedure (CrPC), and the Indian Evidence Act. It addressed:

- Rape, stalking, and acid attacks with enhanced penalties.
- Procedural safeguards for victims.
- A widened definition of sexual assault.

Criminal Law (Amendment) Act, 2018

This Act was passed in response to horrific cases such as the Kathua and Unnao rapes. Key provisions included:

- Minimum 20 years to life or death penalty for raping children under 12.
- Stricter punishment for raping girls below 16.
- Fast-track procedures for trial and investigation.

This 2018 Act largely nullified the need for earlier State-level amendments on child rape.

State-Level Legislative Actions

Madhya Pradesh, Rajasthan, Haryana, Arunachal Pradesh (2017–2018)

- These States introduced amendments to the IPC to allow for the death penalty for rape of girls below the age of 12.
- However, once the Central law in 2018 addressed similar issues, these amendments became largely redundant, although they still demonstrated the urgency with which States were responding to local crimes.

Andhra Pradesh (2019)

Following the gang-rape and murder of a young veterinary doctor in Hyderabad, the Andhra Pradesh government introduced:

- The Andhra Pradesh Special Courts for Specified Offences Against Women and Children Act.
- The Andhra Pradesh Disha Act.

Provisions included:

- 14-day limit for filing chargesheets.
- Death penalty for rape and murder.
- Establishment of special fast-track courts.

Despite the political push, especially by the then Chief Minister, the Bills are still awaiting Presidential assent.

Maharashtra (2021)

After the gang-rape of a 15-year-old girl by multiple perpetrators, the Maharashtra government passed the Shakti Criminal Laws (Maharashtra Amendment) Bill. It proposed:

- Death penalty for rape, gang-rape, and severe acid attacks.
- Strict timelines: 30 days each for investigation, trial, and appeal.
- Penalties for filing false complaints and intimidation.

The Bill was returned by the Centre due to concerns over judicial overreach and its conflict with Supreme Court guidelines.

West Bengal (2024)

Following the rape and murder of a female doctor, the West Bengal Assembly passed the Aparajita Woman and Child Bill, amending the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and POCSO Act within the State. The Bill:

- Mandated life imprisonment without parole or death in aggravated rape cases.
- Introduced a 21-day investigation limit.
- Directed convicts to financially compensate victims for medical and rehabilitative expenses.

The Bill awaits the President's assent.

Tamil Nadu (2025)

The State Assembly passed the Criminal Laws (Tamil Nadu Amendment) Bill with the following provisions:

- Minimum 14 years of rigorous imprisonment for rape.

- 20 years minimum if the perpetrator is a police officer.
- Death penalty for raping girls below 12 years of age.

This Bill, too, is pending central approval.

Central Legal Overhaul: Bharatiya Nyaya Sanhita (2023)

In 2023, Parliament repealed colonial-era criminal laws and introduced:

- Bharatiya Nyaya Sanhita (BNS), replacing IPC.
- Bharatiya Nagarik Suraksha Sanhita (BNSS), replacing CrPC.
- Bharatiya Sakshya Act (BSA), replacing the Indian Evidence Act.

Changes introduced in BNS include:

- Age-specific classification of rape victims and corresponding punishments.
- Punishment for sexual intercourse through false promise or deceit.
- Recognition of sexual exploitation without requiring physical force.

However, the law has been criticized for:

- Exclusion of marital rape from the definition of rape.
- Failing to include male and transgender victims, though future amendments have been indicated.

These laws came into force on July 1, 2024.

Key Issues and Challenges

Federal Difficulties in Lawmaking

- State amendments to criminal law require Presidential assent when they overlap with Central laws.
- The delay or denial of assent highlights friction in Centre-State legislative coordination and undermines the urgency behind State legislative efforts.

Legal Validity and Judicial Concerns

- Some State Bills, such as Maharashtra's Shakti Bill, have been flagged for overstepping Supreme Court rulings and due process norms.
- Laws prescribing death penalty or extremely short trial deadlines have been questioned for potentially compromising the rights of the accused.

Gender Exclusivity of Laws

- Most laws are centered around female victims.
- There is a growing demand to extend protections to male and transgender victims of sexual violence, an area not yet adequately addressed in national laws.

Implementation Deficits

- Despite strong laws, fast-track courts remain under-resourced.
- Forensic and police capacities are inadequate in many regions, undermining the objectives of timely justice.

CBSE Class 10 students to get option of two exams

Source: The Hindu
https://www.thehindu.com/education/cbse-approves-twice-a-year-board-exams-for-class-10-from-2026/article69735644.ece
UPSC Syllabus Relevance: GS2 Social Justice

Context:

CBSE's Two-Exam System for Class 10

Why in News?

From the academic year 2026–27, CBSE will allow Class 10 students to take board exams twice a year to reduce exam stress and align with NEP 2020 recommendations.

Introduction

- In a significant reform aligned with the **National Education Policy (NEP) 2020**, the **Central Board of Secondary Education (CBSE)** has announced that starting from the **academic year 2026–27**, **Class 10 students** will be allowed to take their **board exams twice a year**.
- This aims to reduce the pressure of "high-stakes" exams and promote a more flexible, student-friendly evaluation system.

Key Features of the Reform

1. Dual Examination Opportunity

- All Class 10 students will have to mandatorily appear for the **first board exam**, which will be held in **mid-February**.
- Students who pass the first exam will have the option to **improve their scores** in **up to three academic subjects** (Science, Mathematics, Social Science, and two languages) by appearing in a **second exam** in **May**.

2. Optional Nature of the Second Exam

- The **second examination is not compulsory**. It is meant **only for improvement**.
- The **better score** between the two attempts will be considered for the **final mark sheet**.

3. Eligibility Criteria

- Students must **pass the first exam** and appear in **at least three subjects** to be eligible for the second exam.
- Students who **fail in three or more subjects**, or **do not appear in three or more subjects**, will not be allowed to appear for the second exam and will be placed in the **'Essential Repeat'** category.

Revised Categories of Students

Category	Criteria	Allowed to Take 2nd Exam?
Improvement	Passed first exam; want to improve in up to 3 subjects	Yes
Compartment	Failed or missed 1–2 subjects	Yes (second exam considered as attempt)
Essential Repeat	Failed in 3+ subjects or missed 3+ papers in the first exam	No (Can reappear only next year)
Special Category	Students with valid reasons (sports events, snow-bound areas, etc.) for missing the exam	Yes, with appropriate documentation

Compartment Policy: Redesigned Timeline

- **Until 2025–26**: Compartment exams in **July**, results in **August**.
- **From 2026–27**:
  - **First attempt** (merged with the second/improvement exam) – **June**
  - **Second attempt** – during **next year's main exam**
  - **Third attempt** – during **next year's improvement exam**

Rationale Behind the Policy Shift

1. Alignment with NEP 2020

- NEP recommends making board exams **low-stakes** and allowing **flexible learning paths**.
- Emphasis on **learning outcomes** rather than rote memorization or a one-shot evaluation model.

2. Reducing Stress

- Exam pressure has been a major concern for students and parents.
- Multiple opportunities to improve scores promotes a more **joyful learning environment**.

3. Better Academic Opportunities

- Students can secure higher marks in core subjects needed for **career and stream selection**.
- Helps students who might have had temporary setbacks (illness, anxiety, or other issues).

Operational and Logistical Advantages

1. Faster Declaration of Results

- **First exam results** by **April**.
- **Second exam results** by **June**, aiding **timely Class 11 admissions**.

2. Use of DigiLocker

- Marksheets of the first exam will be made available digitally for immediate **Class 11 admissions**.

3. Reduced Delay

- Earlier, students appearing for improvement or compartment had to wait till **August**.
- Now, **admissions won't be delayed**, and **provisional admission** will be granted based on first results.

Safeguards Against Misuse

- **"No opportunity shopping"** clause: To prevent misuse, students who don't take the first exam seriously or skip it cannot appear for the second exam.
- This ensures the **first exam remains the main evaluation**, not just a dry run.

Special Considerations

1. Subject Replacement Cases

- Students who passed by replacing a failed subject can still opt to **improve in the failed subject**, especially if it is necessary for **further academic pursuits** (e.g., Maths for Science stream).

2. Sports Quota and Remote Areas

- Athletes or students from **snow-bound regions** (e.g., Ladakh) will be allowed flexibility to appear in the **second round** if they miss the first due to genuine reasons.

Significance in the Indian Education System

- Encourages **assessment for learning** rather than **assessment of learning**.
- Provides a **second chance** within the same year — reducing **academic stigma**.
- Aligns Indian board exam structure closer to **international practices** (like SAT, IB).

Conclusion

- CBSE's two-exam policy for Class 10 students marks a progressive step in school education reform.
- It upholds the spirit of equity, flexibility, and student-centric learning as envisaged in the NEP 2020.
- While implementation will require careful planning and communication to all stakeholders, this initiative holds the promise of transforming the exam-centric approach of India's schooling system into one that prioritizes learning outcomes and emotional well-being.

DISASTER MANAGEMENT

India's Disaster Management Gets a Tech Boost

Source: The Hindu

https://www.thehindu.com/news/national/shah-launches-three-tech-platforms-to-improve-speed-precision-in-disaster-management/article69701986.ece

UPSC Syllabus Relevance: GS3 Disaster Management

Context:

Launch of ICR-ER, NDEM Lite 2.0, and Assam Flood Atlas

Why in News?

Union Home Minister launched three major tech platforms—ICR-ER, NDEM Lite 2.0, and the Assam Flood Hazard Atlas.

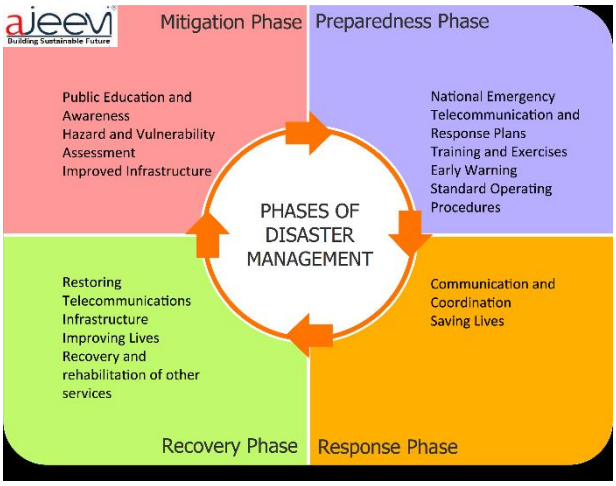
Introduction

- Union Home Minister Amit Shah unveiled three major technological platforms aimed at enhancing the speed, precision, and coordination of India's disaster response mechanism.
- These were launched during the annual conference of Relief Commissioners, Disaster Management Secretaries, and State Disaster Response Forces.

Key Highlights:

1. Technological Platforms Launched:

- **Integrated Control Room for Emergency Response (ICR-ER):** A real-time satellite-data streaming system designed to support nationwide disaster response by enabling immediate coordination among rescue agencies.
- **National Database for Emergency Management Lite 2.0 (NDEM Lite 2.0):** A decentralized and mobile-enabled data system that allows emergency response forces across remote locations to act cohesively and swiftly.
- **Flood Hazard Zonation Atlas of Assam:** A satellite-based flood mapping tool that tracks flood patterns and water levels, aimed at planning floodplain development, disaster mitigation, flood-resilient agriculture, and insurance implementation.



Objectives and Benefits:

- Enhance real-time decision-making through tech-enabled control rooms.
- Enable precise and coordinated responses using centralised and accessible data.
- Promote preparedness and resilience, especially in flood-prone states like Assam.
- Support district and tehsil-level decentralization of disaster management strategies.

Shift in Disaster Management Approach:

Mr. Shah highlighted that under the Modi government, India has moved:

- From a **relief-centric** to an **integrated and proactive** approach.
- Towards **anticipating future disasters**, conducting **advanced research**, and adapting global practices to Indian geography.
- From centralised plans to **district-level**

disaster preparedness, with directives to complete district disaster plans within 90 days.

Focus Areas:

- **Capacity Building:** Structural and financial empowerment of disaster management institutions.
- **Efficiency and Speed:** Use of cutting-edge technologies and expanding response capabilities to the tehsil level.
- **Accuracy and Forecasting:** Improved early warning systems and forecasting tools for better public awareness and response readiness.

Financial Commitment:

- **State Disaster Response Fund (SDRF):**
  - 2004–2014: ₹38,000 crore
  - 2014–2024: ₹1.44 lakh crore
- **National Disaster Response Fund (NDRF):**
  - 2004–2014: ₹28,000 crore
  - 2014–2024: ₹84,000 crore

Total budget increased from ₹66,000 crore to ₹2 lakh crore, nearly a threefold rise.

Policy Directions and Future Roadmap:

- Inclusion of **district- and tehsil-level teams** in national disaster conferences.
- Formulation of a **Lightning Action Plan** to address increasing lightning incidents.
- Implementation of the **Incident Response System (IRS)** across all states.
- Emphasis on **environmental conservation** as a core of disaster mitigation strategy.

Conclusion:

- The launch of these technological platforms signifies a strategic transformation in India's disaster management framework.
- With greater financial outlays, enhanced institutional capabilities, and integration of advanced technologies, India is positioning itself as a **global leader** in disaster preparedness and response.
- The focus on decentralization, anticipatory planning, and inter-agency coordination reflects a **whole-of-government** and **whole-of-society** approach to disaster resilience.

Indian cities have a drainage problem

Source: Indian Express

https://indianexpress.com/article/opinion/columns/indian-cities-have-a-drainage-problem-10042712/?ref=premium_hp

UPSC Syllabus Relevance: GS3 Disaster Management

Context:

Urban Flooding

Why in News

Several Indian cities, including Delhi, Mumbai, and Bengaluru, have recently witnessed severe urban flooding due to intense rainfall and inadequate drainage infrastructure.

Changing Rainfall Patterns and the Impact of Climate Change

- One of the primary causes of increased urban flooding in Indian cities is the change in rainfall patterns due to climate change. There has been a noticeable rise in the **intensity and frequency** of rainstorms, particularly **short-duration high-intensity rainfall events**.
- Traditionally, city drainage systems were designed based on a **return period of one in two years**, meaning they were expected to handle rainfall events likely to occur once every two years.
- However, current rainfall events often exceed these estimates, leading to widespread urban inundation.
- The gap between designed capacity and actual rainfall has widened significantly due to the effects of global warming and erratic monsoons.
- This is a critical issue for urban resilience, as most cities have not updated their infrastructure to cope with extreme weather events.

Outdated and Inadequate Drainage System Design

- When Indian cities were first developed, their drainage systems were designed to carry stormwater from roofs, streets, and roads to natural water bodies.

These systems were based on:

- Historic rainfall data
- Land use patterns prevalent at the time
- Limited urban spread and population

Over time, these parameters have changed drastically.

- Urban areas have grown both in size and population, but the drainage systems have not been correspondingly updated or expanded.
- The result is **systemic inadequacy**, where even moderate rains can lead to flooding in certain areas.

The design limitations are further compounded when drains are unable to discharge stormwater efficiently due to capacity constraints.

Increase in Impervious Surfaces

- The **increase in paved, concretised, and built-up areas** has drastically reduced the amount of land available for natural absorption of rainwater.

- Earlier, open spaces and unpaved surfaces absorbed a significant portion of the rainfall, reducing the burden on stormwater drains.
- Now, with fewer permeable surfaces, a larger volume of water becomes **surface runoff**, which flows directly into the drainage system.
- This excess volume was not anticipated during the original design of stormwater systems, leading to system overload and flooding.

Mismatch Between Catchment Areas and Drain Sizes

- Stormwater drains are designed based on the **catchment area**, which refers to the land area from which rainwater flows into a particular drain.
- As urban areas expand, these catchment areas also grow, but the **drain dimensions often remain unchanged**.
- The flow of stormwater increases as it moves from smaller drains to larger ones in the network. If intermediate and main drains do not have adequate **cross-sectional area** to accommodate this increasing volume, overflow and localized flooding occur.
- This mismatch in scale and design is a technical flaw that leads to widespread urban flooding.

Poor Urban Planning and Encroachment

- In many Indian cities, urban planning has not accounted for the natural topography and hydrological features.
- Construction is frequently permitted in **low-lying areas**, floodplains, and former water bodies. This has eliminated natural buffers and increased the vulnerability of these areas to flooding.
- Moreover, in underpasses and other low-elevation zones, **gravity-based flow** is not feasible.
- These areas require the installation of **mechanical pumps** to evacuate stormwater, but such systems are often missing, inadequate, or poorly maintained.

Integration of Sewage and Stormwater Drains

Another major challenge is the **mixing of sewage with stormwater** in the drainage network. This occurs due to:

- Incomplete or poorly maintained sewerage

systems

- Informal settlements and newly urbanized areas being outside the sewerage network

This mixture reduces the **functional efficiency** of storm drains, leading to clogging and contamination.

- The presence of solid and liquid waste in stormwater channels further obstructs the free flow of water and adds a public health hazard during flood events.

Lack of Maintenance and Desilting

- Drains often get clogged with **silt, solid waste, and debris**, which reduces their effective capacity.
- Regular **desilting and cleaning** are required before every monsoon season, but in most Indian cities, this process is either **not undertaken properly** or done as a formality.
- Many stormwater drains are **permanently covered with concrete slabs**, making them inaccessible for cleaning. This leads to long-term sediment buildup and blockages that are difficult to remove.

Failure to Incorporate Updated Standards

- In 2015, the **Ministry of Housing and Urban Affairs** released a Manual on Stormwater Drainage Systems recommending that cities adopt a **return period of one in five years or higher** for designing or retrofitting drainage systems.
- However, implementation of these guidelines has been poor. As a result, even relatively moderate storms today can cause drainage failure and urban flooding.
- The current situation demands not only adoption of these standards but also further upgradation, considering the **unprecedented scale of climate change-induced rainfall events**.Measures for Mitigation and Long-term Resilience

Scientific and Technological Interventions

Cities need to adopt **GIS-based simulation frameworks** that can model:

- Urban topography
- Land use patterns
- Stormwater flow paths

Such tools enable urban planners to design effective and responsive drainage systems that account for changing population densities and impervious surface areas. This simulation approach was successfully tested in Delhi.

Structural and Non-Structural Solutions

1. **Groundwater Recharge and Rainwater Harvesting** Promoting recharge wells and harvesting systems to divert runoff and reduce load on drains.
2. **Rejuvenation of Lakes and Water Bodies** Restoring urban lakes and wetlands to act as storage basins during rainfall events.
3. **Green Infrastructure** Constructing rooftop gardens, green pavements, and bioswales to absorb and filter rainwater locally.
4. **Underground Storage Systems** Building detention and retention tanks to temporarily hold excess stormwater.
5. **Dedicated Stormwater Tunnels** Some developed countries have constructed deep tunnels that collect excess rainwater and divert it safely to rivers or the sea. However, such infrastructure is highly capital-intensive and requires substantial base-level drainage networks.
6. **Regular Maintenance** Ensuring timely desilting, cleaning, and modernization of drains, especially before the monsoon.

Conclusion

- Urban flooding in Indian cities is a result of **multiple interlinked factors**, including outdated infrastructure, unplanned urban growth, poor maintenance, and climate change.
- While eliminating flooding altogether may not be realistic, the **frequency and severity** can be significantly reduced through **scientific planning, adequate investment, and political commitment**.
- An integrated approach that combines **engineering solutions**, **ecological restoration**, and **urban governance reforms** is essential to address the growing urban flood risk.

Boeing 787: Success and Setbacks

Source: The Hindu
https://www.thehindu.com/sci-tech/science/what-made-boeing-787s-popular-and-later-a-cause-for-concern/article69687247.ece

UPSC Relevance: GS-3 Disaster Management

Context:

Lessons in Aviation Safety

Why in News

The crash of Air India AI171, the first-ever hull loss of a Boeing 787-8 Dreamliner, highlights serious safety, engineering, and regulatory concerns in modern commercial aviation.

Introduction

- Recently, Air India flight AI171 crashed just five minutes after taking off from Ahmedabad, en route to London.
- The aircraft involved was a Boeing 787-8 Dreamliner, carrying 230 passengers and 12 crew members.
- A massive fireball was witnessed near Meghaninagar, shortly after the aircraft went down.
- The Aircraft Accident Investigation Bureau (AAIB) has been tasked with investigating the cause of the crash.
- This crash marks the first ever complete loss ("hull loss") of a Boeing 787-8 aircraft.
- The crash incident has reminded many of the 1988 crash of Indian Airlines Flight 113 in Ahmedabad.

Boeing 787-8 Dreamliner: A Technological Gamechanger

A New Direction in Aircraft Design

- The Boeing 787-8 Dreamliner was introduced in 2011 and was considered a revolutionary aircraft in commercial aviation.
- It was the first major airliner to use carbon-fibre composite materials extensively instead of aluminum, reducing the aircraft's weight.
- The aircraft's engines — either General Electric GEnx or Rolls-Royce Trent 1000 — are high-bypass turbofans that significantly improved fuel efficiency.
- The Dreamliner was designed to consume approximately 20% less fuel than previous twinjet models of similar size.
- The aircraft replaced traditional pneumatic and hydraulic systems with electric systems to increase efficiency and reduce mechanical complexity.
- Due to its electrical systems and onboard power usage, the Boeing 787-8 was often referred to as the "electric aircraft."

Innovation in Passenger Comfort

- Boeing implemented a computer-controlled turbulence-reduction system that significantly improved flight stability and reduced motion sickness.
- The system worked by using sensors that detected air pressure changes and adjusted wing surfaces to reduce turbulence effects.
- The 787-8 aircraft cabin was pressurized to a lower equivalent altitude, improving comfort and reducing fatigue among passengers.
- Engine design changes also helped reduce shear noise, which in turn reduced the need for soundproofing materials inside the cabin.
- This led to a quieter cabin environment and further decreased the overall aircraft weight.

Safety and Quality Concerns: A Troubled Legacy

Early Delays and Battery Failures

- The Boeing 787-8 program was delayed by nearly two years due to challenges in managing its global supply chain and integration issues.
- Boeing had expected suppliers to deliver fully assembled sections like the fuselage and

wings, but this was not achieved in practice.

- The delays led to customer dissatisfaction and the cancellation of at least 60 orders.
- In early 2013, aviation regulators around the world grounded all Boeing 787s after two aircraft suffered battery failures involving lithium-ion cells.
- These battery failures resulted in leaks of corrosive fluids, which posed significant safety risks.
- The incidents were particularly alarming due to the aircraft's dependence on electrical systems for critical operations.

Whistleblower Revelations

- John Barnett, a former Boeing employee, raised alarms about metal slivers left near crucial flight control wiring in some 787 aircraft.
- He warned that if these metal slivers penetrated the wiring, they could cause catastrophic failures.
- In 2024, Barnett was found dead with an apparent self-inflicted gunshot wound while involved in a legal dispute with Boeing.
- Another Boeing engineer, Sam Salehpour, alleged that fuselage sections of the 787 were joined improperly, potentially leading to long-term structural failure.
- He claimed that when he raised these safety concerns internally, he was reassigned to another aircraft project — the Boeing 777.
- The U.S. Federal Aviation Administration (FAA) has opened an investigation into Salehpour's claims and Boeing's production practices.

Production Halts and Grounding Orders

- In 2019, Boeing was forced to slow production of the 787 due to quality control issues, particularly concerning fuselage fitment.
- From January 2021 to August 2022, Boeing did not deliver any new 787 aircraft due to these ongoing concerns.
- Following the whistleblower revelations, the FAA required Boeing to inspect and remove metal slivers before delivering any new aircraft.
- Although Boeing maintained that the slivers did not pose immediate danger, it agreed to comply with the directive.

Systemic Concerns in Boeing's Strategy

- Boeing's 787 program was based on a new approach to commercial air travel that focused on point-to-point connectivity between smaller cities.
- Unlike the Airbus A380, which was built for the hub-and-spoke model and carried 500–800 passengers, the 787 targeted smaller markets with lower passenger loads.
- The strategy aimed to reduce travel time rather than ticket prices, offering non-stop connectivity on long-haul routes.
- Boeing was under intense pressure to meet ambitious production targets and deliver aircraft on schedule.
- Critics have argued that this pressure may have led to compromises in quality control and oversight.
- The treatment of whistleblowers and recurring safety concerns have raised ethical questions about Boeing's internal governance.
- Similar issues had earlier plagued Boeing's 737 Max aircraft, which were involved in two deadly crashes in 2018 and 2019.
- Together, these incidents indicate a potential systemic failure in Boeing's approach to safety and production.

Implications for India and the Global Aviation Sector

For India

- The AI171 crash is the most serious aviation accident in India in recent years.
- The incident will prompt reviews of aircraft maintenance, safety standards, and operational readiness.
- The Directorate General of Civil Aviation (DGCA) is likely to introduce stricter oversight measures.
- Aviation training programs and emergency response systems may undergo upgrades

following the AAIB report.

For Global Aviation

- Global regulators may reconsider the airworthiness certification of Boeing 787 aircraft.
- Airline operators around the world may conduct safety audits of their existing Dreamliner fleets.
- Passenger confidence in Boeing's wide-body aircraft could be significantly affected.
- The crash may influence airline purchase decisions, possibly shifting demand toward Airbus models or new-generation Boeing aircraft with enhanced oversight.

Conclusion

- The crash of Air India flight AI171 is both a tragic loss and a wake-up call for the global aviation industry.
- While the Boeing 787-8 introduced advanced technology and efficiency, it also brought new safety challenges.
- Ongoing investigations and whistleblower allegations point to deeper concerns in Boeing's quality control and ethics.
- The incident underscores the need for transparent investigations, strong regulatory frameworks, and accountability in aircraft manufacturing.
- In the pursuit of innovation, aviation companies must prioritize passenger safety and uphold public trust at all costs.

Blowouts in Oil and Gas Wells

Source: The Hindu

https://www.thehindu.com/sci-tech/science/what-is-a-blowout/article69723758.ece

UPSC Syllabus Relevance: GS3 Disaster Management

Context:

Blowouts in Oil and Gas Wells

Why in News

A blowout is an uncontrolled release of gas or oil from a well due to failure of pressure control systems, posing serious safety and environmental hazards.

Introduction

- A **blowout** is a serious industrial accident that occurs at oil or natural-gas wells when the **underground pressure** of gas or oil overpowers the systems meant to contain it.
- Such events pose significant **safety, environmental, and economic challenges**, requiring immediate expert intervention.

Mechanism of a Blowout

During the normal drilling process, workers drill through layers of rock to reach hydrocarbon reserves. To counteract the high-pressure gases trapped underground, they use a **dense fluid called drilling mud** and install **blowout preventers (BOPs)**—specialized high-pressure safety valves.

However, if:

- the **pressure within the well exceeds the strength of the BOP**, or
- the **weight and volume of drilling mud** used are miscalculated, then the pressurized gas can escape uncontrollably through the bore.
- As it ascends, the gas may mix with oil, sand, and drilling fluid, emerging at the surface in a **violent jet**.
- If ignited, it results in a **massive fire**, constituting a **blowout**.
- These incidents threaten human life, damage infrastructure, pollute the environment, and demand high financial and technical resources to control.

Response and Control

- Blowouts are difficult and expensive to manage.

- Containment typically requires **well-control experts**, sophisticated equipment, and **continuous operations for several days or weeks**.
- Evacuation of nearby populations is often necessary to ensure safety.

Recent Case: ONGC Blowout in Assam

On **June 12, 2025**, a blowout occurred at an Oil and Natural Gas Corporation (ONGC) well in **Sivasagar district, Assam**. Following the incident:

- Over **1,500 residents** in surrounding areas were evacuated.
- ONGC mobilised **well-control experts from the United States** to assist in capping the well.
- By **June 21**, ONGC reported that the gas flow had been brought under control.

Conclusion

- Blowouts highlight the **complex risks** associated with hydrocarbon extraction.
- They underscore the need for **robust safety mechanisms, real-time pressure monitoring, and international collaboration** in crisis response.
- As India seeks to expand its energy exploration, strengthening disaster preparedness and environmental safeguards becomes imperative.

MODERN HISTORY AND ART & CULTURE

Relevance of Gandhian principles amid cross-border terrorism

Source: The Hindu
https://www.thehindu.com/news/national/gandhis-principles-more-relevant-today-amid-cross-border-terrorism-ravi-shankar-prasad-in-uk/article69647491.ece

UPSC Relevance: GS 1 Modern history

Context:

Relevance of Gandhian principles

Why in News

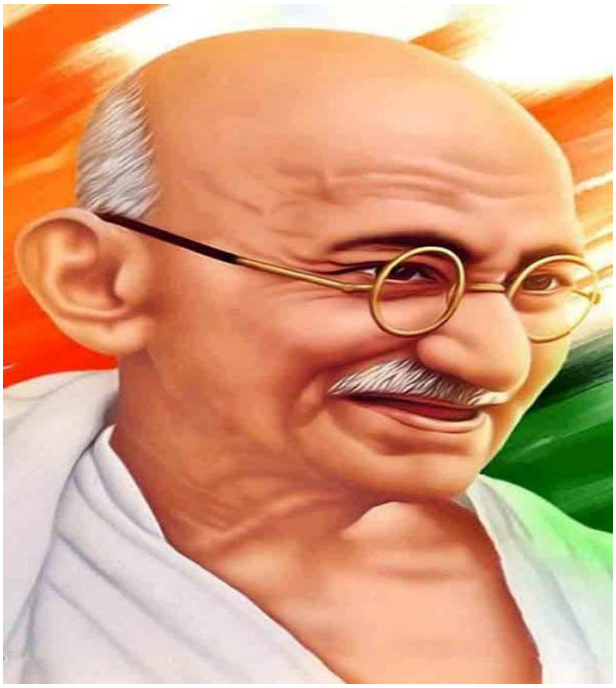
Mahatma Gandhi's principles of non-violence were highlighted as more relevant today during an all-party delegation's diplomatic outreach in London following the Pahalgam terror attack.

Introduction

- Mahatma Gandhi, the Father of the Nation, laid the foundation of India's freedom struggle on the principle of non-violence (Ahimsa).
- In the present context of cross-border terrorism, particularly sponsored by Pakistan, the relevance of Gandhi's ideals continues to be a subject of intense debate.
- The recent remarks by BJP MP Ravi Shankar Prasad in London (June 1, 2025), following the Pahalgam terror attack, bring this relevance to the forefront of public discourse.

The Present Context

- In May 2025, a brutal terrorist attack in Pahalgam, Jammu and Kashmir, led to the loss of 26 innocent lives. In response, India carried out precision strikes on terror infrastructure in Pakistan and Pakistan-occupied Kashmir.
- As part of a broader diplomatic initiative, multi-party delegations were dispatched to major global capitals to highlight Pakistan's continued support for terrorism.
- One such delegation, led by Mr. Ravi Shankar Prasad, emphasized that Gandhiji's ideals of non-violence, truth, and goodwill are more important than ever in the global fight against terrorism.



Gandhian Principles: A Moral Compass

- Gandhiji's commitment to non-violence was not a sign of weakness, but of moral courage. He believed in resisting evil through peaceful means, holding that violence begets more violence.
- In the modern era, his philosophy has shaped India's democratic values, its foreign policy of non-aggression, and its identity as a peace-loving nation.
- However, Gandhi also acknowledged the need for resistance in the face of aggression. As recalled by M.J. Akbar, in response to the 1947 invasion of Kashmir by Pakistan-backed raiders, Gandhi stated that Indian soldiers had the duty to repel such forces, even while he maintained his faith in non-violence.

Cross-Border Terrorism: A Persistent Challenge

Pakistan's use of terrorism as an instrument of state policy has been a long-standing concern.

- The recent Pahalgam incident is only one in a series of attacks supported by groups operating from Pakistani soil.
- Despite international condemnation, Pakistan has often failed to act decisively against terror infrastructure within its territory.

India's response has been multifaceted:

- **Diplomatic outreach**, as seen in the multi-party delegations sent abroad,
- **Precision military action**, under doctrines such as zero-tolerance for terrorism,
- **Engagement with the international community** to treat terrorism as a global threat.

Relevance of Gandhian Values Today

1. **Non-Violence as a Global Ideal**
   Gandhi's philosophy offers an ethical framework for resisting terrorism without descending into a cycle of hatred and vengeance. While force may be necessary for self-defense, non-violence remains the long-term vision for peace.
2. **Truth and Transparency**
   India, in following Gandhian ideals, has consistently presented its case with facts and transparency in global forums, focusing on evidence-based diplomacy.
3. **Amity and Dialogue**
   Gandhiji promoted the idea of Sadbhav (goodwill) among communities. This principle can be the foundation of people-to-people engagement, counter-radicalisation, and regional peace-building.
4. **Democracy and Moral Leadership**
   India, as a democracy, uses its Gandhian legacy to project soft power and moral leadership, in contrast to authoritarian or militarised regimes that use violence for political ends.

Balancing Moral Idealism and Strategic Realism

- While Gandhian ideals form the ethical bedrock of Indian polity, the state must also ensure the security of its citizens. This necessitates a strategic doctrine that balances moral idealism with pragmatic realism.
- The Constitution of India, shaped by Dr. B.R. Ambedkar, provides this balance—ensuring both civil liberties and national security.

Conclusion

- Mahatma Gandhi's philosophy is not merely a historical artifact but a living guide in the 21st century. In a world grappling with terrorism, extremism, and violence, his message of non-violence, truth, and goodwill offers a powerful alternative.
- India, while safeguarding its sovereignty and security through decisive action, must continue to uphold and project Gandhian ideals as the foundation of its global identity and diplomacy.

5,300-yr-old Early Harappan settlement in Gujarat

Source: The Hindu

https://www.thehindu.com/sci-tech/science/kerala-universitys-archaeological-excavation-unearths-5300-year-old-early-harappan-settlement-in-gujarat/article69682898.ece

UPSC Relevance: GS-1 Art and Culture

Context:

Harappan settlement

Why in News

The University of Kerala's excavation at Lakhapar in Kachchh, Gujarat, has revealed a 5,300-year-old Early Harappan settlement.

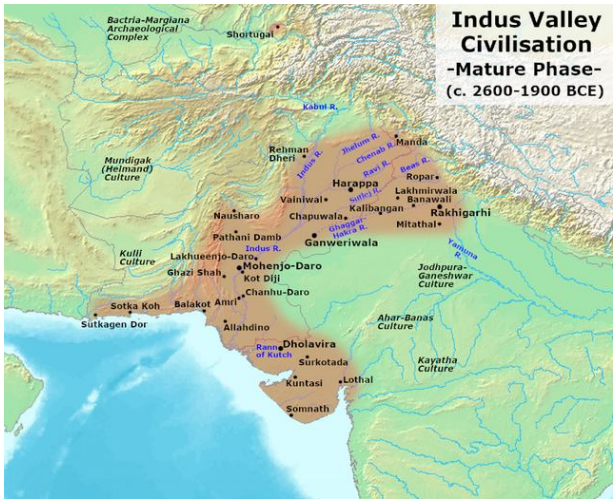
Introduction

- In a significant archaeological breakthrough, researchers from the **University of Kerala** have uncovered a **5,300-year-old Early Harappan habitation site** near **Lakhapar village in Kachchh district**, Gujarat.
- This discovery offers a rare and critical cultural context to previously found

Harappan burials in the region, establishing Lakhapar as a crucial site in understanding the settlement-burial continuum of the Harappan civilization in western India.

Background and Location

- The site lies on either side of the **Gaduli–Lakhapar road**, spanning nearly **three hectares**, close to the now-quiet **Gandi river**, which once served as a **perennial water source**.
- It is situated just **1.5 km** from the known Early Harappan **necropolis of Juna Khatiya**, where nearly **197 burials** were documented over three excavation seasons (2019–2022).
- The site was first identified in **2022** by archaeologists **Dr. Abhayan G.S. and Dr. Rajesh S.V.** of the **Department of Archaeology, University of Kerala**, and later excavated in collaboration with national and international institutions.



Key Findings

1. Settlement Architecture

- Excavations revealed **structural remnants** with **stone walls** made of **local sandstone and shale**, indicating a well-planned layout.
- The scale and material suggest **permanent occupation**, rather than a seasonal or temporary encampment.

2. Pottery and Ceramic Traditions

- Pottery from **both Early (c. 3300 BCE) and Classical Harappan phases** were recovered.
- A notable find is the **Pre-Prabhas Ware**—a **rare ceramic tradition** previously found at only three other sites in Gujarat. This suggests the existence of a **culturally distinct subgroup** within the broader Harappan civilization.
- The **co-occurrence of Early and Classical Harappan pottery** suggests **continuity or transitional phases** in settlement occupation.

3. Burial Discovery

- A **human burial** was discovered in close proximity to the habitation site.
  - The skeleton was **interred in a pit**, without architectural features or grave markers.
  - **Pre-Prabhas Ware pottery** was found with the burial, marking the **first known association** of this ceramic with funerary practices.
  - This suggests a **previously undocumented ritual system** and adds depth to our understanding of **Harappan mortuary traditions**.

Artefacts and Material Culture

- A wide range of artefacts were found, reflecting a **vibrant economy and interregional connections**:
  - **Beads** made of **semi-precious stones**: carnelian, agate, amazonite, and steatite.
  - **Copper and terracotta artefacts**, indicating **metallurgical knowledge** and artistic expression.
  - **Shell ornaments**, pointing to **coastal resource exploitation** and trade.
  - **Rohri chert blades**, indicating **long-distance trade or cultural ties with Sindh** (modern-day Pakistan).

Subsistence and Environment

- **Animal remains** include:
  - **Domesticated species**: cattle, sheep, goats.
  - **Aquatic species**: fish bones, edible shell fragments.
- This implies a **mixed subsistence economy** based on **animal husbandry and fishing**.
- **Archaeobotanical samples** have been

collected to analyse plant remains and **reconstruct ancient diet patterns** and agricultural practices.

Significance of the Lakhapar Discovery

1. Bridging the Settlement-Burial Gap

- While Gujarat has multiple Early Harappan **burial sites** (e.g., Dhaneti), **associated habitation evidence has been sparse**.
- Lakhapar offers a **unique opportunity to study the living and the dead** of the same cultural group, contributing to a more **holistic understanding of Early Harappan life**.

2. Cultural Diversity within the Harappan Civilization

- The presence of **Pre-Prabhas Ware** suggests **regional ceramic traditions**, emphasizing **diversity within Harappan cultural expressions**.
- This supports the idea of the Harappan civilization as a **heterogeneous network** rather than a monolithic culture.

3. Environmental and Hydrological Context

- The site's proximity to the Gandi river, once perennial, underscores the importance of **water sources in Harappan settlement planning**.
- The **desertification of Kachchh** over millennia may explain the eventual abandonment of such settlements.

Conclusion

- The discovery of the **Lakhapar Early Harappan settlement** marks a **major contribution to South Asian archaeology**, enriching our understanding of urbanization, mortuary practices, and regional diversity within the Indus Valley Civilization.
- It bridges crucial archaeological gaps between **habitation and burial**, offering a comprehensive view of **socio-cultural dynamics** in Early Harappan Gujarat.
- As further analysis of botanical, faunal, and material remains continues, Lakhapar may serve as a key to unlocking **the lesser-known frontiers** of the Harappan world.

MISCELLANEOUS

Sahitya Akademi Yuva Puraskar and Bal Puraskar

Source: Indian Express

https://indianexpress.com/article/education/qs-rankings-iit-delhi-jumps-27-ranks-tops-india-list-is-123-globally-10074885/

UPSC Syllabus Relevance: GS1 Awards and Honours

Context:

Sahitya Akademi Yuva Puraskar and Bal Puraskar

Why in News?

Recently, the Sahitya Akademi, India's National Academy of Letters, announced the names of 23 young writers for the Yuva Puraskar and 24 authors for the Bal Sahitya Puraskar for contributions in 24 Indian languages, including English.

About Sahitya Akademi

- The **Sahitya Akademi**, or India's National Academy of Letters, is an autonomous body under the **Ministry of Culture**, established in **1954**.
- It is the **premier literary institution** in India entrusted with the promotion of Indian literature across **24 recognized languages**, including **22 Constitutionally Scheduled languages, English, and Rajasthani**.

It undertakes a wide range of literary activities including:

- Organization of literary events and seminars
- Translation and publication of literary works
- Promotion of multilingual literary dialogue
- Recognition through prestigious literary awards
- **Established:** 1954
- **Autonomous body** under the Ministry of Culture, Government of India.
- **Purpose:** Promotion and preservation of Indian literature in **24 Indian languages** (22 scheduled + English + Rajasthani).
- **Functions:**
  - Literary dialogues and seminars
  - Book publications and translations
  - Literary awards such as:
    - **Sahitya Akademi Award**
    - **Yuva Puraskar**
    - **Bal Sahitya Puraskar**
    - **Translation Award**

Yuva Puraskar

Objective:

- The **Yuva Puraskar** was instituted in **2011** to recognize **young literary talent** in India.
- It encourages the **creative expression** of the younger generation and fosters new voices in Indian literature.

Eligibility Criteria:

- **Age limit:** 35 years or below on **January 1** of the award year
- The literary work must be **original and published** in the **last five years**
- Must be written in any of the **24 recognized languages** of the Akademi

Award Components:

- An **engraved copper plaque**
- A **cash prize of ₹50,000**
- Awarded annually in **each recognized language**, subject to availability of eligible entries

Significance:

- Encourages **young writers** to pursue literary careers
- Helps in the **sustainability of literary culture** in regional languages
- Promotes **literary excellence among youth**, connecting tradition with contemporary themes

Bal Sahitya Puraskar

Objective:

- Introduced in **2010**, the **Bal Sahitya Puraskar** is awarded to authors for **outstanding contributions to children's literature** in any of the 24 recognized languages.

Eligibility Criteria:

- The book must be written for **children** (typically aged under 14–15)
- It should be an **original contribution** in the relevant language
- Literary merit and cultural value are key selection criteria

Award Components:

- **Copper plaque engraved with the recipient's name**
- **Cash prize of ₹50,000**
- Announced and presented annually

Significance:

- Fills the **critical gap** in quality literature for children in Indian languages
- Cultivates the **habit of reading** and cultural literacy among children
- Supports the growth of **children's literature** in diverse genres such as folktales, fables, science fiction, and poetry

Yuva Puraskar 2025 – Key Highlights:

- **Total Languages:** 23
- **No award given in Dogri** this year.
- **Criteria:** Recognizes **young writers (aged 35 or below)** for outstanding literary contributions.
- **Award Components:**
  - An **engraved copper plaque**
  - **Cash prize of ₹50,000**

Notable Awardees:

Language	Recipient
English	**Advait Kottary**
Hindi	**Parvati Tirkey**
Tamil	**Latshmihar**
Telugu	**Prasad Suri**
Assamese	**Suprakash Bhuyan**
Bengali	**Sudeshna Moitra**
Kannada	**R. Dileepkumar**
Malayalam	**Akhil P. Dharmajan**

Bal Sahitya Puraskar 2025 – Key Highlights:

- **Total Awardees:** 24
- Recognizes **significant literary works for children** in **24 Indian languages**.
- **Award Components:**
  - **Engraved copper plaque**
  - **₹50,000 cash prize**

Notable Awardees:

Language	Recipient	Notable Work
English	**Nitin Kushalappa MP**	*Dakshin: South Indian Myths and Fables Retold*
Hindi	**Sushil Shukla**	*Ek Batey Bara*
Bengali	**Tridib Kumar Chattopadhyay**	–
Kannada	**K. Shivalingappa Handihal**	–
Konkani	**Nayana Adarkar**	–
Malayalam	**Sreejith Moothedath**	–
Tamil	**Vishnupuram Saravanan**	–
Telugu	**Gangisetti Sivakumar**	–

Selection Process:

- Each language had a **jury of 3 members**.
- Winners selected as per **rules and procedures** of the Sahitya Akademi.
- Approved by the **Executive Board** chaired by **Madhav Kaushik**, President of Sahitya Akademi.

Importance of These Awards:

- Encourages **young and children's literature** in **regional languages**.
- Promotes **literary diversity** and **cultural expression** across India.
- Recognizes **emerging talent** and fosters **creative writing** for future generations.

Conclusion:

- The **Yuva Puraskar** and **Bal Sahitya**

Puraskar are not merely awards but instruments of **cultural policy**.

- By promoting regional languages and supporting emerging authors, the Sahitya Akademi plays a **foundational role** in India's intellectual and literary development.
- These awards help **preserve India's multilingual traditions**, while inspiring innovation and storytelling for generations to come.

The Journey of Heeng Cultivation in India

Source: The Hindu

https://www.thehindu.com/sci-tech/energy-and-environment/the-story-of-how-heeng-came-to-be-successfully-cultivated-in-india/article69671137.ece

UPSC Relevance: GS 3 Agriculture

Context:

Asafoetida Cultivation in India

Why in News

The first successful flowering and seed setting of heeng (asafoetida) in India was reported by CSIR-IHBT.

Introduction

- Heeng, or asafoetida (*Ferula assa-foetida*), is a pungent spice central to Indian cuisine and Ayurveda.
- Despite its widespread use, India had historically remained entirely dependent on imports for heeng.
- This paradox shifted with a focused mission to introduce and cultivate heeng domestically, led by the CSIR-Institute of Himalayan Bioresource Technology (IHBT), Himachal Pradesh.

Historical and Cultural Significance

- **Culinary Use:** A staple in Indian households, heeng is often added to hot oil at the beginning of cooking to impart flavor and digestive properties.
- **Textual Mentions:** Found in ancient scriptures like the *Mahabharata*, *Charaka Samhita*, and *Pippalada Samhita*.
    - *Charaka Samhita (Sutrasthana 27/299)*: Notes its use in relieving abdominal pain, enhancing taste, and aiding digestion.
- **Ayurveda:** Heeng is considered to refresh the senses and boost consciousness.

Botanical & Ecological Profile

- **Native Range:** Cold, arid regions of Iran, Afghanistan, Central Asia.
- **Climatic Conditions:**
    - Annual Rainfall: ≤200 mm (tolerates up to 300 mm)
    - Temperature: 10–20°C optimal; withstands 40°C highs and –4°C lows
    - Soil: Sandy, well-drained, low moisture
- **Growth Characteristics:**
    - Perennial plant
    - Takes approximately 5 years to mature and flower
    - Oleo-gum resin is harvested from the taproot and rhizome by incision, yielding the spice

Problem: Heavy Import Dependency

- India consumes around 40% of the world's heeng but produced none domestically until recently.
- Imports were primarily from Afghanistan, Iran, and Uzbekistan.

Solution: National Indigenous Cultivation Effort

Lead Agency:

- **CSIR-Institute of Himalayan Bioresource Technology (IHBT), Palampur**

Timeline & Key Events:

2018–2020: Seed Acquisition Phase

- Multilateral efforts to procure viable heeng seeds
- Countries contacted: Iran, Afghanistan, Uzbekistan, Tajikistan, South Africa
- First seed import: October 2018, from Iran
- **ICAR-NBPGR**, New Delhi: Issued import permits and conducted quarantine inspections

2020: Pilot Cultivation Begins

- October 15, 2020: First seedling planted in **Kwaring village**, Lahaul Valley
- November 8, 2020: Expansion to **Janjheli, Mandi**—first mid-hill cultivation trial
- Controlled trials conducted at:
  - CSIR-IHBT Palampur (1300 m)
  - Centre for High Altitude Biology, Ribling (Lahaul & Spiti)

Villages Involved in Early Adoption

- **Lahaul & Spiti:** Madgran, Salgran, Beeling, Keylong
- **Mandi:** Janjehli, Majhakhal, Kataru, Ghayan, Karsog
- **Kinnaur:** Kafnoo, Hango, Maling, Reckong Peo, Kalpa, Moorang, Graming, Katgaon
- **Kullu:** Bagsaid, Dhaugi–Sainj, Kotla–Banjar
- **Chamba:** Pangi, Deol, Bharmour, Mahala, Tooh

Institutional Support & Infrastructure

Heeng Germplasm Resource Centre

- Inaugurated: March 5, 2022
- Location: IHBT Palampur
- Functions:
  - Research and conservation
  - Seed production
  - Farmer training
  - Plant propagation

Tissue Culture Facility

- Developed for large-scale propagation
- Supported by the Government of Himachal Pradesh
- Uses ecological niche modelling and GPS mapping to identify optimal zones

Key Milestone: First Flowering in India

- Date: May 28, 2025
- Location: CSIR-IHBT, Palampur (1300 m)
- Significance:
  - Confirms the plant's reproductive cycle is complete
  - Ensures sustainable seed production
  - Proves adaptability beyond traditional cold desert regions

Significance & Impact

Agricultural and Economic Benefits

- Expands crop options in high-altitude and semi-arid regions
- Diversifies farmer income
- Reduces reliance on volatile imports
- Supports India's self-reliance (Aatmanirbhar Bharat)

Scientific Breakthrough

- Demonstrates potential for adapting exotic, climate-specific crops to Indian conditions
- Sets precedent for future domestication of niche crops

Stakeholders Involved

Institution/Body	Role
CSIR-IHBT	Research, seed trials, farmer training
ICAR-NBPGR	Legal import, quarantine, compliance
Himachal Pradesh Government	Funding, policy support, coordination
State Agriculture Department	Farmer outreach, demo plots, field support
Local Farmers	Field implementation, adoption, scaling up

Conclusion

- The successful flowering of heeng in India marks a historic step toward agricultural diversification, import substitution, and sustainable high-altitude farming. It also

highlights the synergy between scientific research, policy support, and farmer participation—a model worth replicating for other strategic crops.

- With the establishment of the **Heeng Germplasm Resource Centre** and the plant's proven adaptability, India is poised to become not just self-sufficient but a global player in heeng cultivation.

Cold-Resistant Rice and the Revival of Lamarckian Inheritance

Source: The Hindu

https://www.thehindu.com/sci-tech/science/rice-surprise-ability-adapt-cold-stress-epigenetic-marks-lamarck/article69703396.ece

UPSC Syllabus Relevance: GS 3 Agriculture

Context:

Scientific Autonomy in India

Why in News

A recent study demonstrated that rice plants can inherit cold tolerance through epigenetic changes, lending partial support to Lamarck's long-discredited theory of acquired characteristics.

Background:

- In a groundbreaking study published in *Cell* on May 22, 2025, scientists demonstrated that rice plants could inherit cold resistance through changes in **epigenetic marks**, reviving the long-dismissed theory of acquired characteristics proposed by **Jean-Baptiste Lamarck** in the early 19th century.

Lamarck's Theory of Evolution

- Proposed by: Jean-Baptiste Lamarck, a French naturalist
- Published in: 1809 in his book Philosophie Zoologique
- Lamarck believed that organisms **change over time** due to interaction with their environment, and these changes are **inherited** by their offspring.
- He proposed **two laws**:

1. **Law of Use and Disuse:**
   - Organs that are **used frequently** become stronger and more developed.
   - Organs that are **not used** gradually weaken and disappear.
   - *Example:* Giraffes stretching their necks to reach high leaves caused their necks to elongate over generations.
2. **Law of Inheritance of Acquired Characteristics:**
   - Traits acquired or lost during an organism's life (due to use/disuse or environment) are **passed on to offspring**.
   - *Example:* If a blacksmith develops strong arms, his children will inherit strong arms.

Lamarck's Theory of Acquired Characteristics:

- **Proposed in 1809** by French naturalist Jean-Baptiste Lamarck.
- Suggested that **traits acquired during an organism's lifetime**, due to environmental influence or use and disuse of organs, could be **inherited by offspring**.
- Example: Giraffes developing longer necks by stretching to reach high leaves.

This idea held sway until **Charles Darwin's theory of natural selection** (1859), and later, **Gregor Mendel's work on heredity**, supplanted it.

Challenges to Lamarck's Theory:

1. **August Weismann's experiments (late 1800s):**
   - Cutting off mice tails for five generations showed **no inheritance** of acquired trait (taillessness).

2. **Rediscovery of Mendel's laws**:
    - Introduced the concept of **genes as stable units of inheritance**, which are passed unchanged from parent to offspring.

These developments reinforced **Darwinian evolution** through genetic mutation and selection, sidelining Lamarckism.

The Rise of Epigenetics:

- **Epigenetics**: The study of **heritable changes in gene expression** that do **not involve changes to the DNA sequence**.
- **Key discovery (1956)**: Royal Alexander Brink observed that maize with identical genes showed **variable pigmentation**, suggesting **non-genetic inheritance**.
- **Mechanism**: Chemical tags like **methyl groups** attach to DNA, **activating or silencing genes**.
- **Arthur Riggs (1975)** hypothesized that these **epigenetic marks can be inherited**, thus reopening the door to a modified Lamarckian view.

Breakthrough Study: Rice Plants and Cold Tolerance

- Rice plants (*Oryza sativa*) were exposed to **cold temperatures**.
- From the **second generation**, plants showed improved **cold tolerance**, and this trait was passed on to **five generations**.
- No corresponding DNA mutations were found.
- Instead, a gene called **ACT1**, essential for plant development, was **epigenetically regulated**.

Key Findings:

- Normally, cold exposure silences ACT1 via **DNA methylation**.
- Cold-adapted plants **prevent this methylation**, continue expressing ACT1, and thus survive.
- This epigenetic state was **heritable**, confirming that **environmental stress can induce inheritable changes**.

Significance of the Study:

- Offers **experimental proof** for Lamarck's idea of environment-influenced inheritance, though through **epigenetics**, not changes in DNA.
- Suggests that **heritability can sometimes occur through environmental experience**, not just genetic coding.
- Expands our understanding of evolution, **blending Darwinian selection with Lamarckian adaptation**.

Broader Implications:

- **Agriculture**: Epigenetic engineering could help develop **climate-resilient crops** without altering DNA.
- **Evolutionary Biology**: Epigenetics adds a **layer of complexity** to our understanding of heredity and adaptation.
- **Public Health**: Raises questions about **epigenetic inheritance in humans**, e.g., how stress or diet might affect future generations.

Conclusion:

- While once dismissed, **Lamarck's ideas** about the inheritance of acquired characteristics have found **limited but real validation** in the realm of **epigenetics**.
- The study on cold-tolerant rice plants marks a scientific milestone, illustrating that what life endures can, in rare cases, influence what it bequeaths to its offspring — a poetic nod to Lamarck, whose legacy may now be seen in a new light.