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INDIAN ASTRONAUT IN SPACE

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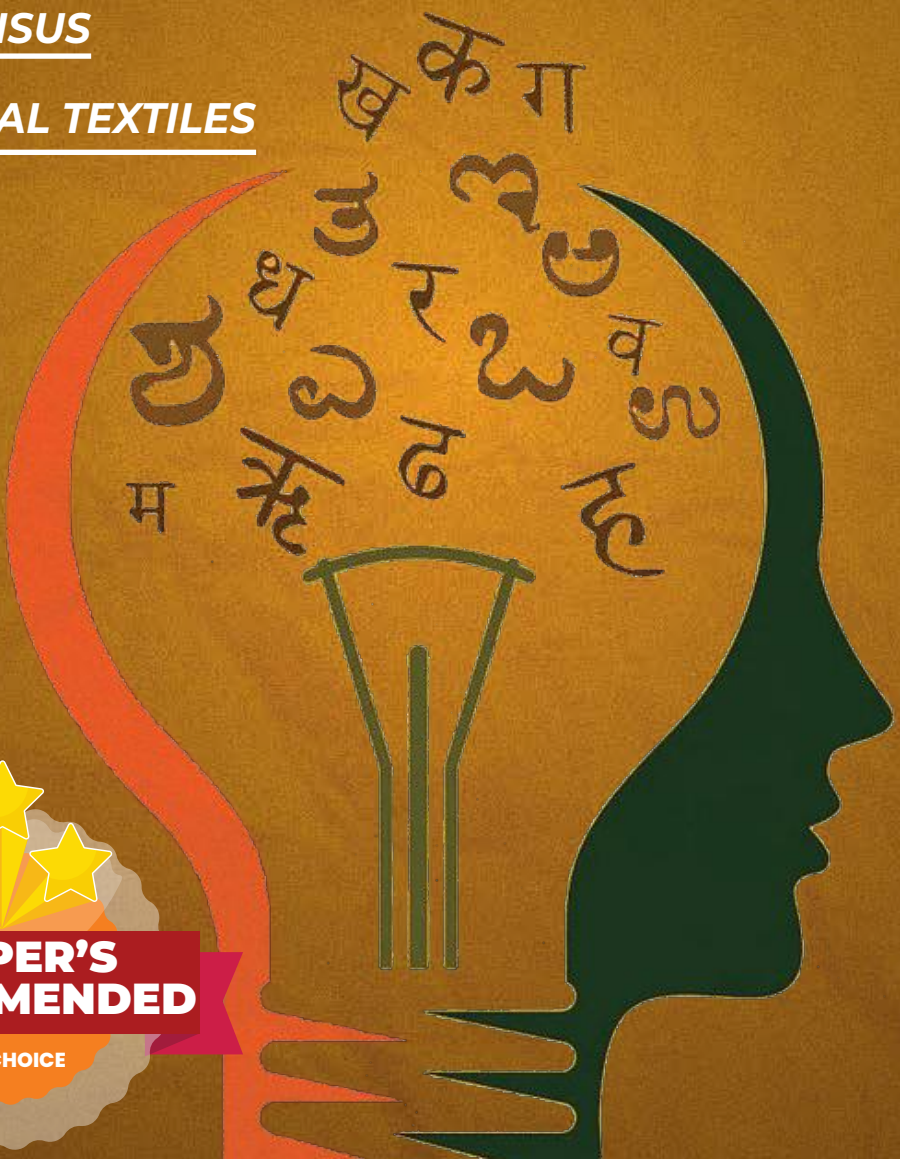


TOPPER'S RECOMMENDED

BEST CHOICE

Contents

PRELIMS

POLITY & GOVERNANCE

MANIPUR UNREST

Context: Violence erupted in Manipur after the arrest of Kanan Singh, a Meitei leader linked to ethnic violence in 2023.

Protests quickly turned violent, prompting curfews and internet shutdowns in key districts. The unrest reflects deep-rooted **ethnic tensions between the Meitei majority and the Kuki-Zomi tribes, which escalated after a court order favouring Scheduled Tribe status for Meiteis—triggering fears among Kukis of marginalization.**

Geography and Location of Manipur (Concise & Focused)

- **Location and Area**
  - Northeastern India, part of the Seven Sister States.
  - Borders Nagaland (N), Assam (W), Mizoram (S), and Myanmar (E).
  - **Area:** Covers around 22,327 sq km.
- **Topography:**
  - Mostly hilly terrain surrounding the central Imphal Valley.
  - **Imphal Valley** — main population and agricultural hub.
  - Example: Imphal city, the capital, is in this valley.
- **Rivers & Water Bodies:**
  - Imphal River and Barak River basin support agriculture.
  - **Loktak Lake:** Largest freshwater lake in Northeast India, famous for floating islands called phumdis.
- **Strategic Location:**
  - Borders Myanmar, serving as an important corridor for India-ASEAN connectivity.
  - Example: Stillwell Road links India to Myanmar and China, crucial for trade and military.
- **Climate & Biodiversity:**
  - Subtropical climate with rich forests and biodiversity.
  - Example: KeibulLamjao National Park on Loktak Lake — the only floating national park in the world, habitat of the endangered Sangai deer.

Source : THE HINDU

UMEED PORTAL

Context : The Government of India has launched the **UMEED (Unified Waqf Management, Empowerment, Efficiency and Development) portal**

Key features include:

- **Mandatory Registration:** All Waqf properties must be registered on the portal within six months of launch, with detailed information such as ownership documents, exact measurements, and geotagged locations.

- **Transparency and Accountability:** The portal aims to ensure greater transparency, accountability, and public participation by making Waqf data digitally traceable and accessible.
- **Grievance Redressal:** An online grievance redressal system is included for prompt resolution of issues related to Waqf property management.
- **Integration with GIS:** The platform integrates with GIS mapping and e-governance tools for efficient tracking and management.

Brief Note on Waqf Board

- **A Waqf Board is a statutory body** established by the government under the Waqf Act to manage and regulate **Waqf properties**—religious endowments made by Muslims for charitable, religious, or community purposes.
- The board ensures the proper administration, protection, and utilization of Waqf assets for the benefit of the community, preventing misuse or illegal occupation.
- **Functions:**
    - Registering Waqf properties and maintaining records.
    - Supervising management and resolving disputes related to Waqf properties.
    - Developing and maintaining Waqf properties to generate revenue for charitable activities.
    - Protecting the rights of beneficiaries, often including vulnerable groups.
    - Working closely with the Central Waqf Council for policy guidance.
- **Legal Framework:**Governed by the **Waqf Act, 1995** (amended several times), which mandates the constitution of State Waqf Boards and defines their powers and responsibilities.

Recent Legislative Changes: Waqf (Amendment) Act, 2025

The Waqf (Amendment) Act, 2025, which came into effect in April 2025, introduces several reforms to improve transparency, accountability, and governance in Waqf administration. **Key features include:**

1. **Centralized Management:**
    - Creation of a Central Waqf Portal for real-time registration, verification, and monitoring of Waqf properties across the country.
    - Mandatory registration of all Waqf properties within six months, with each assigned a unique identification number.
2. **Governance Reforms:**
    - Introduction of mandatory elections for Waqf Board members; nominated members must step down, and elected members must form the majority.
    - Inclusion of non-Muslim members on Waqf Boards to promote inclusivity and diverse viewpoints.
3. **Property Classification:**
    - Ending the practice of declaring 'Waqf by user' for properties without formal documentation.
    - Government properties previously claimed as Waqf are now protected from such declarations.
4. **Women's Rights:**
    - Strengthened provisions ensuring inheritance rights for women in Waqf properties, promoting gender equity aligned with Islamic principles.
5. **Appeal Mechanism:**
    - Establishment of an appeal process allowing High Court review of decisions made by Waqf tribunals within 90 days.

Challenges and Controversies

- Some Muslim organizations have opposed the amendments, viewing them as a threat to religious autonomy and fearing possible misuse of Waqf properties.
- Implementation varies across states, with some facing administrative and legal challenges adapting to the new governance structure.

Source:THE HINDU

AIR INDIA FLIGHT AI171 CRASHES IN AHMEDABAD

Context: An **Air India Boeing 787-8 Dreamliner**, en route from **Ahmedabad to London**, crashed shortly after takeoff on **June 12, 2025**, killing **241 out of 242**peoples on board

Organizations That Handle Airplane Accidents in India

1. Directorate General of Civil Aviation (DGCA)

- **Role**: Regulatory body for civil aviation in India.
- **Functions**:
  - Ensures air safety standards.
  - Grants licenses to pilots, engineers, and airlines.
  - Monitors aircraft operations and airworthiness.
- **In Accidents**:
  - Supervises initial response and coordinates with investigators.
  - Ensures airline compliance with post-crash protocols.

2. Aircraft Accident Investigation Bureau (AAIB)

- **Role**: **Primary agency for investigating aircraft accidents and serious incidents.**
- **Established**: 2011 under the Ministry of Civil Aviation (MoCA), following ICAO guidelines.
- **Functions**:
  - Conducts independent investigations.
  - Determines causes and contributing factors.
  - Recommends safety measures to prevent recurrence.
- **Legal Backing**: Works under **Aircraft (Investigation of Accidents and Incidents) Rules, 2017**.

3. Ministry of Civil Aviation (MoCA)

- **Role**: Parent ministry overseeing DGCA and AAIB.
- **Functions**:
  - Approves aviation safety policies.
  - Coordinates with other ministries (Home, Defense) during major accidents.
  - Provides high-level oversight of investigations and compensation issues.

4. Airports Authority of India (AAI)

- **Role**: Manages airport infrastructure and air traffic services.
- **Functions in Accidents**:
  - Supports **rescue and firefighting (ARFF)** at airports.
  - Assists in emergency coordination and communications.

5. National Disaster Response Force (NDRF) & Local Administration

- **Role**: Provides **emergency response**, rescue, and recovery.
- **Functions**:
  - Assists in evacuating survivors and retrieving bodies.

- Handles hazardous materials if involved in the crash.

Source :THE HINDU

CABINET COMMITTEE ON ECONOMIC AFFAIRS

Context : The Cabinet Committee on Economic Affairs has approved **two major multitracking (doubling) projects** in Jharkhand, Karnataka, and Andhra Pradesh, adding approximately **318 km to the railway network with a total investment of ₹6,405 crore**

The **Cabinet Committee on Economic Affairs (CCEA)** is one of the most important cabinet committees in the Indian government. It plays a key role in formulating and approving economic policies and decisions that impact the nation's economy.

Key Features:

- **Established Under:** Allocation of Business Rules, 1961.
- **Chairperson:** Prime Minister of India.
- **Members:** Selected Cabinet Ministers (e.g., Finance, Home, Commerce, Railways, Agriculture, etc.).

Functions of CCEA:

- **Policy Approval:** Approves major economic policies and schemes relating to agriculture, industry, energy, infrastructure, and public sector undertakings.
- **Investment Proposals:** Clears high-value investment projects above a specified financial limit (e.g., ₹1,000 crore and above).
- **Disinvestment:** Responsible for decisions on disinvestment of central public sector enterprises.
- **Price Controls & Subsidies:** Decides on pricing policies of essential commodities like sugar, fertilizers, etc.
- **FIPB/FDI Cases:**Earlier used to approve FDI proposals recommended by the now-abolished Foreign Investment Promotion Board (FIPB).

Project Highlights

1. Koderma–Barkakana Doubling (133 km, Jharkhand):

- Covers Koderma, Chatra, Hazaribagh, and Ramgarh districts.

2. Ballari–Chikjajur Doubling (185 km, Karnataka & Andhra Pradesh):

- Covers Ballari and Chitradurga (Karnataka), and Anantapur (Andhra Pradesh).

Broader Benefits

- **Connectivity Boost:** Total impact on 1,408 villages and 2.8 million people.
- **Freight Efficiency:** Total expected freight increase of 49 million tonnes/year.
- **Environmental Impact:** Saves 520 million litres of fuel and reduces 2,640 million kg of CO_2 emissions annually—equivalent to planting 110 million trees.
- **Strategic Vision:** Part of the **PM-Gati Shakti Master Plan** to enhance logistics, employment, and regional development.

Source:PIB

GST COUNCIL

Context: The 56th GST Council meeting, expected in late June or early July 2025, will consider a proposal to eliminate the 12% GST slab, aiming to simplify India's current four-rate system (5%, 12%, 18%, 28%) into a three-tier structure.

Key Proposals

- **Remove 12% Slab**: Items currently taxed at 12% may be shifted either to:
  - **5%** (essential/common-use items), or
  - **18%** (non-essential/higher-value items).
- **Alternative Option**: A new 15% slab by merging 12% and 18% is also under discussion, though less favored.

Rationale

- **Simplification**: Part of efforts to streamline the tax structure.
- **Revenue Neutrality**: Supported by consistently strong GST collections.
- **Stakeholder Demand**: Industry and states have long advocated for a less complex GST system.

Possible Impact

- Items like butter, ghee, fruit juice, processed food, and mobile phones—currently under 12%—may see GST rates revised depending on their essentiality.

GST Council

It's a **constitutional body** established under **Article 279A** of the Indian Constitution by the **101st Constitutional Amendment Act, 2016**. It is responsible for making key decisions related to the implementation and administration of the GST regime in India.

Composition

- **Chairperson**: Union Finance Minister
- **Members**:
  - Union Minister of State (Finance)
  - State Finance Ministers (or Ministers nominated by states)

Functions: The GST Council makes recommendations on:

1. **Tax rates** for goods and services.
2. **Exemptions** from GST.
3. **Threshold limits** for registration.
4. **Model GST laws**, rules, and principles of levy.
5. **Special provisions** for some states (e.g., NE & hill states).
6. **Dispute resolution** between Centre and States.

Decision-Making

- **Voting pattern**:
  - Centre: **1/3rd** weightage
  - States (collectively): **2/3rd** weightage

- A decision requires at least a **3/4th majority** of weighted votes.

Source: THE HINDU

GOLDEN JUBILEE OF THE DEPARTMENT OF OFFICIAL LANGUAGE

Context: Union Home Minister Amit Shah, speaking at the Golden Jubilee of the Department of Official Language in New Delhi.

Key highlights:

- The department's role in implementing the Official Languages Act and preserving linguistic diversity.
- Recognition of the department's contributions over the past 50 years.
- A call for continued efforts to strengthen the use of Hindi and regional languages in governance and public communication.

Provisions on Language in the Indian Constitution

The Indian Constitution includes detailed provisions to manage the country's rich linguistic diversity. These are mainly covered under **Articles 343 to 351** in **Part XVII**.

Official Language of the Union (Articles 343–344):

- **Article 343**:
  - Hindi in **Devanagari script** is the official language of the Union.
  - English was to be used for official purposes along with Hindi for **15 years (till 1965)**, and continues today due to the **Official Languages Act, 1963**.
- **Article 344**:
  - A **Commission** and **Committee of Parliament** to be constituted to recommend measures to promote Hindi and restrict the use of English.

Regional Languages (Articles 345–347):

- **Article 345**: State legislatures can adopt **any one or more languages in use in the state** as official language(s).
- **Article 346**: For communication between the state and the Union, **Hindi or English** will be used unless the President permits otherwise.
- **Article 347**: President can recognize a language spoken by a section of the population of a state if there is a demand.

Language of the Judiciary and Laws (Articles 348–349):

- **Article 348**: English to be used in Supreme Court and High Courts and for laws unless Parliament provides otherwise.
- **Article 349**: Parliament must consider recommendations of the **President and Language Commission** before changing the official language of legislation.

Special Directives (Articles 350–351):

- **Article 350**: Citizens can submit **grievances in any language** used in the Union or State.
- **Article 350A**: States must provide facilities for instruction in the **mother tongue** at the primary level for children of linguistic minorities.

- **Article 350B**: Provides for a **Special Officer for Linguistic Minorities** to report to the President.
- **Article 351**: The Union must promote the **spread and development of Hindi**, drawing from Sanskrit and other Indian languages, without harming other languages.

Official Languages Act, 1963

The **Official Languages Act, 1963** was enacted to regulate the use of Hindi and English for official purposes of the Union of India, especially after the expiry of the 15-year constitutional limit (1950–1965) for English use under Article 343.

Key Provisions:

1. **Continuation of English**:
    - Even after 1965, **English can continue to be used** for official purposes of the Union alongside Hindi.
    - This was done to **avoid backlash** from non-Hindi-speaking states (especially southern states like Tamil Nadu).
2. **Communication Between Union and States**:
    - **Hindi or English** to be used for communication between the Union and Hindi-speaking states.
    - **English** to be used for communication with non-Hindi-speaking states.
3. **Optional Use of Regional Languages**:
    - States can use their **own official languages** for state-level administration.
    - English translations must be provided when communicating with the Union or other states.
4. **Bilingual Communication**: Central government documents, notifications, and bills should be issued in **both Hindi and English**.
5. **Amendment in 1967**: The**Official Language (Amendment) Act, 1967** ensured **indefinite continuation** of English along with Hindi for all official purposes.

Source: PIB

EQUALITY IN CONSTITUTION OF INDIA

Context : Constitutional courts in India, particularly the **Supreme Court and High Courts**, play a vital role in interpreting and enforcing the constitutional principle of **equality**, especially in the context of **gender justice** and **anti-discrimination**.

Equality is a fundamental principle of justice that ensures all individuals are treated **fairly and without discrimination**, irrespective of their caste, gender, religion, race, or social status. It is both a **legal right** and a **moral value** essential to democratic societies.

Judicial Practice and Landmark Judgments:

Landmark Cases:

- **Sabarimala Case (2018):** Exclusion of women from the temple ruled unconstitutional.
- **P.B. Vijay Kumar (1995):** Reservations for women in public jobs upheld under Article 15(3).
- **Vishakha Case (1997):** Laid down sexual harassment guidelines; linked gender justice to Articles 14, 19, and 21.
- **Dharwad PWD Employees Case:** Enforced equal pay for equal work.
- **Charu Khurana Case:** Extended equality principles to private professional bodies.

Principles in Action:

- **Affirmative Action:** Constitutionally valid; essential for real equality.
- **Anti-Discrimination:** Laws and practices violating dignity and equality struck down.
- **Equal Pay:** Courts uphold the right to fair and equal remuneration.

Types of Equality:

1. **Formal Equality:**
    - Equal treatment under the law.
    - Everyone is subject to the same rules and standards.
2. **Substantive Equality:**
    - Focuses on outcomes and real-life access to opportunities.
    - Supports **affirmative action** to correct historical and structural disadvantages.
3. **Political Equality:**
    - Equal voting rights and participation in governance.
4. **Social Equality:**Elimination of social discrimination based on caste, class, gender, etc.
5. **Economic Equality:**Fair distribution of wealth and access to resources.

Equality in the Indian Constitution:

- **Article 14:** Equality before law and equal protection of laws.
- **Article 15:** Prohibition of discrimination based on religion, race, caste, sex, or place of birth.
- **Article 16:** Equality of opportunity in public employment.
- **Article 39(d):** Equal pay for equal work (Directive Principle).

Source : THE HINDU

NATIONAL TURMERIC BOARD

Context : Union Home and Cooperation Minister **Amit Shah** recently inaugurated the **headquarters of the National Turmeric Board** in **Nizamabad, Telangana**, a key turmeric-producing region in India.

The board aims to promote the turmeric industry, focusing on:

- Market access for farmers
- Research and quality improvement
- Value addition and exports
- Sustainable farming practices
- India's global turmeric presence

National Turmeric Board (NTB)

It is designed to provide a **comprehensive and inclusive framework** that supports all aspects of the turmeric value chain—from cultivation and research to marketing and exports.

Key Components of the Board Structure

Category	Role/Representation
Chairperson	Appointed by the Government of India to lead the Board
Secretary	Nominated from the Department of Commerce, acts as the administrative head

Central Government Members	Representatives from: – Ministry of AYUSH – Department of Pharmaceuticals – Ministry of Agriculture & Farmers Welfare – Ministry of Commerce & Industry
State Government Representatives	Officials from three major turmeric-producing states (rotated periodically)
Research & Institutional Members	Representatives from national/state institutions engaged in turmeric-related research
Farmer Representatives	Selected turmeric farmers to represent ground-level cultivation challenges and needs
Exporter Representatives	Individuals or associations involved in turmeric trade and export

Headquarters and Nodal Ministry

- **Headquarters:** Nizamabad, Telangana – one of India's leading turmeric-growing regions
- **Nodal Ministry:** Department of Commerce, Ministry of Commerce & Industry

Source :PIB

THREE-LANGUAGE POLICY

Context: The Maharashtra government has **scrapped the mandatory three-language policy** in schools, which earlier required students to learn **Marathi, Hindi, and English**.

Key Highlights:

- **Old Policy:** Mandatory teaching of **three languages** to promote multilingualism.
- **New Change:**
  - Schools **no longer required**following the three-language rule.
  - Provides **greater flexibility** in language selection based on school boards and student preferences.

Implications:

- **For Students:**
  - **Reduced academic burden** with fewer compulsory languages.
  - Greater **focus on regional or global relevance** of language learning.
- **For Schools:**
  - Need to **revise language curricula**.
  - May lead to **increased emphasis on Marathi and English**.

The **Three-Language Policy** is an educational framework introduced as part of India's national education strategy to promote **multilingualism**, **national integration**, and **cultural harmony**.

Origin:

- First proposed in the **1968 National Policy on Education** and reiterated in **1986** and **2020 (NEP)**.
- **Objective:** Ensure that students learn **three languages**—at least **two native to India**.

Structure:

- **In Hindi-speaking states:**
    1. **Hindi**
    2. **English**
    3. One **modern Indian language** (preferably from the South)
- **In non-Hindi-speaking states (e.g., Tamil Nadu, Maharashtra):**
    1. **Regional language** (e.g., Tamil, Marathi)
    2. **English**
    3. **Hindi** or another modern Indian language

Source: THE HINDU

INTERNATIONAL RELATIONS

PRESIDENT OF INDIA HOSTS PRESIDENT OF PARAGUAY

Context : President Droupadi Murmu is hosting President Santiago Peña Palacios of Paraguay on a historic State Visit to India from June 2 to 4, 2025

This marks President Peña's **first-ever visit to India** and only the **second time a Paraguayan head of state has visited**, underscoring the deepening relationship between the two countries.

Focus Areas for Cooperation

- **Sectors Discussed**: Trade, agriculture, healthcare, pharmaceuticals, and information technology.
- **Global Issues**: Shared perspectives on **UN reforms, climate change, renewable energy**, and **counter-terrorism**.
- Both leaders emphasized the importance of collaboration in tackling **cybercrime, drug trafficking, and organised crime**.

Global South Solidarity

- Prime Minister Modi highlighted the **strategic partnership within the Global South**, noting common development goals and challenges.

Mumbai Leg

- In Mumbai, President Peña will engage with **state leaders**, **startup ecosystems**, **business communities**, and **tech innovators**—aiming to strengthen bilateral economic and innovation partnerships.

Significance of the Visit

President Peña referred to India as an *"admirable partner, respected friend, and source of inspiration."*

This visit:

- Reinforces the **growing diplomatic warmth** between India and Paraguay
- Paves the way for **expanded economic and strategic engagement**
- Reflects mutual interest in shaping a more balanced and representative **global order**

Source:PIB

G7 (GROUP OF SEVEN)

Context: Indian Prime Minister **Narendra Modi** has accepted an invitation from Canadian Prime Minister **Mark Carney** to attend the **G7 Summit in Kananaskis, Alberta**.

G7 – Group of Seven

- The **G7** is an **intergovernmental political and economic forum** of the world's most **advanced and industrialized democracies**, formed to coordinate responses to global challenges—economic, security, climate, and more.

- **Current Members (7 Nations + EU Participation) : Canada, France, Germany, Italy, Japan, United Kingdom, United States**

NOTE: European Union (EU): Participates but is **not a formal member**.

Historical Background

- **Established in 1975** (initially G6; Canada joined in 1976 to form G7).
- Created in response to the **oil crisis and global economic recession** in the 1970s.
- Became the **G8** with Russia in 1997 but reverted to **G7 in 2014** after Russia's annexation of Crimea.

Objectives and Role

Objective	Description
Economic Coordination	Harmonize policies among major economies to foster global economic stability
Global Governance	Set the agenda on climate, health, digital taxation, development aid, etc.
Security & Geopolitics	Address issues like terrorism, nuclear proliferation, and war (e.g., Ukraine)
Humanitarian Support	Focus on food security, pandemic response, gender equality, education

Annual G7 Summit

- Hosted **annually by a rotating member country**.
- Features participation of **heads of state/government**.
- Includes **guest invitees** from other countries (e.g., India) and organizations like UN, IMF, WTO.

Decisions are not legally binding but carry high political weight.

Recent Key Themes (2022–2025)

Year	Host Country	Major Agenda Themes
2022	Germany	Climate protection, global health, food security, Ukraine
2023	Japan	Economic resilience, AI governance, nuclear disarmament
2024	Italy	Africa partnerships, climate financing, energy security
2025	**Canada**	**Global supply chains, democratic resilience, tech ethics**

India–Canada Relations

Overview

India and Canada share **historically cordial relations** based on **democratic values, multiculturalism, people-to-people ties, education, and trade**. However, the relationship has witnessed periodic **strains**, especially on issues related to **Khalistani separatism**.

Key Dimensions of Bilateral Relations

1. Political Relations

- Diplomatic relations established in **1947**.
- Periodic engagements at bilateral and multilateral forums (UN, G20, Commonwealth).
- Relations have been impacted by **Canada's stance on internal Indian matters**, including **Khalistan extremism**.

2. Economic & Trade Relations

- Bilateral trade (2023–24): ~**USD 10 billion**.
- Canada is a major source of **potash**, **pulses**, and **energy products**.
- India exports **pharmaceuticals, textiles, engineering goods**.
- Ongoing negotiations for a **Comprehensive Economic Partnership Agreement (CEPA)**.

3. People-to-People Ties

- Over **1.8 million Indo-Canadians** (~5% of Canada's population).
- India is the **largest source of international students** in Canada.
- Strong diaspora influence on bilateral ties and politics.

4. Energy & Technology Cooperation

- Collaboration in **civil nuclear energy** under the **2010 nuclear cooperation agreement**.
- Joint initiatives in **clean energy, AI, climate action, and innovation**.

Recent Issues & Strains

- **Khalistan issue** and pro-separatist activities in Canada.
- Diplomatic tensions in **2023** following Canadian allegations regarding the killing of Sikh activist Hardeep Singh Nijjar.
- Strained intelligence and security cooperation due to **trust deficit**.

Way Forward

- Strengthen **counter-terror cooperation** and avoid politicization of diaspora.
- Focus on **education, clean tech, and economic partnerships**.
- Build mutual trust through **high-level visits** and **track-II diplomacy**.

Source: THE HINDU

UNFPA REPORT

Context: India's population has touched **1.4639 billion (146.39 crore)** in 2025, officially making it the **most populous country in the world**

According to the **UNFPA State of World Population Report 2025**, this figure marks a major demographic milestone with long-term implications.

Key Highlights:

- **Population (2025):** 1.4639 billion
- **Fertility Rate:** 1.9 births per woman (below replacement level of 2.1)
- **Life Expectancy:** 71 years (men), 74 years (women)
- **Age Distribution:**
  - 0–14 years: 24%
  - 10–19 years: 17%
  - 10–24 years: 26%
  - 15–64 years (working age): 68%
  - 65+ years: 7%
- **Population Peak:** Expected around **1.7 billion in the early 2060s**, after which it will gradually decline.

- **Demographic Dividend:** With 68% in the working-age group, India has a key economic opportunity if employment and skilling are addressed effectively.

Fertility & Reproductive Trends:

- Fertility rate has dropped from nearly 6 children per woman in the 1960s to 1.9 in 2025.
- Decline driven by improved education, access to healthcare, and women's empowerment.
- However, **36% of adults still experience unintended pregnancies**, and **30% report unmet reproductive desires**, indicating inequality in access and reproductive autonomy across regions.

Policy Focus:

- The report urges a **shift from population control to reproductive rights**.
- The true demographic dividend can only be realized by **empowering individuals with informed reproductive choices**, and ensuring access to quality healthcare, education, and job opportunities.

Conclusion:

India stands at a pivotal moment in its demographic journey. While falling fertility rates and better life expectancy are positive signs, realizing the benefits of this transition depends on **inclusive policies, reproductive agency, and economic empowerment** of the working-age population.

Decadal Census in India – Brief Note

The **Census of India** is a **decennial (once every 10 years)** exercise conducted to collect comprehensive demographic, socio-economic, and housing data of the country's population. It is the **largest administrative and statistical exercise in the world**.

Historical Background:

- The **first synchronous census** was conducted in **1881** under British rule.
- Since then, it has been carried out **every 10 years without fail**, even during wars, pandemics, or emergencies.
- The **Registrar General and Census Commissioner of India**, under the Ministry of Home Affairs, is responsible for conducting the census.

Key Features:

- **Conducted intwo phases**:
  - **House-listing & Housing Census**
  - **Population Enumeration**
  - Involves **lakhs of enumerators**, mainly government school teachers and other staff.
  - **Census 2011** was the **15th National Census** since 1881.

Census 2021 (Postponed):

- **Census 2021** was to be the **16th decadal census**.
- It has been **postponed indefinitely** due to the **COVID-19 pandemic** and administrative reasons.
- This is the **first time since 1881** that a decadal census has been delayed.

Importance of the Census:

- Provides data for **planning, policy-making, and allocation of resources**.
- Essential for **delimitation of constituencies**, **reservation of seats**, and **distribution of funds** to states.
- Helps track **migration trends, literacy levels, employment**, housing conditions, and access to basic amenities.

Challenges:

- Digital transition: Census 2021 was to be the **first digital census**, using mobile apps for data collection.
- Political sensitivity over caste-based enumeration (demand for **caste census**).
- Urban-rural coverage, underreporting, and data accuracy remain persistent concerns.

Source :THE HINDU

GLOBAL GENDER GAP INDEX

Context: India ranked **131st out of 148 countries** in the **Global Gender Gap Index 2025**, slipping two spots from its 2024 rank (129th)

Key Highlights:

- **Political Empowerment:**
  - Dropped by 0.6 points.
  - Women's representation in Parliament fell from 14.7% to 13.8%.
  - Ministerial positions held by women declined from 6.5% to 5.6%.

- **Economic Participation:**
  - Slight improvement to 40.7%.
  - Women estimated earned income rose to 29.9%.
  - Labour force participation parity remained at 45.9%.
  - India remains in the **bottom five globally** for this pillar

- **Education and Health:**
  - Educational parity reached 97.1%.
  - Health and survival scores improved slightly, aided by better sex ratio at birth.

- **Regional Comparison:**
  - Ranked below Bangladesh (24), Bhutan (119), Nepal (125), and Sri Lanka (130).
  - Ahead only of Maldives and Pakistan in South Asia.

- **Global Overview:**
  - The global gender gap is 68.8% closed.
  - At the current pace, it will take over **120 years** to achieve global gender parity.
  - India remains among the **bottom 20 countries** worldwide.

Note on Global Gender Gap Index

The **Global Gender Gap Index** is an annual report published by the **World Economic Forum (WEF)** that measures gender-based disparities across countries. First launched in **2006**, the index evaluates the progress of nations toward gender parity using a standardized framework.

Key Features:

- **Published by:** World Economic Forum (WEF)
- **Latest Edition:** Global Gender Gap Report 2025
- **Coverage:** 148 countries (in 2025 edition)

Scoring:

- **Score Range:** 0 to 1
  - A score of **1** indicates **full gender parity**.
  - A score closer to **0** indicates **high inequality**.

Significance:

- Tracks **gender gaps**, not absolute levels of development.
- Helps policymakers identify **areas needing intervention**.
- Benchmarks progress across time and regions.

Source: THEHINDU

ISRAEL'S BIGGEST EVER ATTACK AT THE HEART OF IRAN

Context: Israel has launched its most extensive military operation in recent history, striking Iran's key nuclear and military facilities

The attack primarily targeted the **Natanz uranium enrichment facility**, missile bases, and research centers, killing several top Iranian officials

Key Highlights:

- The attack followed a critical IAEA resolution against Iran for non-compliance with nuclear safeguards.
- Prime Minister Netanyahu described the strike as a **"pre-emptive action"** to stop Iran from acquiring nuclear weapons.
- Major sites targeted included **Natanz**, **Isfahan**, **Tehran**, **Tabriz**, **Kermanshah**, **Badrak**, **Piranshahr**, and **Sardasht**.
- Despite the severity, experts believe the risk of a **radiation leakis low due to the type of uranium involved and the design of the facility**.

Implications:

- Marks a sharp escalation in Israel-Iran tensions.
- Likely to impact ongoing nuclear negotiations and regional stability.
- Iran's response and the global diplomatic fallout remain uncertain.

Brief Note on the Israel-Iran Conflict

The **Israel-Iran conflict** is a long-standing geopolitical rivalry marked by deep ideological, strategic, and security tensions in the Middle East.

Historical Background:

- After the 1979 Islamic Revolution, Iran adopted a strongly anti-Israel stance, calling for the elimination of the Israeli state.
- Iran supports militant groups like **Hezbollah (Lebanon)** and **Hamas (Gaza)**, which oppose Israel.
- Israel views Iran's regional influence and proxy network as a direct threat to its security.

Key Issues:

1. **Nuclear Program:**
    - Iran's pursuit of nuclear technology has been a central point of contention.
    - Israel considers a nuclear-armed Iran an existential threat and has conducted cyberattacks (e.g., Stuxnet) and targeted killings of Iranian nuclear scientists.
    - Recent years have seen direct military actions by Israel against Iranian nuclear sites and facilities.
2. **Proxy Warfare:**
    - Iran supports armed groups across the region (Syria, Lebanon, Gaza, Iraq, Yemen), which Israel frequently targets through airstrikes.
    - The conflict often manifests indirectly through these proxies, especially on Israel's northern and southern borders.
3. **Recent Escalations (2024–2025):**
    - Israel has intensified strikes against Iranian military assets and nuclear sites inside Iran.
    - Iran has retaliated with missile and drone attacks.
    - These direct confrontations mark a dangerous shift from shadow warfare to open military engagement.

Global Implications:

- **Regional Instability:** The conflict threatens to destabilize the broader Middle East.
- **Energy Security:** Disruption in the Strait of Hormuz or oil infrastructure can impact global markets.
- **Nuclear Non-Proliferation:** The breakdown of diplomatic efforts (e.g., JCPOA) risks a nuclear arms race in the region.

Source :THE HINDU

PRIME MINISTER VISITS CYPRUS

Context : Prime Minister Narendra Modi's two-day visit to Cyprus marks a significant step in revitalizing India-Cyprus relations after more than two decades The visit aimed to deepen cooperation in trade, investment, technology, and security.

Key Highlights

- **Diplomatic Talks**: PM Modi met with President Nikos Christodoulides to enhance bilateral cooperation across strategic sectors.
- **Business Roundtable**: Business leaders from both nations convened in Limassol, leading to proposals for long-term economic collaboration.
- **Strategic Timing**: The visit gains importance with Cyprus set to hold the EU Council presidency in 2026 and amid shifting regional alignments involving Turkey and Pakistan.

Focus Areas of Cooperation

Area	Cooperation Focus
Trade & Investment	Boosting trade, increasing FDI, using Cyprus as a gateway to Europe
Technology	Collaborating on innovation and tech-driven sectors
Security	Tackling cross-border terrorism and enhancing regional security ties
International Support	Cyprus backs India on global issues like Kashmir and UN reforms

Geopolitical Significance

- Cyprus, being part of the EU and Commonwealth, holds strategic importance for India's outreach to Europe. The partnership also supports India's goals related to the India-Middle East-Europe Economic Corridor (IMEC), leveraging Cyprus's maritime location.

Leadership Remarks

- PM Modi hailed Cyprus as a close friend and valued partner in the Mediterranean and EU. Both nations reaffirmed commitment to concluding the India-EU Free Trade Agreement.

Note on India–Cyprus Relations:

- India and Cyprus share a historically warm and mutually supportive relationship, rooted in shared values of **democracy**, **non-alignment**, and **multilateral cooperation**.

Key Aspects of the Relationship:

- **Diplomatic Ties:** Established in **1962**, the two countries have maintained consistent engagement through high-level visits, bilateral agreements, and participation in international forums.
- **Economic Cooperation:**
  - Cyprus is a **significant source of Foreign Direct Investment (FDI)** into India, especially in sectors like **real estate, finance, and services**.
  - Recent focus on enhancing collaboration in **technology, pharmaceuticals, and green energy**.
- **Support on International Issues:**
  - Cyprus has consistently supported **India's position on Jammu & Kashmir** and its **bid for a permanent seat in the UN Security Council**.
  - India, in return, has supported Cyprus's **territorial integrity and sovereignty**, especially in the context of its dispute with Turkey.
- **Cultural and Educational Exchanges:**
  - Programs under **ICCR scholarships** and growing interest in **yoga and Ayurveda** have boosted people-to-people ties.
- **Strategic Importance:**
  - Cyprus's **EU membership** and **geostrategic location** make it an important gateway for India into **Europe and the Mediterranean region**.
  - Cooperation expected to grow in light of the **India-Middle East-Europe Economic Corridor (IMEC)**.

Source :THE HINDU

GRAND CROSS OF THE ORDER OF MAKARIOS III

Context : Prime Minister Narendra Modi was conferred with the **Grand Cross of the Order of Makarios III**, the **highest civilian honour of Cyprus**.

Significance of the Award:

- Named after **Archbishop Makarios III**, Cyprus's first President.
- Established in **1991**, it is awarded to distinguished global figures for contributions to peace, diplomacy, and international relations.
- The **Grand Cross** is among the highest ranks within the order.

Prime Minister's Remarks:

- PM Modi dedicated the honour to **1.4 billion Indians**, reflecting India's cultural values and global commitment to peace and cooperation, invoking the spirit of "***VasudhaivaKutumbakam***" – the world is one family.

List of **major international awards and honours** conferred upon **Prime Minister Narendra Modi** by various **foreign countries**,

Award	Conferred By (Country)	Year	Reason / Significance
Order of the Nile	Egypt	2023	Egypt's highest state honour for strengthening bilateral relations
Companion of the Order of Logohu	Papua New Guinea	2023	For championing Global South solidarity
Grand Companion of the Order of Fiji	Fiji	2023	For leadership and global contributions
Ebakl Award	Republic of Palau	2023	First foreign head to receive this traditional honour for strengthening Pacific ties
Order of the Druk Gyalpo	Bhutan	2021	Bhutan's highest civilian award for India-Bhutan ties
Legion of Merit	United States	2020	For strengthening Indo-U.S. strategic partnership
Order of St. Andrew the Apostle	Russia	2019	Russia's highest civilian award for fostering ties and strategic partnership
Order of Zayed	United Arab Emirates	2019	UAE's highest civilian award for strengthening ties
King Hamad Order of the Renaissance	Bahrain	2019	For enhancing bilateral relations
Order of Abdulaziz Al Saud	Saudi Arabia	2016	One of the highest civilian honours for efforts in boosting India-Saudi relations
Global Goalkeeper Award	Bill & Melinda Gates Foundation	2019	For Swachh Bharat Abhiyan (Clean India Mission)

Grand Cross of the Order of Makarios III	Cyprus	2025	Cyprus's highest civilian award for strengthening diplomatic and cultural ties

Source: PIB

OPERATION SINDHU

Context : India has launched Operation Sindhu to evacuate its nationals from Iran following the escalation of conflict between Iran and Israel.

Key Highlights:

- **Evacuation Route:** Students were transported by road to **Armenia**, under the guidance of Indian missions in both Iran and Armenia.
- **Flight Details:** The evacuees departed from **Yerevan** on **June 18, 2025**, and arrived in **New Delhi** in the early hours of **June 19**.
- **Ongoing Efforts:** This marks the **first phase** of Operation Sindhu, with further evacuations planned as the situation evolves.

Significance:

Operation Sindhu underscores India's commitment to the safety of its citizens abroad and its ability to swiftly respond to international crises.

India's Overseas Operations

Year	Operation Name	Country / Region	Purpose / Crisis Description
2025	**Operation Sindhu**	**Iran via Armenia**	Ongoing evacuation amid escalating **Iran–Israel conflict**
2023	**Operation Ajay**	**Israel**	Evacuation during the **Israel–Hamas conflict**
2022	**Operation Ganga**	**Ukraine &Neighbors**	Evacuation of students during the **Russia–Ukraine war**
2021	**Operation Devi Shakti**	**Afghanistan**	Evacuation after **Taliban's return to power**
2020–21	**Vande Bharat Mission**	**Global (COVID-19)**	Mass repatriation during **COVID-19 lockdowns**

Source: THE HINDU

UK ASSISTED DYING BILL

Context : British lawmakers have approved a landmark bill legalizing **assisted dyingfor terminally ill adults in England and Wales.**

UK Assisted Dying Bill – Key Highlights

Key Provisions:

- Applies to **mentally competent adults (18+)** diagnosed with a **terminal illnessand a life expectancy of less than six months.**
- Requires approval from **two doctors** and a **specialist panel** (including a psychiatrist, social worker, and legal expert).
- Patients must **self-administer** the life-ending medication.
- Includes safeguards such as **independent advocates** for the disabled and a **disability advisory board**.
- **Voluntary participation** for medical professionals.

Public and Political Response:

- The issue remains **deeply divisive**, balancing **compassionate choice** versus concerns over **vulnerability and abuse**.
- The **Labour government** has taken a **neutral stance**, allowing MPs to vote based on personal conscience.
- Once enacted, the UK would join countries like **Canada, New Zealand, Spain**, and several **U.S. states** in allowing assisted dying for terminally ill patients.

Assisted Dying / Euthanasia in India – Brief Note

- In India, the issue of **assisted dying or euthanasia** is legally, ethically, and socially sensitive. While **active euthanasia** remains illegal, **passive euthanasia** has been permitted under strict conditions.
- **Types of Euthanasia:**
  1. **Active Euthanasia**:
     - *Direct action* (like administering a lethal injection) to end life.
     - **Illegal** in India.
  2. **Passive Euthanasia**:
     - Withholding or withdrawing medical treatment (like life support) that prolongs life in terminally ill patients.
     - **Legalized in 2018** under certain guidelines.

Key Case: Common Cause v. Union of India (2018)

- **Supreme Court verdict** recognized the **right to die with dignity** as part of **Article 21 (Right to Life)**.
- Legalized **passive euthanasia** with strict procedural safeguards.
- Recognized **Advance Medical Directives or "Living Wills"**:
  - Terminally ill patients can state their wish to not be put on life support.
  - Requires approval by medical boards and jurisdictional authorities.

Conditions for Passive Euthanasia:

- Patient must be in a **permanently vegetative or terminally ill condition**.
- **Requires**:

- Approval by **two medical boards**.
- Consent of family/relatives.
- **District Magistrate's** involvement.

Current Status:

- **Active euthanasia** is still prohibited.
- Passive euthanasia is permitted but **rarely used** due to complex legal and procedural requirements.
- The debate continues, with calls for **clearer legislation** and safeguards balancing **individual autonomy and ethical concerns**.

Source : THE HINDU

NUCLEAR PROLIFERATION TREATY (NPT)

Context: Israel-Iran conflict and **Iran's Potential Withdrawal from the NPT.**

Immediate Impacts on Iran:

- **Unrestricted Nuclear Development**: Iran could pursue nuclear weapons openly, beyond international treaty constraints.
- **End of IAEA Oversight**: Monitoring and inspections would stop, raising transparency concerns.
- **Increased Risk of Conflict**: Potential for **pre-emptive military action**, especially from Israel.

Regional Implications:

- **Arms Race in the Middle East**: Nations like **Saudi Arabia, UAE, and Egypt** may develop or accelerate nuclear programs.
- **Destabilization of NPT Norms**: Others may follow Iran's example, undermining the treaty's authority.

Global Consequences:

- **Erosion of Nonproliferation Norms**: Weakens global trust in nuclear agreements.
- **Diplomatic Polarization**: Divergent responses—**U.S. and Europe** may favor sanctions or force; **Russia and China** might resist punitive measures.

Strategic Risks for Iran:

- **Economic Isolation**: May face renewed **UN sanctions** and global backlash.
- **Military Vulnerability**: Loss of legal protections under NPT could legitimize external strikes.

Nuclear Non-Proliferation Treaty (NPT) – Brief Note

- The **Nuclear Non-Proliferation Treaty (NPT)** is a landmark international agreement aimed at preventing the spread of nuclear weapons and promoting peaceful uses of nuclear energy.
- **Adopted:1968**
- **Came into Force:1970**
- **Members:191 countries** (nearly every UN member, except **India, Pakistan, Israel,** and **North Korea** which withdrew in 2003)

Three Pillars of the NPT:

1. **Non-Proliferation:**
    - Nuclear-weapon states agree not to transfer weapons or assist non-nuclear states in acquiring them.
    - Non-nuclear states agree not to pursue nuclear weapons.
2. **Disarmament:**All parties commit to pursue **negotiations** in good faith towards nuclear disarmament.
3. **Peaceful Use of Nuclear Energy:**Promotes access to **nuclear technology for peaceful purposes**, under **IAEA safeguards**.

Nuclear Weapon States Recognized by NPT:

- United States
- Russia
- United Kingdom
- France
- China
  (*States that tested nuclear weapons before 1967*)

Source:THE INDIAN EXPRESS

IRAN'S PARLIAMENT MOVES TO SUSPEND COOPERATION WITH IAEA

Context: Iran's parliament is moving forward with legislation to suspend all cooperation with the International Atomic Energy Agency (IAEA).

Key Points:

- **It proposes halting:**
    - Installation of IAEA surveillance cameras
    - On-site inspections
    - Reporting to the IAEA
- These measures would remain suspended until Iran receives "**objective guarantees**" on the IAEA's neutrality and security assurances for its nuclear sites.

Iran's Standpoint:

- Iranian leaders accuse the IAEA of bias and of acting under political influence.
- The move is seen as a response to perceived threats to Iran's nuclear infrastructure and national sovereignty.

International Response:

- The IAEA has convened an emergency meeting and urged renewed diplomacy to prevent further escalation.
- Western nations have expressed concern, warning that reduced oversight could raise nuclear proliferation risks.

Implications:

- If passed by the full parliament, the bill would drastically reduce transparency into Iran's nuclear program.
- It could heighten regional instability and deepen Iran's international isolation.

International Atomic Energy Agency (IAEA)

- The **International Atomic Energy Agency (IAEA)** is a specialized agency of the United Nations established in **1957**. Its headquarters is in **Vienna, Austria**.
- **Purpose:**
  - Promote the **peaceful use of nuclear energy**.
  - Prevent the **spread of nuclear weapons** (non-proliferation).
  - Ensure **nuclear safety and security** worldwide.

Key Functions:

- **Safeguards and Verification:**Inspects nuclear facilities in member states to verify that nuclear materials are not diverted to weapons programs.
- **Technical Assistance:**Helps countries develop nuclear technology for uses in medicine, agriculture, energy, etc.
- **Standards and Safety:**Sets international safety standards for nuclear operations and radiation protection.
- **Crisis Monitoring:**Responds to nuclear emergencies and monitors compliance with international agreements like the **Nuclear Non-Proliferation Treaty (NPT)**.
- **Structure:**
  - **General Conference:** All member states meet annually.
  - **Board of Governors:** Makes key policy decisions.
  - **Secretariat:** Executes daily functions, headed by the **Director General**.

Source:THE HINDU

IRAN VOTES TO CLOSE STRAIT OF HORMUZ

Context: The **Iranian parliament** has approved a proposal to close the **Strait of Hormuz** in retaliation for recent U.S. airstrikes on its nuclear sites

Strategic Importance of the Strait

- Located between **Iran and Oman**, it handles **20–30% of global oil shipments** and a major share of liquefied natural gas (LNG) exports.
- Closure would cause a global supply shock and spike oil prices.

Impact on India

- India imports:
  - **~50% of its crude oil**
  - **~60% of natural gas** via the Strait.
- A blockade could:
  - Push **Brent crude to $110–$130 per barrel**.

- Trigger **domestic fuel inflation**, increase transport and production costs, and hurt **GDP growth**.

Strait of Hormuz:

- The **Strait of Hormuz** is one of the world's most strategically important maritime chokepoints, located between **Iran and Oman**, connecting the **Persian Gulf** with the **Gulf of Oman** and the **Arabian Sea**.
- **Key Facts:**
  - **Width:** Narrowest point is about **33 km** (21 miles) wide.
  - **Shipping Lane:** Only **3 km** wide in each direction, with a 2 km buffer zone.
- **Oil Transit:**
  - Carries **20–30% of global seaborne oil shipments**.
  - Nearly **17–18 million barrels of oil per day** pass through.
- **Natural Gas:** Major route for **liquefied natural gas (LNG)**, especially from **Qatar**.
- **Geopolitical Importance:**
  - Borders **Iran** to the north and **UAE and Oman** to the south.
  - Iran has previously threatened to close the Strait during tensions with the West.
  - Any disruption here can cause a **global energy crisis** and **spike in oil prices**.

Source: **THE** HINDU

NATO

Context : At the NATO summit in The Hague on **June 25, 2025**, member states agreed to raise defence and security spending to **5% of GDP** by **2035**, marking the alliance's largest military commitment since the Cold War.

Key Highlights

- **New Spending Target**:
  - **Total**: 5% of GDP
  - **Core Defence (troops, weapons, etc.)**: 3.5%
  - **Broader Security (infrastructure, innovation, civil preparedness)**: 1.5%
- **Annual Progress Review**: Countries must submit yearly plans; a formal review will take place in **2029**.
- **Collective Defence Reaffirmed**: Emphasizes NATO's solidarity amid rising threats from **Russia**, **terrorism**, and **cyber warfare**.
- **U.S. Influence**: The decision follows long-standing U.S. pressure for greater burden-sharing among European allies.
- **Divergence in Support**: While most members back the plan, some like **Spain**, **Belgium**, and **Slovakia** have expressed difficulty in meeting the 5% target due to budgetary constraints.
- **Strategic Context:** This move supports NATO's **largest rearmament drive** in decades and reflects the need for stronger **deterrence**, enhanced **readiness**, and adaptability to modern threats, including the war in Ukraine and cyberattacks.

NATO (North Atlantic Treaty Organization)

- The **North Atlantic Treaty Organization (NATO)** is a political and military alliance formed in **1949** to ensure collective defence and security for its member nations.
- **Founding and Purpose**
  - **Established**: April 4, 1949, by the **North Atlantic Treaty (Washington Treaty)**
  - **Headquarters**: Brussels, Belgium
  - **Motto**: *"Animus in consulendo liber"* (A mind unfettered in deliberation)
  - **Primary Objective**: Safeguard the freedom and security of member countries through political and military means

Key Features

- **Collective Defence**: Under **Article 5**, an attack on one member is considered an attack on all.
  - Invoked only once: After the **9/11 attacks** in 2001.
- **Members**: 32 countries (as of 2025), including the U.S., Canada, most European nations, and new entrants like Finland and Sweden.
- **Decision-Making**: Based on **consensus** among all member states.

Functions

- **Military Cooperation**: Joint defense, training, and strategic planning
- **Crisis Management**: Peacekeeping and conflict resolution missions
- **Cyber & Hybrid Threats**: Addressing modern security challenges beyond traditional warfare
- **Partnership Programs**: Works with non-member countries to promote global stability

Source : THE HINDU

INDIA-U.S. TRADE DEAL

Context : India and the U.S. are in the final stages of talks to conclude a limited trade agreement before the **July 8, 2025**, deadline.

Key U.S. Demands

- Lower tariffs and non-tariff barriers on American exports—especially autos, medical devices, and agricultural goods (soy, corn, wheat, ethanol, apples).
- Market access for genetically modified (GM) crops.
- Better terms in sectors like aviation and energy.

India's Stance

- Protects sensitive sectors like agriculture and dairy to safeguard farmers' interests and food security.
- Offers limited concessions: reduced tariffs on almonds, pistachios, and some defense/energy goods.
- Seeks rollback of U.S. tariffs on Indian steel and auto parts.

Sticking Points

- Disagreement over tariffs on farm goods, steel, and auto components.
- U.S. wants immediate, broad access; India prefers a phased approach.
- Talks may need top-level intervention (Modi-Trump) to break the impasse.

If No Deal by July 8

- A 10% tariff on Indian goods could be reimposed.
- Likely limited impact, as exports have remained resilient.
- India is also strengthening trade ties with the EU and UK.

Bilateral Trade Between India and the USA

- India and the United States share a robust and growing trade relationship marked by both strategic cooperation and occasional trade tensions. The U.S. is one of India's largest trading partners, and India is a key market and strategic ally for the U.S. in the Indo-Pacific region.

Key Facts (as of 2024 estimates):

- **Total Bilateral Trade:** Over **$190 billion**, making the U.S. India's **largest trading partner**.
- **India's Exports to U.S.:** ~$118 billion – Includes **pharmaceuticals, textiles, IT services, gems &jewelry**, auto parts.
- **India's Imports from U.S.:** ~$72 billion – Includes **crude oil, defense equipment, aircraft, agricultural products**, and technology.

Areas of Cooperation:

- **Energy Trade:** The U.S. is a key supplier of crude oil, LNG, and coal to India.
- **Defense& Technology:** Growing defense procurement (Apache, C-130, drones), and tech collaboration.
- **Services & IT:** U.S. is the largest market for India's IT exports; many Indian professionals work in the U.S. under H-1B visas.

Challenges & Frictions:

- **Tariff Disputes:** The U.S. often criticizes India's high tariffs on products like autos and agriculture.
- **Trade Barriers:** India raises concerns about U.S. visa restrictions and protectionist policies.
- **Digital Trade & Data Localization:** Emerging areas of disagreement in the tech sector.

Conclusion:

India-U.S. trade is strategic and multifaceted, with significant growth potential. While challenges persist, both countries recognize the mutual economic and geopolitical benefits of a deeper trade partnership.

Source:THE HINDU

ECONOMY

GOVERNMENT OF INDIA HAS SUCCESSFULLY MET ITS FISCAL DEFICIT TARGET OF 4.8% OF GDP

Context : The Government of India has successfully met its fiscal deficit target of 4.8% of GDP for the financial year 2024–25 (FY25)

The Government of India has successfully met its fiscal deficit target of 4.8% of GDP for the financial year 2024–25 (FY25), according to provisional data released by the Controller General of Accounts. The fiscal deficit stood at ₹15.77 lakh crore, representing 100.5% of the revised target announced in the Union Budget.

Key Highlights:

- The fiscal deficit was reduced from 5.6% in the previous year to 4.8% of GDP, underscoring the government's commitment to fiscal consolidation.
- This achievement was driven by disciplined revenue expenditure, higher-than-anticipated non-tax revenues (including a significant dividend from the central bank), and robust capital expenditure that surpassed its revised goal.
- Total government receipts reached ₹30.78 lakh crore, or 97.8% of the revised estimate, while total expenditure amounted to ₹46.56 lakh crore, or 98.7% of the revised estimate.
- For FY26, the government has set a lower fiscal deficit target of 4.4%, aiming to bring the gap below 4.5% in line with its medium-term fiscal roadmap.

This outcome highlights the government's ability to maintain fiscal discipline while continuing to invest in infrastructure and public services despite challenging economic conditions.

1. Fiscal Deficit

- Fiscal Deficit is the gap between the government's total expenditure and its total revenue (excluding borrowings). It indicates how much the government needs to borrow to meet its expenses.
  Formula:
  Fiscal Deficit = Total Expenditure – (Revenue Receipts + Non-debt Capital Receipts)
- It reflects the total borrowings required by the government.

2. Revenue Deficit

- Revenue Deficit occurs when the government's revenue expenditure exceeds its revenue receipts. It shows that the government is borrowing not only for capital investment but also to meet its regular operational expenses.
- **Formula**:
  Revenue Deficit = Revenue Expenditure – Revenue Receipts
- A revenue deficit means the government is not generating enough revenue to cover its routine expenses.

3. Primary Deficit

- Primary Deficit is the fiscal deficit excluding interest payments on previous borrowings. It indicates the current year's borrowing requirement, ignoring the cost of past borrowings.
- **Formula**:
  Primary Deficit = Fiscal Deficit – Interest Payments
- It helps assess the sustainability of government borrowing.

4. Effective Revenue Deficit

- Effective Revenue Deficit is the part of the revenue deficit that excludes grants given for capital assets. It measures the actual shortfall in revenue receipts compared to revenue expenditure on routine functions.
- **Formula**:
  Effective Revenue Deficit = Revenue Deficit – Grants for creation of capital assets
- This gives a clearer picture of the government's operational deficit.

Source :the hindu

INSOLVENCY BANKRUPTCY CODE (IBC)

Context: The recent developments in the Bhushan Power and Steel Ltd. case have reignited concerns around the finality of resolution outcomes and the predictability of the framework.

Insolvency and Bankruptcy Code (IBC), 2016

The **Insolvency and Bankruptcy Code (IBC), 2016** is India's landmark legislation aimed at consolidating and streamlining the insolvency resolution process for individuals, companies, and partnership firms in a time-bound manner.

Objectives:

- To ensure **time-bound resolution** of insolvency and bankruptcy cases (within 330 days).
- To **maximize the value of assets** of insolvent persons.
- To **promote entrepreneurship** and availability of credit.
- To **balance the interests** of all stakeholders, including creditors, debtors, and employees.
- To improve India's **ease of doing business** ranking and promote **credit discipline**.

Key Features:

- **Single framework** for insolvency and bankruptcy covering individuals, companies, and LLPs.
- Establishes institutional mechanisms such as:
  - **Insolvency and Bankruptcy Board of India (IBBI)** – regulatory body
  - **National Company Law Tribunal (NCLT)** – adjudicating authority for corporates
  - **Debt Recovery Tribunal (DRT)** – for individuals and partnership firms
  - **Resolution Professionals (RPs)** – manage the resolution process
- Creditors can initiate the process on default of ₹1 crore or more (earlier ₹1 lakh).
- Control of the defaulting firm is transferred from management to creditors via **Committee of Creditors (CoC)**.

Achievements:

- Helped reduce **non-performing assets (NPAs)** – e.g., NPA ratio declined from 11.2% (2018) to 2.8% (2024).
- Promoted **credit discipline** among borrowers.
- Recovered over **₹3.89 lakh crore** by 2024.
- Enhanced investor confidence and improved business ecosystem.

Challenges:

- **Delays** in resolution beyond 330 days due to judicial backlog.
- **Low recovery rates** in recent years (around 28.6%).
- Inadequate infrastructure, valuation disputes, and multiple legal appeals.
- Lack of clear treatment for **operational creditors** and **complex business models**.

Source :THE HINDU

DOLLAR IS "FLOORED" IN 2025

Context : The U.S. dollar has fallen nearly 10% in 2025, making it one of the weakest performers among major U.S. asset classes.

The decline is driven primarily by a global surge in hedging activity among foreign investors, reflecting growing uncertainty in U.S. policy and market behaviour.

Key Reasons for Dollar Weakness

- **Rising Hedging by Global Investors:** Investors are now hedging U.S. equity positions more aggressively—unlike in the past, where equities were seen as a natural hedge. This widespread increase in hedge ratios is reducing demand for the dollar.
- **Fading U.S. Exceptionalism:** Confidence in the U.S. economic narrative has waned amid shifting policies and global trade tensions, especially under the current administration.
- **Broken Correlations:** Typically, the dollar rises when U.S. stocks fall. However, in 2025, both have been falling together. This unusual behaviour has weakened the dollar's status as a portfolio hedge.
- **Hedging Trends from Global Funds:**Large foreign pension funds have sharply increased their currency hedges on U.S. assets—some by over 10% in just months—leading to massive currency flows out of the dollar.
- **Trade Tensions and Outflows:** Persistent geopolitical frictions, especially U.S.-China tensions, have added to foreign investor caution, accelerating capital outflows from U.S. markets.

<u>Currency Appreciation and Depreciation: Concepts and Impact on Trade. Definitions:</u>

1. Currency Appreciation

- When the value of a country's currency **rises** relative to another currency (usually the US Dollar), it is called **appreciation**.
- Example: ₹75/USD → ₹70/USD (1 USD now costs fewer rupees).

2. Currency Depreciation

- When the value of a country's currency **falls** relative to another currency, it is called **depreciation**.
- Example: ₹75/USD → ₹80/USD (1 USD now costs more rupees).

Impact on Trade

Impact	Appreciation of Currency	Depreciation of Currency
Exports	Becomes costlier in global markets → ↓	Becomes cheaper → more competitive → ↑
Imports	Becomes cheaper → import bill ↓	Becomes expensive → import bill ↑
Trade Balance	May worsen (exports ↓, imports ↑)	May improve (exports ↑, imports ↓)
Current Account Deficit	Likely to increase	May reduce
Foreign Investment Appeal	Attracts more capital (safe haven effect)	May reduce unless higher returns offered
Inflation	Lower (cheaper imports, e.g., oil)	Higher (costlier imports)

Link to US Dollar (USD) Appreciation or Depreciation:

- Since the **US dollar is the dominant global reserve and trade currency**, any movement in USD impacts almost every major economy, including India.
- **If the US Dollar Appreciates (e.g., due to Fed rate hikes, risk aversion):**
  - **Indian Rupee tends to depreciate** → Makes oil, electronics, and other imports expensive.
  - **India's exports become more competitive**, boosting textile, IT, and pharma sectors.
  - **Worsens CAD** if imports (especially crude oil) rise in value.
  - **FII outflows** occur as investors shift to USD-denominated assets → weaker rupee.
- **If the US Dollar Depreciates (e.g., due to US economic slowdown, Fed rate cuts):**
  - **INR tends to appreciate** → Imports become cheaper, easing inflation.
  - **Exports may lose price competitiveness** in global markets.
  - Encourages **capital inflows** into emerging markets like India.

Source : THE HINDU

BHASHINI

Context : The Digital India Bhashini Division (DIBD) and Centre for Railway Information Systems (CRIS) have signed an MoU to develop next-generation multilingual AI solutions for Indian Railways' digital platforms

Key Objectives:

- **Language AI Integration:** Technologies like Automatic Speech Recognition (ASR), Text-to-Text Translation, Text-to-Speech (TTS), and Optical Character Recognition (OCR) will be integrated into platforms like NTES and RailMadad.
- **Support for 22 Indian Languages:** Enhances access to services in native languages across mobile apps, websites, kiosks, and call centers.
- **AI-Driven Passenger Services:** Introduction of multilingual chatbots, voice assistants, and real-time voice interaction systems.
- **Scalable Infrastructure:** Uses both cloud and on-premise models to ensure reliable deployment across the vast railway network.

- **Pilot Programs:** Includes workshops and trial deployments to fine-tune the system before full-scale implementation.

Strategic Importance:

- This collaboration supports the Digital India mission by removing language barriers in public services and enhancing digital inclusivity. It is expected to benefit millions of railway passengers, especially non-English speakers.
- This initiative marks a major leap in citizen-centric digital transformation for Indian Railways.

Brief Note on BHASHINI

- **BHASHINI** (BHASHaINterface for India) is a flagship initiative under the **Digital India** programme, launched by the Ministry of Electronics and Information Technology (MeitY), Government of India. Its core mission is to **enable access to digital services in all 22 scheduled Indian languages**, breaking the language barrier in technology adoption across the country.

- **Key Features:**
  - **National Language Translation Mission (NLTM):** BHASHINI is the implementing arm of NLTM, aiming to create a unified digital public platform for multilingual language technologies.
  - **Technology Stack:** It provides open-source tools for:
  - **Automatic Speech Recognition (ASR)**
  - **Machine Translation**
  - **Text-to-Speech (TTS)**
  - **Optical Character Recognition (OCR)**
  - **Open Ecosystem:** Encourages collaboration between startups, academia, industry, and government to develop language AI tools and datasets.
  - **Public Platform:** Hosts a **Bhashadaan portal** to crowdsource language data, fostering AI model development for low-resource Indian languages.

- **Significance:**
  - Promotes **digital inclusion** by ensuring non-English speakers can access government schemes, health services, education, and e-commerce in their own language.
  - Supports **Make in India** and **Atmanirbhar Bharat** by building indigenous AI capabilities.
  - Facilitates the creation of **voice-enabled and language-neutral digital platforms** for public services.
  - **Recent Applications:**
  - **MoUs with CRIS (Railways), NPCI (UPI voice transactions)**, and other departments to integrate multilingual AI into public services.
  - Empowering platforms like **UMANG**, **MyGov**, and **DigiLocker** with language support.

Source: PIB

TECHNICAL TEXTILES

Context: Prime Minister Narendra Modi shared an article on the progress made in Technical textiles

India's technical textiles sector is witnessing rapid growth, driven by two major government initiatives: the **National Technical Textiles Mission (NTTM)** and the **Production Linked Incentive (PLI)** scheme. Together, these programs aim to transform India into a global leader in this high-value, innovation-driven segment.

Key Outcomes (as of 2025)

Indicator	Value
Domestic Market Growth (Annual)	10%
Exports (Technical Textiles)	$2.9 billion
Total Investment Attracted	₹5,218 crore
Employment Generated	8,500+ jobs
Sector Turnover	₹3,242 crore
Export Revenue (TT alone)	₹217 crore

1. National Technical Textiles Mission (NTTM)

- **Launch & Vision:** Introduced in 2020 with a budget of ₹1,480 crore to make India a global leader by 2026.
- **Key Focus Areas:** Research, innovation, market development, exports, and skill development.
- **Achievements:**
  - 168 research projects supported.
  - Training for over 50,000 individuals.
  - Mandated use of 73 technical textile items in public projects.
- **Strategic Sectors Covered:** Aerospace, defence, agriculture, healthcare, infrastructure, and environment.
- **Ecosystem Building:**
  - 17 startups incubated.
  - Over 2,000 students trained.
  - 16 industry-linked skilling modules developed.
- **Global Presence:** Participation in 30+ international events; man-made textile exports rose from $4.2B (2020–21) to $5.3B (2024–25).

2. Production Linked Incentive (PLI) Scheme

- **High-Value Manufacturing:** Focuses on critical products like carbon fiber, glass fiber, and automotive safety textiles.
- **Objective:** Boost large-scale domestic production and reduce dependence on imports.
- **Global Competitiveness:** Aims to challenge key exporters like China and Vietnam in the technical textiles space.

Source : THE ECONOMIC TIMES

RBI'S FINAL GOLD LOAN GUIDELINES

Context: The Reserve Bank of India's final directions on gold loans is seen as a growth driver for NBFCs, especially those focused on small-ticket lending.

Key Highlights:

- **Higher LTV Ceiling:** The loan-to-value (LTV) ratio has been raised to **85%** for loans up to ₹2.5 lakh, up from 75%, benefiting NBFCs whose portfolios mostly comprise small-ticket gold loans.
- **Bullet Repayment Loans:** For bullet loans (where interest and principal are repaid together), the LTV must now be calculated **including accrued interest**, not just principal. The increased LTV helps offset this stricter computation.
- **Risk Management Emphasis:** While higher LTV allows greater lending, it also increases exposure to gold price volatility. Timely auctions and robust risk practices are now more critical.
- **No Extra Provisioning:** The proposed 1% additional provisioning for LTV breaches has been dropped. However, NBFCs must clearly outline their response and auction policies for LTV breaches.
- **Uniform Rules and Timeline:** These rules apply to all regulated lenders (including banks) and will be implemented from **April 1, 2026**, giving NBFCs time to adjust.
- **Crisil's View:** The new framework provides **additional lending flexibility** and **regulatory clarity**, supporting growth while intensifying competition.

Monetary Policy Measures by RBI

The **Reserve Bank of India (RBI)** uses **monetary policy tools** to regulate money supply, control inflation, ensure financial stability, and support economic growth. These tools are broadly classified into:

1. Quantitative Measures *(General Instruments)*

These control the **overall money supply and credit volume** in the economy.

Measure	Description
Cash Reserve Ratio (CRR)	Percentage of a bank's total deposits that must be kept with RBI as reserves. Higher CRR reduces lending capacity.
Statutory Liquidity Ratio (SLR)	Percentage of net demand and time liabilities (NDTL) that banks must maintain in the form of liquid assets (like government securities).
Repo Rate	Interest rate at which RBI lends to banks. A higher repo rate makes borrowing costly, reducing money supply.
Reverse Repo Rate	Interest rate at which RBI borrows from banks. Used to absorb excess liquidity.
Bank Rate	Long-term lending rate of RBI to banks. Rarely used now.
Open Market Operations (OMO)	RBI buys/sells government securities in the open market to control liquidity. Buying increases money supply; selling reduces it.

2. Qualitative Measures *(Selective Instruments)*

These focus on **controlling the use or direction of credit** rather than its volume.

Measure	Description
Credit Rationing	RBI imposes limits on loans to certain sectors or businesses.
Moral Suasion	RBI persuades banks (non-binding) to follow certain credit practices, like not lending excessively to speculative sectors.
Selective Credit Controls	RBI restricts lending for certain purposes like hoarding or speculative trading.
Margin Requirements	RBI sets minimum margin for loans against securities to control speculative credit.

Source: THE HINDU

FALCON 2000

Context : French aerospace firm Dassault Aviation and Reliance Aerostructure Ltd have announced a joint venture to manufacture Falcon 2000 business jets in Nagpur, India.

Key Highlights

- **Location:** MIHAN SEZ, Nagpur
- **Aircraft:** Falcon 2000; parts of Falcon 6X & 8X
- **Scope:** Fuselage and wing assembly to be shifted to India
- **Estimated Capacity:** Up to 24 aircraft annually
- **Timeline:** First made-in-India jet by 2028

Significance

- **Make in India &Atmanirbhar Bharat:** Major boost to domestic aerospace manufacturing
- **Global Positioning:** India joins elite countries (US, France, Canada, Brazil) producing business jets
- **Exports:** Aircraft will cater to both domestic and international markets
- **Centre of Excellence:** Nagpur facility to become Dassault's first such hub outside France

Market & Strategic Impact

- **Cost Efficiency:** Local assembly reduces labour and logistics costs
- **Policy Support:** Aligned with government aerospace incentives
- **Challenges:** Regulatory clearances, technology transfer, and maintaining global aviation standards

Aircraft Manufacturing in India

India's aircraft manufacturing industry is evolving rapidly, driven by defence needs, commercial aviation growth, and the government's push for indigenous production under the **'Make in India'** and **'Atmanirbhar Bharat'** initiatives.

Key Players & Institutions

Entity	Role / Contribution
Hindustan Aeronautics Ltd (HAL)	India's largest aerospace manufacturer; produces military aircraft like Tejas, Dhruv helicopter
DRDO	Designs and develops aircraft systems (e.g., AEW&C, Rustom UAV)
TATA Advanced Systems	Collaborates with Boeing, Airbus, and Lockheed Martin; manufactures fuselage and components
Bharat Electronics Ltd (BEL)	Supplies avionics and radars for aircraft
Dassault Reliance Aerospace	Joint venture to produce Falcon business jets in Nagpur (Falcon 2000 assembly by 2028)

Major Indigenous Aircraft Projects

Aircraft Name	Type	Details
Tejas (LCA)	Fighter Jet	Indigenous light combat aircraft developed by HAL and DRDO
HTT-40	Trainer Aircraft	Basic trainer aircraft for Indian Air Force
Saras Mk II	Transport Plane	Indigenous light transport aircraft being developed by NAL (CSIR)
TAPAS-BH 201	UAV	Medium-altitude long-endurance drone developed by DRDO
AMCA	Fighter Jet (upcoming)	5th-generation stealth aircraft under development

Civil Aircraft Manufacturing

- **Airbus-Tata JV in Vadodara**: First Indian facility to manufacture C-295 military transport aircraft for IAF.
- **HAL** is collaborating with foreign OEMs to develop civil aircraft like **Regional Transport Aircraft (RTA-90)**.
- **Dassault-Reliance JV**: Manufacturing **Falcon 2000 business jets** in Nagpur by 2028—the first civil aircraft final assembly line in India.

Government Support

- **Defence Procurement Policy (DPP)** and **Make in India** push for indigenization
- **PLI Scheme for Aerospace and Drones**
- Incentives for **MRO (Maintenance, Repair & Overhaul)** industry
- Setting up of **defense corridors** in UP and Tamil Nadu

Source : THE INDIAN EXPRESS

INDIA POST PAYMENTS BANK (IPPB)

Context : India Post Payments Bank (IPPB) has been awarded the **Digital Payments Award 2024–25** by the Department of Financial Services, Ministry of Finance.

India Post Payments Bank (IPPB) – Brief Note

- **Launched:** January 30, 2017 **Owner:** 100% Government of India (under the Department of Posts, Ministry of Communications)
- **Headquarters:** New Delhi
- **Key Features:**
  - Established to leverage the **postal network** for providing **banking services**.
  - Uses over **1.5 lakh post offices** and **2 lakh postal staff (Postmen & Gramin Dak Sevaks)** for last-mile delivery.
  - Offers **digital banking services** such as savings accounts, money transfers, bill payments, and DBT (Direct Benefit Transfers).
  - Focuses on **financial inclusion** by reaching unbanked and underbanked populations in rural and remote areas.

Payment Banks in India – Overview

- **Concept Introduced by:** Reserve Bank of India (RBI) based on **Nachiket Mor Committee** recommendations in 2014
- **Launched:** First licenses issued in 2015
- **Purpose:**
- Enhance **financial inclusion** by providing small savings accounts and payments/remittance services to the underserved.
- **Key Features:**
  - Can accept **deposits up to ₹2 lakh** per customer (limit may be revised by RBI).
  - **Cannot issue credit cards** or give loans.
  - Can offer services like:
    - Savings/current accounts
    - Mobile and online banking
    - UPI, IMPS, NEFT, AEPS-based transactions
    - Utility bill payments and insurance (through third parties)
- **Examples of Payment Banks:**India Post Payments Bank (IPPB), Airtel Payments Bank, Paytm Payments Bank, Fino Payments Bank, NSDL Payments Bank.
- **Significance:**
  - Help bridge the **urban-rural banking divide**.
  - Promote **cashless economy** and **digital financial literacy**.
  - Act as a low-cost, technology-driven solution for basic banking services.

Source:PIB

INDIA TO CONDUCT FIRST-EVER HOUSEHOLD INCOME SURVEY IN 2026

Context: The **Ministry of Statistics and Programme Implementation (MoSPI)** will conduct **India's first comprehensive Household Income Survey** in **February 2026**, aiming to bridge a critical gap in national income data.

Key Features:

- **Objective:**To assess **household income distribution**, understand the **impact of technology on wages**, and support informed **economic planning**.
- **Expert Panel:**An **8-member Technical Expert Group (TEG)**, chaired by **Dr. Surjit S. Bhalla**, will guide survey design, methodology, sampling, and implementation in line with **international best practices**.
- **Historical Gap:**While India has long collected data on **consumption, employment, health, and education** through the **National Sample Survey (NSS)**, no **nationwide income-specific survey** has ever been completed due to **past methodological challenges**.

Significance:

- Will enable precise analysis of **income inequality**, **economic mobility**, and the **structural shifts** in the Indian economy since independence.
- Findings will support **policy formulation** and **resource allocation** at both **central and state levels**.

Reports Released by MoSPI (Ministry of Statistics and Programme Implementation)

- The **Ministry of Statistics and Programme Implementation (MoSPI)** is responsible for collecting, analyzing, and publishing statistical data to aid policy formulation and socio-economic planning in India. It functions through two main wings: the **Central Statistics Office (CSO)** and the **National Sample Survey Office (NSSO)** (now merged into the National Statistical Office, NSO).
- **Major Reports Released by MoSPI / NSO:**

  1. National Statistical Office (NSO) Reports:
  - **Periodic Labour Force Survey (PLFS):**Provides data on employment-unemployment, labor force participation, and worker distribution by sector and gender.
  - **Consumer Expenditure Survey (CES):**Tracks household spending patterns, consumption trends, and helps estimate poverty levels (next round expected after 2011–12).
  - **Household Social Consumption Surveys:**Include topics like **Health**, **Education**, and **Housing**, offering insights into access, usage, and affordability.
  - **Multiple Indicator Survey (MIS):**Captures data on living standards, access to basic amenities, and demographic indicators.

  2. Central Statistics Office (CSO) Reports:
  - **Gross Domestic Product (GDP) Estimates:**Quarterly and annual estimates of GDP at constant and current prices for national and sectoral income.
  - **Index of Industrial Production (IIP):**Measures short-term changes in industrial output across sectors like manufacturing, mining, and electricity.
  - **Consumer Price Index (CPI):**Calculates inflation rates based on retail prices for rural and urban consumers.
  - **Annual Survey of Industries (ASI):**Provides detailed industrial statistics, including employment, output, and investment in registered factories.

3. Other Key Reports:

- **Economic Census:**Covers all entrepreneurial units in India, both agricultural and non-agricultural (excluding crop production).
- **Vital Statistics of India Based on the Civil Registration System (CRS):**Reports on births and deaths registered across states/UTs.
- **Household Income Survey (upcoming in 2026):**Will be the first full-scale national survey to collect direct household income data.

Source:THE INDIAN EXPRESS

DIGITAL PAYMENT INTELLIGENCE PLATFORM (DPIP)

Context: The **Digital Payment Intelligence Platform (DPIP)** is a new RBI-led initiative aimed at curbing digital payment frauds in India.
It is being developed as a **Digital Public Infrastructure (DPI)** to enable **real-time data sharing and fraud detection** across banks.

Why It's Needed

- **Surging Frauds**: Bank frauds have tripled in FY25, reaching ₹36,014 crore.
- **Sector-Specific Threats**: Public banks face more loan frauds, while private banks report higher internet and card frauds.

Development & Structure

- **Built by**: Reserve Bank Innovation Hub (RBIH)
- **In Partnership With**: 5–10 major public and private banks
- **Oversight**: High-level committee chaired by A.P. Hota (former NPCI chief)
- **Launch Timeline**: Expected to be operational within a few months

Key Features

- **Real-Time Intelligence Sharing**: Banks will instantly share and act on fraud data
- **AI-Powered Risk Analysis**: Detects patterns to identify scams before they escalate
- **Unified Banking Response**: Recognizes digital fraud as a shared industry threat

Expected Impact

- Strengthens **digital transaction security**
- Reduces dependency on delayed manual fraud reporting
- Promotes **trust and resilience** in India's digital payments ecosystem

Reserve Bank of India (RBI)

- The **Reserve Bank of India (RBI)** is the **central bank** of the country and the apex institution responsible for **regulating the monetary and financial system** of India.
- **Establishment**
  - **Founded**: 1st April 1935 under the **RBI Act, 1934**
  - **Nationalised**: 1st January 1949
  - **Headquarters**: Mumbai
- **Core Functions**

1. **Monetary Authority:** Controls inflation and liquidity through tools like **repo rate, reverse repo rate, CRR, SLR**, etc.
2. **Issuer of Currency:** Sole authority for issuing currency notes (except ₹1 note, issued by the Government of India).
3. **Custodian of Foreign Exchange:** Manages the **Foreign Exchange Management Act (FEMA)** and maintains forex reserves.
4. **Regulator of Financial System:** Supervises banks, NBFCs, and payment systems. Issues banking licenses and ensures stability.
5. **Government's Banker:** Manages government accounts, borrowings, and public debt.
6. **Developmental Role:** Promotes financial inclusion, digital payments (like UPI), and priority sector lending.

- **Key Departments and Subsidiaries**
  - **Monetary Policy Department (MPD)**
  - **Department of Regulation (DoR)**
  - Subsidiaries: NABARD, NHB (transferred to GoI in 2019), RBIH (RBI Innovation Hub), etc.
- **Recent Initiatives**
  - Launch of **Digital Rupee (CBDC)**
  - Promotion of **Digital Public Infrastructure (DPI)** like **DPIP**
  - Strengthening **cybersecurity and fraud detection** in digital banking
  - Emphasis on **financial literacy and inclusion**

Digital Public Infrastructure (DPI)

- **Digital Public Infrastructure (DPI)** refers to **foundational digital systems** that enable **essential public and private services** at a population scale. DPI acts like the digital equivalent of physical infrastructure (such as roads or electricity), but for digital services like identity, payments, and data sharing.
- **Core Pillars of DPI**
  1. **Digital Identity**
     - Example: **Aadhaar** – provides unique identification to over a billion Indians.
  2. **Digital Payments**
     - Example: **Unified Payments Interface (UPI)** – enables real-time, interbank, low-cost digital transactions.
  3. **Data Exchange**
     - Example: **Account Aggregator Framework**, **DigiLocker** – secure sharing of personal data with user consent.
- **Key Features**
  - **Open, interoperable, and inclusive** digital architecture
  - **Scalable** for public, private, and governance use
  - **Consent-based**, ensuring user control over data
  - **Low-cost and high-efficiency**, especially in delivering government welfare schemes

India's Global Leadership in DPI

- India's DPI model, called **"India Stack,"** is internationally acclaimed.
- Combines **Aadhaar + UPI + DigiLocker + Jan Dhan + Mobile** – ensuring financial and digital inclusion.
- India's DPI helped deliver welfare schemes (e.g., DBT) during the COVID-19 pandemic.
- **Examples of DPI Initiatives**
  - **CoWIN platform** – COVID vaccination tracking
  - **ONDC (Open Network for Digital Commerce)** – democratizing e-commerce
  - **DPIP (Digital Payment Intelligence Platform)** – real-time fraud detection in banking
  - **National Digital Health Mission (NDHM)** – digital health records

Source:THE ECONOMICS TIMES

GEOGRAPHY

SHIPKI LA PASS

Context : Himachal Pradesh has opened the Shipki La pass.

Significance of Shipki La Pass

1. Historical Trade Corridor

- Historically a key trade route between India and Tibet.
- Facilitated exchange of goods like textiles, tea, spices, wool, silk, and herbal medicines.
- Trade was disrupted after the 1962 war, briefly resumed in 1992, but has been stalled since 2020.

2. Strategic and Geographical Importance

- Located at **3,930 meters** in **Kinnaur district**, Himachal Pradesh.
- One of **three official Indo-Tibet trade routes**, alongside Nathu La and Lipulekh.
- The **Sutlej River** enters India here, adding to its geographical relevance.
- Lies close to the **Line of Actual Control (LAC)**, making it vital for border security.

3. Economic and Tourism Potential

- Recently opened for **domestic tourism** to boost the local economy.
- Aims to promote **border tourism** and provide **livelihoods** in remote areas.
- Could help revive **cross-border trade** and support **border village development**.

4. Cultural and Pilgrimage Route

- Considered a potential new route for the **Kailash Manasarovar Yatra**.
- Historically fostered **cultural exchange** between Indian and Tibetan communities.

5. Policy and Security Relevance

- Part of India's strategy to balance **development and national security** in border regions.
- Access remains **regulated** and monitored by **security forces**.

Major Himalayan Passes

Pass Name	Location	Connects / Significance
Karakoram Pass	Ladakh	Connects India with China in the Karakoram Range; ancient Silk Route; currently not used for public transport.
Khardung La	Ladakh	Leads to Nubra Valley from Leh; strategic military use; among the highest motorable roads.
Zoji La	J&K–Ladakh border	Connects Srinagar with Leh; critical for military and civilian transport.
Banihal Pass	Jammu & Kashmir	Lies in Pir Panjal range; connects Jammu with Srinagar (replaced by Banihal Tunnel).
Rohtang Pass	Himachal Pradesh	Connects Kullu Valley with Lahaul & Spiti; Atal Tunnel built under it.
Baralacha La	Himachal Pradesh	On Manali–Leh highway; links Himachal with Ladakh.

Shipki La	Himachal Pradesh	Trade route with China; used by locals for cross-border trade.
Niti Pass	Uttarakhand	Connects India with Tibet (China); used for Indo-Tibetan trade.
Mana Pass	Uttarakhand	One of the highest vehicle-accessible passes; close to the pilgrimage site of Badrinath.
Lipulekh Pass	Uttarakhand (Pithoragarh)	Connects to Tibet via Nepal; route for Kailash Mansarovar Yatra; subject of territorial dispute with Nepal.
Nathu La	Sikkim	Trade route with China; reopened in 2006; highly strategic and militarized.
Jelep La	Sikkim	Lies east of Nathu La; historically important but not in use now.
Bum La Pass	Arunachal Pradesh	Near Tawang; site of 1962 India-China war; currently a Border Personnel Meeting point.
Diphu Pass	Arunachal Pradesh	Tri-junction of India, China, and Myanmar; significant in India's Act East Policy.

Source : THE HINDU

Environment and Ecology

2025 LION CENSUS

Context :2025 Lion Census : 32% Population Rise.

The 2025 Asiatic lion census in Gujarat recorded a 32% population increase, rising from 674 in 2020 to 891 in 2025. This is a significant conservation milestone, reflecting decades of dedicated efforts. However, experts warn that numerical growth alone does not ensure the long-term survival of the species.

Key Findings from the 2025 Census

- **Total Population**: 891 lions (up 32.2%)
- **Distribution**: 44% now live outside protected forests (in farmlands, wastelands, human-dominated areas)
- **Range Expansion**: Lions now inhabit 35,000 sq km across 11 districts (17% increase in range)
- **New Satellite Populations**: Barda Wildlife Sanctuary, Jetpur, Babra-Jasdan
- **Core Area**: Gir National Park and adjacent sanctuaries remain central but are near capacity

Why Numbers Alone Aren't Enough

1. Habitat Limitations

- Over 40% of lions live outside forest zones with less prey and higher risk.
- Fragmented and degraded habitats can't sustain stable populations long-term.

2. Rising Human-Lion Conflict

- Increasing encounters in farms and near human settlements raise chances of conflict.
- Railways, highways, and urban infrastructure fragment wildlife corridors and increase accidental deaths.

3. Single Population Risk

- All wild Asiatic lions live in and around the Gir landscape.
- Makes them vulnerable to disease outbreaks, floods, or forest fires—one event could decimate the population.

4. Genetic Concerns

- Low genetic diversity due to inbreeding reduces resilience to disease and climate stress.
- A genetic bottleneck limits evolutionary adaptability.

5. No Second Wild Population

- Despite longstanding expert consensus, no viable second free-ranging population exists outside Gujarat.
- Plans to relocate lions (e.g., to Kuno National Park, Madhya Pradesh) remain stalled.

Conservation Experts Recommend:

- Expand and Connect Habitats: Create ecological corridors and expand protected areas beyond Gir.
- Establish a Second Population: Translocate lions to a genetically and ecologically suitable area to reduce the single-population risk.

- Minimize Human-Wildlife Conflict: Implement better compensation, awareness programs, and wildlife-friendly infrastructure like underpasses.
- Improve Scientific Monitoring: Strengthen population estimates, disease surveillance, and genetic studies.

Asiatic Lion – A Brief Overview

- The **Asiatic Lion** (*Panthera leo persica*) is a **critically important subspecies** of the lion, found **only in India** and distinct from its African counterpart.
- **Key Facts:**

Attribute	Details
Scientific Name	*Panthera leo persica*
Habitat	**Gir Forest**, Gujarat, India
Current Population	**891 (2025 Census)**
IUCN Status	**Endangered**
Global Range	**Exclusive to India** (only wild population)
Main Threats	Habitat loss, inbreeding, human conflict, disease

- **Distinct Features:**
  - Smaller and leaner than African lions
  - Less developed mane (especially in males)
  - Prominent **skin fold along the belly**
  - Live in smaller groups (prides)

Source: THE INDIAN EXPRESS

KOCHI CONTAINER SHIP ACCIDENT

Context : Centre for Marine Living Resources and Ecology (CMLRE) Leads Urgent Ocean Study After Hazardous Cargo Spill off Kochi

The Centre for Marine Living Resources and Ecology (CMLRE), functioning under the Ministry of Earth Sciences, has initiated an emergency oceanographic study in response to the hazardous cargo and oil spill caused by the capsizing of the container ship *MSC ELSA 3*.

Key Actions and Focus Areas

- **Rapid Assessment**: CMLRE is conducting real-time ocean monitoring to evaluate both the immediate and long-term impacts of the spill on marine ecosystems, coastal habitats, and fisheries.
- **Inter-Agency Coordination:** The study is being carried out in collaboration with the Indian Coast Guard, National Disaster Response Force (NDRF), Customs, and various state agencies involved in containment, cleanup, and risk mitigation efforts.
- **Environmental Impact**: The incident has triggered a tier-2 maritime emergency response. There are serious concerns about toxic effects on marine biodiversity, the contamination of fish stocks, and the potential health risks to coastal populations.

- **Public Safety Measures**: Authorities have enforced a fishing ban within a 20-nautical-mile radius around the sunken ship and have issued advisories urging the public to avoid contact with any washed-up containers or oil-contaminated beaches.
- **Ongoing Response:** Ships, aircraft, and pollution control vessels have been deployed by the Indian Coast Guard to track and contain the oil slick. CMLRE's scientific teams are actively collecting water, sediment, and marine life samples for laboratory analysis.

Significance

The study led by CMLRE is essential for:

- Determining the scale and severity of marine pollution.
- Guiding immediate cleanup and disaster mitigation efforts.
- Supporting long-term strategies for hazardous cargo management and marine disaster preparedness.

Source :PIB

INDIA'S EVPOLICY CHANGE

Context : India introduced a policy allowing **15% concessional import duty** on fully built electric vehicles (EVs), provided manufacturers invest **₹4,150 crore** over three years in local manufacturing.

The policy mandates:

- **25% domestic value addition (DVA)** within 3 years.
- **50% DVA** by the 5th year.
- Permission to import **up to 8,000 EVs annually per manufacturer** for 5 years.
- This is governed by the **Scheme to Promote Manufacturing of Electric Passenger Cars in India (SPMEPCI)**.

Policy Gaps Identified

- Despite incentives, the current scheme **lacks a clear mandate for technology transfer**.
- Absence of technology-sharing mechanisms may keep India **dependent on foreign EV technologies**, especially in high-tech areas like **battery chemistry, power electronics, and drive trains**.

India's Current Status

- EV policy began in **2015** with schemes like **FAME-I and II**.
- India has made progress in adoption but remains **behind in R&D**, **indigenous battery development**, and **technology absorption**.
- Without a strategy for **mandatory technology transfer**, India risks becoming an **assembly hub** rather than a **technology powerhouse**.

Recommendations

- Make **technology transfer compulsory** in exchange for market access.
- Encourage **joint ventures** between foreign and Indian firms.
- Strengthen the **battery ecosystem** with domestic R&D and manufacturing.
- Focus on **value chain integration**—from raw materials to final assembly.

EV-Related Schemes in India

1. **FAME India Scheme (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles)(2015–2019)**

- **Objective**: Promote early adoption of EVs through demand incentives.
- **Focus Areas:**
  - Demand creation
  - Technology platform
  - Pilot projects
  - Charging infrastructure

2. **FAME-II (2019–Extended till March 2025)**

- **Budget**: ₹10,000 crore
- **Focus**:
  - Demand incentives for electric 2-wheelers, 3-wheelers, and buses
  - Support for charging infrastructure
- **Key Conditions**:
  - Vehicles must be registered and pre-approved
  - Must meet minimum range and energy efficiency criteria

3. **PLI Scheme for Automobile and Auto Components (2021)**

- Budget: ₹25,938 crore
- **Focus:**
  - Incentivize domestic manufacturing of Advanced Automotive Technologies (AAT)
  - Includes EVs and components like motors, battery systems, and power electronics
- Benefit: Attracts global and domestic EV manufacturers

4. **PLI Scheme for Advanced Chemistry Cell (ACC) Battery Storage (2021)**

- Budget: ₹18,100 crore
- Aim: Boost local manufacturing of high-performance battery technologies
- Target: 50 GWh of battery manufacturing capacity
- Importance: Critical for EV ecosystem self-reliance

5. **Scheme to Promote Manufacturing of Electric Passenger Cars in India (SPMEPCI) – 2025**

- Launched: June 2025
- Focus:
  - Allows 15% concessional import duty on CBUs for companies investing ₹4,150 crore in India
  - 25% DVA in 3 years, rising to 50% in 5 years
  - Max import: 8,000 fully built units per year per manufacturer
- Issue: No mandatory technology transfer clause

6. **State-Level EV Policies**

Most Indian states have their own EV policies. Common features include:

- Road tax exemption

- Capital subsidies for manufacturing units
- Charging infrastructure support
- Targeted incentives for 2W, 3W, and e-buses

Examples:

- Delhi EV Policy: Focuses on clean air, strong demand incentives
- Tamil Nadu: Offers capital subsidy for battery and EV manufacturers
- Karnataka: One of the first to adopt an EV policy (2017)

7. NATIONAL Electric Mobility Mission Plan (NEMMP) – 2020

- Launched: 2013
- Aim: Provide the vision for future mobility with EVs
- Long-term roadmap to reduce fossil fuel dependence and boost eco-friendly transport

8. Charging Infrastructure Guidelines (Revised 2023)

- Encourages:
- Public and private charging stations
- Open access to power supply
- De-licensing EV charging as a business

Source : THE HINDU

WETLANDS IN RAJASTHAN DECLARED RAMSAR SITES

Context : Khichan and Menar Wetlands in Rajasthan Declared Ramsar Sites

Two new wetlands — **Khichan (Phalodi)** and **Menar (Udaipur)** — have been added to the **Ramsar List of Wetlands of International Importance**.

This takes **India's total Ramsar Sites to 91**, and **Rajasthan's count to 4** (other two: *Sambhar Salt Lake* and *Keoladeo Ghana National Park*).

Significance:

Site Highlights:

- **Menar, Udaipur**:
  - A **community-driven conservation model**.
  - Known for its **rich bird diversity**, especially migratory species.
- **Khichan, Phalodi**:
  - Globally known for hosting **thousands of Demoiselle Cranes**.
  - An excellent example of **local ecological stewardship**.

Importance of Ramsar Recognition:

- Recognizes **wetlands as critical ecosystems** for:
  - **Biodiversity support**
  - **Flood regulation**
  - **Groundwater recharge**
  - **Water purification**

- Reinforces India's role as a **leader in wetland conservation** in Asia.

Source: PIB

HIGH SEAS TREATY – 2025 UN OCEAN CONFERENCE

Context : India is actively moving toward **ratification** of the **High Seas Treaty** (formally the **Biodiversity Beyond National Jurisdiction – BBNJ – Agreement**), contrary to any suggestion of reluctance.

Key Highlights:

- India has **signed** the BBNJ Treaty and is undergoing its **internal ratification process**.
- At the 2025 UN Ocean Conference in Nice, the Minister of State for Earth Sciences confirmed India's commitment to the treaty and ocean conservation.
- A **six-point action plan** was proposed by India, focusing on science-based, inclusive, and sustainable ocean governance.

India's Commitments:

- Enhancing **marine research** and data-driven ocean policy.
- Expanding **marine protected areas**.
- Tackling **plastic and marine pollution** via circular economy models.
- Promoting **climate resilience** and **ocean-based solutions**.
- Supporting **renewable ocean energy**.
- Integrating **indigenous knowledge** in marine governance.
- India also endorsed the **'Nice Ocean Action Plan'**, emphasizing finance, partnerships, and actionable steps toward achieving **SDG-14 (Life Below Water).**

Global Status:

- As of mid-2025, **49 countries** have ratified the treaty; **60** ratifications are required for it to come into force.
- The treaty aims to:
    - Protect biodiversity in **international waters**.
    - Establish **marine protected areas**.
    - Ensure **fair sharing of marine genetic resources**.
    - Foster international cooperation for **high seas governance**.

<u>High Seas Treaty (BBNJ Agreement)</u>

- **Full Name: Agreement on Biodiversity Beyond National Jurisdiction (BBNJ)**
- **Adopted:** June 2023 at the United Nations
- **Purpose:**
  To conserve and sustainably use **marine biological diversity** in areas **beyond national jurisdiction (ABNJ)**, i.e., the **high seas** which cover nearly **two-thirds of the ocean** and nearly **half of the Earth's surface**.
- **Key Features:**
  a. **Marine Protected Areas (MPAs):** Establish a global framework to create **protected zones** in international waters to safeguard marine ecosystems.

b. **Marine Genetic Resources (MGRs):** Ensure**fair and equitable sharing** of benefits arising from the utilization of MGRs, such as deep-sea organisms used in pharmaceuticals or biotechnology.
c. **Environmental Impact Assessments (EIAs):** Mandates EIAs for activities conducted on the high seas to **prevent significant harm** to marine environments.
d. **Capacity Building and Technology Transfer:** Assists**developing countries** with scientific resources, training, and data-sharing to ensure equitable participation in high seas conservation.
e. **Decision-Making Structure:** Establishes institutions to **monitor implementation**, resolve disputes, and update scientific guidelines periodically.

- **Significance:**
  - Fills a major **legal gap** in international maritime law under the **UNCLOS** (United Nations Convention on the Law of the Sea).
  - Aims to protect biodiversity in the **"global commons"**.
  - Critical for tackling threats such as **overfishing**, **climate change**, and **deep-sea mining**.

Global Treaties that India has ratified and not ratified:

Category	Ratified by India	Not Ratified by India
Nuclear Treaties	CWC, BWC	NPT, CTBT, ATT
Environmental Treaties	UNFCCC, CBD, Paris Agreement, Basel, Stockholm	BBNJ (in process), some UN water conventions
Human Rights Treaties	ICCPR, ICESCR, CRC, CEDAW	Migrant Workers' Convention, Enforced Disappearances
Labour Treaties	Some ILO conventions	ILO 87, 98, partially delayed ratification of 138
Maritime Treaties	UNCLOS, CITES, WTO-related	None major

Source :THE HINDU

2025 BONN CLIMATE CHANGE CONFERENCE

Context: Bonn Climate Change Conference to be held from **June 16 to 26, 2025**.

Purpose & Focus

- Acts as a **mid-year preparatory meeting** between COP29 (Baku, 2024) and COP30 (Belém, Brazil, 2025)
- Brings together representatives from nearly 200 countries to:
  - Advance the **Global Goal on Adaptation** (from concept to implementation)
  - Mobilize climate finance (goal: **$1.3 trillion** under the **Baku-Belém Roadmap**)
  - Finalize rules for **UN-backed carbon markets** (Article 6.4 of the Paris Agreement)
  - Strengthen **Nationally Determined Contributions (NDCs)**

Side Themes

- Emphasis on:
  - **Just transition**
  - **Gender-responsive climate action**
  - **Youth and Indigenous Peoples' engagement**
  - **Nature-based solutions**

Significance

- A key platform to:
  - Evaluate **progress on climate adaptation and resilience**
  - Lay the **technical groundwork for COP30**
  - Keep the **1.5°C Paris goal within reach**
  - Influence future climate negotiations on adaptation, finance, and carbon markets

Note on UNFCCC (United Nations Framework Convention on Climate Change)

- The **UNFCCC** is an international treaty adopted in **1992** at the **Rio Earth Summit** to address the global challenge of climate change.
- **Key Features:**
  - **Objective:**To stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system.
  - **Entered into force:March 21, 1994**
  - **Parties:**198 countries (referred to as Parties to the Convention), making it nearly universal.
- **Important Elements:**
  - **Differentiated Responsibilities:** The principle of **"Common but Differentiated Responsibilities and Respective Capabilities" (CBDR-RC)** is central—developed countries are expected to take the lead in reducing emissions.
  - **Annexes:**
    - **Annex I:** Industrialized countries and economies in transition.
    - **Annex II:** Subset of Annex I—required to provide financial and technological support to developing countries.
    - **Non-Annex I:** Developing countries.

Major Protocols and Agreements under UNFCCC:

1. **Kyoto Protocol (1997):**
   - Legally binding emission reduction targets for developed countries.
   - Came into force in 2005.
2. **Paris Agreement (2015):**
   - Legally binding international treaty.
   - All countries submit **Nationally Determined Contributions (NDCs)**.
   - Aim: Limit global temperature rise to **well below 2°C**, preferably **1.5°C**.

Institutional Mechanism:

- **COP (Conference of the Parties):** Supreme decision-making body of the UNFCCC. Held annually (e.g., COP28 in 2023, COP30 in Brazil in 2025).
- **SBSTA & SBI:** Subsidiary bodies that meet in mid-year sessions (like the **Bonn Climate Change Conference**) to carry out technical work and implementation discussions.

Source: THE HINDU

REVISED GREEN INDIA MISSION (2021–2030)

Context: Government has revised Green India Mission under National Action Plan on Climate Change. Here is a **concise version** of the **Revised Green India Mission (GIM)** without citations:

Key Objectives

- **Afforestation & Restoration** on **5 million hectares** of forest and non-forest land.
- **Improve forest quality** on an additional **5 million hectares**.
- **Combat land degradation and desertification**, especially in ecologically sensitive zones.
- Enhance **ecosystem services** (carbon sequestration, biodiversity, water retention).
- Strengthen **livelihoods** for forest-dependent communities.

Focus Areas

1. **Ecologically vulnerable regions** such as:
    - Aravalli ranges
    - Western Ghats
    - Himalayas
    - Mangrove ecosystems
2. Aligns with projects like the **Aravalli Green Wall**.

Implementation Strategy

- **Landscape-based approach** tailored to regional ecology.
- **Community participation** and integration of traditional knowledge.
- **Convergence** with other schemes for synergy.
- **Scientific monitoring** based on vulnerability and carbon potential.

Progress& Funding

- From 2015 to 2021, **11.22 million hectares** brought under plantation and afforestation.
- Over **₹624 crore** released to 18 states between 2019 and 2024.
- **Challenges** include funding gaps, invasive species, and insufficient protection of old-growth forests.

Climate Significance

- Contributes to:
    - India's goal of **33% forest cover**.

- Creating an additional **carbon sink of 2.5–3.0 billion tonnes of CO_2** by 2030.
- Supports **Paris Agreement** and **UNCCD** commitments.

Environmental Schemes in India

1. **National Action Plan on Climate Change (NAPCC) (2008)**
   - Umbrella program addressing climate change through **eight missions**:
   - National Solar Mission
   - National Mission for Enhanced Energy Efficiency
   - National Mission on Sustainable Habitat
   - National Water Mission
   - National Mission for Sustaining the Himalayan Ecosystem
   - National Mission for a Green India (GIM)
   - National Mission for Sustainable Agriculture
   - National Mission on Strategic Knowledge for Climate Change
2. **National Mission for a Green India (GIM)**
   - **Objective:** Enhance forest/tree cover on 5 million ha; improve quality on another 5 million ha by 2030
   - **Revised (2025):** Focus on climate-sensitive areas like Aravallis, Himalayas, mangroves
   - **Significance:** Supports India's carbon sink and land degradation neutrality targets
3. **International Solar Alliance (ISA)**
   - Launched by **India and France** in 2015 (Paris COP-21)
   - Promotes solar energy in **tropical countries**
   - Headquartered in **Gurugram, Haryana**
4. **National Electric Mobility Mission Plan (NEMMP)**
   - Promotes electric vehicles to reduce fossil fuel use
   - Includes **FAME Scheme** (Faster Adoption and Manufacturing of Electric Vehicles)
5. **Paramparagat Krishi Vikas Yojana (PKVY)**
   - Promotes **organic farming** using traditional knowledge
   - Supports formation of **organic farmer clusters**
6. **National Adaptation Fund for Climate Change (NAFCC)**
   - Supports adaptation projects in **climate-vulnerable sectors** (agriculture, forestry, water)
   - Provides **100% central grant** to states/UTs
7. **Unnat Jyoti by Affordable LEDs for All (UJALA)**
   - Promotes **energy-efficient LED bulbs** and appliances
   - Reduces GHG emissions through demand-side management
8. **State Action Plans on Climate Change (SAPCC)**
   - State-level versions of NAPCC
   - Tailor-made climate strategies aligned with local needs
9. **National Clean Air Programme (NCAP) (2019)**
   - Target: **20–30% reduction in PM2.5 and PM10 by 2024**
   - Focuses on 131 non-attainment cities
   - Strategy includes air quality monitoring, capacity building, public awareness
10. **National River Conservation Plan (NRCP)**
    - Focused on abatement of pollution in major rivers (esp. Ganga, Yamuna)

- Includes sewage treatment, riverfront development, public participation

11. **CAMPA – Compensatory Afforestation Fund Management and Planning Authority**
    - Utilizes funds collected from diverted forest land for afforestation
    - Managed under **Compensatory Afforestation Fund Act, 2016**
12. **Soil Health Card Scheme**
    - Provides farmers with soil analysis and fertilizer recommendations
    - Aims at **balanced fertilization** and reduced environmental harm
13. **Wildlife Conservation Programs**
    - **Project Tiger (1973)**
    - **Project Elephant (1992)**
    - **Integrated Development of Wildlife Habitats**
    - **National Wildlife Action Plan (2017–31)**

Source:THE INDIAN EXPRESS

GREEN BONDS

Context: **Green bonds** are emerging as a key financial tool for Africa's **climate resilience**, enabling investment in **renewable energy, infrastructure**, and **environmental sustainability**.
Countries like **Nigeria, South Africa, and Morocco** have successfully raised green finance for flagship projects, reflecting a growing interest in sustainable finance across the continent.

Why Green Bonds Matter

- **Climate Finance Mobilization:** Green bonds help fund vital climate mitigation and adaptation projects (e.g., solar, hydropower).
- **Private Sector Engagement:** Banks and companies now contribute over 60% of green bond issuance value, expanding market participation.
- **Support for Climate Goals:** They align with Africa's Paris Agreement commitments, addressing the $146 billion annual climate finance gap.

Key Challenges

- **Risk Premium:** Investors demand higher returns due to concerns over credit risk, currency volatility, and political instability—raising borrowing costs.
- **Structural Barriers:** Weak capital markets, poor regulatory frameworks, and lack of standardized green finance norms hinder growth.
- **Limited Private Investment:** Only 18% of climate finance in Africa comes from private sources, concentrated in a few countries.
- **Funding Imbalance:** Most funds go to mitigation; only ~7% support adaptation projects, which are harder to finance due to uncertain returns.

Bonds and Their Types

What is a Bond?

- A **bond** is a fixed-income financial instrument that represents a **loan made by an investor to a borrower** (typically a government or corporation). It involves the issuer promising to pay back the

principal on a specified maturity date along with **periodic interest payments** (called coupon payments).

Key Features:

- **Issuer:** Government, corporation, or financial institution
- **Face Value:** The amount paid back at maturity
- **Coupon Rate:** Interest paid to bondholders
- **Maturity:** Date when the principal is repaid
- **Yield:** Return based on purchase price and interest

Types of Bonds:

Government Bonds

- Issued by national governments to finance public expenditure.
- In India: **G-Secs (Government Securities)**.
- Usually**low risk** and offer fixed returns.

Corporate Bonds

- Issued by companies to raise capital for business expansion or operations.
- Higher risk than government bonds but may offer **higher returns**.

Municipal Bonds

- Issued by local or regional governments to fund infrastructure projects (roads, schools).
- May offer **tax benefits** to investors.

Green Bonds

- Specifically used to fund **environmentally sustainable projects** (renewable energy, climate adaptation).
- Aim to **combat climate change** and support sustainability.

Zero-Coupon Bonds

- Sold at a discount; no periodic interest.
- Investor gets **lump sum payment** (face value) at maturity.

Inflation-Indexed Bonds

- Returns are adjusted for **inflation**.
- Protect investors' real purchasing power.

Convertible Bonds

- Corporate bonds that can be **converted into company equity shares** under specified conditions.

Sovereign Bonds

- Issued by a country in **foreign currency**, often targeted at international investors.

Source: THE HINDU

BONNET MACAQUE

Context: Kerala is planning to launch a **birth control programme** for **bonnet macaques** to address rising human–monkey conflicts, especially in forest fringe areas where crop damage and property loss are significant.

Objective:
To reduce conflict without harming wildlife, ensuring protection for both **human livelihoods** and **biodiversity conservation**.

Key Features:

- **Target Species:** Bonnet macaque (*Macaca radiata*), listed as **'vulnerable'** on the IUCN Red List.
- **Proposed Methods:**
  - **Surgical sterilisation**
  - **Intramuscular contraceptive injections**
  - **Oral contraceptives** (exploratory phase)
- **Approach:**
  - Ethical and **sustainable wildlife population control**
  - Based on **international models**
  - To be implemented with **central government approval**
- **Additional Measures:**
  - Creation of **monkey shelters** in deep forest areas
  - **Habitat enrichment** to localise populations and reduce human intrusion

Bonnet Macaque (Macaca radiata)

- The **bonnet macaque** is a species of Old-World monkey native to southern India. It is named for the cap-like whorl of hair on its head that resembles a bonnet.
- **Scientific Name: *Macaca radiata***
- **Conservation Status:**
  - Listed as **"Vulnerable"** on the **IUCN Red List** due to habitat loss and increasing human-wildlife conflict.
- **Habitat:**
  - Found in **southern India**, especially in **forests, temples, urban areas**, and near agricultural fields.
  - Highly **adaptable** to human-dominated landscapes.
- **Behaviour and Ecology:**
  - **Diurnal** and **social**, living in troops with complex hierarchies.
  - Omnivorous—feeds on fruits, seeds, insects, and often human food waste.
  - Exhibits **strong adaptability**, often leading to conflict in urban and rural settings.
- **Threats:**
  - Habitat fragmentation
  - Urbanisation and deforestation
  - Crop raiding, leading to conflict with humans
  - Illegal captivity and mistreatment in religious or tourist areas
- **Conservation Measures:**
  - Ethical **population management** (e.g., sterilisation initiatives)
  - **Habitat enrichment** in forests
  - **Public awareness** and scientific interventions to reduce human-monkey conflict

Source:THE HINDU

SCIENCE & TECHNOLOGY

INDIAN ASTRONAUT IN INTERNATIONAL SPACE STATION (ISS)

ContextIndian Astronaut Gp Capt. Shubanshu Shukla to Study Human Adaptation and Cognitive Effects of Electronic Displays in Space

Group Captain Shubanshu Shukla, one of India's upcoming astronauts, will lead a pioneering study on human adaptation in space during India's next crewed space mission. A major focus will be on the cognitive effects of prolonged exposure to electronic displays in microgravity.

Key Research Objectives:

- **Physical Adaptation:** Monitoring changes in muscle mass, bone density, and cardiovascular health in a zero-gravity environment.
- **Cognitive Performance:** Evaluating memory, attention span, decision-making ability, and reaction time in space conditions.
- **Physiological Health:** Tracking sleep cycles, vital signs, and stress responses during extended space missions.
- **Impact of Electronic Displays:** Investigating how continuous interaction with screens used for navigation and communication affects vision, cognitive clarity, and psychological well-being.

Significance:

- **Health and Safety:** The findings will help improve astronaut training and onboard systems to ensure health and efficiency during long-duration missions, including future plans for India's space station.
- **Technology Design:** Insights will guide the development of astronaut-friendly interfaces and display systems.
- **Global Contribution:** The research adds to the international understanding of human factors in spaceflight and supports global efforts in long-term space exploration.
- This study is a significant milestone in India's human spaceflight program, marking progress in both scientific research and space technology.

<u>International Space Station (ISS) – Brief Note</u>

The **International Space Station (ISS)** is a large, habitable spacecraft that orbits Earth at an altitude of approximately 400 km. It serves as a **microgravity and space environment research laboratory**, where scientific research is conducted in fields like astronomy, biology, physics, and Earth science.

Key Features:

- **Launched:** First module launched in 1998; continuously inhabited since 2000.
- **Partnership:** A collaborative project involving five major space agencies:
- NASA (USA),Roscosmos (Russia),ESA (Europe),JAXA (Japan),CSA (Canada)

Structure:

- Consists of pressurized modules for crew and labs, unpressurized truss segments for solar panels, and external payloads.

Crew:

- Typically hosts 6 astronauts from various countries; crews conduct experiments, maintain systems, and prepare for future deep space missions.

Significance:

- **Scientific Research:** Enables long-term studies on how microgravity affects the human body, plants, materials, and fluids—knowledge crucial for future Moon or Mars missions.
- **International Cooperation:** A symbol of peaceful collaboration among nations in space exploration.
- **Technology Testing:** A platform for testing advanced technologies such as life support systems, robotics, and artificial intelligence in space.

The ISS is expected to operate until **2030**, after which commercial space stations or national stations like India's **Bharatiya Antariksh Station** may take on similar roles in low Earth orbit.

Space Stations by Different Countries

1. International Space Station (ISS) – Multinational

- **Operational Since:** 1998 (still active)
- **Countries Involved:** USA, Russia, Japan, Canada, 11 European nations

2. Tiangong Space Station – China

- **Operator:** China National Space Administration (CNSA)
- **Operational Since:** 2021
- **Past Chinese Stations:**
  - **Tiangong-1** (2011–2016): Prototype space lab
  - **Tiangong-2** (2016–2019): Advanced version for testing life support and docking systems

3. Mir – Soviet Union / Russia

- **Operational:** 1986–2001
- **Significance:** First modular space station; hosted long-duration human missions

4. Salyut Series – Soviet Union

- **Operational:** 1971–1986
- **Details:** World's first space stations; a series of 7 missions

5. Skylab – United States (NASA)

- **Operational:** 1973–1979
- **Details:** First U.S. space station

Future / Proposed Space Stations

1.Bharatiya Antariksh Station – India (ISRO)

- **Planned Launch:** By 2035 (tentative)
- **Purpose:** Long-term Indian human presence in space; research in microgravity and technology testing

2.Lunar Gateway – NASA-led (planned)

- **Orbit:** Lunar orbit (not Earth)
- **Partners:** NASA, ESA, JAXA, CSA
- **Purpose:** Support for Artemis missions and future Mars expeditions

Source : PIB

ARTIFICIAL METAL-BASED NANOZYME THAT PREVENTS EXCESS BLOOD CLOTTING

Context : Researchers at the Indian Institute of Science (IISc), Bengaluru, have developed a novel artificial metal-based nanozyme that prevents excessive blood clotting without causing the bleeding risks commonly associated with traditional anti-clotting drugs.

This nanozyme is made from spherical vanadium pentoxide (V_2O_5) nanoparticles and mimics the action of the natural antioxidant enzyme glutathione peroxidase.

How It Works:

- The nanozyme regulates **Reactive Oxygen Species (ROS),**which can trigger excessive platelet activation and dangerous clot formation in conditions like pulmonary thromboembolism and COVID-19.
- By modulating redox signalling, it prevents abnormal clotting without interfering with normal haemostasis, thus avoiding bleeding complications.
- Tests on human platelets and mouse models showed effective clot prevention and improved survival, with no observed toxicity.

Significance:

- Offers a safer alternative to conventional anti-clotting drugs by selectively targeting abnormal clot formation.
- The research team aims to explore its use in conditions like ischemic stroke.
- Human clinical trials are the next step in advancing this potentially life-saving innovation.

What is Nanozyme?

- Nanozyme is a **term for nanomaterials that mimic the activity of natural enzymes**. These artificial enzymes are designed at the nanoscale and can perform specific biochemical reactions, such as breaking down harmful substances or regulating biological processes.
- Nanozymes are often **more stable, cost-effective, and easier to produce than natural enzymes.** They have wide applications in medicine, diagnostics, environmental cleanup, and biotechnology.
- Recent research has shown their potential in treating diseases like thrombosis by targeting harmful reactions in the body without causing side effects common with traditional drugs.

<u>Applications of Nano Technology</u>

1. Medicine and Healthcare

- **Drug Delivery:** Nanoparticles can deliver drugs directly to diseased cells, improving effectiveness and reducing side effects.
- **Diagnostics:** Used in imaging techniques (e.g., MRI, biosensors) for early and accurate disease detection.
- **Therapy:** Nanozymes and other nanomaterials are being explored for treating cancer, blood clots, and infections.

2. Electronics and Computing

- **Miniaturization:** Used in the manufacture of smaller, faster, and more efficient transistors and microchips.
- **Sensors:** Enable highly sensitive sensors for detecting gases, toxins, or biological markers.

3. Energy Sector

- **Solar Cells:** Improve light absorption and efficiency in photovoltaic devices.
- **Batteries and Fuel Cells:** Enhance storage capacity, charging speed, and lifespan of batteries.

4. Environmental Applications

- **Water Purification:** Nanomaterials like carbon nanotubes and nano-iron remove contaminants and pathogens.
- **Pollution Control:** Capture pollutants or break them down into harmless substances.

5. Textiles and Consumer Goods

- **Smart Fabrics:** Impart properties like water repellence, UV protection, and odor resistance.
- **Durability:** Improve fabric strength and wear resistance.

6. Agriculture

- **Nano-Fertilizers and Pesticides:** Provide controlled and efficient delivery of nutrients and chemicals.
- **Sensors:** Monitor soil health, moisture, and crop conditions in real time.

7. Construction and Materials

- **Stronger Materials:** Nanoparticles enhance strength, flexibility, and durability of concrete, steel, and coatings.
- **Self-Healing Materials:** Certain nanomaterials can help structures repair minor cracks or damage.

8. Cosmetics and Personal Care

- **Skin Care**: Improve the absorption and effectiveness of ingredients in sunscreens and anti-aging products.
- **Safety:** Better control over product behaviour at the molecular level.

Source : THE HINDU

BATTERY ENERGY STORAGE SYSTEMS (BESS): A KEY PILLAR IN INDIA'S CLEAN ENERGY TRANSITION

Context : Recent research shows that bacteria isolated from the Rajgir hot spring exhibit notable antimicrobial activity.

Key Contributions of BESS in India

Grid Stability and Reliability

- As India integrates large amounts of solar and wind energy—both of which are intermittent—BESS plays a vital role in maintaining grid balance by storing surplus energy and releasing it during deficits. This smoothens fluctuations and enhances reliability.

Supporting Renewable Energy Expansion

- The Ministry of Power mandates co-located energy storage with at least two hours of storage capacity for all new solar power projects. This storage must be equal to 10% of the installed solar capacity, ensuring grid resilience and encouraging higher renewable penetration.

Declining Costs and Technological Advancement

- Prices of lithium-ion batteries have dropped significantly, reducing the cost of BESS deployment. Tariffs have declined from ₹1.08 million/MW/month in 2022 to ₹221,000/MW/month, making storage more affordable and competitive with conventional power.

Policy and Regulatory Support

- The government has launched Energy Storage Obligations (ESO), requiring obligated entities to gradually increase storage capacity. At least 85% of stored energy is required to be sourced from renewables. Viability Gap Funding (VGF) is also being offered to reduce upfront costs and catalyze investment.

Utility-Scale and Urban Use Cases

- India's first standalone utility-scale BESS (20 MW/40 MWh) became operational in New Delhi in May 2025. It enhances power quality, particularly benefiting lower-income consumers. Plans are underway to integrate BESS with electric vehicle infrastructure in urban areas.

Future Outlook

Projected Growth

- India is expected to require around 47 GW/236 GWh of BESS capacity by 2031–32 to support a projected 364 GW of solar and 121 GW of wind energy. This highlights the scale and urgency of BESS deployment.

Broader Impact

- Widespread adoption of BESS can delay costly grid upgrades, improve energy security, and facilitate a shift to a modern, sustainable, and resilient power system.

Source: THE HINDU

MagIC MICROSCOPY

Context : MagIC Microscopy (Magnetic Isolation and Concentration cryo-electron microscopy) is a cutting-edge advancement in the field of structural biology, particularly in **cryo-electron microscopy (cryo-EM)**

Cryo-EM is a powerful imaging technique used to visualize biomolecules like proteins, viruses, and complexes at near-atomic resolution by flash-freezing samples and imaging them with an electron beam.

Challenges Addressed:

- Traditional cryo-EM requires relatively high concentrations of biological samples to obtain clear images. This requirement poses a major limitation when studying rare or difficult-to-purify molecules, which are often available only in tiny amounts or very dilute solutions.
- Low sample concentrations typically result in poor signal-to-noise ratios, making it difficult to capture detailed structural information.

Innovations Introduced by MagIC:

- **Magnetic Bead Attachment:** In MagIC microscopy, target molecules are chemically bound to tiny magnetic beads. These beads serve as handles to isolate and concentrate the molecules from extremely dilute solutions.
- **Magnetic Concentration:** By applying external magnetic fields, the beads along with the attached molecules are concentrated into a small area, dramatically increasing local concentration without increasing overall sample volume.

- **Cryo-EM Imaging:** The concentrated molecules on beads are then flash-frozen and imaged using standard cryo-EM techniques, allowing high-resolution structural data collection from much more dilute samples.
- **DuSTER Workflow:** To further enhance data quality, a computational pipeline named DuSTER is employed. It filters out background noise and artifacts, improving the clarity and accuracy of the images obtained.

Advantages of MagIC:

- **Enables Study of Rare Samples:** Researchers can now analyze molecules present at concentrations 100 times lower than previously possible, opening doors to study rare biological complexes, transient intermediates, or hard-to-express proteins.
- **Reduces Sample Volume:** Since the technique concentrates molecules locally, the total amount of biological sample required is reduced, which is cost-effective and less resource-intensive.
- **Speeds Up Data Collection:** Concentrated samples yield better-quality images faster, accelerating the pace of structural biology research.
- **Broader Applications:** This method can aid drug discovery, vaccine development, and understanding fundamental biological processes by providing detailed structural insights into molecules previously inaccessible by cryo-EM.

Potential Impact:

- MagIC microscopy represents a major step forward in overcoming a longstanding bottleneck in structural biology. It expands the usability of cryo-EM to a wider range of biological questions, especially those involving scarce or precious samples.
- By improving both the efficiency and accessibility of molecular imaging, MagIC microscopy has the potential to significantly advance biomedical research and innovation.
- Overview of different microscopy techniques commonly used

1. Light Microscopy

- Uses visible light and lenses to magnify samples.
- Types: Bright-field, Phase-contrast, Differential Interference Contrast (DIC), Fluorescence microscopy.
- Used for observing live cells, tissues, and stained samples.
- Resolution limit: ~200 nm.

2. Electron Microscopy (EM)

- Uses electron beams instead of light for much higher resolution.
- Types:
    - **Transmission Electron Microscopy (TEM):** Electrons pass through ultra-thin samples; reveals internal structures.
    - **Scanning Electron Microscopy (SEM):** Scans the surface with electrons; gives 3D surface images.
- Resolution limit: ~0.1 nm (TEM).

3. Cryo-Electron Microscopy (Cryo-EM)

- Samples are flash-frozen to preserve native structure.

- Used for studying biological macromolecules at near-atomic resolution.
- Includes single-particle analysis, electron tomography.

4. Confocal Microscopy

- Uses laser light and optical sectioning for sharper 3D images.
- Minimizes out-of-focus light by using pinholes.
- Common in cell biology for imaging fluorescently labeled specimens.

5. Atomic Force Microscopy (AFM)

- Uses a sharp tip scanning the surface to create a topographic map.
- Can image surfaces at atomic resolution.
- Useful for materials science and biological samples.

6. Super-Resolution Microscopy

- Breaks the diffraction limit of light microscopy.
- Techniques include STED (Stimulated Emission Depletion), PALM (Photo-Activated Localization Microscopy), and STORM (Stochastic Optical Reconstruction Microscopy).
- Enables imaging of cellular structures at nanometer scale.

7. Magnetic Resonance Imaging (MRI)

- Though primarily a medical imaging technique, MRI uses magnetic fields and radio waves for detailed soft tissue images.
- Not a traditional microscope but important for imaging internal structures non-invasively.

Source: THE HINDU

FLUE GAS DESULPHURISATION (FGD) UNITS

Context : Committee of experts, chaired by Principal Scientific Advisor (PSA) Ajay Sood, has recommended that India do away with a decade-long policy of mandating Flue Gas Desulphurization (FGD) units in all coal-fired thermal power plants (TPPs).

What is an FGD Unit?

- FGD units are systems installed in power plants to remove **sulphur dioxide (SO_2)** from flue gases produced by burning fossil fuels. SO_2 is a harmful pollutant linked to respiratory problems and environmental damage.

Types of FGD Systems:

- **Dry Sorbent Injection**: Uses powdered sorbents like limestone to neutralize SO_2.
- **Wet Limestone Treatment**: Uses a slurry of limestone to scrub SO_2.
- **Seawater Treatment**: Utilizes alkaline seawater to absorb and neutralize SO_2.

Importance

- FGDs reduce air pollution from coal-fired power plants, helping meet environmental standards and protect public health.

Costs and Challenges

- Installation costs approx. ₹1.2 crore per megawatt, making it a major investment.
- India's coal-based capacity remains high, posing financial and logistical challenges.
- Government is reconsidering mandatory installation due to cost and feasibility concerns.

Alternatives

- Reducing coal dependence
- Switching to cleaner energy sources
- Enhancing plant efficiency

Key Takeaways

Aspect	Details
Target Pollutant	Sulphur dioxide (SO_2)
Health Impact	Respiratory illness, acid rain, climate impact
FGD Types	Dry injection, wet limestone, seawater scrubbing
Installation Cost	₹1.2 crore per MW
Policy Concern	High cost vs. health/environmental benefits

Techniques to Reduce Pollutants in Thermal Power Plants:

Pollutant	Control Technology
Sulphur Dioxide (SO_2)	**Flue Gas Desulphurization (FGD)** units (e.g., wet limestone method, dry sorbent injection)
Nitrogen Oxides (NO_x)	**Selective Catalytic Reduction (SCR) ◇ Selective Non-Catalytic Reduction (SNCR)**
Particulate Matter (PM)	**Electrostatic Precipitators (ESP) ◇ Baghouse Filters ◇ Cyclone Separators**
Carbon Dioxide (CO_2)	**Carbon Capture and Storage (CCS)** (still emerging) **◇ Use of supercritical/ultra-supercritical technologies**
Fly Ash	**Dry and wet ash handling systems ◇ Utilization in cement, bricks, and road construction**

Supporting Measures:

- **Low NO_x burners** to limit NO_x formation during combustion
- **Fuel washing/blending** to reduce ash and sulphur content
- **Regular maintenance** to ensure efficiency of pollution control equipment
- **Afforestation and green belts** around plant sites

Source : THE HINDU

INVASIVE ALIEN SPECIES

Context: Invasive Alien Species (IAS) are **non-native organisms** introduced—intentionally or accidentally—into an ecosystem, where they establish, spread, and **negatively impact native biodiversity, ecosystems, agriculture, economy, or human health**.

Key Points:

- **Global Trade & IAS Risk**:
  - The rise in **bilateral trade agreements** has expanded trade links, increasing opportunities for species to hitchhike across borders.
  - Over 200 countries have formed over 34,000 bilateral trade pairs by the early 2000s, contributing to the accidental or deliberate spread of IAS.
- **India's Position**:
  - India is both a **major exporter and importer** of exotic species.
  - Several invasive species—like **mosquitofish (Gambusia)**, **guppies (Poecilia reticulata)**, and **angelfish (Pterophyllumscalare)**—have been introduced through the aquarium trade or for biocontrol purposes.
- **Unregulated Introductions**:
  - Accidental introductions can occur through poorly monitored imports like timber, grains, and ornamental plants.
  - Semi-aquatic IAS are often **underreported** but pose high health and economic risks due to their impact on infrastructure and public services.
- **Biosecurity Weaknesses**:
  - India lacks **mandatory pest-risk assessments** and **robust quarantine infrastructure**.
  - Many ports lack the capability to screen for biological threats, especially from **new trade partners**.
- **Policy Recommendations**:
  - Implement stricter **biosafety protocols** and **risk assessments**.
  - Strengthen **infrastructure**, **institutional frameworks**, and **monitoring systems**.
  - Increase **international cooperation** and make biodiversity conservation a core part of trade policy.

Major Invasive Species in India

Species	Origin	Impact
Lantana camara	Tropical America	Displaces native flora, affects grazing lands
Parthenium hysterophorus	Central America	Allergenic; reduces crop productivity and biodiversity
Eichhornia crassipes*(Water hyacinth)*	South America	Clogs water bodies, reduces oxygen, impacts fisheries
Prosopis juliflora	Central America	Depletes groundwater; displaces native shrubs

Pennisetum setaceum*(Fountain grass)*	Africa	Invades drylands; increases fire risk
Giant African Snail*(Achatina fulica)*	East Africa	Damages crops, spreads rapidly, difficult to eradicate
Tilapia (Oreochromis spp.)	Africa	Outcompetes native fish species, alters aquatic ecosystems
Gambusia affinis	North America	Introduced for mosquito control; harms native fish

ARAK HEAVY WATER REACTOR

Context : Israel strike-hit Arak heavy water reactor was part of Tehran's nuclear deal.

About Arak Heavy Water Reactor

- Located ~250 km **southwest of Tehran**, the Arak reactor has long been a global concern due to its capacity for producing **weapons-grade plutonium**.
- Originally designed to generate ~9 kg of plutonium per year—enough for one nuclear bomb annually.

Role in the 2015 JCPOA (Iran Nuclear Deal)

- Iran agreed to redesign the Arak reactor to **prevent plutonium production**.
- The original core was **disabled and filled with cement**.
- The International Atomic Energy Agency (IAEA) verified the reactor was made inoperable and monitored modifications.

Recent Developments (2025)

- **June 19, 2025**: Israeli airstrike damaged the reactor's **core seal** and its **heavy water production plant**, aiming to prevent future weaponization.
- The reactor was **not yet fueled**, and the IAEA confirmed **no radioactive risk**.
- Concerns remain that Iran has **not fully completed** the redesign, with construction reportedly continuing and possible operation by 2026.

Comparison Table of Nuclear Reactors:

Type	Fuel	Moderator	Coolant	Key Feature
Pressurized Water Reactor (PWR)	Enriched Uranium	Light Water	Light Water	Indirect steam generation
Boiling Water Reactor (BWR)	Enriched Uranium	Light Water	Light Water	Direct steam generation
Pressurized Heavy Water Reactor (PHWR)	Natural Uranium	Heavy Water	Heavy Water	Online refueling, indigenous
Fast Breeder Reactor (FBR)	MOX (Pu + U)	None	Liquid Sodium	Breeds Pu-239, high neutron economy
Advanced Heavy Water Reactor (AHWR)	Thorium + U-233	Heavy Water	Light Water	Utilizes thorium cycle
Gas-Cooled Reactor (GCR/AGR)	Enriched Uranium	Graphite	CO_2 Gas	Used mainly in UK

Molten Salt Reactor (MSR) ***(Experimental)***	Thorium/Uranium	Molten Salt	Molten Salt	Experimental, passive safety

Source : THE HINDU

HAL BECOMES FIRST INDIAN COMPANY TO ACQUIRE FULL ROCKET TECHNOLOGY

Context:Hindustan Aeronautics Limited (HAL) has become the first Indian company to acquire **complete technology** to build and operate a launch vehicle, after winning ISRO's bid for the **Small Satellite Launch Vehicle (SSLV)** program.

Key Highlights:

- HAL won the bid with an offer of **₹511 crore**, outbidding consortiums led by the **Adani Group** and **Bharat Dynamics Ltd**.
- Over the next **two years**, ISRO will assist HAL in developing two prototype SSLVs.
- After this phase, HAL will **independently manufacture, market, and launch** SSLVs for global commercial satellite missions.
- Target market: Launching satellites **up to 500 kg** into **Low Earth Orbit (LEO)**.
- HAL aims to produce **6–12 SSLVs annually** based on demand.

Significance:

- First-ever **full rocket technology transfer** in India's space history.
- Unlike earlier collaborations where ISRO retained control, HAL will have **complete ownership and operational autonomy**.
- HAL becomes India's **third rocket manufacturer**, after private firms **Skyroot Aerospace** and **Agnikul Cosmos**.
- A major step in **privatizing India's space sector** and boosting the country's share in the global launch market.

Strategic Impact:

- SSLV offers **rapid deployment and low-cost launches**, ideal for small satellite markets.
- Supports India's vision of a **$44 billion space economy by 2033**.
- Aligns with global commercial space trends and strengthens **public-private partnerships** in aerospace.

Launch Vehicles of ISRO – Brief Note

The **Indian Space Research Organisation (ISRO)** has developed a series of **launch vehicles (rockets)** to place satellites into various orbits. These vehicles are crucial for India's space missions, ranging from communication and remote sensing to interplanetary exploration.

1. Satellite Launch Vehicle (SLV)

- **First launch vehicle** developed by India.
- Successful launch in **1980**, placing **Rohini satellite** in orbit.
- **4-stage solid propellant** rocket.
- Now retired.

2. Augmented Satellite Launch Vehicle (ASLV)

- Developed to enhance payload capacity after SLV.
- Used between **1987–1994**.
- **Failed in early attempts**, later succeeded.
- Now discontinued.

3. Polar Satellite Launch Vehicle (PSLV)

- **ISRO's workhorse** with a high success rate.
- First successful launch in **1994**.
- **Used to launch satellites into Sun-synchronous Polar Orbits.**
- Capable of **multi-satellite missions** and launching into different orbits.
- Carried out missions like **Chandrayaan-1**, **Mars Orbiter Mission (Mangalyaan)**.

4. Geosynchronous Satellite Launch Vehicle (GSLV)

- Designed to launch **communication satellites** into **Geosynchronous Transfer Orbit (GTO)**.
- Uses **cryogenic upper stage**.
- First successful mission in **2004**.
- **GSLV Mk II** is operational.

5. GSLV Mk III (LVM3)

- **ISRO's most powerful launcher** to date.
- Used for **Chandrayaan-2**, and **Gaganyaan** (upcoming human spaceflight mission).
- Can carry heavier payloads (up to **4 tons to GTO**).
- Used for launching commercial satellites and **OneWeb satellites**.

6. Small Satellite Launch Vehicle (SSLV)

- Newest and **cost-effective** rocket for launching **small satellites** (up to 500 kg).
- Quick turnaround, suitable for commercial launches.
- Technology recently **transferred to HAL** for independent operation.

In Development / Future Launchers:

- **Reusable Launch Vehicle (RLV):** Prototype tested; aims to reduce cost of space access.
- **Next-Gen Launch Vehicle (NGLV):** Planned to replace PSLV, GSLV series with a **modular, semi-cryogenic**design.

Source: THE INDIAN EXPRESS

AXIOM

Context : Indian Astronaut in Space After 41 Years

Mission Highlights

- **Launch**: June 25, 2025, from NASA's Kennedy Space Center on SpaceX's Falcon 9 and Crew Dragon **"Grace"**.
- **Crew**: Peggy Whitson (USA), Sławosz Uznański (Poland), Tibor Kapu (Hungary), and Shukla (India).

- **Duration**: 14 days aboard the ISS.
- **Objectives**: Conducting over 60 scientific, educational, and commercial experiments, including seven from Indian researchers selected by ISRO.
- **Historic First**: Shukla is the first Indian to visit the ISS.

Historical Context

- **Rakesh Sharma's 1984 Mission**: Conducted aboard a Soviet Soyuz to Salyut 7 for 7 days, focused on Earth observation.
- **Shukla's Mission**: Broader scientific goals with international cooperation, longer duration, and commercial involvement.

Comparison: Rakesh Sharma vs. Shubhanshu Shukla

Feature	Rakesh Sharma (1984)	Shubhanshu Shukla (2025)
Spacecraft	Soviet Soyuz	SpaceX Crew Dragon (Grace)
Launch Site	Kazakhstan	Florida, USA
Space Station	Salyut 7 (Soviet)	ISS (International)
Duration	~7 days	~14 days
Focus	Earth observation	Scientific & educational
National Context	Soviet collaboration	International, commercial

Participating Space Agencies

1. **NASA** (USA)
2. **Roscosmos** (Russia)
3. **ESA** (Europe)
4. **JAXA** (Japan)
5. **CSA** (Canada)

Other nations also participate through collaborations.

Objectives

- **Microgravity Research**: Study biology, physics, astronomy, and materials science in space conditions
- **Technology Testing**: For future missions (e.g., Moon, Mars)
- **International Cooperation**: Symbol of peaceful space exploration
- **Commercial and Educational Activities**: Includes experiments by private companies and student research

Source:THE HINDU

GLP-1 RECEPTOR

Context: Semaglutide (2.4 mg) has shown exceptional weight loss results, averaging **15–17% body weight reduction** over 68 weeks

This far exceeds the outcomes of older weight-loss drugs or lifestyle interventions. Long-term studies confirm weight loss is **sustained up to two years**.

How It Works?

- GLP-1 drugs mimic a natural hormone that **regulates appetite and food intake**. They enhance feelings of fullness, reduce hunger, and help manage blood sugar, making it easier for patients to stick to calorie-restricted diets.

Safety and Tolerability

- Generally well-tolerated, these drugs mostly cause **mild gastrointestinal symptoms** like nausea or diarrhea. Serious side effects are rare, making them suitable for **long-term use**.

Impact on Health

- Beyond weight loss, semaglutide improves **cardiometabolic health** by lowering blood pressure, improving lipid profiles, and reducing diabetes and cardiovascular disease risks.

GLP-1 Receptors

- **GLP-1 receptors (Glucagon-Like Peptide-1 receptors)** are specialized protein receptors found primarily on **pancreatic beta cells**and also in the **brain, heart, stomach, and intestines**.
- They are part of the body's natural **glucose regulation system** and play a key role in **metabolism and appetite control**.

Functions of GLP-1 Receptors:

1. **Enhance Insulin Secretion:** When blood glucose levels rise, GLP-1 receptors help **stimulate insulin release** from pancreatic beta cells.
2. **Suppress Glucagon Secretion:** They **inhibit glucagon**, a hormone that raises blood sugar, helping lower glucose levels after meals.
3. **Slow Gastric Emptying:** GLP-1 receptors reduce the rate at which the stomach empties, promoting **satiety** and reducing food intake.
4. **Reduce Appetite:** In the brain, activation of these receptors **lowers hunger signals**, aiding in **weight loss**.

Therapeutic Importance:

- Drugs that **mimic GLP-1** (called **GLP-1 receptor agonists**, e.g., **semaglutide, liraglutide**) are widely used in the treatment of:
    - **Type 2 Diabetes Mellitus** – by improving insulin secretion and lowering blood sugar.
    - **Obesity** – by suppressing appetite and promoting sustained weight loss.

Source:THE INDIAN EXPRESS

HISTORY AND ART & CULTURE

KHEER BHAWANI MELA

Context : Kheer Bhawani Mela amid security concerns in Jammu and Kashmir.

Kheer Bhawani Mela – Key Facts

- Deity: Goddess Ragnya Devi, a form of Durga, worshipped mainly by Kashmiri Pandits.
- Location: Tulmulla, Ganderbal district, Jammu & Kashmir.
- Temple Feature: Built over a natural spring; water is believed to change color as an omen.
- Sacred Offering: Devotees offer kheer (sweet rice pudding), symbolizing purity and devotion.
- Festival Timing: Celebrated on Jyeshtha Ashtami (May–June), with fasting and prayers.

Historical Highlights

- Mentioned in Kalhana's Rajatarangini (12th century).
- Believed to be brought to Kashmir by Hanuman from Sri Lanka.
- Patronized by Dogra kings like Maharaja Pratap Singh.
- Worship includes barefoot circumambulation of the spring.

Modern Context & Revival

- The temple remained intact during the 1990s insurgency; seen as a symbol of divine protection.
- Mela resumed post-2000s with participation of returning Kashmiri Pandits and local Muslim support.
- Now a symbol of faith, resilience, and interfaith harmony.

Source: the hindu

800-YEAR-OLD SHIVA TEMPLE UNEARTHED

Context : 800-Year-Old Shiva Temple Unearthed near Madurai

Overview

- An **800-year-old Shiva temple** has been discovered near **Madurai**, Tamil Nadu.
- The structure dates back to the reign of **Pandya king Maravarman Sundarapandian I** (early 13th century CE).

Historical Significance

- The temple reflects **Pandya-style architecture**, known for its **intricate stone work** and **structural temples**.
- **Inscriptions** found on the site may offer details on:
    - **Land grants and endowments**
    - **Temple administration**
    - **Taxation systems** under the Pandya dynasty

Role of Community & Experts

- The temple was **partially buried** and lay in **neglect** for centuries.
- Local **villagers and archaeologists** played a key role in unearthing the temple.
- Experts believe the find could **reshape understanding of medieval South Indian temple networks**.

Pandya Dynasty Context

- One of the **three ancient Tamil dynasties** (alongside Cholas and Cheras).
- Known for promoting **Shaivism**, **Tamil culture**, and **temple patronage**.
- Maravarman Sundarapandian I was a notable ruler who expanded the Pandya realm and supported temple construction.

Major Styles of Temple Architecture in India:

Style	Region	Key Features	Examples
Nagara	Northern India	Curvilinear shikhara (spire), no boundary walls, multiple towers	Kandariya Mahadev (Khajuraho), Lingaraja (Odisha)
Dravida	Southern India	Pyramid-shaped vimana (tower), enclosed courtyard, large gopurams (gateway towers)	Brihadeeswarar Temple (Thanjavur), Meenakshi Temple (Madurai)
Vesara	Deccan region (Central-South)	Combination of Nagara and Dravida features, intricate carvings	Temples at Pattadakal, Badami

Basic Components of a Hindu Temple:

- **Garbhagriha (Sanctum sanctorum):** The innermost chamber housing the deity's idol.
- **Mandapa:** Pillared hall or pavilion where devotees gather.
- **Shikhara / Vimana:** The rising tower above the sanctum.
- **Pradakshina Patha:** Circumambulatory path around the sanctum.
- **Gopuram:** Monumental entrance tower (mainly in Dravida style).

Source : THE HINDU

KEEZHADI EXCAVATION

Context : The Keezhadi archaeological site in Tamil Nadu has become the center of a political and academic controversy.

Keezhadi Excavation

- **Located near the Vaigai river**, the site has revealed the remains of an advanced urban civilization dating back to at least the 6th century BCE.
- Artifacts such as pottery, tools, and graffiti resembling the Indus script point to a literate, secular, and technologically advanced Tamil society.

Political and Academic Tensions

- The excavation, initiated in 2015, was led in early phases by archaeologist K. Amarnath Ramakrishna. He has refused to revise his 982-page report, asserting it is scientifically valid.

- The Archaeological Survey of India (ASI) and Union Culture Ministry have asked for revisions, citing lack of scientific rigor.
- Tamil Nadu leaders and scholars allege political interference by the central government, accusing it of trying to suppress evidence that showcases the antiquity and independence of Tamil civilization—one that challenges dominant Hindutva narratives.
- The transfer of the lead archaeologist and delays in approval and funding are seen as deliberate stalling tactics.

Statements and Reactions

- Chief Minister M.K. Stalin has accused the Centre of undermining Tamil heritage.
- Union Minister Gajendra Singh Shekhawat denied any political motive, stating more scientific validation is required.
- Tamil academics argue there is a double standard, with less scrutiny applied to excavation reports from Ayodhya and Mathura.

Note on Keezhadi Excavation

Keezhadi is an archaeological site located near the Vaigai River in **Sivaganga district, Tamil Nadu**. Excavations at the site, which began in **2015**, have uncovered evidence of an **urban, literate, and advanced civilization** dating back to **6th century BCE**, contemporaneous with the later phase of the Indus Valley Civilization.

Key Findings:

- **Pottery with graffiti symbols**, some resembling the Indus script.
- **Well-planned settlements**, brick structures, and drainage systems.
- Evidence of **agriculture, trade, craft production**, and literacy.
- Artefacts suggest a **secular, Dravidian civilization** with rich cultural development.

Significance:

- Indicates that **urban civilization existed in southern India** earlier than previously believed.
- Suggests cultural **continuity between the Indus Valley and ancient Tamil societies**.
- Challenges earlier notions that South India remained primitive during the early historic period.

Source : THE INDIAN EXPRESS

INTERNATIONAL CONFERENCE TO DECIPHER INDUS SCRIPT

Context: The Archaeological Survey of India (ASI) will organize a major international conference titled *"Decipherment of Indus Script: Current Status and Way Forward"*

Purpose and Structure

- Aims to bring together global scholars and researchers to discuss the undeciphered Indus script.
- Will feature thematic sessions, presentations (in-person and virtual), and discussions.
- Registration and paper submission deadline: June 30, 2025.

Background

- The Indus script, dating back to 3300–1300 BCE, remains undeciphered despite over a century of study.
- Found on seals, tablets, and pottery of the Harappan civilization across India, Pakistan, and Afghanistan.

Conference Goals

- Assess the current research status.
- Outline future research directions.
- Promote interdisciplinary collaboration and support young scholars.

Key Challenges

- Inscriptions are very short, limiting grammatical analysis.
- No bilingual texts exist for comparison.
- Underlying language remains unknown.
- Limited number and high symbol variation complicate interpretation.

Recent Developments

- Renewed global interest, including a $1 million prize for decipherment.
- New archaeological finds in Tamil Nadu show possible links to Indus symbols.
- Ongoing debates connect the script to Dravidian languages and other cultural traditions.

Indus Valley Civilization (IVC

- **Time Period:** ~3300 BCE to 1300 BCE
- **Mature Phase:** ~2600 BCE to 1900 BCE
- **Geographical Extent:** Spread across present-day **Pakistan**, and **northwestern India** (Haryana, Punjab, Gujarat, Rajasthan). Major sites include:
    - **Harappa** (Punjab, Pakistan)
    - **Mohenjo-daro** (Sindh, Pakistan)
    - **Dholavira** (Gujarat, India)
    - **Rakhigarhi** (Haryana, India)
    - **Kalibangan**, **Lothal**, **Banawali**

Key Features of the Civilization

- **Urban Planning:** Grid-pattern streets, drainage systems, granaries, and citadels.
- **Architecture:** Use of burnt bricks, standardized weights and measures.
- **Economy:** Trade (including overseas with Mesopotamia), agriculture, crafts (beads, pottery, metallurgy).
- **Society:** Evidence suggests a relatively egalitarian structure; no clear evidence of kings or temples.
- **Religion:** No temples found; likely worship of nature, fertility cults, proto-Shiva (pashupati seal), mother goddess figurines.
- **Decline:** Gradual—due to environmental shifts (climate change, river drying), and possible socio-economic disruption.

Indus Script: Key Points

- **Nature:Pictographic** or **logo-syllabic** script found on seals, pottery, tablets, and copper tools.
- **Undeciphered:** Despite over a century of study, the script has **not been conclusively deciphered**.
- **First Reported:** In the 1931 excavation report of **Mohenjo-daro**.
- **Writing Direction:**Generally, right to left.
- **Number of Symbols:** Around 400–600 distinct signs.
- **Usage:** Mostly short inscriptions (average 5 symbols), often used on seals for trade or identification.

Source: THE HINDU

DEFENCE& SECURITY

OPERATION SPIDER'S WEB

Context : On June 1, 2025, Ukraine launched its most daring drone offensive, Operation Spider's Web, representing a major leap in asymmetric warfare.

Operation Spider's Web: A Game-Changer in Drone Warfare

- Ukraine launched its most daring drone offensive, Operation Spider's Web, representing a major leap in asymmetric warfare.
- After 18 months of covert planning, Ukraine smuggled 117 FPV drones into Russian territory using trucks with hidden compartments. These drones were remotely activated to strike at least five high-security Russian airbases, some as far as 4,000 km into Siberia.

Damage Reported:

- 41 Russian military aircraft destroyed or damaged
- Estimated $7 billion in losses to Russia's air assets
- Key Targeted Assets: Strategic bombers, surveillance aircraft, radar systems
- This operation showcased how low-cost, high-tech tactics can inflict serious damage on a militarily superior adversary. It exposed the vulnerability of critical military infrastructure, regardless of distance or security.

Drones vs Diplomacy: The Shifting Battlefield Reality

- The dual developments of a groundbreaking drone strike and stalled diplomacy symbolize the new face of modern conflict.
- **Technology-Driven Warfare**: Ukraine has demonstrated that innovation and stealth can level the battlefield even against larger militaries.
- **Diplomatic Paralysis**: Ongoing hostilities and escalation tactics make genuine negotiations nearly impossible.
- **Narrative War**: While Ukraine frames the drone strikes as leverage for peace, Russia sees it as provocation.
- Ukrainian President Volodymyr Zelenskyy hailed the operation as a historic milestone, hoping it would force Russia to the table. Yet, most analysts believe the attacks may harden Russia's stance rather than soften it.

Key Takeaways

- Asymmetric tactics like drones are reshaping the landscape of warfare.
- Diplomacy is increasingly fragile amid strategic escalations and mutual suspicion.
- Ukraine's operation reaffirms how non-conventional methods can yield strategic wins—but may also escalate geopolitical risks.

Source : the Indian express

TATA ADVANCED SYSTEMS LIMITED (TASL) TO PRODUCE THE FUSELAGE OF THE RAFALE IN INDIA

Context : Dassault Aviation, the French manufacturer of the Rafale fighter aircraft, has partnered with India's **Tata Advanced Systems Limited (TASL)** to produce the **fuselage of the Rafale** in India for the first time outside France.

Decoding Context:

- As part of this landmark collaboration, Tata will set up a cutting-edge production facility in Hyderabad to **manufacture key structural sections of the Rafale,** including the lateral shells of the rear fuselage, the complete rear section, the central fuselage, and the front section.
- **The first fuselage sections** are expected to roll off the assembly line in the financial year 2028, with the facility projected to deliver up to two complete fuselages per month for both Indian and global markets. This initiative is seen as a major step in strengthening India's aerospace manufacturing capabilities and supporting global supply chains, aligning with the government's '**Make in India' and 'Atmanirbhar Bharat' (self-reliant India) initiatives.**
- The partnership also positions India as a key player in high-precision aerospace manufacturing and could have significant implications for future Indian Air Force requirements, including the potential **production of more Rafale fighters under the Multi-Role Fighter Aircraft (MRFA) program**. Notably, the Hyderabad facility's output will support not only India's existing Rafale fleet and new naval orders but also international demand for the aircraft.

Rafale Fighter Jet – Key Facts

Origin & Manufacturer

- **Country:** France
- **Manufacturer:** Dassault Aviation
- **Name Meaning:** "Rafale" means "gust of wind" in French

Type & Role

- **Category:** 4.5-generation **multi-role fighter aircraft**
- **Roles:** Air supremacy, ground support, reconnaissance, nuclear deterrence, anti-ship, electronic warfare

Variants

- **Rafale B** – Twin-seat (used for training and missions)
- **Rafale C** – Single-seat (land-based version)
- **Rafale M** – Carrier-based naval version

Key Features

- **Delta wing with canards** – for high agility
- **Fly-by-wire system** – improves stability and maneuverability
- **Radar:** AESA radar (*RBE2*)
- **Weapons:**
  - Meteor (Beyond Visual Range Air-to-Air Missile – BVRAM)
  - SCALP cruise missile
  - MICA air-to-air missile
  - HAMMER precision-guided bombs
- **Speed:** Mach 1.8 (2,222 km/h)
- **Combat range:** ~1,850 km (without refueling)

India-Specific Customizations

- **'India-specific enhancements'** include:
  - Israeli helmet-mounted display
  - Low-band jammers
  - Infrared search and track (IRST) system
  - To handle **nuclear payload delivery**
  - Cold start capability for high-altitude (e.g., Ladakh)

Brief note on **4.5 generation** and **5th generation** fighter aircraft:

4.5 Generation Fighter Aircraft

- Represents an **evolutionary upgrade** over 4th generation fighters.
- Incorporates **advanced avionics, sensors, and weapons systems** while retaining a similar airframe.
- Features include:
  - **Active Electronically Scanned Array (AESA) radar**
  - Improved **stealth features** (reduced radar cross-section, but not full stealth)
  - Enhanced **network-centric warfare capabilities** (data sharing, situational awareness)
  - Advanced **electronic warfare (EW) systems** and precision-guided munitions
  - Better **engine performance** and maneuverability than 4th generation jets
- Examples: Rafale, Eurofighter Typhoon, Su-35, F-16 Block 60, Mirage 2000-9

5th Generation Fighter Aircraft

- Represent a **major leap in technology** with full stealth design and cutting-edge features.
- Key characteristics:
  - **Stealth capability** with minimal radar cross-section and infrared signature
  - **Advanced sensor fusion** integrating radar, infrared, electronic warfare, and communications into a single display
  - **Supercruise** — ability to fly at supersonic speeds without afterburners
  - Highly agile with **thrust vectoring engines**
  - **Network-centric warfare** with real-time data sharing across platforms
  - Integrated **artificial intelligence** and advanced avionics for pilot assistance
- Examples: F-22 Raptor, F-35 Lightning II, Su-57, Chengdu J-20

Source: THE HINDU

INS ARNALA

Context : The Indian Navy is set to commission its first Anti-Submarine Warfare Shallow Water Craft (ASW-SWC), named **INS Arnala**, at Visakhapatnam.

Details of Warship:

- INS Arnala is the lead ship in a series of 16 vessels designed and built by Garden Reach Shipbuilders & Engineers (GRSE), Kolkata, in partnership with L&T Shipbuilders under a Public-Private Partnership model.

Key Features:

- Over 80% indigenous content, with systems integrated by major Indian defence firms and contributions from more than 55 MSMEs, boosting India's self-reliance in defence manufacturing.
- Length of 77 meters and displacement over 1,490 tonnes, making it the largest Indian warship powered by a diesel engine–waterjet propulsion system.
- Designed for anti-submarine warfare, subsurface surveillance, search and rescue, and low-intensity maritime missions to enhance coastal defence.
- Named after the historic Arnala Fort off Maharashtra, symbolizing India's maritime heritage.
- The crest features a stylized Auger Shell, symbolizing resilience and vigilance, with the motto "ArnaveShauryam" (Valour in the Ocean).

Strategic Importance:

INS Arnala will strengthen the Navy's ability to detect and counter undersea threats in shallow coastal waters, crucial amid increasing submarine activity in the region.

Anti-Submarine Warfare Ships of India

1. INS Kamorta-class (Project 28)

- India's first indigenously designed and built stealth ASW corvettes.
- Equipped with advanced sonar systems, torpedoes, anti-submarine rockets, and anti-ship missiles.
- Key ships: INS Kamorta, INS Kadmatt, INS Kiltan, INS Kavaratti.
- Operate primarily in coastal and offshore areas to detect and neutralize submarines.

2. INS Kora-class Corvettes

- Multi-role corvettes with strong ASW capabilities alongside surface warfare.
- Fitted with torpedoes, depth charges, and anti-submarine rocket launchers.

3. Pondicherry-class (Kilo-class) Submarines

- Though submarines themselves, these also perform ASW roles by hunting enemy subs.
- Acquired from Russia, these diesel-electric submarines enhance underwater warfare.

4. INS Shivalik-class Frigates

- Multi-role stealth frigates with strong ASW sensors and weapons.
- Equipped with towed array sonar, torpedoes, and rocket launchers for submarine hunting.

5. Other ASW Assets

- Indian Navy operates various ASW helicopters (e.g., HAL Dhruv, Sea King) and maritime patrol aircraft (e.g., P-8I) for anti-submarine detection and engagement.

Source:THE HINDU

DRONES IN MODERN WARFARE

Context : The significance of drones have increased during Russia-Ukraine war

Decoding Context:

- **Decisive Role**: By 2025, drones are responsible for 60–70% of damage to Russian military equipment, becoming a dominant tool in battlefield operations.
- **Mass Production**: Ukraine produces around 200,000 First Person View (FPV) drones monthly. These affordable ($200–$400) drones are highly effective against costly Russian tanks and systems.

- **Advanced Capabilities**: Ukrainian drones now serve multiple roles—bombing, reconnaissance, relay, and AI-enabled targeting—demonstrating high adaptability.
- **Strategic Innovation**: Ukraine's GOGOL-M "mothership" drone can autonomously deploy two FPV drones over 300 km, targeting critical assets deep in Russian territory.
- **Russian Response**: Russia has developed drones like the Tyuvik (resistant to jamming) and fiber-optic models, though they face issues with AI autonomy, as seen in Lancet-3 glitches.
- **Drone Boats**: Ukraine introduced armed naval drones like the Magura V7, reportedly used to shoot down Russian aircraft—an unprecedented feat in maritime drone warfare.
- **Tactical Evolution**: Ukraine employs "drone walls" along front lines to disrupt enemy troops and conducts long-range strikes against airfields and military hubs.
- **Global Impact**: The Ukraine conflict has reshaped global military doctrine, with countries like Taiwan, Israel, and NATO members now prioritizing drone and counter-drone strategies.

Summary Table

Drone	Country	Type	Notable Features	Role
FPV Drones	Ukraine	Multirole	Cheap, mass-produced, high damage potential	ISR, attack, jamming
GOGOL-M	Ukraine	Mothership	AI-enabled, launches 2 FPVs up to 300 km	Long-range strike
Magura V7	Ukraine	Naval	Missile-capable USV, downed jet	Naval + airstrike hybrid
Tyuvik	Russia	Light attack	EW-resistant, autopilot, target homing	Frontline attack
Fiber-optic drones	Russia	Recon/Attack	Signal-proof due to wired control	EW zones, stable operations
Lancet-3	Russia	Loitering	Autonomous, sometimes glitchy	Precision strike

Source : THE HINDU

NOMADIC ELEPHANT 2025

Context : The 17th edition of the **India-Mongolia joint military exercise "Nomadic Elephant"** concluded on **June 13, 2025**, in **Ulaanbaatar, Mongolia**

Key Highlights:

- The Indian Army contingent, comprising **45 personnel** mainly from the **Arunachal Scouts**, participated in the exercise.
- The joint training emphasized **interoperability** in **semi-conventional operations** under a **UN mandate**, especially in **semi-urban and mountainous terrain**.
- Activities included:
  - **Counter-insurgency and counter-terrorism** operations
  - **Endurance and reflex shooting**
  - **Room intervention** and **small team tactics**
  - **Rock craft training**
  - **Cyber warfare modules**

Significance:

- Strengthens **bilateral defence cooperation** and trust between India and Mongolia.
- Reinforces shared interests in **regional stability**, **international peacekeeping**, and **strategic partnership**.
- Enhances the Indian Army's readiness for **multinational missions** in varied terrain.

Major Military Exercises Involving India

Exercise Name	Partner Country/Group	Type	Branch Involved	Focus/Remarks
Yudh Abhyas	United States	Bilateral	Army	Counter-insurgency and interoperability
Tiger Triumph	United States	Bilateral	Tri-services	Amphibious operations
Cope India	United States	Bilateral	Air Force	Air combat training
MALABAR	US, Japan, Australia	Multilateral	Navy	Indo-Pacific security and naval cooperation
INDRA	Russia	Bilateral	Tri-services	Strategic cooperation, anti-terror ops
Garuda	France	Bilateral	Air Force	Air warfare training
Varuna	France	Bilateral	Navy	Maritime security and coordination
Shakti	France	Bilateral	Army	Counter-terrorism and tactical ops
Ajeya Warrior	United Kingdom	Bilateral	Army	Counter-insurgency operations
Konkan	United Kingdom	Bilateral	Navy	Maritime operations
Indra Dhanush	United Kingdom	Bilateral	Air Force	Air combat tactics
AUSINDEX	Australia	Bilateral	Navy	Maritime interoperability
AUSTRA HIND	Australia	Bilateral	Army	Peacekeeping and HADR
JIMEX	Japan	Bilateral	Navy	Maritime security and interoperability
Dharma Guardian	Japan	Bilateral	Army	Counter-insurgency
Surya Kiran	Nepal	Bilateral	Army	Jungle warfare and mountain ops
Sampriti	Bangladesh	Bilateral	Army	Counter-terrorism
Bongosagar	Bangladesh	Bilateral	Navy	Maritime cooperation
Mitra Shakti	Sri Lanka	Bilateral	Army	Counter-terrorism and HADR
SLINEX	Sri Lanka	Bilateral	Navy	Maritime cooperation
Ekuverin	Maldives	Bilateral	Army	Counter-insurgency

Maitree	Thailand	Bilateral	Army	Jungle warfare and disaster response
VINBAX	Vietnam	Bilateral	Army	United Nations peacekeeping training
Nomadic Elephant	Mongolia	Bilateral	Army	Counter-insurgency in mountainous terrain
RIMPAC	US-led Multinational	Multilateral	Navy	World's largest naval exercise
MILAN	Multinational (hosted by India)	Multilateral	Navy	Naval diplomacy and cooperation
SCO Peace Mission	SCO Members (incl. China, Russia)	Multilateral	Army	Anti-terror and joint ops training
Cobra Gold	Thailand + Indo-Pacific partners	Multilateral (Observer)	Army/Navy	Humanitarian and military cooperation

Source:PIB

SHAKTI – 2025

Context: India-France Joint Military Exercise Shakti – 2025.

Overview:

A 90-member Indian Army contingent has departed for France to participate in the 8th edition of **Exercise Shakti**, scheduled from **June 18 to July 1, 2025**, at **Camp Larzac, La Cavalerie**, in southern France.

Key Highlights:

- **Indian Representation:** Jammu and Kashmir Rifles battalion along with personnel from other units.
- **French Representation:** 13th Foreign Legion Half-Brigade (13th DBLE).
- **Objective:** Enhance counter-terrorism capabilities, tactical cooperation, and interoperability.
- **Significance:** Strengthens defense ties and strategic partnership between India and France.
- **Nature:** Biennial military exercise.

GOVT. INITIATIVES, SCHEMES AND POLICIES, ORGANISATION

AMENDMENTS TO NUCLEAR ENERGY LAWS

Context : India is considering significant amendments to its nuclear energy laws.

India is considering significant amendments to its nuclear energy laws, specifically the **Atomic Energy Act of 1962** and the **Civil Liability for Nuclear Damage Act (CLNDA) of 2010**, to facilitate greater private sector participation and to align liability regimes with international standards.

Key Drivers Behind the Proposed Amendments:

Encouraging Private and Foreign Investment:

- The current legal framework restricts the construction and operation of nuclear power plants primarily to government entities.
- This has limited the participation of private and foreign companies. Proposed reforms aim to open the nuclear sector to private players and allow foreign firms to hold minority stakes, thereby attracting capital and advanced technology.

Capping Supplier Liability:

- Under the current CLNDA provisions, suppliers of nuclear equipment face potentially unlimited liability in the event of an accident.
- This has deterred global vendors, especially from countries like the United States. Amending the law to cap supplier liability—bringing it in line with global norms—is expected to reassure foreign suppliers and boost project execution.

Scaling Up Nuclear Capacity:

- India's long-term goal is to expand nuclear energy capacity from the current ~8 GW to **100 GW by 2047**.
- Meeting this target demands both regulatory reforms and substantial investments, which the proposed legal amendments are expected to enable.

Supporting Energy Transition and Climate Goals:

- Nuclear power plays a vital role in India's strategy to reduce carbon emissions and dependency on fossil fuels. Involving the private sector could accelerate the deployment of advanced nuclear technologies like **Small Modular Reactors (SMRs)**, enhancing energy security and sustainability.

History of India's Nuclear Energy Programme

India's nuclear energy programme began in the **late 1940s**, under the visionary leadership of **Dr. Homi Jehangir Bhabha**, often called the "father of India's nuclear programme." The programme was conceptualized with a strong focus on peaceful uses of atomic energy and self-reliance in nuclear technology.

Key Milestones:

1. **1948 – Establishment of Atomic Energy Commission (AEC):** Formed under the Department of Scientific Research to develop nuclear technology and policy.
2. **1954 – Department of Atomic Energy (DAE):** Set up directly under the Prime Minister to consolidate atomic research and energy development.

3. **Three-Stage Nuclear Power Programme (1950s):** Conceived by Dr. Bhabha to utilize India's limited uranium and vast thorium reserves:
    - **Stage 1:** Pressurized Heavy Water Reactors (PHWRs) using natural uranium.
    - **Stage 2:** Fast Breeder Reactors (FBRs) using plutonium produced in Stage 1.
    - **Stage 3:** Thorium-based reactors (Advanced Heavy Water Reactors or AHWRs).
4. **1969 – Establishment of Nuclear Power Corporation of India Limited (NPCIL):** A public sector enterprise to manage nuclear power plant construction and operation.
5. **1974 – Pokhran-I (Smiling Buddha):** India conducted its first underground nuclear test, marking a strategic shift and attracting global sanctions, impacting nuclear commerce.
6. **1998 – Pokhran-II:** A series of five nuclear tests established India as a nuclear weapons state, followed by further international isolation.
7. **2008 – Indo-US Civil Nuclear Agreement:** A major breakthrough that ended India's nuclear isolation. India was granted a waiver by the **Nuclear Suppliers Group (NSG)**, enabling nuclear trade despite being a non-signatory to the **Nuclear Non-Proliferation Treaty (NPT)**.
8. **Current Status (as of 2025):**
   India operates **22 nuclear reactors** with an installed capacity of around **7,800 MW**.Reactors are mainly PHWRs; Fast Breeder Reactor development is ongoing.India aims to reach **100 GW nuclear capacity by 2047**.

Source : THE HINDU

MISCELLANEOUS

MSME DAY 2025

Context : President **Droupadi Murmu** will preside over the **MSME Day 2025 – Udyami Bharat** celebrations on **June 27, 2025**, at **Vigyan Bhawan, New Delhi**.

Key Highlights

The event will acknowledge the crucial role of the **Micro, Small and Medium Enterprises (MSME)** sector in India's economy.

Objective:

The event underscores the government's commitment to building a **digitally empowered**, **resilient**, and **competitive MSME ecosystem** to drive India's inclusive economic development.

Significance:

- MSMEs contribute nearly **30% of GDP** and **48% of exports**.
- The day highlights the sector's role in **job creation**, **economic growth**, and **entrepreneurship**.

Key Initiatives to Be Launched:

1. **Online Dispute Resolution (ODR) Portal**
    - A digital platform to help micro and small businesses resolve **payment disputes** quickly and cost-effectively.
2. **Commemorative Stamp – CGTMSE@25**
    - Celebrating **25 years** of the **Credit Guarantee Fund Trust**, which has enabled over ₹9.80 lakh crore in credit guarantees.
3. **MSME Hackathon 5.0**
    - Launch of the new edition to foster **innovation and entrepreneurship**. Results of Hackathon 4.0 will also be announced.
4. **Publications Release**
    - **'MSME Patrika'** and **'Know Your Lender'** to enhance **credit literacy** among MSME entrepreneurs.

<u>Overview of the MSME Sector in India (2025)</u>

The **Micro, Small and Medium Enterprises (MSME)** sector continues to be the **backbone of India's economy**, contributing significantly to employment, GDP, and exports.

Key Statistics (2025):

Indicator	Data (2025)
Total MSMEs	~63 million units
Employment	~110 million (11 crore)
Contribution to GDP	~30–31% of Gross Value Added (GVA)

Contribution to Exports	~45.8% of merchandise exports
Total Export Value (FY25)	₹12.39 lakh crore
Credit Guarantees (CGTMSE FY25)	₹3 lakh crore

Revised Classification of MSMEs (April 1, 2025)

Category	Investment Limit	Turnover Limit
Micro	Up to ₹2.5 crore	Up to ₹10 crore
Small	Up to ₹25 crore	Up to ₹100 crore
Medium	Up to ₹125 crore	Up to ₹500 crore

Recent Initiatives and Reforms

1. **Udyam Registration**
   - ~59 million registered units
   - Supported over 251 million jobs
2. **CGTMSE Modernization**
   - AI-enabled processing to reduce approval time by 30%
   - Enabled over 1 crore loan guarantees
3. **Budget 2025–26 Support**
   - MSME Credit Cards for easy working capital
   - Fund-of-funds and equity infusion for startups and growing MSMEs
4. **Digital Platforms**
   - Launch of **Online Dispute Resolution (ODR) Portal**
   - Tools to address **delayed payments** and **credit literacy**
5. **NITI Aayog Policy Focus**
   - Emphasis on **medium enterprises**
   - Medium enterprises (0.3% of MSMEs) contribute ~40% of MSME exports

Source :PIB

KOLHAPURI CHAPPALS

Context: In its Spring/Summer 2026 menswear collection, Prada featured sandals closely resembling **Kolhapuri chappals**, traditional handcrafted leather footwear from Maharashtra and Karnataka with a **Geographical Indication (GI)** tag

Key Issues:

- **Cultural Appropriation:** The design was used without recognizing its Indian heritage or the artisans behind it.
- **Economic Disparity:** While authentic Kolhapuris are sold for around ₹500, Prada's version was priced above ₹1 lakh, highlighting the imbalance in profits and credit.
- **Weak Legal Enforcement:** Despite GI protection, there is limited legal recourse against global misuse, exposing gaps in international IP law.
- **Artisan Marginalization:** The incident reflects ongoing neglect of traditional craftsmen in global markets.

Geographical Indication (GI) Tag:

A **Geographical Indication (GI)** is a sign used on products that have a **specific geographical origin** and possess **qualities, reputation, or characteristics** inherent to that location. It is a form of **intellectual property right (IPR)** governed in India by the **Geographical Indications of Goods (Registration and Protection) Act, 1999**.

- **Administered by:** Geographical Indications Registry under the **Controller General of Patents, Designs and Trade Marks**.
- **Legal protection:** Prevents unauthorized use by others not belonging to the geographical region.
- **Validity:** Initially for **10 years**, can be renewed indefinitely.
- **Benefits:**
  - Protects traditional knowledge and skills.
  - Helps local artisans, farmers, and producers gain premium value in markets.
  - Promotes rural economic development and preserves cultural heritage.

Tagged Products in India

Product	State of Origin
Kolhapuri Chappal	Maharashtra & Karnataka
Darjeeling Tea	West Bengal
Mysore Silk	Karnataka
Pochampally Ikat	Telangana
Banarasi Saree	Uttar Pradesh
Kanchipuram Silk Saree	Tamil Nadu
Aranmula Kannadi (mirror)	Kerala
Bhut Jolokia (Chili)	Assam
Alphonso Mango	Maharashtra
Basmati Rice	Punjab, Haryana, UP, etc.
Lakadong Turmeric	Meghalaya
Vasmat Haldi (Turmeric)	Maharashtra
Uttarakhand Lal Chawal (Red Rice)	Uttarakhand
Khamti Rice (Khaw Tai)	Arunachal Pradesh
Agassaim Brinjal	Goa
Borsuri Tur Dal	Maharashtra
Marcha Rice	Bihar
Manipuri Black Rice	Manipur
Kaji Nemu (Lemon)	Assam
Attappady Red Gram & Beans	Kerala
Miraj Sitar & Tanpura	Maharashtra

Hupari Silver Craft	Maharashtra
Sawantwadi Wooden Craft	Maharashtra
Goan Feni	Goa
Polavaram Cotton Sarees	Andhra Pradesh
Sohrai–Khovar Painting	Jharkhand
Telia Rumal Textile	Telangana
Sundarbans Honey	West Bengal
Murshidabad Garad &Korial Sarees	West Bengal
Tangail Sarees	West Bengal

Source: THE INDIAN EXPRESS

C. SANKARAN NAIR

Context: C. Sankaran Nair's legacy defies simple categorization due to his multifaceted roles as a jurist, nationalist, reformer, and critic. He was both an **insider in the British legal system** and a **principled dissenter**, resigning from the Viceroy's Council after the Jallianwala Bagh massacre.

Key Aspects of His Legacy

- **Constitutionalist and Rebel**: Rose to become a judge of the Madras High Court, yet protested British atrocities and advocated for Indian rights through constitutional means.
- **Legal and Social Reformer**: Delivered landmark judgments emphasizing due process and justice. Advocated inter-caste marriage, women's rights, and eradication of caste discrimination.
- **Independent Nationalist**: Supported Dominion Status as a step toward full independence. Criticized both British colonialism and Indian political orthodoxy, especially Gandhi's mass movements and the Khilafat agitation.
- **Courage and Integrity**: Refused to apologize after losing a defamation case in England. Resigned from high office over ethical concerns.
- **Underappreciated Figure**: Despite his influence, his contributions were sidelined in mainstream narratives. He is now being rediscovered through biographies and popular media.

C. Sankaran Nair (1857–1934):

- **Lawyer | Jurist | Nationalist | Social Reformer**
- C. Sankaran Nair was a prominent Indian jurist and nationalist leader known for his bold dissent against British colonial rule and his deep commitment to constitutionalism and social justice.
- He served as the **President of the Indian National Congress in 1897**, becoming the first Malayali to hold the position.
- Appointed **Advocate-General of Madras** and later a **Judge of the Madras High Court**, he was known for his commitment to legal integrity and civil rights.
- In protest against the **Jallianwala Bagh massacre (1919)**, he resigned from the **Viceroy's Executive Council**, becoming one of the earliest high-ranking Indians to do so.

- Nair was a strong advocate for **social reform**, promoting **women's rights, caste equality, and inter-caste marriage**.
- He opposed **Gandhi's methods** of mass civil disobedience and criticized the **Khilafat Movement**, preferring constitutional and legislative paths to reform.
- His book, *Gandhi and Anarchy*, outlined his differences with the dominant nationalist strategies of his time.
- Despite his contributions, he was largely forgotten in mainstream history until recent efforts began reviving interest in his legacy.

Source: THE HINDU

MAINS PAPER 1

EMERGENCY AND ITS LESSONS

Introduction (Context)

June 25, 2025 marks the **50th anniversary of the Emergency**, a defining and controversial period in Indian democracy. The 21-month period from June 25, 1975 to March 21, 1977 saw the government of Indira Gandhi suspend civil liberties, curtail press freedom, make mass arrests, cancel elections, and rule by decree.

Historical and Political Background

- Indira Gandhi came to power with a resounding electoral mandate in 1971. However, her government soon faced multiple crises—economic stress due to the 1971 war with Pakistan, the 1973 oil shock, droughts, inflation, and rising unemployment. Public dissatisfaction grew amid charges of corruption and mis-governance.
- In 1974, Gujarat witnessed the Navnirman Movement, where students forced the resignation of CM Chimanbhai Patel. Inspired by this, Bihar's students launched a massive protest that culminated in the **JP Movement**, led by Gandhian socialist **Jayaprakash Narayan**, demanding "Sampoorna Kranti" (Total Revolution). The movement gained national traction and directly challenged the legitimacy of Indira Gandhi's leadership. Around the same time, **George Fernandes** led a nationwide railway strike, crippling Indian Railways for weeks and adding to the state's anxiety.
- The real flashpoint came on **June 12, 1975**, when the **Allahabad High Court convicted Indira Gandhi** of electoral malpractice and declared her 1971 Lok Sabha win void. With mounting calls for her resignation, Indira Gandhi, instead of stepping down, declared an **Emergency** late on the night of **June 25, 1975**. The Proclamation, signed by President **Fakhruddin Ali Ahmed**, was announced on **All India Radio at 8 am the next day**, while newspaper offices were blacked out.

Constitutional Tools and Rule by Decree

The Emergency was declared under **Article 352** of the Constitution, citing "internal disturbance" as the reason. This article gave the central government sweeping powers to override federal norms and suspend democratic rights.

- The **Centre effectively took control of state governments**, converting India into a quasi-unitary state. Laws were made on State List subjects, and financial relations between Centre and States were redefined unilaterally.
- Over **1.12 lakh people** were arrested under draconian laws such as **MISA**, **COFEPOSA**, and the **Defence of India Rules**.
- All major opposition leaders, including JP, Morarji Desai, L.K. Advani, and Atal Bihari Vajpayee, were jailed.
- The most dangerous constitutional change came with the **42nd Amendment Act (1976)**, often called the "Mini-Constitution". It:
    - **Curtailed the powers of the judiciary**, particularly the power of judicial review.
    - Gave **Parliament unchecked power** to amend the Constitution.
    - Allowed laws implementing **Directive Principles** to override Fundamental Rights.

- Removed the judiciary's authority to hear **election petitions** during the Emergency.

About Article 352

- **Article 352** empowers the President to declare a **National Emergency** when India's security is threatened by **war, external aggression, or armed rebellion**.
- Originally included "internal disturbance" as a ground, which was replaced with "armed rebellion" by the **44th Constitutional Amendment (1978)** to prevent misuse.
- Once proclaimed, it must be approved by **both Houses of Parliament** within **1 month** by a **special majority** and renewed every 6 months.
- Centre can legislate on **State List** matters.
- **Fundamental Rights curtailed** especially **Article 19** is suspended.
- **Democratic processes disrupted** as Executive gains legislative powers; judiciary's role reduced (especially during the 1975 Emergency).

Attack on Fundamental Rights and the Press

The Emergency witnessed a blanket suspension of civil liberties:

- **Article 19(1)(a)**, guaranteeing freedom of speech and expression, was suspended.
- The press was placed under **pre-censorship**, and critical voices were silenced.
- Over **250 journalists**, including **Kuldip Nayar**, were imprisoned.
- While most media houses submitted to censorship, **The Indian Express** and **The Statesman** resisted by leaving editorial spaces blank to protest suppression.

Sanjay Gandhi's Five-Point Programme and State Excesses

Indira's son **Sanjay Gandhi** emerged as a de facto policymaker during the Emergency, spearheading a controversial **five-point programme**, which included:

- Family planning (which soon turned coercive),
- Slum clearance (often violent),
- Tree plantation,
- Abolition of dowry, and
- Literacy.

His programme led to **forced sterilisation drives**, especially in North India. In many instances, men were denied rations, salaries, or driving licences without sterilisation certificates. The infamous **Turkman Gate incident** in Delhi and the **Muzaffarnagar police firing** in October 1976 (which killed over 50 protestors) became symbols of state brutality.

End of Emergency and Political Consequences

- In early **1977**, Indira Gandhi unexpectedly lifted the Emergency and called for elections, believing she would still win due to a weakened Opposition and controlled narrative.
- However, the people responded with a stunning verdict. The **Janata Party**, a coalition of anti-Congress forces, won a majority, and **Morarji Desai** became India's first **non-Congress Prime Minister**.
- The new government repealed many of the Emergency-era amendments. The **44th Constitutional Amendment Act (1978)**:
    - **Replaced "internal disturbance" with "armed rebellion"** as a ground for Emergency.

- Restored **judicial review** of Emergency proclamations.
- Made it mandatory that an Emergency be passed by both Houses within one month by a **special majority** (majority of total strength and two-thirds present and voting).

Impact on Indian Democracy

- The Emergency shattered the myth of **Congress' invincibility** and laid the foundation for **multi-party democracy** in India. While the Janata government collapsed by 1979, the **rise of regional parties** and **anti-Congress alliances** gained momentum.
- It gave rise to a generation of new political leaders like **Lalu Prasad Yadav**, **Arun Jaitley**, **George Fernandes**, and **Ram Vilas Paswan**, who shaped Indian politics for decades.
- It led to **deep institutional introspection**. The judiciary emerged stronger post-Emergency, particularly after its controversial ADM Jabalpur judgment (1976), which was later discredited.
- The **Mandal Commission** was established in the post-Emergency period, catalysing **OBC political empowerment** in the 1990s.

Conclusion

The Emergency of 1975–77 stands as a powerful reminder of how fragile democratic institutions can become in the absence of robust checks and balances. It exposed the dangers of concentrated executive power, the vulnerability of civil liberties, and the need for constant vigilance in a constitutional democracy. As India completes 50 years since that turning point, it is vital to uphold the values of liberty, accountability, and constitutional morality to ensure that such an episode is never repeated.

CRITICAL MINERALS IMPORTANT FOR INDIA'S GROWTH

Introduction (Context)

The 21st century is witnessing a fundamental shift in global resource geopolitics from fossil fuels to critical minerals. As the world moves toward a cleaner, digital, and technologically advanced future, the demand for minerals like lithium, cobalt, nickel, and rare earth elements has surged. Hence, India must explore within as iIt is near-impossible to secure mineral supply chains from overseas.

What are Critical Minerals?

- Critical minerals are **metallic or non-metallic elements** that are essential for **high-tech, clean energy, defence**, and **economic applications** but have **high supply chain risks** due to limited global sources or monopoly control.
- Examples include **lithium, cobalt, nickel, copper, rare earth elements, graphite**, etc.

Usage of Critical Minerals

Critical minerals are essential components of various clean energy technologies and industries. Their importance can be highlighted across different sectors:

1. Solar energy

- Critical minerals such as **silicon, tellurium, indium, and gallium** are vital for the production of photovoltaic (PV) cells used in solar panels.
- India's current solar capacity of **64 GW** is heavily dependent on these minerals.

2. Wind energy

- **Rare earth elements** like **dysprosium and neodymium** are used in permanent magnets for wind turbines.
- India aims to increase its wind energy capacity from **42 GW to 140 GW by 2030**, necessitating a stable supply of these minerals.

3. Electric vehicles (EVs)

- **Lithium, nickel, and cobalt** are key materials used in lithium-ion batteries.
- Under the **National Electric Mobility Mission Plan (NEMMP)**, India plans to deploy **6–7 million EVs by 2024**, leading to increased demand for these critical minerals.

4. Energy storage

- Lithium-ion batteries used in advanced energy storage systems depend on **lithium, cobalt, and nickel**.

Global Status of Critical Mineral Supply Chains

- **Cobalt**: Around **70% of global supply** comes from the **Democratic Republic of Congo (DRC)**.
- **Nickel**: **Indonesia** accounts for nearly **50%** of global production.
- **Lithium**: Dominated by **Australia, Chile, and China**.
- **Rare Earth Elements**: **China alone contributes over 66%** of global mining output.

Processing Monopoly:

- **China processes more than 66%** of the world's critical minerals, including copper and aluminium.
- In the case of **rare earth elements**, **China's share exceeds 90%**, giving it a near-monopoly on global supply chains.
- China's control over critical minerals gives it **geopolitical and geoeconomic influence**, as seen in trade disputes and restrictions on rare earth exports.
- The **US and EU** has recognised this threat and are racing to diversify and secure their mineral sources.

Status of Critical Minerals in India

- India is **geologically rich** but remains **under-explored** for critical minerals.
- India currently **imports most** of its lithium, cobalt, and rare earths, making it vulnerable to supply disruptions.
- As per the Indian Bureau of Mines India has **potential reserves of rare earth elements** in states like **Andhra Pradesh, Odisha, and KeralaKhanij Bidesh India Ltd. (KABIL)** has been set up to secure supply from overseas (e.g. lithium in Argentina, cobalt in Africa).
- Despite this, **domestic exploration is inadequate**, and India lacks processing infrastructure.

Critical Minerals and Geopolitics

Minerals have also taken centre-stage in the global trade war. China is using its disproportionate control over rare earth materials to threaten the US and the rest of the world with the debilitating consequences of restricted supply.

- **US Policy Response**:
  - US want to "annex" Canada and Greenland to have control over their vast mineral wealth.
  - US wants to solve Russia-Ukraine conflict is the potential for the US to access Ukraine's rich mineral resources.

  - US is opening up vast tracts of federal land — previously on no-go lists — for mineral exploration on a fast-track basis, cutting approvals time from a year to less than a month.
- **India's Lag**:
  - Long clearance timelines.
  - Limited exploration and survey efforts.
  - Absence of commercial-scale refining or recycling infrastructure.

Value addition: National Critical Mineral Mission of India

- The Government of India launched the **National Critical Mineral Mission (NCMM)** in **2025** to ensure long-term **self-reliance in critical minerals** essential for clean energy, technology, and national security.
- Under NCMM, the **Geological Survey of India (GSI)** will conduct **1,200 exploration projects** between **2024–25 and 2030–31**.
- A list of **30 critical minerals** was identified by a Ministry of Mines committee in 2022; **24 of these** are now under **Central Government auction authority** via the **MMDR Act, 1957**.
- The mission aims to secure critical mineral availability, both domestically and from international sources, and establish a **Centre of Excellence on Critical Minerals** for strategic planning.

Objectives of NCMM

- **Secure domestic and global sourcing** of critical minerals.
- **Strengthen the value chain** through innovation, processing capacity, skill development, and recycling.
- **Reduce import dependency** and enhance India's role in the global clean-tech supply chain.

India's Exploration Efforts

- GSI has taken up **195 projects in 2024–25**, including **35 in Rajasthan**, focused on assessing domestic reserves.
- **Over 100 blocks** of critical minerals are ready for auction.
- **Offshore exploration** will target polymetallic nodules rich in **cobalt, REEs, nickel, and manganese**.
- Exploration follows **UNFC classification** and **MEMC Rules, 2015**.
- GSI previously identified **rare earth elements** in Rajasthan; the **Department of Atomic Energy** reported **1.11 lakh tonnes of REO reserves** in Balotra.

Way Forward for India

- **Accelerate Exploration**: Conduct modern, satellite-based mineral surveys to map reserves.
- **Policy Reforms**: Fast-track mining leases, reduce approval time, and ensure ease of doing business in the mining sector.
- **Domestic Processing**: Set up mineral processing and refining facilities through **public-private partnerships**.
- **Strategic Reserves**: Create a stockpile of critical minerals similar to **strategic oil reserves**.
- **Global Collaboration**: Expand partnerships under platforms like **Quad**, **India-Australia-Japan supply chain initiative**, etc.
- **Research & Recycling**: Invest in **urban mining** and **battery recycling technologies** to reduce import dependence

PAPER 2

ECI INITIATED DE-LISTING OF POLITICAL PARTIES

Introduction (Context)

The Election Commission of India (ECI) has initiated de-listing of 345 Registered Unrecognised Political Parties (RUPPs) that have neither contested elections in the last six years nor have identifiable offices. This move is part of its clean-up drive to ensure electoral integrity.

What are Registered Political Parties?

- Political parties are an association or body of individuals that can be formed by citizens. Article 19(1)(c) guarantees the right to form associations, under which citizens can form political parties.
- **Registration Process (Section 29A, RP Act 1951):**
  - Submit party memorandum/constitution within 30 days of formation.
  - Must pledge allegiance to the Constitution, socialism, secularism, democracy, sovereignty, unity, and integrity of India.
  - ECI examines for provisions ensuring internal democracy, including periodic elections for office bearers.
- The ECI thereafter registers them as a RUPP.

Benefits enjoyed by RUPPs

1. **Tax Exemptions:** Donations received are exempt under Section 13A, Income Tax Act, 1961.
2. **Symbol Allocation:** Entitled to a common election symbol for contesting polls.
3. **Star Campaigners:** Up to 20 star campaigners allowed during elections.
4. **Donation Transparency Requirements:**
   - Maintain records of donors giving above ₹20,000.
   - Accept donations above ₹2,000 only via cheque/bank transfer.

As per **Section 29C of the RP Act**, failure to furnish these details will result in losing income tax exemption. The RUPPs under the **Income Tax Act, 1961**, are further required to accept donations in excess of ₹2000 only through cheque or bank transfers.

Why is ECI de-listing these parties?

- As per ECI notification, there are more than 2,800 RUPPs in India as of May 2025. However, only around 750 of them contested the 2024 general elections. It has resulted in the moniker — 'letter pad parties' — for the rest of the RUPPs.

Provision for de-listing

- The RP Act does not confer explicit powers on the ECI to de-register any political party if it fails to contest elections, conduct inner-party elections or lodge requisite returns.
- However, **the Supreme Court in Indian National Congress versus Institute of Social Welfare & Ors (2002) had held that the ECI does not have the power to de-register any political party under the RP Act.** It may de-register only under exceptional circumstances such as the registration being

obtained by fraud or the political party ceasing to have allegiance to the Indian Constitution or if it is declared unlawful by the Government.

- The ECI from time to time publishes the list of de-listed and inactive RUPPs. The notification of March 2024 (as amended till May 2025), contains the list of 281 de-listed and 217 inactive RUPPs.

Criteria for de-listing

- Parties have been de-listed after they were found to be 'non-existent' at their address even after notices from the ECI.
- Political parties that have not updated the material changes including the list of office bearers since 2014 have been classified as 'inactive'. These parties are denied the benefit of putting up candidates with a common symbol in an election.
- Inactive parties lose benefits like common symbol and tax exemptions.
- The present exercise has identified 345 RUPPs that have not contested any elections since 2019 and could not be physically located anywhere. The ECI has directed the Chief Electoral Officer of various States and Union Territories to issue show-cause notices to these RUPPs before deciding on de-listing them. This is a welcome step that would prevent such 'letter pad parties' from misusing the income tax exemptions or committing any other financial fraud.

Challenges

- **No Statutory Power:** ECI lacks legal authority to de-register parties merely for not contesting elections or lacking inner-party democracy.
- **Letter Pad Parties:** Misuse tax exemptions or serve as vehicles for financial irregularities.
- **Inner-party Democracy Deficit:** Most parties do not conduct internal elections or follow democratic norms.

Way Forward

- **Law Commission Recommendations:**
  - *255th Report (2015):* Amend RP Act to allow de-registration of parties not contesting for 10 consecutive years.
  - *170th & 255th Reports:* Strengthen provisions ensuring inner-party democracy.
- **ECI Electoral Reforms (2016)** Suggested empowering ECI to de-register non-compliant parties.

Legislative changes needed to ensure only active, democratically functioning parties benefit from registration.Regular audits and mandatory updates of office bearer details to maintain active status.

Conclusion

The ECI's current de-listing exercise is a significant clean-up initiative against misuse of political party registration. However, tt may not be ideal for an independent constitutional authority like the ECI to be involved in the muddle of party politics. However, as suggested by the Law Commission in its 170th and 255th report, the RP Act can be suitably amended to contain specific provisions for ensuring internal democracy in political parties, thereby strengthening India's electoral integrity.

SCO SUMMIT 2025

Introduction (Context)

India has refused to sign a joint statement at the Shanghai Cooperation Organisation (SCO) summit in China as it did not reflect the country's concerns on terrorism. Hence, discussing about SCO and its relevance.

What is SCO?

The **Shanghai Cooperation Organisation (SCO)** is a **regional intergovernmental organisation** founded to promote **political, economic, and security cooperation** across Eurasia. It is often described as a **Eurasian political, economic, and security alliance**, aiming to build mutual trust, combat terrorism, and enhance connectivity among member states.

Member Nations

The SCO is a grouping of 10 countries, including India, China, Russia, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran, and Belarus. The **roots of the SCO lie in the "Shanghai Five"** formed in 1996, consisting of China, Russia, Kazakhstan, Kyrgyzstan and Tajikistan.

Observer States: Afghanistan, Belarus, and Mongolia.

Dialogue Partners: Includes countries like Turkey, Sri Lanka, Nepal, and others seeking closer cooperation with SCO.

Why was SCO formed?

- With the dissolution of the USSR in 1991 into 15 independent countries, there were concerns in the region about extremist religious groups and ethnic tensions coming to the fore. To manage these issues, a grouping was created for cooperation on security matters.
- **Key Objectives**
  - Strengthen **mutual trust and neighbourliness**.
  - Promote **regional peace, security, and stability**.
  - Combat **terrorism, extremism, and separatism**.
  - Enhance **economic cooperation, connectivity, and cultural exchanges**.
- The SCO is one of the few international organisations with primarily Asian members that deals with security issues. Its Regional Anti-Terrorist Structure (RATS) regularly holds meetings and exchanges information.

Relevance of SCO

- Acts as a **counterbalance to Western alliances** like NATO in Eurasia.
- Provides a platform for India, China, and Pakistan to engage despite bilateral tensions.
- Enhances **regional connectivity projects**, e.g. China's Belt and Road Initiative (BRI) and India's International North South Transport Corridor (INSTC)
- Conduct Successful **"Peace Mission" joint military exercises** to enhance anti-terror capabilities.
- Established the **Regional Anti-Terrorist Structure (RATS)** in Tashkent to coordinate intelligence on extremism.
- Promoted **trade facilitation and regional connectivity projects**.
- Increased **student exchanges**, tourism promotion, and cultural festivals strengthening people-to-people ties.

- Launched the **SCO Digital Integration Platform** to promote fintech and e-commerce linkages.
- Initiated **joint disaster management drills** in Central Asia in response to increased climate-related disasters.

Recent Summit

- India has refused to sign a joint statement at the Shanghai Cooperation Organisation (SCO) summit in China as it did not reflect the country's concerns on terrorism.
- In the recent Pahalgam terror attack, victims were shot after they were profiled on religious identity. The Resistance Front, a proxy of UN-designated terror group Lashkar-e-Taiba (LeT) claimed responsibility for the attack. India follow zero tolerance policy on terrorism.
- When the SCO draft statement did not mention Pahalgam but talked about the train hijacking in Balochistan, India has refuled to sign the statement.

Significance

- Traditionally, **Russia and China have dominated the SCO**. With Russia's focus diverted due to the **Ukraine war since 2022**, **China's influence has increased**, especially as the **2025 SCO chair**.
- **Further, Pakistan remains a key ally of China**. Beijing has provided **military aid to Pakistan**, particularly after **Operation Sindoor**. China also uses its **global clout to shield Pakistan** from adverse international resolutions.
- In this context, **India's refusal to sign the SCO draft document** gains significance. No **joint statement** was issued at this year's SCO meeting because **India did not agree**.
- India reiterated its stance of **'no compromise on terrorism'**, highlighting that **business as usual is not possible with nations supporting terrorism**.

Challenges faced by SCO

- India-Pakistan and India-China tensions limit consensus building, as seen in the stalled SCO connectivity masterplan in 2025.
- Russia-China growing dominance raises concerns among smaller Central Asian states about sovereignty and equal say.
- Despite frameworks, intra-SCO trade remains low due to **lack of infrastructure harmonisation and tariff barriers**.
- Continued security threats, narcotics trafficking, and refugee influx remain unresolved despite SCO's outreach efforts.
- Duplication of objectives with organisations like CSTO, EAEU, and BRICS dilutes focus and resources.
- Member states' differing alignments with the US, EU, and other blocs hinder deeper strategic cohesion.

Conclusion

The SCO remains a **crucial regional platform** for fostering security and economic cooperation in Eurasia. However, its effectiveness is constrained by **internal rivalries, unequal capacities, and geopolitical complexities**. Going forward, its ability to address **new age challenges such as digital governance, climate resilience, and inclusive connectivity** will determine its relevance in shaping Eurasia's strategic future.

CRITICAL ANALYSIS OF SAARC

Introduction (Context)

South Asia is among the least economically integrated regions globally. Despite geographic proximity and shared history, **intra-regional trade** under **SAFTA** accounts for **just 5–7%** of South Asia's total trade—much lower than **EU (45%)**, **ASEAN (22%)**, or **NAFTA (25%)**. **Current intra-SAARC trade** stands at **$23 billion**, compared to a potential of **$67 billion** or more (UNESCAP).

Rising **economic nationalism**, **border disputes**, and **terror threats** undermine regional cooperation. This lack of integration has deep implications for both economic growth and national security..

What is SAARC?

- **South Asian Association for Regional Cooperation (SAARC)**, established in **1985**, is a regional organization aimed at promoting **economic, cultural, and political cooperation** in South Asia.
- Member countries: **Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka**.
- These nations together form one of the world's most populous regions and share deep cultural, historical, and economic ties.
- Among them, India plays a dominant role—both as an economic powerhouse and as a geopolitical influencer.

Current Status/challenges in SAARC

- South Asia accounts for **25% of the world's population** but only **$5 trillion in GDP**. In contrast, **EU (5.8% of global population)** has a GDP of **$18 trillion**, and **NAFTA** has **$24.8 trillion**
- South Asia's **trade-to-GDP ratio fell from 47.3% (2022) to 42.9% (2024)**. Trade costs within the region are **114% of the goods' value**, higher than with the U.S. (109%)
- Economic instability **fuels unrest**; unrest and conflict **disrupt trade**. Example: **India-Pakistan trade** fell from **$2.41 billion (2018)** to **$1.2 billion (2024)** due to terrorism and border tensions.
- A study by UNESCAP estimated that South Asia's trade potential could have reached **$172 billion by 2020. However, actual intra-SAARC trade stood at just $23 billion—less than a third of its potential. This unexploited capacity is highest in countries like Bangladesh (93% untapped), Maldives (88%), Pakistan (86%), and Nepal (76%).**
- Furthermore, the region faces widening trade deficits, with the cumulative deficit expanding from $204.1 billion in 2015 to $339 billion in 2022. All of this is happening even as overall trade volume (imports + exports) increased to $1,335 billion in that period.
- But perhaps the most pressing concern is the **cost of intra-regional trade**. It is 114% of the value of goods exchanged—more expensive than trading with the United States, despite its geographic distance. For example, it costs a company in India **20% more** to trade with Pakistan than with Brazil, which is 22 times farther away. This cost inefficiency discourages businesses from forming regional value chains and limits competitiveness. In contrast, intra-regional trade costs in ASEAN are only 76%, incentivising tighter economic cooperation and interdependence.
- Agreements are routinely signed but rarely implemented.
- Summits are postponed indefinitely due to bilateral tensions.
- Important initiatives like the SAARC Motor Vehicles Agreement or the South Asian University are either non-functional or underfunded.
- The failure to institutionalise decision-making and enforcement mechanisms has made SAARC largely symbolic.

Causes

- Border disputes, terrorism, and weak transport and trade infrastructure have led to the deterioration of key bilateral trade relationships most notably between India and Pakistan, but also with Nepal and Sri Lanka.
- This fragmentation reduces the ability of countries to benefit from economies of scale, regional supply chains, or cross-border innovation networks.

Steps needed

To revive South Asian economic integration, a multipronged approach is necessary:

1. **Reform and Strengthen SAARC Mechanisms**: Agreements like SAFTA must be implemented in letter and spirit. Trade liberalisation should not remain symbolic but must lead to real reductions in tariffs, simplification of trade procedures, and mutual recognition of standards.
2. **Invest in Cross-Border Infrastructure**: Building transport corridors, energy grids, and digital connectivity can reduce the cost of doing business and foster regional value chains. India's initiatives under BBIN (Bangladesh, Bhutan, India, Nepal) and BIMSTEC should be expanded and synergised with SAARC goals.
3. **Depoliticise Trade Relations**: Economic collaboration must be delinked from political hostility. While political dialogue is crucial, countries must not hold trade hostage to diplomatic deadlocks.
4. **Encourage People-to-People Links**: Strengthening academic exchanges, tourism, and civil society partnerships can rebuild trust, which is the foundational requirement for regional cooperation.
5. **Focus on Trade in Services and Digital Economy**: South Asia has a huge untapped potential in sectors like tourism, fintech, digital health, and education. Regional frameworks must facilitate cross-border investment and collaboration in these emerging areas.

Conclusion

SAARC had the aimof ending distrust and tension, but trust deficits and regional conflicts hinder the full implementation of agreements such as SAFTA. Political diversity, regional disputes, minority issues and terrorism are major obstacles to regional cooperation. Most SAARC countries are in conflict with each other, preventing effective regional integration. Lesser trade opportunity means lesser capacity for innovation, production and investment in the people of the country. Therefore, to exploit the full potential of the South Asian region, members must work actively to enhance intra-regional trade, keeping aside their bilateral conflicts.

RISK OF NUCLEAR RADIATION IN IRAN

Introduction (Context)

Recently, the **United States has launched airstrikes on three major Iranian nuclear sites** — Fordow, Isfahan, and Natanz. These attacks followed similar strikes by **Israel** earlier in the same week, which also targeted Iran's nuclear infrastructure, notably the **Natanz facility**.

The facilities targeted are **key uranium enrichment centres**, critical to Iran's ability to produce **Highly Enriched Uranium (HEU)** — material with potential use in nuclear weapons. The strikes raised fears of a **nuclear explosion or radiation disaster.**

About the Nuclear Facilities

- **Fordow, Isfahan and Natanz nuclear facilities** are uranium enrichment sites that house the infrastructure to convert natural uranium into highly-enriched uranium (HEU) that can potentially be used to make a nuclear bomb.
- Enrichment is the process of increasing the concentration of **Uranium-235 (U235)** in a sample of natural uranium which is primarily more than **99 per cent Uranium-238 (U238).**
- It is only U-235 that is fissile, meaning its nucleus is susceptible to being broken (fissionable) through a process that produces energy, and is capable of sustaining a chain reaction. An enrichment of 3-5 per cent is adequate for producing electricity in nuclear power stations, but for making nuclear weapons, HEU, which has concentrations of 90 per cent or more of U235, is required.

However, the attack did not led to nuclear explosion.

Why There Was No Nuclear Explosion

- **Nuclear weapons require precise triggering mechanisms** to initiate a chain reaction.
- The explosion occurs when **U-235 or Plutonium-239 nuclei undergo uncontrolled fission**, releasing massive energy.
- This process demands **Specific geometric arrangement of fissile material** and p**recise timing and conditions for neutron initiation**.
- **Strikes on nuclear facilities cannot trigger such a controlled reaction**, as:
    - The material is not in weapons-ready form.
    - The infrastructure required to trigger the explosion is not present.
    - Fissile material under stress or attack cannot detonate like a bomb.

Difference Between Nuclear Bombs and Traditional Explosives

Traditional Explosives

- Traditional bombs use chemical explosives like TNT, RDX, etc.
- These bombs are designed to **explode on impact**, such as when dropped from an aircraft or launched from a missile.
- It can also detonate due to **heat, pressure, or friction**. This makes them prone to **accidental explosions**, even in storage.
- Stored chemical explosives can **detonate if struck** by other weapons or fire.

Nuclear Weapons

- Nuclear weapons release energy through a **nuclear fission or fusion reaction**, not through chemical combustion.
- They are designed to **detonate mid-air**, not upon physical impact.
- The explosion occurs in **milliseconds**, heating the surrounding air to **millions of degrees Celsius**.
- The heat causes the air to rapidly expand, generating **blast waves** that cause most of the physical destruction.
- Nuclear detonations emit **electromagnetic radiation** (including gamma rays), contributing to massive damage beyond the immediate blast.

Threat of Nuclear Radiation

- Nuclear facilities, by their very nature, store a lot of radioactive substances such as Uranium in solid, liquid, and gaseous forms, **Uranium hexafluoride (UF6)** used in gas centrifuges, which is toxic and reactive and radioactive dust and waste from enrichment processes.
- Radioactive substances are unstable and release radiation over time. Some of these radiations, like gamma rays, are extremely harmful. They can penetrate the skin, damage cells and DNA, and can cause cancer.
- These radioactive substances are stored, and handled, in carefully designed containers in any nuclear facility. These facilities are constructed in ways to minimise the risk of any leak of radioactive substances in outer environment or in sources of water or food.
- **Nuclear radiation refers to the energy and particles** released from the nucleus of an atom during radioactive decay. This radiation can be in the form of electromagnetic waves or high-speed charged particles.
- **Types of Radiation**: Nuclear radiation can be categorized into different types, including:
- **Alpha particles:** Relatively large, positively charged particles that can be stopped by a sheet of paper or clothing.
- **Beta particles:** High-speed electrons or positrons that can penetrate a few millimeters of aluminum.
- **Gamma rays:** High-energy electromagnetic waves that can pass through many materials and require dense materials like lead for shielding.
- **Neutrons:** Subatomic particles that can penetrate materials and cause further reactions.

Impact of nuclear radiation

Health Impacts on Humans

1. **Cellular and DNA Damage**
    - Radiation, especially **gamma rays**, can penetrate deep into the body, damaging cells and altering DNA.
    - This leads to mutations, cancers, and genetic defects.
2. **Acute Radiation Syndrome (ARS)**
    - High doses over a short period cause **nausea, vomiting, skin burns, internal bleeding**, and may lead to death.
3. **Long-Term Effects**
    - Prolonged exposure to lower doses increases the risk of **leukemia, thyroid cancer, and other malignancies**.
    - Children and fetuses are especially vulnerable to developmental disorders.
4. **Reproductive and Genetic Effects**
    - Exposure may cause **infertility, miscarriages**, or **heritable genetic mutations** passed to future generations.
5. **Psychosocial Effects**
    - Fear of exposure and displacement often causes **anxiety, depression**, and **social trauma**, as seen post-Chernobyl and Fukushima.

Environmental Impacts

1. **Air Contamination**
   - Radioactive isotopes (like Cesium-137, Iodine-131) can disperse in the atmosphere, affecting vast areas.
2. **Soil and Water Pollution**
   - Radiation can contaminate **soil**, rendering land **unusable for agriculture** for decades.
   - Leaching into **groundwater or rivers** leads to long-term ecological toxicity.

3. Impact on Flora and Fauna

- Radiation can cause **mutations in animals and plants**, disrupt food chains, and reduce biodiversity.
- Some species may die off or exhibit abnormalities over generations.

4. Bioaccumulation in Food Chains

- Radioactive elements accumulate in organisms (like fish or livestock), entering the **human food chain** and posing **chronic health risks**.

5. Long-Term Ecological Inaccessibility

- Heavily contaminated zones (like **Chernobyl Exclusion Zone**) remain **uninhabitable for decades to centuries**, altering human settlement patterns.

Examples

- **Chernobyl (1986)**: Massive release of radioactive materials led to widespread cancer and ecological damage across Europe.
- **Fukushima (2011)**: Tsunami-triggered reactor meltdown caused leakage into air and Pacific Ocean, raising global concerns.
- **Marshall Islands (1950s)**: US nuclear tests caused long-term genetic damage and made entire islands uninhabitable.

Value addition: USA used Bunker Buster for attack

GBU-57 MOP ('Bunker Buster')

- Designed to destroy deeply buried and fortified underground targets, including WMD sites.
- It is considered the most powerful **non-nuclear bomb**.
- **Specifications**:
- Length: ~20.5 feet; Diameter: ~31.5 inches.
- Weight: ~13,000 kg.
- Penetration: Up to 60 metres of earth before detonation.

B-2 Spirit Stealth Bomber

- Strategic stealth bomber designed to **penetrate enemy air defenses** and deploy precision-guided munitions.
- It is the only aircraft capable of carrying **two MOPs simultaneously**.
- Known for its **stealth capability** (low radar, visual, acoustic, and infrared signature).
- Range: ~9,600 km (unrefueled), >19,000 km (with mid-air refueling).
- Enhances US nuclear deterrence and strategic strike capability without using nuclear weapons.
- Its **stealth and long-range abilities** make it one of the most potent offensive air assets globally.

Conclusion

The **International Atomic Energy Agency (IAEA)** is the global nuclear watchdog. After the strikes, the IAEA confirmed there is n**o off-site radiation increase** and continuous monitoring is underway to assess safety. The IAEA also plays a crucial role in **inspecting nuclear facilities**, ensuring compliance with safety protocols and responding to radiation emergencies.

ECI'S NEW SOP FOR EVM CHECKING AND VERIFICATION

Introduction (Context)

The Election Commission of India (ECI) has issued a revised standard operating procedure (SOP) for the checking and verification of electronic voting machines (EVMs), which second- and third-placed candidates in an election can opt for, following directions from the **Supreme Court (SC)**.

Supreme Court Judgment

- In a landmark judgment on **April 26, 2023**, the SC rejected a plea for 100% VVPAT slip counting but allowed **second and third-placed candidates** in an election to seek verification of EVMs.
- The **first SOP (2024)** allowed verification of **burnt memory/microcontroller** of up to **5% of EVMs** through mock polls.
- Petitioners like the **Association for Democratic Reforms (ADR)** raised concerns, especially about the **erasure of data** and **lack of scrutiny of Symbol Loading Units (SLUs)**.
- On **May 7, 2025**, the SC accepted ECI's proposal to revise its SOP and preserve data.

What are EVM?

- Electronic Voting Machine (also known as EVM) is voting using electronic means to either aid or take care of the chores of casting and counting votes.
- An EVM is designed with two units: the control unit and the balloting unit. These units are joined together by a cable. The control unit of the EVM is kept with the presiding officer or the polling officer. The balloting unit is kept within the voting compartment for electors to cast their votes. This is done to ensure that the polling officer verifies your identity. With the EVM, instead of issuing a ballot paper, the polling officer will press the Ballot Button which enables the voter to cast their vote. A list of candidates names and/or symbols will be available on the machine with a blue button next to it. The voter can press the button next to the candidate's name they wish to vote for.
- First introduced in 1982 (Kerala); used extensively in all Lok Sabha and State Assembly elections since 2004.

Benefits:

- Faster vote recording and counting compared to paper ballots.
- Minimizes **invalid votes**, human errors, and ballot manipulation
- Reduces paper usage; cost-effective over time.
- **Standalone (non-networked)** devices; no internet/Bluetooth connectivity, hence tamper proof
- Built-in **self-check mechanisms** to detect malfunction.

What are VVPAT?

- VVPAT stands for Voter Verified Paper Audit Trail. It's a mechanism that allows voters to verify if their vote has been cast correctly.

- When a person vote using an Electronic Voting Machine (EVM), the VVPAT system generates a paper slip. This slip shows the symbol of the party the person voted for. The slip automatically drops into a sealed box, ensuring that it can't be tampered with.

Benefits:

- The primary purpose of VVPAT is to make the voting process as transparent as possible. By allowing voters to verify their own votes, it builds trust in the electoral system. Voters can leave the polling booth with confidence that their vote has been correctly recorded and counted.
- Errors and malfunctions can occur in any system, including EVMs. VVPAT provides a way to cross-check the electronic tally with the paper slips, ensuring that the final count is accurate. If there's a discrepancy between the EVM count and the paper slip count, the paper slips can be used for a recount.
- Knowing that every vote is backed up by a paper slip that can be manually counted makes it much harder for anyone looking to tamper with the election results. The existence of VVPAT acts as a strong deterrent to fraud and manipulation.

What is the New SOP?

Data Preservation:

- ECI will **not delete data** from EVMs or Symbol Loading Units that are under verification.
- **SLU data** used to upload symbols on VVPATs will also be retained.

Revised Charges:

- Candidates can opt for: **Self-diagnostic test only**: ₹23,600 per EVM set and **Self-test + mock poll**: ₹47,200 per set.

Candidate Participation:

- Candidates may choose to use either: The **already-loaded symbols** on VVPAT, or **Reload the original symbols** from Symbol Loading Unitsfor the mock poll.

Mock Poll Procedure:

- **BEL/ECIL engineers** will activate Ballot Unit, Control Unit, and VVPAT in candidate presence.
- **No errors** in self-diagnostic test → proceed with mock poll (up to 1400 votes).

Retention of Records:

- All related records (VVPAT slips, video footage, etc.) to be stored for **3 months**(earlier: 1 month).

Significance of the SOP

- Strengthens **electoral transparency and accountability**.
- Empowers losing candidates with **technical verification rights**.
- Addresses concerns over **tampering at symbol loading stage** (SLU).
- Reflects **judicial-ECI collaboration** in upholding voter confidence.

Criticism

According to **ADR**:

- The process merely replicates **routine pre-election tests**.
- It lacks the **spirit of thorough independent verification**.
- Switching on machines and mock polls don’t guarantee **tamper-proof assurance**.

Terminologies

Symbol Loading Unit (SLU): A device used to upload the symbols of contesting candidates onto the VVPAT machines before polling.

- **Ballot Unit (BU):** The part of the EVM where the voter presses the button to cast their vote for the desired candidate.
- **Control Unit (CU):** The component of the EVM operated by polling officials to enable voting and store vote data securely.
- **Self-Diagnostic Test:** An automatic check run by EVMs during setup to detect internal errors or malfunction before polling begins.
- **Association for Democratic Reforms (ADR):** A non-profit electoral watchdog in India known for advocating transparency, accountability, and electoral reforms.
- **Burnt Memory / Microcontroller:** The non-rewritable memory in an EVM where final vote data is stored; crucial for verifying that vote counts were not tampered with post-poll.

MAID WARFARE – MISSILES

Introduction (Context)

- Conflicts in **2025** – including **Israel-Iran hostilities**, **India-Pakistan drone strikes**, and **Ukraine-Russia AI drone warfare** – reveal the emergence of a new warfare model driven by **Missiles, Artificial Intelligence (AI), and Drones (MAID)**.
- The MAID era marks a fundamental transformation in military strategy, accessibility of high-impact tools, and international security architecture.

What is MAID Warfare?

- **M – Missiles**: Long-range precision weapons capable of striking strategic targets.
- **A – Artificial Intelligence (AI)**: Software algorithms enabling automated decision-making in combat.
- **I – Intelligence (Machine-Based)**: Enhances surveillance, target acquisition, and battle planning.
- **D – Drones**: Unmanned Aerial Vehicles (UAVs) used for reconnaissance and attack missions.

Key Features of MAID Warfare

1. Low-Cost, High-Impact Combat

- Traditional systems (e.g., fighter jets like F-35) cost over $100 million.
- Drones cost under $50,000 and can be operated remotely.
- Reduces entry barriers for countries and non-state actors to engage in advanced warfare.

2. Remote Operations

- Operators can launch strikes from **hundreds or thousands of kilometers away**.
- Reduces risk to military personnel, encourages frequent usage of force.

3. High Precision and Rapid Strike Ability

- AI and machine learning enable real-time identification and targeting.
- Example: **India's precision strikes on Pakistani terror camps** avoided civilian casualties.

4. Speed of Decision-Making

- Algorithms can act **faster than human response time**.
- Wars could escalate within **minutes**, bypassing human deliberation or diplomacy.

5. Psychological Detachment

- Distant, screen-based operations lower the emotional barrier for use of lethal force.
- Converts military aggression into **political spectacle** for public consumption.

Ethical, Legal, and Strategic Concerns of MAID Warfare

1. **Lack of Legal Frameworks**

- **International Humanitarian Law (IHL)**, including the **Geneva Conventions**, was created for conventional warfare involving human soldiers and identifiable weapons.
- These laws **do not address AI-based, autonomous, or unmanned systems**, which are central to MAID warfare.
- The absence of regulation makes it difficult to ensure compliance with basic humanitarian principles like distinction and proportionality.

2. **Erosion of Deterrence Logic**

- Traditional military deterrence is based on **high economic, political, and human costs** of war (e.g., nuclear weapons).
- MAID technologies are **low-cost** and **remotely operated**. Allow nations to use force **without risking soldier lives** or facing domestic backlash.
- **Crisis stability is weakened**, as states may engage in preemptive or symbolic strikes.

3. **Breakdown of International Institutions**

- **United Nations (UN)** and its organs (like the UN Security Council) are struggling to regulate or respond to new forms of warfare.
- Powerful nations **bypass UN authority**, acting unilaterally using drones and AI-based strikes.
- No **binding international agreement** on use of **lethal autonomous weapons systems (LAWS)**.

4. **Accountability Crisis**

- When a war crime is committed by a **machine or algorithm**, traditional accountability frameworks fall apart.
- Autonomous warfare blurs the chain of command, making it difficult to uphold justice or pursue war crime investigations.

Risks Ahead

- **Escalation without Control**: Wars could start or spiral before diplomacy even reacts.
- **Technology Outpacing Governance**: No equivalent development in legal or diplomatic safeguards.
- **Non-State Actor Empowerment**: Terrorist groups and rebels can now acquire battlefield-grade capabilities.

Value addition: Terminologies

- Geneva Conventions: **A set of international treaties that establish the** standards of humanitarian treatment during war**, focusing on the protection of civilians, wounded soldiers, and prisoners of war. First adopted in 1864 and expanded in later years.**
- Lethal Autonomous Weapons Systems (LAWS): **Weapons systems that can** select and engage targets without direct human intervention**, using artificial intelligence to operate independently on the battlefield. They raise legal, ethical, and accountability concerns in modern warfare.**

Conclusion

MAID is not a future threat it is a **present danger**. International community must develop **new global treaties and laws** for autonomous and AI warfare. Establish **ethical frameworks** for usage of drones and precision strikes. Reinforce multilateral institutions like the **UN** to manage emerging security risks. Otherwise, the **precision and remoteness** of MAID warfare may make **conflicts more frequent, cheaper to start, and harder to stop**.

EMPOWERING WOMEN IN AGRICULTURE

Introduction (Context)

The United Nations General Assembly has declared 2026 as the International Year of the Woman Farmer, supported by over 100 countries. This move recognizes the vital yet underappreciated role of women in agriculture and seeks to raise awareness about the challenges they face.

Role of Women in Agriculture

- Women play a significant and crucial role in agricultural development and allied fields.
- With growing rural to urban migration by men, there is '**feminisation' of agriculture sector**, with increasing number of women in multiple roles as cultivators, entrepreneurs, and labourers.
- Mainly rural women are engaged in agricultural activities in three different ways depending on the socio-economic status of their family and regional factors. **They work as:**
    - Paid Labourers.
    - Cultivator doing labour on their own land.
    - Managers of certain aspects of agricultural production by way of labour supervision and the participation in post harvest operations.
    - **The types of agricultural activities taken up by women include the following** : Sowing, Nursery management, Transplanting, Weeding, Irrigation, Fertilizer application, Plant protection, Harvesting, winnowing, storing etc.

Data:

- **As per Census 2011, out of total female main workers, 55 per cent were agricultural labourers and 24 per cent were cultivators.**
- However, only 12.8 per cent of the operational holdings were owned by women, which reflect the gender disparity in ownership of landholdings in agriculture. Moreover, there is concentration of operational holdings (25.7 per cent) by women in the marginal and small holdings categories.
- The workforce participation rate for rural females is higher at 30.5 percent against urban women participation rate of 20.20 percent (MoSPI, 2022-23).
- **As per the Annual Periodic Labour Force Survey (PLFS) Report 2022-23,** agriculture had the highest estimated percentage distribution of female workers, i.e. 64.3 %, with 76.2 % in rural areas and 11.7 % in urban areas.
- In India, 80% of economically active women are employed in agriculture.
- Only 14% of agricultural landowners in India are women. As per NFHS-5, female land ownership is only 8.3%.

Issues faced by Women in agriculture

1. Land Ownership and Financial Access

- Limited land ownership prevents women from accessing **credit**, **insurance**, and **government subsidies**.
- **Microfinance and SHGs** offer small-scale support, but are insufficient for larger investments.

2. Access to Information and Technology

- Women have **limited access to mobile phones** and agricultural advisories.
- This leads to **low adoption of technology** and poor resilience-building.

3. Impact of Climate Change

- Women face **greater climate vulnerability** due to added domestic responsibilities and fewer resources.
- Their exposure to **agriculture-related climate risks** is disproportionately higher.

4. Lack of Infrastructure

- A large number of women farmers operate at the subsistence and smallholder level, and a disproportionate share of the agricultural production is left in their hands.
- With little or no access to modern improved technologies, there is a huge problem to secure them reasonable investments in capital, inputs and labor.

Government Initiatives

1. **Mahila Kisan Sashaktikaran Pariyojana (MKSP):** Aims to upgrade skills, enhance resource access, and promote sustainable agriculture among women farmers.

2. **Sub-Mission on Agricultural Mechanisation**: **Provides** 50%–80% subsidies **for machinery purchase by women farmers**.

3. **National Food Security Mission:** Allocates 30% of its budget **to women farmers in various States/UTs.**

4. National Mission on Natural Farming (NMNF): Promotes sustainable farming practices through *women-led Self Help Groups (SHGs)* like **Krishi Sakhis** and **Pashu Sakhis**. Empowers women by involving them in the entire agricultural value chain—from pre-production to post-production.

5. **Agricultural Technology Management Agency (ATMA) Scheme:** Targets the gender gap in agricultural extension services. Promotes **Farm Women's Food Security Groups (FSGs)** - 2 per block annually with ₹10,000 support per group. Reserves **30% of scheme beneficiaries and resources** for women farmers.

6. **Central Sector Scheme of Agri-Clinics and Agri-Business Centres (AC&ABC)** of the Ministry of Agriculture and Farmers' Welfare: **Women entrepreneurs** are eligible for a **44% subsidy**, compared to **36% for others**.

Case Study: Project ENACT, Assam

Implemented in **Nagaon district**, Assam, ENACT empowers women farmers through access to climate-resilient solutions and localized advisories.

Key Features:

- **Weekly mobile advisories** sent to 300+ women farmers in 17 villages.
- **Climate Adaptation Information Centres** support video conferencing and agri-awareness.
- Promotion of **flood-resistant rice varieties** and **nutrition-sensitive crops**.
- Collaboration with **agricultural universities** and **government departments** for climate-resilient seeds and knowledge.

Value addition

Women's empowerment in agriculture index

- **The Women's Empowerment in Agriculture Index (WEAI**) measures the empowerment, agency, and inclusion of women in the agriculture sector in an effort to identify ways to overcome those obstacles and constraints.
- The Index is a significant innovation in its field and aims to increase understanding of the connections between women's empowerment, food security, and agricultural growth.
- It measures the roles and extent of women's engagement in the agriculture sector in five domains:
  - decisions about agricultural production,
  - access to and decision making power over productive resources,
  - control over use of income,
  - leadership in the community, and
  - time use.
- It also measures women's empowerment relative to men within their households.
- It is published by **International Food Policy Research Institute (IFPRI)** in collaboration with **USAID** and **Oxford Poverty and Human Development Initiative (OPHI)**.

Gender Parity Index (GPI):

- WEAI includes a **Gender Parity Index** that measures the relative empowerment of women compared to men in the same household.
- Helps assess whether women have equal decision-making power.

Way Forward

1. Gender-Sensitive Policy Design

- Policies must **incorporate gender-disaggregated data** to reflect women's realities.
- Farming tools, extension services, credit products must be **designed for women**.

2. Strengthening Agri-Value Chains

- Women-managed value chains should be **supported and scaled**.
- **Collective action and SHGs** can be strengthened to enhance market access.

3. Promoting Resilience and Sustainability

- Invest in **climate-smart practices**, **livelihood diversification**, and **nutrition-focused farming**.
- Promote **community seed systems** and localized advisory networks.

Conclusion

The declaration of 2026 as the International Year of the Woman Farmer offers a **historic opportunity** to recognize and support women in agriculture. Strengthening their role can ensure **food security**, **climate resilience**, and **gender equality**, making agriculture truly inclusive and sustainable.

PAPER 3

INDIA'S WATER CRISIS

Introduction

- India faces a growing water crisis affecting economic growth, agriculture, cities, and public health.
- The country holds 18% of the world's population but has only 4% of global freshwater resources.
- Water stress is aggravated by population growth, mismanagement, pollution, and climate change.
- The crisis is already evident through falling water tables, erratic rainfall, and urban shortages.

Current Status and Alarming Indicators

- According to NITI Aayog (2018), nearly 600 million Indians face high to extreme water stress.
- By 2030, India's water demand may double, creating a 40% supply gap.
- India ranks 13th among the world's 17 most water-stressed countries (World Resources Institute).
- Over 60% of irrigation and 85% of drinking water depends on groundwater, which is fast depleting.
- The 2024 Groundwater Quality Report found 70% of India's water sources are contaminated.

Climate Change and Its Impact on Water Resources

- Climate change has increased the unpredictability of monsoons vital for 55% of India's agriculture.
- A 2024 CEEW study found 55% of tehsils saw a 10% increase in extreme rainfall, triggering floods.
- Simultaneously, 33% of India's land is drought-prone, with declining soil moisture in 48% of the area (Conscious Planet, 2024).
- Himalayan glaciers are melting faster, affecting rivers like the Ganga and Indus that support millions.
- The World Bank projects that climate-related water scarcity could cut India's GDP by up to 12% by 2050.

Agricultural Vulnerability and Water Mismanagement

- **Agriculture uses 80% of India's freshwater**, making it most exposed to water shortages.
- **The Economic Survey (2018–19) reported** that a 100mm drop in rainfall reduces farmer income by 15% (kharif) and 7% (rabi).
- Climate change could reduce agricultural incomes by 15–18%, and by up to 25% in unirrigated regions.
- Water-intensive crops like rice and sugarcane continue to dominate due to price and policy incentives.
- Micro-irrigation, which can reduce water use by 50%, covers only 9% of cultivated land.
- **The Atal Bhujal Yojana promotes groundwater management** but covers only 8,000 gram panchayats in 7 states — inadequate for the scale of the crisis.

Urban Water Distress

- Cities like Bengaluru, Chennai, and Delhi are facing seasonal water shortages and infrastructure failures.
- In 2019, Chennai's reservoirs dried up completely, leaving millions without water access.

- **NITI Aayog predicts** that 21 cities, impacting over 100 million people, could deplete groundwater by 2030.
- Urban over-extraction, lack of rainwater harvesting and poor planning exacerbate the problem.

Public Health and Water Quality Concerns

- **Contaminated water** causes around 2,00,000 deaths annually from waterborne diseases (NITI Aayog, 2018).
- **Fluoride and arsenic** affect 230 million people across 19 Indian states.
- **Untreated sewage** continues to pollute rivers like the Yamuna, making them unsafe for use.
- **The World Bank's "One Health"** model — integrating environmental, animal, and human health — could save billions, but implementation is sluggish.

Existing Policy Framework and Gaps

- **The National Water Mission aims** to increase water-use efficiency by 20% by 2025, but lacks tracking systems.
- **CEEW has proposed water accounting** to monitor savings and direct water to critical sectors.
- India's adaptation funding is only ₹260 per capita (2019–20), compared to ₹2,200 for mitigation.
- **Financial tools** like climate bonds and the 2023 Green Credit Programme can help mobilize funds.
- International partnerships, such as the World Bank's $1 billion dam rehabilitation and ADB's $50 million loan for Meghalaya's water harvesting, show promise.
- However, the global water financing gap is $6.7 trillion by 2030 — demanding private sector involvement similar to models in Chile and Peru.

Way forward

- **Jal Shakti Abhiyan** has helped revive 1.5 lakh water bodies since 2019, but community engagement remains low. Women, who often fetch water, should be central to water governance and planning.
- **Integrated Water Resources Management (IWRM)** that is blending traditional methods, nature-based solutions, and technology is key to sustainable management.
- Policies must align across sectors water, energy, agriculture, and climate to prevent fragmented efforts. For instance, solar-powered irrigation could address groundwater depletion and reduce carbon emissions simultaneously.

Conclusion

India's water crisis is not a challenge of capacity but of intent. The tools for building a **water-secure and climate-resilient economy** already exist. What is required is bold leadership, integrated policymaking, and grassroots-level engagement. Addressing water insecurity is not just an environmental necessity but a national imperative — one that underpins our **agricultural sustainability, urban future, public health, and economic growth**. With **1.4 billion lives at stake**, delay is no longer an option.

FOOD PROCESSING SECTOR LED TO GRASS ROOT TRANSFORMATION

Introduction (Context)

A silent transformation is unfolding in rural India through the food processing sector. The food processing sector is emerging not only as a growth engine but also as a powerful tool of **rural empowerment**, **farmers' income augmentation**, and **agri-industrial integration**.

In 2014, the gross value addition of the sector stood at Rs 1.34 lakh crore. Today, following sustained policy focus and institutional drive, that figure has risen to Rs 2.24 lakh crore.

What is food processing?

- **Food Processing** refers to the transformation of raw agricultural products into consumable food or intermediate food products using physical, chemical, or biological means.
- It includes operations like **cleaning, grading, packaging, preservation**, and **value addition**.

Types:

1. **Primary Food Processing:** Focus on transforming raw agricultural products into a form suitable for further processing or consumption. **Examples:**
   - **Fruit and vegetable processing:** Washing, sorting, grading, and packaging fruits and vegetables.
   - **Dairy processing:** Separating milk components (e.g., cream, skim milk) and pasteurizing.
2. **Secondary Food Processing:** Focus on applying cooking and preservation techniques to create edible products. **Examples:**
   - **Baking:** Producing bread, cakes, and pastries.
   - **Juice extraction and concentration:** Processing fruits to extract and concentrate their juices.
3. **Tertiary Food Processing:** Focus on producing ready-to-eat or convenience foods on a large scale. **Examples:**
   - **Frozen meals:** Preparing and packaging complete meals for microwave heating.
   - **Snack foods:** Producing chips, crackers, and other packaged snacks.

Significance

- **The food processing industry act as the link between agriculture and manufacturing.**
- It employs the largest number of persons, not just in the formal sector, where it constitutes 12.38 percent of registered employees, but also in the informal sector.
- As per the **Ministry of Food Processing**, women's share of employment in registered food processing industries stood at 12.6 percent of total employment, whereas the number in the unregistered industries was almost a double and stood at 24.7 percent.
- The sector can contribute immensely to the empowerment of farmers, especially females, by providing improved bargaining power to them, leading to reduction in distress sales and ensuring steady supply to the processors.
- **The food processing industry contributes significantly** to India's GDP, accounting for a substantial percentage of the total.
- The industry is a major contributor to India's export earnings, with processed foods gaining increasing prominence in the international market.
- It attracts considerable industrial investment, further boosting economic activity and development.

- Food processing increases the value of agricultural products by transforming them into marketable goods, reducing wastage, and creating value-added products.
- By processing agricultural produce, the industry helps farmers get better prices for their products, contributing to increased income and improved livelihoods.
- Processing extends the shelf life of perishable agricultural produce, minimizing losses due to spoilage and wastage.
- **The demand for various processed foods encourages farmers to diversify their crops, reducing dependence on a few staple crops.**
- Food processing helps streamline the supply chain, ensuring a more efficient and reliable flow of agricultural products from farm to consumer.
- **Processed foods play a crucial role in making food available to a wider population**, including those in remote areas, by extending shelf life and improving accessibility.
- **Fortified processed foods** can help address nutritional deficiencies by adding essential vitamins and minerals, contributing to better public health.
- By processing and preserving food, the industry helps minimize food wastage, ensuring more food reaches consumers.

Government initiatives

- **Pradhan Mantri Kisan SAMPADA Yojana (PMKSY)**: A comprehensive scheme to boost food processing infrastructure, reduce wastage, and create employment by supporting Mega Food Parks, cold chains, and agro-processing clusters.
- **PM Formalisation of Micro Food Enterprises (PMFME)**: A ₹10,000 crore scheme under Atmanirbhar Bharat to support unorganised micro food businesses through formalisation, training, credit access, and SHG support.
- **Production Linked Incentive (PLI) Scheme for Food Processing**: Provides financial incentives to boost large-scale food manufacturing, enhance global competitiveness, and generate employment through ₹8,900 crore committed investment.
- **Operation Greens**: Initially aimed at stabilising the supply of tomato, onion, and potato (TOP), the scheme now covers 22 perishable crops to ensure fair prices and reduce wastage.
- **Agriculture Infrastructure Fund (AIF)**: A ₹1 lakh crore fund aimed at developing farm-gate and aggregation infrastructure including cold storage, packhouses, and value chains for pre-processing.
- **One District One Product (ODOP)**: Promotes unique local agro-products by providing marketing, branding, and export support, integrating districts into the national food value chain.
- **100% FDI in Food Processing Sector**: Permits full foreign direct investment under the automatic route to attract global capital and technology in food manufacturing and retail.
- **Formation of 10,000 Farmer Producer Organisations (FPOs)**: Aggregates farmers into structured collectives to enhance their bargaining power, ensure better market access, and support value chain integration.
- **National Makhana Board (2024–25 Budget)**: Announced to boost value addition, branding, and global market access for makhana and promote regional superfoods.
- **Support for Food Testing & Irradiation Infrastructure**: Establishment of 100 National Accreditation Board for Testing and Calibration Laboratories accredited labs and 50 irradiation units to improve food safety, shelf life, and export readiness.

Achievements

- Under Kisan SAMPADA Yojana Over 1,604 projects approved with ₹22,000 crore in private investment. 53 lakh farmers benefited and 7.6 lakh jobs generated.
- Under PM Formalisation of Micro Food Enterprises (PMFME) Over 1.41 lakh loans approved worth ₹11,205 crore, 3.3 lakh SHG members supported via seed capital
- Operation Greens extended to 22 perishable crops

Challenges

1. At the Farm Level:

- Lack of **awareness about quality and food safety standards**
- Absence of **processable varieties**
- Inadequate **aggregation centres and cold chains**
- Shortage of **packhouses**, refrigerated vehicles, and value-chain infrastructure
- Rising **income and organised retail** fueling demand for processed and healthier food products.
- Shift in **consumer behaviour** toward convenience, quality, and traceability.

2. Environmental & Production Risks:

- **Depleting soil health** and **water tables**
- Overuse of fertilisers and pesticides
- Need for **sustainable practices** like micro-irrigation and balanced nutrient management

Steps needed

- Invest in **cold chains**, **packhouses**, and **last-mile transport**
- Promote **FPO-led aggregation models**
- Increase awareness of **Codex Alimentarius** and global health standards
- Promote **consumer-centric innovation** with emphasis on traceability and nutrition
- Encourage **export-oriented processing** and branding of regional specialties
- Focus on **climate-smart agriculture**
- Promote **value chain partnerships** with private sector and cooperatives
- Enhance **skills and entrepreneurship** through training and incubation

Conclusion

India's food processing sector stands at the intersection of rural livelihoods, agri-exports, and innovation. With sustained reforms and institutional support, it is not just feeding India — but also branding Bharat globally. By empowering farmers, especially women, and integrating local produce with global markets, it holds the promise of **inclusive growth, employment, and food security** in the decades to come.

GDP BASE YEAR REVISION

Introduction (Context)

India will revise the base year for calculating its Gross Domestic Product (GDP) from 2011–12 to 2022–23. The revised data series will be released on **February 27, 2026**, by the Ministry of Statistics and Programme Implementation (MoSPI). This is part of a routine and necessary statistical exercise to better capture the evolving structure of the Indian economy.

What is GDP?

- **Gross Domestic Product (GDP)** in India refers to the **total monetary value of all final goods and services produced within the country's geographical boundaries** during a specific time period (quarterly or annually).
- **GDP includes only final goods and services** purchased by end-users.
- **Intermediate goods** (e.g. raw materials, parts) used in production are excluded to avoid **double counting**.
- Example: A **cricket bat** is a final good. Its components like **wood, rubber grip, adhesives**, etc., are intermediate goods not counted separately in GDP.

GDP Calculation Methods in India:

1. **Production Method**: Estimates value added across primary (agriculture), secondary (industry), and tertiary (services) sectors.
2. **Income Method**: Sums incomes earned by factors of production – wages, rents, interests, and profits.
3. **Expenditure Method**: Measures total spending on final goods and services – consumption, investment, government expenditure, and net exports.

MoSPI, under the Ministry of Statistics, uses a mix of production and expenditure approaches and incorporates data from sources like the **Annual Survey of Industries**, **MCA-21 corporate filings**, **NSSO surveys**, and **administrative data** from government departments.
Gross Domestic Product (GDP) is the most widely used indicator to assess a country's economic health and growth. Its significance extends across policymaking, investment decisions, and public welfare.

Significance of GDP

- **Measure of Economic Growth:** GDP shows whether the economy is expanding or contracting. A rising GDP indicates higher production, income, and employment levels. A declining GDP may signal recession or economic slowdown.
- **Policy Formulation and Evaluation:** Governments use GDP trends to design fiscal and monetary policies. Helps determine public spending, taxation, and interest rate decisions. Evaluates the impact of policies like Make in India, PLI scheme, or GST reforms.
- **Investment and Business Confidence:** Investors (domestic and foreign) look at GDP growth rates before making decisions. Higher GDP growth attracts FDI, boosts market sentiment, and encourages entrepreneurship.
- **Global Comparisons and Credit Ratings:** GDP helps rank countries by economic size (e.g., India is 5th largest in nominal GDP). International agencies (IMF, World Bank, credit rating agencies) use GDP to assess a country's creditworthiness and economic stability.
- **Budget and Resource Allocation:** Used in deciding tax revenues, public expenditure, and debt sustainability. It is essential for planning state-wise devolution of funds and social welfare schemes.
- **Sectoral Analysis:** GDP components (agriculture, industry, services) help identify leading and lagging sectors. Enables targeted reforms and policy support for underperforming sectors.
- **Tracking Development Goals:** GDP growth is linked to achieving national targets like: Sustainable Development Goals (SDGs), Five-Year/Decadal Economic Plans, India@100 vision, etc.

What is a GDP Base Year?

- The **Base Year** is a reference year used to compare real GDP across years, removing the impact of inflation.
- It helps calculate **real growth rates** by comparing the output of other years to the price and structural dynamics of the base year.
- Earlier, GDP base year revisions happened **once in a decade**, typically in years ending with **1**.
- This aligned with **decennial Population Census**, which provided workforce data for the **informal sector**.
- Since **1993–94**, **NSSO surveys** (Employment & Unemployment) replaced Census for workforce data.
- Consequently, base year revisions occurred **every five years** (up to 2015).
  - Current base year: **2011–12**
  - Proposed new base year: **2022–23**

Historical Timeline of GDP Base Year Revisions in India:

1. 1948–49 → 1960–61 (in 1967)
2. 1960–61 → 1970–71 (in 1978)
3. 1970–71 → 1980–81 (in 1988)
4. 1980–81 → 1993–94 (in 1999)
5. 1993–94 → 1999–2000 (in 2006)
6. 1999–2000 → 2004–05 (in 2010)
7. 2004–05 → 2011–12 (in 2015)
8. 2011–12 → 2022–23 (in 2026 - upcoming)

Rationale Behind Base Year Revisions

- They capture the changes in the way India's economy functions — new industries can be included and outdated ones removed from the calculations.
- They provide a more accurate picture of the "real" economic growth, which is the economic growth after removing the effect of inflation.
- Enables better formulation of fiscal, monetary, and social policies based on up-to-date macro trends.

Why was the base year not changed five years after 2011-12?

- In **2017**, the government announced plans to revise the **GDP base year to 2017–18**.
- Planned to use results from: **Consumer Expenditure Survey (CES)** and **Periodic Labour Force Survey (PLFS)** – replaced quinquennial Employment-Unemployment Surveys.
- **Both surveys faced issues**:
  - PLFS (2017–18) showed **unemployment at a 45-year high**.
  - CES indicated a **rise in poverty** (decline in consumer spending).
- **Government questioned data quality** and rejected CES findings; PLFS was accepted only after 2019 elections.
- Due to **data reliability concerns and disruptions**, 2017–18 was dropped as base year.

- It must be noted that 2017-18 experienced the ramifications of key policy led-disruptions such as the government's decision to overnight demonetise 86% of India's currency base in November 2016 as well as the introduction of a Goods and Services Tax regime (replacing multiple indirect taxes) in July 2017.
- India's GDP growth rate registered a sharp deceleration starting 2017-18, falling from more than 8% in 2016-17 to less than 4% in 2019-20.
- Since the start of 2020, the Covid pandemic-induced disruptions have meant that neither 2020 nor the years immediately after it could be treated as "normal" years.

Other Key Updates Alongside GDP Revision

- **Index of Industrial Production (IIP)** → New base year: **2022–23**
- **Consumer Price Index (CPI)** → New base year: **2023–24**

Significance of the 2026 revision

- Accuracy will affect:
  - **Global investor confidence**
  - **Domestic policymaking**
  - **Fiscal planning and poverty targeting**

Aims to **restore data credibility** amid past controversies and data gaps (e.g., no Census 2021).

Value addition: Terminologies

- **MoSPI (Ministry of Statistics and Programme Implementation)**: The nodal government agency responsible for statistical data collection, analysis, and GDP estimation in India.
- **CPI (Consumer Price Index)**: A measure of inflation that tracks changes in the prices of a basket of goods and services consumed by households.
- **IIP (Index of Industrial Production)**: An indicator that measures the growth rate and performance of various sectors of the industrial economy, including manufacturing, mining, and electricity.
- **PLFS (Periodic Labour Force Survey)**: A nationwide survey conducted by NSO to estimate employment, unemployment, and labour force participation annually.
- **CES (Consumer Expenditure Survey)**: A survey to estimate household consumption expenditure, which is crucial for poverty analysis and updating GDP data.
- **MCA-21**: An online database maintained by the Ministry of Corporate Affairs that stores financial filings of companies, used for estimating private sector contributions to GDP.
- **SNA 2008 (System of National Accounts 2008)**: An international statistical standard developed by the UN, IMF, World Bank, OECD, and EU for compiling national accounts, including GDP.
- **Informal Sector**: Economic activities that are not regulated by the government and often lack formal employment contracts or social security benefits.

Way Forward

- Adopt **transparent methodologies** and publish data sources clearly.
- Ensure **third-party review** and academic scrutiny of GDP calculation methods.
- Resume **regular base year updates** as per **National Statistical Commission** recommendations (every 5 years).
- Close data gaps in poverty, employment, and Census statistics.

INDIA NEEDS AN INCLUSIVE PENSION SYSTEM

Introduction (Context)

India's pension system is fragmented, inadequate, and largely excludes the informal sector. With rising old-age dependency, inflation, and healthcare costs, there is an urgent need to redesign a **universal, inclusive, and sustainable pension system**.

What is a Pension?

A **pension** is a regular payment made to individuals after retirement from active service, typically to provide **financial security and dignity** in old age. It can be funded by employers, the government, or individuals.

Significance of Pension

- **Old-age Security**: Offers income continuity post-retirement, especially as earning capacity declines.
- **Social Stability**: Prevents old-age poverty and promotes intergenerational equity. Pensions empower individuals to be financially independent in their later years, reducing their reliance on family members or charity.
- **Economic Growth**: Pension savings can fund long-term investments, supporting infrastructure and national development.
- **Health and Well-being:** Regular pension income helps the elderly afford healthcare and other essentials, improving their quality of life.
- **Encouragement for Formal Employment**: A well-designed pension system can incentivise formalisation of jobs and labour compliance, contributing to better workforce organization.

Current Status of India's Pension System

- Only **12% of India's workforce** is covered under formal pension schemes.
- Public sector and organized private sector enjoy multiple protections, while **informal sector workers remain largely uncovered**.
- Informal sector coverage depends on **voluntary schemes** like **Atal Pension Yojana (APY)** and **National Pension System (NPS)**. These reached only **5.3% of the population in FY24**.
- **Pension assets** in India stand at **17% of GDP**, much lower than **80% in advanced economies**.

Key Challenges

1.Fragmentation of Schemes

- Multiple overlapping schemes without unified regulation.
- Gig workers and informal workers are covered through limited voluntary channels or aggregator-based schemes, causing duplication and confusion.
- In contrast, countries like **Japan** and **New Zealand** offer universal coverage through flat-rate or residency-based pensions.

2.Lack of Awareness and Sensitisation

- Pension enrolment is low due to **poor financial literacy** and **limited understanding** of long-term retirement planning.
- International examples:
    - **Australia** integrates pension literacy in school curriculum.

- **UK** uses **auto-enrolment (opt-out)** models.
- **Netherlands** provides **annual pension disclosures**.
- **Nigeria** enhances reach through **digital pension infrastructure**.

3.Sustainability and Liquidity Issues

- According to the **Mercer CFA Institute Pension Index 2024**, India scored **44%**, reflecting poor adequacy of pension funds.
- Countries like **China** face unsustainable public pension burdens due to demographic shifts.
- Models from **Denmark, Netherlands, and the US** highlight the importance of private funds and **targeted investments** for long-term returns.

Value Addition

Major Government Pension Schemes

- **Atal Pension Yojana (APY):** A voluntary, government-backed scheme aimed at unorganised sector workers, offering a **guaranteed monthly pension** (₹1,000–₹5,000) after the age of 60, based on contribution.
- **National Pension System (NPS):** A **market-linked, contributory pension scheme** open to all citizens, including private and informal workers, offering flexible investment choices and **tax benefits under Section 80C and 80CCD**.
- **Employees' Pension Scheme (EPS):** Mandatory for workers in the organised sector; a part of the **Employees' Provident Fund (EPF)** contribution goes into EPS to provide pension after retirement or on disability.

Way Forward – Three-Tiered Pension Framework

India should integrate fragmented pension schemes under a single regulator to streamline administration and ensure uniform standards across all sectors.

Tier 1: Basic Pension Guarantee

- The first tier would comprise a mandatory basic pension guarantee, offering a flat-rate contributory pension for all, irrespective of employment status. .

Tier 2: Occupational Pensions

- It would cover occupational pensions that may be mandatory, or on an opt-out basis, establishing employer-based schemes with auto-enrolment, subject to minimum contribution standards would cover occupational pensions that may be mandatory, or on an opt-out basis, establishing employer-based schemes with auto-enrolment, subject to minimum contribution standards

Tier 3: Voluntary Pension Savings

- It would include voluntary pension savings, incentivised through tax benefits, market-linked returns, and flexible products to supplement retirement income.

Other Reforms

- **Financial Literacy Campaigns**: Especially at school and college levels to build pension awareness.
- **Digital Access**: Easy-to-use platforms for enrolment and pension management, especially for informal workers.
- **Annual Disclosures**: Mandatory reporting of pension entitlements to improve transparency and public trust.
- **Robust investment regulation** and performance oversight of pension funds.
- Guarantees long-term **liquidity and solvency** of pension payouts.

- With India's ageing population rising, an inclusive pension framework is crucial for **retirement dignity, poverty reduction, and economic resilience**.

Conclusion

As India transitions to an ageing society, the need for **an inclusive, scalable, and sustainable pension ecosystem** is paramount. A **universal pension guarantee**, backed by **awareness, digital access, and financial security**, will not only reduce old-age poverty but also ensure a dignified retirement for all citizens formal and informal alike. Policymakers must act now to build future-ready pension architecture in line with India's development goals for 2047.

USAGE OF AI IN AGRICULTURE

Introduction (Context)

India's agriculture sector is witnessing a paradigm shift with the integration of digital technologies such as Artificial Intelligence (AI), remote sensing, and data analytics. The recent launch of **CROPIC (Collection of Real Time Observations & Photo of Crops)** by the Ministry of Agriculture exemplifies how AI is being harnessed for improving crop monitoring, insurance delivery, and policy response.

AI and Agriculture

- **Artificial Intelligence in agriculture** involves the use of algorithms, machine learning, and computer vision to interpret data and aid decision-making across various agricultural operations.
- It helps in predicting weather patterns, detecting crop diseases and automating farm operations
- AI offers solutions to long-standing challenges like low productivity, post-harvest losses, and inadequate insurance mechanisms.

Applications of AI in Agriculture

1. Crop Monitoring and Health Assessment

- AI uses satellite images and drone-captured data to detect crop stress, pest attacks, and nutrient deficiencies.
- Helps in timely intervention and improves yield quality and quantity.

2. Precision Farming

- AI-based tools optimise the use of water, fertilisers, and pesticides by analysing soil health and crop needs.
- Reduces input costs and environmental impact.

3. Weather Forecasting and Advisory

- AI models analyse climate data to give location-specific weather forecasts.
- Supports farmers in planning sowing, harvesting, and irrigation schedules.

4. Yield Prediction

- AI algorithms predict crop yields based on weather, soil, and historical data.
- Aids government and private players in planning procurement and supply chain logistics.

5. Pest and Disease Detection

- AI tools identify crop diseases and pests through image recognition.
- Early diagnosis prevents spread and reduces losses.

6. Smart Advisory Services

- Chatbots and voice-based assistants provide customised farming advice in local languages.

- Useful for illiterate and smallholder farmers.

7. Crop Insurance and Loss Assessment

- AI analyses field photos to automate crop loss verification.
- Speeds up insurance claim settlement and reduces disputes.

8. Post-Harvest Management and Supply Chain

- AI helps optimise storage, transport, and market linkages.
- Reduces wastage and ensures better price realisation for farmers.

9. Farm Automation

- AI-powered machines and robots assist in sowing, weeding, and harvesting.
- Reduces labour dependency and increases efficiency.

Example: CROPIC

- **CROPIC stands for Collection of Real Time Observations & Photo of Crops.**
- Under this crops will be photographed four-five times during their cycle, and the pictures will be analysed to assess their health and potential mid-season losses.
- The study will be carried out for two seasons initially, kharif 2025 and rabi 2025-26.
- The study envisages collection of field photographs during the crop season using a mobile application.
- **The CROPIC mobile app** has been developed by the Union Ministry of Agriculture and Farmers' Welfare.
- The photographs from the field will be crowd-sourced directly from farmers. Then, they will be analysed for information including crop type, crop stage, crop damage and its extent.
- **The CROPIC model will use an AI-based cloud platform** for photo analysis and information extraction, and a web-based dashboard for visualisation.
- Also, when compensation or insurance is to be paid to farmers, officials will collect the photographs using the CROPIC Mobile App.
- Hence, will help in reducing **subjective errors** in crop loss assessment and enables **faster and fairer claim settlements** for farmers.

Challenges in Implementing AI in Indian Agriculture

AI integration in Indian agriculture faces several structural and socio-economic challenges:

1. **Digital Divide**: Small and marginal farmers, who make up the majority, often lack access to smartphones, internet, and digital literacy needed to use AI-based tools like CROPIC.
2. **Data Gaps and Quality Issues**: AI requires large volumes of accurate, real-time data. Poor data collection methods, inconsistent crop tagging, and lack of field validation can affect the reliability of AI outputs.
3. **High Initial Costs**: Although long-term savings are possible, the upfront cost of AI tools and services remains a barrier for many farmers.
4. **Bias and Regional Inaccuracy**: AI models trained on limited datasets may fail to capture India's agro-climatic diversity, leading to inaccurate predictions or exclusions.
5. **Privacy and Consent**: Concerns about the ownership and ethical use of farmer data are growing. Clear regulations on data protection are still evolving.
6. **Infrastructure Bottlenecks**: Patchy mobile networks, lack of rural cloud infrastructure, and insufficient local-language interfaces hinder large-scale adoption.

Way Forward

To make AI a farmer-centric, inclusive tool, India must adopt a multi-pronged approach:

- **Strengthen Rural Connectivity**: Ensure reliable mobile internet in rural and remote areas to support digital agriculture platforms.
- **Build Local AI Models**: Develop region-specific, open-source AI datasets and tools in local languages to improve usability and accuracy.
- **Enhance Farmer Training**: Integrate digital literacy and AI training in Krishi Vigyan Kendras (KVKs) and through FPOs.
- **Promote Public-Private Collaboration**: Leverage expertise from startups, agri-tech firms, and research institutions for innovation and scalability.
- **Ensure Ethical Governance**: Create a robust data privacy framework that empowers farmers to control and benefit from their data.
- **Scale Pilot Projects**: Expand successful models like CROPIC across agro-climatic zones to create a unified digital agricultural ecosystem.

Conclusion

CROPIC represents a major step towards **data-driven, AI-supported agriculture** in India. By digitising agriculture in India, efficiencycan be achieved. However, to realise its full potential, **inclusive digital access, localised AI training, and strong institutional support** are crucial.

COMMUNITY FOREST RIGHTS (CFRS) AS A TOOL TO END NAXALISM

Introduction (Context)

- Recently, government has declared that it would end Naxalism by 31 March 2026 and also urged Naxal-affected states to expedite local infrastructure development programmes and provide the best possible rehabilitation packages to surrendered Naxals, while simultaneously continuing operations.
- In this context, the **Gadchiroli model** of combining **CFR recognition, infrastructure development, and community empowerment** offers valuable lessons for other Naxal-affected districts..

About Naxalism

- Naxalism refers to the **armed communist insurgency** originating from the village of **Naxalbari in West Bengal (1967)**.
- It is inspired by **Maoist ideology**, aiming to overthrow the government through **armed struggle**, especially in rural and tribal areas.

Causes

- **Land Alienation**: Tribal farmers lost land without fair compensation.
- **Forest Resource Exploitation**: Conservation and industrial projects displaced forest communities.
- **Poverty and Unemployment**: Underdevelopment made tribal youth vulnerable to recruitment.
- **Social Exclusion**: SCs and STs faced systemic neglect and discrimination.
- **State Repression**: Police excesses triggered resentment among tribal populations.
- **Political Marginalisation**: Tribals lacked voice in governance and decision-making.

Impact of Naxalism

- **Security Threat**: Disturbs internal security in several regions.
- **Loss of Life and Property**: Frequent violence against civilians and security forces.

- **Development Obstruction**: Halts infrastructure and welfare initiatives.
- **Human Rights Violations**: Atrocities by both extremists and state agencies.
- **Democratic Erosion**: Undermines state authority and democratic functioning.

Case study: Gadchiroli Model

- **Gadchiroli is a district in Maharashtra**, known for its vast forests, rich tribal culture, and natural beauty.
- **It is a part of red corridor.** ("Red corridor" refers to the region in India where the Naxalite-Maoist insurgency has the strongest influence. The term "red corridor" refers to the region in India where the Naxalite-Maoist insurgency has the strongest influence.)
- Steps by district to combat naxalism:
  - Development of infrastructure
  - Rehabilitation packages to surrendered Naxals It's
  - Recognize customary and traditional rights of forest-dwelling communities over forest resources.

Key Features of the Gadchiroli Model

- Of the 9,902.8 sq km forest in Gadchiroli, **5,110.07 sq km is under community control**, the highest in India.
- 1,109 villages enjoy **legal CFR recognition** under the **Forest Rights Act, 2006**.
- In 2009, **Mendha Lekha** became the first village in India to be granted CFR.
- Provides **exclusive rights over minor forest produce** (MFP) such as bamboo and tendu.
- **Gram Sabhas manage** forest rights and resources democratically.
- Maharashtra allowed **Gram Sabhas to issue bamboo transit passes**.
- The government provided financial incentives (e.g., **₹1.78 lakh per CFR village**).
- **Governor's directives** empowered Scheduled Areas under the Fifth Schedule to auction and sell MFP.
- **MoU with 728 Gram Sabhas** for **technical and financial support** to implement CFR activities at the local level.

What are Community Forest Rights?

Community Forest Rights (CFRs) are legal rights granted to forest-dwelling communities under the **Forest Rights Act (FRA), 2006** in India. These rights recognize the traditional and customary ownership, use, and management of forest resources by communities.

Key Features of CFRs

- Rights are vested in the **entire community or Gram Sabha**, not individuals.
- Communities have the right to **collect, use, and dispose of minor forest produce** (like bamboo, tendu leaves, honey, etc.).
- Communities are empowered to **conserve, regenerate, and manage** forest resources sustainably.
- Recognizes rights over forests used for **cultural, religious, and livelihood purposes**.
- The **Gram Sabha is the decision-making body** for forest management and benefit-sharing.
- Strengthens **democratic decentralisation** in Scheduled Areas.
- Promotes **sustainable forest conservation** through local stewardship

Achievements in Gadchiroli district

- **Livelihood Security**: CFR households earn a **minimum ₹7,000/month** from forest-based income.
- **Environmental Sustainability**: Forests managed by Gram Sabhas show **lower deforestation** than those under forest departments.
- **Decentralised Governance**: Transparent decision-making via **Gram Sabha mechanisms**.
- **Economic Upliftment**: Reduced migration, fewer middlemen, increased investment in **education and health**.
- **Reinvestment in Forest Conservation**: Local patrols, plantation drives, and forest protection initiatives led by communities.

Reasons for Success

- **Collective action and grassroots movements** initiated by local tribal leaders. They did not depend on external agencies or NGOs for their forest rights.
- The **District Collector's office** has initiated a series of activities, making policies at the Gram Sabha level more responsive to sustainable tribal livelihood and forest conservation. To date, the administration has signed a memorandum of understanding (MoU) with 728 Gram Sabhas to provide necessary technical and financial support in the development, management, and implementation of the recognised CFR areas.

Challenges

- **Mining Threats**: Fear of displacement due to **proposed steel plants and mining projects**, especially in **South Gadchiroli**.
- **Implementation Gaps**: Need for better **convergence of development schemes** at district and block levels.
- **Rights Protection**: Government must ensure development does not violate **PESA** and **FRA** safeguards.

Value Addition

Forest Rights Act (FRA), 2006

- Its objective is torecognize and vest forest rights in forest-dwelling Scheduled Tribes and other traditional forest dwellers.
- **Key Provisions**:
    - **Individual Rights**: For habitation and cultivation on forest land (up to 4 hectares).
    - **Community Forest Rights (CFRs)**: To manage and use forest produce collectively.
    - **Recognition of Rights**: Based on **customary use**, irrespective of forest classification.
    - **Gram Sabha Role**: Central in identifying beneficiaries and managing forest rights.

Significance:

- Legal empowerment of tribal communities.
- Livelihood security and forest conservation.
- Reduction in alienation and forest-related conflicts.

Panchayats (Extension to Scheduled Areas) Act – PESA, 1996

- Its objective is toextend Part IX of the Constitution (Panchayati Raj) to **Fifth Schedule areas** with tribal populations.
- **Key Provisions**:
    - Empowers **Gram Sabhas** to manage natural resources, approve development plans, and protect tribal culture.
    - Gram Sabhas must be consulted before **land acquisition** and rehabilitation.
    - Control over **local markets, minor water bodies, and minor forest produce**.

Significance:

- Ensures **self-governance** for tribal communities.
- Strengthens **decentralised democracy** in tribal areas.
- Safeguards against exploitation and displacement.

Way Forward

- **Replicate the Gadchiroli Model** in other LWE-affected regions through:
    - Strong administrative will for **decentralisation**.
    - **Institutional and financial support** to Gram Sabhas.
    - **Protection of forest rights** against commercial exploitation.
- Ensure **tribal autonomy and livelihood security** remain central to development planning in Scheduled Areas.

KERALA SEEKS WILDLIFE LAW REFORM TO TACKLE RISING ANIMAL ATTACKS

Introduction (Context)

- The Kerala government has sought the **Centre's approval to amend the Wildlife (Protection) Act, 1972**, to allow the state to **cull wild animals** that pose threats to human life and agricultural livelihoods.
- However, this issue is **not confined to Kerala alone**. Across India, **human-animal conflicts are rising**, with growing instances of **crop damage, loss of life, and displacement** caused by wildlife entering human habitats.

Human Animal Conflict

- Human-wildlife conflict refers to the negative interactions between humans and wild animals, often resulting in harm to both parties.
- The issue in Kerala:
- **Wildlife attacks have emerged as a major issue in Kerala**, with the government identifying 273 village local bodies, out of 941, as hotspots.
- The problem animals are mainly tiger, leopard, elephant, bison, wild boar, bonnet macaque and peafowl. Although bonnet macaque (a monkey species) and peafowl do not pose a threat to life, their repeated raids have forced farmers to abandon vast tracts of agricultural land.
- **Crop damage, livestock predation, and damage to infrastructure** can lead to significant economic losses for farmers and communities.
- According to the government data, as many as 919 persons were killed and 8,967 others injured in wildlife attacks in Kerala from 2016-17 to 2024-25 (till January 31).

Reason for the rise in cases

- **Habitat degradation** forcing wildlife into human settlements.
- **Overgrazing by domestic cattle** in forests.
- **Changing cropping patterns** and increased cultivation near forest areas.
- **Population explosion of wild boars and monkeys**, especially bonnet macaques.

Challenges in Present laws

- **The existing legal framework** puts several constraints in taking timely action in emergency situations, , especially in the case of animals protected under **Schedule I of the Act.**
- **Schedule I of the Wildlife Protection Act, 1972** provides the highest level of protection to critically endangered species, prohibiting hunting, poaching, killing, and trading. This schedule covers species like the tiger, blackbuck, and various other animals and birds, with severe penalties for violating the law.
- Hence for killing the animal during human animal conflict following procedure is followed:
  - Before ordering the killing of dangerous wild animals, the state chief wildlife warden should be convinced that it cannot be captured, tranquilised or shifted to another place.
  - Such captured animals should not be held under confinement.
  - The government has to follow the advisory of the Tiger Conservation Authority and Project Elephant Scheme while dealing with human-wildlife conflict.
  - While the district collector, who is the executive magistrate, can issue orders for removal of a public nuisance, there are court orders preventing the invoking of these powers with regard to wild animals.

Demands of Kerala government: Amend Wildlife (Protection) Act, 1972to:

- Allow culling of **man-eating and crop-destroying animals** under regulated conditions.
- Provide for **seasonal and region-specific permissions** for culling.
- **Ease procedural barriers** to taking action during emergencies.
- **Declare wild boars as "vermin"** under **Section 62** of the Act — enabling easier culling.
- **Remove bonnet macaques from Schedule I**, restoring earlier provisions where the chief wildlife warden could take **suo motu action**.

Value Addition

1. Vermin Species

- **Section 62 of the Wildlife (Protection) Act, 1972** empowers the Central Government to declare certain wild animals as *vermin* in specific areas and for a specified period.
- Vermin are usually considered problem or nuisance animals that attack humans, crops, livestock or property.
- Species which are classified as Vermin are placed under **Schedule V** of the Wildlife Protection Act, of 1972.
- Once declared vermin, these animals can be **hunted or culled** without penalty.
- Helps control overpopulated or crop-destroying species (e.g., wild boars, nilgai) and **reduces human-wildlife conflict** while still preserving protection in core habitats.

2. Wildlife (Protection) Act, 1972

- It is the principal legislation for the **protection of wild animals, birds, and plants** in India.
- Provides for the **creation of protected areas** (national parks, wildlife sanctuaries).
- Animals are listed under **Schedules I to VI**:
  - **Schedule I & II**: Highest protection.
  - **Schedule V**: Vermin category.
- **The Wildlife Protection Act, 1972**, established several key bodies to aid in wildlife conservation and protection. These include the **National Board for Wildlife (NBWL), State Boards for Wildlife (SBWL), the Central Zoo Authority (CZA), the National Tiger Conservation Authority (NTCA), and the Wildlife Crime Control Bureau (WCCB).**

3. National Tiger Conservation Authority (NTCA)

- Constituted under the **Wildlife (Protection) Act, 1972 (amended 2006)**.
- A **statutory body** under the Ministry of Environment, Forest and Climate Change (MoEFCC).
- **Mandated to:**
  - Implement **Project Tiger**.
  - Ensure **scientific monitoring, protection, and management** of tiger reserves.
  - Approve plans for mitigation of tiger-human conflict.
  - Provide **technical and financial support** to states.

4. Project Elephant

- Launched in **1992** by MoEFCC to:
  - Protect **Asian elephants**, their habitat, and corridors.
  - Address **man-elephant conflict** through mitigation strategies and community participation.
  - Support **captive elephant welfare** and **eco-development**.
- Includes **financial and technical support** to states for elephant protection and corridor management.

Way forward

- Implement a **dynamic conflict-mapping system** to identify and monitor emerging wildlife hotspots in real-time.
- Ensure **fast-track administrative and judicial approvals** for emergency wildlife control actions.
- Explore **non-lethal methods** like sterilisation, translocation, and immunocontraception where feasible.
- Use **technology-driven monitoring tools** (drones, camera traps, GPS tagging) for population and movement tracking.
- Invest in restoring degraded forests and **creating ecological buffer zones** between wildlife habitats and agricultural fields.
- Promote the cultivation of **non-palatable crops** in high-conflict zones to deter herbivorous wildlife.
- Involve local communities, forest dwellers, and farmers in **conflict mitigation planning** through training and incentives.
- Strengthen **eco-development committees (EDCs)** and **joint forest management (JFM)** platforms.
- Ensure **timely and adequate compensation** for loss of life, livestock, and crops due to wildlife attacks.

- Promote **crop and livestock insurance** schemes specifically designed for wildlife-prone regions.
- Launch **awareness campaigns** to sensitise people on coexistence, conflict reporting, and risk mitigation practices.

Conclusion

Kerala's push for **legal flexibility** in managing human-wildlife conflict underscores the need to **harmonise conservation goals with ground realities**. A rational and humane approach must guide reforms in the Wildlife (Protection) Act to ensure both **ecological integrity** and **human security**.

GREEN COOLING FOR IT SECTOR

Introduction (Context)

The Information and Communications Technology (ICT) industry is under growing pressure to cut its carbon footprint as data centres consume massive amounts of energy, largely due to cooling requirements. This has huge implications on environment.

Why data centres require cooling?

- Cooling is essential in data centres because servers and networking equipment generate a significant amount of heat during operation. If this heat is not efficiently removed, it can cause system overheating, hardware failure, and service disruptions.

Data:

- Nearly 40% of energy in data centres goes toward cooling.
- Traditional air-cooling systems heavily rely on water; a critical concern in water-scarce regions.
- Cooling accounts for up to 60% of operating costs in Indian facilities, especially in high-temperature zones like Hyderabad or Noida. NITI Aayog has recommended liquid-cooling adoption in its digital infrastructure strategy.

Environment Impact

The ICT sector must cut emissions by 42% by 2030 to align with the 1.5°C Paris target.

Impact on environment are:

- **High Energy Use**: Cooling systems, such as air conditioners and liquid cooling technologies, often consume as much energy as the IT equipment itself.
- **Carbon Emissions**: Energy demand, especially when sourced from fossil fuels, leads to significant greenhouse gas (GHG) emissions.
- **Water Usage**: Some cooling methods rely heavily on water, increasing water stress in local areas.
- **Urban Heat Island Effect**: Heat discharged from data centres can elevate local temperatures, contributing to urban heat islands.
- **E-Waste and Refrigerants**: Inefficient or outdated cooling systems may release harmful refrigerants and contribute to electronic waste.

Study by Microsoft and WSP Global

- **A recent study in Nature led by Microsoft and WSP Global** shows that advanced cooling methods like cold plates and immersion cooling can significantly reduce emissions, energy use, and water consumption.
- **Cold plate and immersion cooling** can reduce data centre **greenhouse gas (GHG)** emissions by 15–21%.
- They cut energy use by 15–20% and water use by 31–52%.

1. About Cold Plate cooling

- Cold plate cooling is a direct-to-chip liquid cooling technology.
- It involves placing metal plates with internal microchannels directly on heat-generating components like CPUs or GPUs.
- Coolants such as a glycol-water mixture circulate through these microchannels, absorbing heat and carrying it away to an external heat exchanger or radiator.
- Achieves liquid-to-air heat transfer efficiency between 50%–80%, reducing the need for traditional air-conditioning and fans.
- **Advantages:**
  - Low energy consumption.
  - More compact than traditional cooling.
  - Easier to retrofit into existing systems than immersion cooling.

2. About Immersion cooling

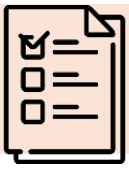
- Immersion cooling involves submerging entire servers or electronic components in thermally conductive, non-electrically conductive liquids (special oils or fluorocarbons).
- **Single-phase immersion**: Liquid absorbs heat and circulates to an external cooler without changing state.
- **Two-phase immersion**: Liquid boils into vapor at a low temperature, carries heat away, condenses, and re-circulates.
- **Advantages:**
  - Superior heat removal (up to 100% contact with heat source).
  - Reduces noise (no fans), improves reliability, and eliminates dust damage.

Way forward

- **Policy Push:** Government must frame guidelines for green data centres and standardize liquid-cooling safety regulations.
- **Incentivize Adoption:** Tax rebates, green bonds, or mandatory LCA-based ratings could encourage faster transition.
- **Public-Private Partnerships:** Collaborations with research institutions and global ICT players can accelerate R&D.
- **Integration with Renewables:** Cooling must go hand-in-hand with sourcing electricity from wind, solar, or green hydrogen.

Conclusion

Advanced cooling methods like cold plates and immersion cooling offer a real opportunity for the ICT industry to cut emissions, save water, and manage the thermal load of modern computing. However, they must be integrated into a broader policy push for better adaptation.



Practice Questions

Q1. Which of the following factors contributed significantly to the achievement of India's FY25 fiscal deficit target?

1. Restrained revenue expenditure
2. High disinvestment proceeds
3. Robust capital expenditure
4. Higher-than-expected non-tax revenue

Select the correct answer using the code below:

a) 1, 2 and 3 only
b) 1, 3 and 4 only
c) 2 and 4 only
d) 1 and 4 only

Correct Answer: b) 1, 3 and 4 only

Q2. In the context of India becoming the world's fourth-largest economy, which of the following best explains the limitations of using nominal GDP as a development indicator?

a) It includes only agriculture and manufacturing output
b) It ignores inflation and purchasing power parity
c) It understates the importance of financial flows
d) It overemphasizes income inequality as a metric.

Correct Answer: b) It ignores inflation and purchasing power parity.

Q3. Which of the following best explains the term "Heat Action Plans (HAPs)" as mentioned in the context of India's climate adaptation efforts?

a) Plans that prioritize the distribution of air conditioners in urban slums
b) Emergency protocols issued during forest fires and dust storms
c) City-level strategies aimed at reducing the health impacts of extreme heat events
d) Long-term national development schemes focused on rural electrification

Answer: C

Q4. With reference to the historical background of the Kheer Bhawani temple, consider the following statements:

1. It finds mention in Kalhana's *Rajatarangini*.
2. The deity is believed to have been brought from Sri Lanka by Hanuman according to legend.
3. The temple was commissioned by Emperor Ashoka as part of his Buddhist reforms.

Which of the statements given above is/are correct?

a) 1 and 2 only
b) 2 and 3 only
c) 1 only
d) 1, 2 and 3

Correct Answer: a) 1 and 2 only

Q5. What does the term "asymmetric warfare" typically refer to, as demonstrated by Ukraine's use of drones?

a) Use of military force by two equally matched conventional armies
b) Conflict where weaker actors use unconventional methods to target stronger powers
c) Wars fought only in cyber or information domains
d) Legal constraints applied by international treaties on warfare

Answer: b) Conflict where weaker actors use unconventional methods to target stronger powers

Q6.Consider the following pairs:

1. Location – Relevance to Asiatic Lion Conservation
2. Barda Wildlife Sanctuary – New satellite population identified
3. Kuno National Park – Site proposed for lion relocation
4. Jetpur and Babra-Jasdan – Core area within Gir National Park

Which of the pairs are correctly matched?

a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2, and 3

Correct answer: a) 1 and 2 only

Q7. The Teesta River, which flows through Sikkim, is important for:

1. Hydroelectric power generation.
2. Irrigation in downstream states like West Bengal and Bangladesh.
3. Serving as an international water boundary between India and China.

Which of these statements are correct?

a) 1 and 2 only
b) 1, 2, and 3
c) 2 and 3 only
d) 1 only

Answer: a) 1 and 2 only

Q8. With reference to the Centre for Marine Living Resources and Ecology (CMLRE), consider the following statements:

1. CMLRE functions under the Ministry of Earth Sciences, Government of India.
2. It is the nodal agency for managing oil spill responses in Indian waters.
3. CMLRE operates a research vessel named *Sagar Sampada* for oceanographic and ecological studies.
4. The institute is primarily tasked with marine biodiversity and ecosystem monitoring in India's Exclusive Economic Zone (EEZ).

Which of the statements given above is/are correct?

a) 1 and 3 only
b) 1, 3 and 4 only
c) 2 and 4 only
d) 1, 2, 3 and 4

Answer: B. 1, 3 and 4 only

Q9. Consider the following statements regarding Bharatiya Antariksh Station:

1. It is India's planned modular space station to be launched after 2035.
2. It will support long-duration human missions and microgravity research.
3. It will be a part of the International Space Station network.

Which of the statements is/are correct?

a) 1 and 2 only
b) 2 and 3 only
c) 1 only
d) 1, 2 and 3

Answer: A. 1 and 2 only

Q10. Consider the following statements about antimicrobial activity:

1. It refers to the ability to kill or inhibit the growth of microorganisms such as bacteria and fungi.
2. Antibiotics are synthetic chemicals and do not occur naturally.

3. Antimicrobial agents work by targeting vital processes like cell wall synthesis or protein production in microbes.

Which of the statements given above are correct?

a) 1 and 2 only]
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2 and 3

Answer: B) 1 and 3 only

Q11. Consider the following statements regarding the impeachment of High Court and Supreme Court judges in India:

1. A notice signed by at least 100 Lok Sabha or 50 Rajya Sabha members is required to initiate impeachment proceedings.
2. Parliament must form a new inquiry committee in all cases before proceeding with the impeachment motion.
3. Impeachment motion requires a two-thirds majority of members present and voting in both Houses of Parliament.
4. The President of India can remove a judge only after the impeachment motion is passed by Parliament.

Which of the statements given above are correct?

A) 1, 2, and 3 only
B) 1, 3, and 4 only
C) 2 and 4 only
D) 1, 2, 3, and 4

Answer: B) 1, 3, and 4 only

Q12. With reference to the India-Middle East-Europe Economic Corridor (IMEC), consider the following statements:

1. IMEC is a transcontinental infrastructure initiative aimed at connecting India with Europe through the Middle East.
2. The corridor is an initiative under the Shanghai Cooperation Organisation (SCO).
3. Regional instability in West Asia can impact the timely implementation of IMEC.
4. IMEC is positioned as a strategic alternative to China's Belt and Road Initiative (BRI).

Which of the statements given above are correct?

A. 1 and 2 only
B. 1, 3 and 4 only
C. 2, 3 and 4 only
D. 1, 2, 3 and 4

Answer:
B. 1, 3 and 4 only

Q13. With reference to the Scheme to Promote Manufacturing of Electric Passenger Cars in India (SPMEPCI), consider the following statements:

1. The scheme offers concessional import duty on fully built electric cars subject to investment and localization commitments by the manufacturer.
2. It mandates a phased increase in domestic value addition (DVA) over a five-year period.
3. The scheme caps the number of completely built EV units that can be imported annually by each manufacturer.
4. It requires foreign companies to establish joint ventures with Indian firms as a precondition for participation.

Which of the statements given above are correct?

A. 1, 2 and 3 only
B. 1, 3 and 4 only
C. 2 and 4 only
D. 1, 2, 3 and 4

Answer:
A. 1, 2 and 3 only

Q14. With reference to Battery Energy Storage Systems (BESS) in India, consider the following statements:

1. The Ministry of Power mandates that all new solar projects must include co-located energy storage with a minimum of two hours' storage capacity.
2. Energy Storage Obligations (ESO) require that at least 85% of the stored energy must be sourced from renewable sources.
3. Tariffs for utility-scale BESS projects in India have increased due to higher lithium-ion battery prices.
4. The BESS sector is supported by Viability Gap Funding (VGF) to accelerate deployment.

Which of the statements given above are correct?

A. 1 and 2 only
B. 1, 2 and 4 only
C. 2, 3 and 4 only
D. 1, 3 and 4 only

Answer:
B. 1, 2 and 4 only

Q15. With reference to *Exposomics*, consider the following statements:

1. It focuses solely on chemical pollutants and their impact on health.
2. It captures both external and internal environmental exposures across the human life span.
3. It uses data-driven methods and high-throughput tools to discover unknown risk factors.

Which of the statements given above is/are correct?

A. 1 only
B. 2 and 3 only
C. 2 only
D. 1, 2 and 3

Answer: B. 2 and 3 only

Q16.With reference to the upcoming nationwide Census of India scheduled to conclude by 2027, consider the following statements:

1. The Census will be conducted in two phases — house listing and population enumeration.
2. It will include caste enumeration for the first time since 1941.
3. For snow-bound states like Himachal Pradesh and Ladakh, the reference date will be different from the rest of the country.
4. The data from this Census will have implications for electoral boundary delimitation and policy implementation.

Which of the above statements is/are correct?

A. 1 and 2 only
B. 1, 3 and 4 only
C. 1, 2 and 4 only
D. 1, 2, 3 and 4

Answer: B. 1, 3 and 4 only

Q17. With reference to the Rafale fighter aircraft, consider the following statements:

1. Rafale is a twin-engine, multi-role 5th generation fighter aircraft developed by France.
2. It is capable of carrying both conventional and nuclear weapons.
3. Rafale jets inducted by India have been modified with India-specific enhancements such as Israeli helmet-mounted displays and low-band jammers.
4. The first Rafale squadron of the Indian Air Force is based in Hasimara, West Bengal.

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 2 and 3 only
C. 2, 3 and 4 only
D. 1, 3 and 4 only

Answer: B. 2 and 3 only

Q18. With reference to India's nuclear energy programme, consider the following statements:

1. The three-stage nuclear power programme was aimed at utilizing India's large thorium reserves.
2. India is a signatory to the Nuclear Non-Proliferation Treaty (NPT).
3. The Indo-US Civil Nuclear Agreement enabled India to gain a waiver from the Nuclear Suppliers Group (NSG).
4. India's first nuclear test was conducted after it had signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

Which of the above statements is/are correct?

A. 1 and 3 only
B. 2 and 4 only
C. 1, 2 and 3 only
D. 1, 3 and 4 only

Answer: A. 1 and 3 only

Q19. Which of the following statements correctly differentiate between disinflation and deflation?

1. Disinflation refers to a decline in the general price level, whereas deflation refers to a slowdown in the rate of inflation.
2. Disinflation is generally considered less harmful than deflation from a macroeconomic perspective.
3. Both disinflation and deflation result in a decrease in the purchasing power of money.

Select the correct answer using the code given below:

A. 1 and 2 only
B. 2 only
C. 1 and 3 only
D. 1, 2 and 3

Answer: B. 2 only

Q20. Consider the following statements regarding the Insolvency and Bankruptcy Code (IBC), 2016:

1. IBC shifted control from creditors to debtors during insolvency resolution.
2. It mandates a time-bound insolvency resolution process with a 330-day deadline.
3. It applies only to companies and excludes individuals and partnership firms.

Which of the above statements is/are correct?

A. 2 only
B. 1 and 3 only
C. 1 and 2 only
D. 2 and 3 only

Answer: A

Q21. Consider the following pairs regarding monetary tools and their effects:

Monetary Tool	Effect
1. Repo Rate Cut	Reduces borrowing costs
2. CRR Cut	Increases liquidity with commercial banks
3. Reverse Repo Rate	Increases credit availability to public

Which of the above pairs are correctly matched?

A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2 and 3

Answer: A

Q22. With reference to the Group of Seven (G7), consider the following statements:

1. The G7 was established in response to the oil crisis and global recession of the 1970s.
2. The European Union is a full member of the G7.
3. G7 decisions are legally binding on all its members.
4. Russia was permanently expelled from the group in 2014.

Which of the statements given above is/are correct?

A. 1 only
B. 1 and 4 only
C. 2 and 3 only
D. 1, 2, and 4 only

Answer:B. 1 and 4 only

Q23. In which of the following ways do recent archaeological discoveries contribute to the understanding of Indian history?

1. Provide evidence of socio-economic systems like taxation and land grants
2. Help in dating dynasties and rulers more accurately
3. Confirm mythological stories from religious texts
4. Reveal lost architectural and cultural traditions

Select the correct answer using the code below:

A. 1, 2 and 4 only
B. 1 and 3 only
C. 2 and 4 only
D.All of the above

Answer: A. 1, 2 and 4 only

Q24. Consider the following statements about Anti-Submarine Warfare (ASW) warships:

1. ASW warships primarily rely on sonar and torpedoes to detect and neutralize underwater threats.
2. Their operational effectiveness is limited in shallow coastal waters due to acoustic challenges.
3. ASW vessels also contribute to maritime domain awareness and coastal security.

Which of the statements given above is/are correct?

A) 1 and 2 only
B) 1 and 3 only
C) 2 and 3 only
D) 1, 2, and 3

Answer: B) 1 and 3 only

Q25. With reference to spectrum allocation in India, consider the following statements:

1. Administrative allocation of spectrum is more suitable for satellite-based services than mobile telecom services.
2. Auctioning of spectrum generally results in higher spectrum prices due to market competition.
3. The Government of India has uniformly adopted the auction method for all types of spectrum allocation.

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 2 and 3 only
C. 1 and 3 only
D. 1, 2 and 3

Answer: A. 1 and 2 only

Q26. With reference to artificial weather modification techniques, consider the following statements:

1. Cloud seeding involves dispersing substances like silver iodide to induce precipitation.
2. Marine cloud brightening is aimed at enhancing the Earth's albedo by increasing the reflectivity of oceanic clouds.
3. Stratospheric aerosol injection is a technique used to trap solar radiation within the lower atmosphere to increase rainfall.
4. Weather modification techniques are universally accepted and regulated under the United Nations Framework Convention on Climate Change (UNFCCC).

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 2 and 3 only
C. 1, 2 and 4 only
D. 1, 3 and 4 only

Answer: A. 1 and 2 only

Q27. With reference to MagIC Microscopy (Magnetic Isolation and Concentration cryo-electron microscopy), consider the following statements:

1. It allows structural analysis of biological samples at much lower concentrations than traditional cryo-EM.
2. The technique uses magnetic beads to concentrate target molecules from dilute solutions.
3. MagIC eliminates the need for flash-freezing in cryo-electron microscopy.
4. A computational workflow named DuSTER is used to filter background noise and improve image clarity.

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 1, 2 and 4 only
C. 2 and 3 only
D.All of the above

Answer:
B. 1, 2 and 4 only

Q28. With reference to the Indian state of Manipur, consider the following statements:

1. Manipur shares its international border with Myanmar.
2. Loktak Lake, known for its unique floating islands called phumdis, is located in Manipur.
3. The Imphal Valley is surrounded by hills and is the primary agricultural and population center of the state.
4. The Brahmaputra River flows through Manipur.

Which of the statements given above is/are correct?

A) 1, 2 and 3 only
B) 2 and 4 only
C) 1 and 4 only
D) 1, 2, 3 and 4

Answer: A) 1, 2 and 3 only

Q29. Consider the following statements regarding the UMEED portal launched by the Government of India:

1. It is a digital platform for the real-time registration and monitoring of Waqf properties across India.
2. Registration of Waqf properties on the portal is voluntary and can be done anytime.
3. The portal integrates GIS mapping for efficient management and tracking of Waqf assets.
4. The initiative aims to empower women and economically weaker sections by ensuring fair utilization of Waqf properties.

Which of the above statements are correct?

A) 1, 2 and 3 only
B) 1, 3 and 4 only
C) 2 and 4 only
D) 1, 2, 3 and 4

Answer: B) 1, 3 and 4 only

Q30. Match the following FSSAI initiatives with their objectives:

Column A	Column B
A. RUCO	1. Repurposing used cooking oil
B. Jaivik Bharat	2. Promoting organic food
C. FoSTaC	3. Training food handlers

Column A	Column B
D. Eat Right Campus	4. Improving institutional food environments

Correct match:

A. A-1, B-2, C-3, D-4
B. A-2, B-1, C-4, D-3
C. A-1, B-4, C-2, D-3
D. A-3, B-2, C-1, D-4

Answer: A

Q31. With reference to modern drone warfare, consider the following pairs:

Drone Type	Feature/Capability
1. Magura V7	Naval drone capable of anti-aircraft strikes
2. Lancet-3	Russian drone with reported glitches in autonomous targeting
3. Tyuvik	Ukrainian drone with fiber-optic, EW-resistant capability

Which of the above pairs are correctly matched?

A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1 and 2 only

Answer:A. 1 and 2 only

Q32. In the context of India's energy transition goals, why is the domestic development of rare earth mineral resources considered critical?

(a) It ensures cheaper electricity for rural India
(b) It reduces dependence on oil imports from the Middle East
(c) It enables self-reliance in clean technologies like EVs and wind turbines
(d) It allows India to export nuclear-grade minerals to allied countries

Answer: (c) It enables self-reliance in clean technologies like EVs and wind turbines

Q32. India has a significant demographic opportunity as per the UNFPA 2025 Report. Which of the following best explains the reason behind this?

A. India has achieved zero population growth.
B. A large proportion of the population is elderly, reducing dependency.
C.A majority of the population is in the working-age group.
D. The fertility rate has risen above replacement level, ensuring workforce supply.

Answer: C. A majority of the population is in the working-age group.

Q33. Which of the following best describes the primary aim of the KATRIN experiment?

A. To detect gravitational waves from neutrino interactions
B. To directly measure the mass of the electron neutrino
C. To observe the conversion of neutrinos into dark matter
D. To detect neutrinos from the Sun using water Cherenkov detectors

Answer: B. To directly measure the mass of the electron neutrino

Q34. With reference to the BHASHINI initiative under Digital India, consider the following statements:

1. BHASHINI aims to develop a national public digital platform for language translation and speech recognition in 22 scheduled Indian languages.
2. It is being implemented by the Ministry of Culture as part of the National Language Promotion Mission.
3. The platform supports technologies such as speech-to-text, text-to-speech, and machine translation.

4. BHASHINI operates only in collaboration with central government departments and does not engage private entities or academic institutions.

Which of the statements given above is/are correct?

A. 1 and 3 only
B. 1, 2 and 4 only
C. 2 and 4 only
D. 1, 3 and 4 only

Answer: A. 1 and 3 only

Q35.The Production Linked Incentive (PLI) scheme for technical textiles aims to:

A. Provide direct subsidies to consumers of technical textile products.
B. Promote large-scale production of high-value items like carbon fiber and automotive safety gear.
C. Impose tariffs on imported technical textile produc
ts.
D. Establish textile parks in all states and union territories.

Answer: B

Q36. Which of the following statements about Sir C. Sankaran Nair is/are correct?

1. He was the only Indian member of the Viceroy's Executive Council who resigned in protest after the Jallianwala Bagh massacre.
2. He served as President of the Indian National Congress during the Surat Session of 1907.
3. He was a firm advocate for constitutional reforms and legal methods of political agitation.

A. 1 and 3 only
B. 2 and 3 only
C. 1, 2 and 3
D. 1 only

Correct Answer: A. 1 and 3 only

Q37. The term "externalization of borders" is often used in refugee discourse. In the context of the Sudan-Egypt-Europe migration route, what does it imply?

A. Migrants are only allowed to leave their country if approved by the UN.
B. European countries support non-EU states like Egypt to stop refugees before reaching Europe.
C. Borders of the EU have been physically relocated to Libya.
D. Border security is now managed by an international task force.

Correct Answer: B. European countries support non-EU states like Egypt to stop refugees before reaching Europe.

Q38. Which of the following types of inflation is primarily caused by an increase in production costs?

A. Cost-push inflation
B. Demand-pull inflation
C. Built-in inflation
D. Structural inflation

Explanation:
Option A is correct.Cost-push inflation results from rising input costs (wages, raw materials), which push up final prices.

Q39. Which of the following statements about aircraft accident investigation and response mechanisms in India is/are correct?

1. The Directorate General of Civil Aviation (DGCA) is the primary agency for investigating all aircraft accidents in India.
2. The Aircraft Accident Investigation Bureau (AAIB) operates under the Ministry of Civil Aviation and conducts independent investigations into civil aviation accidents.
3. The Airports Authority of India (AAI) plays no role in accident response.
4. The National Disaster Response Force (NDRF) assists in rescue and emergency response during aircraft crashes.

Select the correct option:

A. 2 and 4 only
B. 1 and 3 only
C. 1, 2 and 4 only
D. 1, 2, 3 and 4

Correct Answer: A. 2 and 4 only

Q40. Which of the following statements regarding the Global Gender Gap Index is/are correct?

1. It is published annually by the United Nations Development Programme (UNDP).
2. It measures gender parity across economic, education, health, and political parameters.
3. A score of 1 on the index indicates full gender parity.
4. India ranked among the top 50 countries in the 2025 Global Gender Gap Index.

Select the correct answer using the code below:

A. 2 and 3 only
B. 1 and 4 only
C. 1, 2 and 3 only
D. 2, 3 and 4 only

Correct Answer: A. 2 and 3 only

Q41. With reference to the International Atomic Energy Agency (IAEA)'s recent censure of Iran in 2025, consider the following statements:

1. The censure was due to Iran's non-compliance with its obligations under the Nuclear Non-Proliferation Treaty (NPT).
2. The resolution was passed unanimously by all IAEA Board of Governors member countries.
3. Iran has announced plans to withdraw from the NPT as an immediate response.
4. The censure may lead to Iran being referred to the UN Security Council and possible reimposition of sanctions.

Which of the statements given above are correct?

A. 1 and 4 only
B. 1, 2, and 3 only
C. 2 and 4 only
D. 1, 3, and 4 only

Correct Answer: A. 1 and 4 only

Q42. Which of the following pairs of chokepoints and locations are correctly matched?

Chokepoint	Located Between
1. Strait of Hormuz	Iran and Oman
2. Bab-el-Mandeb	Yemen and Djibouti
3. Suez Canal	Egypt and Saudi Arabia
4. Bosphorus Strait	Turkey and Greece

Options:

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) All of the above

Correct Answer: (a)

Q43. Which of the following is/are quantitative monetary policy tools used by the Reserve Bank of India (RBI)?

1. Repo Rate
2. Open Market Operations (OMO)
3. Moral Suasion
4. Statutory Liquidity Ratio (SLR)

Select the correct answer using the code given below:

(a) 1, 2 and 4 only
(b) 1 and 3 only
(c) 2, 3 and 4 only
(d) All of the above

Correct Answer: (a) 1, 2 and 4 only

Q44. Which of the following is a tri-service military exercise involving India and the United States?

(a) Tiger Triumph
(b) Yudh Abhyas
(c) Cope India
(d) Malabar

Correct Answer: (a) Tiger Triumph

Q45. Which of the following cancer drugs is known as the "red devil" due to its striking colour and severe side effects?

A. Doxorubicin
B. Methotrexate
C. Oxaliplatin
D. Cisplatin

Correct Answer: A. Doxorubicin

Q46. With reference to the 4th International Conference on Financing for Development (FfD4), consider the following statements:

1. The conference aims to reform the global financial system to close the SDG financing gap, especially for developing countries.
2. The Compromiso de Sevilla is the official negotiated outcome document of the FfD4 summit.
3. The conference is organized annually by the World Bank in collaboration with the IMF and UNDP.

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 2 and 3 only
C. 1 and 3 only
D. 1, 2 and 3

Correct Answer: A. 1 and 2 only

Q47. Which of the following straits are correctly matched with the water bodies they connect?

1. Strait of Hormuz – Persian Gulf and Gulf of Oman
2. Bab-el-Mandeb – Red Sea and Gulf of Aden
3. Bosporus Strait – Black Sea and Sea of Marmara
4. Dardanelles Strait – Caspian Sea and Aegean Sea

Select the correct answer using the code below:

A. 1, 2 and 3 only
B. 1 and 4 only
C. 2, 3 and 4 only
D. 1, 2, 3 and 4

Correct Answer: A. 1, 2 and 3 only

Q48.Which of the following weapons or systems are equipped on INS Tamal?

1. BrahMos cruise missiles
2. Shtil vertical-launched surface-to-air missiles
3. Anti-submarine rocket launchers
4. Barak-8 missile system

A. 1, 2 and 3 only
B. 2, 3 and 4 only
C. 1, 3 and 4 only
D. All of the above

Correct Answer:A

Q49. With reference to the launch vehicles developed by ISRO, consider the following statements:

1. PSLV is capable of launching satellites into both polar and geostationary orbits.
2. GSLV Mk III (LVM3) is ISRO's most powerful operational launch vehicle.
3. SSLV is designed to carry heavy payloads exceeding 5 tonnes into geostationary orbit.

Which of the statements given above is/are correct?

A. 1 and 2 only
B. 2 only
C. 1 and 3 only
D. 1, 2 and 3

Answer: A. 1 and 2 only

Q50. The Falcon 2000 project in India is primarily associated with which of the following government initiatives

A. Start-up India
B. UDAAN Scheme
C. Atmanirbhar Bharat
D. Smart Cities Mission

Answer:C. Atmanirbhar Bharat