

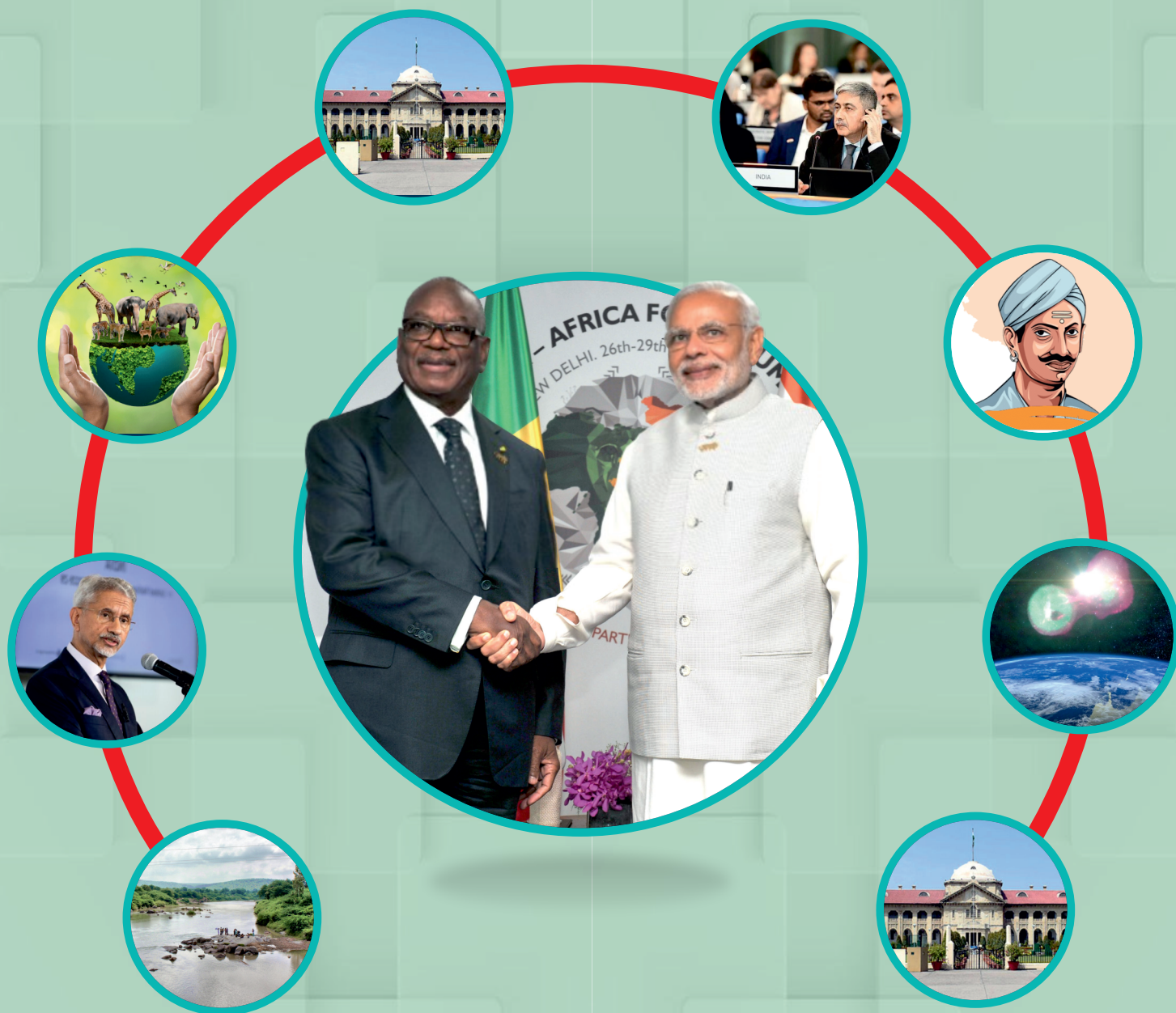


VAJIRAO & REDDY IAS

August 2026 Issue

Monthly Magazine

For UPSC | IAS | IPS & State Civil Services Aspirants



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Persons in News

India–Mali Inaugural Forum for Promotion of Exports: Strengthening Bilateral Trade & Strategic Partnership



Why in News?

- India and Mali institutionalised their economic partnership through the **inaugural India–Mali Forum for the Promotion of Exports**, held in **Bamako** under the theme **"Reinforcing Trade and Strategic Partnerships."**
- The Forum aims to strengthen **bilateral trade, investment, business cooperation, and strategic economic engagement.**
- Bilateral trade crossed **US\$326.61 million in FY 2025–26**, registering a **55% growth** over the previous year.
- Mali also announced a **Dedicated Investment Forum (3–4 December 2026)** to attract global investors.

Overview of the India–Mali Forum

Theme

"Reinforcing Trade and Strategic Partnerships"

Venue

- Bamako, Mali

Organisers

The Forum was jointly organised by:

- Ministry of Industry and Trade, Mali
- Embassy of India in Bamako
- Malian Agency for the Promotion of Exports (APEX-Mali)

Participants

The Forum brought together:

- Senior Government officials of India and Mali
- Around **30 Indian business leaders**
- Representatives of industry and trade organisations

Leadership

- **Mali:** Prime Minister of the Transition Government, **Major General Abdoulaye Maïga**
- **India:** Joint Secretary (FT-Africa), Department of Commerce

India–Mali Bilateral Trade

Trade Performance

Indicator	Details
Bilateral Trade (FY 2025–26)	US\$326.61 million
Annual Growth	55%

The significant rise reflects expanding commercial engagement between the two countries.

Major Exports

Mali's Exports to India

- Raw Cotton
- Finished Leather
- Cashew
- Lead
- Gum Arabic
- Sesame

India's Exports to Mali

- Pharmaceuticals
- Cotton Fabrics
- Two-wheelers
- Three-wheelers
- Bicycles

India's Duty-Free Tariff Preference (DFTP) Scheme

About

India provides **Duty-Free Tariff Preference (DFTP)** to Least Developed Countries (LDCs), including Mali.

Benefits

- Duty-free market access
- Increased export competitiveness
- Promotion of South-South trade
- Strengthening bilateral economic cooperation

Untapped Trade Potential

Particular	Value
Mali's Global Exports	US\$4 Billion
Untapped Export Potential in India	US\$3.96 Billion

Inference: Bilateral trade remains far below its actual potential.

Business Engagement During the Forum

- The Forum included multiple interaction platforms:

Business-to-Business (B2B)

Discussions covered:

- Renewable Energy
- Pharmaceuticals
- Textiles
- Mining
- Automobile Manufacturing

Business-to-Government (B2G)

Focus Areas:

- Investment facilitation
- Regulatory cooperation
- Trade promotion
- Market access

Government-to-Government (G2G)

Discussions focused on:

- Institutional cooperation
- Trade facilitation
- Long-term economic partnership
- Future investment roadmap

Industrial Exhibition

- The Forum also showcased products from Indian manufacturers.

Key Participants

- Sonalika Tractors
- Mahindra
- Tata Motors

The exhibition highlighted India's manufacturing capabilities and suitability for African markets.

Investment Opportunities Presented by Mali

During the Forum:

- **APEX-Mali** presented **Ready-Made Business Plans**.
- Projects were designed for immediate foreign investment.
- Focus was placed on attracting long-term industrial partnerships.

Priority Sectors for Bilateral Cooperation

1. Cotton & Textiles

Potential areas:

- Cotton processing
- Textile manufacturing
- Value addition
- Supply-chain integration

2. Mining

Key minerals include:

- Gold
- Lithium
- Iron Ore
- Bauxite
- Manganese

India can contribute through:

- Mining technology
- Equipment
- Processing expertise

3. Renewable Energy

Areas of cooperation:

- Solar Energy
- Clean Energy Infrastructure
- Sustainable Energy Projects

4. Agro-Industry & Shea Processing

Focus Areas:

- Shea processing
- Food processing
- Agricultural value addition

India also requested Mali to reconsider the **Shea Nut Export Ban**.

5. Pharmaceuticals

Mali requested:

- Faster registration of Indian medicines
- Greater access to affordable pharmaceuticals

6. Social Infrastructure

Future cooperation will include:

- Healthcare
- Education
- Skill Development
- Capacity Building

India's Key Requests

India highlighted the need for:

- Protection of Indian nationals
- Security of Indian investments
- Reconsideration of the Shea Nut Export Ban

Mali's Key Requests

- Mali sought India's assistance in:
- ***Digitisation of Certificate of Origin System***

To improve:

- Export documentation
- Trade facilitation
- Customs efficiency

Registration of Pharmaceuticals

- To accelerate approval of Indian medicines.

Vision Mali 2063

Mali reaffirmed its long-term development vision by aiming to become:

- A regional investment hub
- A secure business destination
- A gateway to West Africa

About Mali



Location

- Landlocked country in **West Africa**
- Situated in the **Sahara** and **Sahel** regions

Neighbouring Countries

- Algeria
- Niger
- Burkina Faso
- Côte d'Ivoire
- Guinea
- Senegal
- Mauritania

Capital

- **Bamako**

Major Rivers

- Niger River
- Senegal River

Highest Peak

- **Mount Hombori (1,155 m)**

Climate

- Hot
- Arid
- Semi-arid

Influenced by:

- Harmattan Winds
- Alizé Winds

Major Physiographic Regions

- Sahara Desert
- Sahel
- Sudanian Savanna

Economy

Major sectors include:

- Gold Mining (Largest Export)
- Cotton
- Livestock
- Fishing

Major Minerals

- Gold
- Iron Ore
- Bauxite
- Manganese
- Lithium

Historical Importance

Mali was once part of the:

- Ghana Empire
- Mali Empire
- Songhai Empire

Timbuktu

Renowned for:

- Trans-Saharan Trade
- Islamic Learning
- Cultural Exchange

Significance of the India–Mali Partnership

The Forum is significant because it:

- Institutionalises bilateral economic cooperation.
- Expands India's engagement with **West Africa**.
- Supports **South-South Cooperation**.
- Diversifies India's trade and investment partnerships.
- Strengthens supply chains in mining, textiles, pharmaceuticals, and renewable energy.
- Enhances India's economic diplomacy in Africa.

Challenges

- Bilateral trade remains below potential.
- Political and security challenges in Mali.
- Limited logistics and transport connectivity.
- Regulatory and market-access barriers.
- Delays in pharmaceutical approvals.
- Restrictions on certain agricultural exports.
- Need for stronger investment protection mechanisms.

Way Forward

- Strengthen institutional dialogue through regular India–Mali trade forums.
- Expand cooperation in **cotton, mining, renewable energy, pharmaceuticals, agro-processing, and infrastructure**.
- Facilitate easier market access and faster regulatory approvals.
- Encourage greater private sector participation and investment.
- Leverage the **December 2026 Investment Forum** to convert business opportunities into concrete projects.
- Deepen India's engagement with West Africa through development partnership, technology transfer, and sustainable economic cooperation.

CURRENT EVENTS OF INTERNATIONAL IMPORTANCE

India's Bid for the 2028–29 UN Security Council (UNSC) Non-Permanent Seat



Why in News?

- India is preparing to contest for a **non-permanent seat** in the **United Nations Security Council (UNSC)** for the **2028–29** term.
- The campaign reflects India's growing aspiration to play a greater role in **global governance** and represent the interests of the **Global South**.

About

- India's campaign comes at a time of increasing geopolitical tensions, including conflicts in **West Asia**, the **Russia–Ukraine conflict**, and growing divisions within multilateral institutions.
- The election will test India's diplomatic outreach across different regional and political groupings.

- Success in the election would further strengthen India's long-standing demand for **permanent membership** in a reformed UNSC.

Key Priorities for India's 2028–29 UNSC Bid

1. Diplomatic Outreach

- India will need extensive diplomatic engagement to secure the required support in the **UN General Assembly**.
- The contest is expected to be competitive, with **Tajikistan** also seeking the Asia-Pacific seat.

2. Expanding International Support

- India is working to broaden support among countries in the **Global South**, **Africa**, **Small Island States**, **Organisation of Islamic Cooperation (OIC)** members, **SCO countries**, and major Western partners.
- Recent diplomatic visits to the **Gulf**, **Caribbean**, and other regions reflect this outreach.

3. Voice of the Global South

- India aims to strengthen its image as a responsible representative of developing countries.
- It seeks to highlight issues such as:
 - **Energy security**
 - **Food and fertiliser security**
 - **Sustainable development**
 - **Reform of global governance institutions**

4. UNSC Reform

- India continues to advocate expansion of both **permanent** and **non-permanent** membership.
- It argues that the present structure no longer reflects contemporary geopolitical realities.

5. Increasing Competition

- Recent UNSC elections indicate that contests are becoming more competitive due to changing geopolitical alignments.
- This underscores the need for sustained diplomatic engagement by India.

United Nations Security Council (UNSC)

About

- The **UN Security Council** was established in **1945** under the **UN Charter**.
- It bears the primary responsibility for maintaining **international peace and security**.

Composition

- Total Members: **15**
 - **5 Permanent Members (P5):** China, France, Russia, United Kingdom and United States.
 - **10 Non-Permanent Members**, elected for **two-year terms**.

Regional Distribution of Non-Permanent Seats

- **5 seats** – African and Asian States.
- **1 seat** – Eastern European States.
- **2 seats** – Latin American and Caribbean States.
- **2 seats** – Western European and Other States.

Election Process

- Members are elected annually by the **UN General Assembly** through a **secret ballot**.
- A candidate must secure a **two-thirds majority** of votes.

Powers

- The UNSC is the **only UN organ** whose decisions are **legally binding** on all member states under the UN Charter.

India and the UNSC

1. India's Membership

- India has served as a **non-permanent member** of the UNSC **eight times**:
 - **1950–51**
 - **1967–68**
 - **1972–73**
 - **1977–78**
 - **1984–85**
 - **1991–92**
 - **2011–12**
 - **2021–22**

2. India's Key Contributions

- Promotion of **counter-terrorism**.

- Strengthening **maritime security**.
- Support for **UN peacekeeping reforms**.
- Emphasis on **development-oriented security**.
- Advocacy for **reform of multilateral institutions**.

3. India's Claim for Permanent Membership

- India is a member of the **G4 Group** comprising **India, Brazil, Germany and Japan**.
- The group supports expansion of both permanent and non-permanent seats in the UNSC.

Challenges Associated with the UNSC

1. Inadequate Representation

- The present composition does not adequately represent today's geopolitical realities.
- Regions such as **Africa, Latin America**, and much of the **Global South** remain under-represented.
- Major economies such as **India, Germany, Brazil and South Africa** are not permanent members.

2. Veto Power

- The veto enjoyed by the **P5** often prevents timely action on important international issues.
- It is widely criticised as being **undemocratic** and inconsistent with the principle of sovereign equality.

3. Geopolitical Rivalries

- Differences among permanent members frequently lead to deadlock on major global crises.
- Rivalries among major powers reduce the Council's effectiveness in maintaining international peace.

4. Sovereignty Concerns

- UNSC resolutions are binding on all member states.
- Measures such as **sanctions, peacekeeping operations** and other enforcement actions may affect a country's sovereignty.

Way Forward

1. Democratise the UNSC

- Reform decision-making to make the Council more representative, transparent and legitimate.

2. Expand Membership

- Increase representation for **Africa, Latin America**, and the **Global South**.
- Include major global contributors such as **India, Brazil, Germany and South Africa**.

3. Reflect Contemporary Realities

- Membership should be aligned with present-day geopolitical and economic realities rather than the post-Second World War order.

4. Reform the Veto System

- Encourage restraint in the use of veto, particularly in cases involving:
 - **Genocide**
 - **War crimes**
 - **Terrorism**
 - **Humanitarian crises**
 - **Mass atrocities**

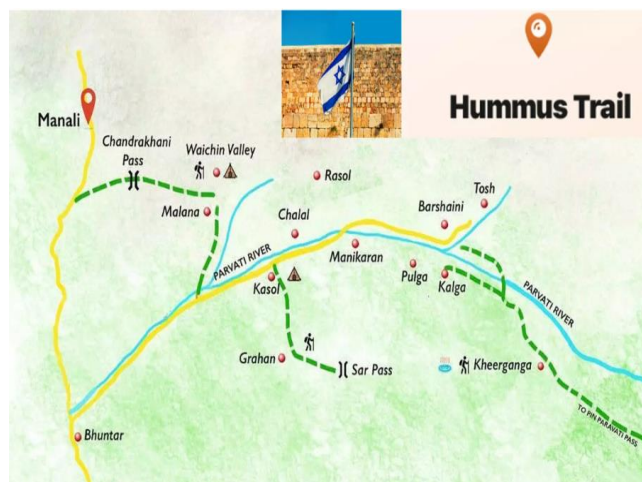
5. Improve Transparency and Accountability

- Promote wider consultations, open debates and greater participation of affected countries.
- Ensure fair and consistent implementation of UNSC resolutions.

6. Strengthen India's Global South Leadership

- Continue active engagement with developing countries.
- Use multilateral forums to highlight the concerns of the **Global South** and build consensus for comprehensive UNSC reforms.

Geneva Conventions and the 'Hummus Trail' Controversy



Why in News?

- The **Geneva Conventions, 1949** have come into focus following a petition filed by the **Hind Rajab Foundation (HRF)** seeking the arrest of an **Israeli soldier** visiting Himachal Pradesh over alleged **war crimes in Gaza**.
- The incident has sparked debate on **International Humanitarian Law (IHL)**, **universal jurisdiction**, India's legal obligations under the **Geneva Conventions Act, 1960**, and the balance between international commitments and diplomatic considerations.

Hummus Trail

About

- The **Hummus Trail** is an informal travel route across India popular among **young Israeli travellers**, particularly those who have completed their mandatory military service.
- The name is inspired by the earlier **Hippie (Hashish) Trail** and reflects a well-established backpacking circuit.

Major Destinations

Popular destinations on the Hummus Trail include:

- **Kasol**
- **Dharamkot**
- **Rishikesh**
- **Pushkar**
- **Goa**
- **Hampi**
- **Gokarna**
- **Kodaikanal**
- **Andaman & Nicobar Islands**

Tiul Gadol ("Big Trip")

- Many Israeli youths undertake a **Tiul Gadol ("Big Trip")** after completing compulsory military service.
- The journey generally lasts **six months to one year** and is often financed through post-service benefits.
- India remains one of the preferred destinations for these travellers.

Geneva Conventions (1949)

About

- The **Four Geneva Conventions of 1949**, together with their **Additional Protocols**, constitute the foundation of **International Humanitarian Law (IHL)**.
- They provide legal protection to persons affected by **armed conflicts**.

Four Geneva Conventions

1. First Geneva Convention

- Protects **wounded and sick members of armed forces on land**.

2. Second Geneva Convention

- Protects **wounded, sick and shipwrecked military personnel at sea**.

3. Third Geneva Convention

- Lays down protections and rights for **Prisoners of War (POWs)**.

4. Fourth Geneva Convention

- Protects **civilians during armed conflict**.
- Identifies serious violations such as:
 - **Wilful killing**.
 - **Torture**.
 - Extensive destruction of property without military necessity.
- Such offences are classified as **grave breaches (war crimes)**.

Universal Jurisdiction

- The Geneva Conventions require State Parties to:
 - **Search for** persons accused of grave breaches.
 - **Prosecute** them in domestic courts, or
 - **Extradite** them to another State for prosecution.
- This obligation applies **irrespective of the nationality of the accused or the place where the alleged offence occurred**.

India's Legal Framework

Geneva Conventions Act, 1960

- India enacted the **Geneva Conventions Act, 1960** to implement its obligations under the Geneva Conventions.

- The Act criminalises **grave breaches** recognised under the four Geneva Conventions.

Jurisdiction

- India possesses the legal authority to investigate and prosecute persons accused of grave breaches if they are found within Indian territory, irrespective of:
 - Nationality.
 - Place where the alleged offence occurred.

Administrative Powers

- Apart from criminal proceedings, the Government of India, through the **Ministry of Home Affairs (MHA)** and immigration authorities, may exercise its sovereign powers under applicable immigration laws, including deportation of foreign nationals where legally warranted.

Global Practice

Universal Jurisdiction

- Several countries have invoked the principle of **universal jurisdiction** to investigate alleged war crimes committed outside their territories.
- Human rights organisations have used domestic legal systems in countries such as **Chile, Brazil, and Canada** to seek legal action against individuals accused of serious violations of international humanitarian law.

Significance for India

1. International Humanitarian Law

- Reinforces India's obligations as a State Party to the **Geneva Conventions**.

2. Diplomatic Balancing

- Highlights the challenge of balancing:
 - Strategic relations with **Israel**.
 - Commitments under international humanitarian law.

3. Rule of Law

- Raises important questions regarding the implementation of **universal jurisdiction** through domestic legislation.

4. Global Legal Developments

- Gains additional significance amid ongoing international legal proceedings concerning the conflict in Gaza, including cases before the **International Court of Justice (ICJ)**.

President of India's State Visits to Moldova and North Macedonia



Why in News?

- The **President of India** concluded **State Visits to the Republic of Moldova and the Republic of North Macedonia**.
- These were the **first-ever visits by an Indian Head of State** to both countries, marking a significant step in strengthening India's diplomatic engagement with Eastern and Southeast Europe.

Visit to Moldova

Key Highlights

Enhanced Capacity Building

- India announced that it will **double the number of Indian Technical and Economic Cooperation (ITEC) training slots** for professionals from Moldova.

Economic Cooperation

- The President addressed the **India–Moldova Business Forum** to promote:
 - Bilateral trade.
 - Investment.
 - Stronger and more resilient supply chains.

Moldova: Geographical & Strategic Profile

Location

- Moldova is a **landlocked country** in **Eastern Europe**.

Borders

It shares borders with:

- **Romania** to the west.
- **Ukraine** to the north, east and south.

Strategic Importance

- Moldova received **European Union (EU) candidate status** along with Ukraine in **2022**.
- It holds strategic importance due to:
 - Its proximity to the **Russia–Ukraine conflict**.
 - The presence of **Transnistria**, a breakaway region located within Moldova's internationally recognised borders.

Visit to North Macedonia

Key Highlights

Tribute to Goce Delčev

- The President paid homage at the grave of **Goce Delčev**, the 19th-century revolutionary who led the struggle for the liberation of **Macedonia and Adrianople** from Ottoman rule.

Support for Global Initiatives

- India welcomed North Macedonia's intention to join:
 - **International Solar Alliance (ISA)**
 - **Coalition for Disaster Resilient Infrastructure (CDRI)**
 - **Global Biofuels Alliance (GBA)**

ITEC Expansion

- India also **doubled ITEC training slots** for North Macedonia.
- The expanded programme will place special emphasis on **Artificial Intelligence (AI)** skill development.

North Macedonia: Geographical & Strategic Profile

Location

- North Macedonia is a **landlocked country** situated in the **Balkan Peninsula** of **Southeast Europe**.

Borders

It shares borders with:

- **Kosovo** (northwest)

- **Serbia** (north)
- **Bulgaria** (east)
- **Greece** (south)
- **Albania** (west)

Strategic Importance

- The country officially changed its name from **Macedonia** to **North Macedonia** in **2019** after resolving a long-standing name dispute with Greece.
- The agreement paved the way for its **NATO membership**.
- North Macedonia serves as an important gateway connecting the **Mediterranean region** with **Central Europe**.

Cultural Connection with India

- Its capital, **Skopje**, is the birthplace of **Mother Teresa**, the Nobel Peace Prize laureate, creating a significant historical and cultural link between India and North Macedonia.

India–Romania Relations

- **President Droupadi Murmu** visited **Romania** during the final leg of her State Visits to **Moldova, North Macedonia, and Romania**, marking the **first State Visit by an Indian President to Romania in nearly 30 years**.

Key Highlights of the Visit

Strengthening Bilateral Relations

- India and Romania reaffirmed their **70-year diplomatic partnership** and agreed to expand cooperation in **trade, investment, and resilient supply chains**.
- Both countries set a target of **doubling bilateral trade within the next three years**.

Trade Relations

- India currently enjoys a **trade surplus** with Romania.
- In **FY 2024–25**, Romania accounted for **0.24% of India's exports** and was India's **56th largest export destination**.
- **Major Indian exports** include:
 - Petroleum products
 - Engineering goods
 - Pharmaceuticals

- **Major imports from Romania** include:
 - Machinery
 - Vegetable oils
 - Iron and steel

Importance of India–EU Free Trade Agreement (FTA)

- India recognised Romania as an important partner within the **European Union (EU)**.
- Both sides noted that the proposed **India–EU Free Trade Agreement (FTA)** would create new opportunities for industries, trade, investment, and skilled professionals.

Education and Cultural Cooperation

- Three agreements were signed to strengthen cooperation in:
 - Education
 - Culture
 - People-to-people exchanges

Science and Technology

- India and Romania agreed to expand joint **Research and Development (R&D)** under the existing **Programme of Cooperation in Science and Technology**.

Promotion of Indian Culture

- An **Indian Studies Chair** will be established at the **University of Bucharest** with support from the **Indian Council for Cultural Relations (ICCR)**.

Capacity Building

- India announced that the number of training opportunities for Romanian professionals under the **Indian Technical and Economic Cooperation (ITEC) Programme** will be doubled.

India–Romania Year of Innovation

- To mark **80 years of diplomatic relations** in **2028**, both countries agreed to celebrate **2028 as the "India–Romania Year of Innovation."**

Romania

Location

- Romania is located in **South-Eastern Europe**.
- It shares borders with:
 - **Ukraine** (North)

- **Moldova** (East)
- **Black Sea** (South-East)
- **Bulgaria** (South)
- **Serbia** (South-West)
- **Hungary** (North-West)

- **Capital: Bucharest**

Political Profile

- Romania is a **democratic republic**.
- It is a member of:
 - **European Union (EU)**
 - **North Atlantic Treaty Organization (NATO)**

Physical Features

- Romania has a balanced physical landscape comprising nearly:
 - One-third **mountains**
 - One-third **hills**
 - One-third **plains**
- Major geographical features include:
 - **Carpathian Mountains**
 - **Transylvanian Basin**
 - **Danube Delta** (UNESCO World Heritage Site)
 - Fertile **Chernozem Plains**

Economy

- Romania is a **high-income economy**.
- It is among the **fastest-growing economies in the European Union**.

Strategic Importance

- Romania's location on the **Black Sea** gives it strategic importance in Europe.
- It hosts the **Port of Constanța**, one of the major gateways for **Europe–Asia trade**.
- It is an important partner for India in sectors such as:
 - Information Technology (IT)
 - Pharmaceuticals
 - Automobiles
 - Renewable Energy
 - India–EU economic cooperation

US–Saudi Arabia Civil Nuclear Agreement



Why in News?

- The **United States** and **Saudi Arabia** signed a landmark **Civil Nuclear Cooperation Agreement** under **Section 123 of the US Atomic Energy Act, 1954 (123 Agreement)** along with a **Bilateral Nuclear Safeguards Agreement**, establishing a **30-year civilian nuclear partnership**.
- The US stated that implementation of the agreement is conditional upon **Saudi Arabia joining the Abraham Accords and normalising diplomatic relations with Israel**.

Key Highlights of the US–Saudi Arabia Nuclear Agreement

Civil Nuclear Cooperation

- Establishes a **30-year multi-billion-dollar civilian nuclear partnership**.
- Facilitates the transfer of:
 - Civil nuclear materials
 - Equipment
 - Technology
 - Technical expertise
- Gives **American nuclear companies priority** in developing Saudi Arabia's civilian nuclear infrastructure.

Uranium Enrichment Framework

- Saudi Arabia will initially **import nuclear fuel** for its reactors.
- A **two-year joint feasibility study** will assess the commercial viability of uranium enrichment.

- If viable:
 - US companies will build and operate enrichment facilities.
 - Sensitive enrichment technology will remain under **US control ("black box" arrangement)**.
 - Technology will **not be transferred** to Saudi Arabia.

Safeguards and Verification

- Unlike the **US–UAE Nuclear Agreement (2009)**, Saudi Arabia is **not required to permanently renounce uranium enrichment or spent-fuel reprocessing (Gold Standard)**.
- The agreement does **not require adoption of the IAEA Additional Protocol**, limiting intrusive international inspections.
- Critics argue that this could weaken **global nuclear non-proliferation norms** by legitimising dual-use nuclear technologies.

Strategic Significance

For Saudi Arabia (Vision 2030)

- Supports **Vision 2030** by:
 - Diversifying energy sources
 - Reducing dependence on oil and natural gas
 - Meeting rising electricity demand
 - Supporting AI data centres, industries and mega infrastructure projects
- Motivated by:
 - Domestic uranium reserves
 - Concerns over Iran's nuclear programme
 - Regional instability
 - Energy security

For the United States

- Secures contracts for the US nuclear industry.
- Limits the growing influence of **China and Russia** in West Asia's strategic infrastructure.

Impact on Iran

- Iran possesses one of the region's most advanced nuclear programmes, including uranium enriched up to **60%**, close to weapons-grade purity.

- Iran maintains its programme is peaceful under the **Nuclear Non-Proliferation Treaty (NPT)**.
- Allowing Saudi Arabia to enrich uranium may encourage Iran to further insist on retaining its own enrichment capabilities, complicating future nuclear negotiations.

Abraham Accords

About

- A series of **US-brokered agreements (2020)** normalising diplomatic relations between **Israel** and several Arab countries.
- Named after **Abraham**, regarded as a common patriarch in **Judaism, Christianity and Islam**.

Key Signatories

- United Arab Emirates (2020)
- Bahrain (2020)
- Morocco (2020)
- Sudan (2021)

Significance

- Expanded cooperation in:
 - Diplomacy
 - Trade
 - Tourism
 - Technology
 - Security
- Reflected a shift where some Arab countries prioritised strategic interests alongside the Palestine issue.

Strategic Deadlock

- Saudi Arabia maintains that normalisation with Israel is possible only through a **credible pathway to an independent Palestinian State** based on **1967 borders**, with **East Jerusalem as its capital**.

India's Interest

- Strengthened India's engagement with both Israel and Gulf countries.
- Led to the formation of the **I2U2 Group (India, Israel, UAE and the US)** focusing on:
 - Energy
 - Food security
 - Water

- Health
- Transport
- Space
- Emerging technologies

Implications for India

Energy Security

- Rising Saudi-Iran rivalry could disrupt oil supplies through the **Strait of Hormuz**.
- India imports nearly **40% of its crude oil** from West Asia, making energy security vulnerable.

Strategic Balancing

- Tests India's **multi-alignment policy**, given its close relations with:
 - Saudi Arabia
 - Iran
 - Israel
 - United States

Impact on IMEC

- Progress of the **India–Middle East–Europe Economic Corridor (IMEC)** depends on regional stability and improved Saudi-Israel relations.
- Delays in expanding the Abraham Accords could affect the project.

Economic Opportunities

- Expansion of Saudi Arabia's civilian nuclear sector may create opportunities for Indian companies in:
 - Engineering
 - Construction
 - Non-sensitive nuclear infrastructure

India–US Nuclear Deal Vs. US–Saudi Arabia Nuclear Agreement

Parameter	India–US Civil Nuclear Deal (2008)	US–Saudi Arabia Nuclear Agreement (2026)
NPT Status	India is a non-signatory to the NPT and received a 2008 NSG waiver , enabling global civil nuclear cooperation.	Saudi Arabia is an NPT signatory as a Non-Nuclear Weapon State (NNWS).
Uranium Enrichment & Reprocessing	India received consent for enrichment and reprocessing after separating civilian and military facilities under IAEA safeguards.	Does not prohibit enrichment. Proposes a feasibility study for a US-operated enrichment facility while keeping sensitive technology under US control.

IAEA Safeguards	India signed an India-specific IAEA Safeguards Agreement and India-specific Additional Protocol , applicable only to civilian facilities.	Covered under an IAEA Comprehensive Safeguards Agreement , but adoption of the Additional Protocol is not mandatory.
Geopolitical Objective	Strengthened the India-US strategic partnership and integrated India into the global nuclear framework.	Supports Saudi Vision 2030 , energy diversification, and reduces dependence on China and Russia while linking implementation to the Abraham Accords.

Conclusion

- The **US-Saudi Arabia Nuclear Agreement** aims to advance Saudi Arabia's civilian nuclear programme while supporting US strategic interests in West Asia.
- However, concerns remain regarding **non-proliferation, regional security, and safeguards**.
- Strong **IAEA oversight**, greater transparency, and adherence to international verification standards will be essential to balance **civilian nuclear cooperation, regional stability, and global non-proliferation objectives**.

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EDITORIALS

Crux of The Hindu & Indian Express

International Issues

16th India-Japan Annual Summit 2026 and Japan's Expanding Indo-Pacific Strategy



Why in News?

- Japanese Prime Minister **Sanae Takaichi** paid her first official visit to India from **1-3 July 2026** for the **16th India-Japan Annual Summit**.
- India and Japan adopted a comprehensive framework covering **defence cooperation, economic security, energy resilience, critical technologies, supply chain security, connectivity, clean energy, artificial intelligence, regional security, and Indo-Pacific cooperation**.

Background of India-Japan Relations

Evolution of Partnership

- India and Japan share a **Special Strategic and Global Partnership** based on:
 - Democracy.
 - Rule of law.
 - Freedom of navigation.
 - Peaceful dispute resolution.
 - Respect for sovereignty and territorial integrity.

Strategic Importance

- Both countries view each other as **natural and indispensable partners** in shaping a stable and prosperous Indo-Pacific region.

Why is PM Takaichi's Visit Important?

Geopolitical Context

- The visit occurred amid:
 - Growing geopolitical uncertainty.
 - Increasing great-power competition.
 - Technological rivalry.
 - Supply-chain disruptions.
 - Maritime security concerns.

Takaichi's Message

- She emphasized that cooperation with India has become more important than ever because both countries share:
 - Fundamental values.
 - Strategic interests.
 - Commitment to a rules-based international order.

Strategic Significance

- Demonstrates Japan's increasing focus on India as a central pillar of its Indo-Pacific strategy.
- Reflects growing India-Japan convergence on regional security and economic resilience.

Japan's Free and Open Indo-Pacific (FOIP) Vision

Origin

- Proposed by former Japanese Prime Minister **Shinzo Abe** during his address to the Indian Parliament in 2007.

Further Development

- Expanded by former Prime Minister **Fumio Kishida** through the New Plan for FOIP in 2023.

Core Objective

- Build a:
 - Free.
 - Open.
 - Inclusive.
 - Rules-based Indo-Pacific.

Alignment with India

- Closely aligns with:
 - Indo-Pacific Oceans Initiative (IPOI).
 - MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions).

Why is Japan Expanding Its Indo-Pacific Role?

China's Growing Assertiveness

Economic Coercion

- Use of trade restrictions and economic pressure.

Military Expansion

- Increased military activities in:
 - South China Sea
 - East China Sea

Taiwan Concerns

- Japan supports peaceful resolution of cross-strait issues.
- Opposes unilateral attempts to alter the status quo by force.

Changing U.S. Role

- Perception of reduced U.S. engagement in some regional issues.
- Encouraging Japan to assume a more proactive leadership role.

Need for Regional Stability

- Ensure security of trade routes.
- Protect supply chains.
- Maintain freedom of navigation.

Three Pillars of Updated FOIP

1. Economic Infrastructure

Focus Areas

- AI and digital economy infrastructure.
- Semiconductor ecosystems.
- Critical mineral supply chains.
- Energy security networks.

2. Economic Growth through Partnerships

Objectives

- Public-private collaboration.
- Infrastructure development.
- Sustainable economic growth.

3. Security Cooperation

Focus Areas

- Maritime security.
- Defence cooperation.
- Capacity building.
- Regional resilience.

Defence and Security Cooperation

Growing Strategic Partnership

- Both countries acknowledged that defence cooperation is on an upward trajectory.

2+2 Ministerial Dialogue

- Agreed to hold the fourth India-Japan 2+2 Ministerial Meeting in Tokyo.

Maritime Security Cooperation

- Enhanced cooperation in:
 - Maritime Domain Awareness (MDA).
 - Satellite-based surveillance.
 - Naval exercises.
 - Naval Maintenance, Repair and Overhaul (MRO).

JAIMEX-25 Naval Exercise

- Successful conduct of the India-Japan maritime exercise was welcomed.

International Fleet Review 2026

- Japan participated in the Fleet Review at Visakhapatnam.

Defence Technology Cooperation

- Promotion of defence manufacturing under **Make in India**.

UNICORN Project

About

- Unified Complex Radio Antenna (UNICORN) Project.

Significance

- Important step toward advanced defence technology cooperation.
- Remaining technical issues largely resolved.

Japan's Expanding Defence Role in Indo-Pacific

Official Security Assistance (OSA)

About

- Japan's military assistance programme.

Recent Developments

- Budget increased by approximately 125%.
- Expansion of recipient countries from 8 to 12.

Australia Partnership

- Enhanced Defence and Security Cooperation.
- Agreement involving **Mogami-class frigates**.

Southeast Asia Outreach

- Increased defence cooperation with:
 - **Philippines**
 - **Indonesia**
 - **South Korea**

Japan-Pacific Defence Dialogue

- Platform involving Pacific and Southeast Asian nations.
- Focus on:
 - Crisis response.
 - Resilience.
 - Interoperability.
 - Capacity building.

Economic Security Cooperation

Why Important?

- Economic security has emerged as a major pillar of Japan's foreign policy.

Key Concerns

- Economic coercion.
- Export restrictions.
- Supply-chain vulnerabilities.
- Overdependence on a single country.

India–Japan Joint Declaration on Economic Security

- Adopted during the summit.
- Promotes cooperation in:
 - Semiconductors.
 - Critical minerals.
 - ICT.
 - Clean energy.
 - Pharmaceuticals.

Critical Minerals Cooperation

Importance

- Essential for:
 - EV batteries.
 - Renewable energy.
 - Semiconductors.
 - Defence manufacturing.

Objective

- Develop diversified and resilient supply chains.

Energy Security Cooperation

Strategic Context

- Both countries are heavily dependent on imported energy.

Strait of Hormuz

- Reaffirmed importance of free navigation through the **Strait of Hormuz**.

Maritime Energy Transport Value Chain

- Joint investments and cooperation across:
 - Energy transportation.
 - Logistics.
 - Strategic reserves.

Joint Statement on Energy Resilience

- Adopted during the summit.

POWERR Asia Initiative

About

- **Partnership on Wide Energy and Resources Resilience (POWERR Asia).**

Objectives

- Regional energy security.
- Strategic stockpiling.
- Supply-chain resilience.

Features

- Financial assistance.
- Energy procurement support.
- Resource security initiatives.

India's IEA Membership

- Japan reaffirmed support for India's membership in the **International Energy Agency**.

Clean Energy Cooperation

India–Japan Cooperative Biogas for Growth Initiative

- Supports India's target of establishing:
 - 1,000 biogas plants.
 - Organic fertilizer facilities.

Key Areas

- Green hydrogen.
- Clean ammonia.
- Solar PV technologies.
- Nuclear energy.

Odisha Clean Ammonia Project

- Reaffirmed support for the landmark project.

Artificial Intelligence and Emerging Technologies

India–Japan AI Strategic Dialogue

- First-ever AI Strategic Dialogue launched.

Focus Areas

- Trusted AI.
- AI infrastructure.
- AI governance.
- AI supply-chain resilience.

Guiding Frameworks

- Hiroshima AI Process.
- New Delhi Declaration on AI Impact.

Quantum Technologies

- Letter of Intent signed for cooperation in quantum technologies.

Trade and Investment Cooperation

Investment Target

- Progress toward the target of **10 trillion Yen investment** in India.

CEPA Review

- Review of the **Comprehensive Economic Partnership Agreement (CEPA)** to make it more forward-looking.

Priority Sectors

- Logistics.
- Agriculture.
- Textiles.
- Food Processing.
- Automobiles.
- Industrial Capital Goods.

Financial Cooperation

- Payment systems cooperation.
- Local currency transactions.
- Banking sector collaboration.

Healthcare Cooperation

- Strengthening pharmaceutical supply chains.

SME and Startup Cooperation

India-Japan SME Forum

- Inaugurated during the summit.

Focus Areas

- MSME integration.
- Startup cooperation.
- Technology partnerships.
- Industrial collaboration.

Japan-India Startup Support Initiative (JISSI)

- Promotes Japanese startup participation in India.

Connectivity and Infrastructure

Major Development Projects

- Mumbai Metro Line-11.
- Bengaluru Metro Phase-3.
- Healthcare projects in Maharashtra.
- Sustainable horticulture projects in Punjab.

Objective

- Promote sustainable and inclusive growth.

Mumbai–Ahmedabad High-Speed Rail Project

Importance

- Flagship India-Japan infrastructure project.

Future Vision

- Support India's plan for a **7,000 km High-Speed Rail Network**.

Next-Generation Mobility Partnership

- Cooperation in:
 - High-speed rail.
 - Advanced mobility.
 - Shipbuilding.
 - Human resource development.

Space, Science and Technology Cooperation

LUPEX Mission

- Joint lunar mission between:
 - **Indian Space Research Organisation**
 - **Japan Aerospace Exploration Agency**

Scientific Exchanges

- LOTUS Programme.
- Sakura Science Exchange Programme.
- Indo-Japan Cooperative Science Programme.

People-to-People Relations

Tourism

- Visitor exchanges crossed 540,000 in 2025.

Education

- Japanese language education.
- Student exchange programmes.
- University collaborations.

Cultural Cooperation

- Anime.
- Manga.
- Gaming.
- Films.

North-East India and Act East Policy

Strategic Importance

- Gateway between India and Southeast Asia.

Japanese Assistance

- Roads.

- Bridges.
- Healthcare infrastructure.
- Forest management.
- Disaster risk reduction.

Industrial Value Chains

- Linking North-East India with the Bay of Bengal region.

Role of BIMSTEC

- **BIMSTEC** identified as a key partner for regional connectivity and prosperity.

Quad Cooperation

Priority Areas

- Maritime security.
- Economic security.
- Critical minerals.
- Emerging technologies.
- Humanitarian Assistance and Disaster Relief (HADR).

Importance

- Strengthens Indo-Pacific resilience and stability.

Regional and Global Issues

South China Sea and East China Sea

- Concern over militarization.
- Opposition to unilateral changes in status quo.
- Emphasis on peaceful dispute resolution under **UNCLOS**.

North Korea

- Commitment to complete denuclearization.

Myanmar

- Support for inclusive political dialogue.

Middle East

- Concern over regional instability.
- Support for safe navigation and energy security.

Africa

- Cooperation through:
 - India-Africa Forum Summit (IAFS).
 - Tokyo International Conference on African Development (TICAD).

Ukraine

- Support for a just and lasting peace based on international law.

UN Security Council Reforms

G4 Cooperation

- India and Japan reiterated support for UNSC reform.

Mutual Support

- Support for each other's candidature as permanent members of a reformed **United Nations Security Council**.

Counter-Terrorism Cooperation

Strong Condemnation

- Condemned terrorism and violent extremism in all forms.

Pahalgam Terror Attack

- Strong condemnation of the April 2025 attack.

Action Against Terror Groups

- Called for action against:
 - Al-Qaeda
 - Islamic State
 - Lashkar-e-Taiba
 - Jaish-e-Mohammed

Significance

For India

- Access to advanced technology.
- Greater Japanese investment.
- Enhanced maritime security.
- Strengthened Indo-Pacific strategy.

For Japan

- Reliable strategic partner.
- Access to a large market.
- Diversified supply chains.
- Stronger regional influence.

For Indo-Pacific

- Promotes a free, open, inclusive, and rules-based regional order.
- Strengthens resilience against geopolitical and economic disruptions.

Challenges

- Managing relations with **China** while protecting strategic interests.
- Balancing ties with the **United States** amid changing regional dynamics.
- Supply chain vulnerabilities.
- Energy security risks.
- Maritime disputes and regional conflicts.

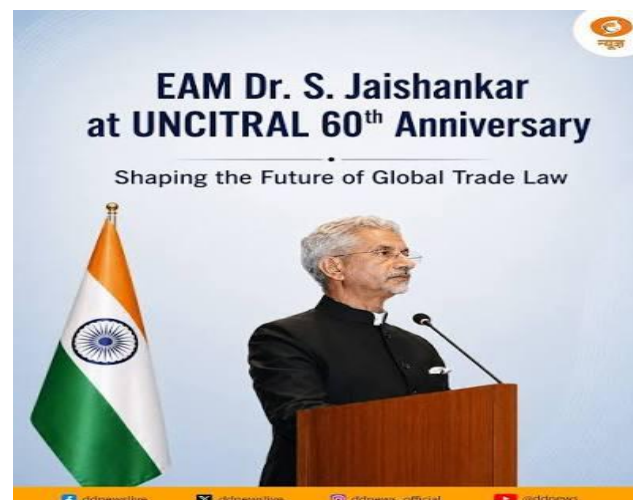
Way Forward

- Deepen defence and maritime cooperation.
- Accelerate semiconductor and critical mineral partnerships.
- Expand clean-energy collaboration.
- Strengthen connectivity in North-East India and the Bay of Bengal region.
- Enhance cooperation through **Quad**, **BIMSTEC**, and ASEAN-led mechanisms.
- Promote trusted technology partnerships in AI, quantum technologies, and cybersecurity.

Conclusion

The **16th India–Japan Annual Summit 2026** marks a significant milestone in the evolution of the **India–Japan Special Strategic and Global Partnership**. As geopolitical competition intensifies across the Indo-Pacific, both countries are emerging as key pillars of a **Free, Open, Inclusive, and Rules-Based Indo-Pacific**, with cooperation spanning defence, economic security, energy resilience, critical technologies, connectivity, and regional stability.

UNCITRAL's 60th Anniversary Conference



Why in News?

- India hosted an international conference to commemorate the **60th anniversary of the United Nations Commission on International Trade Law (UNCITRAL)**.
- Addressing the conference, **External Affairs Minister (EAM) S. Jaishankar** emphasised the need for **predictable, harmonised and inclusive international trade laws**, with greater participation of the **Global South** in shaping global legal norms.

United Nations Commission on International Trade Law (UNCITRAL)

About

- **UNCITRAL** is the **United Nations Commission on International Trade Law**.
- Over the past **60 years**, it has contributed to:
 - Harmonisation of international trade law.
 - Modernisation of commercial legal frameworks.
 - Progressive development of international trade law.
- It develops:
 - Model laws.
 - International conventions.
 - Legal standards governing international trade.

Why is UNCITRAL Becoming More Relevant?

According to the External Affairs Minister, the global economy is undergoing major changes due to:

- Rapid technological advancements.
- Growth of digital commerce.
- Changing global supply chains.
- New investment patterns.
- Geopolitical volatility.
- Cross-border movement of goods, services, capital and data.

These developments have increased the need for:

- Predictable legal systems.
- Harmonised international rules.
- Efficient dispute resolution mechanisms.
- Stable cross-border commercial frameworks.

Key Highlights of EAM Jaishankar's Address

Need for Predictable Legal Frameworks

- Countries require:
 - Reliable legal certainty.
 - Harmonised trade rules.
 - Efficient dispute resolution systems.
- Such frameworks are essential for facilitating:
 - International trade.
 - Cross-border investment.
 - Commercial cooperation.

Inclusive International Trade Law

- International trade law should reflect the developmental priorities of the **Global South**.
- Developing countries should have a greater role in framing international legal norms.
- The future global legal architecture should be:
 - Democratic.
 - Inclusive.
 - Responsive to the needs of developing economies.

Trade Law as an Equaliser

- International trade law should function as a **leveller** by bridging the gap between:
 - Developed economies.
 - Developing economies.

India's Association with UNCITRAL

- India is among the **eight countries** that have maintained **continuous membership** of UNCITRAL.
- India has actively contributed to the evolution of international trade law.

India's Legal Reforms

The External Affairs Minister highlighted India's reforms in:

- Arbitration.
- Commercial dispute resolution.
- Insolvency.

These reforms demonstrate India's commitment to creating:

- A modern legal framework.
- A transparent legal system.
- An internationally compatible commercial environment.

Link with Viksit Bharat 2047

According to the External Affairs Minister, achieving the vision of **Viksit Bharat 2047** requires:

- A resilient economy.
- Technological innovation.
- Expansion of manufacturing.
- Deeper global economic integration.
- Predictable legal frameworks that support international trade and commercial cooperation.

Objectives Highlighted at the Conference

- Promote harmonised international trade laws.
- Strengthen legal certainty in cross-border transactions.
- Improve dispute resolution mechanisms.
- Encourage inclusive participation of developing countries in global rule-making.
- Support seamless international trade and investment.

Other Diplomatic Engagements

The External Affairs Minister also:

- Unveiled the book "**We The People – 250 Voices that Shaped US-India Relationship**", published by the **US-India Strategic Partnership Forum**.
- Participated in:
 - **ASEAN Post-Ministerial Conference with India.**
 - **ASEAN Regional Forum (ARF).**
 - **East Asia Summit Foreign Ministers' Meeting.**
 - **QUAD Foreign Ministers' Meeting** in Manila.
- Held bilateral meetings with counterparts during these engagements.

Significance

- Highlights the growing importance of **international trade law** in an evolving global economy.
- Reinforces the need for **predictable, harmonised and inclusive legal frameworks** for international commerce.

- Reflects India's active role in shaping the future of **global trade governance**.
- Emphasises greater representation of the **Global South** in developing international legal norms.
- Supports India's vision of becoming a globally integrated economy under **Viksit Bharat 2047**.

Prime Minister Narendra Modi's State Visit to Indonesia (6–8 July 2026)



Why in News?

- Prime Minister **Narendra Modi** arrived in **Jakarta** on a two-day State Visit to Indonesia as the first leg of his three-nation tour covering **Indonesia, Australia and New Zealand**.
- The visit was undertaken at the invitation of Indonesian President **Prabowo Subianto**.
- The visit marked a major milestone in advancing the **India–Indonesia Comprehensive Strategic Partnership** and resulted in extensive cooperation across political, defence, maritime, economic, digital, cultural and multilateral domains.

Background

Historical Relations

India and Indonesia share:

- Ancient civilizational ties.
- Strong maritime linkages.
- Hindu-Buddhist cultural influences.
- Shared anti-colonial experiences.
- Democratic values and pluralism.

Strategic Partnership

- Bilateral ties were elevated to a **Comprehensive Strategic Partnership** in 2018.
- Both countries adopted the **Shared Vision of India–Indonesia Maritime Cooperation in the Indo-Pacific (2018)**.

Recent Developments

- President Prabowo visited India in January 2025 as Chief Guest for India's 76th Republic Day celebrations.
- PM Modi's visit represents the next stage of strategic engagement between the two nations.

Arrival and Grand Reception in Jakarta

Official Reception

Upon arrival in Jakarta, PM Modi was received by:

- President Prabowo Subianto.
- Senior Indonesian Ministers.
- Indian Ambassador to Indonesia.
- Members of the Indian diaspora.

Cultural Welcome

A vibrant cultural programme was organized featuring:

- Traditional Indonesian dance performances.
- Indian cultural performances.
- Showcasing shared civilizational heritage.

Indian Diaspora Participation

- Members of the Indian community warmly welcomed the Prime Minister.
- Reflected the strong people-to-people ties between the two countries.

Major Events During the Visit

Ceremonial Reception

- PM Modi was accorded a ceremonial welcome at **Istana Merdeka**.

Bilateral Talks

The two leaders held:

- One-to-one (tête-à-tête) discussions.
- Delegation-level talks.

State Banquet

- President Prabowo hosted a State Banquet in honour of PM Modi.

Address to Indonesian Parliament

- PM Modi addressed the Indonesian Parliament.
- Highlighted democratic values and strategic cooperation.

Prambanan Temple Initiative

- PM Modi and President Prabowo jointly inaugurated restoration and conservation works at the **Prambanan Temple Compounds**, a UNESCO World Heritage Site.

Community Reception

- Both leaders participated in a reception hosted by the Indian community in Indonesia.

Political Cooperation

Strengthening Strategic Engagement

Both leaders agreed to:

- Hold regular Summit-level meetings.
- Increase high-level political exchanges.
- Maintain strategic consultations on regional and global issues.

Institutional Mechanisms

The two sides reaffirmed commitment towards:

- Joint Commission Meeting (JCM).
- Foreign Office Consultations (FOC).
- Ministerial dialogues.
- Senior Officials' Meetings.
- Sectoral Working Groups.

Parliamentary Cooperation

The leaders welcomed:

- Establishment of India–Indonesia Parliamentary Friendship Groups.
- Regular exchanges between parliamentarians.

Think Tank and Academic Cooperation

Support was expressed for deeper cooperation through:

- 3rd India–Indonesia Policy Planning Dialogue (2025).
- 2nd India–Indonesia Track 1.5 Dialogue (2025).
- Jakarta Futures Forum.
- Academic and research institutions.

Defence Cooperation

Strategic Context

India and Indonesia are maritime neighbours situated at key sea lanes connecting the Indian and Pacific Oceans.

Military Cooperation

Both countries agreed to strengthen:

- Defence dialogues.
- Joint military exercises.
- Staff talks.
- Defence training.
- Peacekeeping cooperation.

Capacity Building

- Cadet exchanges.
- Hydrographic cooperation.
- Information sharing.
- Professional military education.

Defence Technology Cooperation

Areas identified include:

- Joint research.
- Joint production.
- Technology transfer.
- Defence innovation.

Defence Industrial Cooperation

The leaders agreed to promote:

- Defence manufacturing partnerships.
- Shipbuilding cooperation.
- Establishment of MRO facilities.
- Defence R&D collaboration.
- Defence supply-chain integration.

Major Defence Outcomes

- Cooperation on **BrahMos Missile System**.
- Air-to-Air Missile Cooperation Agreement.

Military Medical Cooperation

- Progress in pharmaceutical collaboration between Armed Forces Medical Establishments of both countries.

Maritime Cooperation

Strategic Importance

The maritime partnership is a cornerstone of bilateral relations.

Priority Areas

Maritime Domain Awareness (MDA)

- Monitoring maritime activities.
- Information sharing.
- Maritime surveillance.

Maritime Security

- Coastal surveillance.
- Maritime safety.
- Anti-piracy cooperation.

Humanitarian Cooperation

- Humanitarian Assistance and Disaster Relief (HADR).
- Search and Rescue (SAR).

Environmental Cooperation

- Marine pollution control.

Maritime Connectivity

- Port-to-port connectivity.
- Shipping cooperation.

Maritime Agreements

- Renewal of MoU on Maritime Safety and Security Cooperation.
- Implementing Arrangement between BAKAMLA RI and the Indian Coast Guard.

UNCLOS Commitment

Both countries reaffirmed support for:

- Freedom of navigation.
- Respect for international law.
- Adherence to **1982 UNCLOS**.

IFC-IOR Cooperation

- Indonesia deployed an International Liaison Officer at **Information Fusion Centre – Indian Ocean Region**, Gurugram.

Counter-Terrorism and Security Cooperation

Common Position

The leaders strongly condemned terrorism in all forms and manifestations.

Counter-Terrorism Cooperation

Focus areas include:

- Intelligence sharing.
- Counter-radicalization.
- Prevention of violent extremism.
- Disrupting terror financing networks.

AML/CFT Cooperation

Strengthening cooperation on:

- Anti-Money Laundering (AML).
- Countering Financing of Terrorism (CFT).

Emerging Challenges

Joint efforts against:

- Online radicalization.
- Terrorist recruitment through digital platforms.
- Misuse of emerging technologies.

Multilateral Cooperation

The leaders reaffirmed cooperation through:

- **United Nations**
- **Financial Action Task Force**
- **UNSC 1267 Sanctions Committee.**

India–Indonesia Security Dialogue

- Strengthening cooperation through the IISD mechanism.

Cyber and Digital Cooperation

Emerging Technology Cooperation

The two countries agreed to cooperate in:

- Artificial Intelligence (AI).
- Digital Economy.
- Financial Technology (FinTech).
- Digital Public Infrastructure (DPI).
- Digital Forensics.

Cyber Security

Cooperation includes:

- CERT collaboration.
- Protection of critical information infrastructure.
- Capacity building.
- Sharing best practices.

Digital Skills

- Joint training programmes.
- Technology exchange initiatives.

Economic and Trade Cooperation

Shared Development Vision

India

- **Viksit Bharat 2047**

Indonesia

- **Indonesia Emas 2045**

Trade Cooperation

The leaders supported:

- Early conclusion of the review of **ASEAN–India Trade in Goods Agreement (AITIGA).**

Economic Mechanisms

The following mechanisms will be strengthened:

- Working Group on Trade and Investment (WGTI).
- Biennial Trade Ministers Forum (BTMF).
- Economic and Financial Dialogue (EFD).

Objectives

- Improve market access.
- Address tariff barriers.
- Remove non-tariff barriers.
- Facilitate investments.
- Strengthen resilient supply chains.

Critical Minerals and Rare Earth Cooperation

Importance

Critical minerals are essential for:

- Semiconductors.
- EV batteries.
- Renewable energy.
- Defence manufacturing.
- Advanced electronics.

Major Agreements

- MoU between NFTDC, Midwest Ltd and PERMINAS.
- Cooperation on rare earth supply chains.
- Minerals and Steel Supply Chain Cooperation Agreement.

Steel Cooperation

- Strategic Joint Venture between:
 - **Steel Authority of India Limited**
 - **PT Krakatau Steel**

Significance

- Diversified supply chains.
- Economic security.
- Reduced import dependence.

Financial Cooperation

Local Currency Transaction (LCT)

Progress towards operationalisation between:

- Reserve Bank of India
- Bank Indonesia

Benefits

- Reduced transaction costs.
- Greater financial integration.
- Enhanced trade and investment.

Cross-Border QR Payment Linkage

Benefits include:

- Faster payments.
- Tourism promotion.
- Support for students.
- MSME growth.
- Financial inclusion.

Health, Pharma, Food and Fertilizer Cooperation

Health Cooperation

The leaders welcomed:

- Professional Health Workforce Development Arrangement.
- Fellowship programmes.
- Skill enhancement initiatives.
- Clinical training.

Medical Product Regulation

MoU signed between:

- Central Drugs Standard Control Organization
- Badan Pengawas Obat dan Makanan

Food Security

Cooperation in:

- Agricultural innovation.
- Food trade.
- Sustainable food systems.
- Nutrition security.

Marine and Fisheries

- Renewal of cooperation framework under discussion.

Fertilizer Cooperation

- Ensuring affordable and reliable fertilizer availability.

Energy Cooperation

Areas of Cooperation

Conventional Energy

- LNG cooperation.

Renewable Energy

- Green Hydrogen.
- Solar Energy.
- Bioenergy.

Energy Efficiency

- Joint studies.
- Technology exchange.
- Capacity building.

Objective

- Long-term energy security.
- Clean energy transition.

Infrastructure and Connectivity

Andaman–Aceh Connectivity

Objective

Enhance connectivity between:

- Andaman and Nicobar Islands
- Aceh

Expected Benefits

- Tourism.
- Trade.
- Maritime integration.
- Regional development.

Sabang Port Cooperation

Strategic Importance

- Located near the Malacca Strait.

Areas of Cooperation

- Cruise tourism.
- Shipbuilding.
- Ship repair.
- Offshore energy services.

Expected Benefits

- Technology transfer.
- Employment generation.
- Investment promotion.
- Regional prosperity.

Digital Connectivity

Indonesia Open Network (ION)

About

- Indonesia launched **Indonesia Open Network (ION)** based on India's **Open Network for Digital Commerce (ONDC)** architecture.

Significance

- Expands participation of MSMEs.
- Strengthens digital commerce.
- Promotes digital inclusion.

Telecommunications Cooperation

- MoU signed on telecommunications technologies and services.

Benefits

- Digital transformation.
- Improved connectivity.
- Inclusive economic growth.

Biodiversity Conservation and Disaster Management

International Big Cat Alliance (IBCA)

- Indonesia expressed intention to join International Big Cat Alliance.

Conservation Cooperation

Indonesia's initiatives include:

- World Mangrove Center (WMC).
- International Tropical Peatland Center (ITPC).

Disaster Management

MoU signed on:

- Disaster preparedness.
- Capacity building.
- Information sharing.
- Disaster resilient infrastructure.

CDRI

- Recognition of the role of **Coalition for Disaster Resilient Infrastructure**.

Science, Technology and Space Cooperation

Science & Technology

- Joint Commission Meeting on Science & Technology.
- Research, Technology and Innovation MoU.

Space Cooperation

Institutional Cooperation

Between:

- **Indian Space Research Organisation**
- **National Research and Innovation Agency**

Key Areas

- Satellite launches.
- Space research.
- Tracking facilities.

- Space ecosystem development.

Gaganyaan Mission

- Indonesia continues support through Biak Telemetry, Tracking and Command facilities.

Spaceport Cooperation

- Collaboration on development of a spaceport ecosystem in Indonesia.

Nuclear Energy Cooperation

Areas include:

- Nuclear safety.
- Research.
- Nuclear medicine.
- Agriculture.
- Water management.

Culture, Heritage, Tourism and Education

Prambanan Temple Restoration

- India supports restoration of **Prambanan Temple Compounds** through the ASI.

Nalanda Copper Plate

- India gifted a replica of the historic Nalanda Copper Plate inscription.

Tagore–Dewantara Year (2026–27)

Purpose

- Mark 100 years of **Rabindranath Tagore's** visit to Indonesia in 1927.

Associated Personality

- **Ki Hajar Dewantara**

Activities

- Cultural exchanges.
- Educational programmes.
- Academic initiatives.
- People-to-people interactions.

Tourism Cooperation

- Promotion of two-way tourism.
- Visa facilitation discussions.

Education Cooperation

- Student exchanges.
- Academic collaboration.
- Joint research.

IIM Bengaluru Campus

- Proposal to establish a campus in Indonesia welcomed.

Election Cooperation

MoU between:

- Election Commission of India (ECI).
- General Election Commission (KPU) of Indonesia.

Regional and Multilateral Cooperation

Global South

- Agreed to strengthen the voice of developing countries.

UNSC Reform

Both countries supported:

- Expansion of permanent membership.
- Expansion of non-permanent membership.
- Comprehensive reform of the UNSC.

BRICS

- Indonesia reaffirmed support for India's 2026 BRICS Chairship.

Global Governance Reform

- Reform of international financial institutions.
- Strengthening multilateralism.

Major Platforms

- BRICS.
- G20.
- IORA.
- ASEAN-led mechanisms.

Indo-Pacific Cooperation

Shared Vision

Both countries reaffirmed commitment to a:

- Free Indo-Pacific.
- Open Indo-Pacific.
- Inclusive Indo-Pacific.
- Rules-based Indo-Pacific.
- Prosperous Indo-Pacific.

ASEAN Centrality

- Indonesia appreciated India's support for ASEAN Centrality.

AOIP–IPOI Synergy

Strengthening cooperation between:

- ASEAN Outlook on the Indo-Pacific (AOIP).
- Indo-Pacific Oceans Initiative (IPOI).

India–Indonesia–Australia Trilateral

Cooperation in:

- Maritime Domain Awareness.
- Blue Economy.
- Marine Pollution Control.
- Maritime Governance.

UNCLOS

Reaffirmed support for:

- Freedom of navigation.
- Freedom of overflight.
- Respect for international law.

West Asia and Strait of Hormuz

Shared Concerns

- Regional instability.
- Supply chain disruptions.
- Energy security challenges.

Common Position

- Resolve disputes through diplomacy.
- Respect freedom of navigation.
- Ensure uninterrupted global commerce through the **Strait of Hormuz**.

Significance

For India

- Strengthens Act East Policy.
- Enhances maritime influence.
- Secures critical mineral supply chains.
- Deepens ASEAN engagement.

For Indonesia

- Supports industrial development.
- Attracts investments.
- Promotes digital transformation.

For Indo-Pacific

- Reinforces regional stability.
- Strengthens maritime security.
- Promotes a rules-based order.

Conclusion

The 2026 State Visit of Prime Minister Modi to Indonesia marked one of the most comprehensive engagements in recent India–Indonesia relations. Covering **politics, defence, maritime security, trade, critical minerals, connectivity, digital economy, health, energy, culture, education, space and multilateral cooperation**, the visit significantly strengthened the **India–Indonesia Comprehensive Strategic Partnership** and reinforced both countries' role as key pillars of a **free, open, inclusive and rules-based Indo-Pacific**.

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Allahabad High Court on Uniform Minimum Marriage Age

Why in News?

- The **Allahabad High Court** ruled that the minimum age for marriage prescribed under the **Prohibition of Child Marriage Act (PCMA), 2006** applies **uniformly to all citizens**, irrespective of religion.
- The Court held that **personal laws**, including principles under **Muslim Personal Law (Shariat)**, cannot override statutory laws enacted for child protection.

Key Highlights of the Judgment

1. Uniform Applicability of Minimum Marriage Age

- The Court clarified that the **PCMA, 2006** lays down the legal minimum age of marriage for every citizen, regardless of religious affiliation.
- The prescribed minimum age is:
 - **18 years** for females.
 - **21 years** for males.
- A marriage involving a minor is **not automatically void**, but it can be **cancelled at the option of the minor** after attaining majority, within the period specified under the Act.

2. Statutory Law Prevails Over Personal Law

- The Court observed that provisions of **personal law** permitting marriage after puberty cannot supersede statutory protections provided under the **PCMA**.
- Welfare legislations enacted to protect children take precedence over conflicting customary or personal law practices.

3. Harmony with the POCSO Act

- The judgment emphasised that allowing marriage below **18 years** would be inconsistent with the **Protection of Children from Sexual Offences (POCSO) Act, 2012**.
- Since the POCSO Act treats every individual below **18 years** as a child, permitting such marriages would undermine the objective of protecting children from sexual exploitation.

4. Welfare-Centric Interpretation

- The Court recognised the **PCMA** and **POCSO Act** as social welfare legislations enacted in the interest of **child protection, public health, and human dignity**.
- Their provisions are intended to apply uniformly across all communities.

5. Reliance on Judicial Precedent

- The Allahabad High Court relied upon the reasoning adopted by the **Kerala High Court** in **Moidutty Musliyar v. Sub Inspector, Vadakkencherry Police Station (2024)**.
- That judgment also held that statutory safeguards against child marriage cannot be diluted through personal law.

Constitutional Significance

1. Protection of Children's Rights

- Reinforces the principle that **child welfare and dignity** are of paramount importance in the legal system.

2. Gender Justice

- Supports legal measures aimed at preventing **child marriage** and protecting the rights of young girls.

3. Debate on Uniform Civil Code (UCC)

- The judgment contributes to the ongoing discussion on the relationship between **personal laws, statutory laws**, and the concept of a **Uniform Civil Code**.

Legal Position

1. Divergent Judicial Views

- Different High Courts have expressed varying opinions on the interaction between **personal laws** and the **Prohibition of Child Marriage Act, 2006**.

2. Pending Final Clarity

- The **Supreme Court** has not yet delivered a final authoritative ruling on this issue.

3. Legislative Development

- The **Prohibition of Child Marriage (Amendment) Bill, 2021**, which proposed changes relating to the legal age of marriage and associated provisions, lapsed with the dissolution of the **17th Lok Sabha**.

Regulation of Films and OTT Content in India



Why in News?

- The removal of the film **Satluj** from **ZEE5** in India over security concerns has brought attention to India's **dual content regulation framework**.
- While films released in **cinema halls** are regulated under the **Cinematograph Act, 1952**, content released on **Over-The-Top (OTT) platforms** is governed by the **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021**.

Background: Satluj Controversy

About

- The film **Satluj** (earlier titled **Punjab '95**) bypassed theatrical release after the **Central Board of Film Certification (CBFC)** recommended extensive modifications.
- The filmmakers released the uncut version directly on an OTT platform.
- Subsequently, the film was removed from the platform following security-related concerns, triggering debate on the regulation of digital content.

Regulation of Theatrical Films

Legal Framework

- Films intended for **public exhibition in cinema halls** are governed by the **Cinematograph Act, 1952**.
- Prior certification by the **Central Board of Film Certification (CBFC)** is mandatory before theatrical release.

Central Board of Film Certification (CBFC)

About

- The **CBFC** is a statutory body functioning under the **Ministry of Information and Broadcasting (MIB)**.
- It examines films and grants certification for public exhibition.

Grounds for Restricting Certification

The CBFC may:

- Refuse certification.
- Require modifications.
- Grant certification with conditions.

Restrictions may be imposed on grounds relating to:

- **Sovereignty and integrity of India.**
- **Security of the State.**
- **Friendly relations with foreign States.**
- **Public order.**
- **Decency and morality.**
- **Defamation.**
- **Contempt of court.**

These broadly correspond to the **reasonable restrictions under Article 19(2)** of the Constitution.

Cinematograph (Amendment) Act, 2023

Key Features

- Introduced age-based **UA** sub-categories:
 - **UA 7+**
 - **UA 13+**
 - **UA 16+**
- Made **film certificates permanently valid**, replacing the earlier **10-year validity period**.

Appeal Mechanism

- The **Film Certification Appellate Tribunal (FCAT)** was abolished in **2021**.
- Aggrieved filmmakers must now challenge CBFC decisions directly before the **High Courts**.

Regulation of OTT Platforms

Legal Framework

- Content on **OTT platforms** is **not subject to prior CBFC certification**.
- It is regulated under **Part III of the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021**.

Three-Tier Grievance Redressal Mechanism

Level I – Self-Regulation

- Complaints are addressed by the **publisher** of the digital content.

Level II – Self-Regulating Bodies

- Complaints unresolved at Level I are examined by **self-regulating bodies** established by publishers.

Level III – Government Oversight

- The **Central Government** oversees compliance through an oversight mechanism and may take appropriate action under the IT Rules.

Government Powers under the IT Act

Section 69A of the Information Technology Act, 2000

About

- Empowers the **Central Government** to block public access to online content.
- Blocking is carried out under the **Information Technology (Procedure and Safeguards for Blocking Access of Information by Public) Rules, 2009**.
- Such action requires:
 - Written reasons.
 - A prescribed review mechanism.

Satluj Case

- The **Ministry of Information and Broadcasting (MIB)** constituted a **High-Level Inter-Departmental Committee** under **Rule 14 of the IT Rules, 2021**.
- The Committee may recommend:
 - Warnings.
 - Disclaimers.
 - Modification of content.
 - Reclassification.
 - Deletion of content.
 - Blocking under **Section 69A**.

Judicial Developments

Constitutional Challenge

- Certain provisions of the **Information Technology Rules, 2021**, particularly those relating to government oversight of digital publishers, are under judicial scrutiny.

- The **Bombay High Court** and **Madras High Court** have stayed the operation of some provisions pending constitutional challenges.

Comparison: Regulation of Films vs OTT Platforms

Aspect	Theatrical Films	OTT Platforms
Legal Framework	Cinematograph Act, 1952	IT Rules, 2021
Prior Certification	Mandatory	Not required
Regulatory Authority	Central Board of Film Certification (CBFC)	Self-regulation with government oversight
Content Review	Before public exhibition	Primarily after publication through grievance mechanism
Appeal	High Courts	Grievance redressal under IT Rules; judicial review available

Significance

- Highlights the distinction between regulation of **public exhibition** and **digital streaming** in India.
- Reflects the evolving legal framework governing **online content** in the digital era.
- Raises important questions regarding:
 - Freedom of speech and expression** under **Article 19(1)(a)**.
 - Reasonable restrictions** under **Article 19(2)**.
 - Government oversight of digital platforms.
 - Balancing **creative freedom**, **national security**, and **public interest** in the regulation of online media.

Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025



Why in News?

- The **Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025** has drawn criticism from several **States, universities and premier institutions** over concerns related to **institutional autonomy, over-centralisation** and the proposed regulatory framework.
- The Bill is currently under examination by a **Joint Parliamentary Committee (JPC)**.

Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025

About

- The Bill seeks to establish the **Viksit Bharat Shiksha Adhishthan (VBSA)** as a **single apex regulator** for higher education.
- It proposes replacing:
 - **University Grants Commission (UGC)**
 - **All India Council for Technical Education (AICTE)**
 - **National Council for Teacher Education (NCTE)**
- The objective is to create a **unified, simplified and transparent regulatory framework** aligned with the **National Education Policy (NEP), 2020** and the vision of **Viksit Bharat 2047**.

Objectives

- Streamline higher education governance.
- Reduce regulatory overlap and compliance burden.
- Improve quality assurance and academic standards.
- Promote institutional autonomy with accountability.
- Strengthen India's higher education ecosystem.

Key Features of the Bill

1. Apex Regulatory Body

- Establishes the **Viksit Bharat Shiksha Adhishthan (VBSA)** as the apex regulator for higher education.
- Covers:
 - Technical education.
 - Teacher education.
 - Architecture education.

- Excludes professional education such as:
 - Medicine.
 - Law.

2. Three-Council Structure

The Commission will function through three specialised councils:

Regulatory Council

- Prescribes minimum institutional standards.
- Promotes institutional autonomy.
- Handles regulatory grievances.

Accreditation Council

- Develops and administers the accreditation framework.
- Evaluates institutional quality.

Standards Council

- Prescribes:
 - Learning outcomes.
 - Academic standards.
 - Curriculum-related norms.

3. Composition

- Chairperson.
- Up to **12 members**, including:
 - Presidents of the three Councils.
 - Union Higher Education Secretary.
 - Eminent education experts.
 - Representatives from State higher education institutions.

4. Appointment and Removal

- **Chairperson** appointed by the **Central Government**.
- Council Presidents and full-time members selected through a **Search-cum-Selection Committee**.
- Members may be removed on grounds such as:
 - Insolvency.
 - Criminal conviction.
 - Incapacity.
 - Abuse of authority.

5. Degree-Granting Powers

Degrees may be awarded only by:

- Universities established by law.

- Institutions specifically empowered by Parliament.
- Higher Education Institutions authorised by the **Regulatory Council** with prior approval of the Central Government.

6. Penalties and Appeals

- The Regulatory Council may impose **graded penalties** for violations.
- Institutions operating without approval may face:
 - Minimum penalty of **₹2 crore**.
 - Closure of the institution.
- Appeals against Commission or Council decisions lie with the **Central Government**.

Concerns Regarding the Bill

1. Over-centralisation

- Replacing multiple regulators with a single apex body may concentrate excessive regulatory powers in the Central Government.
- May reduce the role of States in higher education governance.

2. Threat to Institutional Autonomy

- Institutions such as:
 - **Indian Institutes of Technology (IITs)**.
 - **Indian Institutes of Management (IIMs)**.
 - **Indian Institutes of Science Education and Research (IISERs)**.
 - **Other Institutes of National Importance (INIs)**.

have sought exemptions, citing concerns over autonomy in:

- Academic programmes.
- Research.
- Curriculum design.
- Online education.
- Institutional expansion.

3. Legal Ambiguity

- Although the Bill seeks to protect the autonomy of **Institutes of National Importance (INIs)** and **Institutes of Eminence (IoEs)**, certain provisions may override their parent Acts, creating legal uncertainty.

4. One-Size-Fits-All Framework

- A common regulatory system may not adequately address the diverse requirements of:
 - Research-intensive institutions.
 - Rural colleges.
 - Tribal universities.
 - Teaching universities.
 - Newly established Higher Education Institutions (HEIs).

5. Accreditation Challenges

- Existing accreditation suffers from:
 - Limited institutional capacity.
 - Low accreditation coverage.
 - Allegations of corruption in **NAAC**.
 - Concerns over unreliable accreditation outcomes.

6. Stringent Penalties

- Heavy penalties and closure provisions may disproportionately affect:
 - Small colleges.
 - Rural institutions.
 - Tribal Higher Education Institutions (HEIs).
- Stakeholders have sought an independent adjudication mechanism before imposing major penalties.

7. Limited Focus on Structural Issues

The Bill does not adequately address:

- Low **Gross Enrolment Ratio (GER)**.
- Regional disparities in higher education.
- Limited public funding.
- Challenges in establishing new Higher Education Institutions.
- Higher education expenditure remaining below the recommended **1.5% of GDP**.

Way Forward

1. Safeguard Institutional Autonomy

- Clearly protect the academic, administrative, research and financial autonomy of Higher Education Institutions, particularly **Institutes of National Importance (INIs)**.

2. Strengthen Cooperative Federalism

- Ensure meaningful representation of:
 - State Governments.
 - State Higher Education Councils (SHECs).
- Reflect the **Concurrent List** status of education through shared decision-making.

3. Establish an Independent Funding Body

- Create a separate **Higher Education Grants Council (HEGC)** to:
 - Allocate funds transparently.
 - Reduce regional disparities.
 - Separate funding from regulation and accreditation.

4. Reform Accreditation and Penalties

- Develop differentiated accreditation standards based on institutional diversity.
- Ensure major penalties and closure orders are subject to independent adjudication.

5. Ensure Regulatory Independence

- Establish an **independent educational tribunal** to hear appeals instead of the Central Government.
- Improve transparency through:
 - Parliamentary oversight.
 - Consultative decision-making.
 - Rules-based governance.

Significance

- Seeks to simplify India's fragmented higher education regulatory framework.
- Aligns higher education reforms with the **National Education Policy (NEP), 2020** and the vision of **Viksit Bharat 2047**.
- Promotes quality assurance through a unified regulatory structure.
- Highlights the need to balance:
 - **Regulatory efficiency.**
 - **Institutional autonomy.**
 - **Cooperative federalism.**
 - **Transparent governance.**
 - **Equitable funding.**
- Aims to build a globally competitive, inclusive and accountable higher education system.

Expansion of the Ladakh Autonomous Hill Development Council (LAHDC) Framework



Why in News?

- The **Ladakh Administration** has announced the extension of the **Ladakh Autonomous Hill Development Council (LAHDC)** framework to **all seven districts**.
- It has also created **17 new tehsils** to strengthen **democratic decentralisation, grassroots governance**, and the protection of Ladakh's **land, culture and identity**.

Expansion of the LAHDC Framework

About

- The initiative expands the **Ladakh Autonomous Hill Development Council (LAHDC)** system beyond **Leh and Kargil** to all newly created districts.
- It aims to promote decentralised governance, improve local administration and enhance district-level development.

Key Features

1. Administrative Reorganisation

- Earlier, Ladakh consisted of only:
 - **Leh**
 - **Kargil**
- In **April 2026**, five new districts were created:
 - **Sham**
 - **Nubra**
 - **Changthang**
 - **Zaskar**
 - **Drass**

- The administration has also created **17 new tehsils**, increasing the total number of tehsils from **15 to 32**.

2. Expansion of Autonomous Hill Development Councils

- The **Ladakh Autonomous Hill Development Council Act, 1995** permits the establishment of an **Autonomous Hill Development Council (AHDC)** in every district.
- Following the expansion, each of the **seven districts** will have its own elected **Autonomous Hill Development Council**.
- Implementation will require:
 - Amendments to the LAHDC Act.
 - Delimitation of constituencies.
 - Official notifications.

3. Devolution of Powers

Under the existing LAHDC framework, the Councils exercise executive, financial and administrative powers relating to:

- District-level development.
- Land use and land allotment.
- Infrastructure development.
- Health services.
- Education.
- Tourism.

Note: The precise powers of the five newly proposed councils, particularly regarding recruitment and service matters, will depend on the amended legal framework and subsequent notifications.

4. Infrastructure Strengthening

To improve governance and service delivery in high-altitude regions, the administration has established:

- **Four new divisions** under:
 - Public Health Engineering (PHE).
 - Flood Control Department.
- **Five new divisions** under:
 - Public Works Department (PWD).
 - **Pradhan Mantri Gram Sadak Yojana (PMGSY)**.

5. Proposed Constitutional Safeguards

- The **Ministry of Home Affairs (MHA)** is considering a **customised sui generis model** under **Article 371** of the Constitution.
- The proposal seeks to address demands for:
 - Protection of land rights.
 - Preservation of tribal identity.
 - Cultural safeguards.
 - Demographic protection.
- This model is being considered instead of direct inclusion under the **Sixth Schedule**.

Ladakh Autonomous Hill Development Council (LAHDC)

About

- The **Ladakh Autonomous Hill Development Council (LAHDC)** was established under the **Ladakh Autonomous Hill Development Council Act, 1995**.
- It provides a framework for **democratic decentralisation** and **local self-governance** in Ladakh's districts.
- The Councils are responsible for planning and implementing district-level development programmes.

Functions

- Local area planning.
- Infrastructure development.
- Education.
- Healthcare.
- Tourism promotion.
- Land use and allotment.
- Financial and administrative management at the district level.

Article 371 of the Constitution

About

- **Article 371 to Article 371J** are contained in **Part XXI** of the Constitution titled **"Temporary, Transitional and Special Provisions."**
- These provisions grant **asymmetrical autonomy** to certain States and regions based on their unique historical, geographical, cultural and socio-economic conditions.

Objectives

- Protect indigenous communities.
- Safeguard cultural identity.
- Preserve land rights.
- Provide employment protections.
- Ensure region-specific administrative arrangements.
- Promote balanced regional development.

Significance

- Strengthens **grassroots democracy** through greater decentralisation.
- Improves administrative efficiency by bringing governance closer to local communities.
- Enhances district-level planning and development across all seven districts of Ladakh.
- Supports the protection of **Ladakh's tribal identity, culture and land rights**.
- Reflects the use of **asymmetrical federalism** through a customised **Article 371** framework to address Ladakh's unique geographical and socio-cultural needs.

Supreme Court on Citizenship Determination (Sabitri Dey @ Swasthi Dey Vs. Union of India, 2026)



Why in News?

- In **Sabitri Dey @ Swasthi Dey vs Union of India (2026)**, the **Supreme Court** held that decisions regarding citizenship and foreigner status must be based on **fair procedure, proper evidence and reasoned adjudication**.
- The Court set aside **27 judgments of the Gauhati High Court** that had upheld orders of

the **Foreigners Tribunals (FTs)** declaring several individuals as foreigners and directed fresh consideration of the cases.

Supreme Court's Observations

Background of the Case

- In **1997**, the **Illegal Migrants (Determination) Tribunal (IMDT)** declared **Sabitri Dey and her husband** to be illegal migrants after they failed to appear before the tribunal.
- They later argued that:
 - They had no knowledge of the proceedings.
 - The decision was based largely on hearsay evidence.
- Their challenge before the **Gauhati High Court** was dismissed due to delay, after which they approached the **Supreme Court**.

Supreme Court's Ruling

Fair Procedure is Essential

- The Court ruled that proceedings under the **Foreigners Act, 1946** (now replaced by the **Immigration and Foreigners Act, 2025**) must be conducted in a fair, transparent and legally sound manner.
- Citizenship cannot be decided through mechanical or one-sided proceedings.

Protection of Fundamental Rights

- The Court reiterated that **Article 14 (Equality before Law)** and **Article 21 (Protection of Life and Personal Liberty)** extend to every person, including foreigners.

Burden of Proof

- Referring to **Section 9 of the Foreigners Act, 1946**, the Court clarified that although the burden of proving citizenship lies on the person concerned, this does not permit automatic declaration as a foreigner merely because the individual failed to appear before the Tribunal.

Duties of Foreigners Tribunals

Before declaring a person a foreigner, the Tribunal must:

- Ensure proper service of notice.
- Provide adequate opportunity to present evidence.

- Examine the evidence produced by the State independently.
- Clearly communicate the grounds of the reference.
- Deliver a well-reasoned order based on facts and law.

Significance of the Judgment

- Reinforces **constitutional due process** in citizenship determination.
- Prevents arbitrary or ex parte declarations by Foreigners Tribunals.
- Enhances accountability of Tribunals through reasoned decision-making.
- Recognises the serious consequences of being declared a foreigner, including:
 - Detention.
 - Deportation.
 - Risk of statelessness.
- The judgment is expected to influence future citizenship disputes, particularly in **Assam**.

Evolution of Burden of Proof in Citizenship Cases

Foreigners Act, 1946

- Introduced the principle of **reverse burden of proof**, requiring the individual to establish that he or she is not a foreigner.

Illegal Migrants (Determination by Tribunals) Act, 1983

- Applicable only to **Assam**.
- Placed the burden of proof on the State or complainant instead of the accused individual.

State of Arunachal Pradesh v. Khudiram Chakma (1994)

- The Supreme Court held that a person claiming Indian citizenship must prove such a claim.

Sarbananda Sonowal v. Union of India (2005)

- The Supreme Court struck down the **IMDT Act** as unconstitutional.
- Restored the applicability of **Section 9 of the Foreigners Act, 1946**.
- Described illegal migration as a challenge to national security under **Article 355** of the Constitution.

Foreigners Tribunals (FTs)

About

- Foreigners Tribunals are **quasi-judicial bodies** established under the **Foreigners (Tribunals) Order, 1964**, issued under the **Foreigners Act, 1946**.
- Their primary function is to determine whether an individual is a foreigner under Indian law.
- Although legally applicable across India, they mainly operate in **Assam**, especially in matters linked to the **National Register of Citizens (NRC)**.

Composition

- Each Tribunal is headed by a person with judicial experience, including:
 - Former judicial officers.
 - Advocates.
 - Eligible civil servants.

Powers

Foreigners Tribunals possess powers similar to those of a civil court, including:

- Summoning witnesses.
- Recording evidence on oath.
- Calling for documents.

Under the **Immigration and Foreigners Order, 2025**, they may also exercise certain powers similar to a **Judicial Magistrate First Class**, including issuing warrants and ordering detention where authorised.

Procedure

- A notice is issued after receiving a reference.
- The individual is given an opportunity to produce evidence.
- The Tribunal examines the material before delivering a reasoned opinion.
- If declared a foreigner, the individual may be detained or deported in accordance with law.

New Deportation Policy, 2026

About

- Introduced by the **Ministry of Home Affairs (MHA)** to establish a uniform mechanism for:
 - Identification.
 - Verification.
 - Detention.
 - Deportation of illegal migrants.

Coverage

The policy applies to:

- Illegal migrants.
- Foreign nationals overstaying visas.
- Persons declared foreigners by Foreigners Tribunals.

Implementation

States and Union Territories are required to:

- Constitute district-level **Special Task Forces (STFs)**.
- Establish Holding Centres.
- Use the **Foreigners Identification Portal (FIP)** for biometric and demographic verification.
- Complete nationality verification and deportation within prescribed timelines.

For suspected nationals of **Bangladesh** and **Myanmar**, nationality verification is to be completed within **90 days**.

Evolution of India's Citizenship Framework

Constitution (1950)

- Articles 5–11 adopted a largely **jus soli (citizenship by birth)** approach at the commencement of the Constitution.

Citizenship Act, 1955

- Created the statutory framework for acquiring citizenship through:
 - Birth.
 - Descent.
 - Registration.
 - Naturalisation.
 - Incorporation of territory.

Citizenship (Amendment) Act, 1986

- Restricted citizenship by birth by requiring **at least one parent** to be an Indian citizen.
- Marked the beginning of a gradual shift towards **jus sanguinis (citizenship by descent)**.

Citizenship (Amendment) Act, 2003

- Further tightened citizenship by birth.
- Introduced:
 - Definition of **illegal migrant**.
 - **Section 14A** relating to the National Register of Indian Citizens (NRIC/NPR framework).
 - **Overseas Citizen of India (OCI)** provisions.

Citizenship (Amendment) Act (CAA), 2019

- Provided a fast-track naturalisation pathway for specified religious minorities from:
 - Pakistan.
 - Bangladesh.
 - Afghanistan.
- Reduced the required residency period for naturalisation from **11 years to 5 years** for eligible applicants.

Modes of Acquiring Citizenship (Citizenship Act, 1955)

By Birth

Eligibility depends on the date of birth:

- **26 January 1950 – 1 July 1987:** Citizenship by birth irrespective of parents' nationality.
- **1 July 1987 – 3 December 2004:** At least one parent must be an Indian citizen.
- **On or after 3 December 2004:** One parent must be an Indian citizen and the other should not be an illegal migrant.

By Descent

- Available to persons born outside India to Indian parent(s), subject to prescribed conditions, including consular registration for births after **3 December 2004**.

By Registration

- Available to specified categories such as **Persons of Indian Origin (PIOs)** and spouses of Indian citizens.

By Naturalisation

- Granted to eligible foreign nationals fulfilling the prescribed residence and other legal requirements.

Note: India does **not** recognise dual citizenship.

Significance

- The judgment reinforces that **citizenship determination must be based on constitutional principles rather than procedural technicalities**.
- It strengthens procedural safeguards in proceedings before Foreigners Tribunals while ensuring that decisions affecting citizenship are based on **fair hearing, proper evidence and reasoned adjudication**.

Right to Fair Trial: Supreme Court on Abdul Hameed Vs. State of Rajasthan (2026)

Why in News?

- The **Supreme Court**, in **Abdul Hameed v. State of Rajasthan (2026)**, set aside the **death sentence** awarded in the **1996 Samleti Bus Bomb Blast case (Dausa, Rajasthan)**.
- The Court held that the trial was fundamentally flawed because the accused was denied **effective legal representation**, violating the constitutional **right to a fair trial**.
- It directed a **de novo (fresh) trial**, to be completed within **one year**.

Supreme Court's Key Observations

Fair Trial is a Constitutional Right

- The Court held that a **fair trial is an indispensable constitutional guarantee** and cannot be compromised for administrative convenience.
- Criminal justice must ensure that procedures remain **fair, just and reasonable**, rather than focusing only on securing convictions.

Confession of Co-accused

- The Court reiterated that the **confession of a co-accused is not substantive evidence**.
- Such a confession can only **support** a conclusion that has already been reached through **independent and legally admissible evidence**.

Due Process over Retribution

- The judgment emphasised that **justice is measured by adherence to due process rather than the speed of punishment**.
- It reaffirmed the well-established principle that it is **preferable for many guilty persons to escape than for one innocent person to be wrongly convicted**.

Fresh Trial Ordered

- Instead of acquitting the accused, the Court ordered a **fresh trial**.

- It directed that:
 - The trial be completed within **one year**.
 - The accused must receive **effective legal assistance** throughout the proceedings.

Significance

- The ruling reinforces that **procedural safeguards are integral to the criminal justice system**.
- Even in cases involving **terrorism or other grave offences**, constitutional protections cannot be bypassed.
- It also reminds trial courts to ensure that every accused receives **competent legal representation** before evidence is recorded or punishment is awarded.

Legal Framework for Fair Trial and Legal Aid

Constitutional Provisions

Article 21

- Guarantees **protection of life and personal liberty**.
- The Supreme Court has interpreted it to include:
 - **Right to a fair trial**.
 - **Right to free legal aid** for indigent accused persons.

Article 22(1)

- Ensures that every arrested person has the **right to consult and be defended by a legal practitioner of their choice**.

Article 39A

- Inserted through the **42nd Constitutional Amendment Act, 1976**.
- Directs the State to provide **free legal aid**, ensuring equal access to justice irrespective of economic status.

Statutory Provisions

Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023

- **Section 341** (earlier Section 304 of the CrPC) mandates that courts must provide a **State-funded advocate** to an accused who cannot afford legal representation.

Legal Services Authorities Act, 1987

Institutional Framework

The Act established:

- **National Legal Services Authority (NALSA)**
- **State Legal Services Authorities (SLSAs)**
- **District Legal Services Authorities (DLSAs)**

These bodies provide **free and competent legal services** to weaker sections.

Eligibility

Free legal aid is available to:

- SCs and STs.
- Women and children.
- Persons with disabilities or mental illness.
- Victims of trafficking, disasters or caste violence.
- Industrial workers.
- Persons in custody.
- Economically weaker individuals within the prescribed income limits.

Impact

- Between **2022–23 and 2024–25**, over **44.22 lakh** people received free legal aid and legal advice.

Lok Adalats

- The Act also grants statutory recognition to **Lok Adalats** and **Permanent Lok Adalats** for speedy settlement of disputes.
- Between **2022–23 and 2024–25**, they disposed of **over 23.5 crore cases**, reducing pendency and litigation costs.

Important Supreme Court Judgments

Hussainara Khatoon v. Home Secretary, State of Bihar (1979)

- Declared that **free legal aid** is an essential element of a **fair and reasonable procedure** under **Article 21**.

Khatri v. State of Bihar (1981)

- Held that the State must provide **legal aid from the very first production before the magistrate**, not merely during the trial.

Major Initiatives Supporting Access to Justice

Legal Aid Defense Counsel System (LADCS)

- A **NALSA** initiative providing **free legal defence** in criminal cases to eligible persons.

DISHA Scheme

- **Designing Innovative Solutions for Holistic Access to Justice (2021–26)** promotes:
 - Tele-Law.
 - Nyaya Bandhu (Pro Bono Legal Services).
 - Legal awareness and literacy programmes.
- Benefited **over 2.10 crore people** (February 2025).

Institutions Supporting Speedy Justice

- **Fast-Track Courts (FTCs)**: Speedy disposal of serious offences and sensitive cases; **865 functional** (June 2025).
- **Fast-Track Special Courts (FTSCs)**: Deal with rape and POCSO cases; **725 functional**, including **392 exclusive POCSO courts**.
- **Gram Nyayalayas**: Village-level courts established under the **Gram Nyayalayas Act, 2008**; **488 functional** (March 2025).
- **Nari Adalats**: Resolve domestic and gender-related disputes through mediation under **Mission Shakti (Sambal)**.
- **Exclusive Special Courts**: Established under the **SC/ST (Prevention of Atrocities) Act, 1989** for speedy trial of offences against SCs and STs.

Death Penalty in India

About

- The **death penalty (capital punishment)** is the execution of a person after conviction by a competent court following due legal process.

Legal Position

- The **Bharatiya Nyaya Sanhita (BNS), 2023** retains capital punishment.
- It also extends it to offences such as:
 - **Mob lynching resulting in death.**
 - **Rape of a minor.**

- Around **14 offences**, including **murder, terrorism and abetment of mutiny**, are punishable with death.

Exemptions

The death penalty cannot be imposed on:

- Juveniles.
- Pregnant women.
- Persons suffering from mental illness.

Appellate Safeguards

- A Sessions Court's death sentence requires **confirmation by the High Court**.
- Further appeal lies before the **Supreme Court**.

Legal Remedies

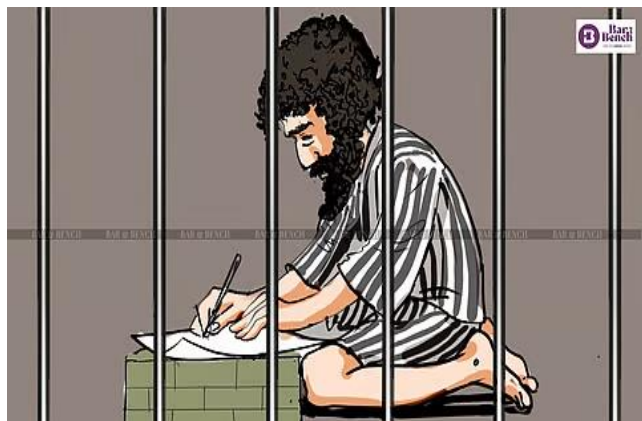
Death-row convicts may seek relief through:

- **Mercy Petition** before the **President (Article 72)**.
- **Mercy Petition** before the **Governor (Article 161)**.
- **Curative Petition**, recognised in **Rupa Ashok Hurra v. Ashok Hurra (2002)**, to remedy a gross miscarriage of justice.

Conclusion

The Supreme Court's judgment reinforces that **fair trial, effective legal representation and due process** are fundamental pillars of the rule of law. By prioritising constitutional safeguards over procedural expediency, the Court strengthened the protections guaranteed under **Articles 21, 22 and 39A**, reaffirming that justice must always be **fair, transparent and constitutionally compliant**.

Premature Release of Elderly & Terminally Ill Prisoners



Why in News?

- The **Supreme Court** directed all **States and Union Territories** to frame and notify, within **three months**, a **uniform policy** for the **premature release of elderly and terminally ill prisoners** on humanitarian grounds.
- The direction came while hearing a petition filed by **National Legal Services Authority (NALSA)**, which highlighted the absence of a common national framework. NALSA argued that such a policy would uphold humanitarian values while reducing **prison overcrowding**.

What Did the Supreme Court Direct?

Objective

- Ensure **humane treatment** of vulnerable prisoners.
- Reduce **prison overcrowding**.
- Improve **access to justice**.
- Establish a **uniform national mechanism** for compassionate release.

Eligibility & Procedure

- Every State and UT must clearly specify:
 - Eligibility criteria.
 - Application procedure.
 - Timelines for deciding remission or premature release.
- Policies must be prepared in consultation with the **State Legal Services Authorities (SLSAs)**.

Medical Assessment

- States and UTs must constitute **independent medical boards** to assess:
 - Terminal illness.
 - Advanced age.
 - Severe medical vulnerability.

Definition of Terminal Illness

- Policies must adopt a **uniform definition** of terminal illness.
- The Court permitted the use of the **UN Office on Drugs and Crime (UNODC) Handbook** definition:
 - A condition where there is **no reasonable medical possibility of preventing continued deterioration leading to death**.

Role of Under Trial Review Committees (UTRCs)

- UTRCs must periodically review cases involving:
 - Elderly prisoners.
 - Terminally ill prisoners.
 - Physically incapacitated inmates.
- They should recommend appropriate legal measures such as:
 - Bail.
 - Parole.
 - Remission.
 - Premature release.

Time-Bound Decisions

- Authorities must avoid unnecessary delays.
- Every decision should be:
 - Reasoned.
 - Transparent.
 - Subject to judicial review.

Digital Tracking System

- The **Union Government**, with support from the **National Informatics Centre (NIC)**, must:
 - Develop an **e-portal** for processing and tracking applications.
 - Provide technical support and training to States and UTs.

Transparency & Accountability

- The portal should provide:
 - Automated alerts.
 - Timeline monitoring.
 - Compliance reports.
 - Supervisory oversight.
- It must also ensure **confidentiality of prisoners' medical and personal information**.

Compliance Monitoring

- The Centre, States and UTs must submit **compliance affidavits within six months**, detailing:
 - Eligible prisoners identified.
 - Prisoners granted premature release.
 - Pending cases.

Status of Prison Overcrowding in India

Current Situation

- As of **2024**, India had:
 - **1,333 prisons**.
 - **Sanctioned capacity: 4.53 lakh** inmates.
 - **Actual prison population: Over 5.11 lakh**, resulting in significant overcrowding.

High Occupancy States

- **Delhi: 194.6%** (Highest)
- **Meghalaya: 163.5%**
- **Jammu & Kashmir: 148.3%**
- **Madhya Pradesh: 147.1%**

Improving Trends

- **Chhattisgarh** reduced prison occupancy from **234% (2015) to 127.6% (2024)**.
- **Uttar Pradesh** has also shown improvement in reducing overcrowding.

Government Measures to Reduce Prison Overcrowding

Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023 Section 479(1)

- Replaces **Section 436A of CrPC**.
- Provides that **first-time offenders** who have completed **one-third of their maximum sentence** must be released on bond.
- Jail Superintendent is required to initiate the release process.

Model Prisons and Correctional Services Act, 2023

- Replaces the **Prisons Act, 1894**.
- Shifts prison administration from **punishment to reformation and rehabilitation**.
- Introduces **electronic tagging** for prisoners released on parole or furlough.

Prison Reforms

- **Model Prison Manual, 2016**
 - Standardises prison administration.
 - Focuses on prisoner classification, healthcare and vocational training.

- **Prisons Development Fund (2018)**
 - Supports modernization of prison infrastructure.

E-Prisons Project

- Digitises prison records.
- Integrates prisons with the **Inter-operable Criminal Justice System (ICJS)**.
- Generates timely alerts when prisoners become eligible for bail.

Support to Poor Prisoners Scheme

- Provides financial assistance to undertrial prisoners unable to:
 - Furnish bail.
 - Arrange sureties.

National Legal Services Authority (NALSA)

About

- A **statutory body** established in **1995** under the **Legal Services Authorities Act, 1987**.
- Completed **30 years** in **2025**.
- **Chief Justice of India (CJI)** serves as its **Patron-in-Chief**.

Constitutional Basis

- Established to implement **Article 39A**, which directs the State to provide **free legal aid**.
- Supports:
 - **Article 14** – Equality before law.
 - **Article 22(1)** – Right to legal representation after arrest.

Functions

- Formulates legal aid policies.
- Monitors implementation of legal aid programmes.
- Provides financial assistance to:
 - State Legal Services Authorities (SLSAs).
 - NGOs implementing legal aid schemes.

Institutional Network

- **NALSA** (National Level)
- **State Legal Services Authorities (SLSAs)** – Headed by the Chief Justice of the respective High Court.

- **District Legal Services Authorities (DLSAs)** – Headed by the District Judge.
- **Taluk/Sub-Divisional Legal Services Committees.**
- **High Court Legal Services Committees.**
- **Supreme Court Legal Services Committee.**

Eligible Beneficiaries

Free legal aid is available to:

- Women and children.
- Scheduled Castes (SCs).
- Scheduled Tribes (STs).
- Economically Weaker Sections (EWS).
- Industrial workers.
- Persons with disabilities.
- Other categories specified under the **Legal Services Authorities Act, 1987**.

Fast-Track Courts (FTCs) & Public Examination Paper Leaks



Why in News?

- The **Prime Minister** announced the establishment of **Fast-Track Courts (FTCs)** to ensure speedy investigation and strict punishment for those involved in **public examination paper leaks**.
- The announcement followed nationwide protests over irregularities in **NEET-UG 2026**.
- Subsequently, the **Delhi High Court** constituted a **Special Fast-Track Court** exclusively to hear offences under the **Public Examinations (Prevention of Unfair Means)**

Act, 2024, and transferred all pending cases under the Act to this court for expedited disposal.

Summary

- Fast-Track Courts are intended to ensure **swift investigation and speedy trials** in paper leak cases, strengthen deterrence, and restore public confidence in competitive examinations.
- However, preventing examination fraud also requires broader reforms such as strengthening the **National Testing Agency (NTA)**, implementing the **Dr. K. Radhakrishnan Committee (2024)** recommendations, adopting secure digital technologies, and improving institutional accountability.

What are Fast-Track Courts (FTCs)?

- **Fast-Track Courts (FTCs)** are specialised courts created to ensure the speedy disposal of specific categories of important or long-pending cases and reduce the burden on the regular judiciary.
- The **right to a speedy trial** has been recognised by the **Supreme Court** as part of **Article 21** (Right to Life and Personal Liberty), notably in **Hussainara Khatoon v. Home Secretary, State of Bihar (1979)**.
- India does not have a single law governing all FTCs. They are established through **Finance Commission recommendations, Central Government schemes, or High Court notifications**.

Categories of Cases Handled by FTCs

- The **Eleventh Finance Commission (2000–05)** recommended FTCs to dispose of long-pending criminal and sessions cases.
- The **Fourteenth Finance Commission (2015–20)** expanded their scope to include:
 - Heinous offences such as murder, kidnapping and extortion.
 - Civil property disputes pending for over five years.
 - Cases involving vulnerable sections of society.

- FTCs also prioritise matters concerning:
 - Women.
 - Children.
 - Senior citizens.
 - Persons with disabilities.
 - Terminally ill individuals.

Fast-Track Special Courts (FTSCs)

- **Fast-Track Special Courts (FTSCs)** were launched in **October 2019** under a **Centrally Sponsored Scheme**.
- They are dedicated to the speedy disposal of:
 - Rape cases.
 - Cases under the **Protection of Children from Sexual Offences (POCSO) Act, 2012**.
- The scheme was introduced following the **Criminal Law (Amendment) Act, 2018** and the Supreme Court's **Suo Motu Writ (Criminal) No. 1 of 2019**.
- It is partly funded through the **Nirbhaya Fund**.
- **Exclusive POCSO Courts (e-POCSO Courts)** exclusively hear offences under the POCSO Act.

Other Special FTCs

- In **2017**, the Supreme Court directed the establishment of special FTCs to expedite criminal cases involving **Members of Parliament (MPs)** and **Members of Legislative Assemblies (MLAs)**.

Constitutional Position

- In **State of West Bengal v. Anwar Ali Sarkar (1952)**, the Supreme Court held that **speed alone cannot justify creating a special court**.
- Classification must be based on a reasonable and objective criterion such as:
 - Seriousness of the offence.
 - Vulnerability of the victim.

Performance of FTCs

- Regular trial courts dispose of around **3.3 cases per month** on average.
- **Fast-Track Special Courts** dispose of approximately **9.5 cases per month**, indicating greater efficiency.

- Despite faster disposal, **over 2.4 lakh cases** remained pending before FTSCs by the end of **2023**.

Important Judicial Decisions

- **Brij Mohan Lal v. Union of India (2012):**
 - Held that establishing and continuing FTCs is primarily the responsibility of State Governments.
 - Observed that temporary courts and ad hoc appointments cannot permanently solve judicial delays.
- **Anita Kushwaha v. Pushap Sudan (2016):**
 - Declared **access to justice** as a Fundamental Right under **Articles 14 and 21**.
- **P. Ramachandra Rao v. State of Karnataka (2002):**
 - Held that no fixed time limit can be prescribed for completing criminal trials.

Importance of FTCs in Paper Leak Cases

- **Restores Public Trust:** Speedy disposal reinforces fairness and credibility in competitive examinations.
- **Acts as a Deterrent:** Quick investigation and punishment discourage organised examination fraud.
- **Protects Students:** Timely resolution reduces repeated exam cancellations, protecting students' careers, mental health and financial interests.

Limitations of FTCs in Tackling Paper Leaks

Post-Facto Nature

- FTCs provide speedy trials only **after** a paper leak has occurred and cannot prevent examination fraud.

Inter-State Challenges

- Examination mafias often operate across multiple States.
- Local FTCs alone cannot effectively tackle such organised crimes without coordinated national investigations.

Digital Forensics Constraints

- Modern paper leaks involve:
 - Encrypted messaging applications.
 - Dark web platforms.
 - IP tracking.
 - Cryptocurrency transactions.

- Delays in cyber-forensic analysis and forensic laboratory reports often slow investigations.

Investigation Delays

- FTCs begin functioning only after filing of the charge sheet.
- Multi-agency investigations involving the **State Police, Cyber Cells, CBI, ED** and financial agencies often take considerable time.
- Delays may result in **default bail**, weakening the objective of speedy justice.

Structural Issues

- As highlighted in **Brij Mohan Lal (2012)**, FTCs frequently suffer from:
 - Shortage of judges.
 - Inadequate infrastructure.
 - Lack of prosecutors and support staff.
 - Temporary funding arrangements.

Funding Issues

- After the expiry of initial Central funding, States became responsible for financing FTCs.
- Consequently, their performance varies significantly across States.

Witness and Prosecution Challenges

- Weak witness protection mechanisms.
- Intimidation by organised examination mafias.
- Lack of specialised cyber experts.
- Alleged political influence affecting prosecution.

Dr. K. Radhakrishnan Committee (2024):

Institutional Reforms

Area	Existing Gap	Recommendation
Examination Pattern	Single-day OMR examinations remain vulnerable to leaks.	Introduce multi-shift Computer-Based Tests (CBTs) to localise any breach.
Examination Logistics	Dependence on third-party agencies for printing and transporting question papers.	Minimise outsourcing and ensure secure handling by authorised agencies.
Candidate Verification	Existing biometric verification remains limited.	Implement DIGI-EXAM , a DigiYatra-inspired biometric authentication system from application to admission.

Way Forward

- Strengthen the **National Testing Agency (NTA)** by granting it statutory status with greater autonomy and accountability, similar to the **UPSC**.
- Conduct high-stakes examinations only at **high-security examination centres** under direct government supervision.
- Develop a **Supreme Court-monitored Standard Operating Procedure (SOP)** for specialised cyber investigations to ensure charge sheets are filed within **90 days**.
- Strengthen examination security through advanced technologies such as **Quantum Key Distribution (QKD)** for secure transmission of question papers and **blockchain-based audit trails** for tamper-proof examination records.
- Introduce a **Command-Failure Liability Clause** under the **Public Examinations (Prevention of Unfair Means) Act, 2024**, to fix accountability on supervisory officials responsible for lapses in examination security.

Special Intensive Revision (SIR)



- The **Supreme Court (SC)** ruled that the **Special Intensive Revision (SIR)** process is **meant exclusively for electoral purposes** and **cannot be used** to determine citizenship or affect access to welfare benefits.

- The observation came while hearing a petition alleging that the **West Bengal Government** was using SIR data to remove beneficiaries from welfare schemes such as:
 - Food security programmes
 - Women's welfare schemes
 - Backward Caste certifications

Supreme Court's Observations

- The Court reiterated its **2025 Bihar SIR judgment**, holding that:
 - **SIR outcomes cannot be used for any purpose other than elections.**
 - The **Election Commission of India (ECI)** cannot decide questions of citizenship through the SIR process.
 - Any **citizenship-related issue** identified during SIR must be referred to the **Government** for adjudication under the **Citizenship Act, 1955**.

Special Intensive Revision (SIR)

About

- The **Special Intensive Revision (SIR)** is a comprehensive exercise conducted by the **Election Commission of India (ECI)** under the supervision of the **Chief Election Commissioner** to update and purify electoral rolls.

Legal Basis

- **Article 324** of the Constitution empowers the ECI to supervise, direct, and control elections.
- **Section 21(3) of the Representation of the People Act, 1950** authorises the ECI to conduct a **Special Revision** of electoral rolls.

Objectives

- Remove:
 - Duplicate voters
 - Deceased voters
 - Shifted voters
 - Ineligible or "ghost" voters
- Ensure electoral rolls accurately reflect the eligible voting population.
- Uphold the democratic principle of **"One Person, One Vote."**

Background

- The **Special Intensive Revision** has been conducted **eight times** between **1951 and 2004**.
- The **last SIR** was carried out during **2002–2004**, more than **two decades** ago.

Right to Protest and Police Powers in India



- **Violent clashes** during the '**Chalo Sansad**' protest (**July 2026**) reignited the debate on balancing the **constitutional right to protest** with the **State's responsibility to maintain public order**.

Constitutional Basis of the Right to Protest

Fundamental Rights

- The Constitution does not explicitly mention the **right to protest**, but it is derived from:
 - **Article 19(1)(a)**: Freedom of speech and expression.
 - **Article 19(1)(b)**: Right to assemble peacefully and without arms.
 - **Article 19(1)(c)**: Right to form associations or unions.
 - **Article 21**: Right to life and personal liberty, including the right to live with dignity and voice grievances against the State.

Reasonable Restrictions

- The right to protest is **not absolute**.
- **Article 19(2)**: Allows restrictions on speech in the interests of sovereignty, security of the State, public order, decency, morality, defamation, contempt of court, and incitement to offences.
- **Article 19(3)**: Permits restrictions on peaceful assembly in the interests of sovereignty, integrity, and public order.

Statutory Framework

- **Section 163, BNSS, 2023**: Empowers Executive Magistrates to issue prohibitory orders in urgent situations.
- **Delhi Police Act, 1978**: Regulates protest routes, timings, and conditions.
- Under the **BNS, 2023**, an assembly becomes **unlawful** only if its common object involves criminal force, resisting the law, committing offences, or compelling others through threats.

Standards Governing Police Action

Democratic Policing

- The **NHRC Manual** states that police must protect citizens' rights and the rule of law.
- The **UN Basic Principles on the Use of Force and Firearms (1990)** require force to be **lawful, necessary, and proportionate**.
- Police should first use **warnings, persuasion, and negotiation**, resorting only to the **minimum necessary force**.

Police Accountability

- The **BNSS, 2023** and **D.K. Basu v. State of West Bengal (1997)** require arresting officers to display visible name tags.
- However, no similar mandatory provision exists for officers engaged solely in crowd-control operations, creating accountability concerns.

Important Supreme Court Judgments

- **Ram Manohar Lohia v. State of Bihar (1965)**: Distinguished **law and order** from **public order**; restrictions are justified only when public order is genuinely threatened.
- **Himat Lal K. Shah v. Commissioner of Police (1973)**: The State may regulate protests but cannot extinguish the right to protest.
- **In Re: Ramlila Maidan Incident (2012)**: Force should be used only as a **last resort**.
- **Anita Thakur v. State of Jammu & Kashmir (2016)**: Excessive police force violates fundamental rights.
- **Mazdoor Kisan Shakti Sangathan v. Union of India (2018)**: Police may regulate but not prohibit peaceful assemblies.

- **Amit Sahni v. Commissioner of Police (2020):** Protests cannot indefinitely occupy public spaces or block essential traffic.

Major Concerns

- Political interference in policing.
- Inadequate human rights and de-escalation training.
- Police vacancies and excessive workload.
- Disproportionate use of tear gas, lathi charge, preventive detention, and mass arrests.
- Lack of transparency due to masked or unidentified personnel.
- Gender-sensitive safeguards not always followed.
- Blanket internet shutdowns affecting fundamental rights.
- Weak implementation of **Prakash Singh (2006)** police reforms.
- Continued reliance on the colonial-era policing framework under the **Police Act, 1861**.

Way Forward

- Train police in **BNSS/BNS** provisions with emphasis on negotiation and non-lethal crowd control.
- Fully implement the **Prakash Singh (2006)** directives by strengthening **Police Complaints Authorities (PCAs)**.
- Separate **investigation** from **law-and-order** functions.
- Modernize police forces through the **Modernization of Police Forces (MPF)** scheme, improve manpower, and expand the use of body-worn cameras and CCTV.
- Promote **SMART Policing—Strict and Sensitive, Modern and Mobile, Alert and Accountable, Reliable and Responsive, Tech-savvy and Trained**.

Reforms in India's Public Examination System



- The **Union Government** launched major reforms in **July 2026** to strengthen the integrity of public examinations following allegations of irregularities in exams like **NEET** and nationwide protests.
- Key measures include:
 - Termination of **47 National Testing Agency (NTA)** officials.
 - Introduction of the **Public Examinations (Prevention of Unfair Means) Amendment Bill, 2026**.
 - Constitution of a **high-powered task force** chaired by **Nandan Nilekani** to overhaul India's examination system.

Public Examinations (Prevention of Unfair Means) Amendment Bill, 2026

Stricter Punishments

- Minimum imprisonment for offences such as paper leaks and OMR tampering increased from **3 years to 5 years**, with a maximum of **10 years**.
- For organised examination fraud, the minimum punishment increased from **5 years to 7 years**.

Higher Financial Penalties

- Maximum fine for general offences increased from **₹10 lakh to ₹50 lakh**.
- Minimum fine for organised examination fraud increased from **₹1 crore to ₹10 crore**.

Accountability of Service Providers

- Private IT vendors and printing agencies found involved in malpractice can face penalties up to **₹5 crore**.
- Their debarment period has been increased from **4 years to 8 years**.

Fast-Track Investigation and Trial

- Investigations must be completed within **60 days**.
- States and UTs must establish **Special Fast-Track Courts** for exclusive day-to-day hearings.
- Existing cases under the **2024 Act**, including **NEET-related cases**, will be transferred to these courts.
- Trials must conclude within **3 months** after filing of the chargesheet.
- Appeals must be filed within **30 days** and disposed of within **3 months** by a **two-judge High Court Bench**.

High-Powered Task Force

- Chaired by **Nandan Nilekani**, former Chairman of **UIDAI** and co-founder of **Infosys**.
- Mandated to recommend next-generation reforms to make public examinations:
 - Leak-proof
 - Technology-driven
 - Secure
 - Transparent
 - Tamper-resistant

Dr. K. Radhakrishnan Committee (2024)

Background

- Constituted after the **UGC-NET paper leak** and **NEET-UG 2024** controversies.
- Submitted **101 recommendations** covering examination reforms, institutional restructuring, technology, and data security.

Major Recommendations

- Strengthen NTA with permanent experts.
- Establish specialised functional verticals.
- Prefer government examination centres.
- Create State and District-Level Coordination Committees.
- Introduce **DIGI-EXAM** with Aadhaar-based biometric authentication.
- Use encrypted question paper transmission.
- Expand CCTV surveillance.
- Introduce AI-based monitoring.

- Gradually shift to **Computer-Based Tests (CBTs)**.

Need to Overhaul the Testing Ecosystem

Structural Weaknesses

- Centralised paper setting, printing, and transportation create multiple vulnerable points.
- A single breach can compromise examinations for millions of candidates.

Threat to Meritocracy

- Examination leaks undermine **Article 14 (Equality before Law)** and **Article 16 (Equality of Opportunity in Public Employment)** by giving unfair advantage to organised fraud networks.

Economic Impact

- Delayed examinations and litigation slow recruitment.
- According to the **ILO India Employment Report 2024**, youth account for **83% of India's unemployed workforce**.
- Exam delays waste productive years and worsen the demographic challenge.

Growth of Coaching Economy

- Uncertain examination cycles have fuelled a **₹50,000 crore coaching industry**, forcing many families into debt.

Mental Health Concerns

- Student suicides have increased by nearly **80%** over the past decade.
- Examination failure remains one of the major causes.

Technological Gaps

- Existing systems lack advanced encryption, deep-tech surveillance, and secure digital architecture, making them vulnerable to organised cyber-enabled fraud.

Way Forward

Technology-Based Reforms

- Adopt a **Just-in-Time (JIT)** encrypted digital paper delivery system.
- Introduce **algorithmic question randomisation** using **Item Response Theory (IRT)**.

- Conduct CBTs on secure **air-gapped intranet networks**.
- Ensure compliance with the **Digital Personal Data Protection Act, 2023** for handling candidate data.

Institutional Reforms

- Transform the **NTA** into an autonomous body with independent funding and accountability.
- Develop sovereign testing infrastructure using government institutions.
- Mandate **STQC** cybersecurity certification for all private vendors.
- Establish an independent **National Examination Audit Commission (NEAC)** for audits and whistleblower complaints.

Procedural Reforms

- Replace single-day, high-stakes examinations with **multiple examination cycles**.
- Introduce **Aadhaar-linked iris and facial biometric verification** throughout the examination process.

Long-Term Educational Reforms

- Strengthen **PARAKH** to standardise school board assessments.
- Reduce dependence on a single entrance examination.
- Regulate the coaching industry by enforcing the **2024 Coaching Centre Guidelines** and penalising institutes involved in examination fraud.

Corruption in India



- Recent **NEET paper leak protests** have reignited the debate on **corruption, accountability, and institutional failure** in India.
- The discussion has also raised questions about the effectiveness of **digitalisation**, the

Right to Information (RTI) Act, 2005, and anti-corruption institutions in reducing corruption, while highlighting concerns over weak enforcement and institutional opacity.

Major Causes of Corruption in India

Bureaucratic Discretion and Red Tape

- Complex regulations, excessive administrative discretion, and monopolistic licensing create opportunities for bribery and "speed money."
- **Example: Coal Block Allocation Scam** exposed the risks of discretionary and non-transparent allocation.

Weak Enforcement and Judicial Delay

- Slow investigations and lengthy trials weaken the deterrent effect of anti-corruption laws.
- **Example: The Fodder Scam** took decades before convictions were secured.

Flawed Procurement and Welfare Leakages

- Collusive bidding, inflated contracts, and weak oversight encourage corruption in public procurement.
- Welfare schemes often suffer from:
 - Middlemen
 - Ghost beneficiaries
 - Diversion of public funds
- **Example: Commonwealth Games Scam.**

Weak Whistleblower Protection

- Poor implementation of protective mechanisms discourages reporting of corruption.
- RTI activists and whistleblowers face serious threats.
- **Example: Murder of NHAI engineer Satyendra Dubey.**

High Election Costs and Opaque Political Funding

- Rising campaign expenditure increases dependence on unaccounted donations.
- Encourages:
 - Quid pro quo arrangements
 - Policy capture
 - Crony capitalism
- **Example: Electoral Bonds controversy.**

Regulatory Capture and Weak Public Mobilisation

- Political influence may favour selected corporate entities and distort competition.
- Public mobilisation against corruption is weakened by:
 - Political cynicism
 - Lack of credible leadership
 - Limited media support

Government Measures to Combat Corruption

Prevention of Corruption Act (PCA), 1988

- Defines "public servant" broadly.
- Criminalises:
 - Bribe-taking
 - Criminal misconduct
 - Abuse of official position
- **2018 Amendment:**
 - Criminalised giving of bribes.
 - Introduced a **2-year trial timeline**, extendable to **4 years**.

Prevention of Money Laundering Act (PMLA), 2002

- Prevents money laundering.
- Provides for confiscation of proceeds of crime.
- Grants extensive powers to the **Enforcement Directorate (ED)**.

Lokpal and Lokayuktas Act, 2013

- Establishes:
 - **Lokpal** at the Centre.
 - **Lokayuktas** in States.
- Investigates corruption allegations against:
 - Prime Minister
 - Union Ministers
 - Members of Parliament
 - Public functionaries

Fugitive Economic Offenders Act, 2018

- Targets economic offenders who flee India.
- Allows confiscation of assets even before conviction.

Benami Transactions (Prohibition) Amendment Act, 2016

- Prohibits benami property transactions.
- Aims to curb black money generation.

Central Vigilance Commission (CVC)

- Supervises vigilance administration.
- Advises government on corruption-related matters.

Right to Information (RTI) Act, 2005

- Empowers citizens to seek information from public authorities.
- Promotes transparency and reduces monopoly over official information.

Major Anti-Corruption Institutions

Central Vigilance Commission (CVC)

- **Governing Law:** CVC Act, 2003.
- Apex vigilance institution.
- Supervises vigilance administration.
- Exercises superintendence over the **CBI** in corruption cases.

Central Bureau of Investigation (CBI)

- **Governing Law:** Delhi Special Police Establishment Act, 1946.
- Premier investigating agency for:
 - Corruption
 - Economic offences
 - Major criminal cases

Enforcement Directorate (ED)

- **Governing Laws:** PMLA, 2002 and FEMA, 1999.
- Investigates:
 - Money laundering
 - Financial crimes
 - Asset attachment cases

Comptroller and Auditor General (CAG)

- **Constitutional Basis: Article 148.**
- Audits receipts and expenditure of Union and State Governments.
- Functions as the **watchdog of the public exchequer** by exposing financial irregularities.

Major Impacts of Corruption

Denial of Basic Services

- Citizens face difficulties in accessing:
 - Food rations
 - Healthcare
 - Education
 - Welfare schemes
- Bribes and middlemen often become necessary.

Greater Burden on the Poor

- Poor and marginalised communities suffer the most due to:
 - Limited digital access
 - Low legal awareness
 - Financial constraints

Weakening of Democratic Institutions

- Reduces the credibility and independence of:
 - Executive
 - Legislature
 - Judiciary
 - Lokpal
 - CBI
 - ED
 - Information Commissions

Economic Loss and Crony Capitalism

- Diverts public resources.
- Distorts market competition.
- Encourages policy capture by politically connected businesses.

Erosion of Public Trust

- Delayed punishment and selective accountability reduce confidence in governance.
- Encourages protests and creates the perception that corruption carries low risk.

Measures Needed to Reduce Corruption

Strengthen Transparency and Whistleblower Protection

- Preserve the effectiveness of the **RTI Act**.
- Ensure independent and adequately staffed Information Commissions.

- Strengthen protection for:
 - Whistleblowers
 - Journalists
 - Civil society organisations

Time-Bound Grievance Redressal

- Introduce a comprehensive grievance redressal law.
- Implement:
 - Citizens' Charters
 - **Sevottam Model**
- Reduce administrative discretion and bribery.

Swift Investigation and Trial

- Ensure corruption cases are investigated and decided within fixed timelines.
- Strengthen specialised courts and investigating agencies.

Independent Accountability Institutions

- Provide operational independence, adequate resources, and transparent appointments for:
 - CVC
 - CBI
 - Lokpal
 - Lokayuktas
 - Vigilance bodies
- Strengthen the framework recommended by the **Santhanam Committee**.

Political Funding and Public Oversight

- Ensure political donations are:
 - Digitally recorded
 - Publicly disclosed
 - Independently audited
- Consider recommendations of the:
 - **Dinesh Goswami Committee**
 - **Indrajit Gupta Committee**
- Strengthen parliamentary scrutiny, procurement audits, and social audits.

Conclusion

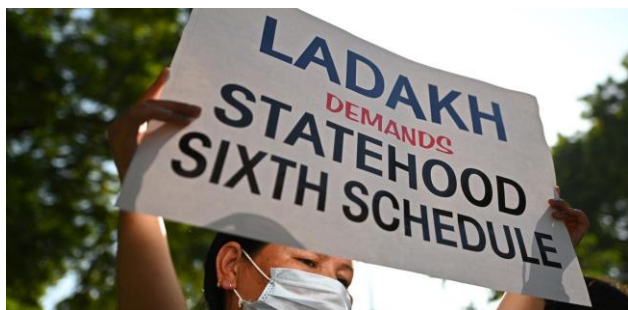
- Corruption weakens institutions, undermines public trust, distorts economic development, and disproportionately harms the poor.
- While **digitalisation** and **legal reforms** are important, they must be supported by **transparency, independent institutions, time-bound justice, citizen empowerment, accountability, and strong political will** to build a corruption-free governance system.



Crux of The Hindu & Indian Express

Indian Polity & Governance

Centre Proposes Customised Article 371 Model for Ladakh : Towards Greater Autonomy and Democratic Self-Governance



Why in News?

- The **Ministry of Home Affairs (MHA)** has proposed a **customised constitutional model under Article 371** for the **Union Territory (UT) of Ladakh** to provide greater democratic representation and institutional autonomy.
- During the fifth round of discussions with representatives of the **Leh Apex Body (LAB)** and the **Kargil Democratic Alliance (KDA)**, the Centre shared a draft proposing the establishment of a **Union Territory-level elected body** with executive, financial, and legislative powers.
- While acknowledging **Statehood as Ladakh's long-term aspiration**, the proposal seeks to strengthen self-governance through a unique constitutional arrangement suited to the region's geographical, cultural, and administrative needs.

Background

Ladakh became a **Union Territory without a legislature** on **31 October 2019** following the enactment of the **Jammu and Kashmir Reorganisation Act, 2019**, which bifurcated the erstwhile State of Jammu and Kashmir into:

- **Union Territory of Jammu & Kashmir** (with legislature)

- **Union Territory of Ladakh** (without legislature)

Since then, various political, social, and civil society groups in Ladakh have consistently demanded:

- Statehood for Ladakh.
- Constitutional safeguards under the **Sixth Schedule**.
- Protection of land, jobs, culture, language, and environment.
- Greater democratic participation in governance.

These demands intensified following concerns over administrative centralisation and the absence of an elected legislative institution.

What is the Centre's New Proposal?

- The Ministry of Home Affairs has proposed adopting a **customised *sui generis* (unique) governance model** under **Article 371** of the Constitution for Ladakh.
- Instead of immediately granting Statehood, the proposal envisages a phased approach that would strengthen democratic governance within the existing Union Territory framework.

Key Features of the Proposed Governance Model

1. Customised Model under Article 371

- The Centre has proposed that Ladakh be provided constitutional safeguards through a **special provision under Article 371**, similar in principle to the special arrangements available for several other States, but specifically designed to suit Ladakh's unique circumstances.
- The meeting minutes state that:
 - Existing provisions under **Article 371(A–J)** were examined.
 - A **customised model most suitable for Ladakh** would be developed.
 - The model would be tailored to Ladakh's geographical, demographic, ecological, and cultural characteristics.
- The proposal reflects a ***sui generis*** approach, meaning a **unique constitutional arrangement** rather than a direct replication of existing models.

2. Establishment of a Union Territory-Level Elected Body

- A major feature of the proposal is the creation of an **elected governing institution** at the Union Territory level.
- The proposed body would possess:
 - **Executive powers**
 - **Financial powers**
 - **Legislative powers**
- This would provide Ladakh with an institutional political voice while remaining a Union Territory.

3. Statehood as a Long-Term Goal

- The discussions acknowledged that:
 - **Statehood remains the long-term aspiration of Ladakh.**
- However, considering the present circumstances, both sides agreed that establishing an elected UT-level governance structure would serve as an important first step toward greater autonomy.

4. Democratic Institutional Framework

- The proposed model aims to:
 - Strengthen democratic participation.
 - Improve local accountability.
 - Enhance people's representation in governance.
 - Decentralise decision-making.
- The elected body would function alongside existing local institutions while exercising authority over devolved subjects.

5. Harmonious Relationship with Panchayati Raj Institutions

- The proposed governance structure would function in coordination with existing:
 - Panchayati Raj Institutions (PRIs)
 - Autonomous Hill Development Councils
- The objective is to avoid institutional overlap while ensuring effective grassroots governance.

6. Accountability of Bureaucracy

- Representatives from Ladakh emphasised that:

- The bureaucracy should be accountable to the elected executive.
- The Centre agreed that, for subjects transferred to the elected body:
 - Administrative control,
 - Supervision, and
 - Performance appraisal of civil servants
- would be exercised by the elected executive. This represents a significant step toward democratic accountability in administration.

What Happened During the Fifth High-Powered Committee (HPC) Meeting?

- The proposal emerged during the **fifth meeting of the Sub-Committee of the High-Powered Committee (HPC) on Ladakh**, held on **22 May 2026**.
- Subsequently, a follow-up meeting was held in **Leh**, where the minutes were jointly signed by representatives of:
 - Ministry of Home Affairs
 - Ladakh Administration
 - Leh Apex Body (LAB)
 - Kargil Democratic Alliance (KDA)
 - Political representatives from Ladakh
- For the first time, the MHA publicly released a detailed presentation outlining progress made through five rounds of dialogue.

Demands Raised by Ladakh Representatives

- Despite welcoming continued dialogue, representatives reiterated several long-standing demands.

1. Statehood

Civil society organisations maintained that full Statehood remains the ultimate objective for ensuring democratic governance and greater constitutional autonomy.

2. Inclusion under the Sixth Schedule

The demand for inclusion under the **Sixth Schedule** was reiterated to provide constitutional safeguards for:

- Tribal communities
- Land ownership
- Natural resources

- Local customs
- Traditional governance

3. Separate Administrative and Police Services

Leaders demanded the creation of:

- Ladakh Administrative Service
- Ladakh Police Service

to ensure greater local representation in governance and public administration.

4. Withdrawal of Cases

Representatives also sought withdrawal of criminal cases related to the **24 September 2025 protests**, during which violence resulted in:

- Four civilian deaths
- Around ninety injuries

Government's Developmental Initiatives in Ladakh

During the discussions, the Ministry highlighted various measures undertaken since 2019.

These include:

- Domicile-based protections.
- Reservation policies.
- Employment initiatives.
- Infrastructure development.
- Administrative reforms.
- Cultural preservation.
- Continuous dialogue with stakeholders.

The Centre maintained that these initiatives demonstrate its commitment to Ladakh's long-term development and welfare.

Article 371

- **Article 371** and its sub-clauses (**Articles 371A to 371J**) provide **special constitutional provisions** for certain States to address their unique historical, cultural, social, geographical, and developmental circumstances.
- These provisions enable asymmetric federal arrangements within the Indian constitutional framework.

Objectives of Article 371 Provisions

The special provisions seek to:

- Protect local customs and traditions.
- Safeguard land and natural resources.
- Promote balanced regional development.

- Preserve tribal identity and culture.
- Provide administrative flexibility.
- Address region-specific governance needs.

States Covered under Article 371

Constitutional Provision	State	Major Objective
Article 371	Maharashtra & Gujarat	Regional development boards
Article 371A	Nagaland	Protection of customary law, land and resources
Article 371B	Assam	Special committee for tribal areas
Article 371C	Manipur	Hill Areas Committee
Article 371F	Sikkim	Protection of existing laws and political arrangements
Article 371G	Mizoram	Protection of customary law and land
Article 371H	Arunachal Pradesh	Special powers of the Governor regarding law and order
Article 371I	Goa	Legislative Assembly provisions
Article 371J	Karnataka (Hyderabad-Karnataka region)	Educational and employment reservations

The proposed arrangement for Ladakh is expected to be a **customised constitutional model** rather than an extension of any existing provision.

Sixth Schedule: Why is Ladakh Demanding It?

About the Sixth Schedule

The **Sixth Schedule** of the Constitution provides for **Autonomous District Councils (ADCs)** in tribal-majority areas of:

- Assam
- Meghalaya
- Tripura
- Mizoram

These councils possess legislative, judicial, and administrative powers over specified subjects.

Why is Ladakh Seeking Sixth Schedule Status?

Supporters argue that Sixth Schedule protection would:

- Safeguard tribal identity.
- Protect land from unrestricted acquisition.
- Preserve local culture and language.
- Strengthen environmental conservation.
- Ensure greater control over natural resources.
- Promote local self-governance.

The demand has gained prominence since Ladakh's reorganisation as a Union Territory in 2019.

Significance of the Proposed Article 371 Model

- If implemented, the proposed framework could have several important implications.

1. Greater Democratic Representation

- An elected UT-level institution would provide Ladakh with a formal political platform for decision-making.

2. Enhanced Administrative Accountability

- Bringing bureaucracy under the supervision of the elected executive could strengthen democratic governance.

3. Constitutional Recognition of Ladakh's Unique Identity

- A customised Article 371 model would acknowledge Ladakh's distinct geographical, cultural, ecological, and tribal characteristics.

4. Balance Between Autonomy and National Integration

- The proposal attempts to provide greater regional autonomy while retaining Ladakh's status as a Union Territory.

5. Institutional Stability

- Creating a structured governance framework may reduce administrative uncertainty and facilitate long-term policy planning.

Challenges

Despite the progress in dialogue, several issues remain unresolved:

- Demand for full Statehood continues.
- Sixth Schedule inclusion has not been accepted.
- Defining the legislative, financial, and executive powers of the proposed elected body.
- Balancing authority between the elected institution, Lieutenant Governor, and Union Government.
- Ensuring harmonious functioning with existing Hill Development Councils and Panchayati Raj Institutions.
- Addressing concerns regarding land rights, employment opportunities, environmental protection, and cultural preservation.

Way Forward

The Centre's proposal for a customised governance model under **Article 371** represents a significant step towards strengthening democratic self-governance in Ladakh while recognising its unique socio-cultural and geographical context. The proposed Union Territory-level elected body with executive, financial, and legislative powers has the potential to bridge the existing democratic deficit and enhance local participation in governance. However, sustained dialogue between the Union Government and Ladakh's civil society organisations will remain essential to build consensus on unresolved issues such as Statehood, Sixth Schedule safeguards, protection of land and employment, and institutional accountability. A carefully designed constitutional framework that balances regional aspirations with national interests can promote inclusive governance, preserve Ladakh's distinct identity, and ensure sustainable development in the strategically important Himalayan region.

Harjit Singh Grewal Appointed Chairperson of the National Commission for Minorities (NCM)



1. Context

- The **Central Government** has appointed **Harjit Singh Grewal** as the **Chairperson of the National Commission for Minorities (NCM)**.
- The appointment fills a vacancy that existed since **April 2025**, following the completion of the tenure of **Iqbal Singh Lalpura**.
- Harjit Singh Grewal is the **second consecutive Sikh leader** to head the statutory commission.

- Along with the Chairperson, **Munawari Begum** has been appointed as the **Vice-Chairperson**, and **Glenn E. Souza Ticlo** has been appointed as a **Member** of the Commission.

2. About the National Commission for Minorities (NCM)

- The **National Commission for Minorities (NCM)** is a **statutory body** established under the **National Commission for Minorities Act, 1992**.
- It was constituted to safeguard the rights and interests of notified minority communities in India.
- The Commission monitors the implementation of constitutional and legal safeguards available to minorities and advises the Government on issues concerning minority welfare and development.
- It also investigates complaints regarding the violation or deprivation of minority rights.

3. Composition of the Commission

The National Commission for Minorities consists of:

- One **Chairperson**.
- One **Vice-Chairperson**.
- **Five Members**.

Present Composition

- **Chairperson:** Harjit Singh Grewal.
- **Vice-Chairperson:** Munawari Begum.
- **Member:** Glenn E. Souza Ticlo.
- Following these appointments, the Commission has **four members**, against its sanctioned strength of **seven**.

4. Tenure

- Under **Section 4(1)** of the **National Commission for Minorities Act, 1992**, the Chairperson, Vice-Chairperson, and Members hold office for **three years** from the date they assume office or until further orders.

5. Notified Minority Communities in India

The Central Government has notified the following **six religious communities** as minorities under the NCM Act:

- Muslims

- Christians
- Sikhs
- Buddhists
- Parsis (Zoroastrians)
- Jains

6. Functions of the National Commission for Minorities

The Commission is mandated to:

- Monitor the implementation of constitutional and legal safeguards provided to minority communities.
- Examine complaints regarding the deprivation of minority rights and safeguards.
- Evaluate the progress of socio-economic and educational development of minority communities.
- Investigate instances of discrimination against minorities and recommend corrective measures.
- Conduct studies and research relating to minority welfare and development.
- Advise the Central and State Governments on policies concerning minority protection and development.
- Recommend measures for the effective implementation of minority welfare programmes.
- Submit reports and recommendations to the Government on matters affecting minority communities.

7. Constitutional and Legal Basis

- Although the **National Commission for Minorities** is **not a constitutional body**, it derives its authority from the **National Commission for Minorities Act, 1992**.
- The Commission works to uphold the principles of **equality, non-discrimination, and religious freedom** guaranteed under the Constitution of India.

Relevant Constitutional Provisions

- **Article 14:** Equality before the law.
- **Article 15:** Prohibition of discrimination on grounds of religion, race, caste, sex, or place of birth.

- **Article 16:** Equality of opportunity in public employment.
- **Article 25:** Freedom of conscience and free profession, practice, and propagation of religion.
- **Article 29:** Protection of the interests of minorities.
- **Article 30:** Right of minorities to establish and administer educational institutions.

8. Significance

- The appointment restores the leadership of the National Commission for Minorities after a prolonged vacancy.
- The Commission plays an important role in protecting the constitutional rights of minority communities.
- It serves as an institutional mechanism for addressing grievances relating to discrimination and denial of safeguards.
- The Commission contributes to inclusive governance by advising governments on minority welfare policies.
- Its recommendations support social harmony, national integration, and equitable development.

9. Challenges

- Vacancies in the Commission may affect its effectiveness and timely disposal of complaints.
- Many recommendations of the Commission are advisory in nature and are not legally binding.
- Ensuring balanced socio-economic development across diverse minority communities remains a significant challenge.
- Effective coordination with State Governments is necessary for better implementation of welfare programmes.

10. Way Forward

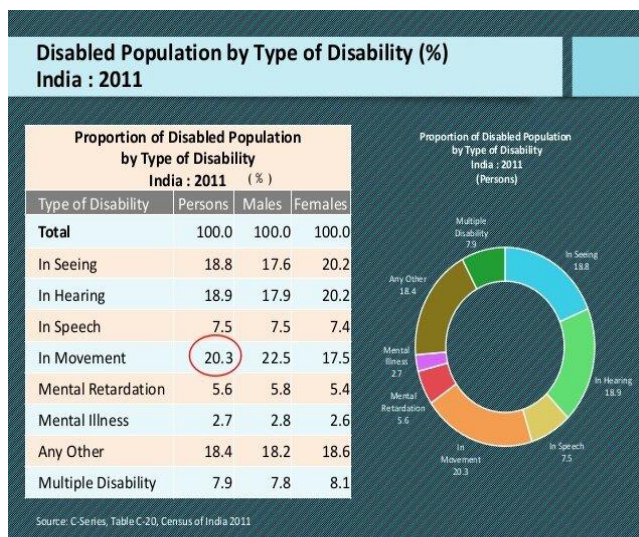
- All vacant positions in the Commission should be filled promptly to strengthen its institutional capacity.
- Greater financial and administrative support should be provided for effective functioning.

- Minority welfare programmes should be regularly monitored and independently evaluated.
- Awareness regarding constitutional safeguards and legal remedies available to minority communities should be enhanced.
- Stronger coordination between the Union Government, State Governments, and the Commission will improve policy implementation and grievance redressal.



Indian Society & Social Justice

Rights-based Disability Welfare Framework in India



Why in News?

- The growing focus on disability rights and social protection has revived discussions on establishing a uniform, rights-based and dignity-centric welfare framework for Persons with Disabilities (PwDs) across India.
- Despite progressive legislation, Persons with Disabilities continue to face multiple barriers, including inadequate financial assistance, regional disparities in welfare, inaccessible infrastructure, limited livelihood opportunities, digital exclusion and administrative hurdles.

- The enactment of the **Rights of Persons with Disabilities (RPwD) Act, 2016** marked a significant shift by expanding the recognised categories of disabilities from 7 to 21 and bringing India's legal framework in line with the **UN Convention on the Rights of Persons with Disabilities (UNCRPD)**.
- However, bridging the implementation gap through stronger institutions and a nationally assured **Minimum Universal Disability Pension** remains essential for ensuring equal rights and social justice.

Why is a Rights-based Disability Welfare Framework Essential?

Rights-based Approach

- A rights-based framework recognises disability as a matter of equality, human rights and social justice rather than charity or welfare.
- It seeks to guarantee equal access to education, healthcare, employment, public services, accessibility and social security for every Person with Disability.

Addressing Welfare Exclusion

- Although digital governance initiatives have expanded welfare delivery, many PwDs continue to face difficulties in accessing benefits.
- Challenges such as complex certification procedures, lack of accessible digital platforms, documentation issues and administrative delays often prevent eligible individuals from receiving support.

Strengthening Social Security

- Disability pension amounts provided in several States remain inadequate to meet even basic living expenses.
- Limited financial assistance affects access to healthcare, assistive devices, mobility support, nutrition and independent living.

Reducing Interstate Disparities

- Disability welfare benefits differ significantly across States due to variations in financial resources and policy priorities.

- A nationally consistent framework would ensure that social protection is based on entitlement rather than geographical location.

Increasing Public Investment

- India's expenditure on disability welfare remains relatively low compared to the scale of the beneficiary population.
- Greater investment is necessary to strengthen rehabilitation services, accessibility projects, assistive technologies and income support programmes.

Enhancing Economic Participation

- Limited access to education and employment prevents many Persons with Disabilities from contributing fully to the economy.
- Improving inclusion can expand the workforce, enhance productivity and promote inclusive economic growth.

Advancing Constitutional Values

- A rights-based model reinforces constitutional principles of equality, dignity, non-discrimination and social justice.
- It also facilitates more effective implementation of the Rights of Persons with Disabilities Act, 2016 throughout the country.

Present Status of Persons with Disabilities in India

Current Scenario

- As per **Census 2011**, India has approximately **2.68 crore Persons with Disabilities**, representing around **2.21%** of the total population.
- Disability prevalence is comparatively higher among males than females and is more pronounced in rural areas.
- The **Rights of Persons with Disabilities Act, 2016** recognises **21 categories of disabilities**, covering physical, sensory, intellectual and multiple disabilities.

Constitutional Framework

- **Preamble:** Upholds justice, liberty, equality and fraternity for every citizen.
- **Fundamental Rights (Part III):** Ensure equality before law, equal protection of laws

and protection against discrimination for all citizens, including Persons with Disabilities.

- **Article 41:** Directs the State to provide assistance in cases of unemployment, sickness, old age and disability, subject to available resources.
- **Article 243-G:** Assigns Panchayats responsibilities relating to social welfare, including the welfare of Persons with Disabilities.
- **Article 243-W:** Empowers Urban Local Bodies to safeguard the interests of weaker sections of society, including Persons with Disabilities.

Legislative and Policy Framework

- **National Policy for Persons with Disabilities, 2006** aims to promote equal opportunities, protect rights and facilitate full participation in society.
- India became a State Party to the **UN Convention on the Rights of Persons with Disabilities (UNCRPD)** in 2008, leading to the enactment of the **Rights of Persons with Disabilities Act, 2016**.
- The **National Trust Act, 1999** supports the welfare of individuals with autism, cerebral palsy, intellectual disabilities and multiple disabilities.
- The **Rehabilitation Council of India Act, 1992** regulates rehabilitation professionals and establishes standards for rehabilitation services.
- The **Scheme for Implementation of the Rights of Persons with Disabilities Act (SIPDA)** promotes accessibility, skill development and capacity building for Persons with Disabilities.

Important Judicial Developments

- **Rajive Raturi v. Union of India (2024):**
 - The Supreme Court recognised accessibility as an essential component of the right to life under Article 21.
 - It highlighted digital accessibility as a prerequisite for achieving substantive equality and preventing exclusion.

- **Reserve Bank of India v. A. K. Nair & Others (2023):**

- The Supreme Court clarified that eligible Persons with Disabilities are entitled to reservation in promotions under the RPwD Act, 2016 in accordance with applicable government policies.

What are the Major Challenges Faced by Persons with Disabilities?

Limited Accessibility

- A large number of public buildings, transportation systems and urban spaces continue to lack universal accessibility features.
- Inadequate provision of ramps, tactile pathways, lifts and accessible public infrastructure restricts independent mobility.

Educational Barriers

- Inclusive education is constrained by insufficient specialised teachers, inaccessible school infrastructure and limited assistive learning resources.
- Literacy and educational attainment among Persons with Disabilities remain considerably below the national average.

Employment Constraints

- Social stigma, inaccessible workplaces and inadequate workplace accommodations continue to limit employment opportunities.
- A substantial proportion of employable Persons with Disabilities remain outside the formal workforce.

Healthcare Gaps

- Many healthcare facilities are not adequately equipped to meet the needs of Persons with Disabilities.
- Shortages of specialised equipment, trained personnel and accessible infrastructure continue to affect healthcare delivery.

Digital Exclusion

- Rapid digitalisation of public services has created additional barriers for persons unable to access inaccessible websites, applications and digital platforms.

- Weak enforcement of digital accessibility standards further widens the digital divide.

Weak Implementation

- Although the legal framework is comprehensive, inconsistent implementation, inadequate monitoring and limited institutional capacity reduce its overall effectiveness.

What Measures can Strengthen Disability Empowerment?

Improve Disability Identification

- Develop an integrated national digital database linked to disability certificates.
- Ensure portability of benefits across States.
- Simplify certification procedures and minimise administrative delays.

Strengthen Social Security

- Introduce a nationally guaranteed **Minimum Universal Disability Pension** for all eligible beneficiaries.
- Establish an independent institutional mechanism to standardise eligibility, monitor implementation and strengthen grievance redressal.

Ensure Universal Accessibility

- Adopt universal design standards in government buildings, educational institutions, healthcare facilities and public transport.
- Improve digital accessibility through screen-reader compatibility, captioning, sign language support and compliance with prescribed accessibility guidelines.

Promote Inclusive Education

- Increase the availability of trained special educators and assistive technologies.
- Encourage early detection and intervention for children with disabilities.
- Strengthen disability-inclusive implementation of **Samagra Shiksha** and the **National Education Policy (NEP) 2020**.

Expand Employment Opportunities

- Enhance vocational training and skill development programmes.

- Encourage employers through incentives and workplace accommodation measures.
- Expand employment-linked schemes and facilitate participation in emerging sectors, including digital and gig-based employment.

Build Social Awareness

- Incorporate disability sensitisation into the training of government officials, teachers, healthcare workers, police personnel and judicial officers.
- Promote awareness campaigns that encourage respect, inclusion and equal participation while reducing stigma and discrimination.

Conclusion

- Ensuring equality for Persons with Disabilities requires a transition from a welfare-centric approach to a comprehensive rights-based model focused on empowerment, inclusion and dignity.
- Strengthening social protection, improving accessibility, expanding educational and employment opportunities and ensuring effective enforcement of existing laws will enable Persons with Disabilities to participate fully in social, economic and political life.
- A robust and uniformly implemented disability welfare framework will strengthen constitutional values, fulfil India's international commitments and contribute to the vision of an inclusive and developed India.

National Statistics Day and Sustainable Development Goals (SDGs) Progress in India



Why in News?

- The **Ministry of Statistics and Programme Implementation (MoSPI)** observed the **20th Statistics Day on 29 June 2026** to commemorate the **133rd birth anniversary of Prof. P. C. Mahalanobis**, whose contributions shaped India's statistical system.
- The occasion also witnessed the release of the **Sustainable Development Goals (SDGs) – National Indicator Framework Progress Report, 2026**, which evaluates India's advancement towards achieving the 17 SDGs.

What is National Statistics Day?

About

- The Government of India declared **29 June as National Statistics Day in 2007** in honour of Prof. P. C. Mahalanobis.
- The day aims to create awareness about the importance of statistics in governance, policymaking, economic planning and evidence-based decision-making.

Theme 2026: “Unlocking the Potential of Administrative Data”

- The theme highlights the growing importance of using data generated through routine government processes such as tax databases, welfare records, population registers and administrative systems.
- It emphasises reducing dependence only on traditional surveys and promoting faster, cost-effective and real-time policymaking through administrative data.

Prof. P. C. Mahalanobis: Architect of India's Statistical System

About

- **Prasanta Chandra Mahalanobis (1893–1972)** is regarded as the **Father of Indian Statistics** for establishing the foundations of India's modern statistical institutions.
- His work played a crucial role in strengthening statistical methods for economic planning, governance and national development.

Major Contributions

Institutional Development

- He established the **Indian Statistical Institute (ISI)** in **1931**, which was recognised as an **Institution of National Importance by Parliament in 1959**.
- His efforts contributed to the creation of the:
 - **National Sample Survey (NSS)** in **1950**
 - **Central Statistical Organisation (CSO)**
- He also founded **Sankhya**, India's first statistical journal, in 1933.

Contribution to Economic Planning

- He served as a key member of India's first Planning Commission.
- He played an important role in designing the **Second Five-Year Plan (1956–1961)** based on the **Mahalanobis Model**.
- The model focused on rapid industrialisation, particularly through investment in heavy industries and capital goods.

Mahalanobis Distance

- Developed in 1930, the **Mahalanobis Distance** is a statistical measure used to determine the distance between a data point and a distribution.
- It is widely applied in fields such as machine learning, classification, pattern recognition and cluster analysis.

Advancement of Sample Surveys

- He promoted large-scale sample surveys as an efficient alternative to complete population enumeration.
- His approach demonstrated that scientifically designed samples could generate reliable estimates at lower costs compared to traditional census methods.

Application of Statistics in Governance

- He encouraged the practical use of statistics for solving real-world problems.
- Statistical analysis developed under his guidance helped in areas such as flood management, agricultural studies and meteorological research.

Global Recognition

- He served as Chairman of the **United Nations Subcommission on Statistical Sampling (1947–1951)**.
- He was elected a **Fellow of the Royal Society, London in 1945**.
- He received the **Padma Vibhushan in 1968**, India's second-highest civilian honour.

Key Findings of SDGs – National Indicator Framework Progress Report, 2026

SDG 1: No Poverty

- Multidimensional poverty declined from **24.85% (2015–16) to 14.96% (2019–21)**.
- Coverage under social protection systems increased significantly from **22% in 2019 to 65.3% in 2026**.
- Major contributors:
 - Pradhan Mantri Jan Dhan Yojana
 - Direct Benefit Transfer (DBT)

SDG 2: Zero Hunger

- Prevalence of underweight children below five years reduced from **35.7% (2015–16) to 31.8% (2023–24)**.
- Child stunting declined from **38.4% to 29.3%** during the same period.
- Key initiatives:
 - POSHAN Abhiyaan
 - PM POSHAN Scheme

SDG 3: Good Health and Well-being

- Maternal Mortality Ratio improved from **122 (2015–17) to 87 per 1 lakh live births (2022–24)**.
- Institutional and skilled birth attendance increased from **81.4% to 91.3%** between NFHS-4 and NFHS-6.
- Under-five mortality declined from **43 (2015) to 28 per 1,000 live births (2024)**.
- Neonatal mortality reduced from **25 to 18 per 1,000 live births** during the same period.
- TB treatment coverage improved from **71% (2020) to 92% (2024)**.
- Key drivers:
 - National Health Mission

- Ayushman Bharat
- Janani Suraksha Yojana
- Mission Indradhanush

SDG 4: Quality Education

- Higher secondary Gross Enrolment Ratio improved significantly between 2015–16 and 2024–25.
- Schools with internet facilities increased from **46.3% to 84.2%**.
- Key initiatives:
 - Samagra Shiksha Abhiyan
 - National Education Policy (NEP) 2020

SDG 5: Gender Equality

- Sex Ratio at Birth improved from **896 (2015–17) to 918 (2022–24)**.
- Female-to-male Labour Force Participation Ratio increased from **0.43 (2020–21) to 0.52 (2025)**.
- Women-led Self Help Groups linked with banks increased from **88.92% to 96%**.
- Major initiatives:
 - Beti Bachao Beti Padhao
 - Expansion of SHG networks
 - Gender budgeting

SDG 6: Clean Water and Sanitation

- Rural households with piped water supply increased from **48.15% (2021–22) to 81.81% (2025–26)**.
- Wastewater treatment increased from **17.97% to 82.20%**.
- Water-use efficiency improved from **2.89 USD/m³ (2020) to 5.30 USD/m³ (2023)**.
- Key programmes:
 - Jal Jeevan Mission
 - Swachh Bharat Mission
 - Atal Bhujal Yojana

SDG 7: Affordable and Clean Energy

- Universal household electrification has been achieved.
- Renewable energy capacity per capita increased from **64.04 watts (2014–15) to 193.36 watts (2025–26)**.

- Energy intensity of the economy declined, indicating improved efficiency.
- Key initiatives:
 - Saubhagya Scheme
 - PM-KUSUM
 - Production Linked Incentive (PLI) Scheme for Solar PV Modules

SDG 8: Decent Work and Economic Growth

- Unemployment rate declined from **6.1% (2017–18)** to **3.1% (2025)**.
- Tourism recorded a growth rate of **15.01% in 2023–24**.
- Key drivers:
 - Startup India
 - PM Mudra Yojana
 - Swadesh Darshan 2.0
 - Expansion of e-Visa facilities

SDG 9: Industry, Innovation and Infrastructure

- Manufacturing sector employment share increased from **11.40% (2022–23)** to **12.14% (2025)**.
- Population covered by 4G mobile networks reached **99.51% in 2025**.
- Key initiatives:
 - BharatNet
 - Atal Innovation Mission
 - Startup India

SDG 10: Reduced Inequalities

- Rural household expenditure inequality declined, with Gini coefficient improving from **0.28 (2011–12)** to **0.23 (2023–24)**.
- Urban inequality also reduced from **0.36** to **0.28**.
- Female representation among professional and technical workers improved to **51.3% in 2025**.
- Major instruments:
 - PM Jan Dhan Yojana
 - PM-KISAN
 - Accessible India Campaign
 - DBT

SDG 11: Sustainable Cities and Communities

- Urban wards with complete door-to-door waste collection increased from **43% to 97%**.
- Waste processing increased from **17.97% to 82.20%**.
- India has adopted disaster risk reduction strategies aligned with the **Sendai Framework (2015–2030)**.
- Key initiatives:
 - AMRUT
 - Pradhan Mantri Awas Yojana
 - Smart Cities Mission

SDG 12: Responsible Consumption and Production

- Waste recycling plants increased from **829 (2019–20)** to **3,236 (2025–26)**.
- Post-harvest storage losses of wheat and rice from government stocks reduced almost to zero.
- Major policy measures:
 - Extended Producer Responsibility (EPR)
 - Circular economy promotion
 - Plastic and e-waste management frameworks

SDG 13: Climate Action

- India has updated its climate commitments under the **Paris Agreement and UNFCCC framework**.
- Industrial compliance with environmental standards improved from **86.25% (2018)** to **91.82% (2024)**.
- Climate action is guided by:
 - National Action Plan on Climate Change (NAPCC)
 - State Action Plans on Climate Change

SDG 14: Life Below Water

- Maximum Sustainable Yield in fisheries increased from **3.078 million tonnes/year** to **5.311 million tonnes/year**.
- India continues efforts for sustainable marine resource management.
- Key interventions:
 - Mangrove restoration

- Coral transplantation
- Artificial reefs
- Coastal ecosystem protection

SDG 15: Life on Land

- Forest cover increased from **21.34% (2019)** to **21.76% (2023)** of geographical area.
- Area covered under Ramsar wetlands increased significantly.
- Key programmes:
 - Green India Mission
 - Project Tiger
 - Project Elephant
 - Nagar Van Yojana
 - National Biodiversity Strategy and Action Plan

SDG 16: Peace, Justice and Strong Institutions

- Number of judges increased from **1.33 to 1.55 per lakh population** between 2016 and 2024.
- Court availability improved during the same period.
- Aadhaar coverage reached **95.67% in 2025–26**.
- India continues to maintain a National Human Rights Institution compliant with Paris Principles.

SDG 17: Partnerships for the Goals

- India's share in global merchandise exports increased from **1.62% (2015)** to **1.70% (2024)**.
- Share in global commercial services exports increased from **3.11% to 4.35%**.
- This reflects India's increasing integration with global trade networks.

National Indicator Framework (NIF)

About

- The **National Indicator Framework (NIF)** is India's primary statistical mechanism for monitoring progress towards the 17 Sustainable Development Goals.
- It has been developed by **MoSPI** in coordination with **NITI Aayog**, **UN agencies** and **other stakeholders**.

Features

- The framework currently contains **277 national indicators (2026)** covering different SDG targets.
- It is periodically revised by the **High-Level Steering Committee (HLSC)** to align with global indicators and national priorities.
- It supports decentralised SDG monitoring through:
 - State Indicator Frameworks (SIFs)
 - District Indicator Frameworks (DIFs)

Conclusion

- Statistics play a critical role in measuring development outcomes, improving governance and designing evidence-based policies.
- The progress reflected in the SDGs-National Indicator Framework Report highlights India's achievements across poverty reduction, healthcare, education, infrastructure and sustainability.
- Strengthening data quality, administrative data systems and statistical capacity will remain essential for achieving the Sustainable Development Goals and ensuring inclusive development.

Viksit Bharat – Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025 (VB-G RAM G Act)

What makes Viksit Bharat-G RAM G better than MGNREGA?	
MGNREGA	Viksit Bharat-G RAM G
100 days of wage employment per rural household	125 days of wage employment per rural household
Multiple and scattered categories of works with limited strategic focus	4 clearly defined priority areas focusing on water security, rural infrastructure, livelihoods and climate resilience
Center bears unskilled wage costs, states bear unemployment allowance	State cost-sharing for wages, 60:40 for most states, 90:10 for certain special-category regions
No explicit statutory "pause window"	States can notify up to 60 days in a FY when work will not be executed
Demand based funding with unpredictable allocations	Normative funding ensuring predictable budgeting while protecting the employment guarantee
Gram Panchayat planning is central	Integrates institutionalised convergence and infrastructure planning

Source: Ministry of Rural Development

Why in News?

- The **Viksit Bharat – Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025**

(VB-G RAM G) came into force across rural India on **1st July 2026**.

- The Act replaces the **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005**, introducing a restructured rural employment framework focused on employment security, durable asset creation, climate resilience and digital governance.
- The VB-G RAM G Act, 2025 expands guaranteed rural employment from **100 days to 125 days per household per financial year**.
- It shifts the focus from short-term employment generation towards **durable rural infrastructure, water security, livelihood assets and climate-resilient development**.
- The Act integrates rural planning with platforms such as **PM Gati Shakti** and promotes Gram Panchayat-led development through Viksit Gram Panchayat Plans.
- However, concerns have emerged regarding increased State financial burden, reduced demand-driven employment guarantee, greater centralisation, digital exclusion risks and pending liabilities under MGNREGA.

What is the VB-G RAM G Act, 2025?

About

- The VB-G RAM G Act, 2025 provides a statutory guarantee of wage employment to eligible rural households willing to undertake unskilled manual work.
- It aims to:
 - Strengthen rural livelihoods.
 - Create productive rural assets.
 - Improve village-level economic resilience.
 - Align rural development with the vision of **Viksit Bharat @2047**.

Evolution of Rural Employment Programmes

- India's rural employment programmes have evolved through several stages:
 - **Rural Manpower Programme (1960s)** focused on generating

employment opportunities in rural areas.

- **Crash Scheme for Rural Employment (1971)** aimed at providing immediate employment.
- **Jawahar Rozgar Yojana (1993)** and **Sampoorna Grameen Rozgar Yojana (1999)** expanded rural employment initiatives.
- **Maharashtra Employment Guarantee Act, 1977** introduced the idea of a statutory right to employment.
- **MGNREGA, 2005** provided a nationwide legal guarantee of rural employment.

Focus Areas of VB-G RAM G

- The Act places **Gram Panchayats at the centre of rural transformation**.
- It focuses on:
 - Durable infrastructure creation.
 - Natural resource management.
 - Water conservation.
 - Climate resilience.
 - Women's empowerment through Self Help Groups (SHGs).

Key Features of the VB-G RAM G Act, 2025

Enhanced Employment Guarantee

- The guaranteed employment period has been increased from **100 days to 125 days per household per financial year**.
- It provides greater income security to rural households dependent on wage employment.

60-Day Agricultural Pause Period

- The Act introduces a **60-day no-work period** during peak sowing and harvesting seasons.
- The objective is to prevent labour shortages in agriculture.
- Workers can utilise their guaranteed employment days during the remaining **305 days** of the year.

National Minimum Wage Floor

- For the first time, a national minimum wage floor of **₹300 per day** has been introduced.
- No State can provide wages below this statutory minimum under the programme.

Timely Wage Payments

- Wages must be paid weekly or within a maximum period of **14 days** after completion of work.
- This aims to improve income stability and reduce payment delays.

New Worker Identification System

- Workers will receive **Gramin Rozgar Guarantee Cards**.
- Existing e-KYC verified job cards will continue during the transition period to avoid disruption.

Revised Funding Pattern

- Unlike MGNREGA, where the Centre largely financed wage expenditure, VB-G RAM G introduces a shared funding model:
 - **Normal States:** Centre-State ratio of 60:40.
 - **North-Eastern and Himalayan States:** Centre bears 90%.
 - **Union Territories without legislature:** 100% Central funding.

Normative Resource Allocation

- The Act replaces the traditional demand-driven funding approach with a **normative allocation system**.
- The Centre determines State-wise expenditure limits based on recommendations linked with the **16th Finance Commission's horizontal devolution formula**.

Four Strategic Development Areas

Employment generation will focus on four major areas:

- **Water security**
 - Water conservation.
 - Groundwater management.
 - Irrigation-related works.

- **Core rural infrastructure**

- Roads.
- Community assets.
- Essential village infrastructure.

- **Livelihood infrastructure**

- Assets supporting agriculture and rural enterprises.

- **Climate resilience**

- Works addressing extreme weather events and environmental challenges.

Integration with PM Gati Shakti

- Planning will be undertaken through **Viksit Gram Panchayat Plans**.
- These plans will be integrated with PM Gati Shakti to avoid fragmented asset creation.

Digital Asset Mapping

- All assets created under the programme will be recorded in the **Viksit Bharat National Rural Infrastructure Stack**.
- It aims to improve monitoring, transparency and coordination.

Limitations of MGNREGA

Fragmented Asset Creation

- Many MGNREGA works remained scattered, limiting the creation of large-scale productive rural infrastructure.

Agricultural Labour Shortages

- During peak agricultural seasons, demand-driven employment sometimes affected labour availability for farming activities.

Wage Payment Delays

- Delays in fund release and administrative processes frequently resulted in late wage payments.

Leakages and Irregularities

- Challenges included:
 - Fake job cards.
 - Ghost beneficiaries.
 - Manipulation of muster rolls.
 - Poor-quality assets.

Fiscal Uncertainty

- The demand-driven nature created uncertainty in expenditure requirements and contributed to pending liabilities.

Rationale Behind VB-G RAM G Act, 2025

Changing Rural Economy

- Rural India has witnessed:
 - Declining poverty.
 - Greater livelihood diversification.
 - Improved digital connectivity.
- These changes created a need for a modern rural employment framework.

Focus on Durable Assets

- The new framework prioritises long-term development through:
 - Water security.
 - Infrastructure creation.
 - Climate adaptation.
 - Livelihood support.

Improved Accountability

- Digital monitoring and integrated planning aim to improve transparency and efficiency.

Concerns Related to VB-G RAM G Act, 2025

Increased Financial Burden on States

- The 60:40 funding pattern may significantly increase State expenditure obligations.
- Some estimates suggest that State financial responsibility may rise substantially compared to MGNREGA.

Allocation Concerns

- Normative allocation may disadvantage States with higher labour demand.
- States requiring expenditure beyond the Centre's approved ceiling will have to bear additional costs.

Weakening of Right to Work

- Critics argue that replacing demand-driven funding with fixed allocations may weaken the legal guarantee of employment.
- The right to work could become dependent on predetermined budget limits.

Problems with 60-Day Work Suspension

- A fixed nationwide agricultural pause may not reflect India's diverse climatic and agricultural conditions.
- It may affect workers during situations such as:
 - Drought.
 - Crop failure.
 - Delayed monsoon.

Centralisation of Governance

- Greater Union control over planning and finances may reduce the autonomy of Gram Sabhas and Panchayati Raj Institutions.

Reduced Social Accountability

- Centralised grievance mechanisms and weaker community monitoring may affect transparency.

Wage Structure Concerns

- The national minimum wage floor of **₹300 per day** has resulted in varied impacts across States:
 - States with wages below ₹300 witnessed significant increases.
 - States already paying above ₹300 experienced limited wage changes.
- Some regions, such as parts of Sikkim, have higher notified wage rates.

Pending MGNREGA Liabilities

- Concerns have been raised regarding unresolved MGNREGA dues, including pending wage payments, before implementation of the new framework.

Way Forward

Strengthening Cooperative Federalism

- A gradual transition should be adopted to reduce the financial pressure on States.
- A fiscal compensation mechanism may be considered for States facing higher employment demand.

Revisiting Funding Structure

- A balanced funding arrangement can be explored:
 - Continued higher Central contribution for wages.

- Shared funding for material components.

Decentralising Agricultural Pause Period

- Gram Sabhas and District Collectors should have flexibility to modify the 60-day pause period according to local conditions.
- This will help address droughts, irregular rainfall and crop failures.

Protecting the Rights-Based Framework

- A **National Contingency Buffer Fund** can be created to address sudden increases in labour demand due to:
 - Economic distress.
 - Natural disasters.
 - Climate-related shocks.

Inclusive Digital Governance

- Technology should improve transparency without excluding vulnerable groups.
- Alternative mechanisms should be available when:
 - Biometric authentication fails.
 - Internet connectivity is unavailable.
 - Workers face digital barriers.

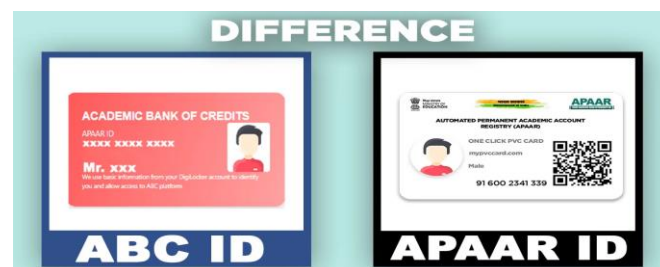
Empowering Panchayati Raj Institutions

- Gram Panchayats should retain autonomy in:
 - Selecting local projects.
 - Designing village development plans.
 - Managing implementation priorities.
- Independent social audit mechanisms should be strengthened to ensure accountability.

Conclusion

- The VB-G RAM G Act, 2025 represents a shift from a welfare-oriented employment programme towards a rural development model focused on infrastructure creation, climate resilience and economic transformation.
- However, its success depends on maintaining the balance between fiscal discipline and the constitutional principles of livelihood security and decentralised governance.
- Ensuring adequate funding, protecting the right to employment and empowering local institutions will determine whether the Act becomes a foundation for inclusive rural development under **Viksit Bharat @2047**.

Academic Bank of Credits (ABC) and APAAR: Digital Transformation of Academic Records



Why in News?

- The **Academic Bank of Credits (ABC)** and **Automated Permanent Academic Account Registry (APAAR)** are creating a digital ecosystem for managing academic records in India.
- These initiatives aim to make education more flexible, transparent and accessible by enabling secure storage, transfer and recognition of students' academic achievements.

What is Academic Bank of Credits (ABC)?

About

- **Academic Bank of Credits (ABC)** is a digital platform launched by the **Ministry of Education, Government of India**.
- It is regulated by the **University Grants Commission (UGC)**.
- It enables students to store, manage, transfer and redeem academic credits earned from recognised higher education institutions.

Objective

- To create a flexible and learner-centric education system where academic achievements can be digitally recorded and utilised throughout a learner's educational journey.
- It supports the objectives of:
 - **National Education Policy (NEP) 2020**.
 - **National Credit Framework (NCrF)**.
- It promotes lifelong learning, academic mobility and multiple pathways in education.

How Does Academic Bank of Credits Work?

- Students register on the ABC portal and receive a unique **ABC ID or APAAR ID** linked with their Aadhaar and DigiLocker accounts.
- Students enrolled in eligible Higher Education Institutions (HEIs) can use the ABC facility.
- Educational institutions upload students' earned credits directly to their ABC accounts.
- Students can:
 - Accumulate credits.
 - Transfer credits between institutions.
 - Redeem credits for completing academic programmes.
- Credits remain valid for up to **7 years** or the duration prescribed by the concerned discipline.
- Once credits are redeemed, they cannot be reused.
- Academic institutions are responsible for credit redemption and issuing certificates through the **National Academic Depository (NAD)** platform.
- NAD acts as the digital repository for securely storing academic awards and records.

Key Features of Academic Bank of Credits

Academic Mobility

- ABC allows students to move between different higher education institutions without losing previously earned credits.
- It enables seamless transfer of credits across programmes and institutions.

Digital Verification System

- ABC provides a consent-based digital document exchange mechanism.
- It reduces verification delays and simplifies academic record management.

Multiple Entry and Exit (MEE)

- ABC enables the **Multiple Entry and Exit framework** introduced under NEP 2020.
- Students can leave and re-enter educational programmes while retaining recognition for completed learning.

SWAYAM Integration

- Students can earn up to **40% of credits** through courses offered on the **SWAYAM online learning platform**.
- This expands access to quality digital education.

Alignment with National Credit Framework (NCrF)

- ABC is integrated with the **National Credit Framework (NCrF)**.
- It recognises different forms of learning, including:
 - Academic learning.
 - Vocational education.
 - Experiential learning.

Role of APAAR (Automated Permanent Academic Account Registry)

About

- APAAR provides students with a permanent digital academic identity.
- It acts as a lifelong academic account containing educational records and achievements.

Importance

- Enables secure storage of academic credentials.
- Reduces paperwork and duplication of records.
- Facilitates easy verification of qualifications.
- Supports seamless academic mobility and lifelong learning.

Significance of ABC and APAAR

- Promotes a flexible and student-centric education system.
- Supports implementation of NEP 2020 reforms.
- Encourages interdisciplinary learning and skill-based education.
- Improves transparency and efficiency in academic record management.
- Enables recognition of learning gained through different modes and institutions.
- Strengthens India's digital education ecosystem.

Conclusion

- The Academic Bank of Credits and APAAR represent a major shift towards a flexible, technology-enabled and learner-focused education system.
- By ensuring secure academic records, credit portability and multiple learning pathways, these platforms can support lifelong learning and make higher education more accessible and inclusive.

Ayushman Bharat Digital Mission (ABDM) and Ayushman Bharat Health Account (ABHA)



Why in News?

- The **Ayushman Bharat Digital Mission (ABDM)** has achieved a major milestone by linking **over 104 crore digital health records** with **more than 93 crore Ayushman Bharat Health Accounts (ABHA)**.
- The mission is accelerating India's transition towards a **digital, paperless and integrated healthcare ecosystem**.

Ayushman Bharat Health Account (ABHA)

About

- **ABHA** is a **14-digit unique digital health ID** created under the **Ayushman Bharat Digital Mission (ABDM)**.
- It enables citizens to securely access and manage their medical records across participating healthcare institutions.

Objective

- To establish a **portable, paperless and consent-based** digital health system that allows individuals to access and share their medical history whenever required.

Key Features of ABHA

1. Unified Digital Health Record

- Enables individuals to maintain all their medical records under a single digital identity.
- Records generated at different hospitals and laboratories can be accessed through one platform.

2. Consent-Based Data Sharing

- Health information is shared only after obtaining the patient's permission.
- Consent remains **time-bound** and can be withdrawn at any stage, ensuring greater control over personal data.

3. Seamless Interoperability

- Supports smooth transfer of medical records between hospitals, laboratories and healthcare providers.
- Eliminates the need to repeatedly carry physical prescriptions and reports.

4. Faster Hospital Services

- Services such as **Scan and Share** enable QR-code-based registration for OPD visits.
- This significantly reduces registration formalities and waiting time.

5. Integrated Healthcare Network

- Connects patients with hospitals, doctors, laboratories, pharmacies, insurers and digital health platforms through a common digital ecosystem.

6. Support for Health Insurance

- Facilitates faster processing of insurance claims through integration with the **National Health Claims Exchange (NHCE)**.
- Improves transparency and reduces delays in claim settlement.

7. Privacy Protection

- Health records remain with the healthcare provider that generated them instead of being stored in a central database.
- Information is shared only through a secure consent-based mechanism.

8. Significance

- Reduces paperwork and duplication of medical tests.
- Improves continuity of treatment across healthcare facilities.
- Promotes efficient healthcare delivery and advances **Universal Health Coverage (UHC)**.

How ABDM is Transforming Healthcare

1. Integrated Digital Health Ecosystem

- Creates a connected platform linking patients, healthcare providers, laboratories, pharmacies, insurers and digital health applications for seamless service delivery.

2. Verified National Registries

- The **Healthcare Professionals Registry (HPR)** and **Health Facility Registry (HFR)** provide authenticated databases of doctors and healthcare institutions.
- This improves trust and helps citizens identify verified healthcare providers.

3. Reduced Waiting Time

- Digital registration through **Scan and Share** minimises paperwork and speeds up patient registration in hospitals.

4. Better Access to Healthcare Services

- Through the **Unified Health Interface (UHI)**, citizens can:
 - Book appointments.
 - Consult doctors.
 - Locate hospitals, blood banks and **Jan Aushadhi Kendras**.
 - Access ambulance services and other digital health services.

5. Citizen-Centric Digital Health Management

- Digital platforms allow individuals to:
 - Access health records.
 - Book appointments.
 - Use telemedicine services.
 - Monitor health through wearable devices.
 - Receive AI-enabled health insights.

6. Digitisation of Healthcare Facilities

- The **Digital Health Incentive Scheme (DHIS)** encourages hospitals and laboratories to adopt digital health records.
- **eSushrut@Clinic** supports smaller healthcare facilities in digitising patient registration, billing and record management.

7. Faster Insurance Claim Processing

- The **National Health Claims Exchange (NHCX)** creates a common platform for hospitals and insurers, reducing delays in claim settlement.

8. Privacy and Secure Data Sharing

- ABDM follows a **privacy-by-design** approach.
- Medical records remain with the originating institution and are shared only after patient approval.

9. Public Health and Artificial Intelligence

- Anonymised health data supports:
 - Disease surveillance.
 - Better health planning.
 - Evidence-based policymaking.
 - Ethical use of **Artificial Intelligence (AI)** in healthcare.

Ayushman Bharat Digital Mission (ABDM)

About

- Launched in **2021**, ABDM aims to build a comprehensive **digital health ecosystem** by providing every citizen with a unique digital health identity and enabling secure electronic exchange of health information.

Key Components of ABDM

1. Ayushman Bharat Health Account (ABHA)

- Provides every citizen with a unique digital health identity for managing personal health records.

2. Healthcare Professionals Registry (HPR)

- A verified national database of healthcare professionals from different systems of medicine.

3. Health Facility Registry (HFR)

- A national repository of public and private healthcare institutions, including hospitals, clinics, laboratories and pharmacies.

4. Unified Health Interface (UHI)

- An open digital platform that enables easy discovery and delivery of healthcare services across multiple applications.

5. Data Security

- Ensures secure handling and sharing of health information in accordance with the **Digital Personal Data Protection (DPDP) Act, 2023**.

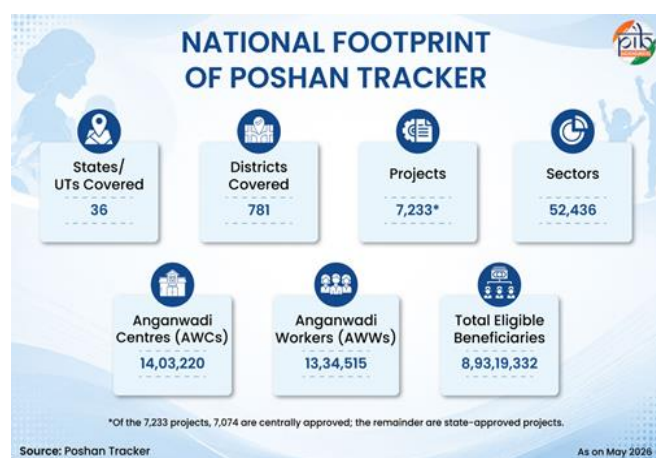
6. Transparency and Accessibility

- Enhances transparency in healthcare delivery while improving citizens' access to both public and private health services.

Implementation

- **Ayushman Bharat Digital Mission** is implemented by the **National Health Authority (NHA)** under the **Ministry of Health and Family Welfare**.
- The **National Health Authority** was established in **2019** to implement major digital and public health initiatives in India.

Poshan Tracker



Why in News?

- **Poshan Tracker** has emerged as India's flagship **real-time nutrition monitoring platform**, covering all **28 States and 8 Union Territories** and registering **over 8.93 crore beneficiaries** (May 2026).
- It has strengthened nutrition governance under **Mission Poshan 2.0** through digital monitoring, Aadhaar-based beneficiary identification and data-driven decision-making.

About

- **Poshan Tracker** is a mobile-based governance platform that serves as the digital backbone of **POSHAN Abhiyaan** and **Mission Poshan 2.0**.
- It was launched in **March 2021** by the **Ministry of Women and Child Development (MoWCD)** in collaboration with the **National e-Governance Division (NeGD)**.
- It enables near real-time monitoring of nutrition and Anganwadi services across the country.

Objectives

- Strengthen nutrition governance through technology-enabled monitoring.
- Improve tracking of beneficiaries and service delivery.
- Support evidence-based policymaking for reducing malnutrition.
- Enhance nutrition services for **children, pregnant women, lactating mothers** and **adolescent girls**.

Key Features

1. Beneficiary Tracking

- Maintains a real-time digital database of beneficiaries using **Aadhaar-authenticated records**.
- Tracks key beneficiary groups including:
 - Children.
 - Pregnant women.
 - Lactating mothers.
 - Adolescent girls.

2. Growth Monitoring

- Monitors the nutritional status of children (0–5 years) using indicators such as:
 - **Stunting**
 - **Wasting**
 - **Underweight**
 - **Severe Acute Malnutrition (SAM)**
 - **Moderate Acute Malnutrition (MAM)**
 - **Overweight and Obesity**
- Facilitates continuous monitoring of child growth through digital records.

3. Aadhaar-Based Authentication

- Uses Aadhaar verification to minimise duplication and eliminate fake beneficiaries, ensuring targeted delivery of benefits.

4. Facial Recognition System (FRS)

- Supports last-mile authentication of beneficiaries and improves monitoring of service delivery.

5. Digital Tools

- Provides:
 - Home Visit Scheduler for Anganwadi Workers.
 - Poshan Calculator based on WHO Child Growth Standards.
 - Early Childhood Care and Education (ECCE) learning material for children aged 3–6 years.

6. Support for Anganwadi Workers

- Digitises beneficiary records, growth monitoring, home visits and service delivery.
- Reduces paperwork and improves efficiency through smartphones, internet connectivity and digital growth-monitoring devices.

7. Monitoring Supplementary Nutrition

- Tracks implementation of the **Supplementary Nutrition Programme (SNP)** under Anganwadi Services.
- Enables monitoring of regular nutrition support provided to beneficiaries.

Recognition

- Appreciated by international organisations such as **WHO** and **UNICEF**.
- Showcased during the **G20 Ministerial Conference on Women's Empowerment (2023)**.
- Received the **National Award for e-Governance (Gold Award), 2024**.
- Awarded the **Prime Minister's Award for Excellence in Public Administration (2025)**.

POSHAN Abhiyaan

About

- **POSHAN Abhiyaan** is the flagship nutrition mission of the **Ministry of Women and Child Development**, launched on **8 March 2018** at **Jhunjhunu, Rajasthan**.
- It adopts a **convergence-based approach** to improve nutritional outcomes among vulnerable groups.

Objectives

The mission aims to reduce:

- **Stunting**.
- **Undernutrition**.
- **Anaemia** among children, women and adolescent girls.
- **Low Birth Weight (LBW)**.

Strategic Pillars

1. Quality Nutrition Services

- Strengthens nutrition and health interventions through:
 - **Integrated Child Development Services (ICDS)**
 - **National Health Mission (NHM)**
 - **Pradhan Mantri Matru Vandana Yojana (PMMVY)**
- Focuses on the **first 1,000 days** of a child's life.

2. Convergence

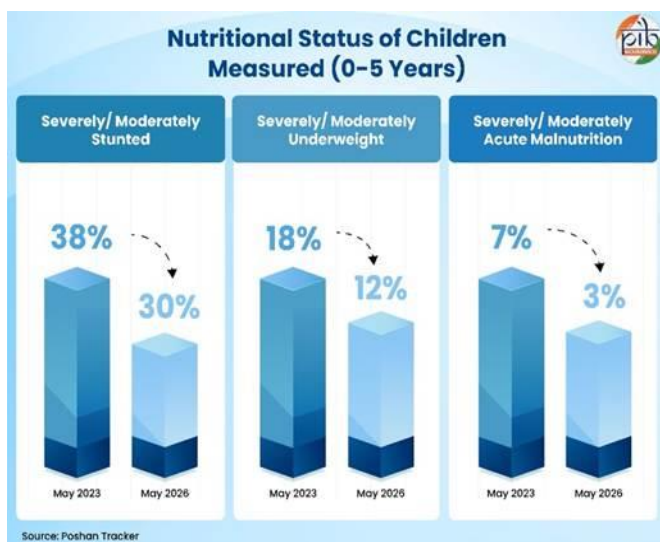
- Promotes coordination among multiple ministries such as **Health, Women & Child Development, Water & Sanitation**, and other stakeholders.
- The **National Council on India's Nutrition Challenges**, chaired by **NITI Aayog**, guides policy implementation and reviews progress.

3. Technology-Driven Governance

- Uses **Poshan Tracker** and **ICDS-Common Application Software (ICDS-CAS)** for real-time monitoring and improved service delivery.

4. Jan Andolan

- Encourages community participation and behavioural change to improve nutrition awareness and healthy practices.



Mission Poshan 2.0

About

- **Mission Poshan 2.0**, also known as **Mission Saksham Anganwadi and Poshan 2.0**, is the Government of India's integrated nutrition programme.

Formation

- Announced in **Union Budget 2021–22** by merging:
 - POSHAN Abhiyaan
 - Anganwadi Services
 - Scheme for Adolescent Girls

Nodal Ministry

- **Ministry of Women and Child Development (MoWCD).**

Objectives

- Reduce malnutrition.
- Improve nutrition, health and immunity among:
 - Children.
 - Pregnant women.
 - Lactating mothers.
 - Adolescent girls.

Key Components

1. Integrated Nutrition Services

- Combines nutrition support with **Early Childhood Care and Education (ECCE)** and early childhood stimulation.

2. Strengthening Anganwadi Centres

- Upgrades infrastructure through the **Saksham Anganwadi** initiative.

3. Saksham Anganwadi

- Modernises Anganwadi Centres by providing:
 - LED screens.
 - Smart learning tools.
 - Safe drinking water facilities.
 - **Poshan Vatikas.**
 - Improved infrastructure and learning environment.

Significance

- Promotes **real-time, technology-enabled nutrition governance.**
- Improves transparency and accountability in welfare delivery.
- Enables timely identification of malnutrition and targeted interventions.
- Supports evidence-based policymaking through reliable digital data.
- Contributes towards achieving the vision of a **well-nourished and healthy Viksit Bharat.**

All India Survey on Higher Education (AISHE) 2022–23 & 2023–24

AISHE

All India Survey on Higher Education

Why in News?

- The **Ministry of Education** has released the **All India Survey on Higher Education (AISHE) Reports 2022–23 and 2023–24.**
- The reports highlight significant improvements in **higher education enrolment, Gross Enrolment Ratio (GER), female participation, social inclusion, and STEM education.**
- Despite these gains, challenges related to **employability, quality, faculty shortages, and research** continue to affect the sector.

Key Highlights of AISHE 2022–23 & 2023–24

1. Gross Enrolment Ratio (GER)

- GER measures the proportion of students enrolled in higher education relative to the **18–23 years** population.
- GER increased steadily from **23.7 (2014–15)** to **30.0 (2023–24)**.
- Improvement was observed across all major social groups:
 - **Female GER:** Increased to **31.2**.
 - **Scheduled Castes (SC):** Increased to **27.8**.
 - **Scheduled Tribes (ST):** Increased to **22.8**.

2. Gender Parity

- The **Gender Parity Index (GPI)** stood at **1.08** in **2023–24**.
- A GPI above **1** indicates that **female enrolment exceeds male enrolment**.
- Female participation has remained higher than male participation for **seven consecutive years**.

3. Higher Education Enrolment

- Total enrolment increased significantly from **3.42 crore** in **2014–15** to **4.50 crore** in **2023–24**.
- Female enrolment witnessed faster growth than overall enrolment, reaching **2.24 crore**.

4. Social Inclusion

- Higher education participation has expanded substantially among socially disadvantaged groups.
- Enrolment increased considerably among:
 - **Scheduled Castes (SCs)**.
 - **Scheduled Tribes (STs)**.
 - **Other Backward Classes (OBCs)**.

5. STEM Education

- Enrolment in **Science, Technology, Engineering and Mathematics (STEM)** disciplines crossed **one crore students**.
- The share of **women in STEM** also increased, reflecting greater gender inclusion in technical education.

6. Faculty Strength

- India's higher education system has witnessed a steady rise in faculty strength.
- Female representation among faculty members has increased significantly over the past decade, contributing to improved gender diversity in academia.

All India Survey on Higher Education (AISHE)

About

- AISHE is an annual survey conducted by the **Ministry of Education** since **2010–11**.
- It serves as the principal source of official statistics on India's higher education sector.

Objectives

- Provide reliable data for educational planning and policymaking.
- Assist in resource allocation.
- Monitor the progress of higher education across the country.

Data Collected

AISHE collects information on:

- Student enrolment.
- Faculty strength.
- Educational infrastructure.
- Examination results.
- Institutional characteristics.

Methodology

- Data is collected through a **web-based Data Capture Format (DCF)** submitted by Higher Education Institutions (HEIs).

Limitations

- Participation by institutions is **voluntary**.
- Information is **self-reported**, making data quality dependent upon the reporting institutions despite built-in validation mechanisms.

Challenges in India's Higher Education Sector

1. Employability Gap

- Graduate unemployment remains high, particularly among young graduates.

- A significant mismatch exists between **academic qualifications** and **industry-required skills**.

2. Quantity vs Quality

- Expansion in the number of institutions has not always translated into improvement in educational quality.
- Global rankings continue to indicate limited international competitiveness of Indian universities.

3. Rural–Urban Divide

- Unequal distribution of educational institutions and digital infrastructure limits access for students in rural areas.
- Regional disparities contribute to higher dropout rates and unequal learning opportunities.

4. Faculty Shortages

- Large vacancies in teaching and non-teaching positions affect academic quality.
- Dependence on contractual and ad hoc faculty reduces institutional stability.

5. Student Mental Health

- Competitive entrance examinations and academic pressure have increased stress, anxiety and other mental health concerns among students.

6. Low Investment in Research

- India's expenditure on **Research and Development (R&D)** remains below the global average.
- Limited research funding affects innovation and global competitiveness.

7. Quality Concerns in Private Institutions

- Rapid growth of private institutions has not always been accompanied by improvements in educational quality.
- Variations exist in accreditation standards and learning outcomes.

8. Financial Constraints of State Universities

- Many State universities face inadequate funding, resulting in infrastructure gaps and limited academic resources.

9. Weak Research–Teaching Linkages

- Much of India's advanced research is concentrated in specialised research institutions rather than universities, limiting research-based teaching.

10. Regulatory and Digital Challenges

- Multiple regulatory requirements can reduce institutional autonomy.
- Digital inequality continues to affect students from rural and economically weaker sections.

11. Rising Cost of Higher Education

- Increasing dependence on private institutions has raised educational costs.
- Many students rely on educational loans, creating financial stress and repayment challenges.

Way Forward

1. Achieve NEP 2020 Targets

- Increase public investment in education to achieve the **50% GER target by 2035** envisioned under the **National Education Policy (NEP), 2020**.

2. Promote Multidisciplinary Education

- Encourage flexible learning through:
 - **Academic Bank of Credits (ABC)**.
 - Multiple entry and exit options.
 - Integration of humanities and STEM disciplines.

3. Strengthen Research and Innovation

- Increase investment in research through the **Anusandhan National Research Foundation (ANRF)**.
- Promote innovation, deep-tech research and university-industry collaboration.

4. Enhance Institutional Autonomy

- Provide greater academic and administrative autonomy to high-performing institutions based on objective performance indicators.

5. Strengthen Industry–Academia Linkages

- Align curricula with industry requirements through internships, skill-based learning and participation of industry experts in academic governance.

6. Address Faculty Shortages

- Improve faculty recruitment, encourage academic mobility and attract experienced professionals into teaching and research.

7. Leverage Digital Technologies

- Expand digital learning platforms such as SWAYAM and DIKSHA.
- Use **Artificial Intelligence (AI)** and digital tools to improve personalised learning and bridge regional disparities.

8. Foster Future-Ready Skills

- Promote **design thinking, computational skills, critical thinking, innovation, and problem-solving** across disciplines to improve employability and prepare graduates for emerging sectors.

Draft National Food Security (Amendment) Bill, 2026



Why in News?

- The **Union Government** has proposed amendments to the **Antyodaya Anna Yojana (AAY)** provisions under the **National Food Security Act (NFSA), 2013**.
- The proposal shifts AAY foodgrain entitlement from a **fixed household quota** to a **per-person entitlement**, raising concerns regarding its impact on vulnerable households and State-wise allocations.

Key Provisions of the Draft National Food Security (Amendment) Bill, 2026

About

- The **Draft National Food Security (Amendment) Bill, 2026** proposes changes to

foodgrain entitlements under the **Antyodaya Anna Yojana (AAY)**.

- After public consultation, the Centre is expected to hold discussions with **State Governments** and other stakeholders before introducing the Bill in Parliament.

Existing Provision

- Under the **National Food Security Act (NFSA), 2013**, every **AAY household** receives a fixed entitlement of **35 kg of foodgrains per month**, irrespective of family size.

Proposed Entitlement

- Every AAY beneficiary will receive **7 kg of foodgrains per month**.
- However, the entitlement will be **capped at 35 kg per household**.
- Consequently:
 - Households with **five or more members** will receive the maximum **35 kg**.
 - Smaller households will receive proportionately lower quantities.

Government's Rationale

The proposed amendment aims to:

- Remove disparities between small and large AAY households.
- Ensure a more equitable **per-capita distribution** of foodgrains.
- Rationalise foodgrain allocation in line with household size.

Impact on Households

Household Size	Existing Entitlement	Proposed Entitlement
1 Member	35 kg	7 kg
2 Members	35 kg	14 kg
3 Members	35 kg	21 kg
4 Members	35 kg	28 kg
5 or More Members	35 kg	Maximum 35 kg

National Food Security Act (NFSA), 2013

About

- Enacted in **2013**, the **National Food Security Act (NFSA)** transformed food security from a welfare programme into a **legal right**.

Coverage

- Covers:
 - **75%** of the rural population.
 - **50%** of the urban population.
- Overall, nearly **two-thirds** of **India's population** is covered.

Foodgrain Entitlements

- **Antyodaya Anna Yojana (AAY):**
 - **35 kg** per household per month.
- **Priority Households (PHH):**
 - **5 kg** per person per month.

Beneficiary Identification

- State Governments identify eligible households, issue ration cards and periodically update beneficiary lists.

Women's Empowerment

- The **eldest woman (18 years or above)** is recognised as the head of the household for issuing ration cards.

Life-Cycle Nutritional Support

The Act provides nutritional support to:

- Pregnant women.
- Lactating mothers.
- Children (6 months–14 years) through:
 - **Anganwadi Centres.**
 - **Schools.**
- Pregnant and lactating women are entitled to **maternity benefits of at least ₹6,000.**

Food Security Allowance

- Beneficiaries are entitled to a **Food Security Allowance** if foodgrains or meals are not supplied as prescribed.

Centre–State Responsibilities

Central Government

- Procures and allocates foodgrains.
- Arranges transportation.
- Provides financial assistance.

State Governments

- Identify beneficiaries.
- Distribute foodgrains through **Fair Price Shops (FPS).**
- Establish grievance redressal mechanisms.

Food Subsidy

- The Act originally prescribed subsidised prices of:
 - **₹3/kg** for rice.
 - **₹2/kg** for wheat.
 - **₹1/kg** for coarse grains.
- It also permits **Direct Benefit Transfer (DBT)** of food subsidies in notified areas.

Major Criticisms of the Proposed Amendment

1. Reduced Benefits for Smaller Households

- One- to four-member AAY households would receive significantly less foodgrain than the existing **35 kg** entitlement.
- This may adversely affect:
 - Elderly couples.
 - Widows.
 - Persons with disabilities.
 - Small nuclear families.

2. Household Ceiling

- Although the proposal introduces a per-person entitlement, the **35 kg cap** means households with more than five members would receive **less than 7 kg per person.**

3. Regional Disparities

- States with smaller average family sizes, particularly many southern States, may receive lower allocations despite successful population stabilisation.

4. Limited Nutritional Support

- The proposal focuses only on cereals.
- It does not include:
 - Pulses.
 - Edible oils.
 - Protein-rich foods.
- Critics argue that this may not adequately address nutritional security.

5. Outdated Beneficiary Coverage

- NFSA coverage continues to be based largely on the **2011 Census.**
- Population growth has resulted in the exclusion of many eligible households.

6. Access-Related Issues

- The proposal does not address:
 - Biometric authentication failures.
 - e-KYC issues.
 - Exclusion of migrant workers.
 - Difficulties faced by persons without permanent addresses.

Way Forward

1. Protect Existing Entitlements

- Ensure that no **AAY household** receives less than the existing **35 kg** monthly allocation, especially vulnerable households.

2. Remove the Household Ceiling

- If a per-person entitlement is adopted, remove the **35 kg cap** so that all beneficiaries receive **7 kg per person**, irrespective of family size.

3. Diversify the Food Basket

- Expand food assistance beyond cereals by including:
 - Pulses.
 - Edible oils.
 - Protein-rich foods.
- This would improve nutritional security and dietary diversity.

4. Update NFSA Coverage

- Revise beneficiary limits using the latest population estimates to include households currently excluded due to reliance on the **2011 Census**.

5. Improve Accessibility

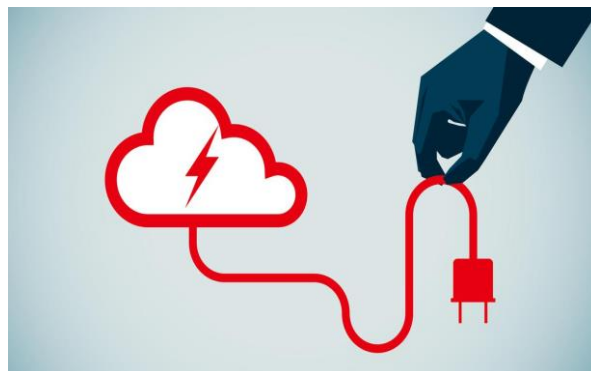
- Address authentication failures by providing alternative verification mechanisms.
- Consult **State Governments**, food rights experts and affected communities before implementing reforms.

Significance

- Seeks to improve equity in foodgrain distribution among **Antyodaya Anna Yojana (AAY)** beneficiaries.
- Highlights the need to balance **efficient targeting** with the **rights-based approach** of the **National Food Security Act, 2013**.

- Reinforces the importance of protecting the most vulnerable sections while ensuring equitable and nutritionally adequate food security.

Internet Blackout Preparedness



Why in News?

- India ranked **9th globally** among nearly **100 countries** in preparedness to withstand a major internet disruption, according to a study by **TRG Datacenters**, a U.S.-based digital infrastructure provider.
- The **United States** ranked first, followed by **Indonesia** and the **United Kingdom**.

India's Internet Blackout Preparedness Ranking

- India secured the **9th position** with a **vulnerability score of 23.4**.
- A **lower vulnerability score** indicates stronger preparedness and greater digital resilience.

Key Indicators

1. Submarine Cable Connectivity

- India is connected to the global internet through **22 submarine fibre-optic cables**.
- Among the top 10 countries, this is the lowest number.
- Comparison:
 - **United States:** 115 cables.
 - **Indonesia:** 72 cables.
 - **United Kingdom:** 65 cables.

2. Internet Exchange Points (IXPs)

- India has **40 Internet Exchange Points (IXPs)**.
- IXPs enable domestic internet service providers to exchange traffic directly.

- Benefits include:
 - Faster internet speeds.
 - Lower network costs.
 - Improved domestic connectivity during international disruptions.

3. Electricity Access

- Around **99.5%** of India's population has access to electricity.
- Reliable power is essential for:
 - Data centres.
 - Cable landing stations.
 - Telecom infrastructure.
 - Internet Exchange Points.

4. Cybersecurity Readiness

- India received a **cybersecurity readiness score of 98.5/100**.
- Reflects a strong capacity to safeguard critical digital infrastructure against:
 - Cyberattacks.
 - Network disruptions.

5. Internet Usage

- Approximately **70%** of India's population uses the internet.
- High internet dependence increases the economic and social consequences of large-scale disruptions.

Strengths

- Extensive network of **Internet Exchange Points (IXPs)**.
- Near-universal electricity access.
- Strong cybersecurity preparedness.
- Growing digital infrastructure supporting national connectivity.

Challenges

1. Limited Submarine Cable Diversity

- India has relatively fewer submarine cables than other leading digital economies.
- This limits alternative international data routes during disruptions.

2. Shared Infrastructure Risks

- Multiple telecom operators may rely on:
 - Common submarine cables.

- Shared landing stations.
- Common power infrastructure.
- Shared domestic fibre routes.

- This creates **single points of failure**.

3. External Vulnerability

- Damage to submarine cables outside India's territorial waters can significantly affect domestic internet services.

Example

- In **September 2025**, damage to submarine cables near **Saudi Arabia** reportedly slowed internet services across:
 - India.
 - Pakistan.
 - United Arab Emirates (UAE).
- The incident highlighted India's dependence on international cable routes.

Measures to Improve Preparedness

- Diversify submarine cable routes.
- Develop additional cable landing stations.
- Expand domestic fibre-optic networks.
- Promote decentralised **Internet Exchange Points (IXPs)**.
- Strengthen disaster recovery mechanisms.
- Conduct regular failover and network resilience tests.
- Ensure genuine route diversity among telecom operators.

Internet Blackout

About

- An **internet blackout** refers to a complete or partial disruption of internet connectivity across a region or country.

Causes

- Damage to submarine cables.
- Cyberattacks.
- Power failures.
- Technical faults.
- Natural disasters.
- Deliberate sabotage.
- Geopolitical conflicts.

Key Infrastructure

Submarine Fibre-Optic Cables

- Carry the majority of international internet traffic.
- Form the backbone of global internet connectivity.

Internet Exchange Points (IXPs)

- Allow domestic networks to exchange traffic directly without routing it through international networks.
- Improve efficiency and resilience of national internet infrastructure.

Traffic Rerouting

- During cable failures, internet traffic can be redirected through:
 - Alternative submarine cables.
 - Cable landing stations.
 - Internet Exchange Points.
- Although connectivity is maintained, users may experience:
 - Reduced speeds.
 - Higher latency.
 - Network congestion.

Impact of Internet Blackouts

A prolonged internet disruption can affect:

- Communication services.
- Banking and financial systems.
- Digital payments.
- Cloud computing services.
- Businesses and e-commerce.
- Emergency response systems.
- Government services.

Major Risks

- Ship anchors damaging submarine cables.
- Natural disasters.
- Cyberattacks.
- Sabotage.
- Geopolitical tensions.
- Dependence on a limited number of international cable routes.

Significance

- Highlights the growing importance of **digital infrastructure resilience** in an increasingly connected economy.
- Emphasises the need to strengthen **submarine cable connectivity, network redundancy, and cybersecurity**.
- Supports India's vision of building a secure and reliable **Digital Public Infrastructure (DPI)** ecosystem.
- Strengthening internet resilience is critical for ensuring uninterrupted digital services, economic stability, national security, and the growth of India's digital economy.

Civil Registration System (CRS) Report, 2024



Why in News?

- India achieved **near-universal registration of births and deaths** in 2024, according to the latest **Civil Registration System (CRS) Report**.
- The report shows that **99.1% of estimated births** and **99.4% of estimated deaths** were officially registered, reflecting remarkable progress compared to the early 2000s.

Civil Registration System (CRS)

About

- The **Civil Registration System (CRS)** is India's official mechanism for continuously recording **births, deaths and stillbirths**.
- It functions under the **Registration of Births and Deaths (RBD) Act, 1969**, which was updated in 2023.
- The **Office of the Registrar General and Census Commissioner of India (RGI)** under

the **Ministry of Home Affairs** publishes the annual CRS Report.

- Although the system became operational in **1970**, comprehensive registration has been achieved only in recent years.

Key Highlights of CRS Report 2024

Near-Universal Registration

- **Birth registration: 99.1%** of estimated births were registered.
- **Death registration: 99.4%** of estimated deaths were officially recorded.

Steady Improvement

- Registration coverage has expanded significantly over the past two decades.
- In **2000**:
 - Birth registration stood at **56%**.
 - Death registration was **48%**.
- By **2014**, these figures had improved to about:
 - **86.6%** for births.
 - **72.5%** for deaths.

Performance of States and UTs

- **18 States and Union Territories** achieved complete registration of births.
- **21 States and Union Territories** reported **100% death registration**.

Delay in Registration

- Although coverage is high, many births and deaths continue to be registered **after the prescribed 21-day period**, reducing the timeliness of official records.

Infant Death Registration

- Registration of infant deaths remains uneven.
- Urban areas account for **84.2%** of registered infant deaths, while rural areas contribute only **15.8%**, indicating possible under-reporting in rural regions.

Medical Certification Gap

- Registration of a death does not automatically include **medical certification of the cause of death**.
- The absence of reliable cause-of-death information limits the usefulness of mortality

data for disease surveillance and public health planning.

Coverage Estimation

- Registration completeness is assessed using estimates from the **Sample Registration System (SRS)**.
- Since the SRS itself may under-report births and deaths, the actual completeness of CRS registration could differ from reported estimates.

Significance of the Civil Registration System

Reliable Vital Statistics

- Generates official data on:
 - Births.
 - Deaths.
 - Fertility.
 - Mortality.
 - Sex ratio at birth.

Evidence-Based Policy

- Helps governments evaluate demographic trends and formulate health and social welfare policies.

Support for Local Planning

- Provides district and local-level data for decentralised planning and effective implementation of development programmes.

Legal Identity

- Birth and death certificates serve as essential legal documents for:
 - Identity proof.
 - School admission.
 - Welfare schemes.
 - Pension claims.
 - Insurance.
 - Property inheritance.
 - Other administrative purposes.

Public Health Surveillance

- Timely registration enables authorities to monitor mortality trends, detect health emergencies and respond effectively during epidemics and disasters.

Registration of Births and Deaths: Legal Provisions

Mandatory Registration

- Every birth and death occurring in India must be registered under the **Registration of Births and Deaths Act, 1969**.
- Registration is carried out at the place where the event occurs.

Registration Authorities

- The **Registrar General of India (RGI)** supervises implementation at the national level.
- **Chief Registrars, District Registrars, and Local Registrars** manage registration at State, district and local levels.

Digital Registration

- Following the **2023 amendment**, registration is to be carried out through the **digital Civil Registration System (CRS)**.

Time Limit

- Births, deaths and stillbirths should normally be reported within **21 days** of occurrence.
- Delayed registration is permitted after payment of the prescribed fee and completion of required formalities.

Events Occurring Outside India

Births

- Births of Indian citizens abroad are registered under the **Citizenship Act, 1955** and related rules through Indian diplomatic missions.
- If parents subsequently settle in India, the birth may also be registered under the RBD Act within the prescribed period after arrival.

Deaths

- Deaths of Indian citizens occurring abroad and registered at Indian Consulates are recognised as valid under Indian law.

Penalty

- Registrars failing to perform their statutory duties may face a penalty of up to **₹1,000** under the Act.

Registrar General of India (RGI)

About

- The **Registrar General of India (RGI)** was established in **1949** under the **Ministry of Home Affairs**.
- It serves as the country's principal authority for demographic and population statistics.

Functions

- Conducts the **Census of India**.
- Oversees implementation of the **Registration of Births and Deaths Act, 1969**.
- Manages the **Civil Registration System (CRS)**.
- Maintains the **National Population Register (NPR)**.
- Supports demographic analysis and policy formulation through population data.

Significance

- The CRS has evolved into a robust national system for recording vital events, with India achieving **almost universal registration** of births and deaths.
- Further improvements in **timely reporting, medical certification of causes of death, and accurate rural registration** will enhance the quality of demographic statistics and strengthen evidence-based governance, public health planning and delivery of citizen services.

UDISE+ Report 2025–26 & Performance Grading Index (PGI) 2.0



Why in News?

- The **Ministry of Education (MoE)** has released the **UDISE+ Report 2025–26** and the

Performance Grading Index (PGI) 2.0 (2025–26).

- Together, these reports assess the status of school education across India by evaluating enrolment, infrastructure, teacher availability, learning outcomes and governance, with greater emphasis on educational quality under the **National Education Policy (NEP) 2020**.

Key Highlights of UDISE+ Report 2025–26

Declining Dropout Rates

- School dropout has continued to decline across several stages of education.
- At the **secondary level (Classes IX–XII)**, the dropout rate reduced from **8.2% to 7%**.
- At the **preparatory stage (Classes III–V)**, it declined from **2.3% to 1.8%**.

Inter-State Variations

- Higher secondary-level dropout rates were reported in:
 - Ladakh.
 - Gujarat.
 - Chhattisgarh.
 - Karnataka.

Improved Enrolment and Retention

- **Gross Enrolment Ratio (GER)** at the secondary stage increased from **68.5% to 71.7%**.
- Student retention at the secondary level also improved from **47.2% to 51.9%**, indicating better continuation in schooling.

Teacher Availability

- India's school education system now has **over one crore teachers**, marking a significant milestone.

Pupil-Teacher Ratio (PTR)

The PTR remains well below the benchmark recommended under **NEP 2020**:

- Foundational Stage – **10:1**
- Preparatory Stage – **12:1**
- Middle Stage – **17:1**
- Secondary Stage – **21:1**

Transition Between School Stages

Student progression across educational stages has improved:

- Foundational to Preparatory – **99.2%**
- Preparatory to Middle – **93.8%**
- Middle to Secondary – **88.3%**

School Infrastructure

Digital Infrastructure

- Nearly **70%** of schools have computers.
- Around **67%** are connected to the internet, reflecting gradual digital expansion.

Basic Facilities

Most schools now have access to essential infrastructure:

- Electricity – **95%**
- Drinking water – **99.5%**
- Girls' toilets – **98.5%**
- Handwashing facilities – **96.9%**

Inclusive Infrastructure

- Libraries are available in over **90%** of schools.
- However, only **58.2%** have ramps with handrails, indicating that accessibility for **Children with Special Needs (CwSN)** still requires improvement.

Gender Representation

- Women account for **54.9%** of India's teaching workforce.
- Girls constitute **48.4%** of total student enrolment.

Unified District Information System for Education Plus (UDISE+)

About

- **UDISE+** is the national digital database for school education developed by the **Ministry of Education**.
- It collects information from **pre-primary to higher secondary schools**, covering both government and private institutions.

Purpose

It supports:

- Educational planning.
- Resource allocation.
- Policy monitoring.

- Implementation of flagship programmes such as **NEP 2020** and **Samagra Shiksha** through real-time data.

Performance Grading Index (PGI) 2.0 (2025–26)

Major Findings

No Top Performer

- No State or Union Territory achieved the highest performance categories:
 - **Utkarsh**
 - **Uttam-1**
 - **Uttam-2**

Best Performer

- **Chandigarh** emerged as the highest-performing region by securing the **Uttam-3** grade.

Overall Performance

- No State or UT fell into the lowest performance categories, indicating that all achieved at least a moderate level of school education performance.

Performance Grading Index (PGI) 2.0

About

- **PGI 2.0** is an evaluation framework developed by the **Department of School Education and Literacy**, Ministry of Education.
- It measures the performance of school education systems across States and Union Territories.
- The framework supports evidence-based policymaking and encourages continuous improvement in educational quality.

Assessment Framework

- Performance is measured using **73 indicators** carrying a total of **1,000 marks**.

Major Domains

- Learning Outcomes & Quality.
- Access.
- Infrastructure & Facilities.
- Equity.
- Governance Processes.
- Teacher Education & Training.

Grading System

- States and UTs are classified into **10 performance categories**, ranging from **Utkarsh** (highest) to **Akanshi-3** (lowest).

Focus

- PGI 2.0 assigns greater importance to:
 - Learning outcomes.
 - Equity.
 - Teacher development.
- This shifts the focus beyond infrastructure towards educational quality.

Major Challenges in School Education

High Dropout at Secondary Stage

- Although retention remains high in early schooling, a substantial proportion of students discontinue education before completing secondary school.

Weak Foundational Learning

- Inadequate **Foundational Literacy and Numeracy (FLN)** in early grades affects students' ability to cope with higher classes, increasing the likelihood of dropout.

Single-Teacher Schools

- A large number of schools continue to function with only one teacher, affecting classroom instruction as well as administrative responsibilities.

Limited Accessibility

- Many schools still lack adequate facilities for **Children with Special Needs (CwSN)**, restricting inclusive education.

Learning Quality Gap

- While enrolment and infrastructure have improved considerably, learning outcomes have not progressed at the same pace, as reflected in PGI results.

Regional Disparities

- Significant differences persist among States in educational quality, governance capacity, teacher availability and implementation of school programmes.

Resource Constraints

- Educationally weaker districts continue to face shortages of funds, infrastructure and

administrative capacity needed to implement reforms effectively.

Major Government Initiatives

- **Right to Education (RTE) Act, 2009**
- **Samagra Shiksha**
- **PM POSHAN Scheme**
- **Kasturba Gandhi Balika Vidyalayas (KGBVs)**

Way Forward

Strengthen School Governance

- Consolidate low-enrolment and single-teacher schools into well-equipped cluster schools.
- Expand adoption of **APAAR** for seamless student tracking.
- Empower **School Management Committees (SMCs)** through greater community participation.

Improve Learning Outcomes

- Accelerate implementation of **NIPUN Bharat Mission** to achieve universal Foundational Literacy and Numeracy.
- Promote competency-based assessment through the **PARAKH** framework.
- Encourage mother tongue or regional language instruction during the foundational years, as envisaged under **NEP 2020**.

Strengthen Teacher Capacity

- Fill teacher vacancies through mission-mode recruitment.
- Expand teacher education under **ITEP**.
- Enhance continuous professional development through the **DIKSHA** platform.

Promote Equity and Retention

- Introduce vocational education from **Class VI**.
- Improve accessibility for Children with Special Needs.
- Strengthen implementation of the **PM POSHAN Scheme** to improve attendance and retention.

Improve Monitoring

- Complement administrative data with independent academic and social audits to assess actual learning outcomes and improve accountability.

Significance

- The **UDISE+ Report 2025–26** reflects encouraging progress in enrolment, infrastructure and teacher availability, while **PGI 2.0** highlights the need to improve educational quality and learning outcomes.
- Together, these reports provide a comprehensive evidence base for strengthening India's school education system and advancing the goals of **NEP 2020** through data-driven governance.

NIPUN Bharat Mission



Why in News?

- Five years after its launch in **July 2021**, the **NIPUN Bharat Mission** is under review to assess its achievements and explore its expansion beyond Grade 3 for strengthening foundational learning.
- The **National Education Policy (NEP) 2020** identified **Foundational Literacy and Numeracy (FLN)** as the country's highest school education priority, noting that over **five crore elementary students** lacked basic reading and arithmetic skills.

What is NIPUN Bharat Mission?

About

- **NIPUN Bharat** stands for **National Initiative for Proficiency in Reading with Understanding and Numeracy**.

- It was launched in **July 2021** by the **Ministry of Education** under the **Samagra Shiksha** programme to achieve universal foundational literacy and numeracy in line with **NEP 2020**.

Objective

- To ensure that every child develops essential reading, writing and numeracy skills by the **end of Grade 3**, and at the latest by **Grade 5**, by **2026–27**.

Target Group

- Covers children aged **3–9 years**, from **Balvatika to Grade 3**.
- Uses grade-specific learning milestones known as **Lakshyas**.

Learning Approach

The Mission promotes:

- Play-based learning.
- Activity-based teaching.
- Experiential learning.
- Storytelling.
- Toy-based education.
- Art-integrated and sports-integrated pedagogy.
- Learning suited to children's language and local environment.

Foundational Competencies

Foundational Literacy

Includes:

- Oral language development.
- Letter and word recognition.
- Reading fluency.
- Reading comprehension.
- Writing skills.

Foundational Numeracy

Includes:

- Number sense.
- Basic mathematical operations.
- Measurement.
- Shapes and geometry.
- Spatial understanding.
- Data handling.

Teacher Capacity Building

- Teachers and school heads receive specialised **NISHTHA-FLN** training.
- Focus areas include:
 - Mother tongue-based teaching.
 - Peer learning.
 - Classroom support.
 - Effective use of teaching-learning materials.

Learning Resources

- The **DIKSHA** platform provides:
 - Digital textbooks.
 - Worksheets.
 - Assessment resources.
 - Educational videos.
 - Children's literature.
 - Teacher handbooks.

Assessment and Monitoring

- Uses competency-based and continuous assessment instead of rote testing.
- Technology-enabled systems monitor:
 - Individual child progress.
 - Annual learning outcomes.
 - Mission implementation.

Implementation Mechanism

- Implemented by the **Department of School Education and Literacy** under **Samagra Shiksha**.
- Operates through a **five-tier structure**:
 - National level.
 - State level.
 - District level.
 - Block/Cluster level.
 - School level.
- Involves School Management Committees, parents, local bodies and communities.

Expected Outcomes

The Mission seeks to:

- Improve foundational learning outcomes.
- Reduce school dropouts.
- Ensure smoother transition to higher classes.
- Promote inclusive education.
- Build a strong base for advanced learning and future employability.

Status of Foundational Literacy and Numeracy (FLN) in India

About FLN

- Foundational Literacy and Numeracy refers to a child's ability to:
 - Read and understand simple texts.
 - Perform basic mathematical operations by the end of **Class 3**.
- These skills form the basis for higher learning, critical thinking and problem-solving.

Current Status

- Despite policy emphasis, a large number of children still lack minimum learning competencies.
- According to the **ASER Report**:
 - Grade 3 government school students able to read a Grade 2 text improved from **16.3% (2022)** to **23.4% (2024)**, indicating gradual but insufficient progress.
- The **World Bank** estimates India's **learning poverty** at around **55%**, meaning many children cannot read and understand a simple passage by the age of 10.
- Learning losses caused by the **Covid-19 pandemic** further worsened the situation.

Policy Support for FLN

National Education Policy (NEP) 2020

- Declares FLN as the highest national priority.
- Targets universal foundational learning by the end of Grade 3.

Samagra Shiksha

- Integrated school education programme covering pre-school to Class XII.
- Supports quality improvement across all stages of schooling.

PM SHRI Schools

- Develops more than **14,500 model schools** demonstrating NEP 2020 implementation.

DIKSHA Platform

- National digital platform providing quality educational content for students and teachers.

Measures to Strengthen NIPUN Bharat

Expand Coverage up to Grade 5

- Continue structured foundational learning support beyond Grade 3, as many Grade 5 students still struggle with reading and basic mathematics.

Universalise Balvatika

- Ensure all children receive quality pre-school education through:
 - Trained educators.
 - Age-appropriate learning materials.
 - Play-based pedagogy.

Strengthen Teacher Development

- Replace one-time training with continuous professional development.
- Align teacher training with the **National Professional Standards for Teachers (NPST)**.
- Equip teachers to effectively handle **Multi-Grade Multi-Level (MGML)** classrooms.

Professional Mentoring

- Create a dedicated mentoring system where mentors:
 - Regularly observe classrooms.
 - Assess learning.
 - Provide constructive feedback to teachers.

Improve Assessments

- Align **PARAKH Rashtriya Sarvekshan (PRS)** with the **Foundational Learning Study (FLS)**.
- Introduce competency-based assessments at Grade 5.
- Focus on measuring actual learning outcomes rather than rote performance.

Strengthen Governance

- Publish a district-level **NIPUN Index** to monitor performance.
- Increase parental participation through:
 - Home-reading activities.
 - Community reading festivals.
- Revive the **National Steering Committee** for outcome-based monitoring and accountability.

Conclusion

NIPUN Bharat has laid the foundation for improving early learning in India by prioritising foundational literacy and numeracy. However, achieving universal FLN will require extending support beyond Grade 3, strengthening teacher mentoring, improving assessments, expanding early childhood education and ensuring stronger community participation. A robust foundational learning system is essential for building a skilled, productive and knowledge-driven Viksit Bharat.

Import Ban on Goods Produced Through Forced Labour



Why in News?

- The **Directorate General of Foreign Trade (DGFT)** has amended the **Foreign Trade Policy (FTP), 2023** to prohibit the import of goods that are produced wholly or partly through **forced labour**.
- The move comes after the **United States Trade Representative (USTR)** launched a **Section 301 investigation** against around **60 economies**, including India, alleging inadequate measures to prevent imports linked to forced labour.

Key Highlights of the Amendment

New Provision in FTP 2023

- A new provision, **Paragraph 2.20B**, has been added to the Foreign Trade Policy.
- It clearly prohibits the import of products that are manufactured, either fully or partially, using forced labour.

Legal Empowerment

- The amendment authorises the **DGFT** to:

- Receive complaints.
- Conduct investigations.
- Collect relevant information.
- Recommend restrictions on identified products.

- Based on these recommendations, the Central Government may prohibit the import of specific goods through separate notifications.

Addressing a Legal Gap

- India already prohibits **forced labour within the country** through existing labour and criminal laws.
- However, until now, there was **no explicit trade provision** preventing the import of goods manufactured using forced labour in other countries.
- The amendment fills this regulatory gap.

Investigation and Enforcement Mechanism

DGFT Enquiry Process

- The DGFT will investigate complaints related to suspected forced labour in imported goods.
- After examining the evidence, it may recommend import restrictions to the Central Government.

Procedural Framework

- The detailed procedure for conducting such enquiries will be incorporated into the **Handbook of Procedures, 2023**, ensuring a structured implementation mechanism.

Alignment with International Standards

ILO Definition of Forced Labour

- India has adopted the definition contained in the **International Labour Organization (ILO) Forced Labour Convention, 1930 (Convention No. 29)**.

Meaning of Forced Labour

According to the ILO, forced labour refers to:

Any work or service extracted from a person under the threat of punishment and performed without the person's free and voluntary consent.

Significance of the Amendment

Strengthening Trade Compliance

- The amendment integrates labour rights into India's foreign trade framework and aligns trade practices with internationally accepted standards.

Enhancing India's Global Trade Credibility

- Demonstrates India's commitment to ethical and responsible global supply chains, improving confidence among international trading partners.

Supporting Ongoing Trade Negotiations

- The measure strengthens India's position in international trade discussions, particularly with countries placing greater emphasis on labour standards and responsible sourcing.

Shift Towards Proactive Trade Regulation

- India has moved beyond relying solely on domestic labour laws by incorporating labour compliance directly into its trade policy.
- This reflects a more proactive approach to regulating imports and promoting fair trade practices.

Conclusion

The amendment to the **Foreign Trade Policy, 2023** marks an important step towards integrating **ethical labour standards** into India's trade regime. By explicitly banning imports linked to forced labour, establishing an investigation mechanism and aligning with **ILO standards**, India aims to strengthen supply-chain integrity, improve international trade credibility and reinforce its commitment to fair and responsible commerce.

Jnanpith Award 2025



Why in News?

- **Noted Tamil poet and lyricist R. Vairamuthu** has been selected for the **60th Jnanpith Award (2025)**.
- He is the **third Tamil writer** to receive this honour, after **Akilan** and **Jayakanthan**, ending a **24-year gap** for Tamil literature.
- He had earlier received the **Sahitya Akademi Award (2003)** for his novel **Kallikattu Ithikasm**.

Jnanpith Award

About

- The **Jnanpith Award** is **India's highest literary honour**, presented for an author's outstanding contribution to Indian literature.
- Instituted in **1961** by the **Bharatiya Jnanpith**, it is often regarded as the **"Nobel Prize of Indian Literature."**
- The award celebrates India's rich linguistic diversity and literary excellence.

Institutional Background

- The award was established by **Sahu Shanti Prasad Jain** and **Rama Jain** through the **Bharatiya Jnanpith**, a cultural organisation founded in **1944**.
- The **first Jnanpith Award** was presented in **1965** to **G. Sankara Kurup** for **Malayalam literature**.
- **Ashapurna Devi (Bengali)** became the **first woman recipient** in **1976**.
- **Amitav Ghosh** became the **first English-language recipient** in **2018**.

Eligibility

- Awarded annually to an **Indian author** for an outstanding contribution to literature.
- From **1965 to 1981**, the award recognised a **specific literary work**.
- Since **1982**, it has been conferred for an author's **lifetime contribution** to Indian literature.
- Covers all **22 languages listed in the Eighth Schedule** of the Constitution, along with **English** (included from **2013**).
- **Posthumous awards** are not given.

Award Components

The recipient receives:

- **Cash prize of ₹11 lakh**
- **Citation**
- **Bronze statuette of Goddess Vagdevi (Saraswati)**, symbolising knowledge and learning.

Selection Process

- The awardee is selected by the **Pravara Parishad**, a committee comprising eminent scholars and literary experts.
- Selection is based on:
 - Literary excellence
 - Originality and creativity
 - Vision
 - Overall contribution and impact on Indian literature.

National Anti-Doping (Amendment) Act, 2025

Why in News?

- India's **Commonwealth Games 2026** campaign suffered a setback after two medal contenders were ruled out due to **anti-doping violations**, affecting the country's medal prospects.
- The issue has gained greater significance with the implementation of the **National Anti-Doping Act, 2022** and the **National Anti-Doping (Amendment) Act, 2025**, which aim to strengthen India's anti-doping framework.

Why has India's Doping Issue Become a Concern?

- India's **weightlifting quota** for the Commonwealth Games was reduced from **16 to 11 athletes** because of multiple anti-doping violations during the qualification period.
- Under Commonwealth Games rules, every anti-doping violation committed by an athlete or support personnel reduces the country's athlete quota.
- According to the **World Anti-Doping Agency (WADA) Annual Report 2024**, India recorded

a **3.6% positivity rate**, placing it among the countries with the highest doping violations.

- The issue has become more important as India prepares to host the **2030 Commonwealth Games** and continues its bid for the **2036 Olympic Games**.
- **Doping** refers to the use of prohibited substances or methods to artificially improve an athlete's performance.

National Anti-Doping (Amendment) Act, 2025

- The Act amends the **National Anti-Doping Act, 2022** to strengthen India's anti-doping system.
- It provides a legal framework to prevent doping, safeguard athletes' rights and maintain fairness in sports.
- The legislation aligns India's anti-doping regime with the **World Anti-Doping Code** and the **UNESCO International Convention against Doping in Sport**.

Institutional Framework

- Establishes the **National Anti-Doping Agency (NADA)** to implement anti-doping rules across the country.
- Constitutes the **National Board for Anti-Doping in Sports** to supervise NADA and advise the Central Government on anti-doping matters.

Key Provisions

- Gives statutory backing to anti-doping testing, results management, education, intelligence gathering and investigations.
- Defines acts that constitute anti-doping rule violations.
- Authorises the National Board to obtain information from the Disciplinary and Appeal Panels regarding their functioning.

Significance

- Improves transparency, accountability and procedural fairness in anti-doping administration.
- Strengthens institutional autonomy.
- Brings India's anti-doping framework closer to international standards.

- Promotes fair competition and a level playing field for athletes.

National Anti-Doping Agency (NADA)

- **Established:** 2005.
- **About:** India's autonomous body responsible for implementing and monitoring anti-doping programmes.
- **Functions:** Plans and coordinates anti-doping activities, conducts testing and ensures compliance with the **World Anti-Doping Code**.
- **Initiative:** Runs awareness programmes such as the **#PlayTrue Campaign** to promote clean sport.

World Anti-Doping Agency (WADA)

- **Established:** 1999 by the **International Olympic Committee (IOC)**.
- **Role:** Global organisation responsible for coordinating anti-doping efforts worldwide.
- **Governance:** Operates through equal partnership between governments and the international sports movement.
- **World Anti-Doping Code:** The principal international framework that harmonises anti-doping rules across countries and sports.
- **WADA Prohibited List:** Updated annually to identify banned substances and prohibited methods.
- **Applicability:** Covers both in-competition and out-of-competition testing across all recognised sports.

Commonwealth Games 2026



commonwealth
games

GLASGOW 2026

- The **23rd Commonwealth Games** are being held in **Glasgow, Scotland**, from **23rd July to**

2nd August 2026, with athletes representing **74 nations and territories**.

Key Highlights of Commonwealth Games 2026

Sports Included

- The 2026 edition features **10 sports**, which is **nine fewer** than the **Birmingham Commonwealth Games 2022**.
- The sports are:
 - Athletics
 - Swimming
 - 3×3 Basketball
 - Track Cycling
 - Weightlifting
 - Bowls
 - Artistic Gymnastics
 - Netball
 - Boxing
 - Judo

India's Participation

- India has fielded a **125-member contingent**, including **para-athletes**.
- Indian athletes are competing in:
 - Athletics
 - Boxing
 - Weightlifting
 - Judo
 - Artistic Gymnastics
 - Track Cycling
 - Bowls
 - Swimming
 - Para-sports
- India is **not participating** in **3×3 Basketball** and **Netball**.

India's Performance

- India made its **Commonwealth Games debut in 1934**.
- Its **best-ever performance** came at the **2010 Commonwealth Games in New Delhi**, where the country secured **101 medals**.

Commonwealth Games (CWG)

About

- The **Commonwealth Games (CWG)** is the **second-largest multi-sport event** in the world after the **Olympic Games**.
- It brings together athletes from **Commonwealth nations and territories**, most of which were formerly part of the **British Empire**.

Origin

- The concept of the Games was proposed by **Canadian sports journalist Melville Marks Robinson**.
- The idea evolved from the **Inter-Empire Championships**, organised in **London in 1911** during the **Festival of Empire** celebrating the coronation of **King George V**.
- The **first official Games**, then called the **British Empire Games**, were held in **Hamilton, Canada, in 1930**.
- **Gordon Smallacombe** of Canada won the **first-ever Commonwealth Games gold medal** in the **triple jump**.

Evolution

- The Games have generally been organised **every four years**, except in **1942** and **1946**, when they were not held.
- In **1978**, the event was officially renamed the **Commonwealth Games**.

Governing Body

- The **Commonwealth Games Federation (CGF)** is responsible for the planning, governance and overall conduct of the Games.

India and the Commonwealth Games

- India last hosted the Commonwealth Games in **New Delhi in 2010**.
- India has also secured the hosting rights for the **Centenary Commonwealth Games 2030**, with **Ahmedabad, Gujarat**, selected as the host city.

India at Commonwealth Games 2026 – Weightlifting Success



- India made a strong start at the **2026 Commonwealth Games** in **Glasgow, Scotland**, as **Mirabai Chanu** won the country's first **gold medal**, while **Chanambam Rishikanta Singh** and **Raja Muthupandi** secured **silver medals**, boosting India's medal tally.

Mirabai Chanu (Women's 48 kg)

- **Saikhom Mirabai Chanu**, the **Tokyo Olympics 2020 silver medallist** from **Manipur**, won India's first **gold medal** at the **2026 Commonwealth Games**.
- She lifted a **total of 190 kg**, comprising:
 - **Snatch:** 85 kg
 - **Clean and Jerk:** 105 kg
- She **broke the Commonwealth Games records** in:
 - Snatch
 - Clean and Jerk
 - Overall Total
- She became the **first Indian weightlifter to win three consecutive Commonwealth Games gold medals**:
 - **Gold Coast 2018 – Gold**
 - **Birmingham 2022 – Gold**
 - **Glasgow 2026 – Gold**
- She had earlier won a **silver medal** at the **2014 Glasgow Commonwealth Games**.

Rishikanta Singh (Men's 60 kg)

- **Chanambam Rishikanta Singh** from **Manipur** won the **silver medal**.
- He registered a **combined lift of 264 kg**.

Raja Muthupandi (Men's 65 kg)

- **Raja Muthupandi** from **Tamil Nadu** secured the **silver medal**.
- He recorded a **combined lift of 286 kg**.

India at the Commonwealth Games

- **India made its Commonwealth Games debut in 1934** at the **London Games**.
- **First Commonwealth Games medal: Rashid Anwar** won a **bronze medal** in **wrestling**.
- **First individual Commonwealth Games gold medal: Milkha Singh** won the **440 yards event** at the **1958 Cardiff Commonwealth Games**.

Generation Z-Led Protests



- A wave of **Generation Z (Gen Z)**-led **demonstrations**, spearheaded by the **Cockroach Janta Party (CJP)**, has emerged over alleged irregularities in **NEET**, rising graduate unemployment, and the increasing financial burden of education.
- Drawing comparisons with **Bangladesh, Nepal, Indonesia, and Peru**, the protests have brought **youth aspirations, civic participation, accountability, and systemic reforms** to the forefront of public discourse.

Generation Z (Gen Z)

About

- Also known as "**Zoomers**".
- Refers to individuals born between the **mid-1990s and early 2010s**.
- Characterised by:
 - Digital nativity
 - High social media engagement
 - Strong civic and political awareness

Role in Politics

- Gen Z has emerged as a major political force by mobilising against:
 - Corruption
 - Unemployment
 - Inequality
 - Governance failures
- Unlike traditional movements, these protests are:
 - Decentralised
 - Digitally coordinated
 - Youth-driven
- In several countries, sustained youth mobilisation has resulted in **policy reversals, government changes, and political reforms**.

Global Examples

- **Bangladesh:** Student-led job quota protests led to the removal of **Sheikh Hasina's government**, with **Muhammad Yunus** becoming interim leader before fresh elections.
- **Nepal:** Anti-corruption protests resulted in a change of government and the emergence of youth-backed leadership.
- **Indonesia:** Public protests against lawmakers' privileges forced the government to roll back several controversial measures.
- **Peru:** Youth protests intensified political instability and successive leadership changes.
- **India:** NEET paper leak protests resulted in the acceptance of several demands, including the **Education Minister's resignation**.

Evolution of Youth Movements in India

1950s–1960s: Ideological Politics

- Campus-based movements led by organisations such as:
 - **SFI (Students' Federation of India)**
 - **ABVP (Akhil Bharatiya Vidyarthi Parishad)**
- Major issues:
 - Language
 - Education
 - Ideological mobilisation

- Key developments:
 - **Anti-Hindi Agitation (1965)**
 - **Naxalbari Movement (1967)**
- 1970s: Anti-Establishment Movement**
- Student movements expanded beyond campuses.
- Major issues:
 - Corruption
 - Inflation
 - Authoritarian governance
- Key developments:
 - **Nav Nirman Andolan (1974)**
 - **JP Movement (1974–75)**
 - Student mobilisation before the **Emergency (1975–77)**.
- 1980s–1990s: Identity & Social Justice**
- Focus shifted to:
 - Regional identity
 - Migration
 - Reservation
- Key developments:
 - **Assam Agitation (1979–85)**
 - **Anti-Mandal Commission Protests (1990)**
- 2000s–2010s: Rights-Based Activism**
- Internet and social media reshaped youth activism.
- Key developments:
 - **India Against Corruption (Anna Hazare Movement, 2011)**
 - **Nirbhaya Protests (2012)**
- 2020s–Present: Issue-Based Activism**
- Digital and decentralised movements focused on:
 - Education
 - Employment
 - Governance
 - Social justice
- Key developments:
 - **Anti-CAA/NRC protests**
 - **Agnipath protests (2022)**

- **Cockroach Janta Party (CJP) movement (2026)** over alleged NEET paper leaks, unemployment, and rising education costs.

Major Shifts in Youth Movements

- From charismatic leaders to decentralised digital networks.
- From ideological politics to issue-based activism.
- From party-linked movements to independent digital mobilisation.
- From purely street protests to hybrid online-offline campaigns.
- From campus issues to national policy debates on education, employment, governance, and democratic accountability.

Major Causes of Youth Disillusionment in India

Economic Challenges

- Jobless growth and skill mismatch.
- According to the **ILO India Employment Report 2024**:
 - Youth account for **83% of India's unemployed workforce**.
 - Graduate unemployment stands at **29.1%**, nearly nine times higher than among those without schooling.
- AI and automation are disrupting entry-level jobs.
- Expansion of the gig economy has reduced job security.

Educational Challenges

- Rapid privatisation has increased degrees without improving employable skills.
- Frequent paper leaks, recruitment delays, and proxy candidates have weakened confidence in merit-based examinations.
- Commercialisation of coaching institutions has increased the financial burden on students.

Social and Psychological Challenges

- Youth face increasing **institutional anomie** and **relative deprivation**.

- Rising education loans and examination failures have contributed to growing student distress.
- **Student suicides accounted for 8.5% of total suicides in 2024**, with coaching hubs witnessing major clusters.
- Persistent examination failures and recruitment delays are accelerating **brain drain**.

Political Challenges

- Traditional politics often prioritises identity issues over youth concerns such as employment and education.
- Growing use of restrictions, internet shutdowns, and surveillance has reduced avenues for democratic participation, increasing youth alienation.

First Indian to Win Medals in Both 5,000 m and 10,000 m at the Commonwealth Games



Why in News?

- Indian long-distance runner **Gulveer Singh** became the **first Indian man** to win a **Commonwealth Games medal in the 10,000 metres**, securing **silver** at the **2026 Commonwealth Games in Glasgow**.
- Indian weightlifter **Harjinder Kaur** also won **silver** in the **women's 69 kg** category, taking **India's weightlifting medal tally to seven**.

Gulveer Singh

Historic Achievement

- Became the **first Indian man** to win a Commonwealth Games medal in the **10,000 metres**.

- Won the **silver medal** at the **2026 Commonwealth Games**.

Performance

- Finished the race in **27 minutes 49.8 seconds**.
- **Gold:** Ky Robinson (Australia)
- **Bronze:** David Mullarkey (Isle of Man)

Significance

- India's first Commonwealth Games medal in the **10,000 metres** since **Kavita Raut** won **bronze** in the women's event at the **2010 Delhi Commonwealth Games**.
- Marked the **first time since 1986** that **no African athlete** finished on the men's 10,000 m podium.
- Secured India's **second athletics silver medal** at the Games after **Sarvesh Kushare** in the **men's high jump**.

Harjinder Kaur

Performance

- Won the **silver medal** in the **women's 69 kg weightlifting** event.
- Lifted:
 - **Snatch:** 101 kg (*Personal Best*)
 - **Clean and Jerk:** 126 kg (*Personal Best*)
- **Total Lift: 227 kg**

Competition Highlights

- Maintained **second position** throughout the competition.
- Broke the **Commonwealth Games snatch record twice** during her attempts.

Medal Winners

- **Gold:** Charlotte Simoneau (Canada) – **240 kg (Commonwealth Games Record)**
- **Silver:** Harjinder Kaur (India) – **227 kg**
- **Bronze:** Nya Phebe Hayman (Australia) – **218 kg**

Significance

- Won her **second consecutive Commonwealth Games medal**.
- Improved upon the **bronze medal** she won at the **2022 Commonwealth Games in Birmingham**.
- Helped increase **India's weightlifting medal tally to seven** at the **2026 Commonwealth Games**.

**Crux of The Hindu & Indian Express****Indian Society & Social Justice****India Rises to 94th Rank in UN SDG Index 2026, But Hunger and Environmental Challenges Persist****INDIA RISES TO 94TH IN 2026 SDG INDEX;
PERSISTENT HURDLES IN HEALTH AND
HUNGER FLAGGED****Why in News?**

- India has achieved its **highest-ever ranking** in the **2026 UN Sustainable Development Goals (SDG) Index**, securing the **94th position among 167 countries** with an overall score of **68.3 out of 100**, according to the **Sustainable Development Report (SDR) 2026** released by the **UN Sustainable Development Solutions Network (SDSN)**.
- Since the adoption of the SDGs in 2015, India has improved its ranking by **18 places**, reflecting significant progress in several socio-economic indicators.
- However, the report also highlights persistent challenges in areas such as hunger, health, governance, environmental sustainability, and climate action.

What is the Sustainable Development Report (SDR)?

- The **Sustainable Development Report (SDR)** is an annual global assessment published by the **UN Sustainable Development Solutions Network (SDSN)**.
- It evaluates countries' progress towards achieving the **17 Sustainable Development Goals (SDGs)** adopted under the **2030 Agenda for Sustainable Development**.

Objectives of the Report

- Measure global and national progress on SDGs.

- Identify areas requiring urgent policy intervention.
- Promote evidence-based policymaking.
- Encourage international cooperation and accountability.

Key Findings of the Sustainable Development Report 2026**Global Scenario****1. World Off Track to Achieve SDGs by 2030**

The report paints a concerning global picture:

- None of the **17 Sustainable Development Goals** are currently on track to be fully achieved by **2030**.
- Only **16.5%** of the SDG targets are progressing satisfactorily.
- Nearly **50%** of the targets are witnessing only marginal progress.
- Around **15%** of the indicators have actually deteriorated since 2015.

This reflects the impact of multiple global crises including:

- Climate change
- Armed conflicts
- Rising debt burdens
- Economic slowdowns
- COVID-19 aftereffects

2. Top Performing Countries

The **Nordic countries** continue to dominate global sustainability rankings due to their strong social welfare systems, environmental policies, and institutional governance.

Rank	Country
1	Finland
2	Sweden
3	Denmark

These countries perform exceptionally well in:

- Quality education
- Universal healthcare
- Gender equality
- Renewable energy
- Strong democratic institutions

3. Lowest Ranked Countries

Countries affected by prolonged conflict and political instability remain at the bottom.

- Chad
- Central African Republic
- South Sudan

Poor governance, humanitarian crises, and weak institutions continue to hinder SDG progress.

4. Most Challenging Global Goals

The SDGs that are progressing the slowest globally are:

- **SDG 2:** Zero Hunger
- **SDG 11:** Sustainable Cities and Communities
- **SDG 14:** Life Below Water
- **SDG 15:** Life on Land
- **SDG 16:** Peace, Justice and Strong Institutions

These goals require significant global cooperation and investment.

5. Commitment to Multilateralism

The report also assessed countries based on their support for the United Nations and multilateral cooperation.

- **Barbados** ranked first in commitment to UN-based multilateralism.
- **United States** ranked last due to:
 - Opposition to parts of the 2030 Agenda
 - Withdrawal from several international organizations
 - Reduced engagement in multilateral frameworks

India's Performance in SDG Index 2026

Highest Ever Ranking

India secured:

- **Rank:** 94 out of 167 countries
- **Score:** 68.3/100

This marks a significant improvement from:

- **2015 Rank:** 112
- **2026 Rank:** 94

India has emerged as one of the fastest-improving major economies alongside China.

India's Progress Towards SDGs

According to the report:

- **33.3%** of SDG targets are on track for achievement by 2030.
- **42.7%** show only limited or moderate progress.
- **24%** of indicators have deteriorated.

This indicates that although India is progressing, the pace is insufficient to fully achieve the SDGs by 2030.

Major Challenges Identified

1. SDG 2: Zero Hunger — India's Biggest Concern

The report identifies hunger as India's most serious development challenge.

Key Indicators

- Child wasting: **19%** (highest in the world)
- Child stunting: **29.3%**
- Undernourishment: **12%**

These figures highlight continuing nutritional deficiencies despite improvements in food production and welfare schemes.

Reasons

- Poor maternal nutrition
- Poverty
- Unequal food distribution
- Inadequate dietary diversity
- Climate-related agricultural stress

2. Major Structural Challenges

India continues to face "major challenges" in **7 out of 17 SDGs**.

These include:

- **SDG 2:** Zero Hunger
- **SDG 3:** Good Health and Well-being
- **SDG 5:** Gender Equality
- **SDG 11:** Sustainable Cities and Communities
- **SDG 14:** Life Below Water
- **SDG 15:** Life on Land
- **SDG 16:** Peace, Justice and Strong Institutions

3. Health Concerns (SDG 3)

The report notes worsening outcomes in:

- Air pollution-related mortality
- Non-communicable diseases (NCDs)
- Lifestyle disorders

Rapid urbanization, pollution, and changing lifestyles continue to burden India's healthcare system.

4. Governance and Institutional Decline (SDG 16)

The report records a substantial decline in India's **Press Freedom Index** score.

- **2015:** 59.51
- **2026:** 31.96

Institutional quality and governance indicators remain areas requiring improvement.

5. Environmental Setbacks

India is showing deterioration in:

SDG 12

Responsible Consumption and Production

SDG 13

Climate Action

The decline is mainly attributed to:

- Increasing fossil fuel consumption
- Cement production
- Rising industrial emissions

Record CO₂ Emissions

- Per capita carbon dioxide emissions reached: **2.21 tonnes per person**, the highest level recorded for India.

Areas Where India Has Performed Well

- Despite several challenges, the report highlights notable achievements.

SDG 7: Affordable and Clean Energy

India has significantly expanded:

- Electricity access
- Rural electrification
- Household electrification

Government initiatives such as:

- Saubhagya Scheme
- Deen Dayal Upadhyaya Gram Jyoti Yojana
- Renewable energy expansion

have contributed substantially.

SDG 9: Industry, Innovation and Infrastructure

India has witnessed remarkable progress in:

- Mobile broadband coverage
- Internet penetration
- Digital infrastructure
- Digital public services

The Digital India programme and expanding telecom networks have accelerated digital inclusion.

Sustainable Development Goals (SDGs)

SDG Dashboard and Trends



About

The **Sustainable Development Goals (SDGs)** consist of:

- **17 Goals**
- **169 Targets**

They were adopted in **2015** by **193 UN Member States** under the **2030 Agenda for Sustainable Development**.

The SDGs aim to eradicate poverty while ensuring environmental sustainability and inclusive economic growth.

Objectives

The SDGs seek to achieve:

- Poverty eradication
- Zero hunger
- Better healthcare
- Quality education
- Gender equality
- Climate action
- Sustainable economic growth
- Peaceful and inclusive societies

Historical Evolution

The SDGs evolved through several international milestones:

1987

Brundtland Commission

- Introduced the modern definition of sustainable development.

2000

Millennium Development Goals (MDGs)

- Focused on reducing extreme poverty by 2015.

2002

Johannesburg Declaration (Rio+10)

- Strengthened global commitment to sustainable development.

2012

Rio+20 Summit

- Laid the groundwork for developing the SDGs.

2015

2030 Agenda for Sustainable Development

- Adoption of the 17 Sustainable Development Goals.

Core Principles of the 2030 Agenda

The SDGs are based on five guiding principles:

- **Universality**
- **Integration**
- **Leave No One Behind**
- **Multi-stakeholder Participation**
- **Regular Monitoring and Review**

The Five Ps of Sustainable Development

The SDGs are built around:

- **People** – Ending poverty and ensuring dignity.
- **Planet** – Protecting natural resources and combating climate change.
- **Prosperity** – Inclusive economic growth.
- **Peace** – Justice, accountable institutions, and social harmony.
- **Partnership** – Global cooperation and collective action.

India's Domestic SDG Architecture

1. NITI Aayog

NITI Aayog is the nodal institution for SDG implementation in India.

Its key initiatives include:

- SDG India Index
- SDG Dashboard
- Promotion of cooperative and competitive federalism

2. Ministry of Statistics and Programme Implementation (MoSPI)

MoSPI monitors SDG progress through the:

- National Indicator Framework (NIF)
- 277 national indicators

It is supported by the **Data for Development Coordination Forum (DDCF)** in collaboration with NITI Aayog and the UN Resident Coordinator Office.

3. Ministry of Panchayati Raj

The Ministry promotes localization of SDGs through:

- Nine Localisation of SDGs (LSDGs) themes
- Local Indicator Framework (LIF)
- Panchayat Advancement Index (PAI)

The PAI evaluates over **2.5 lakh Gram Panchayats** using a **100-point performance scale**, encouraging grassroots implementation of sustainable development.

Way Forward

India's improved ranking in the **SDG Index 2026** reflects meaningful progress in expanding electricity access, digital connectivity, and infrastructure. However, the report underscores that significant challenges remain in eliminating hunger, improving public health, strengthening institutions, advancing gender equality, and addressing environmental degradation. Achieving the SDGs by 2030 will require accelerated policy implementation, stronger Centre–State coordination, increased investment in nutrition and healthcare, sustainable urban planning, climate-resilient development, and robust monitoring mechanisms. With only one-third of its SDG targets currently on track, India must intensify efforts to ensure that economic growth translates into inclusive, equitable, and environmentally sustainable development, in line with the overarching commitment to "**Leave No One Behind.**"

Uttarakhand Declared India's Sixth Fully Literate State



Why in News?

Uttarakhand has officially been declared India's sixth fully literate state after meeting the adult literacy criteria set under the **National Education Policy (NEP) 2020** and the **ULLAS – New India Literacy Programme**.

Key Highlights

- **Sixth Fully Literate State:** Uttarakhand has joined Mizoram, Goa, Tripura, Himachal Pradesh, and Sikkim in achieving the status of a fully literate state.
- **High Literacy Rate:** The state has recorded an adult literacy rate of over **98%**, fulfilling the literacy benchmarks established by the Government of India.
- **Official Recognition:** The declaration was made after Uttarakhand satisfied the literacy norms prescribed by the **Department of School Education and Literacy** under the **Union Ministry of Education**.
- **Governor's Approval:** The proposal to grant full literacy status received approval from **Governor Lt Gen (Retd.) Gurmit Singh** in **July 2026**, following its approval by the **Uttarakhand State Cabinet** in **June 2026**.
- **About ULLAS:** The **ULLAS (Understanding Lifelong Learning for All in Society)** initiative, also known as the **New India Literacy Programme**, focuses on enhancing adult literacy while promoting lifelong learning, digital literacy, financial literacy, life skills, and continuing education.
- **Government's Vision:** Chief Minister **Pushkar Singh Dhami** stated that attaining full literacy would further strengthen Uttarakhand's role in achieving the national vision of **Viksit Bharat 2047**.

State of Food Security and Nutrition in the World (SOFI) Report 2026



Why in News?

- The **State of Food Security and Nutrition in the World (SOFI) 2026** report, released by the **Food and Agriculture Organization (FAO)** of the United Nations, highlights a significant decline in undernourishment in India over the past two decades.
- However, the report notes that **142.5 million people remain undernourished**, while **520.1 million people cannot afford a healthy diet**.

Key Findings for India

Decline in Undernourishment

- The share of undernourished population declined from:
 - **21.1% (2004–06) to 9.8% (2023–25)**.
- Number of undernourished people reduced from:
 - **243.9 million to 142.5 million**.
- This represents a reduction of approximately **101 million people**.

Affordability of a Healthy Diet

- As of **2025**, **520.1 million people (35.5% of the population)** were unable to afford a healthy diet.
- The proportion declined from **59.8% in 2017**, but more than **one in every three Indians** still

cannot regularly afford a nutritionally adequate diet.

Rising Cost of Healthy Diet

- Since **2017**, the cost of a healthy diet in India has increased by nearly **48%**.
- During the same period, the increase was about **32%** in the **United States**.
- In **2025**, the cost of a healthy diet in India was estimated at **PPP \$4.11 per person per day**.

India in Comparison

South Asia

Country	Cost of Healthy Diet (PPP \$/day)
Pakistan	3.94
India	4.11
Bangladesh	4.59
Sri Lanka	5.21
Bhutan	6.17

Other Countries

Country	Cost of Healthy Diet (PPP \$/day)
China	3.64
United States	2.86
United Kingdom	2.75
South Korea	7.37
Japan	8.27

Positive Trend

- The report notes that the decline in the number of people unable to afford a healthy diet among **lower-middle-income countries** has been driven mainly by **India**.
- Excluding India, the report indicates an **increasing trend** in the number of people unable to afford a healthy diet among these countries.

Nutrition Indicators

Child Stunting

- Among children below five years:
 - **41.7% (2012) → 32.9% (2024)**.
- Indicates improvement in chronic undernutrition.

Child Wasting

- Wasting stood at **18.7% in 2024**.

- The report notes that this remains **among the higher rates globally**.

Overweight among Children

- Increased from:
 - **2.1% to 3.7%** over the same period.

Adult Obesity

- The report states that **adult obesity has doubled**.

Anaemia among Women

- Among women aged **15–49 years**, anaemia increased from:
 - **50.1% to 53.7%**.

Key Concerns

- A large population continues to experience undernourishment.
- More than one-third of the population cannot afford a healthy diet.
- Rising cost of nutritious food.
- High prevalence of child wasting.
- Increasing incidence of overweight and obesity.
- Rising anaemia among women of reproductive age.

Significance

- The report highlights significant progress in reducing **undernourishment** in India over the past two decades.
- It also underscores the continuing challenge of ensuring **affordable, nutritious diets** for all.
- The findings point to the **double burden of malnutrition**, with persistent undernutrition alongside rising overweight, obesity and anaemia.
- India's progress has contributed significantly to improving affordability of healthy diets among **lower-middle-income countries**.

□□□

Expansion of Foreign Portfolio Investor (FPI) Participation in Government Securities (G-Secs)



Why in News?

- The Government has introduced reforms to increase **Foreign Portfolio Investor (FPI)** participation in **Government Securities (G-Secs)**. The measures aim to deepen India's bond market, attract stable foreign capital, and strengthen India's position as a global investment destination.

Key Reforms Introduced to Expand Foreign Participation in G-Secs

Objective

The reforms aim to:

- Deepen India's government bond market.
- Diversify the investor base.
- Attract long-term foreign institutional capital.
- Improve liquidity and efficiency in the debt market.
- Strengthen India's integration with global financial markets.

1. Tax Exemptions for Foreign Investors

- Foreign Portfolio Investors (FPIs)** and **Foreign Institutional Investors (FIIs)** will be exempt from taxation on:
 - Interest income from Government Securities.
 - Capital gains arising from the sale, transfer, exchange, or redemption of Government Securities.

- The exemption will apply from **1 April 2026**.

2. Expansion of Fully Accessible Route (FAR)

Fully Accessible Route (FAR):

- FAR allows foreign investors to invest in specified Government Securities without restrictions applicable under the General Route.

Expansion:

The FAR framework has been extended to include:

- New issuances of:
 - 15-year Government Securities.
 - 30-year Government Securities.
 - 40-year Government Securities.
- Sovereign Green Bonds (SGRBs) in FAR-eligible maturities.

Significance:

- Provides foreign investors access to a wider range of long-term government debt instruments.
- Encourages investment in sustainable and climate-related projects.

3. Liberalisation Under General Route

The Government has removed:

- Short-term investment limits.
- Concentration limits.
- Security-wise investment limits.

This provides greater flexibility to foreign investors while maintaining overall investment caps.

4. Existing Investment Limits Maintained

The overall foreign investment limits remain unchanged:

- Central Government Securities (CGSs):** 6% of outstanding securities.
- State Government Securities (SGSs):** 2% of outstanding securities.

5. Merger of Investment Categories

The existing categories of:

- General Investment Category.
- Long-Term Investment Category.

have been merged into a single investment limit for:

- Central Government Securities.
- State Government Securities.

This simplifies the investment framework for FPIs.

6. Target Investors

The reforms aim to attract long-term institutional investors such as:

- Pension funds.
- Insurance companies.
- Sovereign wealth funds.

These investors generally provide stable and long-duration capital.

Significance of Greater Foreign Participation in G-Secs

1. Development of Bond Market

- Increases liquidity in government bond markets.
- Improves price discovery.
- Supports development of a stronger yield curve.
- Creates better financial benchmarks.

2. Lower Government Borrowing Costs

- Increased demand for government bonds can reduce borrowing costs.
- Helps improve efficiency in government debt management.

3. Better Monetary Policy Transmission

- A deeper bond market improves the effectiveness of monetary policy actions by the Reserve Bank of India.

4. Support for Economic Development

Greater foreign investment can provide additional financing for:

- Infrastructure development.
- Manufacturing.
- Urban development.
- Climate initiatives.
- Other national priorities.

5. Global Financial Integration

- Supports inclusion of Indian bonds in global bond indices.
- Enhances India's role in international financial markets.

Key Concepts Related to Foreign Investment in Government Securities

Foreign Institutional Investor (FII)

- An FII is a category of foreign institutional investor that invests pooled funds in financial markets.
- Examples include:
 - Mutual funds.
 - Pension funds.
 - Insurance companies.
 - Hedge funds.
- FIIs often participate actively in investment decisions.

Foreign Portfolio Investor (FPI)

- FPIs are foreign individuals, institutions, or funds investing in financial assets such as:
 - Stocks.
 - Bonds.
 - Mutual funds.
 - Government Securities.
- They do not participate in the management or control of the companies or entities in which they invest.

Government Securities (G-Secs)

- Government Securities are tradable debt instruments issued by:
 - Central Government.
 - State Governments.

Purpose:

- Financing public expenditure.
- Managing fiscal deficits.
- Regulating liquidity in financial markets.

Fully Accessible Route (FAR)

- A mechanism introduced by the Reserve Bank of India to allow non-residents to invest in specified Government Securities without investment restrictions under the general framework.

Bank for International Settlements (BIS)

- BIS is an international financial institution owned by central banks.
- It promotes:
 - Global monetary cooperation.
 - Financial stability.

- It also acts as a banker and asset manager for central banks and international organisations.

Long-Term Capital Gains (LTCG)

- LTCG refers to gains earned from the transfer of Government Securities held for a longer period:
 - **Listed G-Secs:** More than 12 months.
 - **Unlisted G-Secs:** More than 24 months.

Short-Term Capital Gains (STCG)

- STCG refers to gains earned from the transfer of Government Securities held for:
 - **Listed G-Secs:** Up to 12 months.
 - **Unlisted G-Secs:** Up to 24 months.

Conclusion:

The reforms to expand FPI participation in Government Securities represent a major step towards developing a deeper and more globally integrated Indian bond market. By attracting long-term institutional investors and improving market efficiency, these measures can strengthen financial stability and support India's long-term economic growth.

India's Marine Fisheries Sector: Sustainability Status, Challenges and Way Forward

Why in News?

- The Government of India's recent evaluation, based on data from the Central Marine Fisheries Research Institute (CMFRI), suggests that India's marine fisheries resources remain largely sustainable, with around 91.1% of assessed fish stocks classified as being in healthy condition.
- However, observations by the Food and Agriculture Organization of the United Nations (FAO) and field-level evidence highlight several concerns, including stagnating marine production, increasing fishing pressure, declining catches, degradation of coastal ecosystems and expansion of mechanised trawling.

Key Overview

- India's marine fisheries sector shows signs of sustainability according to official assessments, but concerns remain regarding the methodology of stock evaluation and the ecological pressure on coastal waters.
- The major challenges include overcapacity of fishing fleets, damage to inshore habitats, weak enforcement mechanisms and conflicts between mechanised and small-scale fishers.
- Sustainable fisheries management requires stronger scientific assessments, ecosystem-based governance, regulation of destructive fishing practices and greater involvement of fishing communities.

Current Status of India's Fisheries Sector



Marine Resource Base

- India has an Exclusive Economic Zone (EEZ) of nearly **2.4 million sq. km**, extending up to 200 nautical miles.
- Coastal waters, continental shelves and nearshore regions serve as major fishing grounds due to their high biological productivity.

Condition of Fish Stocks

- According to CMFRI's latest assessment, **91.1% of the 135 marine fish stocks assessed in 2022** were considered sustainable.
- Most commercially important species were reported to be in a healthy state.
- However, India mainly relies on **landing data (catch records)** for assessing stock health, unlike several countries that conduct detailed scientific stock assessments at sea.

Economic Importance

- Fisheries contribute around **7.43% of Agricultural Gross Value Added (GVA)**.

- Total fish production increased significantly, reaching around **197.75 lakh tonnes in FY 2024–25**.

Export Performance

- India's seafood exports reached approximately **₹62,408 crore in FY 2024–25**.
- Frozen shrimp remains the dominant export product, with major markets including the US and China.

Financial and Infrastructure Support

- The Union Budget 2026–27 allocated around **₹2,761 crore** for fisheries development.
- Around **₹2,500 crore** was allocated specifically for the Pradhan Mantri Matsya Sampada Yojana (PMMSY).
- The Fisheries and Aquaculture Infrastructure Development Fund (FIDF) and expansion of Kisan Credit Card (KCC) facilities have improved credit availability and processing infrastructure.

Fishing Fleet and Mechanisation

- India has more than **64,000 mechanised fishing vessels** along with traditional and artisanal fishing boats.
- Increasing mechanisation has improved productivity but has also created ecological and livelihood concerns.

Technological Developments

Modern sustainable aquaculture technologies include:

Recirculatory Aquaculture Systems (RAS):

- A closed-loop fish farming system where water is continuously filtered and reused.
- Helps reduce water consumption and environmental impact.

Bio-floc Technology:

- Uses beneficial microbial communities grown through carbon addition.
- Converts waste into microbial protein, which helps maintain water quality and provides supplementary nutrition for fish.

Digital Governance

- The National Fisheries Digital Platform (NFDP), launched in 2024, provides digital

identities to over 30 lakh fisheries stakeholders.

- It improves access to insurance, subsidies and government services.

Formalisation of Fisheries Sector

- The Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY), with an allocation of ₹6,000 crore, focuses on:
 - Formalising the fisheries value chain.
 - Improving traceability.
 - Enhancing productivity and market access.

Regulatory Framework

- The **2025 Rules for Sustainable Harnessing of Fisheries in the EEZ and High Seas** aim to ensure responsible exploitation of marine resources and long-term fisheries security.

Major Challenges Facing India's Fisheries Sector

1. Concerns Regarding Sustainability Assessment

- Although official estimates indicate that 91.1% of assessed fish stocks are sustainable, questions remain because assessments rely heavily on catch data.
- Landing-based assessment may not accurately represent actual fish population levels and ecosystem health.

2. Degradation of Coastal Ecosystems

- Inshore waters are among India's most productive fishing zones, particularly for shrimp.
- These ecosystems face threats from:
 - Mangrove destruction.
 - Coastal pollution.
 - Reduced nutrient flow due to river damming.
 - Damage to seabed habitats.

3. Expansion of Mechanised Trawling

- The growth of mechanised vessels, especially bottom trawlers, has increased pressure on marine ecosystems.
- Trawling damages benthic habitats, reduces biodiversity and affects the livelihood of small-scale fishers.

4. Weak Enforcement Mechanisms

- Although regulations such as seasonal fishing bans and coastal fishing restrictions exist, implementation remains inadequate.
- Many coastal states face shortages of monitoring systems, manpower and patrol infrastructure.

5. Overcapacity and Livelihood Challenges

- Excess fishing capacity has intensified competition over declining resources.
- Small-scale fishers face increasing economic insecurity due to competition from larger mechanised fleets.

6. Limited Benefits from Deep-Sea Fishing Push

- Government programmes encourage movement towards deep-sea fishing.
- However, FAO assessments suggest deep-sea resources may provide limited additional output.
- High fuel, technology and investment requirements may create additional burdens for small fishers.

Government Initiatives for Sustainable Fishing National Policy on Marine Fisheries (NPMF), 2017

- Establishes sustainability as the central principle for marine fisheries management.
- Focuses on conservation, responsible fishing and long-term resource security.

Uniform Fishing Ban

- A **61-day seasonal fishing ban** during the monsoon period is implemented in the EEZ to support fish breeding and stock recovery.

Restriction on Destructive Fishing Practices

Measures include:

- Ban on pair trawling.
- Ban on bull trawling.
- Restrictions on artificial LED fishing lights.

Promotion of Sustainable Practices

Government promotes:

- Sea ranching.
- Artificial reefs.
- Mariculture activities such as seaweed farming.

State-Level Fisheries Regulations

Coastal states and Union Territories regulate:

- Fishing gear and mesh size.
- Engine capacity.
- Minimum Legal Size (MLS) of fish.
- Zoning of fishing areas for different vessel categories.

Steps Needed for Sustainable Development of Fisheries Sector

Strengthen Coastal Governance

- Improve monitoring of territorial waters through:
 - Vessel tracking systems.
 - Coastal patrols.
 - Community-based surveillance.
 - Strict enforcement mechanisms.

Improve Scientific Stock Assessment

- Move beyond catch-based estimates.
- Conduct scientific surveys at sea to assess:
 - Fish population.
 - Marine biodiversity.
 - Benthic ecosystem conditions.

Regulate Mechanised Trawling

- Enforce coastal zoning rules.
- Control destructive bottom trawling.
- Protect breeding grounds and small-scale fishing communities.

Promote Aquaponics

- Encourage integrated fish farming systems combining aquaculture and hydroponics.
- Benefits include:
 - Lower water consumption.
 - Better land utilisation.
 - Additional income opportunities.

Develop Cold Chain Infrastructure

Investment is required in:

- Fish landing centres.
- Cold storage facilities.
- Refrigerated transportation.
- Processing units.

This will reduce post-harvest losses and improve product quality.

Encourage Value Addition and Diversification

Support should be provided for:

- Fish processing.
- Packaging and branding.
- Market linkages.
- Development of products such as ready-to-eat seafood, fish oils and collagen-based products.

Conclusion

India's fisheries sector has significant economic and nutritional importance, but long-term sustainability depends on balancing production growth with ecological conservation. Strengthening scientific assessments, protecting coastal ecosystems, regulating mechanised fishing and involving fishing communities in decision-making will be essential for building a resilient and sustainable marine fisheries system.

Viksit UDAN: Expanding Regional Air Connectivity under India's Aviation Growth Strategy

UDAN 5.0 Series
Reforming for Greater Efficiency and Reach

UDAN 5.0 (April 2023)

- ✓ Focused on Category-2 (20–80 seats) and Category-3 (>80 seats) aircraft.
- ✓ Distance cap (800 km) removed to allow longer routes.
- ✓ Prioritised routes linked to airports that are operational or near completion.
- ✓ Airlines must commence operations within 4 months, improving turnaround time and planning.

UDAN 5.1 (May 2023)

- ✓ Tailored to helicopter connectivity, especially in priority areas.
- ✓ Viability Gap Funding (VGF) caps increased; airfare caps reduced.
- ✓ Allowed routes where at least one endpoint is a heliport, expanding access to remote regions.

UDAN 5.2 (July 2023)

- ✓ Designed for small aircraft operations (<20 seats).
- ✓ Enhanced flexibility with airlines allowed to operate 10%–40% of the annually quoted RCS seats per quarter.
- ✓ Aimed at bolstering last-mile connectivity and supporting rural tourism.

UDAN 5.3 (January 2024) and UDAN 5.4 (August 2024)

- ✓ Special rounds to re-bid discontinued or terminated routes.
- ✓ Open to all airline categories, aimed at reviving connectivity on strategic routes.

UDAN 5.5

- ✓ Further refined route allocations and bidding guidelines.
- ✓ Included seaplane operations, with bids invited for 50+ water bodies, enhancing multimodal regional access.

Why in News?

- Recently, the Prime Minister launched the upgraded phase of the Regional Connectivity Scheme (RCS)–UDAN, named **Viksit UDAN**, in

Rajasthan. The initiative aims to strengthen regional aviation, improve connectivity in underserved regions and contribute to the broader vision of **Viksit Bharat 2047**.

- The Union Cabinet had earlier approved the **Modified UDAN Scheme in March 2026**, providing the framework for this new phase of regional aviation expansion.

Key Features of Viksit UDAN

About Viksit UDAN

- Viksit UDAN represents the next-generation version of the **Regional Connectivity Scheme–UDAN**, which was launched in **October 2016** to make air travel affordable and accessible for ordinary citizens.
- The scheme focuses on expanding aviation infrastructure beyond metropolitan cities by connecting smaller towns, remote areas and strategically important regions.

Implementation Period and Financial Support

- The scheme will operate for **10 years (FY 2026–27 to FY 2035–36)**.
- A total financial support of **₹28,840 crore** has been allocated for its implementation.

Strengthening Regional Connectivity

- The primary objective is to improve air access in:
 - Tier-2 and Tier-3 cities
 - Remote and hilly regions
 - Island territories
 - Aspirational districts
- The scheme seeks to promote inclusive economic development by integrating smaller regions into the national aviation network.

Airport Development

- Around **100 airports** will be developed from existing unserved airstrips.
- An investment of **₹12,159 crore over eight years** has been planned for improving regional airport infrastructure.

Operation and Maintenance Support

- The scheme provides financial assistance for the operation and maintenance of approximately **441 aerodromes**.

- Support will be available for three years with financial limits of:
 - ₹3.06 crore annually per airport
 - ₹0.90 crore annually per heliport or water aerodrome

Expansion of Helipad Infrastructure

- The scheme proposes development of **200 modern helipads** in:
 - Mountainous areas
 - Remote locations
 - Islands
 - Aspirational districts
- These facilities will improve emergency medical services, disaster response and accessibility of public services.

Viability Gap Funding (VGF)

- Around **₹10,043 crore** has been earmarked as VGF support for airline operators over ten years.
- Airlines will receive financial assistance for five years, with gradual reduction of support from the third year onwards.
- Route exclusivity under the scheme will be limited to three years to encourage competition.

Implementation Model

- UDAN airports will be developed through a **Challenge Mode approach**, encouraging:
 - Faster execution
 - Innovation
 - Quality infrastructure
 - Long-term sustainability
- The scheme also promotes domestic aviation manufacturing through the proposed use of:
 - Hindustan Aeronautics Limited (HAL) Dhruv helicopters
 - HAL Dornier aircraft for regional connectivity operations

Expected Impact

Viksit UDAN is expected to:

- Increase affordable air travel options
- Promote tourism and trade
- Encourage regional investment

- Improve emergency and healthcare connectivity
- Generate employment opportunities
- Support balanced regional economic growth

UDAN Scheme

About UDAN

- **UDAN (Ude Desh ka Aam Nagrik)** is a flagship initiative of the Ministry of Civil Aviation aimed at making air travel accessible to citizens across India.
- It was launched under the **National Civil Aviation Policy (NCAP), 2016**.
- The scheme focuses on connecting smaller cities through a market-based model supported by government incentives.
- The **Airports Authority of India (AAI)** acts as the nodal implementing agency.

Funding Mechanism

- UDAN maintains affordable fares through:
 - Fare caps for passengers
 - Viability Gap Funding (VGF) support for airlines
- The scheme follows a cooperative model involving:
 - Waiver of landing charges
 - State government support
 - Reduction of Aviation Turbine Fuel (ATF) VAT to 1% or below

Expansion of Airport Infrastructure

- India's airport network has witnessed significant growth:
 - Increased from **74 airports in 2014 to 159 airports in 2024**
- UDAN has contributed to the expansion of aviation infrastructure by bringing previously underserved regions into the air connectivity network.

Evolution of UDAN Phases

UDAN 1.0

- Focused on connecting unserved and underserved airports through affordable regional flights.

UDAN 2.0

- Expanded the scheme to include:

- Helipads
- More remote regions

UDAN 3.0

- Introduced:
 - Tourism-oriented routes
 - Additional regional connectivity options

UDAN 4.0

- Prioritised:
 - North-Eastern states
 - Hilly regions
 - Island territories

UDAN 5.0 Series

- Further expanded regional aviation by promoting:
 - Seaplane operations
 - New connectivity models

Significance of Viksit UDAN

- Viksit UDAN represents a shift from merely increasing flight routes to building a broader regional aviation ecosystem.
- By improving connectivity in underserved areas, the scheme aims to integrate remote regions into India's economic growth process and strengthen aviation as a driver of inclusive development.

World Bank Country Income Classification 2027: India's Lower-Middle-Income Status



Why in News?

- The **World Bank Group's Country Income Classification (FY 2027)** has retained India in

the **Lower-Middle-Income** category, a status it has held since **2009**.

- Meanwhile, **Sri Lanka, Vietnam, and the Philippines** have been upgraded to the **Upper-Middle-Income** group following improvements in their economic performance.

Key Highlights of the FY 2027 Classification

1. Global Income Classification Trends

- Six countries moved into a higher income category during the latest revision.
- The share of **Low-Income countries** has declined significantly over the past few decades, indicating gradual improvement in global income levels.

2. Countries Upgraded

- **Lower-Middle to Upper-Middle Income:**
 - Sri Lanka
 - Vietnam
 - Philippines
 - Jordan
 - Micronesia
- **Low to Lower-Middle Income:**
 - Togo

3. Reasons Behind Upgrades

- **Vietnam** and the **Philippines** achieved higher income status through sustained industrialisation, export growth and rising national income.
- **Sri Lanka** recovered from its recent economic crisis with support from tourism, financial services and macroeconomic stabilisation.
- **Jordan** and **Togo** benefited largely from updated statistical estimates and revised national data.

4. India's Position

- India remains in the **Lower-Middle-Income** category with a **Gross National Income (GNI) per capita of USD 2,760 (2025)**.
- Despite strong economic growth, per capita income remains below the threshold required for the next income category.

How Does the World Bank Classify Economies?

1. Income Categories

The World Bank classifies economies into four groups based on **Gross National Income (GNI) per capita**:

- Low Income
- Lower-Middle Income
- Upper-Middle Income
- High Income

2. Basis of Classification

- Income categories are revised **every year on 1 July**.
- The classification is based on the **previous year's GNI per capita**.

3. Atlas Method

- The World Bank uses the **Atlas Method** to convert national income into **US dollars**.
- This method smooths the effects of **exchange rate fluctuations** and **inflation**, allowing more reliable international comparisons.

4. Annual Revision

- Income thresholds are updated every year using the **Special Drawing Rights (SDR) Deflator** to account for global inflation.

Income Categories (FY 2027)

Income Group	GNI per Capita (2025)
Low Income	USD 1,175 or below
Lower-Middle Income	USD 1,176 – USD 4,635
Upper-Middle Income	USD 4,636 – USD 14,375
High Income	Above USD 14,375

Importance of Income Classification

1. Development Finance

- Determines eligibility for financial assistance from institutions such as the **International Development Association (IDA)** and the **International Bank for Reconstruction and Development (IBRD)**.

2. Foreign Aid Allocation

- Assists international agencies and donor countries in identifying nations that require development assistance.

3. Trade Preferences

- Influences access to preferential trade arrangements and special provisions available to developing countries.

4. Climate Finance

- Helps prioritise funding for countries with greater economic vulnerability to climate change.

5. Investment Decisions

- Provides investors with a broad indication of a country's level of economic development.

6. Policy Benchmarking

- Enables governments to compare economic progress with peer economies and formulate long-term development strategies.

Limitations of GNI Per Capita

1. Ignores Income Distribution

- Average income does not reflect disparities in wealth or regional inequality.

2. Incomplete Measure of Development

- It does not capture improvements in **health, education, governance, environmental sustainability, or quality of life**.

3. Excludes Informal Contributions

- Large portions of **informal economic activity** and unpaid work remain outside its assessment.

4. Operational Indicator

- The World Bank considers income classification as an administrative and analytical tool rather than a complete measure of development.

Why Does India Remain a Lower-Middle-Income Economy?

1. Large Population Base

- Although India's economy has expanded rapidly, the gains are spread across a population exceeding **1.4 billion**, resulting in relatively modest **per capita income**.

2. Regional Economic Disparities

- Considerable differences exist between economically advanced states and less-developed regions, reducing the national average income.

3. Large Informal Economy

- A significant share of India's workforce remains engaged in **informal employment** and **low-productivity agriculture**, limiting growth in average earnings.

4. Structural Transformation Still Underway

- India moved out of the **Low-Income** category only in **2009**.
- Achieving **Upper-Middle-Income** status requires sustained long-term growth in **per capita income**, supported by productivity gains, industrialisation and quality employment.

BHAVYA Industrial Parks Scheme



Why in News?

- The **Union Minister of Commerce & Industry** chaired the **Board of Trade** meeting in New Delhi and urged States to prioritise exports by effectively implementing the **BHAVYA Industrial Parks Scheme**.
- The scheme is expected to strengthen India's manufacturing base and improve export competitiveness through greater Centre-State-industry collaboration.

About

- **BHAVYA (Bharat Audyogik Vikas Yojana)** is a **Central Sector Scheme** of the **Department for Promotion of Industry and Internal Trade (DPIIT)**.
- It aims to develop **100 world-class, investment-ready industrial parks** across the country with modern infrastructure and seamless connectivity.

Objectives

- Promote **manufacturing-led economic growth**.

- Develop integrated industrial infrastructure to attract domestic and foreign investments.
- Support flagship initiatives such as **Make in India** and **PM Gati Shakti**.
- Enhance India's role in **Global Value Chains (GVCs)** and boost exports.

Key Features

1. Financial Outlay

- The scheme has an allocation of approximately **₹33,660 crore**.
- It will be implemented over a **six-year period (2026–27 to 2031–32)**.

2. Industrial Park Development

- Supports the development of both **Greenfield** and eligible **Brownfield** industrial parks.
- Minimum land requirement:
 - **100 acres** for most states.
 - **25 acres** for **hilly states, North-Eastern states, Union Territories and smaller states**.

3. Competitive Selection Process

- In the initial phase, **up to 50 industrial parks** will be selected through a challenge-based evaluation.
- Selection will be based on factors such as:
 - Connectivity.
 - Land suitability.
 - Quality of infrastructure.
 - Existing industrial ecosystem.
 - Policy support.
 - Digital readiness.
 - Environmental sustainability.

4. Modern Infrastructure

The industrial parks will provide:

- **Plug-and-play industrial facilities**.
- **Multimodal transport connectivity**.
- **Reliable power and water supply**.
- **Underground utility networks**.

- Waste management and **Common Effluent Treatment Plants (CETPs)**.
- Testing and certification laboratories.
- Worker housing and social infrastructure.
- Renewable energy facilities.
- Digital **single-window clearance** systems.

5. Implementation Mechanism

- Projects will be executed through **Special Purpose Vehicles (SPVs)** formed under the **Companies Act, 2013**.
- The **National Industrial Corridor Development Corporation (NICDC)** will function as the **Project Management Agency**, overseeing implementation and monitoring.

Significance

1. Investment Promotion

- Creates investment-ready industrial infrastructure to attract both **domestic and foreign investors**.

2. Manufacturing Competitiveness

- Strengthens India's manufacturing ecosystem through integrated infrastructure and improved ease of doing business.

3. Export Growth

- Enhances export capacity by improving industrial efficiency and supporting participation in **Global Value Chains (GVCs)**.

4. Employment Generation

- Industrial expansion is expected to create substantial **direct and indirect employment opportunities**.

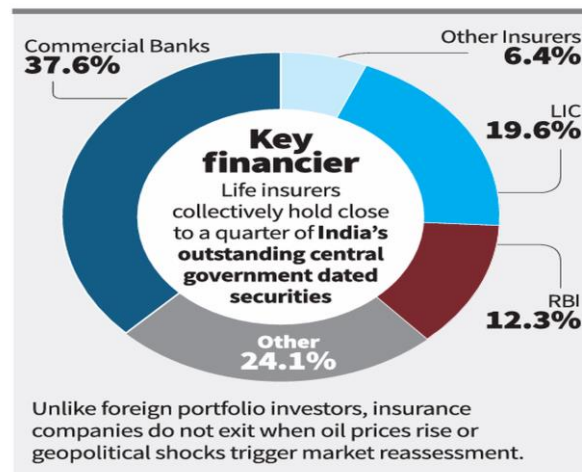
5. Faster Project Execution

- Ready-to-use industrial parks and streamlined approvals can reduce delays related to **land acquisition** and regulatory clearances.

6. Balanced Regional Development

- Lower land requirements for **hilly, North-Eastern** and **smaller states** encourage more balanced industrial development across regions.

Insurance Sector in India: Towards 'Insurance for All by 2047'



Source: MoF Status Paper on Government Debt 2023-24.

Why in News?

- India's insurance sector has emerged as a major source of **long-term capital**, with life insurers holding nearly **one-fourth of the Central Government's outstanding dated securities**.
- The sector plays a dual role by providing **financial protection** to households while supporting the government's long-term borrowing requirements and infrastructure financing.

How Does the Insurance Sector Provide 'Patient Capital'?

1. Long-Term Investment Base

- Life insurance policies generally have long maturities, allowing insurers to invest funds over extended periods.
- This makes **Government Securities (G-Secs)** an ideal investment, as they offer stability and match insurers' long-term financial commitments.

2. Financing National Development

- Premiums collected from millions of policyholders are invested in government borrowing programmes.
- These funds indirectly support infrastructure sectors such as **transport, defence, energy and public infrastructure**.

3. Stable Source of Government Borrowing

- Unlike foreign investors, insurance companies generally maintain long-term investments even during periods of market uncertainty.
- Their consistent participation helps reduce volatility in the government securities market and supports fiscal stability.

4. Supporting the Bond Market

- Insurance companies are major investors in long-duration government bonds.
- Their investments contribute to a stable **sovereign yield curve**, lowering long-term borrowing costs.

5. Role of LIC

- **Life Insurance Corporation of India (LIC)** remains the largest institutional investor in government securities.
- Owing to its systemic importance, **IRDAI** has designated LIC as a **Domestic Systemically Important Insurer (D-SII)**.

Insurance Sector in India

Constitutional Position

- Insurance is listed under the **Union List (Entry 47)** of the **Seventh Schedule**, giving Parliament exclusive legislative authority over the sector.

Evolution of the Sector

1. Early Development

- Modern insurance began during the colonial period with the establishment of early insurance companies.
- The **Insurance Act, 1938** became India's first comprehensive insurance legislation.

2. Nationalisation Phase

- **Life insurance** was nationalised through the **LIC Act, 1956**, leading to the creation of **Life Insurance Corporation of India (LIC)**.
- **General insurance** was nationalised in **1972**, resulting in the establishment of the **General Insurance Corporation (GIC)**.

3. Liberalisation

- Based on the recommendations of the **Malhotra Committee (1993)**, the sector was opened to private participation.

- The **Insurance Regulatory and Development Authority of India (IRDAI)** was established to regulate the industry and safeguard policyholders.
- Private insurance companies entered the market from **2000**, while the **FDI limit** has been progressively increased to encourage investment.

Recent Reforms

Sabka Bima Sabki Raksha (Amendment of Insurance Laws) Act, 2025

The legislation aims to accelerate the vision of **Insurance for All by 2047** through several reforms:

- Allows **100% Foreign Direct Investment (FDI)** in insurance companies.
- Simplifies regulatory procedures and improves ease of doing business.
- Strengthens protection of policyholders.
- Expands the regulatory powers of **IRDAI**.
- Provides greater operational flexibility to **LIC**.

Major Government Initiatives

- **Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)**
- **Pradhan Mantri Suraksha Bima Yojana (PMSBY)**
- **Ayushman Bharat – PM Jan Arogya Yojana (AB-PMJAY)**
- **Bima Sugam** digital platform.

Current Status of India's Insurance Sector

1. Expanding Market

- India is among the world's fastest-growing insurance markets and ranks among the leading emerging economies in life insurance.

2. Rising Premium Collection

- Premium income has continued to grow, reflecting increasing demand for insurance products.

3. Insurance Penetration

- Insurance penetration has improved but remains significantly below the global average, indicating substantial untapped potential.

4. Growth of Health Insurance

- Health insurance has become the largest segment within the non-life insurance market due to rising healthcare costs and increasing public awareness.

5. Growth Drivers

Key factors supporting sectoral expansion include:

- Rising household incomes.
- Growing middle class.
- Expansion into smaller cities and rural areas.
- Regulatory reforms.
- Digitalisation and InsurTech innovations.
- Greater health and financial awareness after the pandemic.
- Increasing participation through **Bancassurance**.

Major Challenges

1. Low Insurance Coverage

- Insurance penetration in India remains well below the global average, particularly in the **non-life insurance** segment.

2. The 'Missing Middle'

- A large section of the population is neither covered by government insurance schemes nor able to afford comprehensive private insurance.

3. Affordability Issues

- Rising insurance premiums and healthcare costs limit access for low-income households and senior citizens.

4. Consumer Trust Deficit

- Instances of **mis-selling**, complex policy conditions, hidden exclusions and claim disputes continue to affect consumer confidence.

5. Climate Risks

- Increasing frequency of natural disasters highlights the need for stronger insurance coverage against climate-related losses.

6. Cybersecurity Concerns

- Growing digitalisation has increased the risks of cyberattacks, data breaches and misuse of sensitive customer information.

7. Regulatory Uncertainty

- Frequent policy changes can affect long-term planning by insurers and investors.

Way Forward

1. Improve Affordability

- Rationalise taxation on essential insurance products and provide greater tax incentives to encourage wider insurance adoption.

2. Strengthen Digital Infrastructure

- Fully operationalise **Bima Sugam** and integrate digital platforms for seamless policy purchase, servicing and claim settlement.

3. Promote Inclusive Insurance

- Develop affordable insurance products for **gig workers, MSMEs, rural households** and other underserved groups.
- Expand climate-risk and parametric insurance products.

4. Develop India as a Reinsurance Hub

- Strengthen **GIFT City** to attract global reinsurance companies and build domestic reinsurance capacity.

5. Leverage Foreign Investment

- Use increased FDI to bring advanced technology, specialised insurance products and global underwriting expertise.

6. Enhance Consumer Protection

- Strengthen measures against mis-selling through technology-driven monitoring.
- Simplify policy documents, improve insurance literacy and ensure faster grievance redressal to build public trust.

India's Toy Industry



Why in News?

- India's **toy industry** has witnessed rapid growth in **domestic manufacturing, exports and employment**, supported by government initiatives promoting indigenous production, quality standards and innovation.
- The sector is emerging as a **sunrise industry**, combining **traditional craftsmanship, modern manufacturing, educational value and export competitiveness**.

Current Status of India's Toy Industry

1. Rising Exports

- India's exports of toy-related products have increased significantly in recent years, reflecting growing global demand for Indian toys.
- The country has strengthened its presence in international toy markets through improved manufacturing and quality standards.

2. Growth in Electronic and Non-Electronic Toys

- Exports of both traditional and electronic toys have recorded substantial growth.
- The expanding electronic toy segment reflects increasing innovation and technological capabilities.

3. Major Export Destinations

- The **United States** is the largest market for Indian toy exports.
- Other important destinations include:
 - **United Kingdom**
 - **Germany**
 - **Netherlands**
 - **Poland**

4. Expansion of Gaming Products

- Exports of **video game consoles**, gaming devices and related products have increased significantly.
- Key export markets include the **United States, UAE, Russia, France**, and the **United Kingdom**.

5. Growth in Festive and Entertainment Products

- Exports of festive, carnival and entertainment-related products have expanded considerably, indicating diversification of India's toy exports.

6. Decline in Imports

- Imports of traditional and educational toys have declined substantially.
- This reflects increasing domestic manufacturing capacity and reduced import dependence.

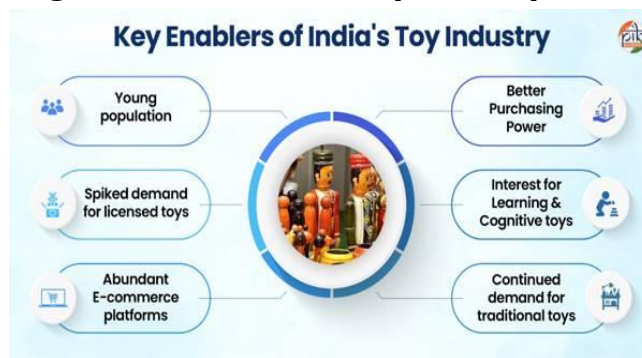
7. Trade Surplus

- India has transitioned from a **trade deficit** to a **trade surplus** in the toy sector, indicating stronger export performance and improved domestic production.

8. Employment Generation

- Employment in the **games and toys industry** has increased considerably over recent years, creating opportunities in manufacturing, design, packaging and allied sectors.

Significance of India's Toy Industry



1. Cultural Heritage

- India's toy-making tradition dates back to the **Indus Valley Civilization**.
- Traditional toys based on Indian mythology, folklore and local traditions help preserve the country's rich cultural heritage.

2. MSME and Artisan Development

- The sector supports a large number of **Micro, Small and Medium Enterprises (MSMEs)**, artisans, craftsmen, start-ups and local manufacturers.

3. Women's Employment

- Activities such as handicrafts, toy assembly, packaging and design create significant employment opportunities for women and economically weaker sections.

4. Educational Value

- Growing demand for **STEM toys**, puzzles and educational games promotes:

- Cognitive development.
- Creativity.
- Problem-solving skills.
- Experiential learning among children.

5. Manufacturing and Export Growth

- The industry supports the objectives of **Make in India** by:
 - Reducing imports.
 - Strengthening domestic manufacturing.
 - Expanding India's share in global toy markets.

6. Promotion of Indian Knowledge Systems

- Toys inspired by Indian history, culture, traditional stories and local heroes help promote indigenous knowledge and values among children.

7. Preservation of Traditional Crafts

- **GI-tagged toys** and products promoted under the **One District One Product (ODOP)** initiative help preserve traditional craftsmanship while improving market access for artisans.

Major Government Initiatives

1. National Action Plan for Toys (2020)

- Promotes indigenous toy manufacturing.
- Encourages toy designs inspired by Indian culture, heritage and educational needs.
- Supports innovation, quality improvement and development of toy clusters.

2. Toys Quality Control Order (2020)

- Makes **Bureau of Indian Standards (BIS)** certification mandatory.
- Ensures that toys sold in India comply with prescribed safety standards.

3. Customs Duty on Toys

- Increase in **Basic Customs Duty (BCD)** on imported toys has encouraged domestic manufacturing by reducing the price advantage of imported products.

4. Toy Biz International B2B Exhibition

- Provides a platform for Indian manufacturers to connect with domestic and international buyers and promote exports.

5. Toycathon

- Launched in **2021** to encourage innovative toys and games based on Indian culture, heritage, folklore and values.

6. e-Toycathon

- Promotes innovation in **electronic toys**, educational toys and technology-enabled learning solutions.

7. e-Toys Lab

- Established by the **Ministry of Electronics and Information Technology (MeitY)** at **C-DAC, Noida**.
- Provides training in:
 - Electronic toy design.
 - Prototype development.
 - Product testing.
 - Industry-oriented skills.

8. Manak Manthan

- Organised by **BIS** to create awareness regarding toy safety standards and quality requirements.

9. One District One Product (ODOP)

- Promotes district-specific toy products through:
 - Branding.
 - Packaging.
 - Skill development.
 - Market access.
 - Technology adoption.

10. GI-Tagged Toys

Important GI-tagged toy products include:

- **Channapatna Toys and Dolls (Karnataka)**
- **Leather Toys (Indore)**
- **Thanjavur Dolls (Tamil Nadu)**

These products preserve traditional knowledge, regional identity and artisan livelihoods.

11. GST Rationalisation

- Reduction in **GST on toys** has made educational and developmental toys more affordable and encouraged wider adoption.

12. Free Trade Agreements (FTAs)

- Trade agreements with countries and regional groupings such as the **UAE**,

Australia, EFTA, Oman, New Zealand, and the **United Kingdom** are expected to improve market access for Indian toy exports.

13. Districts as Export Hubs

- Identifies districts with export potential for toy manufacturing.
- Strengthens local production, exports and employment by developing district-level toy clusters.

Challenges

1. Global Competition

- Indian manufacturers face strong competition from established global producers, particularly in low-cost mass manufacturing.

2. Innovation and Design

- Greater investment is needed in research, product design and innovation to meet evolving consumer preferences.

3. Quality Compliance

- Continuous adherence to international safety and quality standards is essential for expanding exports.

4. Skill Development

- Upgrading the skills of artisans and workers remains necessary to improve productivity and competitiveness.

5. Supply Chain Development

- Strengthening domestic component manufacturing and reducing dependence on imported inputs will enhance long-term competitiveness.

Significance

- Promotes **Atmanirbhar Bharat** through indigenous manufacturing.
- Strengthens **MSMEs** and artisan livelihoods.
- Generates employment, particularly for women.
- Preserves India's traditional crafts and cultural heritage.
- Encourages innovation through educational and STEM-based toys.
- Enhances India's position in the global toy market through export-led manufacturing.

India's First Indigenous Export–Import Shipping Container

Why in News?

- India has unveiled its **first domestically manufactured export–import shipping container** for global shipping company **A.P. Moller–Maersk** at the **Maersk–CONCOR Inland Container Depot (ICD)**, Dadri, Uttar Pradesh.
- The initiative marks a significant step towards **Atmanirbhar Bharat**, **Make in India**, and the **Maritime Amrit Kaal Vision 2047** by promoting indigenous container manufacturing.

India's Indigenous Shipping Container Initiative

About

- The initiative aims to manufacture **globally deployable shipping containers** in India for international shipping companies.
- It seeks to reduce India's dependence on imported containers and strengthen the country's position in the global maritime logistics sector.

Objectives

- Promote indigenous container manufacturing.
- Reduce import dependence.
- Strengthen supply-chain resilience.
- Enhance India's maritime manufacturing capabilities.
- Support exports and global trade competitiveness.

Key Features

1. International Standards

- The first India-made shipping container complies with:
 - **International Organization for Standardization (ISO)** specifications.
 - **International Convention for Safe Containers (CSC)** standards.
- This makes the container suitable for **global shipping operations**.

2. Container Manufacturing Promotion Scheme (CMPS)

About

- The initiative is supported by the proposed ₹10,000 crore Container Manufacturing Promotion Scheme (CMPS) announced in the Union Budget 2026.

Key Components

- Capital expenditure support.
- Operational incentives.
- Research and Development (R&D) assistance.
- Promotion of domestic manufacturing capacity.

3. Manufacturing Capacity

- The scheme aims to increase India's annual container manufacturing capacity nearly **tenfold**, reaching approximately **7.5 lakh Twenty-foot Equivalent Units (TEUs)**.

Benefits of the Initiative

1. Reduced Import Dependence

- Strengthens domestic manufacturing and reduces reliance on imported shipping containers.

2. Supply Chain Resilience

- Improves the availability of containers for exporters and importers.
- Enhances resilience against global supply-chain disruptions.

3. Employment Generation

- Creates employment opportunities in:
 - Manufacturing.
 - Logistics.
 - Engineering.
 - Allied industries.

4. Skill Development

- Promotes technology transfer and develops skilled manpower in advanced manufacturing.

5. Boost to Exports

- Supports India's export competitiveness by ensuring a reliable supply of internationally compliant shipping containers.

Maritime Amrit Kaal Vision 2047

About

- The indigenous container initiative forms part of India's broader maritime transformation

under the **Maritime Amrit Kaal Vision 2047**, aimed at making India a leading global maritime nation.

Major Reforms

1. Merchant Shipping Act, 2025

- Modernises India's legal framework governing merchant shipping.

2. Coastal Shipping Act, 2025

- Promotes coastal shipping as an efficient and sustainable mode of transport.

3. Indian Ports Act, 2025

- Strengthens port governance, efficiency and infrastructure development.

4. Digital Maritime Initiatives

Key initiatives include:

- **One Nation One Port Process**
- **Maritime Single Window**
- **e-Samudra**

These initiatives aim to improve:

- Ease of doing business.
- Digital integration.
- Port efficiency.
- Cargo movement.

5. Infrastructure Development

- Expansion of:
 - Shipbuilding capacity.
 - Port infrastructure.
 - Container terminals.
 - Maritime logistics facilities.

Significance

- Advances the objectives of **Atmanirbhar Bharat** and **Make in India**.
- Reduces strategic dependence on imported shipping containers.
- Strengthens India's maritime logistics and global supply-chain resilience.
- Enhances export competitiveness through internationally certified container manufacturing.
- Supports employment generation, technology transfer and growth of the domestic maritime manufacturing ecosystem.
- Contributes to achieving the goals of the **Maritime Amrit Kaal Vision 2047**.

Circularity in India's Textile Sector

Why in News?

- India's textile industry is increasingly adopting **circular and sustainable manufacturing practices** through policy measures promoting organic fibres, eco-friendly chemicals, textile recycling, waste recovery, traceability, eco-labelling and green manufacturing.
- These initiatives aim to improve resource efficiency, reduce environmental impact and enhance India's competitiveness in global textile markets.

Current Status of India's Textile Sector

Economic Importance

- India's textile and apparel industry contributes around **2% of GDP** and nearly **11% of manufacturing Gross Value Added (GVA)**.
- It is the **sixth-largest exporter** of textiles and apparel globally, accounting for about **4% of world exports**.
- The sector provides direct employment to **over 45 million people**, including a large number of women and rural workers.

Need for Sustainable Production

- Due to its large economic footprint and export orientation, the industry is increasingly shifting towards environmentally responsible production methods.
- Growing international demand for sustainable products has accelerated the move towards a **circular textile economy**.

What is Circularity in the Textile Sector?

Meaning

- A circular textile economy aims to maximise the lifespan of fibres, fabrics and garments through **reuse, repair, recycling, upcycling and recovery**, thereby reducing dependence on fresh raw materials.

Core Principle

- Instead of treating textiles as waste after use, materials are continuously brought back into the production cycle, reducing resource consumption.

Environmental Benefits

- Circular practices help:
 - Reduce textile waste.
 - Lower greenhouse gas emissions.
 - Minimise landfill pressure.
 - Reduce consumption of water, energy and chemicals.

India's Circular Economy Performance

- India handles nearly **7.8 million tonnes of textile waste annually**.
- More than **70%** of textile waste is recovered through recycling, reuse or upcycling.
- Nearly **95%** of pre-consumer textile waste is reused.
- Around **55%** of post-consumer textile waste is diverted away from landfills.
- The textile recovery ecosystem supports around **40–45 lakh livelihoods**, especially women and economically weaker communities.

Promoting Sustainability Across the Textile Value Chain

1. Sustainable Raw Materials

Organic Fibre Promotion

- The **National Programme for Organic Production (NPOP)** encourages organic cotton by setting production standards and certifying organic products.
- Indian certification standards are recognised by the **European Commission** and **Switzerland** for specified products.

Improving Soil Health

- Organic farming practices focus on maintaining soil fertility through sustainable nutrient management and improved farming methods.

Jute Sector Initiatives

- The **Jute-ICARE** programme supplies certified seeds, retting accelerators and improved cultivation practices to improve both productivity and fibre quality.

New-Age Natural Fibres

- **Mini Mission-III** under the Mission for Cotton Productivity promotes climate-smart cultivation of fibres such as:
 - Ramie
 - Sisal
 - Flax

National Fibre Scheme

- Supports development of natural, man-made and emerging fibres while reducing import dependence and encouraging innovation.

2. Reducing Hazardous Chemicals

Regulatory Measures

- India has:
 - Restricted **benzidine-based dyes**.
 - Banned the use of **70 azo dyes**.
 - Implemented commitments under the **Stockholm Convention** to reduce Persistent Organic Pollutants (POPs).

Cleaner Production

- Pilot projects promote:
 - Eco-friendly textile production.
 - Safer chemical alternatives.
 - Sustainable manufacturing practices.

Large Chemical Reduction Programme

- Covers:
 - 400 factories.
 - Eight textile clusters.
 - Four fashion houses.
- Expected outcomes include:
 - Significant reduction in hazardous chemical use.
 - Lower greenhouse gas emissions.

3. Green Manufacturing

PM MITRA Parks

- PM MITRA Parks are integrated textile manufacturing hubs based on the **5F vision**:
 - Farm
 - Fibre
 - Factory
 - Fashion
 - Foreign

Key Features

- Common Effluent Treatment Plants (CETPs).
- Wastewater recycling.
- Scientific waste management.
- Shared utilities.
- Integrated manufacturing infrastructure.

Scale

- Seven parks have been approved with an outlay of **₹4,445 crore**.
- Investment commitments exceed **₹27,000 crore**.

Support for MSMEs

- Since MSMEs account for over **80%** of production capacity, programmes like:
 - **RAMP**
 - **MSE-GIFT**
 - **MSE-SPICE**promote adoption of clean technologies and circular-economy investments.

4. Emission Reduction and Waste Management

Indian Carbon Market

- Textile industries have been brought under the **Carbon Credit Trading Scheme (CCTS)**.
- Eligible industries disclose:
 - Scope 1 emissions.
 - Scope 2 emissions.
- Better-performing units earn tradable carbon credits.

Cleaner Manufacturing Standards

- Initiatives such as:
 - BREF/COINDS.
 - Tex Eco Initiative.
- Encourage efficient use of:
 - Water.
 - Energy.
 - Chemicals.

Textile Recycling

- India's textile recycling industry is projected to reach **USD 3.5 billion** by 2030 while generating nearly **one lakh green jobs**.

Waste Recovery

- **Solid Waste Management Rules, 2026** promote:
 - Waste segregation.
 - Extended Producer Responsibility (EPR).
 - Greater use of Refuse Derived Fuel (RDF).

Research and Innovation

- The **National Technical Textiles Mission (NTTM)** supports research to convert textile waste and biomass into advanced materials.

Effluent Treatment

- Textile industries are required to install **ETPs** or **CETPs** for environmentally compliant wastewater treatment.

Industry Initiatives

- **SURE (Sustainable Resolution)** encourages voluntary sustainable manufacturing.
- Awareness programmes such as **Circle Back** and exhibitions like **Bharat Tex** promote circular textile practices.
- ESG initiatives facilitate knowledge-sharing and adoption of sustainable production methods.

Post-Production Circularity and Market Support

Textile Waste Recovery

- Focus areas include:
 - Collection.
 - Segregation.
 - Recycling.
 - Upcycling.
 - Reintegration of textile waste into production.

Eco-Mark Scheme

- The **Eco-Mark Scheme, 2024** provides environmental certification for textiles based on resource efficiency, emissions, biodiversity protection and waste management.

Traceability

- Initiatives such as:
 - **Kasturi Cotton.**
 - **Silk Mark.**

- Improve product traceability and responsible sourcing.

Government Procurement

- An MoU among the **Textiles Committee, GeM** and **SCOPE** promotes procurement of upcycled textile products.

Market-Based Incentives

- Certification, traceability and eco-labelling strengthen consumer confidence while expanding market opportunities for sustainable textiles.

Conclusion

India's textile industry is steadily moving towards a **circular and sustainable production model** by integrating traditional resource-efficient practices with modern environmental standards. Continued emphasis on organic fibres, cleaner manufacturing, recycling, waste recovery, eco-labelling and traceability can improve global competitiveness, generate green employment, support MSMEs and significantly reduce the environmental footprint of the textile sector.

Strengthening India's Skill Development Ecosystem



Why in News?

- The Government has highlighted several initiatives aimed at strengthening India's **skill development ecosystem**, covering school education, vocational training, artificial intelligence (AI), apprenticeships, entrepreneurship and women-centric skilling programmes.
- India's improving workforce readiness supports the vision of achieving a **fully skilled workforce by 2047**. According to the **India Skills Report 2026**, employability has

increased from **46% in 2020** to **56.4% in 2026**, reflecting the positive impact of targeted skilling initiatives and rising industry demand.

Why is Skill Development Important for India?

Boosting Economic Growth

- Skilled human resources improve productivity, innovation and enterprise development.
- Better skills generate employment opportunities, reduce poverty and contribute to sustainable economic growth.

Preparing for Future Jobs

- Rapid technological transformation is creating demand for skills in:
 - Artificial Intelligence (AI)
 - Automation
 - Digital technologies
 - Green economy
 - Advanced manufacturing
- Continuous upskilling and reskilling are becoming essential for workforce competitiveness.

Enhancing AI Preparedness

- India scored **49.3** in the **IMF AI Preparedness Index**, higher than the average for emerging economies.
- To fully benefit from AI-driven growth, continuous investment in digital and technical skills is necessary.

Utilising the Demographic Dividend

- More than **54%** of India's population is below **25 years**, while over **62%** belongs to the working-age group.
- This demographic advantage can be converted into economic strength through quality skill development.

Meeting Global Workforce Demand

- India is expected to generate a large pool of skilled professionals while several countries face workforce shortages.

- A lifelong learning model—from school education to continuous workplace training—can position India as a global talent hub.

Major Skill Development Initiatives from School Level

Samagra Shiksha

- Integrates skill education from pre-school to Class XII.
- Supports vocational education aligned with **SDG 4** across thousands of schools.

Hub-and-Spoke Model

- Nearby schools utilise infrastructure available in designated hub schools for vocational training, improving access while optimising resources.

Vocational Skill Laboratories

- Skill labs have been established in **Jawahar Navodaya Vidyalayas** and **Eklavya Model Residential Schools** to strengthen practical learning.

PM SHRI Schools

- Serve as model institutions implementing **NEP 2020**, with emphasis on innovation, experiential learning and 21st-century skills.

Atal Tinkering Laboratories

- Encourage creativity, scientific thinking and innovation among school students through hands-on experimentation.

SOAR for AI Readiness

- Introduces Artificial Intelligence education to students of Classes VI–XII through partnerships with leading technology companies.

National Skills Qualifications Framework (NSQF)

- A competency-based qualification framework integrating academic education, vocational education and skill development.
- Enables credit transfer and lifelong learning across different education pathways.

YUVA AI for ALL

- A free AI awareness programme under the **IndiaAI Mission** designed to build basic AI literacy among young citizens.

Vidyanjali Programme

- Connects schools with volunteers, professionals, NGOs and CSR organisations to provide mentoring, career guidance and skill development support.

Major Upskilling and Reskilling Initiatives

Skill India Mission

- Launched in **2015** to provide industry-relevant skill training, upskilling and reskilling through digital platforms, skill centres and employment initiatives.

Major Schemes under Skill India

- Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
- Jan Shikshan Sansthan (JSS)
- National Apprenticeship Promotion Scheme (NAPS)
- Craftsman Training Scheme (CTS)

PMKVY 4.0

- Demand-driven programme offering short-term industry-oriented training across multiple sectors throughout the country.

Jan Shikshan Sansthan (JSS)

- Provides community-based vocational training for:
 - Neo-literates.
 - School dropouts.
 - Women.
 - Tribal communities.
- Focuses on locally relevant livelihood opportunities.

National Apprenticeship Promotion Scheme (NAPS)

- Encourages industry-based apprenticeship under the **Earn While You Learn** model.
- Government provides stipend support to apprentices.

Craftsman Training Scheme (CTS)

- Long-term vocational education delivered through **Industrial Training Institutes (ITIs)**.
- Courses are regularly updated to meet industry requirements.

PM-SETU

- Modernises Government ITIs into industry-linked centres of excellence.
- Operates through a Hub-and-Spoke model and aims to train large numbers of youth in emerging sectors.

FutureSkills Initiative

- Supports AI education, data science and other advanced technologies through:
 - AI & Data Labs.
 - FutureSkills Prime platform.
 - IndiaAI Mission.

Pradhan Mantri Viksit Bharat Rozgar Yojana

- Provides financial incentives to:
 - First-time employees.
 - Employers creating sustained employment opportunities.

Entrepreneurship Development Initiatives

PM Vishwakarma

- Supports traditional artisans through:
 - Skill upgradation.
 - Toolkit assistance.
 - Affordable credit.
 - Market linkages.
- Gives special emphasis to women and socially disadvantaged groups.

Startup India Learning Platform

- Offers free online courses on entrepreneurship, finance, management, technology and business development.

Entrepreneurship Development Programmes

- Implemented through institutions such as:
 - NIESBUD.
 - Indian Institute of Entrepreneurship (IIE).
- Provide mentoring, incubation and business management training.

MSME Entrepreneurship Skill Development Programme

- Promotes self-employment and entrepreneurship among youth, women, SCs, STs, persons with disabilities and other vulnerable groups.

Skill Development Announcements in Union Budget 2026–27

Sports Sector

- Strengthening coaching, sports science and athlete development under the **Khelo India Mission**.

Tourism

- Special programme to train tourist guides through structured certification.

Healthcare

- Training of multi-skilled caregivers to support India's expanding care economy.

Higher Education

- Establishment of:
 - New All India Institutes of Ayurveda.
 - National Institute of Design.

AVGC Sector

- Creation of Content Creator Labs for:
 - Animation.
 - Visual Effects.
 - Gaming.
 - Comics.

University Townships

- Integrated education hubs combining higher education, research, innovation and skill development.

Women-Centric Skill Development Initiatives

AI Careers for Women

- Provides intensive AI training to young women studying in rural colleges.
- Promotes participation in emerging technologies.

Swavalambini Programme

- Builds entrepreneurial capabilities among women through awareness and enterprise development programmes.

NAVYA Scheme

- Targets adolescent girls (16–18 years) in aspirational districts.
- Offers training in:
 - Digital marketing.
 - Cybersecurity.

- Artificial Intelligence.
- Green jobs.
- Financial literacy.
- Life skills.

Inclusive Skilling

- These initiatives seek to improve:
 - Women's employability.
 - Entrepreneurship.
 - Financial independence.
 - Participation in future-ready occupations.

Conclusion

India is gradually building a comprehensive **life-cycle skill development ecosystem**, beginning with school education and extending through vocational training, apprenticeships, entrepreneurship and continuous upskilling. Greater emphasis on emerging technologies, industry partnerships, women's participation and lifelong learning can help create a highly skilled workforce, improve employability and support India's long-term vision of becoming a **Viksit Bharat by 2047**.

Mobile Phone Manufacturing Scheme (MPMS)

The infographic is divided into two main green sections. The left section, titled 'MOBILE PHONE MANUFACTURING SCHEME (MPMS)', lists four bullet points: 'Cabinet approves the Mobile Phone Manufacturing Scheme (MPMS) with a budgetary outlay of ₹62,500 crore', 'The scheme will be implemented for 5 years (FY 2026–27 to FY 2030–31)', 'It provides incentive support of 2.25%–5% on eligible sales for manufacturing mobile phones in India', and 'An additional incentive of up to 1.5% is linked to domestic sourcing of key components and sub-assemblies'. The right section, also titled 'MOBILE PHONE MANUFACTURING SCHEME (MPMS)', lists three bullet points: 'To promote Indian brands, an additional 3% incentive on eligible sales is provided for product design and R&D', 'The scheme is expected to generate cumulative mobile phone production of approximately ₹39 lakh crore during its tenure', and 'It is also expected to create around 60,000 direct jobs'. A vertical label 'CABINET DECISION 15-07-2026' is placed between the two sections. At the bottom, there is a photo of Prime Minister Narendra Modi and a photo of a person working on a mobile phone.

Why in News?

- The **Union Cabinet** has approved the **Mobile Phone Manufacturing Scheme (MPMS)** with a total outlay of **₹62,500 crore**.
- The scheme aims to expand India's mobile phone manufacturing capacity, increase domestic value addition, strengthen supply chains, and enhance India's position as a global electronics manufacturing hub.

What is the Mobile Phone Manufacturing Scheme (MPMS)?

About

- MPMS is a government incentive scheme designed to accelerate mobile phone manufacturing in India while promoting domestic production of components, innovation, and global competitiveness.

Duration

- The scheme will remain operational for **five years**, from **FY 2026–27 to FY 2030–31**.

Production Incentives

- Eligible manufacturers will receive incentives ranging from **2.25% to 5%** on qualifying mobile phone sales manufactured in India.

Domestic Value Addition

- An additional incentive of **up to 1.5%** is provided to manufacturers that procure key components and sub-assemblies from domestic suppliers.

Support for Indian Brands

- Indian companies engaged in **product design, research and development (R&D)** can receive an additional **3% incentive**, encouraging indigenous innovation and intellectual property creation.

Objectives of MPMS

Expand Manufacturing Capacity

- Increase India's overall mobile phone production and strengthen its position as one of the world's leading manufacturing centres.

Increase Local Value Addition

- Promote greater domestic production of components and reduce dependence on imported parts.

Strengthen Supply Chains

- Develop a deeper, more resilient and globally competitive electronics manufacturing ecosystem.

Promote Indian Brands

- Encourage Indian companies to move beyond assembly into product design, innovation and patent creation.

Enhance Technological Self-Reliance

- Support indigenous R&D and intellectual property development to strengthen India's technological sovereignty.

Expected Outcomes

Higher Production

- Mobile phone production is expected to reach approximately **₹39 lakh crore** during the scheme period.

Export Growth

- The scheme aims to significantly increase mobile phone exports and improve India's integration into global electronics value chains.

Employment Generation

- Around **60,000 direct jobs** are expected to be created, boosting industrial employment.

Global Manufacturing Leadership

- MPMS is expected to further establish India as a major global manufacturing and export hub for mobile phones.

Current Status of India's Electronics Manufacturing

Policy Background

- MPMS succeeds the **Production Linked Incentive (PLI) Scheme for Large Scale Electronics Manufacturing (PLI-LSEM)**, which significantly boosted India's electronics manufacturing before concluding in March 2026.

Rapid Growth in Electronics Production

- Electronics production expanded from **₹1.90 lakh crore (2014–15)** to an estimated **₹13.11 lakh crore (2025–26)**, representing nearly seven-fold growth.

Strong Export Performance

- Electronics exports increased from **₹38,263 crore** to **₹4.24 lakh crore**, recording almost an eleven-fold rise.

Growing Export Importance

- Electronic goods have become India's **third-largest export category**, with exports reaching nearly **USD 48 billion** in FY 2025–26.

Improved Domestic Value Addition

- Local value addition has increased from **15% to 23%**, indicating stronger domestic manufacturing capabilities.

Expansion of Component Manufacturing

- More than **40 major component manufacturers** have established or expanded operations in India, supported by an expanding supplier ecosystem.

Mobile Phone Manufacturing: India's Growth Engine

Leading Role in Electronics

- Mobile phone manufacturing has become the backbone of India's electronics industry, driving production and export growth.

Global Position

- India is now the **world's second-largest mobile phone manufacturer by volume**, with **99.2%** of phones used domestically being manufactured within the country.

Production Growth

- Mobile phone production increased from **₹18,900 crore** in 2014–15 to **₹6.27 lakh crore** in 2025–26, representing more than a thirty-fold increase.

Export Growth

- Mobile phone exports rose dramatically from **₹1,566 crore** to **₹2.60 lakh crore**, making them one of India's fastest-growing export sectors.

Largest Export Product

- Mobile phones have emerged as **India's largest export product**, replacing several traditional export commodities.

Smartphone Export Milestone

- In **2025**, smartphones became India's single-largest exported product category, surpassing exports such as diesel fuel and cut diamonds.

Women in Electronics Manufacturing

Growing Workforce Participation

- Women account for nearly **30%** of the total workforce employed in India's electronics manufacturing sector.

Major Role in Mobile Manufacturing

- Nearly **70%** of the direct workforce in mobile phone manufacturing consists of women, making it one of India's most women-intensive manufacturing industries.

Employment through PLI

- The PLI Scheme for Large Scale Electronics Manufacturing has created employment opportunities for approximately **90,000 women**.

Socio-Economic Impact

- The sector is promoting safe, skilled and formal employment opportunities, contributing to women's financial independence and economic empowerment.

Conclusion

The **Mobile Phone Manufacturing Scheme (MPMS)** represents the next phase of India's electronics manufacturing strategy. By encouraging higher domestic value addition, supporting Indian innovation, strengthening supply chains and promoting exports, the scheme seeks to transform India from a major manufacturing destination into a global leader in mobile technology, while generating employment and advancing the vision of **Atmanirbhar Bharat**.

Index of Core Industries (ICI)

Why in News?

- The **Office of Economic Adviser (OEA)** under the **Department for Promotion of Industry and Internal Trade (DPIIT)**, Ministry of Commerce & Industry, released the **first provisional Index of Core Industries (ICI)** based on the new **2022–23 base year**.
- The revised series replaces the **2011–12 base year** and has been implemented retrospectively from **April 2023**, with a back series released for comparison.

What is the Index of Core Industries (ICI)?

About

- The **Index of Core Industries (ICI)** is a monthly indicator that tracks the production performance of India's key infrastructure industries.

- It provides an early assessment of industrial activity and reflects the health of sectors that support the broader economy.
- The provisional ICI is generally released on the **20th of the following month** (or the next working day).

Relation with IIP

- Core industries form the backbone of industrial production and significantly influence the **Index of Industrial Production (IIP)**.
- Under the revised **2022–23 base year**, the combined weight of core industries in the IIP is **32.88%**, compared to **40.27%** under the previous series.

Major Changes in the New ICI Series (Base Year 2022–23)

Addition of Iron Ore

- The number of core industries has increased from **eight to nine** with the inclusion of **Iron Ore**.
- Iron ore has been added due to its crucial role in **steel production** and industrial development.

The Nine Core Industries

- Coal
- Crude Oil
- Natural Gas
- Refinery Products
- Fertilisers
- Steel
- Cement
- Electricity
- Iron Ore

Methodological Improvements

Steel

- The Steel Index will now use **Gross Production Data** instead of Net Production Data to align with the revised IIP methodology.

Coal

- Only **Raw Coal** has been retained.
- **Coal Middlings** and **Washed Coal** have been removed to avoid double counting.

Revised Sectoral Weights

Industry	Weight (%)
Electricity	30.93
Refinery Products	22.57
Steel	17.58
Crude Oil	7.43
Coal	5.59
Iron Ore	4.90
Cement	4.41
Natural Gas	3.84
Fertilisers	2.73

Introduction of Linking Factor

- A **Linking Factor** has been introduced to ensure comparability between the old and new series.

Formula:

Linking Factor = (Geometric Mean of old ICI for 2022–23) ÷ (Geometric Mean of new ICI for 2022–23)

- The overall **Linking Factor** is **1.47**.

Key Highlights of ICI (June 2026)

- The **Index of Core Industries** recorded **5.0% year-on-year (YoY) growth** in **June 2026**, compared to **3.2%** in **May 2026**.

Sectors Showing Positive Growth

- **Iron Ore: 43.9%**
- **Electricity: 9.8%**
- **Cement: 9.8%**
- **Steel: 4.6%**
- **Coal: 1.4%**

Sectors Showing Negative Growth

- Natural Gas
- Crude Oil
- Refinery Products
- Fertilisers

Major Growth Drivers

- **Iron Ore** and **Electricity** emerged as the biggest contributors to overall industrial growth.

Quarterly Performance

- During **April–June 2026**, cumulative ICI growth stood at **3.6%**, compared to **1.0%** during the same period in the previous year.

Difference Between ICI and IIP

Basis	Index of Core Industries (ICI)	Index of Industrial Production (IIP)
Purpose	Measures production of key infrastructure industries.	Measures overall industrial production.
Compiling Agency	Office of Economic Adviser (OEA), DPIIT, Ministry of Commerce & Industry	National Statistical Office (NSO), Ministry of Statistics & Programme Implementation (MoSPI)
Coverage	9 Core Industries	Manufacturing, Mining and Electricity sectors covering hundreds of industrial products
Relationship	Acts as a leading indicator and forms a subset of the IIP.	Comprehensive indicator of industrial production.
Importance	Assesses the health of infrastructure sectors and identifies supply-side bottlenecks.	Used by the Government and RBI for policy formulation and monitoring industrial growth.

WTO Agreement on Fisheries Subsidies (AFS)



Why in News?

- India has deposited its **Instrument of Acceptance** for the **WTO Agreement on Fisheries Subsidies (AFS)**, becoming the **123rd WTO member** to formally accept the agreement.

What is the WTO Agreement on Fisheries Subsidies (AFS)?

About

- The **Agreement on Fisheries Subsidies (AFS)** was adopted by consensus during the **12th**

WTO Ministerial Conference (MC12) held in Geneva in June 2022.

- It is the **first multilateral WTO agreement** focused primarily on **environmental sustainability**.
- The agreement came into force on **15 September 2025**, after receiving acceptance from **two-thirds of WTO members**.

Scope of the Agreement

Coverage

The agreement applies only to:

- Marine wild capture fisheries.
- Fishing-related activities carried out at sea.

Excluded Activities

The agreement **does not cover**:

- Aquaculture (fish farming).
- Inland fisheries such as rivers, lakes and reservoirs.

Key Provisions of the Agreement

Ban on Harmful Subsidies

The agreement prohibits government subsidies that support:

- Illegal, Unreported and Unregulated (IUU) fishing**.
- Fishing of **overfished fish stocks**.

Its objective is to discourage unsustainable fishing practices and conserve marine resources.

Global Concern

- According to the WTO, nearly **37.7% of global marine fish stocks** are currently overfished, compared to about **10% in 1974**.
- Around **USD 35 billion** is provided annually as fisheries subsidies worldwide, a large share of which supports industrial-scale fishing fleets and contributes to overexploitation.

Significance for India

Protection of Small-Scale Fishers

- By limiting excessive subsidies to large industrial fishing fleets, the agreement creates a more balanced and fair international fishing environment.
- This helps safeguard the livelihoods, employment and food security of India's traditional and small-scale coastal fishing communities.

No Impact on Aquaculture Exports

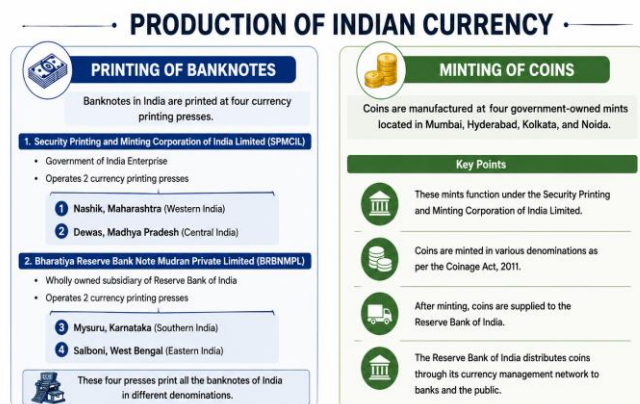
- Since aquaculture is excluded from the agreement, India's shrimp farming industry and other aquaculture-based seafood exports remain unaffected.
- This also strengthens India's image as a supplier of sustainably produced seafood in global markets.

Alignment with India's Domestic Policies

India is already implementing several measures that complement the objectives of the agreement, including:

- **Sustainable Harnessing of Fisheries in the Exclusive Economic Zone (EEZ) Rules, 2025.**
- **Guidelines for Sustainable Harnessing of Fisheries in the High Seas by Indian-Flagged Fishing Vessels, 2025.**
- Capacity-building, infrastructure development and welfare initiatives under the **Pradhan Mantri Matsya Sampada Yojana (PMMSY).**

Polymer Currency Notes



Why in News?

- The **Reserve Bank of India (RBI)** is reviving its long-pending proposal to introduce **polymer (plastic) currency notes**.
- **Bharatiya Reserve Bank Note Mudran Pvt. Ltd. (BRBNMPL)** has invited global bids for **Biaxially Oriented Polypropylene (BOPP)-based polymer substrate**, indicating progress towards a pilot project.
- The initial rollout is expected to begin with **₹10 and ₹20 denomination notes**.

What are Polymer Currency Notes?

About

- Polymer banknotes are made from **Biaxially Oriented Polypropylene (BOPP)** instead of the conventional **100% cotton-based paper** used in Indian currency.
- They are:
 - More durable.
 - Water-resistant.
 - Tear-resistant.
 - Harder to counterfeit because of advanced security features such as **transparent windows** and embedded security elements.

Global Adoption

- More than **60 countries** have adopted polymer banknotes in full or in part.
- **Australia** became the first country to introduce a complete polymer banknote series in **1988**.
- Polymer notes generally remain in circulation **2.5–4 times longer** than paper notes.

Why is India Considering Polymer Notes?

High Cost of Replacing Paper Notes

- India spends nearly **₹5,000 crore every year** replacing damaged and soiled currency.
- Around **20–24 billion notes** become unfit for circulation annually under the **RBI's Clean Note Policy**.

Frequent Wear of Lower Denominations

- Lower-value notes such as **₹10 and ₹20** experience heavy circulation and deteriorate much faster than higher denominations.

Longer Lifespan

- Polymer notes have a significantly longer life, reducing replacement frequency and overall lifecycle expenditure.

Better Security

- Advanced security features make polymer notes more resistant to **counterfeiting and tampering**.

Environmental Perspective

- A study by **TERI**, commissioned by the RBI, found that although polymer notes have a **higher initial carbon footprint**, their longer lifespan results in a **lower overall lifecycle environmental impact** because fewer notes need to be produced, transported and replaced.

Timeline of Polymer Currency in India

- **2009:** RBI proposed issuing **100 crore ₹10 polymer notes**.
- **2012:** The Government approved a pilot project in **Kochi, Mysuru, Jaipur, Bhubaneswar and Shimla**, selected to represent different climatic conditions.
- The proposal was later suspended due to **technological challenges** and subsequently remained inactive after **demonetisation in 2016**.
- **2026:** BRBNMPL revived the initiative by inviting global bids for polymer substrates.

Challenges Associated with Polymer Notes

Higher Manufacturing Cost

- Polymer banknotes cost **30–60% more** to manufacture than paper notes.
- For lower denominations, production expenses may reach **20–24% of the note's face value**, raising concerns about economic viability.

Dependence on Imported Raw Material

- Polymer notes require **polypropylene**, whose prices fluctuate with global crude oil markets.
- India imports nearly **20% of its polypropylene requirement**, creating supply-chain dependence.

Infrastructure Upgradation

- Introducing polymer currency would require modifications to:
 - ATMs.
 - Currency sorting machines.
 - Vending machines.
 - Banknote processing equipment.
- These changes would involve substantial implementation costs.

Environmental Concerns

- Polymer notes require specialised recycling facilities and appropriate plastic waste management systems.

Growth of Digital Payments

- The proposal comes despite rapid digitalisation.
- **UPI** now processes over **24,000 crore transactions annually** and accounts for nearly **85% of India's retail digital payments**.

Why Physical Currency Still Matters

- Despite digital payment growth, **currency in circulation** has increased from around **₹16–17 lakh crore** a decade ago to **over ₹41 lakh crore (2025–26)**.
- This reflects the RBI's "**currency demand paradox**", where cash demand continues to rise alongside digital payments.

Cash remains essential for:

- The informal economy.
- Rural and remote regions with limited internet connectivity.
- Small traders and street vendors.
- Emergency situations such as natural disasters, power failures and network disruptions.
- Therefore, India's payment ecosystem requires the **coexistence of both physical currency and digital payment systems** rather than treating them as substitutes.

RBI's Clean Note Policy

About

- Introduced in **1999** to maintain the circulation of **clean and good-quality currency notes** while systematically removing damaged and soiled notes.

Objectives

- Improve the quality and lifespan of currency.
- Enhance public convenience.
- Maintain confidence in India's currency system.

Major Measures

- Banks must issue only **clean currency notes**.

- Soiled and mutilated notes can be exchanged at **currency chest branches**, even by non-customers.
- Stapling of currency bundles has been discontinued and replaced with **paper or polythene bands**.
- RBI uses **Currency Verification and Processing Systems (CVPS)** to verify, sort and destroy unfit notes.
- Banks are encouraged to ensure adequate availability of coins and organise currency exchange facilities, especially in rural and semi-urban areas.

Currency Management in India

Constitutional and Legal Framework

- The **Union List** of the Constitution places **currency, coinage, legal tender and foreign exchange** under the exclusive jurisdiction of the Union Government.
- The **Reserve Bank of India Act, 1934** governs the issuance and management of banknotes.
- The **Coinage Act, 2011** regulates the design, minting and circulation of coins.

Role of RBI

The RBI is responsible for:

- Issuing banknotes.
- Assessing currency demand.
- Maintaining adequate currency supply.
- Ensuring circulation of clean and good-quality notes.
- Distributing coins supplied by the Government.

Role of the Government of India

The Government:

- Issues the **₹ 1 note**.
- Designs and mints coins.
- Approves the design and material of banknotes based on RBI recommendations.
- Provides the **sovereign guarantee** for all banknotes issued by the Reserve Bank of India.



EDITORIALS

Crux of The Hindu & Indian Express

Economics

Nine Years of Goods and Services Tax (GST): India's Journey Towards a Simpler, Digital and Unified Tax System



Why in News?

- The **Goods and Services Tax (GST)** has completed **nine years** since its nationwide rollout on **1 July 2017**.
- It marks one of the most significant indirect tax reforms in independent India.
- Over the years, GST has transformed India's taxation landscape by creating a unified national market, expanding the tax base, strengthening cooperative federalism, and promoting digital tax administration.
- The recently introduced **Next-Generation GST (GST 2.0) Reforms**, effective from **22 September 2025**.
- It has further simplified the tax structure, reduced compliance burdens, rationalised tax rates, and enhanced support for households, MSMEs, businesses, and India's long-term economic growth.

Goods and Services Tax (GST): An Overview

- The **Goods and Services Tax (GST)** is a comprehensive **destination-based, value-added indirect tax** levied on the supply of goods and services.
- It replaced India's fragmented system of multiple Central and State indirect taxes with

a **single unified taxation framework** based on the principle of **"One Nation, One Tax."**

- GST has become one of India's most important post-Independence economic reforms by improving tax transparency, reducing cascading taxation, encouraging formalisation of the economy, and facilitating seamless interstate trade.

Constitutional Background

Timeline		
2006-07: The govt moots a proposal for GST in the Budget; negotiations with states begin	Aug 2013: The Parliamentary Standing Committee submits its report, the govt incorporates recommendations of the committee in the Bill	capping GST rate at 18%, and specifying the same in the Constitution Amendment Bill
2008: The govt. constitutes the empowered committee (EC) of state finance ministers	Sep. 2013: Revised bill sent to the empowered committee	July 2016: The Centre and states agree against capping GST rate in the Constitution Amendment Bill
2009: The committee releases its first discussion paper	Dec 2014: The Constitution Amendment Bill introduced in the LS	Aug 2016: Rajya Sabha passes Constitution Amendment Bill
2011: The UPA govt. introduces the Constitution Amendment Bill for GST in Lok Sabha (LS)	May 2015: LS passes the Bill	Industry hails reforms, says will make doing business easier
	August 2015: Congress insists on	

- GST was introduced through the **101st Constitutional Amendment Act, 2016**, which provided the constitutional framework for implementing a unified indirect tax regime across India.
- The amendment empowered both the **Union Government** and **State Governments** to levy GST concurrently while establishing the **GST Council** as the apex decision-making body for GST-related matters.

Taxes Subsumed under GST

- GST replaced numerous indirect taxes previously levied by the Centre and States.

Central Taxes Subsumed

- Central Excise Duty
- Additional Excise Duties
- Service Tax
- Additional Customs Duties (CVD)
- Special Additional Duty (SAD)

State Taxes Subsumed

- Value Added Tax (VAT)
- Central Sales Tax (CST)
- Entry Tax
- Luxury Tax
- Entertainment Tax
- Purchase Tax
- Advertisement Tax
- Various State Cesses and Surcharges

Overall, GST subsumed:

- **17 indirect taxes**
- **13 cesses**

thereby significantly reducing tax fragmentation and cascading effects.

Major Achievements of GST over the Past Nine Years

1. Creation of a Common National Market

One of the most significant achievements of GST has been the establishment of an integrated domestic market.

By replacing multiple indirect taxes with a unified framework, GST has:

- Eliminated tax barriers across States.
- Reduced cascading taxation.
- Lowered logistics and compliance costs.
- Improved ease of doing business.
- Enhanced supply chain efficiency.

This has strengthened India's vision of **"One Nation, One Tax, One Market."**

2. Expansion of the Taxpayer Base

GST has significantly expanded India's formal tax base.

Growth in Registered Taxpayers

Year	Registered Taxpayers
2017	66.5 lakh
May 2026	1.65 crore

The sharp increase reflects:

- Greater formalisation of businesses.
- Wider tax compliance.
- Increased digital registration.

3. Strong Growth in GST Revenue

- GST collections have shown sustained growth over the years.

Gross GST Collections

Financial Year	Collection
2017–18	₹7.4 lakh crore
2021–22	₹13.76 lakh crore
2025–26	₹22.27 lakh crore

The steady rise reflects improved compliance, economic expansion, and increased consumption.

4. High-Frequency Economic Indicator

GST collections have evolved into one of India's most important indicators of:

- Consumption demand

- Business activity
- Trade performance
- Economic formalisation
- Tax compliance

During **April–May 2026**, GST collections reached: **₹ 4.37 lakh crore** indicating continued economic momentum.

5. Strengthening Cooperative Federalism

The **GST Council** has emerged as one of India's most successful examples of cooperative federalism.

It provides a common platform where:

- The Union Government
- State Governments
- Union Territories

jointly decide GST policies through consensus.

Regular Council meetings have enabled:

- Timely rate rationalisation.
- Resolution of implementation challenges.
- Continuous policy improvements.

6. Digital Transformation of Tax Administration

GST has revolutionised tax administration through technology.

The **Goods and Services Tax Network (GSTN)** provides a common digital platform for:

- Registration
- Return filing
- Tax payments
- Refund processing
- Invoice matching

Major technological innovations include:

- E-invoicing
- Pre-filled returns
- Real-time validation
- Digital reconciliation
- Automated compliance

These measures have improved transparency while reducing manual errors.

7. Ease of Compliance for Small Taxpayers

Several reforms have simplified GST compliance for MSMEs and small businesses.

Major measures include:

- Higher exemption thresholds.
- Composition Scheme.

- Quarterly Return Monthly Payment (QRMP).
- NIL return filing through SMS.
- Faster registration for low-risk taxpayers.

These reforms have reduced compliance costs for smaller enterprises.

Key Features of Goods and Services Tax (GST)

1. Supply-Based Taxation

- Unlike the earlier tax regime, where taxes were levied separately on manufacture, sale, or provision of services, GST taxes the **supply of goods and services**.
- This creates a unified taxation system across the entire value chain.

2. Destination-Based Taxation

GST follows the **destination principle**, meaning:

- Tax revenue accrues to the State where goods or services are consumed rather than where they are produced.

This has replaced the earlier origin-based taxation system.

3. Value-Added Tax

- GST is levied only on the **value addition** at each stage of production and distribution.
- The **Input Tax Credit (ITC)** mechanism prevents cascading taxation by allowing businesses to offset taxes paid on inputs against output tax liability.

4. Dual GST Model

India follows a **dual GST structure**, under which:

- **Central GST (CGST)** is levied by the Union Government.
- **State GST (SGST)** is levied by State Governments.
- **Integrated GST (IGST)** applies to interstate supplies and imports.

This ensures concurrent taxation while preserving fiscal federalism.

5. Rate Structure after GST 2.0

The **Next-Generation GST Reforms (GST 2.0)** have simplified the rate structure.

The system now primarily consists of:

GST Rate	Coverage
5%	Essential goods and services
18%	Standard rate
40%	Luxury and sin goods

The streamlined structure makes GST simpler and more predictable.

Governance Structure

GST Council

The GST Council is the apex constitutional body responsible for:

- Tax rate recommendations.
- Exemptions.
- Threshold limits.
- Policy reforms.
- Administrative coordination.

It embodies the principle of cooperative federalism.

Goods and Services Tax Network (GSTN)

GSTN is the technology backbone of GST.

Its functions include:

- Online registration.
- Return filing.
- Invoice matching.
- Payment processing.
- Data analytics.
- Compliance monitoring.

Next-Generation GST Reforms (GST 2.0)

Background

- The **56th GST Council Meeting** approved a comprehensive package of reforms known as **GST 2.0**, which came into effect from **22 September 2025**.

The reforms seek to:

- Simplify GST.
- Reduce compliance burden.
- Improve taxpayer experience.
- Promote economic growth.

1. Simplified Tax Structure

GST 2.0 rationalised tax rates into:

- **5%**
- **18%**

along with a **40% rate** for luxury and demerit goods. This reduces complexity and classification disputes.

2. Higher Tax on Luxury and Sin Goods

A **40% GST rate** now applies to selected luxury and sin goods, including:

- Lottery and online gaming.
- Tobacco products.
- Aerated beverages.
- Luxury automobiles.
- Yachts.
- Private aircraft.

The objective is to maintain revenue neutrality while ensuring equity in taxation.

3. Relief for Households

Lower GST rates and exemptions have reduced the cost of essential goods and services.

Additional relief includes:

- GST exemptions on certain insurance products.
- Lower taxation on essential medicines.

These measures improve household affordability and financial security.

4. Support for MSMEs and Industry

GST 2.0 lowers tax rates on several key industrial inputs such as:

- Cement.
- Handicrafts.

Benefits include:

- Lower production costs.
- Increased competitiveness.
- Support for artisans and manufacturers.
- Promotion of domestic manufacturing.

5. Correction of Inverted Duty Structure

The reforms seek to reduce situations where:

- Input tax rates exceed output tax rates.

Correcting inverted duty structures helps:

- Improve working capital.
- Reduce refund dependence.
- Promote domestic value addition.

6. Easier Compliance

GST 2.0 further simplifies:

- Registration.
- Return filing.

- Refund processing.
- Documentation requirements.

These reforms particularly benefit:

- MSMEs.
- Startups.
- Small taxpayers.

7. Data-Driven Tax Administration

GST now increasingly relies on:

- Artificial Intelligence (AI).
- Machine Learning (ML).
- Data analytics.
- E-invoicing.
- Real-time validation.

These technologies improve compliance, reduce fraud, and strengthen tax administration.

Challenges in the Current GST Framework

Despite significant progress, several challenges remain.

1. Exclusion of Key Commodities

Certain products remain outside the GST framework, including:

- Alcohol for human consumption.
- Five petroleum products.

This limits seamless Input Tax Credit (ITC) and results in continued tax cascading.

Bringing these items under GST remains politically sensitive due to States' revenue dependence.

2. Classification Disputes

Although GST 2.0 has simplified the rate structure, disputes continue regarding:

- Product classification.
- Exemptions.
- Special categories.
- Interpretation of applicable rates.

These disputes create uncertainty for businesses.

3. Operationalisation of GST Appellate Tribunal

The GST Appellate Tribunal has been established to provide an independent dispute resolution mechanism.

However:

- Delays in appointments.
- Infrastructure constraints.

Transitional challenges have slowed its full operationalisation.

4. Compliance Burden on MSMEs

Despite digital reforms, small businesses continue to face challenges related to:

- Frequent notifications.
- Return filing.
- Invoice reconciliation.
- Procedural changes.

Continuous capacity building remains essential.

5. Inverted Duty Structure

Certain sectors still experience:

- Higher tax on inputs than outputs.
- Delayed refunds.
- Liquidity constraints.

This affects competitiveness and working capital management.

6. Centre–State Revenue Issues

GST depends on strong cooperative federalism.

Differences regarding:

- Rate rationalisation.
- Compensation.
- Revenue sharing.
- Exemptions

may slow future reforms.

Way Forward: Reforms to Further Strengthen GST

1. Gradual Inclusion of Excluded Items

- A phased inclusion of petroleum products—beginning with **Natural Gas** and **Aviation Turbine Fuel (ATF)**—could expand the GST base while minimising revenue shocks.
- Since **alcohol for human consumption** is constitutionally outside GST, any future reform would require broad political consensus and adequate fiscal safeguards for States.

2. Further Rate Rationalisation

Following GST 2.0, future reforms should focus on:

- Reducing residual classification disputes.
- Reviewing exemptions.
- Eliminating remaining inverted duty structures.

3. Faster Refund Processing

Refund mechanisms should become:

- Faster.
- More predictable.
- Fully digital.

This would particularly benefit exporters and sectors facing working-capital pressures.

4. Strengthening Dispute Resolution

The GST Appellate Tribunal should become fully operational through:

- Timely appointments.
- Adequate infrastructure.
- Binding clarificatory circulars.
- Limited amnesty for procedural lapses.

These measures would reduce litigation and improve certainty.

5. Preparing GST for Emerging Sectors

Future GST reforms should establish clear taxation frameworks for:

- Digital goods and services.
- Crypto-assets.
- Carbon credits.
- Artificial intelligence-related services.
- Other emerging sectors.

This would align India's tax system with evolving global practices.

Conclusion

The completion of nine years of GST marks a significant milestone in India's tax reform journey. The introduction of **Next-Generation GST (GST 2.0)** demonstrates the Government's commitment to making the indirect tax system simpler, more transparent, technology-driven, and taxpayer-friendly. Going forward, broadening the tax base, completing the operationalisation of dispute-resolution mechanisms, further rationalising tax rates, strengthening digital governance, and addressing remaining structural challenges will be essential to realise the full potential of GST. These reforms will not only improve tax efficiency but also support investment, manufacturing, exports, and inclusive economic growth, contributing to the broader vision of **Viksit Bharat 2047**.

India Strengthens Global Leadership in Food Standards at the 49th Session of the Codex Alimentarius Commission (CAC49)



Why in News?

- India achieved significant milestones at the **49th Session of the Codex Alimentarius Commission (CAC49)** held in **Geneva, Switzerland (6–10 July 2026)**.
- The Commission adopted **seven Codex standards and guidelines** developed under India's **chairmanship and co-chairmanship**.
- India also secured approval for the development of a **Codex Standard for Cashew Kernels**.
- Further, India was elected **Co-Chair of the Electronic Working Group on New Food Sources and Production Systems (NFPS)**, highlighting its growing leadership in global food governance.

Key Highlights

- Seven India-led Codex standards and guidelines adopted.
- Codex Standards adopted for:
 - Dried Coriander Seeds
 - Fresh Curry Leaves
- Five additional Codex texts adopted under India's co-chairmanship.
- India's proposal to develop a **Codex Standard for Cashew Kernels** approved.

- India elected **Co-Chair** of the Electronic Working Group on **New Food Sources and Production Systems (NFPS)**.
- Strengthens India's contribution to science-based international food standards and global food trade.

Indian Delegation

Led by

- **Rajit Punhani**
 - Chief Executive Officer (CEO), **Food Safety and Standards Authority of India (FSSAI)**

Members

- Officials from:
 - Food Safety and Standards Authority of India (FSSAI)
 - Spices Board India

What is the Codex Alimentarius Commission (CAC)?

- The **Codex Alimentarius Commission (CAC)** is the **international food standards-setting body**, established jointly by:
 - Food and Agriculture Organization (FAO)
 - World Health Organization (WHO)

Established

- **1963**

Meaning of Codex Alimentarius

- Latin term meaning:
 - **"Food Code" or "Food Book"**

Headquarters

- Rome, Italy (*Hosted by FAO*)

Objectives of the Codex Alimentarius Commission

The Commission seeks to:

- Protect consumer health.
- Ensure fair practices in international food trade.
- Develop science-based food standards.
- Harmonize food regulations across countries.
- Facilitate global food trade.
- Reduce technical barriers to trade.

Functions of CAC

The Commission develops international:

- Food standards.
- Codes of practice.
- Food safety guidelines.
- Food labelling standards.
- Food hygiene standards.
- Maximum Residue Limits (MRLs) for pesticides and veterinary drugs.
- Standards for food additives and contaminants.

Importance of Codex Standards

International Food Benchmark

Codex standards provide globally accepted benchmarks for:

- Food quality.
- Food safety.
- Consumer protection.
- International trade.

Recognition under WTO

The **World Trade Organization (WTO)** recognizes Codex standards under the:

- **Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures.**

This helps:

- Reduce trade disputes.
- Harmonize food regulations.
- Facilitate exports and imports.

India's Major Achievements at CAC49

1. Adoption of Seven India-Led Codex Texts

A. Codex Standard for Dried Coriander Seeds

Significance

- Establishes internationally harmonized quality standards.
- Facilitates trade in one of the world's most widely traded spices.
- Improves product quality and market acceptance.
- Benefits Indian spice exporters.

B. Codex Standard for Fresh Curry Leaves

Significance

- Provides an international quality benchmark.
- Enhances export opportunities.

- Promotes global recognition of an important Indian culinary herb.
- Supports consumer confidence.

2. Adoption of Five Codex Texts under India's Co-Chairmanship

(i) Codex Standard for Vanilla

- Harmonizes international quality requirements.
- Facilitates global trade.

(ii) Codex Standard for Large Cardamom

- Establishes common quality standards.
- Benefits spice-producing and exporting countries.

(iii) Annexes to Guidelines for the Safe Use and Reuse of Water in Food Production and Processing

Objective

- Promote sustainable water management.
- Ensure food safety.
- Encourage efficient resource utilization.

(iv) Guidelines for the Control of Campylobacter and Salmonella in Chicken Meat

Purpose

Strengthen measures to reduce food-borne illnesses caused by:

- Campylobacter
- Salmonella

(v) Food Labelling Provisions

The Commission adopted provisions relating to:

- Joint presentation of food products.
- Multipack formats.
- General Standard for the Labelling of Prepackaged Foods.

Benefits

- Uniform labelling practices.
- Better consumer information.
- Greater transparency.

Approval for Codex Standard on Cashew Kernels

India's Proposal Accepted

- The Commission approved India's proposal to initiate work on a:
 - **Codex Standard for Cashew Kernels**

- under the:

- **Codex Committee on Processed Fruits and Vegetables (CCPFV).**

Why is this Important?

Cashew is among the world's most traded tree nuts.

A Codex standard will:

- Harmonize international quality requirements.
- Improve food safety.
- Facilitate fair trade.
- Reduce technical barriers to trade.
- Enhance export competitiveness.
- Improve market access for Indian cashew exports.

Benefits for India

India is a major:

- Producer.
- Processor.
- Exporter of cashew kernels.

The proposed standard will:

- Increase export opportunities.
- Strengthen India's position in the global cashew market.
- Improve farmer incomes.
- Promote value-added agricultural exports.

India Elected Co-Chair of NFPS Working Group

What is NFPS?

- **NFPS = New Food Sources and Production Systems**

Role of the Electronic Working Group

The Working Group will:

- Review existing regulatory frameworks.
- Identify gaps in Codex risk analysis principles.
- Examine emerging food production systems.
- Recommend future Codex guidance.

Importance

The Working Group will help develop international guidance on emerging food technologies such as:

- Alternative proteins.
- Cultured meat.
- Precision fermentation.
- Novel food ingredients.
- Future food production systems.

Role of FSSAI

- **Food Safety and Standards Authority of India (FSSAI)**

Established

- **2008**

Parent Ministry

- Ministry of Health & Family Welfare

Legal Basis

- Food Safety and Standards Act, 2006

Functions

FSSAI is responsible for:

- Regulating food safety.
- Framing food standards.
- Licensing food businesses.
- Monitoring food quality.
- Consumer awareness.
- Representing India in Codex meetings.

Challenges

- Harmonizing domestic standards with Codex requirements.
- Compliance costs for MSMEs.
- Strengthening food testing infrastructure.
- Capacity building for exporters.
- Regulating emerging food technologies.
- Ensuring effective implementation of standards.

Way Forward

- **Strengthen Food Safety Infrastructure**
- **Promote Science-Based Regulation**
- **Support Exporters**
- **Deepen International Cooperation**
- **Leverage India's Leadership**

IAMAI Launches E-Commerce Council of India (ECCI) to Strengthen India's Digital Commerce Ecosystem



1. Context

- The **Internet and Mobile Association of India (IAMAI)** launched the **E-Commerce Council of India (ECCI)** on **17 July 2026**.
- The ECCI is the first national platform established to bring together stakeholders across India's **\$120 billion digital commerce ecosystem**.
- The initiative aims to promote collaboration between industry participants and the government to support the sustainable growth of India's digital economy.

2. About the E-Commerce Council of India (ECCI)

- The ECCI has been established as a collaborative platform to strengthen India's digital commerce ecosystem through policy advocacy, research, and stakeholder engagement.
- It will facilitate dialogue between industry participants and policymakers on issues affecting the digital commerce sector.
- The Council will promote evidence-based policymaking by generating research, developing industry best practices, and contributing to regulatory discussions.
- The initiative seeks to ensure that India's digital commerce sector remains innovative, trusted, and globally competitive.

3. Objectives of ECCI

- To provide a common platform for digital commerce stakeholders to engage with policymakers.
- To promote research and knowledge-sharing on emerging issues in the digital commerce sector.
- To develop industry-wide best practices that improve transparency, efficiency, and consumer trust.
- To strengthen policy advocacy by presenting a unified industry perspective on regulatory matters.
- To create a conducive business environment that supports innovation, investment, and sustainable growth.

4. Key Highlights

- IAMAI President **Subho Ray** stated that digital commerce has emerged as one of the most important pillars of India's digital economy.
- He emphasized that the future growth of the sector will depend on continuous collaboration between the government and industry.
- Economist **Laveesh Bhandari**, while delivering the keynote address, highlighted that innovation alone would not be sufficient and that greater collaboration among stakeholders would be essential for the sector's next phase of growth.
- IAMAI stressed the need for the industry to speak with a unified voice on major policy issues to facilitate informed policymaking and regulatory certainty.

5. Stakeholders Included

The ECCI seeks to bring together a wide range of stakeholders, including:

- Policymakers and government agencies.
- E-commerce marketplaces and online retailers.
- Brands and Direct-to-Consumer (D2C) companies.
- Logistics and supply chain service providers.

- Technology companies and digital payment solution providers.
- Startups, exporters, and MSMEs.
- Industry experts and academic institutions.

6. Major Companies Expected to Participate

The Council is expected to include leading digital commerce companies such as:

- Amazon
- Flipkart
- Swiggy
- Eternal
- IndiaMART
- MakeMyTrip
- Ixigo
- Uber
- Rapido
- Shiprocket
- Transport Corporation of India Limited (TCIL)
- eBay
- Meesho
- Tata 1mg

7. Significance

- The ECCI is expected to improve coordination between the government and the digital commerce industry.
- It will promote regulatory certainty through structured policy dialogue.
- The initiative will strengthen consumer trust by encouraging responsible business practices.
- It will improve the ease of doing business for digital commerce enterprises.
- The Council is expected to support innovation, entrepreneurship, and investment in India's digital economy.
- It will help MSMEs and exporters integrate more effectively into domestic and global digital markets.
- The initiative aligns with India's vision of becoming a global digital economy and expanding its digital public infrastructure.

8. India's Digital Commerce Ecosystem

- India's digital commerce sector has evolved beyond traditional online retail.
- It now includes online marketplaces, mobility services, travel technology, logistics, digital payments, supply chain management, Direct-to-Consumer (D2C) brands, cross-border trade, exporters, and AI-powered commerce.
- The sector has become a significant contributor to employment generation, innovation, and economic growth.

9. Challenges

- Rapid technological changes require continuous policy adaptation.
- Regulatory uncertainty may affect long-term investments.
- Ensuring consumer protection and data privacy remains a key challenge.
- Balancing innovation with fair competition requires effective regulatory frameworks.
- Small businesses and MSMEs need greater digital capacity and infrastructure to fully benefit from digital commerce.

10. Way Forward

- Regular dialogue between industry and government should be institutionalized through platforms such as the ECCI.
- Evidence-based policymaking should be encouraged through research and stakeholder consultations.
- Consumer protection frameworks should be strengthened while promoting innovation.
- Greater support should be provided to MSMEs to improve digital adoption and market access.
- Policies should encourage responsible AI adoption, cross-border digital trade, and global competitiveness.

Prime Minister Inaugurates 75 Redeveloped Railway Stations under the Amrit Bharat Station Scheme (ABSS)



1. Context

- Prime Minister **Narendra Modi** virtually inaugurated **75 redeveloped railway stations** across **20 States** from **Jalandhar, Punjab**.
- The stations have been redeveloped under the **Amrit Bharat Station Scheme (ABSS)**, one of the world's largest railway station modernization programmes.
- The redevelopment aims to improve passenger amenities, enhance connectivity, preserve local heritage, and promote regional economic development.

2. About the Amrit Bharat Station Scheme (ABSS)

- The **Amrit Bharat Station Scheme (ABSS)** is a flagship initiative of the Ministry of Railways for the long-term redevelopment and modernization of railway stations across India.
- The scheme seeks to transform railway stations into modern, accessible, passenger-friendly, and environmentally sustainable transport hubs.
- It focuses on improving station infrastructure while incorporating local culture, heritage, and architectural identity.
- The redevelopment follows the vision of "**Virasat Bhi, Vikas Bhi**", which emphasizes preserving heritage alongside promoting modern development.

3. Key Highlights

- **75 redeveloped railway stations** were inaugurated across **20 States**.
- The stations were redeveloped at a total cost of approximately **₹1,570 crore**.
- The redevelopment includes modern passenger amenities, improved accessibility, upgraded waiting areas, better sanitation facilities, digital services, and enhanced station infrastructure.
- Architectural designs have been customized to reflect the local history, traditions, and cultural heritage of each region.

4. Important Redeveloped Stations

Some of the major redeveloped stations include:

Punjab

- Jalandhar Cantonment
- SAS Nagar (Mohali)
- Sri Muktsar Sahib
- Sri Anandpur Sahib

Gujarat

- Pratapnagar
- Godhra
- Porbandar
- Bhaktinagar

Odisha

- Barpali
- Balangir
- Paralakhemundi
- Talcher
- Kesinga
- Bimalgarh
- Baripada

Southern Railway

- Nine stations under the Southern Railway zone were also redeveloped.

5. New Train Services Flagged Off

The Prime Minister also inaugurated two important railway services:

Kartoli–Ambala Train

- The new train service will strengthen connectivity between **Punjab, Haryana, and Himachal Pradesh**.

- It is expected to improve regional mobility and facilitate economic activity.

Sant Ravidas Express

- The train will operate between **Amritsar (Chheharta)** and **Varanasi**.
- It establishes a direct rail link between two important religious and cultural centres associated with **Guru Ravidas**.

6. Other Infrastructure Projects Inaugurated

- The Prime Minister inaugurated and dedicated **rail and road infrastructure projects worth over ₹5,470 crore** in Jalandhar.
- He inaugurated the **30.9-km Package-6** of the **Delhi–Amritsar–Katra Greenfield Expressway**.
- The projects are aimed at improving transport connectivity, passenger convenience, logistics efficiency, and regional economic growth.

7. India's First Hydrogen-Powered Train

- Prime Minister Modi flagged off **India's first hydrogen-powered passenger train** from **Jind Railway Station in Haryana**.
- The train will operate between **Jind and Sonipat**, covering a distance of **89 kilometres** in approximately **two hours**.
- Hydrogen-powered trains produce significantly lower emissions compared to conventional diesel-powered trains and support India's clean energy transition.

8. Other Development Projects

Haryana

- The Prime Minister laid the foundation stone and dedicated development projects worth around **₹14,700 crore** in **Jind**.

Chandigarh

- Development projects worth over **₹4,700 crore** were launched in sectors including:
 - Healthcare
 - Education
 - Road infrastructure

9. Significance

- The redevelopment of railway stations will significantly improve passenger

experience through better amenities and accessibility.

- Modern railway stations are expected to become integrated transport hubs that support multimodal connectivity.
- Incorporating local architectural elements will help preserve India's cultural heritage while promoting tourism.
- Improved railway infrastructure will enhance regional connectivity, facilitate trade, and stimulate economic growth.
- Hydrogen-powered rail transport supports India's commitments toward clean energy, reduced carbon emissions, and sustainable mobility.
- The projects contribute to the government's vision of modernizing Indian Railways as part of national infrastructure development.

10. Challenges

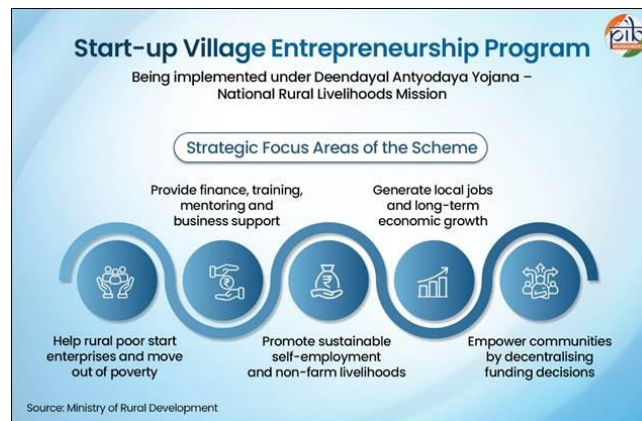
- Maintaining high-quality infrastructure after redevelopment requires continuous funding and efficient management.
- Coordinating large-scale redevelopment projects across multiple states presents administrative challenges.
- Ensuring timely completion of future station redevelopment projects remains essential.
- Adoption of hydrogen technology requires adequate fuel production, storage infrastructure, and skilled workforce.

11. Way Forward

- The Amrit Bharat Station Scheme should be implemented efficiently across all identified railway stations.
- Greater emphasis should be placed on universal accessibility, digital services, and environmentally sustainable infrastructure.
- Renewable energy, green building standards, and smart mobility solutions should be integrated into station redevelopment.
- Expansion of hydrogen-powered and other clean-energy railway technologies should be encouraged to reduce emissions.

- Continuous investment in railway modernization will strengthen India's logistics network and support long-term economic growth.

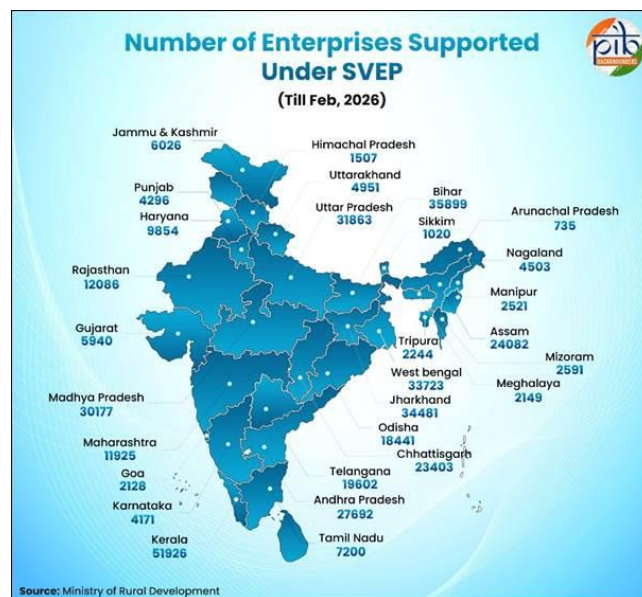
Start-up Village Entrepreneurship Programme (SVEP)



Why in News?

- As of **30 June 2026**, the **Start-up Village Entrepreneurship Programme (SVEP)** has supported **4.32 lakh rural enterprises** across India.
- The programme has emerged as an effective model for **grassroots entrepreneurship, poverty reduction, employment generation and rural economic development**.

Start-up Village Entrepreneurship Programme (SVEP)



About

- **SVEP** was launched in **2016**.

- It is a **sub-scheme** of the **Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM)**.
- The programme promotes **non-farm rural enterprises** by supporting **Self-Help Groups (SHGs)** and their family members in establishing small businesses.
- It provides:
 - Financial assistance.
 - Institutional support.
 - Business management training.
 - Soft skill development.
 - Business development services.
- It also facilitates:
 - Bank linkages.
 - Convergence with government schemes.
 - Community-based enterprise promotion.

Objectives

- Promote rural entrepreneurship.
- Support non-farm enterprises.
- Generate sustainable livelihoods.
- Create self-employment opportunities.
- Reduce rural poverty.
- Strengthen local economies through community institutions.

Key Features

Community-led Enterprise Promotion

- Funding and enterprise support are based on **community-led decision-making**.
- Community institutions identify entrepreneurs and provide continuous handholding support.

Financial Support

- Facilitates:
 - Bank credit.
 - Community Enterprise Fund (CEF).
 - Convergence with schemes such as **Pradhan Mantri Mudra Yojana**.

Institutional Support

- Provides:
 - Training.
 - Mentoring.
 - Business planning.
 - Enterprise management support.
 - Credit facilitation.

Digital Support

- Digital tools are used for:
 - Business planning.
 - Loan appraisal.
 - Enterprise tracking.

Implementation Mechanism

State Rural Livelihood Missions (SRLMs)

- SVEP is implemented through **State Rural Livelihood Missions (SRLMs)**.
- Financial provision:
 - **₹6.50 crore per block**.
 - Average investment of **₹27,083 per enterprise**.

Block Resource Centres–Enterprise Promotion (BRC-EPs)

- Coordinate programme implementation at the block level.

Community Resource Persons–Enterprise Promotion (CRP-EPs)

- Provide:
 - Technical assistance.
 - Mentoring.
 - Training.
 - Credit facilitation.
- At least:
 - **90%** selected from SHG households.
 - **60%** are women.
- Each CRP-EP supports up to **50 enterprises**.

Role of SHGs

- Identify potential entrepreneurs.
- Facilitate enterprise establishment.
- Manage loans through the **Community Enterprise Fund (CEF)**.
- Monitor enterprise performance.

Beneficiary Selection

- Entrepreneurs are selected based on:
 - Need.
 - Poverty status.
 - Entrepreneurial potential.
- Beneficiaries receive:
 - Training.
 - Mentoring.
 - Financial support.
- Programme mandates:
 - At least **60% women beneficiaries**.
 - Representation of **SC, ST, Minority communities** and **Persons with Disabilities (PwDs)**.

Achievements



- **4.32 lakh rural enterprises** supported.
- Around **86%** of entrepreneurs belong to:
 - SC.
 - ST.
 - Minority.
 - OBC communities.
- Highest number of enterprises supported in:
 - Assam.
 - Bihar.
 - Jharkhand.
 - West Bengal.
 - Madhya Pradesh.

Monitoring

- Monitored through:
 - Quarterly reviews.
 - Periodic assessments.
 - Centralised Management Information System (MIS) for:
 - Enterprise performance.
 - Fund utilisation.
 - Programme progress.

Impact Assessment (Quality Council of India)

Major Findings

- **99%** of SVEP-supported enterprises were profitable.
- Enterprises contributed **57%** of total household income.
- Average monthly enterprise revenue: **₹39,000**.
- Manufacturing enterprises earned an average of **₹47,800 per month**.
- **96%** of entrepreneurs reported increased savings.
- **75%** of enterprises were owned or managed by women.

Social Impact

- Promoted first-generation entrepreneurship.
- Improved confidence and livelihood security.
- Enhanced:
 - Education.
 - Nutrition.
 - Health.
 - Sanitation.
- Increased savings and long-term enterprise growth.
- Improved social status of beneficiaries.

About DAY-NRLM

Deendayal Antyodaya Yojana–National Rural Livelihoods Mission

- One of the world's largest livelihood programmes.
- Mobilises rural poor households into **Self-Help Groups (SHGs)**, predominantly women.

- Focuses on:
 - Sustainable livelihoods.
 - Financial inclusion.
 - Skill development.
- As of **mid-June 2026**, more than **10.29 crore rural households** had been mobilised into SHGs.

Significance

- Promotes **grassroots entrepreneurship** and **inclusive rural development**.
- Generates local employment through non-farm enterprises.
- Empowers women and socially disadvantaged communities.
- Strengthens community-based institutions.
- Contributes to the vision of **Atmanirbhar Bharat** and a **vibrant rural start-up ecosystem**.

National Investment Policy for Urea-2026 (NIPU-2026)



Why in News?

- The **Cabinet Committee on Economic Affairs (CCEA)** has approved the **National Investment Policy for Urea-2026 (NIPU-2026)**.
- The policy aims to boost **domestic urea production**, encourage the establishment of new **gas-based urea plants**, reduce import dependence, and strengthen India's fertilizer security under the vision of **Atmanirbhar Bharat**.

Key Features of NIPU-2026

Expansion of Domestic Production

- The policy proposes setting up **8–9 new gas-based urea manufacturing plants** across the country.

- Each plant is expected to produce around **12.7 lakh metric tonnes** of urea annually.
- Together, these plants will add nearly **10 million tonnes** to India's domestic urea production capacity.

Major Policy Reforms

Separate Cost Structure

- The subsidy calculation will separately account for **fixed costs** and **variable costs**, making the system more transparent.

Assured Return on Investment

- Investors will receive a **Return on Equity (RoE)** within a defined range:
 - **Minimum:** 12%
 - **Maximum:** 16%
- This aims to improve investor confidence while ensuring reasonable returns.

Protection from Exchange Rate Fluctuations

- To reduce foreign exchange risks, fixed costs will be converted into **Indian Rupees (INR)** after four years using the prevailing exchange rate.

Focus on New Gas-Based Plants

- Unlike the **New Investment Policy (NIP)-2012**, which covered expansion, revival and modernization of existing plants, **NIPU-2026** focuses on establishing **new gas-based urea manufacturing units**.

Improved Financial Viability

- The new policy is expected to save **over ₹250 crore per plant** compared to projects established under **NIP-2012**.

Equal Incentives

- The policy offers the same incentives to:
 - Private sector companies.
 - Public sector enterprises.
 - Cooperative sector units.

Why is NIPU-2026 Needed?

Reducing the Demand-Supply Gap

- Urea is India's most widely used fertilizer, and demand is increasing by nearly **5% every year**.
- India's annual requirement is around **40 million tonnes**, while domestic

production is only about **30 million tonnes** from **33 operational plants**.

- The remaining **10 million tonnes** are imported.
- NIPU-2026 aims to bridge this gap through additional domestic production.

Replacement of Earlier Policy

- The **New Investment Policy (NIP)-2012** expired in **October 2019**.
- Since then, several proposals for new urea projects have been received, creating the need for a new policy framework.

Reducing Import Vulnerability

- India depends heavily on imported urea and **Liquefied Natural Gas (LNG)**.
- Global supply disruptions and geopolitical tensions, especially around key trade routes such as the **Strait of Hormuz**, can increase fertilizer costs and threaten food security.
- Expanding domestic production will improve supply security.

What is Urea?

About

- **Urea (NH_2CONH_2)** is a white crystalline organic compound widely used as a **nitrogenous fertilizer**.

High Nitrogen Content

- It contains about **46% nitrogen**, the highest among commonly used solid nitrogen fertilizers.
- It is essential for the growth of crops such as:
 - Wheat
 - Paddy
 - Sugarcane

Government Pricing

- Urea is heavily subsidized by the Government of India to keep it affordable for farmers.
- Its **Maximum Retail Price (MRP)** is fixed by the government.

- Unlike urea, other fertilizers are covered under the **Nutrient Based Subsidy (NBS)** scheme.

Major Fertilizer Initiatives in India

Neem Coated Urea (NCU)

- The government has mandated **100% neem coating** of urea.
- Benefits include:
 - Improved nitrogen-use efficiency.
 - Slower nitrogen release into the soil.
 - Prevention of diversion of subsidized urea for industrial use.

Urea Gold

- A **sulphur-coated urea** introduced to address sulphur deficiency in soils and improve crop productivity.

Liquid Nano Urea

- Developed by **IFFCO**.
- It is a nano-fertilizer sprayed directly on plant leaves, reducing the need for conventional bulk urea.

PM PRANAM

Pradhan Mantri Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth

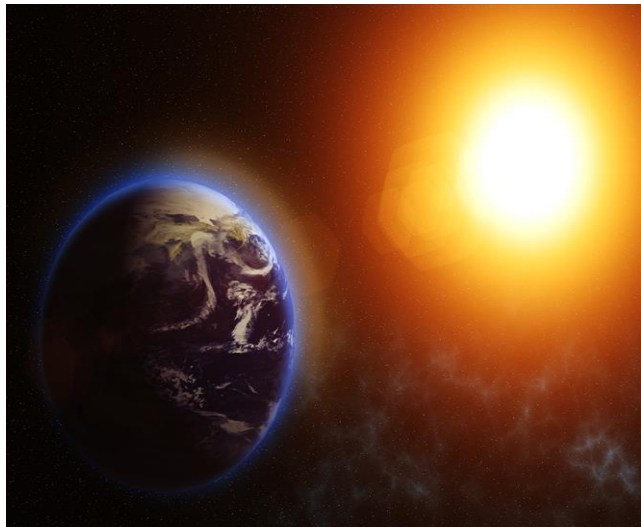
- Encourages States and Union Territories to promote balanced fertilizer use and reduce dependence on chemical fertilizers.

One Nation One Fertilizer

- Under the **Pradhan Mantri Bhartiya Jan Urvarak Pariyojana**, all subsidized fertilizers are marketed under the common brand name **"Bharat"**.
- The initiative aims to improve availability, reduce logistics costs and create a uniform fertilizer distribution system.

□□□

Thermal Signatures of Solar Storms: New Insights for Space Weather Forecasting



Why in News?

- Indian astrophysicists have discovered new insights into the thermal evolution of **Interplanetary Coronal Mass Ejections (ICMEs)** and their role in influencing space weather conditions near Earth.
- The study reveals how the heating and cooling behaviour of ICMEs during their journey from the Sun to Earth affects their ability to disturb Earth's magnetic environment, impacting communication systems, aviation, satellites and power grids.

What are Interplanetary Coronal Mass Ejections (ICMEs)?

About

- Interplanetary Coronal Mass Ejections (ICMEs)** are huge eruptions of magnetised plasma released from the Sun's outer atmosphere (corona).
- These plasma clouds travel through interplanetary space and can interact with Earth's magnetic field when directed towards the planet.

Impact of ICMEs

- Interaction of ICMEs with Earth's magnetic field can generate **geomagnetic storms**.

- These storms may affect:
 - Satellite operations.
 - GPS navigation systems.
 - Radio communication.
 - Aviation routes.
 - Electricity grids.
- They also produce auroras in Earth's upper atmosphere.

Solar Activity Cycle

- The Sun follows an approximately **11-year activity cycle**.
- The occurrence of ICMEs increases during the solar maximum phase.
- The peak of the current **Solar Cycle 25** occurred in 2025.

Key Findings of the Study

First Long-Term Study of ICME Thermal Behaviour

- A research team from the **Indian Institute of Astrophysics (IIA), Bengaluru**, an autonomous institute under the Department of Science and Technology (DST), conducted the first long-term statistical analysis of ICME thermal behaviour near Earth.
- The study examined data collected over **29 years (1995–2024)** covering:
 - Solar Cycle 23.
 - Solar Cycle 24.
 - Rising phase of Solar Cycle 25.

Research Methodology

- Scientists analysed ICME observations at **1 Astronomical Unit (AU)**, the average distance between Earth and the Sun.
- The study used solar wind plasma measurements from satellites positioned near **L1 (Lagrange Point 1)**, located around 1.5 million km from Earth towards the Sun.
- Researchers used:
 - OMNI database maintained by NASA's Space Physics Data Facility.
 - Data from NASA CDAWeb repository.

Understanding ICME Thermal Evolution

Polytropic Index

- Scientists studied the relationship between pressure, temperature and density of ICME plasma using the **polytropic index**.
- This helped determine whether ICMEs were undergoing heating or cooling during their movement through space.

Major Observations

- Earlier assumptions suggested that CMEs mainly cool as they expand.
- However, the study found that ICMEs remain **thermodynamically active**, involving continuous energy exchange.
- Around **45% of magnetic ejecta showed heating signatures at 1 AU**, especially during periods of high solar activity.

Variation Across Solar Cycles

- Solar Cycle 23 showed more heating-dominated ICME conditions.
- Solar Cycle 24 showed more cooling-dominated behaviour.
- This indicates that ICME thermal evolution is influenced by changes in the Sun's magnetic environment.

Link Between ICME Thermal State and Geomagnetic Storms

- The study established a relationship between ICME thermal conditions and the severity of solar storms affecting Earth.
- Stronger geomagnetic storms are generally associated with ICMEs having:
 - Heating-dominated thermal states.
 - Strong magnetic fields.
 - Low plasma beta, indicating dominance of magnetic pressure.
 - Compressed sheath regions.
 - Higher expansion speeds.

Importance for Space Weather Forecasting

- Understanding ICME thermal behaviour can improve prediction of potentially harmful solar storms.

- Thermal indicators such as **polytropic index trends** may act as early warning signals for the geo-effectiveness of approaching ICMEs.
- Combining thermal information with magnetic field and plasma properties can enhance forecasting accuracy.

Role of Aditya-L1 Mission

- Future research will incorporate observations from India's **Aditya-L1 solar mission**.
- Data from its coronagraph and solar wind instruments will help:
 - Track CME evolution closer to the Sun.
 - Understand energy transfer processes during CME travel.
 - Improve space weather prediction models.

Significance of the Study

- Provides a better understanding of how solar eruptions evolve between the Sun and Earth.
- Strengthens India's contribution to heliophysics and solar research.
- Helps protect critical infrastructure affected by space weather events, including:
 - Communication networks.
 - Satellites.
 - Navigation systems.
 - Power grids.

Conclusion

- The study shows that ICMEs are not simply expanding clouds of plasma but undergo complex thermal changes during their journey through space.
- Understanding their heating and cooling patterns can significantly improve forecasting of geomagnetic storms.
- Integration of Aditya-L1 observations will further strengthen India's ability to monitor and predict space weather events.

Exosomes



Why in News?

Tiny particles called **exosomes**, released by almost all human cells, are gaining attention as potential tools for the diagnosis and treatment of diseases such as cancer and Alzheimer's disease. However, their extremely small size has made detailed observation and study challenging for scientists.

What are Exosomes?

- **About:** Exosomes are small **extracellular vesicles** released naturally by cells into the surrounding environment.
- **Size:** They typically range between **30–200 nanometres (nm)** in diameter.

Structure:

- They are surrounded by a **lipid bilayer membrane**, similar to the outer membrane of a cell.
- They contain a variety of biological materials, including:
 - Proteins
 - Lipids
 - RNA molecules
 - Signalling molecules

Origin:

- Exosomes are produced by almost all types of cells in the human body.
- They carry biological information from their parent cells to other cells.

Functions of Exosomes

1. Intercellular Communication:

- Exosomes act as messengers between cells by transferring biological materials and signals.

- They influence the behaviour and functions of recipient cells.

2. Immune System Regulation:

- They play an important role in modifying immune responses by carrying immune-related molecules.

3. Transfer of Genetic Material:

- Exosomes transport RNA and other genetic materials, allowing cells to influence gene expression in neighbouring cells.

4. Disease Monitoring and Treatment Potential:

- Since exosomes reflect the condition of their parent cells, they can act as biomarkers for detecting diseases.
- Their ability to deliver molecules to specific cells makes them potential tools for targeted therapies.

Medical Significance of Exosomes

Area	Potential Role
Cancer	Detection of tumour-related signals and targeted drug delivery
Alzheimer's Disease	Understanding disease progression and identifying biomarkers
Regenerative Medicine	Supporting tissue repair and cell communication
Drug Delivery	Transporting therapeutic molecules to specific cells

Challenges in Exosome Research

- Extremely small size makes detection and detailed analysis difficult.
- Difficulty in isolating pure exosome populations from biological samples.
- Need for better techniques to understand their role in different diseases.

Conclusion:

Exosomes represent a promising area of biomedical research due to their role in cell-to-cell communication and their potential applications in disease diagnosis, monitoring, and targeted treatment. Their further study could open new possibilities in precision medicine.

GAGAN (GPS Aided GEO Augmented Navigation)



Why in News?

The **Directorate General of Civil Aviation (DGCA)** successfully conducted India's first **satellite-based landing system approach on a commercial jet aircraft using GAGAN**, marking a significant milestone in India's indigenous aviation navigation capabilities.

About GAGAN

Full Form: GPS Aided GEO Augmented Navigation

About:

- GAGAN is India's indigenous **Satellite-Based Augmentation System (SBAS)**.
- It has been jointly developed by:
 - Indian Space Research Organisation (ISRO)
 - Airports Authority of India (AAI)
- It became operational in **2015**.
- It improves the accuracy and reliability of GPS signals for safer navigation.



Need for GAGAN

- Standard GPS signals can suffer from:
 - Atmospheric disturbances.
 - Signal errors.
 - Other technical inaccuracies.
- These limitations make ordinary GPS unsuitable for precision aviation operations.

Role of GAGAN:

- Provides real-time corrections to GPS signals.
- Provides integrity information by alerting users when GPS signals are unreliable.
- Enables safer aircraft navigation and satellite-based landing approaches.

Key Features of GAGAN

- Improves GPS accuracy and reliability.
- Provides integrity monitoring for aviation safety.
- Supports precision approach and landing operations.
- Certified according to international civil aviation standards.
- It is the **first SBAS certified for the equatorial region**.

Architecture of GAGAN

GAGAN operates through an integrated network consisting of:

- 15 Indian Reference Stations (INRES)**
- 2 Indian Master Control Centres (INMCC)**
- 3 Indian Land Uplink Stations (INLUS)**
- 4 communication networks**
- 3 geostationary satellites carrying GAGAN payloads:**
 - GSAT-8
 - GSAT-10
 - GSAT-15

Applications of GAGAN

Apart from aviation, GAGAN has applications in:

- Maritime navigation.

- Road transport.
- Railways.
- Disaster management.
- Defence.
- Telecommunications.
- Surveying and mapping.

Significance of GAGAN

- Places India among a select group of countries having operational **SBAS technology**, along with:
 - USA
 - Europe
 - Japan
- It is interoperable with:
 - **WAAS** – USA
 - **EGNOS** – Europe
 - **MSAS** – Japan
- Enhances aviation safety and supports the growth of satellite-based navigation services in India.

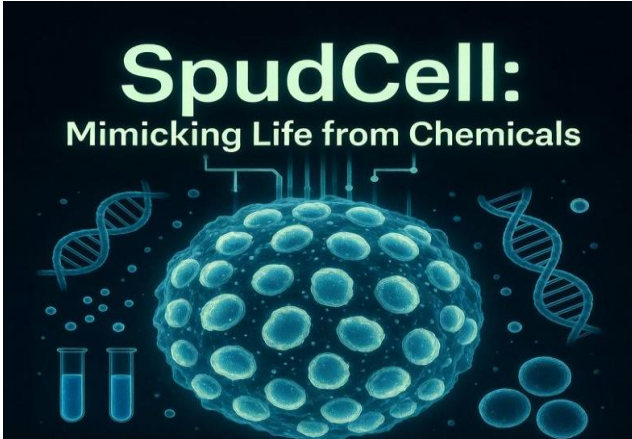
GAGAN Vs. NavIC

Feature	GAGAN	NavIC
Type	Satellite-Based Augmentation System (SBAS)	Regional Navigation Satellite System
Purpose	Improves GPS accuracy through corrections and integrity information	Provides independent positioning, navigation and timing (PNT) services
Primary Use	Precision aviation navigation and landing	Navigation services over India and surrounding region
Coverage	Uses GPS augmentation	Covers India and up to 1,500 km beyond its boundaries
Developed By	ISRO and AAI	ISRO

Conclusion:

GAGAN represents a major advancement in India's space-based navigation capabilities by enabling safer and more accurate aviation operations while expanding the use of satellite navigation technology across multiple sectors.

SpudCell: Breakthrough in Synthetic Biology and Artificial Life Engineering



SpudCell:
Mimicking Life from Chemicals

What is SpudCell?
Scientists create synthetic biology marvels mimicking natural cells using chemicals, not biology! SpudCell is a potato-shaped synthetic cell built from test-tube components from scratch, proving life can emerge from non-living parts.

Why It Matters (Pros)
- Revolutionizes medicine with biofactories for drugs, tackles climate change via sustainable materials, and pushes scientific boundaries of creation.

Limitations (Cons)
Risks of misuse for harmful purposes exist; current tech can't fully replicate complex natural cells yet.

Future Implications
Potential for bioengineered solutions in energy, food, and medicine; demands ethical oversight and safety checks.

"No need to worry – Science demands critical scrutiny & rigorous safety."
– Dr Akshat Jain, USA

Why in News?

- Scientists in the United States have achieved a significant breakthrough in **synthetic biology** by creating **SpudCell**, an artificial cell assembled entirely from non-living chemical materials.
- The synthetic cell demonstrates several characteristics associated with living systems, including growth, DNA replication, cell division and evolutionary selection. However, it is not considered a fully independent living organism because it still depends on external components for survival and functioning.

What is SpudCell?

- **SpudCell** is a laboratory-created synthetic cell designed from non-biological chemical components.
- Unlike conventional genetic engineering, which modifies existing organisms, SpudCell was constructed **from the ground up using lifeless materials**.
- It represents an attempt to understand and recreate fundamental biological processes through chemical engineering.

Key Features of SpudCell

Constructed from Non-Living Components

- The synthetic cell was created using a basic artificial membrane structure called a **liposome**.
- A liposome is a small spherical structure made of lipid molecules that can act as an artificial cell boundary.
- Scientists used this structure as the foundation for building a cell-like system without using a pre-existing living organism.

Artificial Protein Production System

- SpudCell contains a specialised **cell-free protein synthesis system known as the PURE system**.
- This system enables the translation of a customised synthetic genome into functional proteins.
- The artificial genome contains around **90,000 base pairs of DNA**, which directs the production of required cellular components.

Nutrient Absorption Mechanism

- The synthetic cell can obtain materials needed for growth through a programmed feeding mechanism.
- Its artificial DNA directs the production of **alpha-haemolysin protein**, which forms molecular structures on the cell surface.
- These structures act like hooks that allow SpudCell to attach to smaller nutrient-filled bubbles and absorb their contents.

DNA Replication

- As SpudCell increases in size, it can duplicate its artificial genetic material.
- A specialised copying enzyme enables accurate replication of the synthetic DNA blueprint.

Artificial Cell Division

- Natural cells depend on complex internal structures such as the **cytoskeleton** for division.
- SpudCell uses a simpler mechanism based on:
 - Protein accumulation on its outer surface
 - Physical pressure

- Mechanical stress

- These forces allow the synthetic cell to split into two daughter cells.

Evolutionary Capability

Demonstration of Darwinian Selection

- Researchers demonstrated that artificial systems can undergo **natural selection**.
- A genetic mutation was introduced that allowed certain SpudCell variants to absorb nutrients more efficiently.
- These faster-growing variants reproduced more successfully and gradually became dominant within the population.

Limitations of SpudCell

Although SpudCell displays life-like characteristics, it is not a complete living organism.

Major limitations include:

- Dependence on externally supplied nutrients
- Requirement for external ribosomes and biological components
- Inability to independently maintain all cellular functions like natural organisms

Therefore, it represents a **synthetic life-like system rather than fully autonomous artificial life**.

Significance of the Discovery

Advancement in Synthetic Biology

- SpudCell provides evidence that essential biological processes can be recreated using non-living chemical materials.
- It improves understanding of how life-like systems can emerge from basic molecular components.

Potential Applications

Precision Medicine

- Development of programmable artificial cells for:
 - Targeted drug delivery
 - Controlled release of medicines
 - Personalised therapies

Sustainable Biomanufacturing

- Synthetic cells could be engineered to produce:
 - Industrial chemicals

- Biological materials
- Environment-friendly products

Environmental Applications

- Artificial organisms may be designed for:
 - Pollution removal
 - Environmental monitoring
 - Waste management

Synthetic Biology

- **Synthetic biology** is an interdisciplinary field that combines biology, engineering, chemistry and computer science to design or redesign biological systems.
- It aims to create biological components and organisms with specific functions beyond those found naturally.

Conclusion

The development of SpudCell marks an important milestone in synthetic biology by showing that complex life-like behaviours can be engineered from non-living materials. While it does not represent the creation of independent artificial life, it opens new possibilities in medicine, biotechnology and environmental solutions by demonstrating the potential of programmable synthetic systems.

National Action Plan for Prevention and Control of Zoonoses



Why in News?

- On the occasion of **World Zoonoses Day** (6 July), the **Ministry of Health & Family**

Welfare organised a **National Multistakeholder Consultation** to discuss the **Draft National Action Plan for Prevention and Control of Zoonoses**.

- The proposed action plan aims to strengthen India's preparedness against zoonotic diseases through the **One Health Approach**.

About

- The proposed **National Action Plan** will provide a common framework for preventing, detecting and responding to zoonotic diseases.
- States and Union Territories will prepare their own **State Action Plans** based on local disease patterns, environmental conditions and public health needs.

Key Highlights

1. One Health Approach

- The action plan adopts the **One Health** framework, recognising that **human health, animal health and environmental health** are closely interconnected.
- It encourages coordinated action among different ministries and sectors to prevent disease outbreaks.

2. State-Level Action Plans

- The national framework will guide States and Union Territories in designing region-specific strategies according to their ecological and epidemiological conditions.

3. Capacity Building

- Under the **National One Health Programme for Prevention and Control of Zoonoses**, two important learning resources were introduced:
 - **Learning Resource Package** covering **10 priority zoonotic diseases**.
 - **E-learning modules** for doctors, veterinarians and frontline health workers to strengthen surveillance and disease management.

4. Strengthening Disease Surveillance

- Experts recommended expanding **sentinel surveillance sites** to improve early detection of zoonotic diseases.

- Greater use of the **Integrated Health Information Platform (IHIP 2.0)** was emphasised for timely data sharing among different sectors.

5. Institutional Coordination

- The **National Centre for Disease Control (NCDC)** will play a central role in:
 - Integrated disease surveillance.
 - Risk communication.
 - Inter-ministerial coordination.
 - Strengthening long-term financing for zoonotic disease control programmes.

Priority Zoonotic Diseases

The Learning Resource Package focuses on the following diseases:

- **Anthrax**
- **Brucellosis**
- **Kyasanur Forest Disease (KFD)**
- **Crimean-Congo Haemorrhagic Fever (CCHF)**
- **Nipah Virus Disease**
- **Mpox**
- **Rabies**
- **Leptospirosis**
- **Scrub Typhus**
- **Zika Virus Disease**

Zoonotic Diseases

About

- **Zoonotic diseases (Zoonoses)** are infectious diseases that spread naturally between **animals and humans**.
- They may be caused by **viruses, bacteria, parasites or fungi**.

Modes of Transmission

1. Direct Transmission

- Spread through direct contact with infected animals or their body fluids such as saliva, blood, urine or faeces.
- **Example: Rabies.**

2. Indirect Transmission

- Occurs through contact with contaminated environments, animal shelters or infected objects.

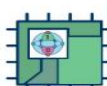
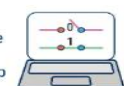
3. Vector-Borne Transmission

- Transmitted through vectors such as **mosquitoes, ticks or fleas**.
- **Examples: Zika, Kyasanur Forest Disease (KFD) and Scrub Typhus.**

4. Food-Borne Transmission

- Results from consuming contaminated food or water, including **unpasteurised milk** and improperly processed animal products.
- **Examples: Brucellosis and Anthrax.**

Quantum Computing and Quantum Error Correction (QEC)

Quantum Computing	Vs.	Classical Computing
 Calculates with qubits, which can represent 0 and 1 at the same time		 Calculates with transistors, which can represent either 0 or 1
 Power increases exponentially in proportion to the number of qubits		 Power increases in a 1:1 relationship with the number of transistors
 Quantum computers have high error rates and need to be kept ultracold		 Classical computers have low error rates and can operate at room temp
 Well suited for tasks like optimization problems, data analysis, and simulations		 Most everyday processing is best handled by classical computers

Why in News?

- Recent advances in **Quantum Error Correction (QEC)** by companies such as **Google**, along with India's **National Quantum Mission (NQM)**, have renewed global interest in **quantum computing**.
- These developments are expected to accelerate the transition from **Noisy Intermediate-Scale Quantum (NISQ)** computers to **fault-tolerant quantum computers**, unlocking transformative applications in cryptography, climate modelling, materials science and drug discovery.

Quantum Computing

About

- **Quantum computing** is an emerging field that applies the principles of **quantum**

mechanics to solve computational problems that are beyond the capabilities of classical computers.

- For certain complex problems, quantum computers can perform calculations in a fraction of the time required by today's most powerful supercomputers.

Classical Bit vs Qubit

Classical Computer	Quantum Computer
Uses bits .	Uses qubits (quantum bits) .
A bit can exist only as 0 or 1 .	A qubit can exist as 0, 1, or a combination of both simultaneously due to superposition .

Core Principles of Quantum Computing

1. Superposition

- A qubit can exist in multiple states simultaneously until it is measured.
- This enables quantum computers to process many possible solutions at the same time.

2. Entanglement

- Two or more qubits can become linked so that the state of one is correlated with the state of another, irrespective of the distance between them.
- This property enables highly efficient information processing.

3. Quantum Interference

- Quantum algorithms manipulate probability amplitudes so that incorrect outcomes cancel out while correct solutions are reinforced.

4. Massive Parallelism

- By combining **superposition** and **entanglement**, quantum computers can evaluate numerous computational possibilities simultaneously, providing significant speed advantages for selected problems.

Types of Qubits

1. Superconducting Qubits

- Built using **Josephson Junctions** and operated at temperatures close to **absolute zero**.
- Used in processors such as **Google's Willow**.

2. Quantum Dot Qubits

- Constructed using semiconductor materials such as **silicon** or **germanium**.

3. Trapped Ion Qubits

- Created by trapping individual ions using electromagnetic fields.

4. Photonic Qubits

- Use **photons (light particles)** to carry quantum information.

5. NMR Qubits

- Based on **Nuclear Magnetic Resonance (NMR)** using atomic nuclei.
- Used in one of the earliest demonstrations of quantum computing.

Quantum Key Distribution (QKD)

About

- **Quantum Key Distribution (QKD)** is a highly secure communication technology used to exchange encryption keys through quantum particles.

Working

- Any attempt to intercept the transmitted quantum information disturbs the quantum state, immediately revealing the presence of an eavesdropper.
- This provides extremely secure communication against cyberattacks.

The 'Noise' Problem in Quantum Computing

About

- Present-day quantum computers are known as **Noisy Intermediate-Scale Quantum (NISQ)** devices because they are highly susceptible to computational errors.

Major Sources of Noise

1. Decoherence

- Qubits easily lose their quantum state when exposed to external disturbances such as:
 - Heat.
 - Light.
 - Electromagnetic interference.
- This loss of quantum information is known as **decoherence**.

2. High Error Rates

- Quantum processors operate at temperatures close to -273°C to minimise errors.
- Despite this, they still experience significantly higher error rates than classical computers.

3. Imperfect Quantum Operations

- Lasers, microwave pulses and other control mechanisms used to manipulate qubits are not perfectly accurate, introducing additional computational errors.

Quantum Error Correction (QEC)

About

- **Quantum Error Correction (QEC)** is a technique that combines multiple **physical qubits** to create a more stable **logical qubit** capable of performing reliable computations.

How it Works

- Instead of relying on a single fragile qubit, information is encoded across several qubits.
- When individual qubit error rates remain below a critical threshold, adding more qubits improves overall system reliability.

Recent Breakthrough

- Researchers working with **Google's Willow processor** demonstrated that increasing the number of physical qubits successfully reduced the overall error rate.
- This represents a major step towards the development of **fault-tolerant quantum computers**.

India's National Quantum Mission (NQM)

About

- The **National Quantum Mission (NQM)** was approved in **April 2023** to establish India as a global leader in **Quantum Technologies** by **2031**.

Objectives

- Develop indigenous quantum technologies.
- Build intermediate-scale quantum computers.
- Create a domestic ecosystem for quantum hardware and software.

- Promote research, innovation and commercialisation.

Key Targets

1. Quantum Computing

- Develop quantum computers with **50–1,000 qubits**.

2. Quantum Communication

- Establish a **2,000-km satellite-based quantum communication network** using **Quantum Key Distribution (QKD)**.

3. Quantum Sensing and Metrology

- Develop advanced quantum sensors for high-precision scientific, industrial and defence applications.

4. Quantum Materials

- Promote research on advanced quantum materials and devices required for future quantum technologies.

5. Innovation Ecosystem

- Establish **Thematic Hubs (T-Hubs)** to promote collaborative research.
- Support quantum technology startups through innovative financing mechanisms such as **Optionally Convertible Debt (OCD)**.

Progress

- India has successfully developed an **indigenous 1,000-km quantum communication network**, achieving half of its planned **2,000-km** target with support from the **Department of Science and Technology (DST)** and **QNu Labs**.

Significance

- Positions India among leading nations in **quantum technology**.
- Strengthens capabilities in **cybersecurity, secure communications** and **strategic technologies**.
- Supports breakthroughs in **artificial intelligence, drug discovery, climate modelling, materials science** and **financial modelling**.
- Contributes to technological self-reliance under the vision of **Atmanirbhar Bharat**.

Mission Drishti (OptoSAR Satellite)



Why in News?

- **Mission Drishti**, the world's first **OptoSAR satellite**, lost communication after developing an anomaly during its **Launch and Early Orbit Phase (LEOP)**.
- Preliminary analysis indicates that a **geomagnetic solar storm** exposed the satellite to radiation, affecting a critical onboard system.

Mission Drishti

About

- **Mission Drishti** is the world's first **OptoSAR satellite**, designed to simultaneously capture:
 - **Optical multi-spectral images**, and
 - **Synthetic Aperture Radar (SAR)** images of the same location.
- The mission aimed to improve Earth observation by combining the strengths of both optical and radar imaging.

Objectives

- Provide reliable Earth observation under all weather conditions.
- Overcome limitations caused by cloud cover.
- Deliver faster and more accurate geospatial intelligence.
- Support defence, disaster management and developmental planning.

Key Features

1. OptoSAR Technology

- Integrates **optical sensors** and **Synthetic Aperture Radar (SAR)** into a single satellite.
- Captures optical and radar imagery simultaneously, enabling comprehensive Earth observation.

2. Solving the Tropical Cloud Cover Problem

- Optical sensors provide high-quality visual images but are affected by:
 - Cloud cover.
 - Night-time conditions.
- **SAR sensors** can:
 - Penetrate clouds.
 - Operate during both day and night.
- This ensures continuous monitoring even under adverse weather conditions.

3. Artificial Intelligence-Based Image Generation

- When optical images are obstructed by clouds, **Artificial Intelligence (AI)** generates **optical-like images** using SAR data.
- This makes satellite imagery easier to interpret for users without specialised expertise.

4. Sensor Synchronisation

- Mission Drishti uses a proprietary technology stack to synchronise optical and SAR sensors.
- This enables:
 - Instant fusion of optical and radar data.
 - Elimination of manual alignment of images captured from different viewing angles.

Applications

Mission Drishti was designed to support:

1. Border Surveillance

- Continuous monitoring of sensitive border regions under all weather conditions.

2. Defence

- Improved reconnaissance and strategic intelligence gathering.

3. Disaster Management

- Rapid assessment during:
 - Floods.
 - Cyclones.
 - Landslides.
 - Other natural disasters.

4. Agriculture

- Crop monitoring and agricultural planning.

5. Infrastructure Planning

- Mapping and monitoring infrastructure projects.

6. Insurance Assessment

- Accurate assessment of damage following natural disasters.

Significance

- Demonstrates advancements in **Earth Observation (EO)** technologies through the integration of optical and radar imaging.
- Addresses the longstanding challenge of **tropical cloud cover**, improving the reliability of satellite-based monitoring.
- Enhances applications in **national security, disaster response, precision agriculture**, and **infrastructure management**.
- Strengthens India's growing **private space ecosystem**, alongside companies such as **Agnikul Cosmos** and **Skyroot Aerospace**, fostering innovation in the country's commercial space sector.

Secondary Infertility in India



Why in News?

- **Secondary infertility** is emerging as a major reproductive health concern in India.
- Analysis of **National Family Health Survey (NFHS)** data shows that its prevalence increased from **about 19.5% in the early 1990s to 28.6% in 2015–16**.
- Delayed parenthood, lifestyle disorders, reproductive health complications and male infertility are major contributors to this rising trend.

Infertility

About

- **Infertility** is a disease of the **male or female reproductive system**, defined as the inability to achieve pregnancy after **12 months or more of regular unprotected sexual intercourse**.
- According to the **World Health Organization (WHO)**, approximately **one in six people** of reproductive age experience infertility during their lifetime.
- Infertility may result from:
 - Male factors.
 - Female factors.
 - Combined male and female factors.
 - Unexplained causes.

Types of Infertility

1. Primary Infertility

- A couple or individual has **never achieved pregnancy**.

2. Secondary Infertility

- A couple or individual has achieved **at least one previous pregnancy** but is subsequently unable to conceive again.

Causes of Rising Secondary Infertility in India

1. Delayed Parenthood

- Increasing focus on education, careers, urbanisation and financial stability has delayed family completion.
- Women attempting a second pregnancy after **35 years** face:
 - Declining ovarian reserve.
 - Reduced egg quality.
- Advancing paternal age may also reduce sperm quality.

2. Postpartum Anatomical Complications

- Previous pregnancies and deliveries may alter reproductive anatomy.
- Factors include:
 - Caesarean section-related uterine scar defects (**Isthmocele**).
 - Pelvic adhesions.
 - Pelvic Inflammatory Disease (PID).
 - Fallopian tube blockage.

3. Progression of Reproductive Disorders

- Conditions such as:
 - Endometriosis.
 - Uterine fibroids.

may develop or worsen after the first pregnancy, reducing fertility.

4. Hormonal and Metabolic Changes

- Weight gain, sedentary lifestyle and metabolic disorders can disrupt the **Hypothalamic–Pituitary–Ovarian (HPO) axis**, affecting ovulation and fertility.

5. Polycystic Ovary Syndrome (PCOS) and Thyroid Disorders

- PCOS, insulin resistance and thyroid disorders may worsen over time, leading to irregular ovulation and reduced fertility.

6. Male Infertility

- Lifestyle factors such as:
 - Smoking.
 - Alcohol consumption.
 - Obesity.
 - Chronic stress.
 - Metabolic disorders.

can progressively reduce sperm count, motility and quality.

7. Exposure to Endocrine-Disrupting Chemicals (EDCs)

- Long-term exposure to:
 - Pesticides.
 - Microplastics.
 - Industrial chemicals.

can interfere with hormonal balance and reproductive health.

8. Air Pollution

- Chronic exposure to **PM2.5** and heavy metals increases oxidative stress, adversely affecting both male and female fertility.

Challenges in Addressing Secondary Infertility

1. Legal and Regulatory Constraints

- The **Surrogacy (Regulation) Act, 2021** generally prohibits married couples from opting for surrogacy if they already have a

surviving child, except in limited circumstances.

- This may restrict reproductive options for couples with medically diagnosed secondary infertility.

2. Limited Public Health Support

- Advanced fertility treatments such as:
 - **In Vitro Fertilization (IVF).**
 - **Intracytoplasmic Sperm Injection (ICSI).**

remain expensive and are largely excluded from public health insurance schemes such as **Ayushman Bharat–Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)**.

3. Policy Gaps

- India's **RMNCH+A (Reproductive, Maternal, Newborn, Child and Adolescent Health)** programme primarily focuses on:
 - Family planning.
 - Maternal health.
 - Child health.
- Infertility management receives limited policy attention.

4. Urban-Centric Fertility Services

- Assisted Reproductive Technology (ART) services are concentrated in private hospitals located mainly in metropolitan and Tier-I/Tier-II cities.
- District hospitals often lack specialised fertility infrastructure and trained professionals.

5. Social Stigma

- Couples with one child often receive limited social support despite experiencing infertility.
- Male infertility continues to be under-recognised due to social misconceptions, delaying diagnosis and treatment.

6. Misinformation and Unregulated Care

- Misleading claims regarding guaranteed fertility treatments and reliance on unverified therapies may delay evidence-based medical care.

Government Initiatives

1. Assisted Reproductive Technology (Regulation) Act, 2021

- Regulates Assisted Reproductive Technology (ART) clinics and services.
- Seeks to ensure ethical practices and protect patients.

2. Surrogacy (Regulation) Act, 2021

- Regulates surrogacy in India and lays down eligibility conditions for intending couples and surrogate mothers.

3. Jiyo Parsi Scheme

- Initiative of the **Ministry of Minority Affairs** aimed at addressing the declining population of the **Parsi community** through fertility support.

4. Employees' State Insurance Corporation (ESIC) Scheme

- Provides free **IVF treatment** for eligible insured beneficiaries.

5. Central Government Health Scheme (CGHS)

- Offers partial reimbursement for fertility treatment to eligible Central Government employees.

6. State-Level IVF Schemes

Several States have introduced subsidised fertility programmes, including:

- **Goa Free IVF Scheme**
- **Tamil Nadu ART Scheme**
- **Rajasthan ART Policy**

Way Forward

1. Adopt a Rights-Based Approach

- Recognise infertility care as an integral component of **reproductive rights** under **Article 21**.

2. Expand Affordable Fertility Care

- Include fertility treatments such as **IVF** and **ICSI** under **AB-PMJAY** and strengthen public financing for infertility care.

3. Strengthen Public Health Infrastructure

- Develop infertility diagnosis and treatment facilities in **district hospitals** with trained specialists and laboratory support.

4. Review Regulatory Provisions

- Reassess restrictive provisions of the **Surrogacy (Regulation) Act, 2021** affecting couples with medically diagnosed secondary infertility.

5. Address Social Stigma

- Promote awareness regarding both **male and female infertility**.
- Encourage timely diagnosis and counselling to reduce stigma and improve treatment outcomes.

6. Improve Regulation and Awareness

- Strengthen oversight of fertility clinics and curb misleading advertisements.
- Promote evidence-based reproductive healthcare and public awareness campaigns.

Significance

- Highlights the growing burden of **secondary infertility** as a public health challenge.
- Emphasises the need to integrate infertility management into India's reproductive healthcare system.
- Supports equitable access to affordable fertility services while protecting **reproductive autonomy** and improving overall reproductive health outcomes.

NeoSep1 Clinical Trial



Why in News?

- The **Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry**, has become the **first centre in India** to enrol a newborn in the **NeoSep1** international clinical trial.

- The trial aims to identify **safe and effective antibiotic combinations** for treating **antimicrobial-resistant neonatal sepsis**, particularly in **Low- and Middle-Income Countries (LMICs)**.

NeoSep1 Clinical Trial

About

- **NeoSep1** is a **multicentre international clinical trial** sponsored by the **Global Antibiotic Research and Development Partnership (GARDP)**.
- It seeks to improve the treatment of **drug-resistant neonatal sepsis** through evidence-based antibiotic regimens.
- The trial aims to enrol **3,000 newborns** across **Asia and Africa** by **2028**.

Participating Countries

Current Participants

- India
- Ghana
- Kenya
- South Africa
- Vietnam
- Pakistan

Proposed Expansion

- Malaysia
- Bangladesh
- Uganda

Objectives

- Identify the most effective antibiotic combinations for newborns with sepsis.
- Develop evidence-based treatment protocols suited to **LMICs**.
- Improve survival outcomes while promoting responsible use of antibiotics.

Key Feature – PRACTical Trial Design

- NeoSep1 uses the **PRACTical (Personalised Randomised Controlled Trial)** design.
- Physicians first identify clinically appropriate treatment options for each newborn.
- Eligible treatment regimens are then randomly assigned, improving real-world applicability while supporting **antimicrobial stewardship**.

Significance for India

- India's neonatal sepsis is caused by a pathogen profile different from that of high-income countries.
- The trial will generate **India-specific evidence** for selecting effective antibiotic combinations against multidrug-resistant infections.

Neonatal Sepsis

About

- **Neonatal sepsis** is a severe **systemic bloodstream infection** occurring in infants **below 90 days of age**.
- Due to their immature immune systems, newborns are highly vulnerable to rapid spread of infection, which may lead to:
 - Septic shock.
 - Multi-organ failure.
 - Death.
- It may present as:
 - Septicaemia.
 - Pneumonia.
 - Meningitis.

Classification

1. Early-Onset Sepsis (EOS)

- Occurs within the **first 72 hours** of life.
- Usually results from infections transmitted from the mother before or during childbirth.

2. Late-Onset Sepsis (LOS)

- Occurs between **72 hours and 90 days** after birth.
- Generally acquired from:
 - Hospital environments (**Nosocomial infections**).
 - Community sources.

Causes

Global Pattern

Major pathogens include:

- **Group B Streptococcus (GBS)**.
- **Escherichia coli (E. coli)**.

Indian Pattern

Neonatal sepsis in India is predominantly caused by **Gram-negative multidrug-resistant (MDR) bacteria**, including:

- **Klebsiella pneumoniae.**
- **Escherichia coli (E. coli).**
- **Acinetobacter species.**
- **Pseudomonas aeruginosa.**

Major Risk Factors

- Prolonged rupture of membranes.
- Maternal infections.
- Infected amniotic fluid.
- Unhygienic delivery practices.
- Prematurity.
- **Low Birth Weight (LBW).**
- Prolonged hospitalisation.
- Use of invasive medical devices such as:
 - Ventilators.
 - Intravenous lines.
 - Central venous catheters.

Signs and Symptoms

1. Temperature Instability

- Fever.
- Hypothermia.

2. Respiratory Symptoms

- Rapid breathing.
- Grunting.
- Apnoea.

3. Neurological Symptoms

- Lethargy.
- Irritability.
- Abnormal crying.
- Seizures.

4. Gastrointestinal Symptoms

- Poor feeding.
- Vomiting.
- Abdominal distension.

Note: Symptoms are often non-specific and may worsen rapidly, requiring immediate medical attention.

Treatment

- Immediate administration of **broad-spectrum antibiotics** after collecting **blood cultures** (gold standard for diagnosis).
- Antibiotic therapy is subsequently modified based on **antimicrobial susceptibility testing**.

- Supportive care is essential for managing complications and improving survival.

Burden of Neonatal Sepsis in India

1. High Mortality

- Neonatal sepsis is the **second leading cause of neonatal mortality**.
- It accounts for approximately **30–40% of neonatal deaths** in India.

2. Distinct Pathogen Profile

- India's burden is dominated by **Gram-negative multidrug-resistant bacteria**, making treatment more challenging than in many high-income countries.

3. Antimicrobial Resistance (AMR)

- Increasing resistance to commonly used antibiotics has reduced the effectiveness of standard treatment and increased reliance on expensive last-resort drugs.

4. Diagnostic Challenges

- Blood culture reports require **48–72 hours**.
- Small blood sample volumes and prior antibiotic exposure often reduce diagnostic accuracy.
- Consequently, clinicians frequently rely on empirical broad-spectrum antibiotics.

5. Need for India-Specific Evidence

- India's unique pathogen distribution and antimicrobial resistance patterns require locally generated clinical evidence.
- The **NeoSep1 trial** is expected to provide scientifically validated, safe and cost-effective antibiotic treatment strategies tailored to Indian conditions.

Significance

- Strengthens global efforts to combat **Antimicrobial Resistance (AMR)** in newborns.
- Generates evidence-based treatment protocols specifically for **Low- and Middle-Income Countries (LMICs)**.
- Supports rational antibiotic use through improved **antimicrobial stewardship**.
- Enhances India's capacity to address one of the leading causes of **neonatal mortality** with locally relevant clinical evidence.

Helium Export Restrictions and Global Supply Chain



Why in News?

- China has imposed a **temporary ban on helium exports**, raising concerns over the global supply of this critical resource.
- Although China imports over **80%** of its helium requirements, the restriction aims to conserve domestic stockpiles for strategic sectors such as **AI chip manufacturing** and **quantum computing**.

Helium

About

- **Helium (He)** is a chemical element and the **second lightest** as well as the **second most abundant element** in the observable universe after hydrogen.
- It is the first element of the **Noble Gas** group.

Physical Properties

- Colourless, odourless and tasteless.
- Non-toxic and non-flammable.
- Chemically inert.
- Has the **lowest boiling point** among all elements (**-269°C or 4.2 K**), enabling it to remain liquid at ultra-low temperatures.

Occurrence

- On Earth, helium is a **non-renewable resource**.
- It is produced through the **radioactive decay of uranium and thorium** deep within the Earth's crust over millions of years.
- The gas gradually accumulates in **natural gas reservoirs**.

Extraction

- Helium is commercially extracted from **natural gas fields** containing at least **0.3% helium by volume**.
- It is separated using its extremely low boiling point and purified to commercial-grade purity (typically **99.997% or higher**).

Minor Sources

- Small quantities may be recovered from:
 - Liquefied Natural Gas (LNG) plants.
 - The atmosphere.
- However, these sources contribute negligibly to global demand.

Global Helium Supply Chain

1. Concentrated Global Production

- China produces only about **1.6%** of global helium.
- More than **80%** of its domestic requirement is met through imports.
- Major producers include:
 - **United States**
 - **Qatar**
 - **Russia**
 - Canada
 - Algeria

2. Geopolitical Risks

- Restrictions on Russian exports and geopolitical disruptions have tightened global helium supplies.
- Qatar remains a major supplier, particularly to Asian countries.

3. Chokepoint Vulnerability

- Helium shipments from Qatar pass through the **Strait of Hormuz**.
- Regional conflicts in West Asia can significantly disrupt global supplies.

4. Storage and Transportation Challenges

- Helium must be transported either as:
 - Cryogenic liquid.
 - Highly compressed gas.
- It requires specialised **vacuum-jacketed stainless steel containers**.

- Delays in transportation lead to **boil-off losses**, where helium escapes irreversibly into the atmosphere.

5. India's Vulnerability

- India is **100% dependent on imports** for helium.
- More than **50%** of imports originate from **Qatar**.
- Supply disruptions directly affect:
 - Healthcare.
 - Semiconductor manufacturing.
 - Fibre optics.
 - Scientific research.
- The disruption at **Qatar's Ras Laffan complex (March 2026)** led to shortages and a **35–50% increase in helium prices** in India.

Applications of Helium

1. Healthcare

Application

- Used as a cryogenic coolant in **Magnetic Resonance Imaging (MRI)** scanners to maintain superconducting magnets.

Significance

- Essential for expanding diagnostic healthcare infrastructure.
- Supply shortages increase healthcare costs and delay critical diagnostics.

2. Semiconductor Industry

Application

- Provides rapid cooling of silicon wafers.
- Creates an inert atmosphere during chip fabrication.

Significance

- A critical resource for the **India Semiconductor Mission (ISM)**.
- Supports domestic semiconductor manufacturing.

3. Space and Aerospace

Application

- Used to pressurise rocket fuel tanks.
- Purges fuel lines in cryogenic propulsion systems.

Significance

- Essential for **ISRO** missions.
- Supports:
 - **LVM3** launch vehicle.
 - **Gaganyaan** Human Spaceflight Mission.

4. Quantum Computing

Application

- Used in **dilution refrigerators** to cool quantum processors close to absolute zero.

Significance

- Fundamental for India's **National Quantum Mission**.
- Enables stable operation of quantum computers.

5. Telecommunications

Application

- Used during the manufacture of **optical fibre cables**.
- Prevents microscopic defects by rapidly cooling molten glass.

Significance

- Supports:
 - **BharatNet**.
 - Nationwide **5G/6G** rollout.

6. Defence and Nuclear Sector

Application

- Used as the preferred gas for leak detection in high-pressure and vacuum systems.

Significance

- Ensures safety and integrity in:
 - Nuclear power plants.
 - Naval propulsion systems.
 - Defence equipment.

Helium Resources in India

1. Bakreshwar Thermal Springs (West Bengal)

- India's most promising indigenous helium source.
- Geothermal gases contain approximately **1.4% helium**.
- The **Variable Energy Cyclotron Centre (VECC)** under the **Department of Atomic Energy (DAE)** has established a pilot plant to:

- Capture.
- Purify.
- Liquefy helium.

2. Monazite Sands (Kerala)

- Rich in **Thorium** and **Uranium**, whose radioactive decay produces helium.
- Commercial extraction remains technologically challenging and capital-intensive.

3. Oil and Natural Gas Basins

- **ONGC** is mapping natural gas fields, including:
 - Godavari Basin.
 - Mahanadi Basin.
- However, Indian natural gas generally contains very low helium concentrations compared to major global producers.

Challenges

- Heavy dependence on imports.
- Highly concentrated global production.
- Geopolitical disruptions affecting supply.
- Complex storage and transportation requirements.
- Limited commercially viable domestic reserves.
- Rising demand from strategic sectors such as semiconductors, quantum computing, healthcare and space technology.

Way Forward

1. Develop Domestic Resources

- Scale up helium extraction from **Bakreshwar Thermal Springs**.
- Accelerate exploration of helium-bearing natural gas reserves.

2. Diversify Import Sources

- Reduce dependence on a single supplier by expanding imports from multiple producing countries.

3. Build Strategic Reserves

- Establish national helium reserves for critical sectors such as healthcare, defence and scientific research.

4. Promote Recycling

- Encourage helium recovery and recycling in:
 - Hospitals.
 - Research laboratories.
 - Semiconductor manufacturing facilities.

5. Strengthen Research and Technology

- Invest in cost-effective extraction, storage and liquefaction technologies through indigenous R&D.

Significance

- Helium is a **critical strategic resource** for emerging technologies, healthcare, defence and space exploration.
- Supply disruptions can significantly affect India's ambitions in **semiconductor manufacturing, quantum computing, digital infrastructure** and **space technology**.
- Developing domestic capabilities and diversifying supply sources are essential for strengthening India's technological self-reliance and strategic resilience.

Parrot Bornavirus 4 (PaBV-4)



Why in News?

- India has reported its **first confirmed detection and genetic characterisation** of **Parrot Bornavirus 4 (PaBV-4)**.
- The discovery highlights a previously undocumented threat to **captive and exotic psittacine birds** in the country.

Parrot Bornavirus 4 (PaBV-4)

About

- **Parrot Bornavirus (PaBV)** belongs to the genus **Orthobornavirus** under the **Bornaviridae** family.

- It primarily infects **psittacine birds**, including:
 - Parrots.
 - Parakeets.
 - Macaws.
 - Cockatoos.
 - Cockatiels.
 - Budgerigars.
 - Lovebirds.

Classification

Based on genome sequencing, **Parrot Bornaviruses** are classified into **eight genotypes**, grouped into two clades:

1. *Alphapsittaciforme*

Includes:

- PaBV-1
- PaBV-2
- PaBV-3
- **PaBV-4**
- PaBV-7
- PaBV-8

2. *Betapsittaciforme*

Includes:

- PaBV-5
- PaBV-6

Associated Disease

Proventricular Dilatation Disease (PDD)

About

- **PaBV** is the causative agent of **Proventricular Dilatation Disease (PDD)**, a serious neurological and gastrointestinal disease affecting psittacine birds.

Symptoms

- Weight loss.
- Regurgitation.
- Weakness.
- Poor coordination.
- Behavioural changes.
- Progressive neurological impairment.
- Death in severe cases.

Key Findings

- **PaBV-4** was detected in **44 out of 83 birds** tested.
- It was identified in:
 - **88%** of birds that died from **Proventricular Dilatation Disease (PDD)**.
 - **19%** of apparently healthy birds.

Asymptomatic Transmission

- Detection of the virus in clinically healthy birds indicates the possibility of **asymptomatic carriers**, allowing silent transmission within captive bird populations.

Global Genetic Link

- Genetic sequencing revealed close similarity with **PaBV-4** strains reported from:
 - United States.
 - Canada.
 - Israel.
 - Japan.
 - South Korea.
- This suggests a possible link with the **international trade of exotic birds**.

Significance

- Marks the **first confirmed detection** of **PaBV-4** in India.
- Highlights an emerging threat to:
 - Exotic pet birds.
 - Aviculture.
 - Conservation breeding programmes.
- Demonstrates the risk of **cross-border transmission** through international bird trade.
- Emphasises the importance of strengthening **avian disease surveillance** in India.

Way Forward

1. Strengthen Quarantine Measures

- Implement strict quarantine protocols for imported and captive exotic birds.

2. Regular Health Screening

- Conduct routine diagnostic screening for **Parrot Bornavirus** in breeding centres, aviaries and pet facilities.

3. Improve Veterinary Care

- Ensure early diagnosis, clinical monitoring and appropriate veterinary management of infected birds.

4. Enhance Biosecurity

- Maintain hygienic enclosures.
- Improve sanitation practices.
- Prevent contact between infected and healthy birds.

5. Strengthen Disease Surveillance

- Expand surveillance programmes for emerging avian diseases.
- Monitor the movement and trade of exotic birds to prevent the introduction and spread of infectious diseases.

Significance for India

- Protects the health of captive and exotic bird populations.
- Supports conservation breeding programmes and responsible aviculture.
- Strengthens India's preparedness against emerging animal diseases with potential economic and ecological impacts.
- Reinforces the need for robust **biosecurity**, **quarantine**, and **disease surveillance** systems in the wildlife and pet trade sectors.

Gaganyaan Mission



Why in News?

- **ISRO** is advancing preparations for **Gaganyaan**, India's first indigenous human spaceflight mission.
- As part of mission validation, ISRO is conducting extensive tests on the **Crew Module**, which is designed to safely return astronauts to Earth by surviving the extreme heat and forces experienced during atmospheric re-entry.

What is the Gaganyaan Mission?

About

- **Gaganyaan** is India's flagship human spaceflight programme, officially announced in **2018**.
- The mission aims to send **three astronauts** into **Low Earth Orbit (LEO)** at an altitude of about **400 km** for a **three-day mission**, followed by a safe splashdown in Indian waters.

Global Significance

- Successful completion of Gaganyaan will make **India the fourth country**, after the **United States, Russia and China**, to independently develop and execute a human spaceflight programme.

Launch Vehicle

- The mission will be launched using the **Human-rated Launch Vehicle Mark-3 (HLVM3)**, which will place the **Orbital Module (OM)** into the intended orbit.

Uncrewed Test Missions

- Before sending astronauts, ISRO is carrying out multiple uncrewed missions to verify the reliability and safety of critical systems, including:
 - **Crew Module**
 - **Crew Escape System**
 - **HLVM3 Launch Vehicle**

Astronauts for Gaganyaan

- The astronauts selected for the mission are:
 - **Group Captain Prasanth Balakrishnan Nair**
 - **Group Captain Ajit Krishnan**
 - **Group Captain Angad Pratap**

- **Wing Commander Shubhanshu Shukla**

Strategic Importance

- Gaganyaan will enable scientific research in **microgravity**, including studies in:
 - Biological sciences
 - Material science
 - Medicine
- It will also validate technologies such as:
 - Life-support systems
 - Radiation protection
 - Safe atmospheric re-entry
- The mission will support India's future plans for the **Bharatiya Antariksh Station (2035)** and a **crewed lunar mission (2040)**.

Orbital Module (OM)

About

- The Gaganyaan spacecraft, known as the **Orbital Module (OM)**, follows a **two-module configuration** to reduce weight and improve efficiency.

Crew Module (CM)

- The **Crew Module** is a pressurised, habitable capsule that carries the astronauts.
- It contains:
 - **Environmental Control and Life Support System (ECLSS)** to maintain Earth-like living conditions.
 - **Thermal Protection System (TPS)** for re-entry.
 - Avionics and deceleration systems for safe landing.

Service Module (SM)

- The **Service Module** supports the Crew Module while in orbit by providing:
 - Propulsion
 - Electrical power
 - Thermal control
 - Avionics
 - Deployment mechanisms
- It separates before re-entry and burns up in the atmosphere.

Design Advantage

- Unlike **Russia's Soyuz** and **China's Shenzhou**, which use three-module spacecraft, Gaganyaan adopts a **lighter two-module architecture**, improving efficiency while maintaining mission capability.

How Does the Crew Module Ensure Safe Re-entry?

Service Module Separation

- Before re-entry, the **Service Module** separates from the Crew Module through the **Connect & Disconnect System (CS-CDS)**.
- This redundant pyrotechnic system ensures proper separation. Failure could alter the spacecraft's balance and jeopardize a safe re-entry.

Sphere-Cone Design

- The Crew Module uses a **sphere-cone aerodynamic shape**.
- The blunt lower surface creates a detached shockwave that deflects extreme heat, while the conical body generates controlled lift to reduce the forces experienced by astronauts during descent.

Thermal Protection System (TPS)

- The module is protected by an **ablative heat shield**.
- As the spacecraft re-enters the atmosphere, the heat shield gradually burns away, carrying heat with it and protecting the crew from extremely high temperatures.

Active Attitude Control

- **Reaction Control System (RCS)** thrusters continuously adjust the capsule's orientation during descent.
- This ensures the heat shield remains correctly positioned and maintains stable flight throughout re-entry.

Multi-stage Parachute System

- A two-stage parachute sequence slows the capsule safely:
 - **Drogue parachutes** stabilize the capsule.
 - **Main parachutes** reduce its speed for a controlled splashdown.

- The system includes redundant parachutes to improve mission safety.

Crew Module Uprighting System (CMUS)

- After splashdown, the Crew Module may land upside down.
- The **Crew Module Uprighting System (CMUS)** automatically inflates flotation bags using stored cold gas.
- These flotation devices rotate the capsule into an upright position, ensuring crew safety and allowing Indian Navy recovery teams to locate and retrieve the astronauts efficiently.

Conclusion

The **Gaganyaan Mission** represents a major milestone in India's space programme by demonstrating indigenous human spaceflight capability. Through rigorous testing of the Crew Module, advanced re-entry technologies and multiple safety systems, ISRO is laying the foundation for future long-duration space missions, India's own space station, and eventual human exploration beyond Earth orbit.

Draft National Health Research Policy, 2026



\Why in News?

- The **Department of Health Research (DHR)** under the **Ministry of Health and Family Welfare** has released the **Draft National Health Research Policy, 2026** for public consultation.
- The policy proposes India's first integrated framework to strengthen health research by connecting **biomedical sciences, clinical research, public health, epidemiology, digital health, and Artificial Intelligence (AI)** while aligning research priorities with the country's disease burden.

What are the Key Features of the Draft National Health Research Policy, 2026?

National Health Research Agenda (NHRA)

- The policy proposes creating a **National Health Research Agenda (NHRA)** to periodically identify national research priorities.
- The agenda will be based on:
 - Disease burden
 - Health equity
 - Pandemic preparedness
 - National strategic priorities
- Research priorities will be formulated through consultations with **States, Union Territories, researchers, and community stakeholders.**

Three-Tier Governance Structure

To improve coordination across institutions, the policy proposes a three-level governance framework:

- **National Health Research Stewardship Committee:** Overall policy guidance and strategic oversight.
- **Department of Health Research (DHR):** Nodal agency for implementation and coordination.
- **Indian Council of Medical Research (ICMR):** Scientific and technical leadership.

Outcome-Based Research Evaluation

- The draft recommends shifting from publication-focused evaluation to **impact-based assessment.**
- It proposes expanding the **ICMR Impact of Research and Innovation Scale (ICMR-IRIS)**, introduced in 2025.
- Researchers will be evaluated on contributions such as:
 - Public health policies
 - Clinical practice improvements
 - Indigenous technologies
 - Health programmes
 - Institutional capacity
 - Health equity and societal impact

Higher Investment in Health Research

- India currently spends only **0.024% of GDP** on health research.
- The policy proposes increasing public investment to:
 - **0.072% of GDP by 2037**
 - **0.15% of GDP by 2047**
- It also sets long-term targets for:
 - Research funding
 - Medical science PhDs
 - Indigenous health technologies

Focus on Emerging Technologies

The policy identifies several priority research areas, including:

- Artificial Intelligence (AI)
- Health data science
- Precision medicine
- Cell and gene therapy
- Climate-related health research
- Tuberculosis
- Antimicrobial Resistance (AMR)
- Maternal and child health

Shared Research Infrastructure

- Publicly funded laboratories and research facilities will function as **shared national infrastructure**.
- This aims to improve access, reduce duplication of resources, and simplify research processes.

Research Ethics and Data Governance

- The policy gives importance to:
 - Ethical research practices
 - Cybersecurity
 - Data governance
 - Research integrity
 - Community participation
- These measures seek to enhance transparency, accountability, and public confidence in health research.

Why is a National Health Research Policy Needed?

Fragmented Research Ecosystem

- Health research is currently spread across institutions such as **ICMR, DBT, CSIR, AIIMS**, and State medical universities.
- Limited coordination often results in duplication of work and delays in translating research into healthcare policies.

Uneven Research Capacity

- Research facilities are concentrated in premier institutions.
- Many **Tier-II and Tier-III medical colleges** lack adequate infrastructure, skilled researchers, and innovation capacity.

Mismatch with Disease Burden

- Research priorities do not fully reflect India's changing health profile, which includes:
 - Infectious diseases
 - Non-Communicable Diseases (NCDs)
 - Antimicrobial Resistance (AMR)
 - Maternal and child health challenges
 - Climate-sensitive diseases

Weak Translation into Policy

- Existing evaluation systems mainly reward publications and patents.
- As a result, many scientific discoveries fail to translate into affordable technologies, clinical applications, or public health policies.

Need to Regulate Emerging Technologies

- Rapid growth in **AI, genomics, precision medicine, digital health, and health data** requires updated regulatory frameworks.
- Existing approval processes are often slow and complex.

Strengthening Health Security

- India's ranking in the **Global Health Security Index (2021)** highlighted the need to improve:
 - Pandemic preparedness
 - Genomic surveillance
 - Biosecurity
- The policy seeks to build stronger national capabilities in these areas.

Ethical Concerns

- The policy also addresses issues such as:
 - Data fabrication
 - Plagiarism
 - Peer-review manipulation
 - Authorship disputes
 - Excessive self-citation
 - Weak reproducibility
- These practices affect the credibility and quality of scientific research.

Major Initiatives Promoting Health Research in India

National Health Research Programme (NHRP)

- Implemented by **ICMR**, the programme supports large multi-state research projects on priority health issues such as:
 - Tuberculosis
 - AMR
 - One Health
 - Cancer
 - Mental health
 - Vector-borne diseases
 - Neonatal mortality
 - Oral health

Innovative Extramural Research Grants

- ICMR provides dedicated grant programmes, including:
 - **First in the World Challenge (FIWC)**
 - **Anveshan Grants**
 - **Nischayak Grants**
- These schemes encourage innovative research and indigenous healthcare technologies.

Human Resource Development (HRD) Scheme

- Implemented by DHR, the scheme supports research talent through:
 - Women Scientist Fellowships
 - Start-up Grants
 - Short-Term Studentships (STS)
 - NRI/OCI Fellowships

Research Infrastructure Expansion

The government is strengthening research capacity by establishing:

- **Multi-Disciplinary Research Units (MRUs)**
- **Model Rural Health Research Units (MRHRUs)**
- **Viral Research and Diagnostic Laboratories (VRDLs)**

These facilities improve regional research capability, disease surveillance, and public health preparedness.

Anusandhan National Research Foundation (ANRF)

- **ANRF** promotes research, innovation, and scientific development across higher education and research institutions.

ISRO–AIIMS MoU (2026)

- The collaboration focuses on:
 - Space medicine research
 - Healthcare technologies for long-duration space missions
 - Medical support for the **Bharatiya Antariksh Station**
 - Strengthening India's human spaceflight programme.

Conclusion

The **Draft National Health Research Policy, 2026** aims to create an integrated, outcome-oriented, and innovation-driven health research ecosystem. By improving coordination, increasing investment, strengthening ethical standards, and promoting emerging technologies, the policy seeks to make health research more relevant to India's public health needs while supporting evidence-based policymaking and indigenous medical innovation.

Borophene-Based Green Lubrication Technology



Why in News?

- Researchers at the **Institute of Advanced Study in Science and Technology (IASST), Guwahati**, under the **Department of Science and Technology (DST)**, have demonstrated the **world's first use of borophene as a lubricant additive in castor oil**.
- The innovation offers a promising approach for developing **energy-efficient, sustainable and eco-friendly lubrication technologies**.

Why Was This Research Needed?

- **Friction and wear** are major causes of:
 - Energy loss.
 - Equipment damage.
 - Reduced machinery efficiency.
- **Castor oil**, though renewable and biodegradable, has limited lubrication performance.
- Researchers explored whether adding advanced nanomaterials could improve its efficiency without compromising its environmental benefits.

What is Borophene?

- **Borophene** is a **two-dimensional (2D) nanomaterial** composed entirely of **boron atoms**.
- It possesses:
 - High mechanical strength.
 - Excellent electrical conductivity.
 - Superior physical properties suitable for advanced technologies.

Applications

- Batteries.
- Supercapacitors.
- Fuel cells.
- Green lubrication technologies.

Key Findings of the Study

Reduced Friction

- Adding only **0.1 wt.% borophene** to castor oil reduced friction by **about 42%** compared with pure castor oil.

Protective Tribofilm Formation

- Borophene dispersed uniformly in the oil without requiring chemical modification.

- During operation, it formed a **protective tribofilm** containing:
 - Iron oxides.
 - Carbon-based compounds.
 - Boron-containing compounds.

Performance Benefits

The protective layer:

- Reduces shear stress.
- Improves load-bearing capacity.
- Minimises wear and tear of machine components.

Significance

- Improves machinery efficiency.
- Extends the operational life of equipment.
- Reduces energy consumption.
- Supports the development of environmentally sustainable lubrication systems.

Potential Applications

- Renewable energy systems.
- Marine equipment.
- Sustainable manufacturing.
- Green lubrication technologies.

Space Oncology

Why in News?

- **Cancer** remains a major public health challenge worldwide, and India is expected to report nearly **1.87 million new cancer cases in 2026**, increasing both healthcare and economic burdens.
- In this context, **Space Oncology** has emerged as a promising area of research that uses **microgravity** and the unique conditions of space to study cancer, improve drug development, and explore advanced treatment strategies.

What is Space Oncology?

- **Space Oncology** is an emerging branch of medical research that examines how the **space environment**, particularly **microgravity** and **cosmic radiation**, influences cancer cells, tumour growth, treatment response, and disease progression.

- The space environment acts as a **natural laboratory**, allowing scientists to investigate tumour development, metastasis, treatment resistance, radiation effects, biomarker identification, and tissue behaviour under conditions that cannot be replicated on Earth.
- It also supports advanced cancer research through **3D cell cultures, tumour spheroids, protein crystallisation, drug discovery**, and improved drug formulation.

Importance of Space Oncology

- Cancer is caused by the uncontrolled growth of abnormal cells, and its increasing incidence in India highlights the need for more effective treatment strategies.
- The disease creates a significant economic burden due to high treatment costs, income loss, financial distress, and caregiver responsibilities.
- Space-based research enables the development of more realistic tumour models, improving the understanding of cancer biology and accelerating new therapies.
- Microgravity also offers opportunities to enhance drug formulation, improve testing accuracy, and reduce reliance on animal experiments.

Effects of Microgravity on Cancer Cells

- Microgravity alters the internal structure of cancer cells by causing **cytoskeletal reorganisation**, modifying **focal adhesion signalling**, and changing interactions with the **extracellular matrix**.
- These changes influence tumour-cell adhesion, migration, growth, invasion, and gene expression.
- The space environment promotes the formation of **multicellular tumour spheroids**, which closely resemble real tumours and improve cancer research.
- Altered cellular behaviour under microgravity also affects drug absorption and treatment response.

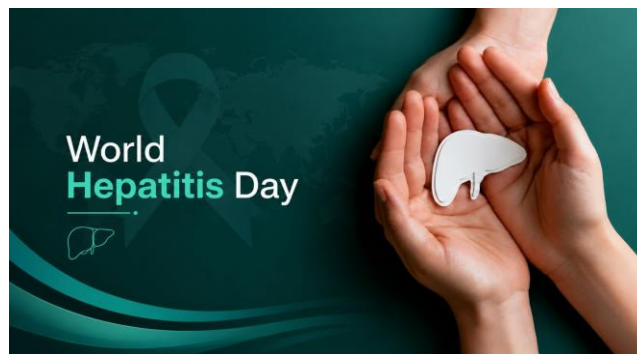
Space Oncology and Different Cancer Types

- **Breast Cancer:** Microgravity may reduce aggressive tumour characteristics by influencing cell adhesion, migration, and cell-cycle regulation, making tumour spheroids more responsive to targeted therapies.
- **Gastrointestinal Cancer:** Certain gastrointestinal cancers exhibit altered growth under microgravity, with increased sensitivity to drugs due to changes in resistance-related genes and cellular proteins.

India's Potential Role in Space Oncology

- India can utilise **ISRO's** growing capabilities and the expanding space sector to promote space-based biomedical research.
- Greater investment in **microgravity-based pharmaceutical research** can support the development of innovative cancer drugs and advanced tumour models.
- Collaboration among **ISRO, research institutions, hospitals, pharmaceutical companies, and private space startups** can accelerate progress in space oncology.
- India can focus on translating space research into **affordable cancer diagnostics, therapies, and drug-delivery technologies** to address its growing cancer burden.
- With declining launch costs and expanding commercial space opportunities, India has the potential to become a **global hub for space biotechnology and cancer research**.

World Hepatitis Day 2026



Why in News?

- **World Hepatitis Day** was observed on **28th July 2026** to raise awareness about **viral**

hepatitis, one of the world's deadliest infectious diseases.

- The theme for **World Hepatitis Day 2026** is "**Hepatitis: Let's Break It Down**", highlighting the need to remove financial, social and systemic barriers to hepatitis prevention, diagnosis and treatment.

What is Hepatitis?

About

- **Hepatitis** is inflammation of the **liver** caused by:
 - Viral infections
 - Toxic substances (alcohol and certain drugs)
 - Autoimmune disorders

Major Types

- The five major hepatitis viruses are:
 - **Hepatitis A (HAV)**
 - **Hepatitis B (HBV)**
 - **Hepatitis C (HCV)**
 - **Hepatitis D (HDV)**
 - **Hepatitis E (HEV)**

Most Serious Forms

- **Chronic Hepatitis B and Hepatitis C** account for more than **90% of hepatitis-related deaths and disability**.
- They are major causes of:
 - Cirrhosis
 - Liver failure
 - Liver cancer

Burden of Hepatitis

Global Burden

- Viral hepatitis causes:
 - Nearly **1.34 million deaths** annually.
 - Around **2 million new infections** every year.
- About **287 million people** live with chronic Hepatitis B or C, most of whom are unaware of their infection.

India's Burden

- India has an estimated:
 - **29 million people** with chronic **Hepatitis B**.

- **5.5 million people** with chronic **Hepatitis C**.

- India ranks **second** among the ten countries with the highest hepatitis burden.
- India accounts for **10–15%** of the global Hepatitis B carrier population.

Seroprevalence

- According to **India's 2021 HIV Sentinel Surveillance**:
 - **Hepatitis B: 0.85%** (about **1 in 118** people).
 - **Hepatitis C: 0.29%** (about **1 in 345** people).
- **Seroprevalence** refers to the proportion of people who test positive for a disease in a surveyed population.

Diagnosis Gap

- India's **Hepatitis B diagnosis rate** is only **2.4%**.
- Most infected individuals remain undiagnosed because the disease often progresses without early symptoms.

Vaccination Gap

- **Birth-dose Hepatitis B vaccination** reaches only about **63%** of newborns.
- **Third-dose coverage** during infancy is around **93%**.
- Delayed birth-dose vaccination increases the risk of **mother-to-child transmission**.

Symptoms

- Early stages are usually symptomless.
- Possible symptoms include:
 - Fatigue
 - Poor appetite
 - Nausea
 - Abdominal pain
 - Dark urine
 - Jaundice

Major Challenges

- Low awareness
- Misinformation
- Social stigma
- Weak integration into primary healthcare

- High treatment costs

WHO Elimination Targets (2030)

- **90% reduction** in new Hepatitis B infections.
- **65% reduction** in hepatitis-related deaths.
- **90% diagnosis coverage.**

Types of Hepatitis

Hepatitis A (HAV) & Hepatitis E (HEV)

Cause

- Infection by **HAV** or **HEV**.

Transmission

- Faecal-oral route through contaminated food and water.
- Associated with poor sanitation and unsafe drinking water.

Prevention

- Safe drinking water.
- Good hygiene and sanitation.
- Hepatitis A vaccination.

Treatment

- Usually self-limiting.
- Supportive care including hydration and proper nutrition.

Hepatitis B (HBV)

Cause

- Infection by the **Hepatitis B virus**.

Transmission

- Mother-to-child during birth.
- Contact with infected blood and body fluids.

Prevention

- Hepatitis B vaccination under the **Universal Immunisation Programme**.
- Birth dose within **24 hours**, followed by doses at **6, 10 and 14 weeks**.
- Safe injections and blood transfusions.

Treatment

- Chronic patients receive antiviral medicines according to national guidelines.

Hepatitis C (HCV)

Cause

- Infection by the **Hepatitis C virus**.

Transmission

- Exposure to infected blood.

- Unsafe injections.
- Shared needles.
- Contaminated blood products.

Prevention

- Safe injections and blood transfusions.
- Needle-exchange programmes.
- No vaccine is currently available.

Treatment

- Nearly all patients can be cured within **12–24 weeks** using **Direct-Acting Antiviral (DAA)** drugs.

Hepatitis D (HDV)

Cause

- Infection by the **Hepatitis D virus**.
- Occurs only in people already infected with **Hepatitis B**.

Transmission

- Contact with infected blood and body fluids.

Prevention

- Hepatitis B vaccination also protects against Hepatitis D.

Treatment

- Specialist management along with treatment of underlying Hepatitis B infection.

Government Initiatives

National Viral Hepatitis Control Programme (NVHCP)

Launch

- Launched in **2018**.

Objective

- Provide:
 - Screening
 - Diagnosis
 - Treatment
- Reduce hepatitis-related illness and deaths.
- Support **SDG 3** for combating communicable diseases by **2030**.

Coverage

- Covers **Hepatitis A, B, C, D and E** through:
 - Prevention
 - Awareness
 - Diagnosis

- Treatment
- Improved access to healthcare

Surveillance & Treatment

- Hepatitis A and E are monitored through the **Integrated Disease Surveillance Programme (IDSP)**.
- Free diagnostic services and medicines are provided for **Hepatitis B and C**.

Digital Monitoring

- Uses the **NVHCP Management Information System (MIS)** for:
 - Paperless registration
 - Reporting
 - Treatment monitoring
 - Programme management

Other Government Initiatives

Maternal & Child Health Programme

- Universal screening of pregnant women for **Hepatitis B**.

Universal Immunisation Programme (UIP)

- Ensures Hepatitis B birth-dose vaccination.
- Infants born to infected mothers receive:
 - Hepatitis B vaccine
 - Hepatitis B Immunoglobulin (HBIG) within **24 hours**.

National AIDS Control Programme

- Screens high-risk groups for Hepatitis B and C.
- Provides Hepatitis B vaccination to healthcare workers and eligible high-risk groups.

National Tuberculosis Elimination Programme (NTEP)

- Uses existing molecular testing machines for hepatitis diagnosis.

Blood Transfusion Services

- Hepatitis-positive blood donors are linked to healthcare facilities for treatment.

Helpline

- Toll-free number: **1800-11-6666**
- Provides information on:
 - Prevention
 - Transmission

- Treatment
- Healthcare facilities

Conclusion

- India has expanded hepatitis screening, diagnosis and treatment through the **National Viral Hepatitis Control Programme** and other national health programmes.
- However, challenges such as **low awareness, delayed diagnosis, incomplete birth-dose vaccination, stigma and limited access to healthcare** continue to hinder elimination efforts.
- Achieving hepatitis elimination will require **stronger primary healthcare, wider testing, timely vaccination, sustained funding and greater public awareness**.

Data Centres in India



Why in News?

- Residents and citizens' groups in **Andhra Pradesh** and **Maharashtra** have protested against proposed mega data centre projects due to concerns over **water, electricity, and environmental impacts**.
- **Google** is developing a **1 GW AI data centre hub** in **Visakhapatnam** and **Anakapalli (Andhra Pradesh)**.
- **Amazon** is setting up a **422 MW hyperscale data centre** in **Thane (Maharashtra)**.
- India's data centre sector is expanding rapidly due to increasing demand for **cloud computing, artificial intelligence (AI), digital payments, e-governance, and data localisation**.

- However, mega data centres require large amounts of **electricity, land, cooling infrastructure, and water**, creating concerns in water-stressed and densely populated regions.
- The protests highlight the need for **transparent environmental assessments, sustainable site selection, water-efficient cooling systems, renewable energy, and meaningful public consultation.**

What are Data Centres?

About

- Data centres are specialised facilities that **store, process, and manage large volumes of digital data.**
- They contain critical **IT infrastructure**, including:
 - Servers
 - Storage devices
 - Networking equipment
 - Cooling systems
 - Power supply systems
 - Security infrastructure
- They provide a **secure, reliable, and scalable environment** for cloud computing, AI applications, and digital services.

Geographical Distribution

- India currently has around **150 data centres.**
- Major operators include:
 - Amazon Web Services (AWS)
 - Microsoft Azure
 - Google Cloud
- **Mumbai** hosts more than **50%** of India's data-centre capacity.
- Emerging hubs include:
 - Ahmedabad
 - Pune
 - Visakhapatnam (Vizag)

Key Factors Driving Growth of Data Centres

Rapid Digitalisation

- Expansion of:
 - E-governance

- E-commerce
- Digital payments
- Online services

- India generates nearly **20% of the world's data** but possesses only about **3% of global data-centre capacity**, creating a significant infrastructure gap.

Artificial Intelligence & Cloud Computing

- Growth of:
 - Generative AI
 - Cloud services
 - Enterprise digitalisation
- AI-specific data-centre capacity is expected to increase from about **275 MW** to nearly **6,546 MW by 2030.**
- Total operational capacity could reach nearly **12 GW.**

Large Digital Consumer Base

- India has:
 - Over **1.03 billion internet users**
 - Around **22 billion UPI transactions every month**
- Rising use of:
 - Smartphones
 - 5G
 - Internet of Things (IoT)
 - Data-intensive applications is increasing demand for domestic data storage.

Government Policies

- States offer:
 - Subsidised land
 - Electricity incentives
 - Stamp-duty exemptions
 - Tax reimbursements
 - Faster approvals
- Examples:
 - **Gujarat Data Centre Policy 2026–29** aims for **₹6 lakh crore investment and 7.5 GW capacity.**
 - **Andhra Pradesh** plans around **5 GW capacity** in Visakhapatnam.

Private & Global Investments

Major projects include:

- Google – **1 GW AI campus** (Visakhapatnam)
- Reliance & Meta – **168 MW** facility (Jamnagar)
- Yotta – Greater Noida (**40 MW expandable to 250 MW**)
- TCS HyperVault – Target of **1 GW**

Data Localisation

- Data protection policies encourage companies to store Indian users' data within India.
- Benefits include:
 - Improved digital sovereignty
 - Reduced dependence on foreign infrastructure
 - Better security of financial and government data

Government Initiatives

State Data Centre Policies

States including:

- Gujarat
- Uttar Pradesh
- Tamil Nadu
- Telangana
- Maharashtra
- Andhra Pradesh have introduced dedicated data-centre policies.

Fiscal Incentives

Governments provide:

- Stamp-duty exemptions
- Electricity-duty reimbursement
- Capital subsidies
- Interest subsidies
- Tax benefits
- Concessional land

Infrastructure Support

- Dedicated data-centre parks
- Reliable electricity and water supply
- High-capacity substations
- Single-window clearances

- Relaxed building and Floor Space Index (FSI) norms

Digital India (2015)

- Strengthens digital infrastructure and supports large-scale data management.

National Informatics Centre (NIC)

- Operates National Data Centres supporting e-governance services.

Concerns Associated with Data Centres

Water Stress

- Cooling systems require large quantities of water.
- A **1 MW** data centre may consume around **25.5 million litres annually**.
- This increases pressure on water-scarce regions.

Pressure on Electricity Grid

- AI data centres could add nearly **26.3 GW** of electricity demand by **2031–32**.
- Sudden demand spikes may:
 - Cause transmission congestion
 - Affect grid stability

Environmental Impact

- High electricity consumption may increase dependence on fossil fuels.
- Diesel generators and cooling systems contribute to:
 - Air pollution
 - Noise pollution
 - Carbon emissions
- Data centres may account for around **7% of India's electricity demand by 2040**.

Limited Local Employment

- Data centres are highly capital-intensive.
- Permanent employment opportunities remain relatively low after construction despite large consumption of land, water, and power.

Transparency Issues

Concerns include:

- Unclear water-use estimates
- Limited environmental disclosures
- Inadequate public consultation

- Confidential project agreements

Financial & Strategic Risks

- Heavy subsidies and debt-funded expansion may create underutilised infrastructure.
- Dependence on a few global hyperscale companies may increase technological and economic dependence.

Measures to Address Concerns

Transparent Resource Disclosure

- Developers should publicly disclose verified estimates of:
 - Water consumption
 - Electricity demand
 - Cooling requirements
 - Emissions
 - Waste generation

Mandatory Public Consultation

- Conduct public hearings involving:
 - Local communities
 - Municipal bodies
 - Environmental groups
- Make environmental impact reports publicly available.

Water-Sensitive Planning

- Promote:
 - Treated wastewater
 - Closed-loop cooling systems
 - Rainwater harvesting
 - Water-efficient technologies
- Avoid dependence on drinking-water sources.

Comprehensive Environmental Assessment

- Assess impacts on:
 - Forests
 - Wildlife
 - Reservoirs
 - Air quality
 - Noise
 - Nearby residential areas

Sustainable Energy Use

- Increase use of:
 - Renewable energy

- Energy-efficient servers
- Battery-based backup systems

- Reduce dependence on diesel generators.

Appropriate Site Selection

- Locate data centres away from:
 - Ecologically sensitive areas
 - Densely populated regions
 - Water- and power-stressed areas

Local Benefit Sharing

- Ensure commitments towards:
 - Local employment
 - Skill development
 - Infrastructure improvement
 - Business opportunities for local communities

Independent Monitoring

- Establish real-time monitoring of:
 - Water use
 - Electricity consumption
 - Environmental compliance
 - Community grievances
- Ensure periodic public reporting and penalties for violations.



EDITORIALS

CruX of The Hindu & Indian Express

Science & Technology

India's Ethanol Blended Petrol (EBP) Programme: Achievements, Challenges & the Road Ahead



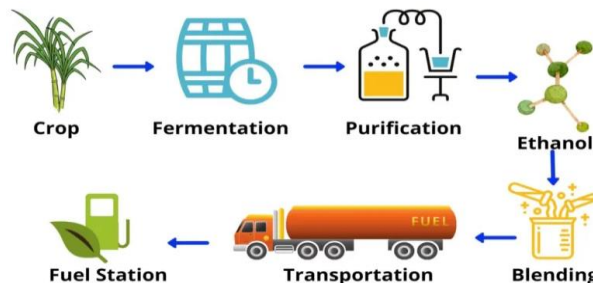
Why in News?

- India's **Ethanol Blended Petrol (EBP) Programme** has become a key pillar of the country's **energy transition** and **biofuel policy**.
- The programme aims to:
 - Strengthen **energy security**.
 - Reduce dependence on imported crude oil.
 - Support farmers through an additional source of income.
 - Lower greenhouse gas emissions.
 - Promote domestically produced renewable fuels.
- Recently, **E20 petrol** has attracted public attention due to concerns regarding:
 - Vehicle mileage.
 - Engine compatibility.
 - Running costs.
 - Consumer choice at fuel stations.

Key Points :

- India's transition towards cleaner mobility is being driven through multiple technologies, including:
 - Ethanol blending
 - Flex-fuel vehicles
 - Hybrid vehicles
 - Electric Vehicles (EVs)
 - CNG
 - Compressed Biogas (CBG)
 - Hydrogen fuel
- Among these, **ethanol blending** offers one of the quickest and most cost-effective pathways to reduce transport-sector emissions while improving energy security.
- However, concerns relating to **fuel efficiency, vehicle compatibility, sustainability, water usage, pricing, and future blending targets beyond E20** require scientific assessment and policy clarity.

What is India's Ethanol Blending Programme (EBP)?



- Ethanol (Ethyl Alcohol)** is a renewable biofuel produced through:
 - Fermentation of sugars using yeast.
 - Petrochemical processes.

Major Feedstocks in India

- Sugarcane molasses
- Sugarcane juice
- Maize
- Surplus rice
- Damaged food grains

What is Ethanol Blending?

- Ethanol blending refers to: **Mixing ethanol with petrol** to reduce crude oil consumption and greenhouse gas emissions.

Common Blends

Blend	Ethanol Content	Remarks
E10	10%	Suitable for most existing vehicles
E20	20%	Requires compatible engines; slight reduction in mileage possible

Generations of Ethanol

Generation	Feedstock	Key Characteristics
First Generation (1G)	Sugarcane, Corn, Wheat	Mature technology but competes with food production
Second Generation (2G)	Crop residues, Paddy straw, Bamboo	Converts agricultural waste into fuel; reduces stubble burning
Third Generation (3G)	Algae	High productivity; does not require agricultural land; under research
Fourth Generation (4G)	Genetically modified organisms	Designed for higher carbon capture; currently at experimental stage

Ethanol Blended Petrol (EBP) Programme

- Launched under the **National Biofuel Policy (NBP), 2018**.

- Implemented by the **Ministry of Petroleum and Natural Gas (MoPNG)**.

Objectives

- Reduce crude oil imports.
- Improve energy security.
- Lower greenhouse gas emissions.
- Increase farmers' income.
- Promote renewable fuels.

Major Achievement

- India achieved its **20% Ethanol Blending Target (E20)** in **2025**, five years ahead of the original target of **2030**.

Current Status (April 2026)

- All petrol sold across India must contain:
 - 20% ethanol (E20)**
 - Minimum **Research Octane Number (RON)** of **95**

Expansion of Ethanol Production Capacity

Year	Production Capacity
2014	Less than 2 Billion Litres
2026	Nearly 20 Billion Litres

Current capacity significantly exceeds the **11 Billion Litres** required for nationwide E20 implementation.

Role of National Biofuel Coordination Committee (NBCC)

The **NBCC** oversees:

- Feedstock selection.
- Allocation based on surplus availability.
- Coordination among ministries.

Key Policy Reforms Supporting EBP

1. Ethanol Interest Subvention Scheme (EISS)

- Operational during **2018–2022**.
- Financial assistance for:
 - Molasses-based ethanol plants.
 - Grain-based ethanol plants.

2. Long-Term Offtake Agreements (LTOAs)

Public Sector Oil Marketing Companies (OMCs) signed long-term agreements with ethanol producers to ensure:

- Assured demand.
- Timely payments.
- Stable markets.

3. Administered Pricing Mechanism

Government-fixed ethanol prices ensured:

- Investment certainty.
- Private sector participation.
- Stable ethanol supply.

4. GST Rationalisation

GST on ethanol was reduced:

- From 18% to 5%**

Result:

- Lower production costs.
- Increased blending.

5. Legislative Reforms

- Amendments in the **Industries (Development & Regulation) Act** facilitated:
 - Interstate movement of ethanol.
 - Easier transportation and distribution.

Impact of the Ethanol Blending Programme

1. Energy Security

The programme has:

- Reduced crude oil imports.
- Saved **over ₹1.4 lakh crore** in foreign exchange since 2014.
- Reduced vulnerability to global oil price fluctuations.

2. Farmer Empowerment

Income Generated

Beneficiary	Earnings (Till 2025)
Farmers	₹1.18 lakh crore
Distilleries	₹1.96 lakh crore

The programme has transformed farmers from: **Annadata (Food Provider)** to **Urjadata (Energy Provider)**.

3. Rural Employment

The expansion of:

- Distilleries
- Agro-processing industries

has created employment opportunities, particularly in:

- Uttar Pradesh
- Maharashtra
- Bihar

4. Climate Action

Ethanol:

- Burns more completely than petrol.
- Produces lower emissions.

Environmental Benefits

- Reduction of approximately **832 lakh metric tonnes of CO₂ emissions**.
- Supports India's **Net Zero by 2070** target.
- Contributes towards India's **Panchamrit Commitments**.

5. Waste-to-Wealth

Grain-based ethanol production generates:

DDGS (Dried Distillers Grain with Solubles)

Uses:

- Premium cattle feed.
- Reduces fodder shortages.
- Supports the circular economy.

Key Concerns Regarding E20 Petrol

1. Reduced Mileage

Since ethanol contains lower energy than petrol:

- Fuel efficiency may decline.
- Consumers may experience higher running costs.

2. Compatibility with Older Vehicles

Older vehicles designed for:

- E10
- Pure petrol

may experience:

- Reduced performance.
- Increased maintenance.
- Durability issues.

3. Material Corrosion

Ethanol is **hygroscopic**, meaning it absorbs moisture.

Possible effects:

- Corrosion of metal components.
- Damage to rubber and plastic parts.
- Wear in fuel pumps and valves.

4. Lack of Consumer Choice

Unlike Brazil, Indian consumers generally cannot choose between:

- E10

- E20
- Pure petrol at fuel stations.

5. Limited Price Incentive

Consumers do not receive visible price benefits despite ethanol blending.

Reasons include:

- Ethanol attracts **5% GST**.
- Petrol remains outside GST.
- Retail prices remain largely unchanged.

6. Concerns Beyond E20

Future transition to:

- E25
- E30
- E85
- E100

would require:

- Fresh engine testing.
- Material compatibility assessment.
- Vehicle certification.
- Homologation.

7. Water Usage

Critics argue ethanol production requires significant water.

Although modern plants:

- Use around **3–5 litres of processed water** per litre of ethanol.
- Operate under **Zero Liquid Discharge (ZLD)** systems.

Concerns remain regarding:

- Water-intensive crops.
- Sustainable feedstock selection.

Global Experience in Ethanol Blending

Country	Ethanol Blending Status
United States	E10 widely used; E15 expanding; large flex-fuel market
Brazil	High ethanol blending; over 80% new cars are flex-fuel vehicles
Japan	Gradual rollout of E10
Canada	Ethanol blending under clean fuel policies
Thailand	Extensive biofuel programme
European Countries	Ethanol blended fuels widely promoted

Measures Needed to Strengthen India's EBP

1. Greater Consumer Choice

Fuel stations should provide:

- E10
- E20
- E25
- E85
- E100

with proper labelling.

2. Scientific Testing

Before moving beyond E20:

Comprehensive testing should cover:

- Engine durability
- Fuel efficiency
- Emissions
- Corrosion resistance
- Certification

3. Promote Flex-Fuel Vehicles

Government support should include:

- PLI incentives
- Tax benefits
- Assured ethanol availability
- Support for advanced engine technologies

4. Retrofit Existing Vehicles

Develop:

- Certified compatibility kits
- Affordable retrofitting solutions
- Financial assistance for older vehicle owners

5. Promote Sustainable Feedstocks

Reduce dependence on sugarcane by encouraging:

- Maize
- Agricultural residues
- Surplus grains
- Damaged food grains
- Second-generation ethanol

Strengthen:

- Farmer Producer Organisations (FPOs)
- Cooperatives
- District procurement centres

6. Transparent Pricing

Government should:

- Provide visible consumer price benefits.
- Improve pricing transparency.
- Protect farmer incomes.

7. Strengthen Infrastructure

Invest in:

- Moisture-controlled storage.
- Dedicated ethanol pipelines.
- Blending facilities.
- Transportation infrastructure.

8. Improve Public Awareness

Consumers should receive clear information regarding:

- Vehicle compatibility.
- Expected mileage changes.
- Warranty validity.
- Insurance coverage.
- Fuel availability.

Conclusion

India's **Ethanol Blended Petrol (EBP) Programme** has emerged as a cornerstone of the country's clean energy transition by reducing crude oil imports, improving energy security, lowering greenhouse gas emissions, and creating new income opportunities for farmers. Achieving the **E20 target ahead of schedule** demonstrates significant policy success. However, long-term sustainability will depend on addressing consumer concerns related to mileage, vehicle compatibility, pricing, infrastructure, and water use through scientific research, transparent communication, diversified feedstocks, and supportive regulatory measures. A balanced and evidence-based approach can position ethanol blending as an effective bridge towards a cleaner, more self-reliant, and resilient transport fuel ecosystem while complementing India's broader transition to electric mobility, hydrogen, and other low-carbon technologies.

Telangana Declares Cancer a Notifiable Disease: Strengthening Cancer Surveillance in India



Why in News?

- Telangana has declared **cancer a notifiable disease**, making it mandatory for **all public and private healthcare facilities** to report every diagnosed cancer case to a **State Cancer Registry Portal within one month**.
- The initiative aims to:
 - Accurately assess the state's cancer burden.
 - Improve disease surveillance.
 - Facilitate evidence-based public health planning.
 - Strengthen India's cancer data ecosystem by integrating with the **National Cancer Registry Programme (NCRP)** under the **Indian Council of Medical Research (ICMR)**.

What is Telangana's New Cancer Notification Policy?

Key Provisions

Under the new policy:

- Every **public and private hospital, clinic, laboratory, and diagnostic centre** must report all confirmed cancer cases.
- Reporting must be completed **within one month of diagnosis**.
- Data will be uploaded to a **State Cancer Registry Portal**.
- The information will be validated by the **Centre of Excellence (MNJ Cancer Hospital)**

before being transmitted to the **National Cancer Registry Programme (NCRP)**.

Objectives of the Policy

The initiative seeks to:

- Accurately estimate the cancer burden.
- Track cancer incidence and mortality.
- Identify geographical disease patterns.
- Improve healthcare planning.
- Enable targeted screening and prevention programmes.
- Strengthen evidence-based policymaking.

Significance of the Initiative

The policy will help:

- Generate comprehensive cancer statistics.
- Improve allocation of healthcare resources.
- Support early diagnosis and treatment planning.
- Enhance cancer surveillance across the state.
- Standardize cancer reporting with national databases.

What is a Notifiable Disease?

A **notifiable disease** is a disease that must be **reported by law** to designated government authorities whenever it is diagnosed.

The objective is to enable:

- Disease surveillance.
- Early detection of outbreaks.
- Timely public health interventions.
- Better health planning and resource allocation.

Legal Framework in India

Epidemic Diseases Act, 1897

The **Epidemic Diseases Act, 1897** provides the legal framework for disease notification in India.

However:

- The **State Governments** decide which diseases are notified within their jurisdictions.
- The **Union Government** generally mandates notification for nationally significant communicable diseases.

Common Notifiable Diseases in India

Several diseases have already been notified by various states, including:

- Tuberculosis (TB)
- Dengue
- Malaria
- Cholera
- Hepatitis
- Measles
- Polio

During the COVID-19 pandemic:

- **COVID-19** was declared a notifiable disease across the country.

Cancer Notification in India: Current Scenario

National Position

- At present:
 - **Cancer is not a nationally notifiable disease.**
- The **Ministry of Health and Family Welfare** has traditionally restricted mandatory notification mainly to **communicable diseases** because of their epidemic potential.

State-Level Initiatives

In the absence of a national mandate:

- **17 Indian States** have independently declared cancer a notifiable disease.
- **Telangana** is the latest state to adopt this policy.

This reflects growing recognition of the need for comprehensive cancer surveillance.

Data Deficit in India's Cancer Care

Existing Cancer Surveillance System

- India currently relies on two major cancer surveillance mechanisms:

1. Population-Based Cancer Registries (PBCRs)

- These registries collect data on cancer cases occurring within a defined population.

2. Hospital-Based Cancer Registries (HBCRs)

- These registries collect information from hospitals regarding cancer diagnosis, treatment, and outcomes.

Limitations of Existing Registries

The current surveillance system faces several challenges:

- **Limited Population Coverage**

- PBCRs and HBCRs together cover only **10–16% of India's population.**

- **Urban Bias**

- Most registries are concentrated in:
- Urban areas
- Major cities
- leading to underrepresentation of rural populations.

- **Public Sector Bias**

- Many cancer cases diagnosed in:
- Private hospitals
- Small clinics
- remain outside the existing registry network.

Incomplete National Data

As a result:

- Actual cancer incidence remains underestimated.
- Regional disparities are poorly captured.
- Policy decisions may not reflect ground realities.

Growing Cancer Burden in India

According to the **Global Cancer Observatory (GLOBOCAN)**:

Year	Estimated Cancer Cases
2022	1.41 Million
2045 (Projected)	2.46 Million

Projected Increase

- Approximately **74% increase** between 2022 and 2045.

Reasons for Rising Cancer Cases

The increase is attributed to:

- Ageing population.
- Increased life expectancy.
- Lifestyle changes.
- Urbanisation.
- Tobacco and alcohol consumption.
- Environmental pollution.
- Changing dietary habits.

Institutional Recommendations

The following institutions have long advocated mandatory cancer notification:

- **Indian Council of Medical Research (ICMR)**
- **National Centre for Disease Informatics and Research (NCDIR)**

They recommend making cancer a notifiable disease to:

- Capture missing data.
- Improve surveillance.
- Include private healthcare providers.
- Develop comprehensive national cancer statistics.

Policy Implications of Cancer Notification

Making cancer a notifiable disease would have several important policy implications.

1. Improved Disease Surveillance

Mandatory reporting would provide:

- Reliable incidence data.
- Mortality statistics.
- Regional disease mapping.

2. Better Healthcare Planning

Accurate data would support:

- Establishment of cancer treatment centres.
- Expansion of oncology services.
- Human resource planning.
- Better allocation of healthcare funds.

3. Strengthening Health Insurance

Reliable epidemiological data can help:

- Expand insurance coverage.
- Estimate financial requirements.
- Improve reimbursement planning.

4. Targeted Public Health Interventions

Disease mapping enables:

- Focused screening programmes.
- High-risk district identification.
- Awareness campaigns.
- Early diagnosis initiatives.

5. Enhanced Research

Comprehensive databases support:

- Cancer epidemiology research.
- Clinical studies.

- Health policy analysis.
- Identification of emerging cancer trends.

Challenges

Despite its benefits, mandatory cancer notification may face several challenges:

- Increased reporting burden on healthcare providers.
- Need for digital reporting infrastructure.
- Ensuring data accuracy and standardisation.
- Integrating private healthcare institutions.
- Protecting patient confidentiality and data privacy.
- Requirement for trained personnel and continuous monitoring.

Way Forward

To strengthen cancer surveillance across the country, the following measures are needed:

National-Level Notification

- Consider declaring cancer a **nationally notifiable disease** to ensure uniform reporting across all states.

Strengthen Cancer Registries

- Expand the coverage of **Population-Based Cancer Registries (PBCRs)**.
- Improve **Hospital-Based Cancer Registries (HBCRs)**.
- Increase rural and private-sector participation.

Digital Integration

- Develop a unified national digital reporting platform.
- Integrate state registries with the **National Cancer Registry Programme (NCRP)**.

Public–Private Collaboration

- Mandate reporting by private hospitals, laboratories, and diagnostic centres.
- Standardise reporting formats and timelines.

Capacity Building

- Train healthcare professionals in cancer reporting.
- Improve digital infrastructure and data management systems.

Strengthen Prevention and Early Detection

Use surveillance data to:

- Expand screening programmes.
- Promote early diagnosis.
- Improve Information, Education, and Communication (IEC) campaigns.
- Enhance tobacco control and lifestyle interventions.

Conclusion

Telangana's decision to declare **cancer a notifiable disease** marks a significant step towards strengthening cancer surveillance and evidence-based healthcare planning in India. By mandating reporting from both public and private healthcare institutions, the initiative addresses longstanding gaps in cancer data collection and improves the accuracy of disease burden estimates. As cancer cases are projected to rise substantially in the coming decades, comprehensive surveillance will be essential for expanding healthcare infrastructure, improving insurance coverage, strengthening early detection programmes, and designing targeted public health interventions. The Telangana model could serve as an important template for a future **national framework for mandatory cancer notification**, enabling India to build a more responsive and data-driven cancer control strategy.

Vikram-1: India's First Privately Developed Orbital Rocket and the Rise of the Commercial Space Sector



1. Context

- Skyroot Aerospace successfully launched Vikram-1 under Mission Aagaman, making it India's first privately developed orbital

launch vehicle to successfully place payloads into **Low Earth Orbit (LEO)**.

- With this achievement, **India became the third country after the United States and China** where a private company has independently reached orbit.
- The mission marks a historic milestone in India's commercial space journey and validates the country's recent space sector reforms.

2. About Vikram-1

- **Vikram-1** is an **orbital launch vehicle** developed by **Skyroot Aerospace**, a Hyderabad-based private space company and India's first space-sector unicorn.
- The rocket is named after **Dr. Vikram Sarabhai**, regarded as the father of the Indian Space Programme.
- It follows the successful **Vikram-S** suborbital mission launched in **2022**, which demonstrated launch capability but did not achieve orbit.
- The maiden orbital mission, **Mission Aagaman**, successfully placed payloads into Low Earth Orbit, demonstrating India's private launch capability.

3. Key Features of Vikram-1

Payload Capacity

- Vikram-1 is capable of carrying **300–480 kilograms** of payload into **Low Earth Orbit (LEO)**.
- It is specifically designed to serve the rapidly growing global **small satellite launch market**.

Carbon Composite Structure

- The rocket extensively uses **all-carbon composite structures** instead of conventional metallic alloys.
- This significantly reduces the rocket's weight, improves fuel efficiency, and increases payload capacity.

3D-Printed Raman Engine

- Vikram-1 is equipped with the **3D-printed liquid-fuelled Raman engine**.
- The engine enables precise orbital insertion while reducing manufacturing time,

component complexity, and production costs.

Advanced Solid Propulsion

- The lower stages are powered by the **Kalam series solid rocket motors**.
- These provide high thrust, operational reliability, and mission stability.

Symbolic Payload

The maiden mission carried:

- **"Cosmic Bloom"**, a floral artwork symbolising India's scientific aspirations.
- An **18-karat gold micro-rocket** containing microscopic sculptures of:
 - Dr. C. V. Raman.
 - Dr. Vikram Sarabhai.
 - Dr. A. P. J. Abdul Kalam.

4. Significance of Vikram-1

Validation of Space Sector Reforms

- The successful launch validates India's landmark space sector reforms initiated in **2020**.
- It demonstrates the effectiveness of opening the space sector to private participation.

Emergence of a Commercial Space Ecosystem

- Vikram-1 represents India's transition from an **ISRO-led model** to a **public-private partnership model**.
- It strengthens India's position in the global commercial launch services market.

Global Competitiveness

- Indigenous innovations such as **3D printing** and **carbon composite technology** enable India to develop world-class launch vehicles at competitive costs.
- This enhances India's competitiveness in the global small satellite launch industry.

Strategic Importance

- Private launch vehicles reduce dependence on ISRO for routine commercial launches.
- ISRO can therefore devote greater resources to:
 - Gaganyaan.
 - Deep-space exploration.
 - Planetary missions.

- Advanced scientific research.

5. Government Reforms Supporting the Private Space Sector

Indian Space Policy, 2023

- The policy opened the **entire space value chain** to **Non-Government Entities (NGEs)**.
- Private companies are now permitted to undertake:
 - Satellite manufacturing.
 - Launch vehicle development.
 - Launch services.
 - Downstream space applications.

IN-SPACe (Indian National Space Promotion and Authorisation Centre)

About

- IN-SPACe is an autonomous agency established to regulate and promote private participation in the space sector.
- It acts as a **single-window agency** for authorization and facilitation.

Functions

- Grants authorization to private space missions.
- Provides access to ISRO infrastructure and testing facilities.
- Facilitates technology transfer.
- Encourages innovation and commercialization.

NewSpace India Limited (NSIL)

About

- NSIL is the commercial arm of ISRO.
- It promotes commercialization of Indian space technologies and supports private sector participation.

Functions

- Commercial launch services.
- Satellite manufacturing.
- Technology transfer.
- End-to-end space solutions.

6. Government Financial Support

IN-SPACe Seed Fund Scheme

- Provides grants up to **₹1 crore** for startups and MSMEs.

- Supports mentorship, networking, and business development.

₹1,000 Crore Venture Capital Fund

- Created to promote early-stage investment in India's space startup ecosystem.

Technology Adoption Fund (TAF)

- Corpus: ₹500 crore.
- Provides:
 - Up to **60% funding** for startups and MSMEs.
 - Up to **40% funding** for large industries.
- Maximum assistance:
 - **₹25 crore per project.**

Liberalised Foreign Direct Investment (FDI)

The Government has liberalized FDI norms:

- **74% Automatic Route:**
 - Satellite manufacturing and operations.
- **49% Automatic Route:**
 - Launch vehicles.
 - Spaceports.
- **100% Automatic Route:**
 - Satellite components and subsystems.

These reforms encourage foreign investment, technology transfer, and ease of doing business.

7. India's Space Sector: From Policy to Progress

Major achievements include:

- Growth of space startups from **1 startup (2014)** to **over 400 startups (2026)**.
- Expansion of India's space economy from **USD 8.4 billion** towards an estimated **USD 40–45 billion by 2030** and **USD 100 billion by 2040**.
- NSIL successfully executed India's first commercial **LVM3** mission.
- **Vikram-S (2022)** became India's first privately developed rocket.
- **Agnikul Cosmos (2024)** launched from India's first private launch pad using the world's first **single-piece 3D-printed semi-cryogenic engine**.

- IN-SPACe approved India's first PPP Earth Observation satellite constellation led by **Pixxel**.

- **HAL** received SSLV technology transfer.

- **Bellatrix Aerospace** demonstrated indigenous Green Propulsion Systems.

8. Challenges

Limited Launch Infrastructure

- India remains heavily dependent on the **Satish Dhawan Space Centre (Sriharikota)**.

Absence of Reusable Launch Vehicles

- Indian private companies currently use expendable launch systems, unlike **SpaceX**, which significantly reduces launch costs through reusable rockets.

Regulatory Gaps

- India has not yet enacted a comprehensive **Space Activities Act**.
- Issues relating to liability, insurance, intellectual property, and dispute resolution remain uncertain.

Limited Government Procurement

- Unlike NASA, India lacks an "anchor customer" model providing assured long-term contracts to private companies.

Supply Chain Dependence

- India imports many:
 - Space-grade semiconductors.
 - Radiation-hardened electronics.
 - Sensors.
 - Advanced propulsion components.

Orbital Congestion

- Competition for orbital slots and radio spectrum is increasing because of global mega-constellations.

Space Security

- Growing private participation requires stronger:
 - Space Situational Awareness (SSA).
 - Cybersecurity.
 - Space debris management.

9. Way Forward

- Enact a comprehensive **Space Activities Act** to provide legal certainty.
- Establish a specialised tribunal for commercial space disputes.
- Expand government procurement through an **anchor customer model**.
- Launch Production Linked Incentive (PLI) schemes for space-grade electronics and advanced materials.
- Accelerate development of:
 - Kulasekarapattinam Spaceport.
 - Space Manufacturing Parks.
- Promote reusable launch vehicle (RLV) technology.
- Strengthen indigenous manufacturing under **Atmanirbhar Bharat**.
- Utilize international initiatives such as:
 - **iCET (India–US Initiative on Critical and Emerging Technology)**.
 - **Artemis Accords**.
- Enhance global collaboration while protecting strategic national interests.

10. Significance

- Vikram-1 demonstrates India's growing technological capabilities in commercial space.
- It establishes India among a small group of nations capable of privately developed orbital launches.
- The mission strengthens India's ambition of becoming a major global launch service provider.
- It promotes innovation, entrepreneurship, employment, and high-technology manufacturing.
- A vibrant private space ecosystem will contribute significantly to India's economic growth and strategic autonomy.

India Approves Its First Dengue Vaccine – QDENG (TAK-003)

INDIA APPROVES ITS FIRST DENGUE VACCINE
QDENG (TAK-003) developed by Takeda Biopharmaceuticals
Market authorization granted by the Drug Controller General of India (DCGI)

KEY HIGHLIGHTS

- First dengue vaccine approved in India.
- Approved for individuals aged 4 to 60 years.
- Type: Live attenuated tetravalent vaccine.
- Protects against all four dengue virus serotypes (DENV-1, DENV-2, DENV-3, DENV-4).
- Dosage: Two doses administered 3 months apart.
- Can be given irrespective of previous dengue infection.
- No pre-vaccination screening is required.

CLINICAL PERFORMANCE

- Based on 19 Phase I, II and III clinical trials involving over 28,500 participants.
- Phase III (TIDES) trial enrolled 20,000+ participants across eight dengue-endemic countries.
- 80.2% efficacy against confirmed dengue (12 months after second dose).
- 90.4% efficacy against dengue-related hospitalization (18 months).
- Long-term studies showed sustained protection for up to 7 years.

GLOBAL STATUS

- Approved in 43 countries.
- WHO recommends its use in high dengue transmission settings.
- Received WHO prequalification.
- Included in the national immunization programmes of Brazil and public programmes in Argentina, Colombia, and Indonesia.

ABOUT DENGUE

- Cause: Dengue virus (Flavivirus).
- Vector: Female *Aedes aegypti* mosquito.
- Transmission: Mosquito-borne (not spread directly from person to person).
- Symptoms: High fever, severe headache, muscle and joint pain, skin rash, and swelling in some cases.
- Severe forms: Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).

A STRONG STEP TOWARDS A DENGUE-FREE INDIA

1. Context

- The **Drug Controller General of India (DCGI)** has granted **market authorisation** to **Takeda Biopharmaceuticals** India's **QDENG (TAK-003)**, making it the **first dengue vaccine approved in India**.
- The vaccine has been approved for the **prevention of dengue disease in individuals aged 4 to 60 years**.
- The approval marks a significant milestone in India's efforts to reduce the burden of dengue, which remains one of the country's major vector-borne diseases.

2. About QDENG (TAK-003)

- **QDENG (TAK-003)** is a **live-attenuated tetravalent dengue vaccine** developed by **Takeda Biopharmaceuticals**.
- It is designed to provide protection against **all four serotypes of the dengue virus (DENV-1, DENV-2, DENV-3, and DENV-4)**.
- The vaccine is administered as a **two-dose regimen**, with the second dose given **three months after the first dose**.
- It can be administered **irrespective of whether an individual has previously been infected with dengue**.
- Unlike some earlier dengue vaccines, **QDENG does not require pre-vaccination screening** for prior dengue infection.

3. Approval by the Drug Controller General of India (DCGI)

- The **Drug Controller General of India (DCGI)** is the national regulatory authority

responsible for approving new drugs, vaccines, and medical devices in India.

- The approval was granted after evaluation of extensive global and Indian clinical trial data demonstrating the vaccine's safety, efficacy, and immunogenicity.
- The vaccine is approved for use in **individuals aged 4–60 years**.

4. Clinical Trial Evidence

The approval is based on **Takeda's global clinical development programme**, which included:

- **19 Phase I, Phase II, and Phase III clinical trials**.
- More than **28,000 participants** across dengue-endemic and non-endemic countries.

TIDES (DEN-301) Phase III Trial

- Included **over 20,000 participants** from **eight dengue-endemic countries**.
- Demonstrated:
 - **80.2% efficacy** against virologically confirmed dengue **12 months after the second dose**.
 - **90.4% efficacy** against dengue-related hospitalization **18 months after vaccination**.
 - **84.1% efficacy** against hospitalization after **4.5 years**.
 - Sustained protection against dengue disease and hospitalization over **seven years** across all four dengue virus serotypes.

Indian Phase III Trial

- Conducted among participants aged **4–60 years**.
- Demonstrated that the vaccine was:
 - Safe.
 - Well tolerated.
 - Immunogenic in children, adolescents, and adults.

5. Global Status

- **QDenga** has been approved in **43 countries** across:
 - Asia.

- Latin America.

- Europe.

- More than **32 million doses** have been distributed through public and private immunization programmes.
- The vaccine has received **WHO prequalification**.
- It is **recommended by the World Health Organization (WHO)** for use in dengue-endemic regions with high transmission.
- It has been incorporated into:
 - **Brazil's National Immunization Programme**.
 - Public vaccination programmes in **Argentina, Colombia, and Indonesia**.

6. About Dengue

- **Dengue** is a **viral disease** caused by the **dengue virus (DENV)**, which belongs to the **Flavivirus** genus.
- It is transmitted primarily through the bite of infected **Aedes aegypti** mosquitoes, and to a lesser extent **Aedes albopictus**.
- There are **four distinct serotypes** of the dengue virus:
 - DENV-1
 - DENV-2
 - DENV-3
 - DENV-4
- Infection with one serotype provides lifelong immunity against that serotype but only temporary protection against the others.

Symptoms

- High fever.
- Severe headache.
- Muscle and joint pain.
- Skin rash.
- Nausea and vomiting.
- In severe cases, dengue may progress to **Dengue Hemorrhagic Fever (DHF)** or **Dengue Shock Syndrome (DSS)**, which can be life-threatening.

7. Dengue Burden in India

- India accounts for **nearly one-third of the global dengue burden**.

- Reported dengue cases have increased **almost eleven-fold over the past two decades**.
- The actual number of infections is believed to be significantly higher than officially reported due to underreporting and asymptomatic infections.
- Dengue outbreaks occur mainly during and after the monsoon season because of increased mosquito breeding.

8. Significance

- The approval of **India's first dengue vaccine** represents a major advancement in the country's public health preparedness.
- Vaccination can significantly reduce severe dengue cases and dengue-related hospitalizations.
- The vaccine strengthens India's strategy for controlling vector-borne diseases.
- It complements existing dengue prevention measures such as vector control, surveillance, and public awareness.
- The availability of a vaccine is expected to reduce healthcare costs associated with recurrent outbreaks.
- It contributes to improved health security in one of the world's largest dengue-endemic countries.

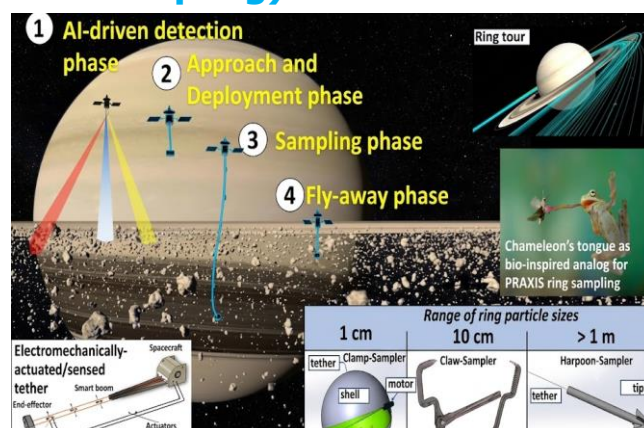
9. Challenges

- Ensuring affordable and equitable access to the vaccine across all regions remains essential.
- Integrating the vaccine into India's immunization strategy will require careful planning.
- Continued mosquito control measures remain necessary because vaccination alone cannot eliminate dengue transmission.
- Public awareness regarding vaccine eligibility and continued preventive practices needs to be strengthened.
- Continuous surveillance will be required to monitor vaccine effectiveness under real-world conditions.

10. Way Forward

- The Government should develop clear guidelines for the phased introduction of the dengue vaccine.
- Vaccination should complement integrated vector management and public health surveillance.
- Strengthening urban sanitation and mosquito breeding control remains critical.
- Research on long-term vaccine effectiveness and disease surveillance should continue.
- Public awareness campaigns should promote vaccination alongside preventive measures such as eliminating stagnant water and using personal protective measures.

PRAXIS (Planetary Rings Autonomous EXploration with In-situ Sampling)



Why in News?

- NASA has selected **PRAXIS (Planetary Rings Autonomous EXploration with In-situ Sampling)** under the **Innovative Advanced Concepts (NIAC) 2026 Phase I** programme.
- The mission proposes the **first-ever direct sampling of particles from planetary ring systems**.

What is PRAXIS?

About

- PRAXIS is a proposed robotic mission designed to **directly collect and analyse particles from planetary rings**.
- If successful, it would become the **first mission to physically sample material from a planetary ring**.

Significance

- Humans have never directly collected particles from planetary rings.
- Samples could greatly improve our understanding of the ring systems of:
 - **Saturn**
 - **Uranus**
 - **Neptune**
 - Smaller ringed bodies such as **Chariklo** and **Chiron**

Saturn's Rings

Composition

- Saturn's rings are composed mainly of **water ice**.
- Ring particles range in size from **microscopic grains to house-sized boulders**.

Dynamic Nature

- Ring particles are constantly:
 - Moving
 - Colliding
 - Combining
 - Breaking apart

Background

Cassini Mission

- NASA's **Cassini Mission** made significant discoveries about Saturn and its rings.
- However, important questions remain regarding:
 - Formation of planetary rings
 - Evolution over time
 - Particle movement
 - Eventual disappearance of rings

Objectives of PRAXIS

- Measure the:
 - Size
 - Porosity
 - Internal structure
 - Chemical composition
- Explain important ring features such as:
 - Density waves
 - Gaps
 - Propellers
 - Self-gravity wakes

Key Features

Close-up Observation

- PRAXIS would provide the **first close-up observations of millimetre- to centimetre-sized ring particles**, a capability unavailable during the Cassini mission.

AI-Powered Robotic Explorer

- The mission will use an **AI-driven, bio-inspired robotic system** capable of:
 - Autonomous navigation
 - Collision avoidance
 - Target selection
 - Precision sampling
 - Real-time scientific analysis

Sampling Method

- Instead of flying directly through the hazardous ring environment, the spacecraft will:
 - Graze the ring plane
 - Identify a suitable particle
 - Perform a **touch-and-go sampling operation**
- Sampling will be carried out using a **long, soft and deployable boom**.

Exploration of Multiple Ring Regions

- After analysing one sample, the spacecraft will move to another section or gap within the rings.
- Sampling from multiple locations will allow scientists to compare particles from different ring environments.

Future Potential

NIAC Phase I

- Focuses on:
 - Computer simulations
 - Detailed system design
 - Mission feasibility studies

Possible Phase II

- If selected, Phase II will support:
 - Prototype development
 - Laboratory testing
 - Feasibility demonstrations
 - Operational strategy development

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Animal and Plant Discoveries–2025: Expanding India's Biodiversity Knowledge Base



Why in News?

- The **Ministry of Environment, Forest and Climate Change (MoEFCC)** released the **Animal Discoveries–2025** and **Plant Discoveries–2025** reports during the **111th Foundation Day celebrations of the Zoological Survey of India (ZSI)** held in Kolkata.
- The reports, prepared by the **Zoological Survey of India (ZSI)** and the **Botanical Survey of India (BSI)** respectively, highlight India's expanding biological diversity documentation efforts.

Key Highlights of Animal and Plant Discoveries–2025

Animal Discoveries–2025

Growth in Faunal Diversity

- India recorded the addition of **709 new animal species in 2025**, increasing the total documented faunal diversity of the country to **1,05,953 species**.
- Among the States and regions, **Kerala reported the highest number of discoveries (98 species)**, followed by West Bengal, Karnataka and Arunachal Pradesh.
- The findings demonstrate the importance of India's diverse ecosystems, including Himalayan regions, islands, forests and

coastal habitats, as centres of biological discovery.

Important Animal Species Discovered

Species	Common Name	Location	Significance
<i>Myotis himalaicus</i>	Himalayan long-tailed Myotis	Uttarakhand (Western Himalayas)	An insectivorous bat with a long tail that contributes to natural pest control.
<i>Lycodon irwini</i>	Irwin's wolf snake	Great Nicobar Island	A non-venomous snake with glossy black appearance named after wildlife conservationist Steve Irwin.
<i>Ptyctolaemus mamdaphaensis</i>	Namdapha green fan-throated lizard	Arunachal Pradesh	A newly identified lizard species found in the Namdapha landscape.
<i>Ptyctolaemus siangensis</i>	Siang green fan-throated lizard	Arunachal Pradesh	A distinct species of green fan-throated lizard recorded from Siang district.

Plant Discoveries–2025

Expansion of Floral Diversity

- The **Botanical Survey of India (BSI)** documented **353 new plant taxa**, expanding India's botanical inventory.
- A significant proportion of these discoveries belonged to **non-vascular plants**, which contributed around **57% of the additions**, while vascular plants accounted for the remaining share.
- Arunachal Pradesh emerged as the leading contributor with 49 plant discoveries**, followed by Uttarakhand and Kerala.

Important Plant Discoveries

- Polystichum siangense:** A newly identified fern species from Arunachal Pradesh.
- Milium beddomei:** A wild relative of custard apple discovered from the Western Ghats.
- Hericium indicum:** A wild edible tooth fungus with ecological and nutritional significance.

Zoological Survey of India (ZSI)

About

- The **Zoological Survey of India (ZSI)** is India's premier institution responsible for

the systematic study, exploration, documentation and conservation-oriented research of animal diversity.

- It functions under the administrative control of the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.

Organisational Structure

- The headquarters of ZSI is located in **Kolkata, West Bengal**.
- It operates through **16 regional centres** spread across different ecological zones of India, including:
 - Western Ghats
 - Marine ecosystems
 - Himalayan and high-altitude regions
 - Island ecosystems

Historical Background

- The origin of ZSI can be traced to the **Zoological Section of the Indian Museum, Calcutta, established in 1875**.
- The foundation of systematic scientific research in India was influenced by the establishment of the **Asiatic Society of Bengal in 1784 by Sir William Jones**.
- ZSI was formally established as an independent organisation on **1 July 1916** to document and study animal diversity in the Indian subcontinent.

Expanded Role in Biodiversity Conservation

- After India became a party to the **Convention on Biological Diversity (CBD) in 1994**, ZSI expanded its role beyond traditional taxonomy.
- It now contributes to:
 - Ecosystem monitoring
 - Species conservation
 - Biodiversity assessment
 - Wildlife research

National Zoological Collection

- Under the **Biological Diversity Act, 2002**, ZSI serves as the national repository for the **National Zoological Collection**.
- It maintains millions of preserved reference specimens that support

scientific research, taxonomy and biodiversity documentation.

Modern Scientific Initiatives

- ZSI contributes to advanced conservation tools and research methods such as:
 - DNA barcoding for species identification
 - Wildlife forensic techniques
 - Environmental Impact Assessments (EIAs)
- It has developed scientific systems such as the **Pangolin Indexing System** to support efforts against illegal wildlife trade.

Major Publications

ZSI publishes several important scientific resources, including:

- **Indian Red Data Book:** Provides information on threatened animal species.
- **Fauna of India Series:** Documents India's animal diversity.
- **Animal Discoveries:** Annual compilation of newly recorded animal species.

Significance of Biodiversity Documentation in India

Scientific Importance

- Species documentation provides a foundation for taxonomy, ecological research and conservation planning.
- It helps identify regions with high biodiversity value and supports ecosystem management.

Conservation Planning

- Newly discovered species require habitat protection and scientific assessment of their conservation status.
- Biodiversity databases assist policymakers in designing protected area strategies and conservation programmes.

Climate and Ecosystem Resilience

- Understanding species diversity improves knowledge of ecosystem functioning and resilience against climate change.
- Documentation of lesser-known organisms, including fungi and non-vascular plants, highlights the ecological importance of all forms of life.

Conclusion

- The discoveries recorded in **Animal Discoveries-2025** and **Plant Discoveries-2025** underline India's rich biological diversity and the importance of continuous scientific exploration.
- Institutions such as ZSI and BSI play a crucial role in documenting species, supporting conservation policies and strengthening India's commitment towards biodiversity protection.
- Expanding scientific databases and strengthening habitat conservation will remain essential for preserving India's ecological heritage.

Delhi Electric Vehicle Policy 2.0: Accelerating the Transition Towards Electric Mobility

Delhi EV Policy 2.0



Why in News?

- The Delhi government has introduced the **Electric Vehicle Policy 2.0**, which is expected to be implemented from **1 July 2026** and will remain operational until **31 March 2030**.
- The policy aims to accelerate the adoption of electric vehicles (EVs), reduce vehicular emissions and establish Delhi as a leading centre for sustainable urban mobility.

Key Provisions of Delhi Electric Vehicle Policy 2.0

Objective

- The policy seeks to promote large-scale electrification of transport by focusing on vehicle categories that contribute significantly to pollution and daily mobility demand.
- Priority segments include:
 - Two-wheelers
 - Three-wheelers
 - Commercial goods vehicles
 - School buses
 - Aggregator fleets
 - Government transport vehicles

Electrification Target

- The policy aims to achieve **30% electrification of Delhi's total vehicle fleet by 31 March 2030**.
- It builds upon the earlier **Delhi EV Policy 2020**, under which EV adoption reached around **14% by 2025**.

Registration Mandates

- The policy introduces phased restrictions on registration of conventional fuel-based vehicles:
 - From **1 January 2027**, only electric three-wheelers and N1 category trucks will be registered in Delhi.
 - From **1 April 2028**, only electric two-wheelers will be eligible for registration.
- Existing fossil fuel vehicles will continue to operate until completion of their permitted lifecycle.

Electrification of School Buses

- School bus operators will be required to convert at least **10% of their fleet to electric vehicles within two years** of policy notification.
- The broader objective is to achieve **30% electrification of school buses by 2030**.

Financial Allocation

- The Delhi government has allocated around **₹7,000 crore** for implementation of the policy.
- The overall investment framework is estimated at **₹15,000 crore**, covering:
 - Charging infrastructure development
 - Vehicle purchase incentives
 - Scrapping incentives
 - Supporting EV ecosystem development

Purchase Incentives

- EV buyers will receive financial support along with exemption from road tax and registration charges.
- Incentive structure includes:

Two-wheelers

- ₹30,000 in the first year
- ₹20,000 in the second year
- ₹10,000 in the third year

Three-wheelers

- ₹50,000 in the first year
- ₹40,000 in the second year
- ₹30,000 in the third year

N1 Commercial Trucks

- Subsidy of up to ₹1 lakh during the first year.

Vehicle Scrapping Incentives

- Incentives will be provided for scrapping old vehicles below BS-IV emission standards.
- Proposed support includes:
 - Two-wheelers: ₹10,000
 - Three-wheelers: ₹25,000
 - Four-wheelers: ₹1 lakh
 - N1 trucks: ₹50,000
 - Gramin Seva vehicles: ₹15,000

Charging Infrastructure Development

- The policy aims to establish more than **30,000 public charging points** across Delhi.
- Around **₹1,000 crore** has been earmarked for charging infrastructure expansion.

- The objective is to address range anxiety and improve consumer confidence in EV adoption.

Implementation Mechanism

- The **Transport Department** will serve as the nodal agency responsible for policy execution.
- **Delhi Transco Ltd.** will develop charging infrastructure in coordination with:
 - Power Department
 - Electricity distribution companies

Special Provision for N2 Electric Trucks

- Electric N2 trucks carrying loads between **3.5 tonnes and 12 tonnes** will receive exemption from “No Entry” restrictions for a period of **10 years**.
- This benefit will be limited to the first **1,000 N2 electric trucks** purchased within three months of policy notification.

Exclusion of Hybrid Vehicles

- The policy does not provide incentives for hybrid vehicles.
- The government has chosen to prioritise pure electric vehicles due to their zero tailpipe emission advantage.

Significance of Delhi Electric Vehicle Policy 2.0

Reduction in Air Pollution

- Transport emissions are among the major contributors to Delhi's air pollution crisis.
- Increased EV adoption can reduce dependence on fossil fuels and improve urban air quality.

Focus on High-Impact Transport Segments

- Prioritising two-wheelers, three-wheelers and commercial vehicles can generate greater environmental benefits due to their high usage intensity.

Shift Towards Structural EV Adoption

- The policy moves beyond short-term subsidies and introduces regulatory measures to create long-term behavioural and market transformation.

Promotion of Green Economy

- Expansion of EV adoption can encourage investment in:
 - Battery manufacturing
 - Charging networks
 - EV maintenance services
 - Fleet electrification

Model for Other Cities

- Delhi's experience can provide a framework for other urban centres seeking to transition towards cleaner transportation systems.

Challenges Associated with Electric Vehicle Transition

High Initial Cost

- Electric vehicles generally have higher upfront costs compared to conventional vehicles.
- This may affect adoption among:
 - Auto-rickshaw drivers
 - Delivery workers
 - Small commercial vehicle operators

Financing Constraints

- Limited access to affordable loans and financing options may slow EV adoption among low-income users and small businesses.

Charging Infrastructure Issues

- Large-scale deployment requires:
 - Adequate charging stations
 - Reliable electricity supply
 - Regular maintenance
 - Convenient public access

Pressure on Power Grid

- Rapid growth in EV charging demand may increase stress on urban electricity networks, especially during peak hours.

Battery Management Challenges

- Growing EV adoption will create concerns related to:
 - Battery waste disposal
 - Recycling systems

- Availability of land for charging facilities
- Transition of workers involved in conventional vehicle repair services

Conclusion

- Delhi Electric Vehicle Policy 2.0 represents a major step towards transforming urban transport through cleaner mobility solutions.
- By combining purchase incentives, registration mandates, charging infrastructure development and scrappage support, the policy aims to create a sustainable EV ecosystem.
- Effective implementation, affordable financing, battery recycling mechanisms and reliable infrastructure will be crucial for achieving Delhi's long-term electric mobility goals.

Discovery of Gitchak nakana: India's First Aquifer-Dwelling Blind Fish from Northeast India



Why in News?

- Recently, an international team of taxonomists discovered a new genus and species of blind, groundwater-dwelling fish named **Gitchak nakana** from a dug-out well in Assam.
- The discovery represents the **first documented occurrence of a specialised subterranean fish from Northeast India and the Eastern Himalayan region**, expanding knowledge about India's hidden groundwater biodiversity.

About Gitchak nakana

Nomenclature

- The species name has been derived from the **Garo language**.
- '**Gitchak**' means **red**, referring to the fish's bright red colouration when alive.
- '**Na-tok kana**' means **blind fish**, highlighting its absence of functional eyes.

Taxonomic Classification

- **Gitchak nakana** represents a newly identified genus and species.
- It belongs to the family **Cobitidae**, commonly known as the family of true loaches.
- The species shows unique evolutionary adaptations for survival in underground aquatic environments.

Habitat Characteristics

- It is a specialised **subterranean or phreatobitic fish**, meaning it lives in groundwater systems such as aquifers.
- The species was discovered in an isolated dug-out well in Assam.
- Due to its extremely restricted distribution and vulnerability, the exact location of the population has been kept confidential.

Ecological and Biogeographical Significance

First Record from Eastern Himalayas

- The discovery provides the first strong evidence that the **Eastern Himalayas also support specialised subterranean aquatic fauna**.
- Earlier, such highly adapted underground fish species were mainly reported from the **lateritic regions of the Western Ghats in southern India**.

Evolutionary Importance

- Subterranean fishes are considered among the most evolutionarily distinct groups because they develop specialised adaptations for life without sunlight.
- These adaptations include:
 - Loss or reduction of eyes.
 - Enhanced sensory systems to detect movement and chemicals.

- Adaptation to low oxygen and nutrient-poor underground environments.

Comparison with Other Subterranean Fish Species

- India has other unique underground fish species, including:

Blind Catfish (*Horaglanis krishnai*)

- Found in Kerala.
- It is one of the world's most evolutionarily distinct freshwater fishes.
- It survives in underground aquatic habitats and has highly reduced eyes.

Conservation Concerns

Threats to Subterranean Species

- Groundwater-dwelling species are highly vulnerable due to their:
 - Extremely limited geographic distribution.
 - Dependence on specific aquifer conditions.
 - Low population size.
 - Habitat disturbance caused by groundwater extraction and pollution.

Need for Conservation Priority

- Scientists have emphasised the need to identify and protect subterranean biodiversity hotspots.
- Conservation strategies should focus on:
 - Protection of groundwater ecosystems.
 - Regulation of activities affecting aquifers.
 - Detailed population assessments of newly discovered species.

Related Species Under Threat

Neolissochilus pnar (Cave Mahseer)

- The discovery also highlighted concerns regarding **Neolissochilus pnar**, a cave-dwelling mahseer found in Meghalaya.
- It is recognised as one of the largest known cavefish species in the world.
- The species faces threats from:
 - International aquarium trade.
 - Habitat disturbance.

- Lack of scientific data regarding population size and distribution.

Significance of the Discovery

- Expands understanding of India's hidden freshwater biodiversity.
- Highlights that the Eastern Himalayan region contains unexplored subterranean ecosystems.
- Strengthens the need for biodiversity surveys beyond surface ecosystems.
- Demonstrates the importance of conserving lesser-known species with unique evolutionary histories.
- Supports India's broader biodiversity conservation goals under international commitments such as the Convention on Biological Diversity (CBD).

Conclusion

- The discovery of **Gitchak nakana** reveals the presence of highly specialised underground aquatic ecosystems in Northeast India.
- Protecting such unique species requires greater scientific exploration, groundwater ecosystem conservation and targeted biodiversity management.
- Conservation efforts must recognise subterranean habitats as important ecological systems requiring protection alongside forests, rivers and wetlands.

Bengal Fox: Declining Sightings in Tamil Nadu



Why in News?

- Researchers and conservationists have reported a decline in Bengal fox sightings across several districts of Tamil Nadu

where the species was previously common.

- The absence of recent records has raised concerns regarding habitat degradation and threats affecting Bengal fox populations.

About Bengal Fox

About

- The **Bengal fox**, also known as the **Indian Fox** or **Indian Desert Fox**, is a small carnivorous mammal native to the Indian subcontinent.
- It belongs to the family **Canidae**, which includes dogs, wolves and other fox species.

Habitat

- Bengal foxes generally inhabit:
 - Open grasslands.
 - Thorny scrublands.
 - Semi-arid regions.
 - Dry and non-forested landscapes.
 - Foothill regions.
- They prefer areas located between forests and agricultural landscapes and are considered **edge species**.

Distribution

- The species is found across the Indian subcontinent, including:
 - India.
 - Nepal.
 - Pakistan.
- In India, its distribution extends from the Himalayan foothills to the southern tip of the Indian peninsula.

Behavioural Characteristics

Social Behaviour

- Bengal foxes are known for their **monogamous behaviour**.
- They generally form long-term pair bonds and live in family groups.

Activity Pattern

- Their activity pattern varies according to environmental conditions.

- Populations may shift from daytime activity to **crepuscular (active during twilight)** and **nocturnal (active at night)** behaviour.

Breeding

- Breeding season usually occurs during **December and January**.
- The gestation period ranges between **50–60 days**.
- They usually raise their young in underground dens.

Conservation Status

IUCN Status

- Classified as **Least Concern** by the International Union for Conservation of Nature (IUCN).

Legal Protection

- Listed under **Schedule II of the Wildlife Protection Act, 1972**.

Major Threats

Habitat Loss

- Conversion of open scrublands and grasslands for agriculture, infrastructure and urban expansion reduces suitable habitats.

Habitat Fragmentation

- Breaking of continuous habitats into smaller patches restricts movement and reduces genetic exchange among populations.

Human-Wildlife Conflict

- Bengal foxes face direct persecution in some regions due to traditional practices and misconceptions.

Disease Transmission

- Expansion of feral dog populations increases the risk of disease transmission to fox populations.

Significance of Bengal Fox Conservation

- Bengal foxes play an important role in maintaining ecological balance as small carnivores.
- Their presence indicates the health of open grassland and scrub ecosystems.

- Conservation of their habitat also benefits several other species dependent on these landscapes.

Conservation Measures Needed

- Protection and restoration of grasslands and scrub ecosystems.
- Monitoring of declining populations through systematic surveys.
- Reducing habitat fragmentation caused by development activities.
- Controlling disease risks from feral dogs.
- Creating awareness among local communities about the ecological importance of Bengal foxes.

Conclusion

- The decline in Bengal fox sightings in Tamil Nadu highlights the vulnerability of open-habitat species facing rapid landscape changes.
- Although the Bengal fox is currently classified as Least Concern, continued habitat protection, scientific monitoring and community participation are essential to ensure its long-term survival.

Southern Birdwing Butterfly: First Record in Telangana



Why in News?

- The rare **Southern Birdwing butterfly** has been recorded for the first time in Telangana in the **Kollapur Range of Amrabad Tiger Reserve**.
- This sighting marks an important addition to the known distribution range of one of India's largest butterfly species.

About Southern Birdwing

About

- The **Southern Birdwing**, also known as the **Sahyadri Birdwing**, is a large and colourful butterfly species endemic to South India.
- It is mainly associated with the **Western Ghats ecosystem**.
- **Scientific Name:** *Troides minos*
- It is the **second-largest butterfly species in India**.
- It is the **State Butterfly of Karnataka**.

Habitat and Distribution

- Southern Birdwing is generally found up to an elevation of around **3,000 feet (910 metres)**.
- Its habitats include:
 - Lowland evergreen forests.
 - Mixed deciduous forests.
 - Dry scrublands.
 - Agricultural landscapes.
- It is primarily distributed across southern India, especially the Western Ghats region.

Physical Features

Size

- The butterfly has a large wingspan ranging between **140–190 mm**.

Colour and Pattern

- Adult butterflies show distinct colour patterns:
 - **Forewings:**
 - Upper surface is glossy black.
 - Veins are marked with white borders.
 - **Hindwings:**
 - Bright golden-yellow colour.
 - Black borders, spots and veins are present.

Difference Between Male and Female

- Female Southern Birdwings have:
 - Prominent grey-white stripes along the forewing veins.

- Rows of large triangular black spots on the hindwings.

Behaviour

- Southern Birdwings are mainly active during the early morning hours.
- They have:
 - Slow and graceful flight patterns.
 - A preference for flying above tree canopies.

Conservation Status

IUCN Status

- The Southern Birdwing is classified as **Least Concern** under the **IUCN Red List**.

Ecological Significance

- Butterflies act as important indicators of ecosystem health.
- The presence of Southern Birdwing in the Amrabad Tiger Reserve highlights the ecological importance of the region's forests and habitats.
- Its discovery indicates the need for continued biodiversity monitoring in forest landscapes.

Significance of the Discovery

- Expands the known geographical distribution of the Southern Birdwing beyond its traditionally recognised Western Ghats range.
- Highlights the biodiversity value of the **Amrabad Tiger Reserve**.
- Supports further research on butterfly diversity and conservation in Telangana.

Conclusion

- The first documented sighting of the Southern Birdwing in Telangana reflects the rich biodiversity of the Amrabad Tiger Reserve.
- Protecting forest habitats and maintaining ecological connectivity are essential for conserving butterfly species and the wider ecosystem they support.

Five New Species of Impatiens Discovered in Western Ghats

Why in News?

- Researchers have discovered **five new species of flowering plants belonging to the genus Impatiens** from the **misty and rain-fed regions of the Western Ghats in Kerala**.
- The newly identified species add to the rich floral diversity of one of India's most important biodiversity hotspots.

About Five New Species of Impatiens

- The newly discovered species belong to the genus **Impatiens**.
- **Family:** Balsaminaceae.
- Impatiens is a large genus of flowering plants commonly known for their colourful flowers and preference for moist habitats.
- These species were found in high-rainfall and mountainous regions of Kerala's Western Ghats.

Newly Discovered Species

1. *Impatiens berchmansiensis*

- It is a delicate balsam species with **bright yellow flowers**.
- It was discovered near the **cold highland streams of Vagamon in Idukki district, Kerala**.
- Its habitat highlights the adaptation of Impatiens species to cool and moist environments.

2. *Impatiens ninanii*

- It is a hardy herb species with:
 - Violet-coloured petals.
 - Deep purple-speckled stems.
- It was found in the forests of **Mankulam Viripara, Idukki district**.

3. *Impatiens filcyii*

- It is characterised by:
 - Pinkish-purple flowers.
 - A distinctive centre marked with yellow and purple shades.
- It was discovered in the open grasslands of Mamalakkandam, Ernakulam district.

4. *Impatiens xanthopetala*

- The name **xanthopetala** refers to its **yellow petals**.
- It grows on steep rocky cliffs.
- Key features include:
 - Golden-yellow petals.
 - Dark brown spots on the flowers.
- It was found in **Pambanar, Idukki district**.

5. *Impatiens flavispicata*

- It produces:
 - Pure white flowers.
 - A concealed yellow spur.
- It was discovered in the dense forest areas of **Mamalakkandam, Ernakulam district**.

Significance of the Discovery

- The discovery further highlights the exceptional biodiversity of the **Western Ghats**, one of the world's major biodiversity hotspots.
- New plant discoveries help in:
 - Understanding ecological evolution.
 - Strengthening conservation efforts.
 - Identifying species that may require habitat protection.
- The presence of unique Impatiens species in isolated habitats reflects the ecological richness and high endemism of the Western Ghats.

PaleoIndia Portal



Why in News?

The Union Minister of Environment, Forest and Climate Change recently launched the

PaleoIndia Portal, a digital platform aimed at documenting and preserving India's fossil heritage.

About PaleoIndia Portal

Developed By:

- The portal has been jointly developed by:
 - **Zoological Survey of India (ZSI)**
 - **National Centre for Sustainable Coastal Management (NCSCM), Chennai**
- It uses dynamic geological maps provided by the **Geological Survey of India (GSI)**.

Purpose:

- To create a comprehensive digital repository of India's fossil fauna.
- To support research, conservation, and public awareness regarding India's paleontological heritage.

Coverage:

- The portal documents fossil fauna from:
 - **28 States**
 - **8 Union Territories**

Database:

- It currently contains information on **more than 5,000 fossil specimens**.
- The database includes fossils of:
 - Mammals
 - Reptiles
 - Birds
 - Fishes
 - Amphibians
 - Molluscs
 - Arthropods
 - Foraminifera
 - Echinoderms
 - Ichnofossils (trace fossils such as footprints and burrows)

Key Features:

- Provides a **real-time data upload system**.
- Enables contributions from:
 - Field researchers
 - Scientists
 - Citizen scientists

- Helps in documenting and safeguarding India's fossil diversity.

Significance of PaleoIndia Portal

- Creates a centralized platform for India's paleontological records.
- Encourages scientific research on fossils and geological history.
- Supports conservation of fossil sites and heritage.
- Promotes citizen participation in biodiversity and geological documentation.

Key Facts about National Centre for Sustainable Coastal Management (NCSCM)

About:

- NCSCM was established in **2011** by the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.
- It is an autonomous institution working for the protection, conservation, rehabilitation, and sustainable management of coastal ecosystems.

Headquarters:

- **Chennai, Tamil Nadu**

Objectives of NCSCM

- To develop into a world-class knowledge institution for:
 - Coastal zones
 - Marine environment
 - Coastal resources and processes
- To promote **Integrated and Sustainable Coastal Zone Management (ICZM)** for the welfare of traditional coastal and island communities.
- To provide scientific and policy advice to:
 - Union Government
 - State Governments
 - Other stakeholders on coastal management issues.

Major Functions of NCSCM

- Coastal vulnerability assessments.
- Coastal environmental impact studies.

- Mapping of **Ecologically Sensitive Areas (ESAs)**.
- Preparation of **Integrated Coastal Zone Management (ICZM) plans**.
- Scientific support for coastal conservation and policy formulation.

Six Research Divisions of NCSCM

- **Geospatial Sciences, Remote Sensing and Geographic Information Systems (GIS)**
 - Focuses on spatial mapping, satellite data analysis, and coastal monitoring.
- **Integrated Social Sciences & Economics**
 - Studies socio-economic aspects of coastal communities and resource use.
- **Coastal Environmental Impact Assessment**
 - Examines environmental impacts of coastal development activities.
- **Conservation of Coastal & Marine Resources**
 - Works on protection and sustainable use of marine biodiversity.
- **Knowledge, Governance and Policy**
 - Supports policy development, governance frameworks, and knowledge management.
- **Futuristic Research and Integrated Island Management Unit**
 - Focuses on future challenges and sustainable management of island ecosystems.

Conclusion:

The PaleoIndia Portal strengthens India's efforts to document and conserve its fossil heritage by combining scientific research, digital technology, and citizen participation. Along with institutions like NCSCM, it supports a broader approach towards understanding and protecting India's natural heritage.

Unified National Energy Policy Framework



Why in News?

The Indian National Science Academy (INSA), through its Centre for Science, Technology, Innovation and Policy (CSTIP), released a policy brief in May 2026 recommending a **Unified National Energy Policy Framework**. The proposal aims to accelerate India's energy transition while supporting the objectives of **energy independence by 2047** and achieving **net-zero emissions by 2070**.

- The proposed framework seeks to bring together India's fragmented energy policies, improve energy security, modernize the electricity system, and create a coordinated pathway for sustainable growth.
- It focuses on:
 - Renewable energy integration
 - Energy storage solutions
 - Green Hydrogen development
 - Carbon Capture, Utilisation and Storage (CCUS)
 - Circular Economy approaches
 - DISCOM reforms
 - Affordable and inclusive energy transition

What is a Unified National Energy Policy Framework?

About

- It is an integrated policy approach that coordinates different segments of the energy sector, including:
 - Coal, oil and natural gas
 - Renewable energy sources such as solar and wind
 - Electricity generation and distribution
 - Green Hydrogen
 - Climate action commitments
- Instead of managing each energy source separately, the framework views the entire energy chain — production, transmission, distribution and consumption — as one interconnected system.

Need for a Unified Energy Policy Framework

1. Moving from Energy Capacity Addition to System Integration

- India's renewable energy capacity has expanded significantly, increasing from around **40 GW in 2015 to nearly 260 GW in 2025**.
- The growing share of variable renewable energy requires:
 - Better grid management
 - Energy storage capacity
 - Flexible thermal power support
 - Pumped storage hydropower systems
 - Battery Energy Storage Systems (BESS)
- Without proper integration, fluctuations in renewable generation can affect grid stability.

2. Overcoming Fragmented Energy Governance

- India's energy sector is managed by multiple ministries and agencies, including:
 - Ministry of Coal
 - Ministry of Power
 - Ministry of Petroleum and Natural Gas

- Ministry of New and Renewable Energy
- Department of Atomic Energy
- Separate policy approaches often result in:
 - Coordination challenges
 - Delayed implementation
 - Inefficient resource utilization
- A unified framework would consider coal, gas, biomass and renewable energy as interconnected components of the national energy mix.

3. Bridging Supply and Demand Gaps

- Energy production targets are increasing rapidly, but supporting infrastructure and market demand have not developed at the same pace.
- Major programmes such as:
 - National Green Hydrogen Mission
 - SATAT (Compressed Biogas initiative)

face challenges related to:

- Transportation infrastructure
- Storage and evacuation systems
- Pricing mechanisms
- Integrated planning can ensure that energy production is matched with actual consumption requirements.

4. Creating a Common Energy Data System

- Electricity-related information is currently spread across different institutions and lacks uniform standards.
- This affects:
 - Policy planning
 - Investment decisions
 - Real-time grid management
- The proposed **National Electricity Data Centre (NEDC)** under the National Electricity Data Sharing Framework aims to:
 - Create standardized energy databases
 - Improve forecasting
 - Support AI-based grid operations

5. Reducing Import Dependence and Financial Pressure

- India relies heavily on imported crude oil, with imports accounting for more than **85% of crude oil consumption**.
- Fragmented subsidies and policies increase fiscal pressure.
- A coordinated energy framework can connect:
 - Rooftop solar initiatives such as PM Surya Ghar
 - Agricultural solar programmes like PM-KUSUM
 - DISCOM reforms
 - CCUS deployment for emission-intensive industries

Challenges in Implementing a Unified Energy Architecture

1. Institutional Coordination Issues

- Creating a centralized energy planning mechanism may face resistance from existing institutions.
- Different sectors currently operate under separate regulatory structures, creating coordination gaps.
- This can lead to:
 - Mismatch between renewable and conventional energy planning
 - Delays in decision-making

2. Transmission Infrastructure Constraints

- Renewable energy generation is expanding faster than transmission infrastructure.
- Renewable projects generally require:
 - Around 12–18 months for development
- Interstate transmission networks may require:
 - Around 18–30 months
- This gap can result in:
 - Grid congestion
 - Renewable energy wastage
 - Power evacuation challenges

3. Energy Storage Shortfall

- The Central Electricity Authority (CEA) estimates that India will require around

60.63 GW of energy storage capacity by 2030, including **41.65 GW through BESS**.

- Current storage capacity remains inadequate due to:
 - High installation costs
 - Dependence on imported critical minerals

4. Financial Challenges of DISCOMs

- State-owned electricity distribution companies face persistent financial problems due to:
 - High transmission and commercial losses
 - Revenue gaps
 - Unsustainable tariff structures
- Weak DISCOM finances limit their ability to invest in:
 - Smart grids
 - Modern distribution systems
 - Renewable energy integration

5. Just Transition and Federal Concerns

- A national energy transition strategy must address differences among states.
- Major concerns include:
 - Protecting workers in traditional energy sectors
 - Supporting coal-dependent regions
 - Providing skill development opportunities
- Balancing national climate goals with state economic interests remains a key challenge.

Key Features of the Proposed INSA Framework

1. Energy Adequacy

- Focuses on ensuring a stable and diversified energy supply through:
 - Modern infrastructure
 - Large-scale storage systems
 - Advanced digital technologies

2. Energy Access

- Aims to provide reliable energy services to all citizens by:
 - Improving last-mile connectivity

- Strengthening distribution networks
- Expanding decentralized energy solutions

3. Energy Affordability

- Emphasizes that the clean energy transition should remain economically viable for:
 - Households
 - Businesses
 - Industries
- Suggested measures include:
 - Innovative financing mechanisms
 - Market efficiency improvements
 - Consumer protection measures

4. Context-Specific Sustainability

- The framework supports customized climate strategies based on:
 - Regional conditions
 - Social requirements
 - Economic realities
- It promotes:
 - Community participation
 - Workforce transition
 - Region-specific solutions

Strategic Technologies and Enablers

1. Circular Economy and CCUS

- The framework highlights:
 - Circular resource management
 - Carbon Capture, Utilisation and Storage (CCUS)

as important tools to reduce emissions, especially in difficult-to-decarbonize sectors.

2. Green Hydrogen and Clean Technologies

- Prioritizes:
 - Expansion of Green Hydrogen production
 - Development of related infrastructure
 - Promotion of advanced clean energy technologies

3. Integrated Resource Management

- The framework considers:
 - Coal

- Renewable energy
- Biomass
- Natural gas
- Waste-to-energy

as interconnected resources contributing to a unified energy system.

Way Forward

- India needs to focus on:
 - Better coordination among energy institutions
 - Faster development of transmission infrastructure
 - Expansion of affordable energy storage systems
 - Greater adoption of clean technologies
- Long-term priorities should include:
 - Scaling Green Hydrogen
 - Expanding circular economy practices
 - Commercial deployment of CCUS technologies
- A balanced approach combining technological innovation, economic feasibility and social inclusion will be essential for achieving a secure and sustainable energy future aligned with **Net Zero 2070**.

Climate Tipping Points Debate at UNFCCC Subsidiary Bodies Meeting (SB64)



Why in News?

At the **64th Session of the Subsidiary Bodies (SB64)** of the **United Nations Framework Convention on Climate Change (UNFCCC)**

held in Bonn, Germany, India called for greater scientific precision before introducing the concept of “**climate tipping points**” into international climate negotiations.

India emphasised that climate-related decisions should be based on clearly defined scientific parameters and internationally accepted evidence. The Bonn discussions were aimed at preparing technical groundwork for the upcoming **COP31 Climate Change Conference** scheduled in Antalya, Türkiye.

Climate Tipping Points

Meaning

- Climate tipping points refer to critical thresholds within the Earth’s climate system beyond which sudden, large-scale and potentially irreversible changes may occur.
- Once such thresholds are crossed, changes can become self-reinforcing and may continue even without a proportional increase in greenhouse gas emissions.

Examples of Potential Climate Tipping Points

Some major climate systems considered vulnerable to tipping behaviour include:

- **Amazon Rainforest Transformation:**
 - Large-scale degradation of the Amazon could reduce its ability to maintain a rainforest ecosystem, potentially resulting in a shift towards a drier savanna-like environment.
- **Atlantic Meridional Overturning Circulation (AMOC) Disruption:**
 - A slowdown or collapse of this major ocean circulation system could significantly influence global climate patterns.
- **Coral Reef Ecosystem Collapse:**
 - Rising ocean temperatures and increasing stress factors may trigger widespread coral bleaching and biodiversity loss.
- **Monsoon System Changes:**
 - Significant alterations in Indian and West African monsoon

behaviour could affect rainfall patterns, agriculture and livelihoods.

India’s Position on Climate Tipping Points

Demand for Scientific Certainty

India argued that:

- The term “**climate tipping points**” **does not yet have a universally agreed scientific definition.**
- There are uncertainties regarding:
 - The exact thresholds at which changes may occur.
 - The timeline of possible events.
 - The severity of resulting impacts.

India maintained that global climate policies should rely on established scientific research and peer-reviewed evidence rather than concepts that lack precise boundaries.

Clarification Regarding 1.5°C and 2°C Targets

- India highlighted that the **1.5°C and 2°C temperature goals under the Paris Agreement** are internationally negotiated policy objectives.
- These targets should not automatically be interpreted as confirmed climate tipping thresholds.

The distinction is important because exceeding these temperature levels does not necessarily indicate an immediate transition into irreversible climate changes.

Response from the European Union

- The European Union disagreed with India’s concerns.
- It argued that questioning the urgency surrounding climate tipping points could weaken climate action efforts and create uncertainty in negotiations.

Impact on Developing Countries

India raised concerns that including unclear tipping point concepts in UNFCCC frameworks could:

- Increase climate mitigation responsibilities on developing economies.
- Create additional financial and technological pressures.

- Affect the principle of **Equity and Common But Differentiated Responsibilities (CBDR)**.

Common But Differentiated Responsibilities (CBDR)

- CBDR is a key principle of global environmental governance.
- It recognises that while all countries share responsibility for addressing climate change, their historical contributions and capabilities differ.

Climate Finance and Trade-Related Concerns

Along with the tipping point debate, India highlighted:

Climate Finance

- Concerns regarding inadequate and declining climate finance support from developed countries.
- The need for stronger financial assistance to help developing nations undertake climate adaptation and emission reduction measures.

Carbon Border Adjustment Mechanism (CBAM)

- India opposed unilateral trade measures such as the European Union's **Carbon Border Adjustment Mechanism (CBAM)**.
- It argued that such measures could increase costs for developing countries and affect their economic development pathways.

Bonn Climate Change Conference

About

- The Bonn Climate Change Conference is the annual mid-year negotiation meeting conducted under the **UNFCCC framework**.
- It is officially known as the **Sessions of the Subsidiary Bodies (SBs)**.
- Along with the annual **Conference of the Parties (COP)**, it forms one of the major platforms for international climate negotiations.

Objectives

The conference focuses on:

- Reviewing implementation of existing climate commitments.

- Advancing technical discussions on climate policies.
- Preparing negotiation agendas for the upcoming COP.

Supporting Bodies

1. Subsidiary Body for Implementation (SBI)

- Deals with:
 - Implementation of UNFCCC decisions.
 - Institutional arrangements.
 - Financial and technical support mechanisms.

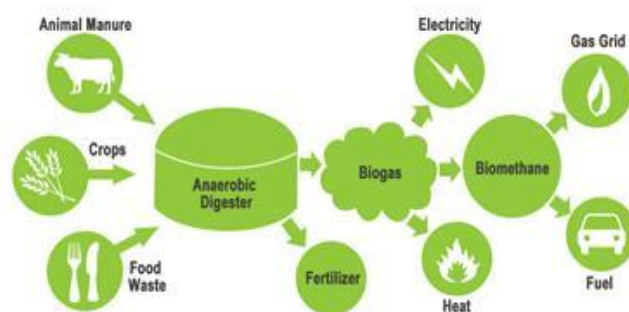
2. Subsidiary Body for Scientific and Technological Advice (SBSTA)

- Provides scientific and technical inputs for climate negotiations.
- Uses assessments and research, including findings from the **Intergovernmental Panel on Climate Change (IPCC)**.

Conclusion

The discussion on climate tipping points reflects the broader challenge of balancing urgent climate action with scientific accuracy. India's position emphasises that international climate policies must be based on clear scientific understanding while ensuring fairness for developing countries. Strengthening climate finance, maintaining equity principles and improving scientific cooperation remain essential for effective global climate governance.

Compressed Biogas (CBG)



Why in News?

- Rising tensions in **West Asia** have renewed concerns about India's heavy reliance on imported fossil fuels, particularly crude oil and LPG transported through the **Strait of Hormuz**.

- In this context, **Compressed Biogas (CBG)** is being viewed as an important domestic energy source that can improve energy security while converting organic waste into clean fuel.

Compressed Biogas (CBG)

About

- **Biogas** is a renewable fuel generated when biodegradable materials decompose in an oxygen-free environment through microbial action.
- Common feedstock includes:
 - Cattle dung.
 - Crop residues.
 - Food waste.
 - Municipal solid waste.
 - Sewage sludge.
 - Other biodegradable biomass.
- Raw biogas mainly contains **methane (45–75%)** along with carbon dioxide and trace gases.
- After removing impurities and compressing the purified methane, it is converted into **Compressed Biogas (CBG)**.
- CBG has properties comparable to **Compressed Natural Gas (CNG)** and can be used for:
 - Transport.
 - Domestic cooking.
 - Industrial processes.
 - Electricity generation.

Current Status of CBG in India

Sector Progress

- India launched the **Sustainable Alternative Towards Affordable Transportation (SATAT)** initiative in **2018** to promote commercial production of CBG.
- The programme initially targeted **5,000 CBG plants**.
- However, by **June 2026**, only **132 plants** had become operational, indicating slower-than-expected implementation.

Mandatory Blending

To create assured demand, the Government has introduced phased blending of CBG with:

- **Compressed Natural Gas (CNG)** used in vehicles.
- **Piped Natural Gas (PNG)** supplied to households.

Blending Schedule

- FY26 – **1%**
- FY27 – **3%**
- FY28 – **4%**
- FY29 onwards – **5%**

Present Scenario

- India possesses abundant biomass resources, yet commercial production remains limited.
- Alongside commercial projects, nearly **2.88 lakh household-scale biogas plants** have been installed over the past decade through government programmes.

Global Scenario

- The **European Union, China**, and the **United States** account for nearly **90%** of global biogas production.

Major Government Initiatives

1. SATAT

- Encourages private entrepreneurs to establish CBG plants.
- Facilitates long-term procurement of CBG by Oil Marketing Companies (OMCs).

2. GOBARDhan Scheme

- Promotes scientific management of cattle dung and biodegradable waste.
- Supports production of:
 - Biogas.
 - Organic manure.
- Financial assistance is provided for community-based projects.

3. CBG Blending Obligation

- Introduces mandatory blending of CBG with CNG and PNG in a phased manner.
- Ensures a stable market for CBG producers.

4. National Bioenergy Programme

- Offers Central Financial Assistance for:
 - CBG plants.
 - Bio-CNG projects.
 - Other bioenergy initiatives.

5. Biomass Aggregation Machinery Scheme

- Assists CBG developers in procuring machinery for collecting, transporting and storing agricultural biomass.

6. Infrastructure Development

- Financial support has been earmarked for connecting CBG plants with existing gas pipeline networks.
- **Swachh Bharat Mission (Urban) 2.0** also encourages biomethanation facilities for processing municipal waste.

Why is CBG Important for India?

1. Enhances Energy Security

- Heavy dependence on imported petroleum products exposes India to international conflicts and price volatility.
- CBG offers a domestically available alternative produced from locally available biomass.

2. Reduces Fossil Fuel Dependence

- Replacing a portion of CNG and LPG consumption with CBG can lower fossil fuel imports and reduce the country's energy import bill.

3. Supports Climate Goals

- As a renewable fuel, CBG emits significantly fewer greenhouse gases than conventional fossil fuels.
- It contributes towards India's **Net Zero target by 2070** and broader clean energy objectives.

4. Converts Waste into Wealth

- Organic waste that would otherwise create pollution can be converted into useful energy.
- This helps tackle:
 - Crop residue burning.
 - Open dumping of waste.
 - Methane emissions from unmanaged biomass.

5. Strengthens Rural Economy

- Farmers and rural entrepreneurs can earn additional income by supplying agricultural residues and cattle dung.
- The digestion process also produces nutrient-rich **Fermented Organic Manure (FOM)**, reducing dependence on chemical fertilisers.

6. Improves Decentralised Energy Access

- Community-level CBG plants can provide reliable energy in rural and remote areas, promoting local energy self-sufficiency.

Challenges

1. High Initial Investment

- Setting up a CBG plant requires substantial expenditure on digesters, purification units, compressors and storage infrastructure.
- India's current production capacity remains only a small fraction of its estimated potential.

2. Financing Constraints

- Financial institutions often consider CBG projects risky due to uncertain revenues, fluctuating gas prices and limited demand for by-products such as organic manure.

3. Feedstock Management

- Biomass is widely scattered and seasonal, making collection and transportation expensive and logistically difficult.

4. Inadequate Infrastructure

- Limited gas pipelines, storage facilities and injection points restrict efficient distribution of CBG.

5. Fragmented Policy Framework

- Multiple schemes are administered by different agencies, leading to overlaps, procedural delays and coordination issues.

6. Land and Food Security Concerns

- Excessive dependence on dedicated energy crops may compete with food production and alter cropping patterns.

Way Forward

Strengthen Financial Support

- Provide viability gap funding, concessional loans, tax incentives and interest subsidies to improve project viability.

Develop Organised Biomass Supply Chains

- Promote farmer cooperatives, biomass collection centres and long-term procurement agreements to ensure uninterrupted feedstock supply.

Expand Infrastructure

- Accelerate development of gas pipelines, storage facilities and local injection points to improve distribution.

Integrate Existing Schemes

- Bring initiatives such as **SATAT**, **GOBARdhan** and the **National Bioenergy Programme** under a coordinated national framework with single-window approvals.

Promote Waste-Based Feedstock

- Give priority to cattle dung, municipal waste, sewage sludge, food waste and crop residues rather than encouraging cultivation of dedicated energy crops.

Significance

- **Compressed Biogas (CBG)** has the potential to become a key pillar of India's clean energy transition by simultaneously addressing **energy security, waste management, rural livelihoods** and **climate commitments**.
- Realising this potential will require faster project implementation, improved financing mechanisms, efficient biomass supply chains and stronger market support for CBG producers.

Manasbal Lake Restoration



Why in News?

- **Manasbal Lake** in **Jammu & Kashmir** is witnessing a remarkable ecological revival, reflected in the return of several migratory bird species following habitat restoration and improved water management measures.

What are the Key Facts about Manasbal Lake?

About

- **Manasbal Lake** is an **alkaline, spring-fed freshwater lake** located in **Ganderbal district, Jammu & Kashmir**.
- It is recognised as **India's deepest freshwater lake**, with a maximum depth of around **13 metres**.
- Popularly called the **"Supreme Gem of Kashmir Lakes,"** it is famous for its **lotus blooms, rich aquatic biodiversity, and diverse birdlife**.
- The lake receives water from **rainfall, natural springs, and surface runoff**, creating a highly productive freshwater ecosystem.

Rich Bird Diversity

- The lake supports **more than 46 bird species** belonging to **23 families**.
- Important species recorded include:
 - Mallards
 - White-headed Ducks
 - Eurasian Hoopoes
 - Horned Grebes
 - Long-eared Owls
- The return of migratory birds is considered an important indicator of improving **water quality and ecosystem health**.

Major Conservation Measures

Habitat Restoration

- The **Wullar-Manasbal Development Authority (WMDA)** has undertaken:
 - Dredging operations
 - Removal of excessive aquatic weeds
- These measures aim to improve water circulation and restore the lake's ecological balance.

Water Resource Management

- The **Jammu & Kashmir Water Resources Regulatory Authority** is preparing a **water budget** to assess:
 - Carrying capacity of the lake
 - Water withdrawals
 - Water availability
- Mechanised gates and gauge meters are being installed to maintain sustainable water levels.

Pollution Control

A comprehensive pollution management strategy includes:

- Establishment of a **Sewage Treatment Plant (STP)**.
- Development of an integrated **Solid Waste Management Plant**.
- Installation of **trash guards** at the Lar irrigation canal to prevent solid waste and pollutants from entering the lake.

Community Participation

- Conservation efforts are supported through:
 - **World Wetlands Day** celebrations.
 - Bird-watching festivals.
 - Promotion of **eco-friendly tourism**.
- These initiatives encourage public participation while reducing human pressure on the wetland ecosystem.

Major Lakes of Kashmir

Wular Lake

- One of **Asia's largest freshwater lakes** and a **Ramsar Site**.
- Plays an important role in **flood control, fisheries, and wetland biodiversity**.

Dal Lake

- Kashmir's most famous urban lake, known for:
 - Houseboats
 - Shikaras
 - Mughal gardens
- It is a major tourism and cultural landmark.

Manasbal Lake

- India's deepest freshwater lake.
- Renowned for its biodiversity, lotus flowers, and successful wetland restoration initiatives.

Surinsar–Mansar Lakes

- Recognised as **Ramsar Sites**.
- Noted for their ecological importance, scenic beauty, and cultural significance.

Conclusion

The restoration of **Manasbal Lake** demonstrates how scientific habitat management, pollution control, sustainable water governance, and community participation can revive fragile wetland ecosystems. The lake's improving ecological condition and the return of migratory birds highlight the importance of integrated conservation for protecting India's freshwater biodiversity.

India's First Hydrogen-Powered Train (NaMo Green Rail)



Why in News?

- Prime Minister Narendra Modi flagged off India's first hydrogen-powered train, named **NaMo Green Rail**.
- The train operates on the **89-km Jind–Sonapat section** of the **Northern Railway** in **Haryana**, marking a

significant step towards clean and sustainable rail transport.

What are the Key Features of the NaMo Green Rail Project?

About the Project

- The project has been launched as a **technology demonstration initiative** to evaluate the performance of hydrogen-powered rail systems under Indian conditions.
- It aims to validate:
 - Hydrogen propulsion technology
 - Refuelling infrastructure
 - Safety protocols
 - Operational procedures
 - Maintenance systems
- The experience gained will support the future deployment of hydrogen-powered trains across India.

Indigenous Development

- The train has been **designed and developed entirely in India**.
- Its technical specifications were prepared by the **Research Design and Standards Organisation (RDSO)**.

Technical Features

- The train consists of:
 - **2 Hydrogen Driving Power Cars**
 - **8 Trailer Coaches**
- Each power car generates **1,200 kW**, providing a total propulsion capacity of **2,400 kW**.
- It has:
 - **Operational speed:** 75 km/h
 - **Maximum design speed:** 110 km/h

How Does the Hydrogen Train Work?

Fuel Cell Technology

- The train uses **Proton Exchange Membrane (PEM) Fuel Cells**.
- Hydrogen stored onboard reacts electrochemically with oxygen from the atmosphere to generate electricity.
- The electricity powers the traction motors that drive the train.

Battery Support

- **Lithium Iron Phosphate (LiFePO₄) batteries** assist during acceleration and help meet changing power requirements, ensuring smoother operation.

Environmental Significance

- The fuel-cell reaction produces only:
 - **Water vapour**
 - **Heat**
- As a result, the train operates **without smoke or direct carbon emissions** from the exhaust.
- However, the overall environmental benefits depend on whether the hydrogen used is produced through **renewable energy sources (green hydrogen)**.

Safety Measures

- Since hydrogen is **highly flammable**, the project incorporates multiple safety features, including:
 - Specialised hydrogen storage systems
 - Leak detection mechanisms
 - Ventilation systems
 - Automatic shutdown systems
- The hydrogen storage and supply system has been approved by the **Petroleum and Explosives Safety Organisation (PESO)**.
- It has also undergone an independent safety assessment by **TÜV SÜD (Germany)**.

Global Significance

- With this achievement, **India joins a select group of countries** that have developed or tested hydrogen-powered railway technology, including:
 - Germany
 - Japan
 - China
 - United States

Potential Applications

- Hydrogen-powered trains can serve as an alternative to diesel locomotives on:
 - Non-electrified railway routes
 - Heritage railway lines
 - Difficult-to-electrify sections

- The project also supports the objectives of the **National Green Hydrogen Mission** and may facilitate future deployment on routes such as the **Kalka–Shimla Railway**.

Challenges

Despite its potential, several challenges remain:

- High cost of hydrogen production.
- Limited availability of **green hydrogen**.
- Complex storage and transportation requirements.
- Need for dedicated hydrogen refuelling infrastructure.

Conclusion :

The **NaMo Green Rail** project marks an important milestone in India's transition towards cleaner railway transport. By demonstrating indigenous hydrogen fuel-cell technology, the initiative supports sustainable mobility, strengthens technological self-reliance, and contributes to India's long-term clean energy and decarbonisation goals.



EDITORIALS

Crux of The Hindu & Indian Express

Ecology & Environment

Coal Power Plants & Sulphur Dioxide Emissions: Pollution Norm Exemptions Raise Air Quality Concerns Around Delhi-NCR



Why in News?

- A report by the **Centre for Research on Energy and Clean Air (CREA)** has revealed that **81% of sulphur dioxide (SO₂) emissions** from coal-fired power plants within a **300 km radius of Delhi-NCR** originate from plants that were **exempted from mandatory installation of Flue Gas Desulphurisation (FGD) systems** under the **July 2025 notification**.
- The findings come one year after the Union Government **relaxed emission norms** for most coal-based thermal power plants.
- Experts warn that increasing coal-based electricity generation, coupled with weaker emission controls, could worsen **PM2.5 pollution** and public health outcomes.

Key Highlights

Major Findings of the CREA Report

- **81%** of SO₂ emissions around Delhi-NCR come from **Category C** coal plants exempted from FGD installation.
- Around **90%** of estimated SO₂ emissions originate from plants operating **without FGD systems**.
- CREA assessed:
 - **12 coal-fired thermal power plants**
 - **37 generating units**
 - **25 units** with sufficient publicly available data.
- Estimated SO₂ emissions in **2025**:
 - **154 kilotonnes (kt)**
- **Category C plants** alone contribute:
 - **125 kilotonnes (81%)**
- **Category A plants** contribute:
 - **29 kilotonnes**

Why the Report is Significant

- India is expected to witness **higher coal-based electricity generation** due to:
 - Rising electricity demand.
 - Reduced hydropower generation during **strong El Niño** conditions.

- Increased coal consumption without effective pollution controls may further deteriorate air quality in North India.

What is Sulphur Dioxide (SO₂)?

Definition

- Sulphur dioxide (SO₂) is a **colourless, toxic gas** produced mainly by:
 - Burning sulphur-containing fossil fuels (especially coal).
 - Industrial processes.
 - Smelting operations.
 - Volcanic activity (natural source).

Major Sources in India

- Coal-fired thermal power plants.
- Petroleum refineries.
- Steel and cement industries.
- Industrial boilers.
- Heavy fuel oil combustion.

Why is SO₂ a Concern?

Health Impacts

Exposure to SO₂ can cause:

- Respiratory diseases.
- Asthma attacks.
- Chronic bronchitis.
- Reduced lung function.
- Cardiovascular diseases.
- Stroke.
- Premature mortality.

Children, the elderly, and people with respiratory illnesses are particularly vulnerable.

Environmental Impacts

SO₂ contributes to:

- Formation of **PM2.5** (secondary particulate matter).
- Acid rain.
- Soil acidification.
- Water pollution.
- Damage to crops and forests.
- Reduced visibility (haze).

How Does SO₂ Form PM2.5?

Formation Process

- Coal combustion releases **SO₂** into the atmosphere.

- SO₂ reacts with:
 - Oxygen.
 - Water vapour.
 - Ammonia.
- Forms:
 - Sulphate aerosols.
- These become **fine particulate matter (PM2.5)**.

Why PM2.5 is Dangerous

- Diameter less than **2.5 micrometres**.
- Can penetrate deep into the lungs.
- Can enter the bloodstream.
- Causes long-term health problems and premature deaths.

What is Flue Gas Desulphurisation (FGD)?

- FGD is an **air pollution control technology** used in coal-fired thermal power plants to remove **sulphur dioxide (SO₂)** from exhaust gases before they are released into the atmosphere.

Working Mechanism

- Flue gases pass through an absorber tower.
- Limestone or lime slurry reacts with SO₂.
- Converts SO₂ into:
 - Gypsum (Calcium Sulphate).
- Cleaned gases are released through chimneys.

Efficiency

FGD systems can remove:

- **90–95%** of sulphur dioxide emissions.

Benefits

- Reduces SO₂ emissions.
- Lowers PM2.5 formation.
- Prevents acid rain.
- Improves air quality.
- Protects public health.
- Helps meet emission standards.

India's Emission Norms for Thermal Power Plants

2015 Notification

The Ministry of Environment, Forest and Climate Change (MoEFCC):

- Mandated FGD installation for **all coal-fired power plants**.

- Original compliance deadline: **2017**

Repeated Extensions

The deadline was extended **four times** due to:

- High installation costs.
- Equipment shortages.
- COVID-19 disruptions.
- Implementation delays.

2021 Categorisation of Thermal Power Plants

Plants were classified into:

Category A

- Plants located within:
 - **10 km of Delhi-NCR**
 - Million-plus cities
 - Critically polluted areas

Requirement

- Mandatory FGD installation.

Category B

- Plants near:
 - Non-attainment cities.

Requirement

- Compliance based on pollution levels.

Category C

- Remaining thermal power plants.

Initially:

- Required to install FGDs.

July 2025 Notification: Relaxation of Norms

The Union Government revised emission norms.

Category A

- Must install FGDs by **2027**.

Category B

- Assessed on a **case-by-case basis**.

Category C

- **Exempted** from mandatory FGD installation.

These plants account for nearly:

- **78% of India's coal-fired thermal power plants.**

Why is CREA Critical of the Revised Policy?

1. Location-Based Categorisation is Inadequate

The categorisation depends mainly on:

- Whether a plant is located within **10 km of a city**.

However, SO₂ can travel:

- **Hundreds of kilometres** before converting into PM_{2.5}.

Thus, Even distant power plants can significantly affect Delhi-NCR's air quality.

2. Increased Coal Generation

India's electricity demand continues to rise.

During strong **El Niño** years:

- Hydropower generation declines.
- Coal generation increases.

Without FGDs, SO₂ emissions are expected to rise substantially.

3. Weak Monitoring

CREA highlights:

- Limited public access to **Continuous Emission Monitoring System (CEMS)** data.
- Lack of transparency regarding:
 - FGD installation.
 - Operational status.
 - Compliance.

Case Study: Controlled vs Uncontrolled Plants

Mahatma Gandhi Thermal Power Plant (FGD Installed)

Annual Generation

- Around **3,400–4,000 million units**

SO₂ Emissions

- Unit 1:
 - **1,775 tonnes**
- Unit 2:
 - **2,154 tonnes**

Shows:

- Effective pollution control significantly reduces emissions.

Rajpura Thermal Power Plant (Without Effective FGD)

SO₂ Emissions

- Unit 1:
 - **20,851 tonnes**
- Unit 2:
 - **22,690 tonnes**

It emerged as:

- The **largest SO₂ emitter** in the study.

Why Does This Matter for Delhi-NCR?

According to CREA:

- The energy sector contributes up to:
 - **16% of particulate pollution** in Delhi-NCR cities.

Combined with:

- Vehicular emissions.
- Construction dust.
- Biomass burning.
- Crop residue burning.

SO₂ significantly worsens winter smog.

Challenges

- Increasing dependence on coal.
- Relaxed emission standards.
- Slow FGD implementation.
- Weak regulatory enforcement.
- Poor monitoring transparency.
- Rising electricity demand.
- Climate-induced reduction in hydropower.

CREA's Recommendations

1. Reinstate Mandatory FGD Installation

- Make FGDs compulsory for **all coal-fired power plants**, irrespective of category.

2. Improve Transparency

- Publicly disclose:
 - Real-time CEMS data.
 - SO₂ emissions.
 - Compliance reports.

3. Monitor FGD Performance

- Regularly publish:
 - Installation status.
 - Operational efficiency.
 - Maintenance records.

4. Strengthen Regulatory Oversight

- Ensure strict enforcement of emission norms.
- Periodic environmental audits.
- Independent verification of emissions.

5. Accelerate Energy Transition

- Expand renewable energy.
- Improve energy efficiency.
- Promote battery storage.
- Reduce dependence on coal over the long term.

Government Initiatives for Air Pollution Control

- **National Clean Air Programme (NCAP)**
- **Commission for Air Quality Management (CAQM)**
- **Graded Response Action Plan (GRAP)**
- **National Ambient Air Quality Standards (NAAQS)**
- **Continuous Emission Monitoring Systems (CEMS)**
- **National Electricity Plan (Cleaner Energy Transition)**

Kukrail Reserve Forest & India's First Night Safari

Why in News?

- The **Supreme Court (SC)** has allowed the **Uttar Pradesh Government** to proceed with the country's **first Night Safari** and **zoological park** project at **Kukrail Reserve Forest, Lucknow**.
- The project has already received approval from the **Central Zoo Authority (CZA)** and the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.

Note: In **Ashok Kumar Sharma (IFS) vs Union of India**, the Supreme Court ruled that no final approval for any zoo or safari project can be granted without the Court's prior permission.

Kukrail Reserve Forest

Location

- **Kukrail Reserve Forest**, notified in **1950**, is situated in **Lucknow, Uttar Pradesh**.
- Spread across nearly **4,500 acres**, it is the **largest continuous green cover** within the city.
- The forest derives its name from the **Kukrail Stream**, a tributary of the **Gomti River**.

Kukrail Gharial Rehabilitation Centre (KGRC)

- The forest houses the **Kukrail Gharial Rehabilitation Centre (KGRC)**.
- Established in **1975**, it is **India's first gharial conservation centre**, created to conserve the **Critically Endangered Gharial**.

Ecological Importance

Kukrail Reserve Forest serves as Lucknow's **urban green lung** by:

- Absorbing carbon (carbon sequestration).
- Regulating local temperatures.
- Recharging groundwater.
- Improving air quality.
- Enhancing climate resilience.

Biodiversity

- Supports rich urban biodiversity, including:
 - Birds
 - Reptiles
 - Butterflies
 - Small mammals
- Also contributes to maintaining the ecological health of the **Kukrail Stream**.

Zoo Vs. Night Safari Vs. Protected Areas

Feature	Zoo	Night Safari	Protected Areas (PAs)
Definition	Facility where captive wild animals are kept for public display, education, research and ex-situ conservation.	Guided night-time visitor experience within a recognised zoo, featuring mainly nocturnal animals in naturalistic enclosures.	Legally protected natural ecosystems established for in-situ conservation of wildlife and habitats (e.g., National Parks, Wildlife Sanctuaries).
Animal Status	Captive animals	Captive animals	Wild animals living in their natural habitats
Habitat	Artificial or semi-natural enclosures	Naturalistic enclosures with controlled lighting	Natural ecosystems
Type of Conservation	Ex-situ conservation	Ex-situ conservation	In-situ conservation
Primary Objective	Conservation, education, research and recreation	Conservation awareness through observation of nocturnal wildlife	Protection of biodiversity, habitats and ecological processes
Legal Framework	Recognised by the Central Zoo Authority (CZA) under the Wild Life (Protection) Act, 1972	Governed by the CZA Night Safari Guidelines and the Wild Life (Protection) Act, 1972	Protected under the Wild Life (Protection) Act, 1972

Indian Grey Hornbill



Why in News?

- The **Indian Grey Hornbill** has successfully bred for the **fourth consecutive year** in **Gujarat's Gir forests**, marking a successful reintroduction after disappearing from the region for more than **60 years**.
- As part of the reintroduction programme:
 - **40 Indian Grey Hornbills** were translocated from the **Aravalli forests** of Gujarat.
 - The birds were released in **two phases**:
 - **28 birds (2021–22)**
 - **12 birds (2023)**
 - **11 male hornbills** were fitted with satellite transmitters to monitor their movement, habitat use, settlement patterns, and breeding behaviour.

Indian Grey Hornbill

About

- The **Indian Grey Hornbill** is a common hornbill species native to the **Indian subcontinent**.
- It inhabits forests, wooded areas, orchards, and even human-modified landscapes.

Scientific Name

- **Ocyrceros birostris**

Distribution

- It is the **most widely distributed** hornbill species in India.

- Found from **Jammu to Kerala** and **Rajasthan to West Bengal**.

Neighbouring Countries

- The species is also found in:
 - Pakistan
 - Nepal
 - Bangladesh

Habitat

- Prefers:
 - Dry plains
 - Foothills
 - Deciduous forests
 - Thorn scrub
 - Orchards
 - Gardens
 - Urban areas with mature trees

Habitat Recovery in Gir

- The successful reintroduction was supported by improved habitat protection after:
 - **Gir Wildlife Sanctuary** was declared in **1965**.
 - **Gir National Park** was established in **1975**.

Conservation Status

- **IUCN Red List: Least Concern (LC)**

Physical Features

- Ashy or silvery-grey body.
- Long tail with a distinct white terminal band.
- Curved ivory-coloured beak, blackish at the base.

Casque

- Possesses a narrow casque (horn-like projection) on the beak.
- The casque is **larger in males** than in females.

Eye Characteristics

- **Adults:** Red eyes with grey skin around the eyes.
- **Juveniles:** Brown-orange eyes with reddish-orange skin around the eyes.

Ecological Importance

- Plays a vital role as a **seed disperser**.

- Contributes to the regeneration of trees in forests, agricultural landscapes, and urban ecosystems.

Spotted Deer (Chital)



Why in News?

- The **Gujarat Forest Department** has translocated **50 Spotted Deer (Chital)** from the **Sasan Gir Wildlife Division** to the **Mandvi Forest Range** in **Surat district**.
- The initiative aims to:
 - Strengthen the natural prey base for carnivores.
 - Restore ecological balance.
 - Reduce human–wildlife conflict.
- Under the **Wild Life (Protection) Act, 1972**, the **Chief Wildlife Warden** may permit wildlife translocation for the purpose of **scientific management**.

Purpose of the Translocation

Increase Prey Availability

- Enhance the prey population for carnivores such as lions and leopards.
- Reduce the movement of predators into human settlements in search of food.

Restore Ecosystem Balance

- Improve biodiversity by strengthening herbivore populations.
- Support long-term ecological stability through a balanced food chain.

Reduce Human–Wildlife Conflict

- Adequate prey within forests helps carnivores meet their food requirements naturally, thereby reducing encounters with humans.

Post-release Monitoring

The released deer will be continuously monitored through:

- Forest guards
- Trained wildlife trackers
- Camera traps

Monitoring focuses on:

- Movement patterns
- Habitat use
- Health condition
- Survival and adaptation

Spotted Deer (Chital)

Scientific Name

- **Axis axis**

Other Names

- Chital
- Cheetal
- Axis Deer

Distribution

- Native to the **Indian subcontinent**, including:
 - India
 - Nepal
 - Bhutan
 - Bangladesh
 - Sri Lanka
- Also introduced to the **Andaman Islands**, where it has become an **invasive alien species**.

Habitat

- Found in:
 - Tropical deciduous forests
 - Open grasslands
 - Riverine forests
 - Forest fringes

Physical Features

- Golden-brown coat with distinctive white spots.
- Only **males** possess **three-pronged antlers**, which are shed and regrown every year.

Diet

- Herbivorous.
- Feeds on:
 - Grasses

- Young shoots
- Leaves
- Fallen fruits

Ecological Importance

- Maintains a **symbiotic relationship with Langur monkeys**, which drop fruits and alert deer to predators.
- Serves as an important prey species for:
 - Tigers
 - Leopards
 - Asiatic Lions
 - Indian Wolves
- Plays a crucial role in maintaining ecological balance.

Conservation Status

- **IUCN Red List: Least Concern (LC)**
- **Wild Life (Protection) Act, 1972: Schedule II species.**

Major Threats

- Habitat loss and fragmentation.
- Poaching.
- Competition with livestock for grazing resources.

Smart Collar for High-Altitude Yaks



- **Indian scientists** have developed an **IoT-based smart collar** to monitor the **health, stress levels, and movement** of **high-altitude yaks**, especially in remote Himalayan grazing areas near the international border.

Indian Yak (*Bos grunniens*)

About

- The **Indian Yak (*Bos grunniens*)**, popularly known as the "**Ship of the Himalayas**", is a **high-altitude bovine** adapted to survive extreme cold and rugged terrain.
- It is an important livelihood resource for Himalayan communities.

Distribution

- India has around **58,000 yaks**, with nearly **half located in Ladakh**.
- Other major yak-rearing states include:
 - **Arunachal Pradesh**
 - **Sikkim**
 - **Himachal Pradesh**
 - **Uttarakhand**
- **Wild yaks** are mainly found on the **Tibetan Plateau**.

Habitat

- Found in **high-altitude alpine meadows, alpine steppes, and desert steppes**.
- Usually inhabit elevations between **3,200 and 5,400 metres**.
- They migrate seasonally in search of **grasses, mosses, and lichens**.

Physical Features

- **Wild males** can weigh up to **1,000 kg**, while **females** weigh around **300 kg**.
- Key adaptations include:
 - Long **blackish-brown hair**
 - **Curved horns**
 - **Broad hooves**
 - **Large lungs**
 - High **red blood cell count**
 - High **haemoglobin concentration**, enabling survival in low-oxygen conditions.

Behaviour and Food Habits

- Primarily **daytime grazers** living in herds.

- **Females and young** form larger groups, while **adult males** often remain solitary or in smaller groups.
- Diet includes:
 - Grasses
 - Shrubs
 - Forbs
 - Mosses
 - Lichens
 - Other low-growing plants

Reproduction and Lifespan

- **Mating season:** Begins in **September**.
- **Calves** are generally born in **June** after a **gestation period of about 9 months**.
- Females usually give birth to **one calf every two years**.
- **Wild yaks** have an average lifespan of about **25 years**.

Conservation Status (Wild Yak – *Bos mutus*)

- **IUCN Red List:** **Vulnerable**
- **CITES:** **Appendix I**
- **Wildlife (Protection) Act, 1972:** **Schedule I**.



GI Tag for Mandu's Baobab Fruit (Khurasani Imli)

WHAT IS A GI TAG?	HOW TO APPLY?
> A GI tag is a geographical indication of an item which is specific to a particular place > GI status can be sought for agricultural products, handicrafts, handloom and food products > The RGI (registration of geographical indications) logo given to a particular product can only be used by registered and authorised users > When marketed, a GI tagged product must carry a logo showing its place of origin > Civil and criminal proceedings can be initiated against those using the logo in unauthorised manner	> An association or collective body can apply to GI Registry > Application should be backed by proof of uniqueness, historical records to show proof of origin, quality and special character > After rounds of verification, presentation and meetings, if registry is satisfied, application goes to GI Registry journal > If application receives no opposition within four months, it gets the GI tag

Why in News?

- The iconic **Baobab fruit of Mandu, Madhya Pradesh**, locally known as **Khurasani Imli**, has received the **Geographical Indication (GI) tag**.
- The recognition provides legal protection to the product and promotes its unique

identity, traditional value and regional heritage.

About Khurasani Imli

Characteristics

- Khurasani Imli is a **light green coloured fruit** with a distinct **sweet and sour taste**.
- It is valued for its:
 - Nutritional properties.
 - Traditional medicinal uses.
 - Cultural importance among local communities of the Mandu region.

Geographical Identity

- The fruit is associated with **Mandu**, a historical region of Madhya Pradesh known for its unique landscape and heritage.
- The GI tag links the product's quality and reputation with its geographical origin.

About the Baobab Tree

Scientific Classification

- The Baobab tree is scientifically known as **Adansonia digitata**.
- It is recognised for its:
 - Massive water-storing trunk.
 - Thick branches that create an appearance similar to an inverted tree.
 - Long lifespan and ecological uniqueness.

Historical Origin

- The Baobab tree is believed to have been introduced to Mandu around **six centuries ago**.
- Afghan and Arab traders are considered responsible for bringing the species to the region.
- Over time, the tree adapted to Mandu's local climate and environmental conditions.

Local Distribution

- Mandu has the **largest naturally occurring population of Baobab trees in India**.

- The region is estimated to have more than **1,000 Baobab trees**, making them an important part of the local landscape.

Traditional Uses of Khurasani Imli

Nutritional and Medicinal Importance

- Local tribal communities have traditionally used different parts of the Baobab tree, including:
 - Fruit pulp.
 - Juice.
 - Seeds.
 - Dried bark.
- These products are traditionally used for managing:
 - Diabetes-related issues.
 - Digestive disorders.
 - Fever.
 - Weakness and fatigue.

Cultural Importance

- The Baobab tree and its fruit hold cultural significance among communities living around Mandu.
- Traditional knowledge related to collection, processing and use of the fruit has been passed through generations.

Significance of the GI Tag

Economic Benefits

- The GI recognition can help improve:
 - Branding and marketing of Khurasani Imli.
 - Income opportunities for tribal communities.
 - Development of Baobab-based value-added products.

Support for Local Communities

- Tribal families involved in collection and processing of the fruit may benefit through:
 - Better market access.
 - Organised supply chains.
 - Formation of cooperatives.
 - Improved livelihood opportunities.

Conservation Benefits

- The GI tag can encourage:
 - Protection of existing Baobab populations.
 - Plantation of new trees.
 - Sustainable harvesting practices.

Challenges

Lack of Conservation Framework

- Despite its ecological and cultural importance, dedicated government conservation programmes for Baobab trees remain limited.

Need for Scientific Research

- Greater research is required on:
 - Genetic diversity of Indian Baobab populations.
 - Sustainable cultivation methods.
 - Nutritional and medicinal properties.
 - Climate resilience of the species.

Conclusion

- The GI tag for **Mandu's Khurasani Imli** provides recognition to a unique natural product linked with the region's history, biodiversity and tribal traditions.
- Effective marketing, scientific research and conservation measures can transform Baobab-based products into a sustainable livelihood source while protecting Mandu's unique ecological heritage.

Malaprabha River



Why in News?

- Recently, the **Malaprabha River** in Karnataka has dried up in parts of **Guledgudda taluk**, causing severe difficulties for communities dependent on the river for agriculture, drinking water and daily needs.
- The situation has highlighted concerns regarding river conservation, water management and the impact of climatic variability on peninsular rivers.

About Malaprabha River

Overview

- The **Malaprabha River** is an important tributary of the **Krishna River**.
- It flows entirely through the State of **Karnataka**.
- The river plays an important role in supporting agriculture, settlements and cultural heritage sites along its course.

Course of the River

Origin

- The river originates in the **Western Ghats** at an elevation of around **792 metres**.
- Its source is located at **Kanakumbi village in Belagavi district, Karnataka**, in the Sahyadri hill ranges.
- The **Shri Mauli Devi Temple** at Kanakumbi marks the traditional birthplace of the river.
- The region has historical significance and is also considered a pilgrimage centre.

Flow Path

- After originating in the Western Ghats, the river flows:
 - Initially towards the east.
 - Then towards the northeast direction.
- It finally joins the **Krishna River** at **Kudala Sangama** in Bagalkot district, Karnataka.

Length

- The total length of the Malaprabha River is approximately **304 km**.

Tributaries of Malaprabha River

The major tributaries of the river include:

- **Bennihalla**
- **Hirehalla**
- **Tuprihalla**

Important Infrastructure

Renukasagar Dam

- The **Renukasagar Dam** has been constructed across the Malaprabha River.
- The reservoir supports:
 - Irrigation activities.
 - Water supply.
 - Regional agricultural development.

Ecological and Cultural Significance

Heritage Importance

- The Malaprabha basin is associated with several important historical and architectural sites, including:
 - **Aihole**
 - Known as one of the earliest centres of Indian temple architecture.
 - **Pattadakal**
 - A UNESCO World Heritage Site famous for its Chalukyan temples.
 - **Badami**
 - Renowned for its rock-cut cave temples and Chalukya-era heritage.

Economic Importance

- The river supports local communities through:
 - Agriculture.
 - Livestock activities.
 - Groundwater recharge.
 - Domestic water requirements.

Reasons Behind River Drying

Climatic Factors

- Irregular rainfall patterns and prolonged dry periods can reduce river flow.
- Changing monsoon behaviour has increased stress on seasonal rivers.

Water Demand

- Increased irrigation requirements and groundwater extraction may reduce water availability.
- Excessive dependence on river and groundwater resources affects ecological flow.

River Management Challenges

- Lack of effective watershed management and conservation measures can worsen water scarcity.
- Sustainable water management is essential to maintain river health.

Significance of Conservation

- Protecting the Malaprabha River is important for:
 - Ensuring water security for local communities.
 - Maintaining agricultural productivity.
 - Preserving biodiversity and heritage landscapes.
 - Sustaining ecological balance within the Krishna River basin.

Conclusion

- The drying of the Malaprabha River highlights the growing challenges faced by peninsular rivers due to climate variability, rising water demand and resource pressure.
- Integrated river basin management, groundwater conservation, watershed development and sustainable irrigation practices are essential to ensure the long-term survival of the river and the communities dependent on it.

Mount Erebus: World's Southernmost Active Volcano



Why in News?

- Recently, Mount Erebus, the world's southernmost active volcano located in Antarctica, gained attention due to its unique features, including a permanent

lava lake and the release of tiny pure gold crystals into the atmosphere.

About Mount Erebus

- **Location:** Mount Erebus is a stratovolcano situated on the western part of **Ross Island**, off the coast of Antarctica in the **Ross Sea**.
- **Southernmost Active Volcano:** It holds the distinction of being the **world's southernmost active volcano**.
- **Geological Classification:**
 - It is an **intraplate volcano**.
 - It belongs to the **McMurdo Volcanic Group**.
 - It is located within the **Terror Rift**, which forms part of the **West Antarctic Rift System**.
- **Ring of Fire Connection:** Mount Erebus is associated with the **Pacific Ring of Fire**, the region surrounding the Pacific Ocean basin known for intense volcanic and seismic activity.
- **Elevation:** Its summit rises to approximately **3,794 metres (12,448 feet)** above sea level, making it the **second-highest volcano in Antarctica** after Mount Sidley.
- **Active Volcano Status:**
 - It is one of only two active volcanoes in Antarctica, the other being **Deception Island**.
 - It is among the few volcanoes globally that possess a continuously active lava lake.

Unique Features of Mount Erebus

Permanent Lava Lake

- The summit crater of Mount Erebus contains a persistent lava lake that has remained active since at least **1972**.
- Its eruptions are generally small and **Strombolian in nature**, involving the ejection of volcanic bombs and fragments around the crater rim.

Gold Emissions

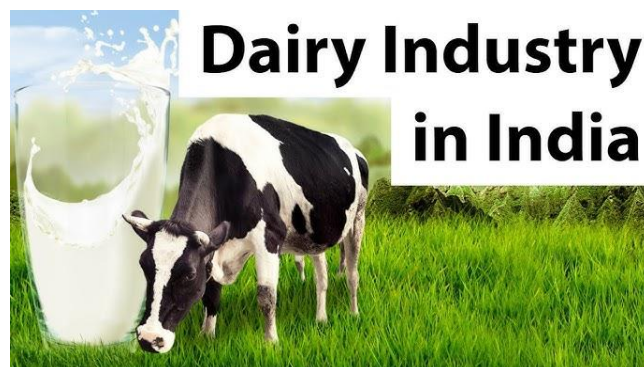
- Mount Erebus is the only known volcano that releases **tiny crystals of pure gold into the atmosphere**.

- These gold particles are carried along with volcanic gases and ash during eruptions.

Significance

- Mount Erebus provides scientists with valuable insights into:
 - Volcanic processes in extreme polar environments.
 - The behaviour of long-lived lava lakes.
 - The interaction between volcanic activity and atmospheric conditions.
- Its unique geological characteristics make it one of the most studied volcanoes in Antarctica.

Climate Change and India's Dairy Sector



Dairy Industry in India

Why in News?

- A recent study published in **Scientific Reports** highlights that rising temperatures and humidity are adversely affecting **milk production** in north-western India, particularly in **Haryana**, due to increasing **heat stress** among dairy animals.

Major Findings of the Study

1. Rising Heat Reduces Milk Yield

- Dairy animals experience a sharp fall in productivity when exposed to prolonged **high temperatures and humidity**.
- The **monsoon months**, when heat and humidity occur together, pose the greatest risk to milk production.
- In comparison, seasonal temperature changes during winter have only a limited effect.

2. Importance of Potential Evapotranspiration (PET)

- **PET**, which reflects the atmosphere's ability to remove moisture through evaporation, can serve as an early indicator of heat stress.
- Higher PET values generally correspond with lower milk output.

3. Growing Economic Burden

- Climate-induced heat stress is already causing major losses to India's dairy economy.
- If current warming trends continue, production losses are expected to increase substantially over the coming decades.

4. Long-Term Outlook

- Climate projections indicate that unchecked global warming could reduce India's total milk production by nearly **25% by the end of this century**, affecting both producers and consumers.

How Heat Stress Affects Dairy Animals

1. Increased Energy for Body Cooling

- Animals expend more energy regulating body temperature through **panting** and other cooling mechanisms.
- As a result, less energy remains available for milk synthesis.

2. Lower Feed Consumption

- High temperatures suppress appetite, reducing nutrient intake and lowering milk production.

3. Hormonal Imbalance

- Heat stress elevates stress hormones, which interfere with the normal process of milk secretion.

4. Decline in Animal Health

- Continuous exposure to heat weakens immunity, increasing disease incidence and treatment costs.

Susceptibility of Different Breeds

1. Buffaloes

- Highly sensitive because they possess fewer sweat glands and absorb more heat due to their dark skin.

- They rely heavily on access to water for cooling.

2. Crossbred Cattle

- More vulnerable than indigenous breeds because they generate greater body heat and are less adapted to tropical climates.

3. Indigenous Breeds

- Native breeds such as **Sahiwal**, **Gir**, and **Hariana** possess natural characteristics that improve heat tolerance and survival under hot climatic conditions.

Impact on India's Dairy Economy

1. Livelihoods

- Lower milk production directly affects the income of millions of rural households that depend on dairy farming.

2. Inflationary Pressure

- Reduced supply may increase the prices of milk and dairy products, adding pressure on household budgets.

3. Agricultural Growth

- Since livestock forms an important component of agricultural output, declining dairy productivity can slow rural economic growth.

4. Cooperative Dairy Sector

- Reduced milk availability may weaken procurement by dairy cooperatives and affect processing capacity.

5. Women's Economic Participation

- As women form the backbone of dairy farming, lower earnings may reduce their financial independence and decision-making role.

6. Nutrition

- Milk is a major source of **protein, calcium and Vitamin B12**.
- Reduced availability could adversely affect nutritional outcomes, especially for children and pregnant women.

7. Environmental Concerns

- Lower livestock productivity can reduce the availability of **organic manure**, increasing dependence on chemical fertilisers.

- Farmers may also keep larger herds to compensate for lower productivity, leading to higher **methane emissions**.
- Reduced use of crop residues as fodder may contribute to increased **stubble burning**.

Government Initiatives

- **Rashtriya Gokul Mission (RGM)**
- **National Livestock Mission (NLM)**
- **Animal Husbandry Infrastructure Development Fund (AHIDF)**
- **National Animal Disease Control Programme (NADCP)**
- **e-Pashuhaat**
- **Pashu Sanjivni**

Way Forward

1. Heat Advisory Systems

- Develop early-warning systems using indicators such as **Temperature-Humidity Index (THI)** and **Potential Evapotranspiration (PET)** to alert farmers before extreme heat events.

2. Climate-Resilient Breeding

- Promote selective breeding programmes that combine **high productivity with heat tolerance**.
- Conserve and improve indigenous cattle breeds with superior climatic adaptability.

3. Better Dairy Infrastructure

- Support farmers in creating **shade structures, cooling facilities, reliable water sources**, and improved livestock shelters.
- Encourage **agroforestry** and cultivation of **climate-resilient fodder crops**.

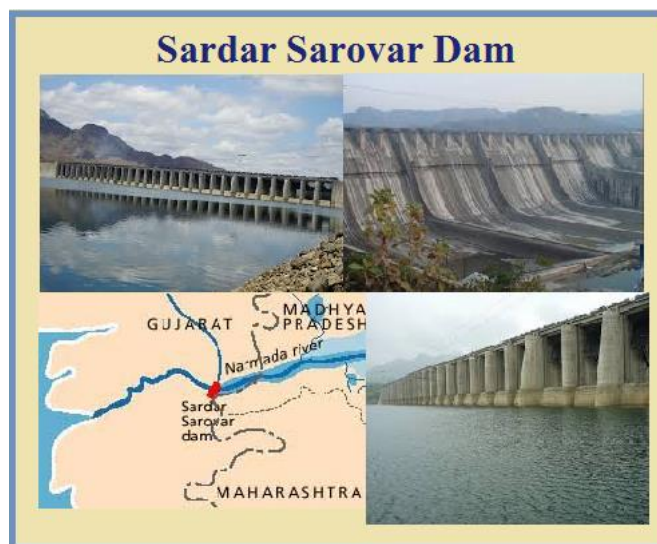
4. Financial Protection

- Introduce **weather-linked livestock insurance**, concessional credit and targeted financial assistance to reduce climate-related risks.

5. Climate-Smart Dairy Development

- Integrate scientific breeding, improved housing, early-warning systems and sustainable management practices to build a **climate-resilient dairy sector**.

Sardar Sarovar Project (SSP) Settlement



Why in News?

- In a significant step towards **cooperative federalism**, the States of **Maharashtra, Gujarat, Rajasthan and Madhya Pradesh** have signed a **one-time settlement agreement** to resolve long-pending financial disputes related to the **Sardar Sarovar Project (SSP)**.
- The agreement settles disputes concerning **cost-sharing, rehabilitation expenditure and construction-related financial liabilities** among the participating States.

Key Highlights of the Settlement

1. Resolution of Long-Pending Financial Disputes

The agreement resolves disputes relating to:

- Cost-sharing of the **Sardar Sarovar Project (SSP)** and **Indira Sagar Project**.
- **Resettlement and Rehabilitation (R&R)** expenditure for displaced families.
- Interest liabilities arising from project-related borrowings during the construction phase.

2. Revised Cost Sharing

- As part of the settlement, **Gujarat** agreed to increase its share of project costs from **50% to 75%**.
- This substantially reduces the financial burden on **Madhya Pradesh** and facilitates closure of pending disputes.

3. Cooperative Federalism

- The settlement demonstrates successful collaboration among multiple States for resolving complex inter-state infrastructure and financial issues through consensus.

Sardar Sarovar Project (SSP)

About

- The **Sardar Sarovar Project (SSP)** is a **multipurpose river valley project** built on the **Narmada River** near **Navagam, Gujarat**.
- It is one of the **largest water resource projects in India**.

Historical Background

- The idea of developing the Narmada River was first proposed by **Sardar Vallabhbhai Patel** in **1946**.
- The foundation stone of the project was laid by **Prime Minister Jawaharlal Nehru** in **1961**.

Location

- The **Sardar Sarovar Dam** is situated near the **Statue of Unity** in Gujarat.
- It is the **terminal gravity dam** on the Narmada River.

Participating States

The project benefits four States:

- **Gujarat**
- **Madhya Pradesh**
- **Maharashtra**
- **Rajasthan**

Major Benefits

1. Irrigation

- Provides irrigation to large agricultural areas, particularly in drought-prone regions.

2. Drinking Water

- Supplies drinking water to numerous rural and urban settlements.

3. Hydropower Generation

- Generates hydroelectric power for participating States.

4. Regional Development

- Has significantly improved agricultural productivity, water availability and economic development, especially in **Gujarat** and **Rajasthan**.

Narmada Water Disputes Tribunal (NWDT)

About

- The **Narmada Water Disputes Tribunal (NWDT)** was constituted in **1969** under the **Inter-State River Water Disputes Act, 1956**.

Award

- The Tribunal delivered its **final award in 1979**.
- It determined:
 - Water sharing among the beneficiary States.
 - Allocation of hydropower.
 - Operational arrangements for the project.

Continuing Disputes

- Although water and power allocations were settled, disputes relating to:
 - Land acquisition.
 - Resettlement and Rehabilitation (R&R).
 - Cost-sharing.
 - Infrastructure expenditure.

continued for several decades until the present settlement.

Narmada River

About

- The **Narmada River** is one of India's major **west-flowing rivers** and the largest river of **Central India**.
- It originates from the **Amarkantak Plateau** in **Madhya Pradesh**.
- It drains into the **Arabian Sea** through the **Gulf of Khambhat (Cambay)** in **Gujarat**.

Key Facts

- **Length:** Approximately **1,312 km**.
- **States Covered:** **Madhya Pradesh, Maharashtra, and Gujarat**.
- **Drainage Basin:** Around **98,800 sq. km**.

Significance

- Demonstrates the effectiveness of **cooperative federalism** in resolving inter-state disputes.
- Ensures greater financial certainty for participating States.
- Facilitates smoother implementation and management of major river valley projects.
- Strengthens long-term cooperation in **water resource management, hydropower generation, and regional development.**

Phu Quoc Island (Vietnam)



Why in News?

- Recently, multiple casualties involving **Indian tourists** were reported after a **speedboat capsized** near **Phu Quoc Island, Vietnam.**

Phu Quoc Island

About

- **Phu Quoc**, popularly known as the "**Pearl Island**," is the **largest island of Vietnam.**
- It is one of Vietnam's leading tropical tourist destinations, renowned for:
 - White-sand beaches.
 - Turquoise waters.
 - Dense forests.
 - Traditional fishing villages.
 - Luxury resorts.

Location

- Located in the **Gulf of Thailand**, close to **Cambodia**, but under the sovereignty of **Vietnam.**

- It forms the central island of an **archipelago comprising 22 islands.**

Area

- Covers approximately **574 square kilometres.**
- Extends about **50 kilometres** from north to south.

Natural Features

- Over **150 kilometres of coastline.**
- Mountain ranges rising to about **630 metres.**
- Evergreen tropical forests.
- Waterfalls.
- Caves.
- Natural rock pools.

UNESCO Recognition

- More than **half of the island** has been protected as part of the **UNESCO Biosphere Reserve** since **2006.**

Economy

Major Economic Activities

- Fishing.
- Agriculture.
- Tourism.

Famous Local Products

- **Fish sauce.**
- **Black pepper.**
- **Pearl cultivation.**

These products contribute significantly to the island's economy and tourism.

Religious Heritage

Caodaism

- Phu Quoc is home to several **Cao Dai temples.**
- **Caodaism** is a **Vietnamese syncretic religion** that combines elements of:
 - Buddhism.
 - Taoism.
 - Confucianism.
 - Christianity.
 - Islam.

Significance

- Largest island of **Vietnam** and a major international tourist destination.

- Recognised for its rich **biodiversity** through the **UNESCO Biosphere Reserve**.
- Plays an important role in Vietnam's tourism, fisheries and agricultural economy.
- Represents Vietnam's unique cultural heritage through the practice of **Caodaism**.

Mid-Air Evaporation of Monsoon Rain over the Western Ghats



Why in News?

- A study conducted by the **Indian Institute of Tropical Meteorology (IITM), Pune**, has found that nearly **25% of the Southwest Monsoon rainfall over the Western Ghats evaporates before reaching the Earth's surface**.
- The findings provide new insights into monsoon dynamics and can improve rainfall forecasting and climate modelling.

Key Findings of the Study

Extent of Rainfall Evaporation

- During the **Southwest Monsoon (June–September)**, nearly **one-fourth of rainfall** over the northern Western Ghats evaporates while falling through the atmosphere.
- The proportion of evaporation is not constant and varies widely from **4% to 61%**, depending mainly on:
 - Air temperature.
 - Atmospheric humidity.

How Mid-Air Evaporation Occurs

- As raindrops descend through relatively dry air beneath clouds, a portion of the

water evaporates before reaching the ground.

- This process reduces the amount of rainfall that is ultimately received at the surface.

Impact on Weather and Rainfall

Cooling of the Atmosphere

- Evaporation absorbs heat from the surrounding air, leading to cooling of the lower atmosphere beneath rain clouds.

Formation of Downdrafts

- The cooled air becomes denser and sinks rapidly, producing **downdrafts**.

Development of Cold Pools

- These descending air masses spread across the surface as **cold pools**, which influence local atmospheric conditions.

Influence on Future Rainfall

- Cold pools affect atmospheric convection and can alter the timing and intensity of subsequent rainfall events.
- Understanding this process is therefore important for improving rainfall and thunderstorm forecasts.

Global Comparison

- The estimated **25% evaporation rate** over the Western Ghats is comparatively lower than many other regions.
- This is mainly because:
 - Monsoon rainfall generally consists of **larger raindrops**, which evaporate less easily.
 - The atmosphere during the Indian monsoon remains highly humid, limiting evaporation.

Comparison with Other Regions

- **Zurich:** Approximately **40%** evaporation.
- **Near Barbados:** Around **60%** evaporation due to drier air and smaller raindrops.

Method Used in the Study

Stable Isotope Technique

- Direct measurement of raindrop evaporation in the atmosphere is difficult.
- Researchers therefore used **stable isotopes** of water as natural indicators.

Working Principle

- During evaporation, **lighter water molecules** evaporate more readily than heavier ones.
- As a result, the remaining raindrops become relatively enriched with **heavier isotopes**.
- By analysing the isotopic composition of rainwater, scientists estimated the proportion of rainfall lost through evaporation.

Rainwater Isotope Network

- IITM maintains a **nine-station rainwater isotope observation network** extending from:
 - The Himalayas.
 - Northeast India.
 - Port Blair in the Andaman and Nicobar Islands.
- This network helps study the origin, movement and variability of monsoon rainfall across the country.

Significance

Improved Weather Forecasting

- Better understanding of below-cloud evaporation can enhance rainfall prediction and storm forecasting.

Refining Climate Models

- Many existing climate models do not adequately account for mid-air rain evaporation.
- The new findings can improve the accuracy of climate simulations.

Better Hydrological Planning

- More realistic rainfall estimates will strengthen hydrological models used for:
 - Flood forecasting.
 - Water resource management.
 - River basin planning.

Understanding Monsoon Behaviour

- The study provides deeper insights into atmospheric processes governing the Indian monsoon, contributing to improved prediction of extreme weather events and long-term climate assessment.

Cotton Sector in India



Why in News?

- Cotton remains one of India's most important commercial crops, playing a vital role in agriculture, industry, exports, and rural employment.
- Beyond farming, it drives the textile value chain, generates livelihoods, and contributes significantly to India's economic growth.

How Does Cotton Contribute to India's Growth?

Economic Importance

- Cotton is one of India's leading commercial crops, connecting agriculture with manufacturing, trade, and exports.
- India contributes nearly **23% of global cotton fibre production**.
- The sector supports around **6 million cotton farmers** and provides employment to **40-50 million people** across ginning, spinning, textiles, transport, and marketing.

"White Gold"

- Cotton and cotton-based products such as fibre, yarn, fabrics, and garments are major contributors to India's foreign exchange earnings.
- Owing to its immense economic value, cotton is popularly known as **"White Gold."**

Strength of the Sector

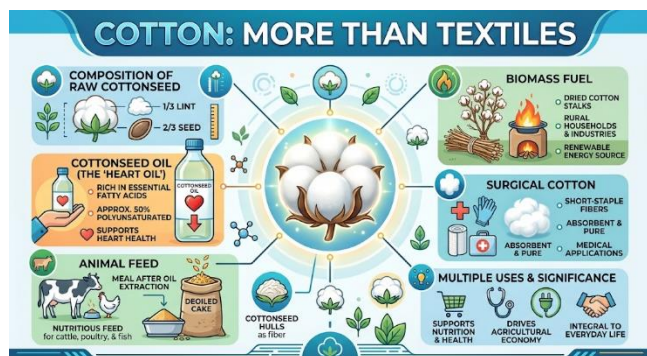
India enjoys several natural and structural advantages:

- Cultivation of all four recognised cotton species.
- Large area under cotton cultivation.
- Rich genetic diversity.
- Well-developed textile and value-chain ecosystem.

Government Support

- Initiatives such as **Minimum Support Price (MSP)**, **Mission for Cotton Productivity**, and **Kasturi Cotton Bharat** are improving productivity, quality, competitiveness, and long-term sustainability.

Cotton: From Swadeshi to Atmanirbhar Bharat



Ancient Heritage

- India has cultivated cotton for thousands of years and was historically a major exporter of cotton textiles to Asia and Europe.
- Cotton cloth also functioned as a medium of exchange in ancient trade.

Rise of the Modern Textile Industry

- The modern cotton textile industry developed during the **19th century**, with major mills established in:
 - Mumbai
 - Ahmedabad
 - Kolkata
- Ahmedabad later earned the title "**Manchester of India.**"

Role in the Swadeshi Movement

- During the **Swadeshi Movement**, Indians promoted indigenous textile production

and reduced dependence on imported British goods.

- Demand further increased during both World Wars, accelerating industrial growth.

Foundation for Self-Reliance

- By Independence, India had developed a strong textile industry, which laid the foundation for today's vision of **Atmanirbhar Bharat**.

Major Features of India's Cotton Sector

Four Cotton Species

India is the only country cultivating all four recognised cotton species:

- **Gossypium arboreum** (Asian cotton)
- **Gossypium herbaceum** (Asian cotton)
- **Gossypium hirsutum** (American upland cotton)
- **Gossypium barbadense** (Egyptian cotton)
- **G. hirsutum** accounts for nearly **90% of hybrid cotton production** in India.
- All commercially cultivated **Bt cotton hybrids** belong to this species.

Bt Cotton

- Bt cotton is a **genetically modified (GM)** variety containing genes from the soil bacterium **Bacillus thuringiensis (Bt)**.
- It provides resistance against **bollworms**, one of the most destructive cotton pests.
- Commercial cultivation began in **2002**.
- Benefits include:
 - Lower pesticide use.
 - Reduced crop losses.
 - Higher productivity.
 - Improved farmer incomes.

Classification Based on Staple Length

Category	Staple Length
Short Staple	Up to 20 mm
Medium Staple	20.5–24.5 mm
Medium-Long Staple	25–27 mm
Long Staple	27.5–32 mm
Extra-Long Staple (ELS)	Above 32.5 mm

Major Cotton-Growing Zones

Northern Zone

- Punjab

- Haryana
- Rajasthan

Central Zone

- Gujarat
- Maharashtra
- Madhya Pradesh

Southern Zone

- Telangana
- Andhra Pradesh
- Karnataka

Other Producing States

- Tamil Nadu
- Odisha

Production and Consumption

Largest Cultivated Area

- India ranks **first globally** in cotton cultivation area.
- Cotton is grown on about **114.84 lakh hectares**, accounting for nearly **38% of the world's cotton acreage**.

Rain-fed Agriculture

- Around **62%** of India's cotton area depends on rainfall.
- Only **38%** is irrigated, making production highly dependent on monsoon conditions.

Global Position

- India ranks **second** in both cotton production and consumption.

Production

- **2024–25**: 297.24 lakh bales (about **5.06 million tonnes**).
- **2025–26 (Provisional)**: 290.91 lakh bales (around **4.95 million tonnes**).

Note: One cotton bale = 170 kg.

Domestic Consumption

- Total consumption reached approximately **328 lakh bales** (5.58 million tonnes), reflecting the strong demand from India's textile industry.

Cotton Exports

Export Performance

- India exported around **18 lakh bales** in **2024–25**.
- Cotton exports were valued at **US\$11.49 billion** in FY25.

Major Export Destinations

- United States
- Bangladesh
- Sri Lanka
- United Kingdom
- United Arab Emirates

Government Initiatives for Cotton Development

Minimum Support Price (MSP)

- MSP protects farmers against price fluctuations.
- Recommended annually by the **Commission for Agricultural Costs and Prices (CACP)**.
- MSP is announced separately for:
 - Medium Staple Cotton.
 - Long Staple Cotton.
- It ensures farmers receive at least **50% return over production cost**.

Cotton Corporation of India (CCI)

- CCI is the nodal agency responsible for MSP procurement whenever market prices fall below MSP.
- Procurement centres expanded from **508 to 571**, covering **152 districts** across **11 states**.

Mission for Cotton Productivity

- Launched in **2025–26** with an outlay of **₹5,659.22 crore**.
- Focuses on:
 - Climate-resilient varieties.
 - High-yielding seeds.
 - Extra Long Staple (ELS) cotton.
- Target:
 - Increase production from **297 lakh bales** to **498 lakh bales by 2031**.
- Supports around **32 lakh farmers** across **140 districts** in **14 states**.
- Based on the **5F Vision**:
 - Farm
 - Fibre
 - Factory
 - Fashion
 - Foreign

Special Project on Cotton (NFSM)

Implemented under the **National Food Security Mission (NFSM)** since **2023–24**.

Focus areas:

- High-Density Planting System.
- Closer Spacing Planting.
- Extra Long Staple cotton production.

Objectives:

- Improve productivity.
- Enhance fibre quality.
- Increase farmers' income.

Kapas Kisan App

A digital platform for transparent MSP procurement.

Features

- Farmer self-registration.
- Slot booking.
- Aadhaar-linked payments.
- SMS alerts.

Impact

- More than **41 lakh farmers** have registered.
- Improved transparency and reduced waiting time.

Kasturi Cotton Bharat

A flagship branding initiative to promote premium Indian cotton globally.

Objectives

- Quality certification.
- Traceability.
- Sustainability.
- Global branding.

Implementation

Jointly implemented by:

- Ministry of Textiles.
- Cotton Corporation of India (CCI).
- TEXPROCIL.

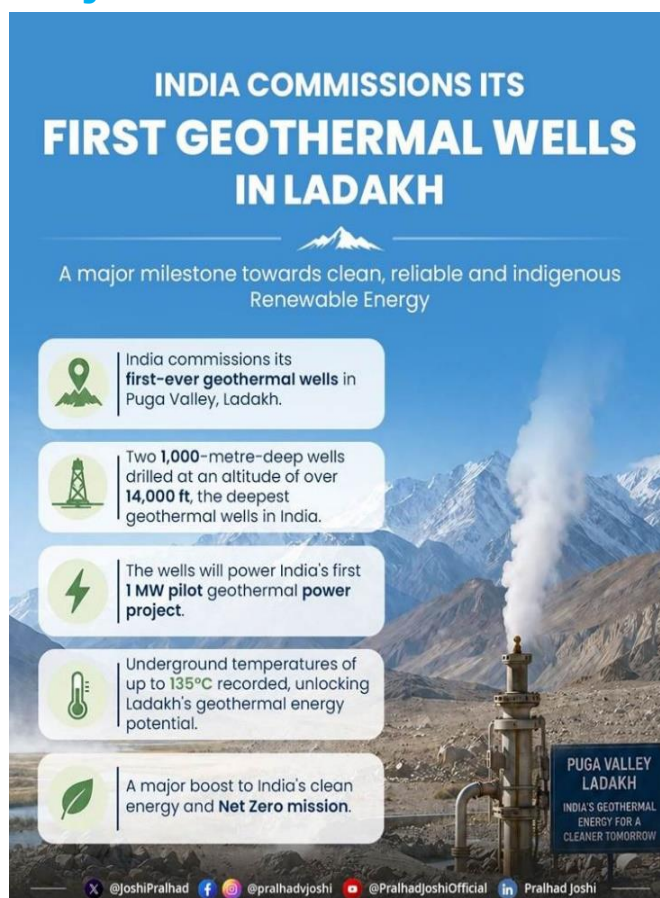
Key Initiatives

- Kasturi Villages.
- Awareness programmes.
- Sustainability promotion.
- Digital traceability platform.

Conclusion

Cotton has remained a cornerstone of India's economy from ancient trade routes to the modern textile industry. Supported by technological innovation, government initiatives, digital procurement, and global branding, India's **"White Gold"** continues to strengthen farmer incomes, expand textile exports, promote rural employment, and contribute to the vision of **Atmanirbhar Bharat**.

Geothermal Energy & Puga Valley Project



Why in News?

- India has commissioned its **first and deepest geothermal wells** at **Puga Valley, Ladakh**, marking an important milestone in the country's clean energy transition and Ladakh's vision of becoming a **carbon-neutral region**.

Key Highlights of the Project

Location

- The project is located in **Puga Valley** in the **Changthang region of Ladakh**, one

of India's most promising geothermal energy sites.

- The valley lies about **22 km from the Salt Lake Valley** and is famous for its **natural hot sulphur springs**.

Depth of the Wells

- Two geothermal wells have been drilled to a depth of **1,000 metres**.
- These are India's **deepest geothermal wells**, constructed at an altitude of over **14,000 feet**.

Power Generation

- The wells will supply heat for a proposed **1 MW pilot geothermal power plant**.
- It will become **India's first demonstration-scale geothermal electricity project**.

Working Mechanism

- The project generates electricity by utilizing the Earth's naturally stored underground heat.
- Unlike **solar** and **wind** energy, geothermal energy can provide **continuous 24×7 power**, irrespective of weather conditions.

Temperature Observations

- A temperature of **135°C** has already been recorded at a depth of **400 metres**.
- Further studies are underway to determine deeper temperatures and evaluate the commercial viability of the geothermal reservoir.

Implementing Agencies

The project is being implemented by:

- **ONGC Energy Centre**
- **Ladakh Administration**
- **Ladakh Autonomous Hill Development Council (LAHDC), Leh**

What is Geothermal Energy?

About

- Geothermal energy is the heat naturally generated within the Earth's interior.
- It is used for:
 - Electricity generation.
 - Direct heating.
 - Heating and cooling buildings.

- It is considered a **renewable energy source** because Earth's internal heat is continuously replenished through natural radioactive decay and residual planetary heat.

Sources of Geothermal Energy

Deep Geothermal Reservoirs

- Underground hot water and steam are accessed by drilling deep wells.
- These are mainly used for electricity generation and industrial heating.

Near-Surface Hydrothermal Resources

- Hot springs and shallow geothermal reservoirs occur in geologically active regions and are comparatively easier to develop.

Shallow Ground Energy

- The relatively constant underground temperature at shallow depths is utilized through **geothermal heat pumps** for heating and cooling buildings.

Policy Framework

- The **National Policy on Geothermal Energy, 2025** aims to promote exploration and commercial development of India's geothermal resources.
- The **Ministry of New and Renewable Energy (MNRE)** is the nodal ministry responsible for implementing the policy.

Geothermal Potential

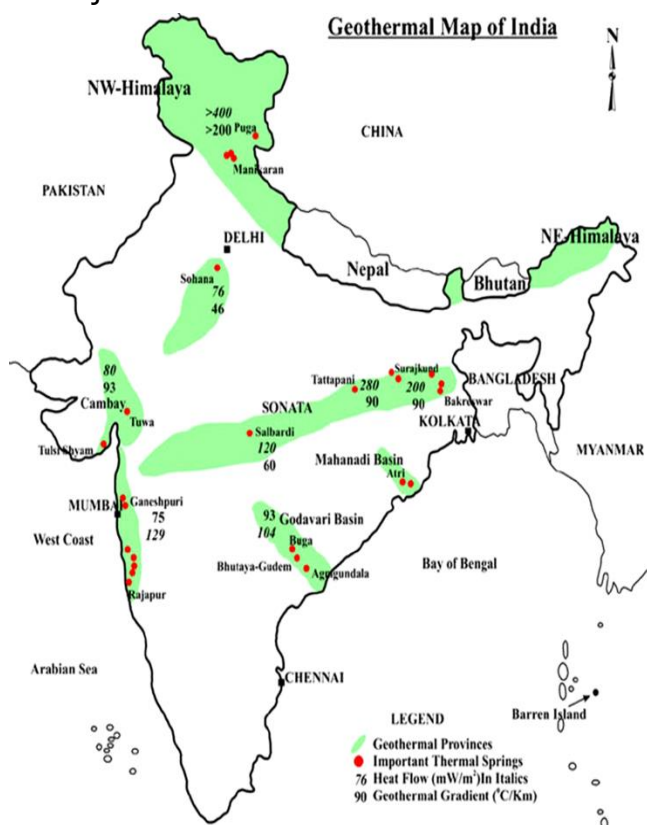
Global Scenario

- Global geothermal power generation capacity reached about **15.4 GW** by the end of **2024**.
- The leading producers are:
 - United States
 - Indonesia
 - Philippines

India's Potential

- The **Geological Survey of India (GSI)** has identified **381 hot springs** across the country.
- Surface temperatures range between **35°C and 89°C**.
- India's estimated geothermal power potential is around **10,600 MW**.

Major Geothermal Provinces in India



India has **10 recognised geothermal provinces**:

- Himalayan Province
- Naga–Lusai Province
- Andaman & Nicobar Province
- Son–Narmada–Tapi Province
- West Coast Province
- Cambay Graben
- Aravalli Province
- Mahanadi Province
- Godavari Province
- South Indian Cratonic Province

Important Geothermal Sites

Major geothermal locations include:

- **Puga** – Ladakh
- **Chumathang** – Ladakh
- **Manikaran** – Himachal Pradesh
- **Tapoban** – Uttarakhand
- **Bakreshwar** – West Bengal
- **Tuwa** – Gujarat
- **Tattapani** – Chhattisgarh
- **Deulajhari** – Odisha

Flood Management in India

Why in News?

- **Assam** has experienced its **worst floods in more than six decades**, affecting **over 8 lakh people** and causing **more than 30 deaths**.
- The disaster has once again exposed gaps in India's flood management system and highlighted the need for **climate-resilient infrastructure and disaster preparedness**.
- Floods in India are becoming more frequent and severe due to the combined effects of **climate change, ecological degradation, unplanned urbanisation, and governance challenges**.
- Strengthening flood resilience requires **integrated river basin management, scientific reservoir operations, floodplain regulation, advanced forecasting systems, nature-based solutions, and better institutional coordination**, shifting the focus from disaster response to disaster risk reduction.

Why is Assam Highly Vulnerable to Floods?

Geographical Setting

- Assam is situated in the **Brahmaputra and Barak river basins**, with more than **50 tributaries** flowing into these rivers.
- Its location within the vast Brahmaputra floodplain makes seasonal flooding a recurring natural phenomenon.

Heavy Sediment Deposition

- The Brahmaputra carries one of the world's largest sediment loads.
- As the river enters Assam's plains, its flow slows down, depositing sediments that raise the riverbed and increase flood risk.

Intense Monsoon Rainfall

- Heavy southwest monsoon rainfall, combined with substantial upstream runoff from **Arunachal Pradesh and Meghalaya**, frequently causes flash floods.

Riverbank Erosion

- Continuous channel shifting and embankment failures along the Brahmaputra have caused severe erosion, affecting nearly **4.27 lakh hectares** since 1950.

Climate Change

- Rising temperatures and increasingly intense rainfall events are making floods more frequent and destructive.

Ageing Embankments

- Many embankments have outlived their intended lifespan and provide limited protection against the highly dynamic Brahmaputra River.

High Exposure

- Nearly **39.58%** of Assam's geographical area is flood-prone, almost **four times the national average**.

Major Causes of Floods in India

Natural Factors

Concentrated Monsoon Rainfall

- Around **75–80%** of India's annual rainfall occurs during the southwest monsoon.
- High-intensity rainfall often exceeds the carrying capacity of rivers and drainage systems.

Siltation and Riverbed Rise

- Himalayan rivers transport enormous quantities of sediment.
- Deposition raises riverbeds, reducing channel capacity and increasing overbank flooding.

River Course Changes

- Sediment-rich rivers frequently alter their channels.
- The **Kosi River**, known as the "**Sorrow of Bihar**," is a notable example.

Glacial Lake Outburst Floods (GLOFs)

- Melting glaciers are expanding glacial lakes, increasing the risk of sudden downstream floods, as witnessed in **Sikkim (2023)**.

Cyclones and Storm Surges

- Coastal cyclones generate intense rainfall and storm surges, aggravating flooding by restricting river discharge into the sea.

Human-Induced Causes

Deforestation

- Loss of forest cover increases runoff, accelerates soil erosion and raises sediment deposition in rivers.

Overdependence on Embankments

- India has built over **34,000 km** of embankments since 1954.
- Breaches often cause sudden and more destructive floods.

Poor Reservoir Management

- Failure to follow reservoir rule curves and sudden water releases during heavy rainfall intensify downstream flooding.

Floodplain Encroachment

- Construction on floodplains and destruction of wetlands reduce the natural capacity of rivers to store floodwaters.

Unscientific Sand Mining

- Excessive sand extraction destabilises river channels and increases flood vulnerability.

Urban Flooding

- Rapid urbanisation has replaced natural surfaces with concrete, increasing surface runoff.
- Encroachment of lakes and drainage channels has reduced urban flood-buffering capacity.
- Inadequate drainage systems and extreme rainfall frequently cause urban flooding.

Measures Taken by India for Flood Management

Structural Measures

- Construction of embankments, drainage channels and flood protection works.
- **Dam Safety Act, 2021** for improved dam safety.
- Scientific reservoir operation using **Rule Curves**.

- **Inter-Basin Water Transfer (IBWT)** under the National Perspective Plan.

Non-Structural Measures

- Flood Plain Zoning.
- Flood forecasting and early warning by the **Central Water Commission (CWC)**.
- Catchment Area Treatment (CAT).
- Community-based disaster preparedness programmes.

Institutional Measures

- **Disaster Management Act, 2005.**
- **Flood Management and Border Areas Programme (FMBAP).**
- **National Water Policy, 2012.**
- Weather forecasting by the **India Meteorological Department (IMD)**.

Challenges in India's Flood Management

Weak Centre-State Coordination

- Constitutional division of powers over water creates coordination challenges between the Centre and States.
- River Basin Organisations remain largely non-functional.

Project Delays

- Delayed approvals, poor fund utilisation and lack of basin-level planning reduce the effectiveness of flood-control projects.

Forecasting Limitations

- Poor maintenance of telemetry stations and water-level sensors weakens flood forecasting and early warning systems.

Transboundary Challenges

- Limited cooperation with neighbouring countries on hydrological data restricts effective flood forecasting in international river basins such as the Brahmaputra.

Reservoir Operation Issues

- Failure to follow reservoir operating protocols and inadequate emergency plans often worsen flood impacts.

Weak Local Preparedness

- Many States have under-resourced disaster response systems, leading to inadequate community preparedness and heavy reliance on the NDRF after disasters occur.

Measures to Strengthen Flood Management

Promote Flood Resilience

- Shift from flood control to flood resilience through:
 - Floodplain management.
 - Raised settlements.
 - Flood-resilient agriculture.
- Based on recommendations of the **Rashtriya Barh Ayog (1980)** and **R. Rangachari Committee (2003)**.

Improve Reservoir Operations

- Revise reservoir rule curves.
- Develop a **National Water Model (NWM)** and **Decision Support System (DSS)**.
- Modernise hydro-meteorological monitoring networks.

Strengthen Disaster Risk Reduction

- Focus on resilient infrastructure, preparedness, early warning systems and the **Build Back Better** principle under the **Sendai Framework (2015–2030)**.

Regulate Floodplain Development

- Encourage States to implement floodplain zoning laws and prevent construction on wetlands and natural drainage channels.

Integrated River Basin Governance

- Establish **River Basin Organisations (RBOs)** for coordinated planning, reservoir operations, sediment management and interstate data sharing.

Use Advanced Technology

- Expand AI-based early warning systems.
- Deploy IoT-enabled monitoring.
- Use satellite-based flood mapping.
- Strengthen the CWC's forecasting network.

Nature-Based Solutions

- Restore wetlands and floodplains.
- Rejuvenate urban water bodies.
- Promote **"Room for the River"** and **Sponge City** approaches.

Interlinking of Rivers

- The **Interlinking of Rivers (ILR)** programme can moderate flood peaks by storing excess monsoon water.

- However, it should complement, not replace, measures such as floodplain zoning, embankments and early warning systems.

Amazon Rainforest



- **Forest fires in Brazil's Amazon** declined to their **lowest level since records began in 1985**, marking a significant recovery from the severe fire season of **2024**.
- The decline reflects progress in **forest conservation and environmental protection**.

Reasons for Decline

- A **delayed rainy season** reduced the spread of forest fires.
- **Reduced deforestation** lowered the availability of combustible forest material.
- Increased **community vigilance and conservation efforts** helped prevent fire outbreaks.

Human-Induced Fires

- Most fires during **2024** were **human-induced**.
- Major causes included:
 - Agricultural land clearing
 - Deforestation
 - Illegal mining activities

Climate Concerns

- Scientists have warned that a possible **Super El Niño** could lead to:
 - A prolonged dry season
 - Higher temperatures
 - Increased risk of future forest fires

Amazon Rainforest

Location and Extent

- The **Amazon Rainforest** is the **world's largest tropical rainforest**, covering approximately **6 million sq. km**.
- It extends across **nine South American countries and territories**, with nearly **60% located in Brazil**.
- It lies within the **Amazon River Basin**, the **world's largest river basin**.

Natural Boundaries

- **North:** Guiana Highlands
- **West:** Andes Mountains
- **South:** Brazilian Plateau
- **East:** Atlantic Ocean

Climate

- Characterised by:
 - Heavy rainfall
 - High humidity
 - Uniformly warm temperatures
- Supports a dense **evergreen tropical rainforest ecosystem**.

Biodiversity

- The Amazon contains nearly **10% of the world's known wildlife species**, making it one of the richest biodiversity hotspots on Earth.

Major Flora

- Brazil nut
- Rubber
- Mahogany
- Cedar
- Rosewood

Major Fauna

- Jaguar
- Capybara
- Tapir
- Sloth
- Anaconda
- Caiman
- Toucan
- Macaw

Important Protected Areas

- **Yasuni National Park** (Ecuador)

- Jaú National Park (Brazil)
- Tumucumaque National Park (Brazil)
- Pico da Neblina National Park (Brazil)
- Manu National Park (Peru)
- Pacaya-Samiria National Reserve (Peru)
- Amacayacu National Natural Park (Colombia)

Global Importance

- Often called the "**Lungs of the Earth**".
- Acts as a major **carbon sink**, helping regulate the global climate and maintain ecological balance.

Amazon River

- Originates in the **Peruvian Andes**.
- It is the **world's largest river by discharge** and the **second-longest river after the Nile**.
- Major tributaries include:
 - Rio Negro
 - Madeira
 - Xingu



Crux of The Hindu & Indian Express



Pradhan Mantri Krishi Sinchayee Yojana (PMKSY): A Decade of Transforming Irrigation and Water Management in Indian Agriculture



Why in News?

- The **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)** has completed **more than 10 years** of implementation.
- It marks a decade of efforts towards expanding irrigation infrastructure, improving water-use efficiency, and promoting sustainable water resource management in Indian agriculture.
- Since its launch in **2015**, the scheme has played a pivotal role in enhancing agricultural productivity by ensuring assured irrigation, conserving water, and encouraging the adoption of modern irrigation technologies.

What is the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)?

- The **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)** is a flagship **Centrally Sponsored Scheme (Core Scheme)**
- Launched in **2015** with the objective of achieving the vision of "**Har Khet Ko Pani**" (**Water to Every Field**) and "**Per Drop More Crop**" by expanding irrigation coverage and promoting efficient water management across the country.
- The scheme seeks to address one of the biggest constraints in Indian agriculture—**dependence on erratic monsoon rainfall**—through the creation of irrigation infrastructure, watershed development, and adoption of micro-irrigation technologies.

Objectives of PMKSY

The major objectives of the scheme are:

- Expand cultivable land under assured irrigation.
- Improve water-use efficiency at the farm level.
- Enhance access to irrigation facilities for farmers.
- Promote sustainable water conservation and groundwater recharge.
- Encourage scientific and precision irrigation practices.
- Reduce wastage of water through modern irrigation technologies.

- Increase agricultural productivity and farmers' income.

Nature of the Scheme

- PMKSY is implemented as a **Centrally Sponsored Core Scheme**.

Funding Pattern

Category	Centre : State Share
General States	60 : 40
North-Eastern & Himalayan States	90 : 10
Union Territories	100% Central Funding

This funding structure enables States to undertake irrigation projects while ensuring adequate financial support from the Union Government.

Evolution and Formulation of PMKSY

- PMKSY was designed by integrating several existing irrigation and water management programmes into a single umbrella scheme to ensure better coordination and convergence.
- It merged three major schemes:

1. Accelerated Irrigation Benefit Programme (AIBP)

- Earlier implemented by the **Ministry of Water Resources, River Development and Ganga Rejuvenation** (now **Ministry of Jal Shakti**).
- Focused on completing pending major and medium irrigation projects.

2. Integrated Watershed Management Programme (IWMP)

- Implemented by the **Department of Land Resources, Ministry of Rural Development**.
- Focused on watershed development, soil conservation, and rainfed area development.

3. On-Farm Water Management (OFWM)

- Implemented by the **Department of Agriculture and Cooperation**.
- Promoted efficient irrigation methods and water-saving technologies.

Core Philosophy of PMKSY

The scheme is built around two guiding principles:

1. Jal Sanchay (Water Conservation)

- Collection and storage of rainwater.
- Groundwater recharge.
- Water harvesting.
- Conservation of available water resources.

2. Jal Sinchan (Efficient Irrigation)

- Scientific distribution of water.
- Efficient application of irrigation at the farm level.
- Reduction of transmission losses.
- Adoption of micro-irrigation technologies.

Together, these principles ensure that water is **stored, managed, and utilized efficiently**, thereby maximizing agricultural output with minimal water use.

Implementation Mechanism

PMKSY follows a **decentralized planning approach**.

Implementation is carried out through:

- **State Irrigation Plans (SIPs)**
- **District Irrigation Plans (DIPs)**

These plans:

- Identify local irrigation requirements.
- Promote convergence among different irrigation programmes.
- Ensure region-specific water management strategies.
- Improve coordination between various departments.

Financial Outlay

The Government approved the continuation of PMKSY for the period **2021–26**.

- **Overall Outlay**
- **₹93,068.56 crore**

Budget Allocation (2026–27)

- The **Union Budget 2026–27** allocated: **₹6,587 crore**

The allocation aims to:

- Expand irrigation infrastructure.
- Improve water-use efficiency.
- Promote sustainable water management.
- Strengthen climate-resilient agriculture.

Major Components of PMKSY

PMKSY covers the complete irrigation value chain through **four major components**.

1. Accelerated Irrigation Benefit Programme (AIBP)

Objective

The Accelerated Irrigation Benefit Programme focuses on the **speedy completion of ongoing major and medium irrigation projects**, including nationally important irrigation projects.

Its objective is to:

- Expand irrigation infrastructure.
- Increase water availability for agriculture.
- Improve irrigation coverage.

Achievements

Since **2016–17**:

- **₹21,023 crore** released as Central Assistance.
- **17.30 million farmers** benefited.

This makes AIBP the **largest component of PMKSY** in terms of beneficiary coverage.

Modernization of Command Area Development and Water Management (M-CADWM)

- To improve last-mile irrigation efficiency, the Government launched the **Modernization of Command Area Development and Water Management (M-CADWM)** as a **sub-scheme under PMKSY-AIBP in 2025–26**.

Initial Outlay ₹1,600 crore

Key Features

- Pressurized piped irrigation.
- Integration of micro-irrigation systems.
- Improved last-mile water delivery.
- Efficient field-level water distribution.

The programme complements AIBP by ensuring that water reaches farms efficiently after major irrigation infrastructure is created.

2. Har Khet Ko Pani

Objective

- The **Har Khet Ko Pani** component aims to ensure **assured irrigation for every cultivable field** by creating new water sources and expanding irrigation facilities.

Focus Areas

- Surface minor irrigation.
- Groundwater development.
- Repair, Renovation and Restoration (RRR) of water bodies.
- Expansion of irrigation potential.

Achievements

Since its inception:

- **3,462 Surface Minor Irrigation (SMI) and RRR schemes** completed.
- **5.93 lakh hectares** of irrigation potential created.
- Groundwater interventions expanded irrigation to **88.55 thousand hectares**.

These interventions have significantly increased irrigation coverage in water-deficit regions.

3. Watershed Development

Objective

- The Watershed Development component focuses on improving the productivity of **rainfed and degraded lands** through integrated natural resource management.

Major Activities

- Soil conservation.
- Moisture conservation.
- Water harvesting.
- Vegetative cover restoration.
- Sustainable land management.

Achievements

Since **2016–17**:

- Central assistance of **₹12,432.09 crore**.
- **1.34 million farmers** benefited.

The programme has enhanced soil fertility, groundwater recharge, and agricultural sustainability in rainfed areas.

4. Per Drop More Crop (PDMC)

Objective

- The **Per Drop More Crop (PDMC)** component promotes **efficient field-level water use** through the adoption of modern micro-irrigation technologies.
- Originally an integral component of PMKSY from **2015–16 to 2021–22**, it has been implemented under the **Pradhan Mantri Rashtriya Krishi Vikas Yojana (PM-RKVY)** since **2022–23**.

Micro-Irrigation Technologies Promoted

Drip Irrigation

- Delivers water and nutrients directly to plant roots.
- Minimizes evaporation and runoff losses.
- Enhances water-use efficiency.
- Improves crop yield and fertilizer efficiency.

Sprinkler Irrigation

- Sprays water uniformly over crops through pipelines and sprinkler heads.
- Mimics natural rainfall.
- Suitable for uneven terrain and various crops.

Benefits of Micro-Irrigation

- Saves water.
- Reduces irrigation costs.
- Improves soil moisture.
- Enhances crop productivity.
- Reduces weed growth.
- Promotes climate-resilient agriculture.
- Minimizes fertilizer losses.

Micro Irrigation Fund (MIF)

- To accelerate the adoption of micro-irrigation, the Government established the **Micro Irrigation Fund (MIF)** under the **National Bank for Agriculture and Rural Development (NABARD)**.
- The fund supports States in expanding micro-irrigation infrastructure and financing irrigation projects.

Financial Assistance

To encourage farmers:

- **55% subsidy** for **small and marginal farmers**.
- **45% subsidy** for **other farmers**.

This financial support reduces the initial cost of installing micro-irrigation systems.

Achievements

Since its inception:

- **110.92 lakh hectares** brought under micro-irrigation.
- Covers approximately **7.98% of India's Net Sown Area (NSA)**.

This has significantly improved water-use efficiency and agricultural productivity.

Significance of PMKSY

- The scheme has emerged as one of India's most comprehensive irrigation initiatives by integrating infrastructure development, water conservation, and efficient irrigation technologies.

Its major contributions include:

- Expanding assured irrigation coverage.
- Improving water-use efficiency.
- Promoting climate-resilient agriculture.
- Conserving groundwater and surface water resources.
- Enhancing agricultural productivity.
- Supporting sustainable natural resource management.
- Reducing dependence on monsoon rainfall.
- Increasing farmers' income through improved irrigation access.

Challenges

Despite notable achievements, PMKSY continues to face several implementation challenges:

- Slow completion of major irrigation projects.
- Regional disparities in irrigation coverage.
- Over-extraction of groundwater in several States.
- Limited adoption of micro-irrigation by small farmers in some regions.
- Fragmented landholdings affecting irrigation efficiency.
- Climate change-induced variability in water availability.
- Need for better convergence among implementing agencies.

Way Forward

After completing a decade of implementation, the **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)** has significantly strengthened India's irrigation infrastructure and promoted sustainable water management in agriculture. However, achieving long-term water security will require faster completion of irrigation projects, wider adoption of micro-irrigation technologies, efficient

groundwater management, and greater convergence between irrigation, watershed, and agricultural programmes. Expanding digital monitoring, encouraging community participation, and promoting water-efficient cropping patterns will further enhance the effectiveness of PMKSY. By ensuring "**Har Khet Ko Pani**" and "**Per Drop More Crop**", the scheme can play a crucial role in improving agricultural productivity, enhancing farmers' incomes, and building climate-resilient agriculture while supporting the broader goals of sustainable rural development.

Kailash Mansarovar Yatra 2026



Why in News?

- Pilgrims undertaking the **Kailash Mansarovar Yatra** were **not permitted to take a holy dip in Lake Mansarovar**, as Chinese authorities continued the ban on bathing in the lake.
- Pilgrims also highlighted the **shortage of toilet facilities** along the **Kailash Parikrama** route.

Key Highlights

Ban on Holy Dip in Lake Mansarovar

- Chinese authorities continued the prohibition on bathing in **Lake Mansarovar**.
- The restriction has been in place since **2018** to prevent pollution of the lake.
- Chinese security personnel and guides maintained strict vigil along the lake, preventing pilgrims from entering the water.

Alternative Arrangement for Pilgrims

- Pilgrims were allowed to:
 - Draw water from the lake using **buckets**.

- Bathe at a short distance from the lake.

- This arrangement enabled pilgrims to perform their religious rituals while complying with Chinese regulations.

Shortage of Toilet Facilities

- Pilgrims reported inadequate toilet facilities along the **Kailash Parikrama** route, particularly at:
 - **Derapuk**.
 - **Jhunjhupui**.
- The shortage caused significant inconvenience, especially for **women pilgrims**.

Demand Raised by Pilgrims

- Pilgrims urged the **Government of India** to take up the issue with the Chinese authorities.
- They requested the provision of:
 - Adequate toilet facilities.
 - Clean sanitation facilities.
 - Better basic amenities along the parikrama route.

Facilities on the Indian Side

- Pilgrims stated that arrangements made by the **Kumaon Mandal Vikas Nigam (KMVN)** on the Indian side were satisfactory.

About Kailash Mansarovar Yatra

Route

- The pilgrimage begins from **Delhi**.
- Total distance: **Approximately 1,738 km**.
 - **Road journey**: Approximately **1,690 km**.
 - **Trekking**: Approximately **38 km**.

Recent Improvement

- Before **2019**, pilgrims had to trek around **60 km**.
- Construction of roads on both the **Indian** and **Chinese** sides has reduced the trekking distance to **38 km**, making the pilgrimage comparatively easier.

Significance

- **Kailash Mansarovar Yatra** is one of the world's most significant religious pilgrimages.

- The issue highlights the importance of:
 - Providing adequate basic amenities for pilgrims.
 - Ensuring better sanitation facilities along the pilgrimage route.
 - Facilitating religious practices while complying with local regulations.

Soil Conservation and Scientific Soil Management in India

- The Government has highlighted India's efforts to conserve soil and promote **scientific soil management** through initiatives such as the **Soil Health Card Scheme**, **National Mission on Natural Farming**, **Khet Bachao Abhiyan**, **geospatial soil mapping**, and **digital agriculture platforms**.

Why is Soil a Strategic National Resource?

Foundation of Agriculture

- Soil is the foundation of crop production, rural livelihoods, and ecosystem sustainability.
- With over **46% of India's workforce** engaged in agriculture and allied sectors, soil health directly influences farm incomes, food security, and economic stability.

Agricultural Land

- According to **Land Use Statistics 2022–23**, India's reported geographical area is **306.65 million hectares**, of which nearly **59%** is under agriculture.

Food and Climate Security

- Healthy soil:
 - Improves crop productivity.
 - Enhances water and nutrient retention.
 - Reduces dependence on external inputs.
- Soil conservation contributes to **SDG 2 (Zero Hunger)** and **SDG 13 (Climate Action)**.

Major Government Initiatives

- **National Mission for Sustainable Agriculture (NMSA)** promotes climate-resilient and resource-efficient farming.

- **National Mission on Natural Farming (NMNF)** encourages nature-based farming practices.
- **Soil Health Card Scheme** provides soil-test results and crop-specific nutrient recommendations.
- **Khet Bachao Abhiyan** promotes balanced fertilizer use and public awareness on soil conservation.

Major Soil Types in India

Alluvial Soil

- Found in the **Indo-Gangetic and Brahmaputra plains** and major river deltas.
- Highly fertile and supports intensive agriculture.

Black Soil

- Found mainly in **Maharashtra, Madhya Pradesh, and Gujarat**.
- Rich in lime and calcium with high moisture retention.

Red Soil

- Distributed across **Tamil Nadu, Karnataka, Andhra Pradesh, Madhya Pradesh, Bihar, West Bengal, and Rajasthan**.
- Rich in iron but deficient in major nutrients.

Laterite Soil

- Found in high-rainfall regions.
- Formed through intense leaching.

Desert Soil

- Found in **Rajasthan, Gujarat, and Leh-Ladakh**.
- Sandy with low moisture-retention capacity.

Forest and Hill Soil

- Found across the **Himalayan and North-Eastern regions**.
- Characteristics vary with altitude and climate.

Saline and Alkaline Soil

- Found in arid, semi-arid, coastal, and waterlogged regions.

Marshy Soil

- Occurs in waterlogged areas of **Tamil Nadu, Bihar, and Uttar Pradesh**.
- Rich in organic matter.

Role of Soil in Climate Action

Soil as a Carbon Sink

- Soil stores atmospheric carbon as **Soil Organic Carbon (SOC)**, reducing greenhouse gases.

Benefits of Soil Organic Carbon

- Improves:
 - Soil fertility
 - Moisture retention
 - Nutrient availability
 - Drought resilience

Carbon Farming

- Encourages sustainable land-management practices that remove and store atmospheric carbon.

Supporting Government Initiatives

- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Natural Farming
- Carbon Credit Trading Scheme

Major Climate-Related Missions

National Mission for a Green India

- One of the **eight missions** under the **National Action Plan on Climate Change (NAPCC)**.
- Targets creation of an additional **2.5–3 billion tonnes CO₂ equivalent carbon sink by 2030**.
- India had already created an additional **2.29 billion tonnes CO₂ equivalent carbon sink between 2005 and 2021**.

National Mission for Sustainable Agriculture

- Launched in **2014–15**.
- Promotes climate-resilient agriculture, soil conservation, efficient water use, and integrated farming.
- **₹2,119.84 crore** released since 2014–15, covering **8.50 lakh hectares** and benefiting **14.35 lakh farmers**.

National Mission on Natural Farming

- Launched in **2024**.
- Promotes nature-based farming to improve soil health and climate resilience.
- As of **March 2026**:
 - **18,786 clusters**
 - **8.80 lakh hectares**
 - **18.19 lakh farmers**
 - **33,676 Community Resource Persons** trained.

Carbon Credit Trading Scheme

- Adopted in **2023**.
- Allows verified carbon reduction projects to earn tradable carbon credits.
- Provides farmers with an additional source of income through sustainable agriculture.

Strengthening Soil Health and Fertilizer Management

Soil Health and Fertility Scheme

- Launched in **2015**.
- Promotes balanced fertilizer use through **Soil Health Cards**.

Capacity Building

- Agricultural Technology Management Agencies (ATMA), Krishi Vigyan Kendras (KVKs), and **70,002 Krishi Sakhis** promote scientific nutrient management.

Expansion of Soil Health Cards

- As of **13 March 2026**:
 - **25.89 crore Soil Health Cards** generated.
 - Around **7.17 lakh demonstrations** conducted.

School Soil Health Programme

- During **2025–26**:
 - **4,430 schools**
 - **1,29,167 students** participated.

Other Fertilizer Management Initiatives

- **Nutrient-Based Subsidy (NBS) Scheme**
- **Direct Benefit Transfer (DBT) in Fertilisers**
- **100% Neem-Coated Urea**
- **Integrated Fertiliser Management System**

- **Khet Bachao Abhiyan** promoting soil-test-based nutrient management.

Building a Digital Soil Ecosystem

Soil Resource Mapping

- High-resolution village-level soil maps prepared using satellite imagery and field surveys.
- Nearly **29 million hectares** mapped by **September 2024** against the target of **142 million hectares**.
- **₹1,076 crore** provided to six states for soil mapping.

Digital Agriculture Mission

- Integrates soil, farmer, weather, land, and crop data for better decision-making.

AgriStack

- Integrates farmer, land, crop, and soil information.
- Over **7.63 crore Farmer IDs** generated by **27 November 2025**.

Digital Crop Survey

- Around **23.5 crore crop plots** surveyed during **Rabi 2024–25**.

AI-Based Soil Management

- **Krishi Decision Support System** provides location-specific crop and nutrient recommendations.
- AI, satellite imagery, and remote sensing help detect nutrient deficiencies and soil stress.
- Precision farming optimizes water and fertilizer use.
- AI-based advisory systems assist farmers in crop planning.
- Agri-robotics supports soil sampling, crop monitoring, and field management.
- Institutions such as **ICAR–Indian Agricultural Research Institute** are developing robotic technologies for precision agriculture.

Conclusion

- Soil is one of India's most valuable natural resources, supporting agriculture, food security, livelihoods, and climate resilience.

- Scientific soil management through **soil testing, balanced nutrient management, natural farming, carbon farming, geospatial mapping, and AI-driven advisory systems** will be crucial for ensuring sustainable agriculture and strengthening rural prosperity.

Thane Creek Flamingo Sanctuary Eco-Nature Park



- **Maharashtra** has approved the development of a **₹45-crore Eco-Nature Park** at the **Thane Creek Flamingo Sanctuary**, featuring **India's first Artificial Intelligence (AI)-powered bird detection and monitoring centre**.

AI-Based Monitoring System

- The sanctuary will use **AI-based cameras and monitoring systems** to:
 - Identify bird species.
 - Track migration patterns.
 - Collect scientific data.
- The system will analyse bird activity across a **1.5-km stretch** using **automated image and sound recognition**.

Thane Creek Flamingo Sanctuary

Location

- Situated **between Mumbai and Navi Mumbai** along **Thane Creek**.
- Declared a **Wildlife Sanctuary** in **2015**.
- It is **India's first dedicated Flamingo Sanctuary**.

Ecological Importance

- It is an important **coastal wetland ecosystem**.

- Supports **thousands of flamingos** and **more than 200 bird species**, including:
 - Greater Flamingo
 - Lesser Flamingo
 - Herons
 - Egrets
 - Shorebirds
 - Kingfishers

Migratory Importance

- Forms part of the **Central Asian Flyway (CAF)**.
- The flyway connects **Europe, Central Asia, and the Indian Subcontinent**, serving as an important migratory route for birds.

Flamingos

About

- Flamingos are **tall wading birds** known for their:
 - Long **S-shaped neck**
 - Long stick-like legs
- They are **highly social birds**, usually found in **large flocks**.
- They inhabit **shallow eutrophic water bodies**, including:
 - Saline lagoons
 - Salt pans
 - Alkaline lakes

Species

- There are **6 species** of flamingos worldwide, but **only 2 species** are found in India:
 - **Greater Flamingo**
 - **Lesser Flamingo**

Other Flamingo Species

- **Chilean Flamingo** (*Phoenicopterus chilensis*)
- **American/Caribbean Flamingo** (*Phoenicopterus ruber*)
- **Andean Flamingo** (*Phoenicoparrus andinus*)
- **James's (Puna) Flamingo** (*Phoenicoparrus jamesi*)

Diet and Colouration

- Flamingos feed on:
 - Algae
 - Molluscs
 - Crustaceans
- Their **white, pink, or orange plumage** is due to **carotenoid pigments** present in their diet.

Habitat

- Depend on:
 - Shallow wetlands
 - Mudflats
 - Coastal lagoons
- These habitats are essential for **feeding and breeding**.

Major Threats

- Habitat degradation
- Pollution
- Coastal development
- Human disturbance
- Changes in water quality

Methane Release in Teesta Stage VI Tunnel



Why in News?

- A **suspected methane gas explosion** inside the under-construction **Head Race Tunnel** of the **Teesta Stage VI Hydropower Project** at **Samardung, Namchi district (Sikkim)** killed several workers and trapped others.
- The incident highlights the **geological and safety risks** associated with infrastructure projects in the fragile Himalayan region.

How is Methane Trapped in Hilly Terrain?

About Methane

- **Methane (CH₄)** is a **colourless, odourless and highly flammable gas**.
- It naturally accumulates in underground rock formations and confined spaces such as tunnels.

Explosion Mechanism

- Methane becomes explosive when mixed with air within a certain concentration.
- Sparks generated during **drilling, blasting or construction activities** can ignite the gas, causing explosions.
- During excavation of the **Head Race Tunnel**, drilling may have disturbed methane-bearing rocks, leading to the sudden release of gas.

Occurrence in Rocks

- Methane may exist as:
 - Natural gas trapped within **porous rocks**.
 - Localised **gas pockets** in young and fragile geological formations.

Organic Origin

- In regions containing **coal-bearing or carbon-rich rocks**, methane forms through the decomposition of ancient organic matter over millions of years.

Anaerobic Conditions

- Waterlogged valleys and hilly depressions create **oxygen-deficient conditions**, allowing microorganisms to decompose organic matter and release methane.

Migration Through Faults

- Methane can migrate upward through **fault lines, cracks and natural fissures** from underground coal, gas or geothermal deposits and accumulate inside enclosed tunnels.

Waste-Related Sources

- Poorly managed waste dumps in hilly regions may also produce methane during the anaerobic decomposition of waste.

Geological Context of Sikkim

- Although **Sikkim** has no major coalfields, parts of **southern Sikkim**, including **Namchi**, contain small coal deposits and lie within the **Rangit Tectonic Window**, a geologically complex region.

Detection Challenges

- Standard geological surveys mainly assess:
 - Rock stability
 - Groundwater conditions
 - Structural safety
- Small and localised methane pockets often remain difficult to detect before excavation.

Why are Infrastructure Projects in Sikkim Highly Vulnerable?

Teesta Stage VI Incident

- This is the **first recorded methane-related tunnel explosion** in Sikkim.
- Earlier hydropower projects were mainly affected by **floods and landslides**.

Previous Project Damage

- The **October 2023 Glacial Lake Outburst Flood (GLOF)** destroyed the **1,200 MW Chungthang Dam**.
- The **510 MW Teesta-V Hydropower Project** was damaged during the flood and again by a **landslide in August 2024**.

Fragile Himalayan Geology

- Sikkim lies in a **young, tectonically active and erosion-prone Himalayan region**.
- The region is highly vulnerable to:
 - Earthquakes
 - Landslides
 - Slope failures

Impact of Construction

- Blasting and tunnelling for:
 - Hydropower projects
 - Highways
 - Railways
- further destabilise slopes and increase the risk of landslides and mudslides.

Human-Induced Pressures

- Environmental risks are intensified by:
 - Unplanned urbanisation
 - Heavy tourism
 - Deforestation
 - Poor waste management

Climate-Related Risks

- Increasing frequency of:
 - Cloudbursts
 - Glacier melting
 - Expansion of glacial lakes
- has increased disasters affecting hydropower infrastructure.

Why Has Tunnelling Become Disaster-Prone in India?

High Geological Risk

- Tunnelling in the **Himalayan and North-Eastern regions** is highly risky due to:
 - Weak rock formations
 - Active fault lines
 - Heavy rainfall
 - Frequent landslides

Systemic Failures

- Tunnel accidents often result from:
 - Poor planning
 - Weak construction quality
 - Inadequate regulatory oversight
 - Lack of accountability

Inadequate Risk Assessment

- Limited geological investigations may fail to identify:
 - Weak rock zones
 - Underground water
 - Fault zones
 - Methane or other gas pockets

Poor Safety Compliance

- Many projects lack:
 - Proper ventilation
 - Fire protection systems
 - Emergency escape routes
 - Real-time gas monitoring

Worker Vulnerability

- Risks increase due to:
 - Limited specialised training
 - Inadequate protective equipment
 - Poor coordination among contractors and subcontractors

Way Forward

- Strengthen **geological investigations** before excavation.
- Introduce **continuous gas detection and real-time monitoring systems** in tunnels.
- Enforce stricter **construction and safety standards**.
- Clearly define **contractor accountability**.
- Establish **specialised tunnel rescue teams** equipped with modern technology.

Western Ghats Eco-Sensitive Area (ESA)



Why in News?

- The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has issued the **7th draft notification** proposing an **Eco-Sensitive Area (ESA)** in the **Western Ghats**.
- The proposal, first issued in **2014**, has again been opened for **60 days** for public objections after the previous draft lapsed.
- The Centre and the six Western Ghats States continue to disagree over the villages and areas to be included in the ESA.

Key Highlights of the 7th Draft Notification

Geographical Coverage

- The proposed ESA covers **56,825.7 sq. km** across six states:
 - Karnataka (largest share – **20,668 sq. km**)
 - Maharashtra
 - Kerala
 - Tamil Nadu
 - Goa
 - Gujarat (smallest share – **449 sq. km**)

Prohibited Activities

The draft proposes a complete ban on:

- Commercial mining
- Stone quarrying
- Sand mining
- New thermal power plants
- Highly polluting **Red Category Industries**
- Large-scale construction projects

Regulated & Exempted Activities

- Hydroelectric power projects will be **strictly regulated**.
- The notification clarifies that the following will **not be affected**:
 - Agriculture
 - Plantation activities
 - Livelihoods of local communities

Phased Implementation

- The notification allows **state-wise or combined phased implementation**.
- ESA notification can proceed without waiting for consensus from all six states.

Expert Committee

- The **Sanjay Kumar Committee**, constituted in **2022** to examine state objections and boundary disputes, has received an extension until **July 2027**.

Evolution of the Western Ghats ESA Proposal

Gadgil Committee (WGEEP), 2011

- Officially known as the **Western Ghats Ecology Expert Panel (WGEEP)**.
- Chaired by **Madhav Gadgil**.

- Recommended declaring the **entire Western Ghats** as an **Eco-Sensitive Area**.

- Proposed three categories:

- ESZ-I
- ESZ-II
- ESZ-III

- Faced strong opposition because it was considered too restrictive for development.

Kasturirangan Committee (2013)

- Recommended a more balanced approach.
- Proposed notifying only about **37% of the Western Ghats** (around **60,000 sq. km**) as ESA.
- Allowed sustainable development in the remaining areas.

Challenges in Notifying the ESA

Centre–State Differences

- Disagreement over balancing:
 - Ecological conservation
 - Developmental needs

Boundary Demarcation

- Disputes regarding:
 - Village boundaries
 - ESA mapping
 - Satellite-based demarcation

Lack of Financial Incentives

- States bear the economic cost of conservation without adequate ecological compensation.

Regulatory Uncertainty

- Delay in final notification has created a policy vacuum, allowing:
 - Illegal mining
 - Quarrying
 - Deforestation
 - Unsustainable development

Western Ghats

Geographical Extent

- Stretch approximately **1,490 km** from **Gujarat to Tamil Nadu and Kerala**.
- Cover around **1,40,000 sq. km**.

- Spread across six states:

- Gujarat
- Maharashtra
- Goa
- Karnataka
- Kerala
- Tamil Nadu

Geological Origin

- Older than the **Himalayas**.
- Formed from the faulted edge of the **Deccan Plateau** after the breakup of the **Gondwana Supercontinent** during the late Jurassic and early Cretaceous periods.

Major Gaps

The range is divided by three important passes:

- **Palghat Gap**
- **Goa Gap**
- **Sencottah Gap**

UNESCO World Heritage Site

- Declared a **UNESCO Natural World Heritage Site** in **2012**.
- Includes **39 protected areas** such as:
 - National Parks
 - Wildlife Sanctuaries
 - Tiger Reserves
 - Reserved Forests

Seven UNESCO Sub-Clusters

- Sahyadri
- Kudremukh
- Talacauvery
- Nilgiri
- Anamalai
- Periyar
- Agasthyamalai

Divisions of the Western Ghats

Northern Western Ghats

- Includes the **Sahyadri Range** in Maharashtra.
- Lies between:
 - Konkan Coast (West)
 - Deccan Plateau (East)

- Major Peaks:

- **Kalsubai** (Highest peak of Maharashtra)
- Salher
- Mahabaleshwar

Central Western Ghats

- Also called the **Kanara Ghats**.
- Located mainly in Karnataka.
- Characterised by:
 - Heavy rainfall
 - Evergreen forests
 - Malanadu region
- Major Rivers:
 - Sharavathi
 - Netravati
- Major Peaks:
 - Vavul Mala
 - Kudremukh

Southern Western Ghats

- Located in Kerala and Tamil Nadu.
- Includes:
 - Nilgiri Hills
 - Anamalai Hills
 - Cardamom Hills
- Highest Peak:
 - **Anamudi (2,695 m)** – Highest peak of the Western Ghats and highest mountain in India outside the Himalayas.

Major Hill Stations

- Matheran
- Mahabaleshwar
- Panchgani
- Lonavala–Khandala
- Amboli Ghat
- Kodagu (Coorg)
- Kudremukh

River Systems

West-Flowing Rivers

- Periyar
- Netravati
- Sharavathi
- Mandovi
- Bharathappuzha

Characteristics

- Short
- Steep-gradient
- Flow into the **Arabian Sea**
- High hydroelectric potential

East-Flowing Rivers

- Godavari
- Krishna
- Kaveri

Characteristics

- Longer rivers
- Flow into the **Bay of Bengal**
- Support irrigation, agriculture and drinking water supply.

Ecological & Economic Importance

Biodiversity Hotspot

- One of the world's **eight hottest biodiversity hotspots**.

Climate Regulation

- Acts as a major **orographic barrier**, intercepting southwest monsoon winds.
- Regulates India's:
 - Monsoon
 - Climate
 - Hydrology

Water Tower of Peninsular India

- Source of numerous major rivers.
- Contains some of the world's finest tropical evergreen rainforests.

Carbon Sequestration

- Sequesters nearly **4 million tonnes of carbon annually**.
- Contributes around **10%** of India's forest-based carbon sequestration.

Mineral Resources

- Rich in:
 - Iron ore
 - Manganese
 - Bauxite

Economic Importance

- Supports industries such as:
 - Paper
 - Plywood
 - Poly-fibre
 - Matchwood
- Provides **Non-Timber Forest Produce (NTFP)** and livelihoods to indigenous and forest-dependent communities.

Biodiversity

High Endemism

- More than **5,000 species of flowering plants**.
- Around:
 - **65% of amphibians** are endemic.
 - **53% of freshwater fishes** are endemic.

Major Wildlife

- Asian Elephant
- Tiger
- Gaur
- Lion-tailed Macaque
- Nilgiri Tahr
- Nilgiri Langur

Conservation Status

- The **IUCN World Heritage Outlook** classifies the Western Ghats as being of **"Significant Concern."**
- Major threats include:
 - Development pressure
 - Habitat fragmentation
 - Linear infrastructure
 - Mining (including Sindhudurg district)
- The ongoing ESA debate reflects the challenge of balancing ecological conservation with regional development.

□□□



Internal Security

Project BRAHMANK of Border Roads Organisation (BRO)



Why in News?

- Recently, the Border Roads Organisation (BRO) celebrated the 16th Raising Day of Project BRAHMANK at Ranaghat, Arunachal Pradesh.
- The occasion highlighted the project's contribution towards strategic road connectivity, border infrastructure development and accessibility in remote areas of the Northeast.

About Project BRAHMANK

Overview

- Project BRAHMANK** is a strategic infrastructure initiative of the **Border Roads Organisation (BRO)**.
- It focuses on the construction, development and maintenance of road networks in difficult and strategically important regions of Arunachal Pradesh and Assam.

Historical Background

- Project BRAHMANK was raised on **29 June 2011** at **Ranaghat, East Siang district, Arunachal Pradesh**.
- It became fully operational on **3 December 2011**.

Area of Responsibility

- The project is responsible for road infrastructure development across:
 - Siang district**
 - East Siang district**

- West Siang district**
- Upper Siang district**
- Shi-Yomi district of Arunachal Pradesh**

- It also covers parts of **Dhemaji district in Assam**.

Significance of Project BRAHMANK

Strategic Connectivity

- The project provides critical road connectivity to the Armed Forces deployed in border areas.
- It improves movement of personnel, equipment and essential supplies in strategically sensitive regions.

Socio-Economic Development

- By connecting remote villages with the national road network, the project helps:
 - Improve access to education and healthcare.
 - Promote trade and local economic activities.
 - Strengthen integration of border communities with the rest of India.

Border Infrastructure Development

- The project supports India's broader efforts to strengthen infrastructure along its international borders.
- It contributes to improved preparedness in challenging Himalayan terrain.

Key Facts about Border Roads Organisation (BRO)

About BRO

- The **Border Roads Organisation (BRO)** is a road construction and maintenance force that provides infrastructure support to the **Indian Armed Forces**.
- It develops and maintains roads in strategically important border regions of India and friendly neighbouring countries.

Establishment

- BRO was established on **7 May 1960**.
- It was created with the objectives of:
 - Strengthening border connectivity.

- Developing infrastructure in remote areas.
- Supporting national security requirements.

Administrative Control

- In 2015, the BRO was brought completely under the **Ministry of Defence**.
- It functions as an important component of India's border infrastructure development strategy.

Major Functions

- Construction and maintenance of:
 - Roads.
 - Bridges.
 - Tunnels.
 - Airfields.
 - Other strategic infrastructure.
- It operates in difficult terrains including:
 - Himalayan regions.
 - High-altitude border areas.
 - Remote northeastern states.

International Role

- Apart from India, BRO has also undertaken infrastructure projects in friendly neighbouring countries to enhance regional connectivity and cooperation.

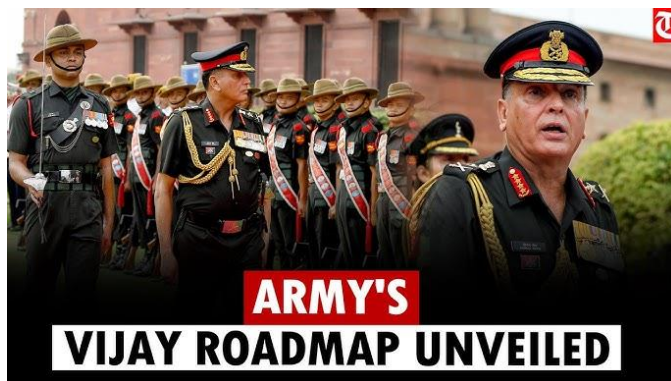
Motto

- The motto of BRO is: "Shramena Sarvam Sadhyam"
- It means "Everything is achievable through hard work."

Conclusion

- Projects like **BRAHMANK** demonstrate the role of the Border Roads Organisation in combining national security requirements with regional development.
- Strengthening border infrastructure improves military preparedness while ensuring that remote communities gain better connectivity, economic opportunities and access to essential services.

VIJAY Roadmap for Indian Army Modernisation



Why in News?

Chief of the Army Staff **General Dhiraj Seth** assumed charge as the **31st Chief of the Army Staff** and unveiled the "**VIJAY**" roadmap for the modernisation of the Indian Army.

The roadmap is aligned with the **Ministry of Defence's Decade of Transformation (2023–2032)** and aims to build a:

- Digitised and technology-enabled force.
- Self-reliant (Aatmanirbhar) Army.
- Multi-domain capable military force.

The roadmap is based on the Prime Minister's mantra that "**JAI leads to VIJAY**", with "**Jai Hind**" and "**Jai Bharat**" as its guiding ethos.

Core Pillars of the VIJAY Roadmap

1. Vigilance (V)

Focus: Operational readiness and border security.

Key Features:

- Prioritises heightened operational preparedness along India's borders.
- Ensures constant alertness to counter evolving security challenges.
- Strengthens the Army's ability to respond rapidly to emerging threats.

2. Innovation and Transformation (I)

Focus: Modernisation through technology and evolving warfare capabilities.

Key Features:

- Integrates modern military doctrines with advanced technologies.
- Promotes rapid capability development.

- Enables the Army to adapt to the changing character of warfare.

3. Jointness and Integration (J)

Focus: Strengthening coordination among the three armed forces.

Key Features:

- Enhances structural synergy among:
 - Indian Army
 - Indian Navy
 - Indian Air Force
- Promotes military-civil fusion through a **Whole-of-Nation approach**.
- Supports the vision of **Viksit Bharat @2047**.

4. Atmanirbharta (A)

Focus: Defence self-reliance and indigenous capability development.

Key Features:

- Reaffirms commitment towards indigenisation of defence capabilities.
- Follows the principle of **“Winning Our Wars with Indigenous Solutions.”**
- Encourages domestic defence manufacturing and reduced dependence on imports.

5. Yodha First (Y)

Focus: Human resource development and welfare of soldiers.

Key Features:

- Prioritises enhanced training standards.
- Promotes technological skilling of military personnel.
- Focuses on welfare frameworks for:
 - Agniveers
 - Veterans
 - Veer Naris

Significance:

The VIJAY roadmap aims to transform the Indian Army into a future-ready, technologically advanced, and self-reliant force capable of addressing emerging security challenges.

Gulf of Aden



Why in News?

The Indian Navy stealth frigate **INS Trikand**, supported by **Marine Commandos (MARCOS)**, responded to a piracy attempt on the merchant vessel **MV Golden Arsenal** in the Gulf of Aden, around **300 nautical miles east-northeast of Djibouti**.

The operation took place amid increasing piracy incidents in the Gulf of Aden and the wider **Western Indian Ocean** region. The **International Maritime Organization (IMO)** has also called for the release of crews of three vessels still being held by Somali pirates.

About Gulf of Aden

Location:

- The Gulf of Aden is an extension of the **Indian Ocean**.
- It lies between:
 - **Arabian Peninsula** to the north.
 - **African continent** to the south.

Boundaries:

- **North:** Yemen
- **South:** Somalia and the Socotra Islands
- **East:** Arabian Sea
- **West:** Djibouti

Connectivity

- Connects to the **Somali Sea** through the **Guardafui Channel**.
- Connects to the **Red Sea** through the strategically important **Bab-el-Mandeb Strait**.

Major Ports

Important ports located along the Gulf of Aden include:

- **Aden – Yemen**

- **Djibouti City** – Djibouti
- **Berbera** – Somaliland
- **Zeila** – Somaliland
- **Bosaso** – Somalia

Economic Importance

- The Gulf of Aden is a major international maritime trade route.
- Around **10% of global seaborne petroleum trade** passes through this region.
- More than **USD 110 billion worth of India's trade** moves through the Gulf of Aden.

Maritime Security Challenges

The region faces several security threats, including:

- Piracy and attacks on merchant vessels.
- Armed maritime assaults.
- Illegal trafficking activities.
- Terrorism-related threats.
- Disruptions caused by regional conflicts.

Strategic Significance

- The Gulf of Aden is a critical chokepoint connecting the Indian Ocean with the Red Sea and the Mediterranean Sea through the Suez Canal.
- Ensuring maritime security in the region is important for:
 - Global energy supplies.
 - International trade routes.
 - Safety of merchant shipping.
 - India's economic and strategic interests.

RIMPAC 2026 and India's Participation Through P-8I Maritime Patrol Aircraft



Why in News?

The Indian Navy's **P-8I maritime patrol aircraft** is participating in the **Rim of the Pacific Exercise (RIMPAC) 2026** being conducted in Hawaii. India's participation highlights its increasing engagement in maritime cooperation initiatives and its commitment to strengthening security partnerships in the Indo-Pacific region.

About RIMPAC (Rim of the Pacific Exercise)

- **RIMPAC** is the world's largest multinational naval exercise.
- It is organised by the **U.S. Pacific Fleet** and has been conducted biennially since **1971**.
- The exercise aims to enhance:
 - Interoperability among participating naval forces.
 - Maritime Domain Awareness (MDA).
 - Operational readiness.
 - Coordination during complex maritime operations.

RIMPAC 2026

- **Edition:** 30th edition of the exercise.
- **Theme:** *"Partners: Integrated and Prepared."*
- **Location:** Hawaii.

Participation

The exercise involves:

- Around **30 participating nations**.
- More than **30 surface ships**.
- Five submarines.
- Over **200 aircraft**.

Major participating countries include:

- India.
- United States.
- Australia.
- Japan.
- France.
- United Kingdom.
- South Korea.
- Singapore.
- Indonesia.

Major Training Activities

RIMPAC involves advanced naval drills, including:

- Anti-submarine warfare operations.
- Air defence exercises.
- Amphibious warfare training.
- Gunnery and missile firing exercises.
- Counter-piracy operations.
- Mine countermeasure operations.
- Diving and salvage activities.

Significance for India

India's participation in RIMPAC helps the Indian Navy to:

- Improve operational coordination with partner navies.
- Enhance capabilities for joint maritime operations.
- Strengthen maritime security cooperation in the Indo-Pacific.
- Contribute towards ensuring safe and secure sea lanes of communication.

P-8I Maritime Patrol Aircraft

About

- The **P-8I** is a long-range, multi-role maritime patrol aircraft developed from the **Boeing 737-800** platform.
- It is designed primarily for:
 - Maritime surveillance.
 - Anti-submarine warfare.
 - Reconnaissance missions.
 - Search and rescue operations.

Capabilities

The P-8I provides:

- Long-range maritime reconnaissance.
- Detection and tracking of submarines and surface vessels.
- Electronic warfare support.
- Targeting assistance for weapon systems.
- Intelligence, surveillance and reconnaissance (ISR) capabilities.

It can also carry:

- Air-to-ship missiles.
- Torpedoes for anti-submarine operations.

Operational Role

- The aircraft has been used by India for strategic surveillance missions, including reconnaissance support during the **post-Galwan high-altitude military standoff**.

India's P-8I Fleet

- The Indian Navy currently operates **12 P-8I aircraft**.
- India is planning to acquire **six additional P-8I aircraft** to further strengthen maritime surveillance and anti-submarine warfare capabilities.

Conclusion

RIMPAC 2026 provides India an important platform to enhance naval interoperability and strengthen partnerships with major maritime powers. The deployment of the P-8I aircraft demonstrates India's growing capability in maritime surveillance, anti-submarine warfare and maintaining security across the Indo-Pacific region.

Regulation of Social Media Platforms in India: Issues, Challenges and Way Forward



Why in News?

- The Government of India has intensified regulatory scrutiny of major digital platforms such as **Meta (WhatsApp and Instagram), Telegram and Signal** over concerns related to **online fraud, copyright violations, AI-generated misinformation and circulation of Child Sexual Exploitation and Abuse Material (CSEAM)**.
- The developments have renewed discussions around **intermediary liability, privacy versus traceability,**

algorithmic accountability and the need for a comprehensive digital platform regulation framework.

- Social media platforms have evolved from being simple communication tools into powerful digital ecosystems that influence information flows, public discourse and online behaviour.
- Recent regulatory actions highlight challenges such as **cyber fraud, piracy, harmful synthetic content, child safety risks and misuse of encrypted communication platforms.**
- India faces the challenge of balancing **digital innovation, user privacy, freedom of expression and platform accountability.**
- A future regulatory framework must focus on **risk-based oversight, algorithmic transparency, stronger child protection mechanisms and due-process-based content regulation.**

What are the Major Concerns Related to Social Media Platforms?

1. Digital Fraud and Identity Misuse

- Features such as **username-based communication on platforms like WhatsApp** may improve privacy by reducing exposure of mobile numbers.
- However, such systems can also enable:
 - Phishing attacks
 - Identity impersonation
 - Username squatting
 - Digital arrest scams
- The Ministry of Electronics and Information Technology (MeitY) has raised concerns regarding possible misuse, while Meta has stated that phone numbers would continue to remain internally linked and verified accounts would receive protection.

2. Privacy Versus Law Enforcement Traceability

- Privacy-enhancing technologies such as **End-to-End Encryption (E2EE)** protect user communications but create difficulties for investigation agencies.
- Encrypted platforms may complicate detection of offences related to:

- Identity theft under Section 66C of the IT Act, 2000
- Cheating through impersonation under Section 66D of the IT Act, 2000

- WhatsApp has been classified as a **Significant Social Media Intermediary (SSMI)** under the IT Act, 2000 and IT Rules, 2021, requiring additional compliance obligations.
- The debate revolves around whether platforms should maintain stronger traceability mechanisms while ensuring privacy protection.

3. Challenges in Combating Online Piracy

- Authorities have identified thousands of Telegram channels allegedly involved in distributing pirated films and OTT content.
- Traditional **notice-and-takedown mechanisms** are often insufficient because illegal content can quickly reappear through new channels.
- Copyright violations are punishable under:
 - Copyright Act, 1957
 - Cinematograph Act, 1952
- The government has encouraged platforms to adopt proactive systems for identifying and restricting pirated content.
- This indicates a shift from reactive removal towards preventive responsibility of digital intermediaries.

4. Safe Harbour Protection Debate

- Section 79 of the IT Act, 2000 provides conditional protection to intermediaries from liability for third-party content.
- However, platforms may lose this protection if they fail to comply with due diligence requirements under the IT Rules, 2021.
- The central issue is whether platforms remain neutral intermediaries or become active publishers by recommending and monetising content through algorithms.

5. Child Sexual Exploitation and Abuse Material (CSEAM)

- Allegations regarding advertisements directing users towards child exploitation

material highlight weaknesses in automated moderation systems.

- Criminal networks increasingly exploit:
 - Advertisement systems
 - Recommendation algorithms
 - Encrypted communication channels
- Distribution of CSEAM violates children's rights and attracts provisions under:
 - Protection of Children from Sexual Offences (POCSO) Act, 2012
 - Information Technology Act, 2000
- Such activities also violate principles under the **UN Convention on the Rights of the Child (UNCRC)**.

6. Misuse of Artificial Intelligence and Synthetic Media

- AI-generated deepfakes, voice cloning and synthetic identities create risks for:
 - Individual privacy
 - Electoral integrity
 - Cybersecurity
 - Public trust
- The rapid spread of synthetic content makes detection and accountability increasingly difficult.

7. Algorithmic Amplification of Harmful Content

- Modern platforms are not merely passive intermediaries; their algorithms actively decide what users see.
- Recommendation systems can amplify:
 - Fake news
 - Fraudulent content
 - Extremist material
 - Pirated content
 - Harmful synthetic media
- Viral misinformation has, in some cases, contributed to social tensions and public disorder, raising questions about platform responsibility.

8. Cross-Border Enforcement Issues

- Global platforms operate across multiple legal jurisdictions.
- This creates challenges in:
 - Accessing digital evidence

- Removing unlawful content
- Investigating cybercrimes
- Prosecuting offenders located abroad

Important Supreme Court Judgments Related to Digital Regulation

Shreya Singhal vs Union of India (2015)

- The Supreme Court upheld the validity of **Section 69A of the IT Act, 2000**, which allows blocking of online content.
- The Court observed that procedural safeguards such as written reasons and review mechanisms prevent arbitrary action.

Tehseen Poonawalla vs Union of India (2018)

- The Supreme Court directed authorities to prevent circulation of inflammatory messages and fake news that could trigger mob violence and lynching.

Anuradha Bhasin vs Union of India (2020)

- The Court recognised that freedom of speech and freedom to carry out professions through the internet are protected under **Article 19 of the Constitution**.

Ajit Mohan (Facebook India) vs Delhi Legislative Assembly (2021)

- The Supreme Court observed that platforms such as Facebook have become centres of significant influence.
- Their algorithms actively curate information and can shape public opinion.

Cybersecurity Concepts in News

Border Gateway Protocol (BGP)

BGP is the core routing protocol that enables communication between different networks on the internet.

It determines the route through which data packets travel across Autonomous Systems.

Since BGP lacks strong authentication mechanisms, it is vulnerable to **BGP hijacking**, where attackers redirect internet traffic.

Resource Public Key Infrastructure (RPKI)

- RPKI is a cryptographic security mechanism designed to improve BGP security.

- It verifies whether network operators are authorised to announce specific internet routes.

DNS Hijacking

- DNS acts as the internet's address directory by converting domain names into IP addresses.
- DNS hijacking manipulates this system to redirect users from genuine websites to malicious ones.

Zero Trust Architecture (ZTA)

- ZTA follows the principle of **"Never Trust, Always Verify."**
- Unlike traditional security models that trust internal networks, Zero Trust assumes every access request could be risky.
- It requires continuous verification of users, devices and applications.

Splinternet

- Splinternet refers to the fragmentation of the global internet into separate national or regional digital ecosystems.
- It is also called the **Balkanisation of the Internet.**

What are the Major Challenges in Regulating Social Media Platforms?

1. Defining Intermediary Liability

- Increasing platform involvement in content recommendation and monetisation creates confusion between:
 - Neutral intermediary
 - Active publisher
- Determining when platforms should lose safe-harbour protection remains a major challenge.

2. Lack of Preventive Regulation

- India's current framework mainly relies on complaint-based removal mechanisms.
- There is limited emphasis on preventive risk assessment of platforms.
- Detection of AI-generated content and deepfakes remains technically challenging.

3. Algorithmic Transparency

- Recommendation and advertising algorithms function as "black boxes".
- Limited transparency prevents effective auditing of:
 - Content amplification
 - Political influence
 - Social harms

4. Fragmented Legal Framework

Digital platforms are regulated through multiple laws including:

- Information Technology Act, 2000
- Digital Personal Data Protection Act, 2023
- Copyright Act, 1957
- POCSO Act, 2012
- Competition Act, 2002

This creates overlapping jurisdictions and compliance uncertainty.

5. Balancing Rights and Regulation

Regulation must maintain equilibrium between:

- Right to privacy under Article 21
- Freedom of speech under Article 19(1)(a)
- National security interests
- Child protection
- Copyright enforcement

6. Institutional Capacity Gaps

Effective regulation requires expertise in:

- Artificial intelligence
- Cyber forensics
- Algorithm auditing
- Cryptography
- Digital investigations

Regulatory institutions are still developing these capabilities.

7. Absence of Comprehensive Digital Platform Law

- Unlike the European Union's Digital Services Act and Digital Markets Act, India does not yet have a single comprehensive law governing digital platforms.
- Multiple fragmented regulations create uncertainty.

What Measures Can Strengthen Digital Platform Regulation in India?

1. Create a Comprehensive Digital Platform Framework

- India requires a dedicated legal framework for AI and digital platforms instead of relying only on amendments to the IT Act.
- Regulation should be technology-neutral and risk-based.

2. Ensure Fair Content Removal Procedures

- Content removal should follow principles of natural justice.
- Users should receive:
 - Reasons for removal
 - Opportunity to appeal
 - Protection against arbitrary censorship

3. Introduce Algorithmic Audits

- Large digital platforms should undergo periodic public-interest assessments.
- Audits should examine impacts on:
 - Elections
 - Public health
 - Social harmony
 - Information integrity

4. Develop AI Governance Standards

- India should strengthen AI governance mechanisms covering:
 - Deepfakes
 - Synthetic media
 - AI transparency
 - Content authentication

5. Enable Lawful Traceability

- Traceability mechanisms should be created for serious crimes such as:
 - Terrorism
 - Child exploitation
 - Organised cybercrime
- Such mechanisms should not unnecessarily weaken encryption for ordinary users.

6. Strengthen Child Online Safety

Platforms should adopt:

- Safety-by-design principles

- Age-appropriate features
- Better CSEAM detection systems
- Faster response mechanisms

Conclusion

The growing influence of social media platforms has created a regulatory challenge where India must balance **privacy, innovation, free expression and public safety**. A future-ready framework should move beyond reactive regulation and focus on **platform accountability, algorithmic transparency, responsible AI governance and rights-based digital regulation**. This will help create a safer and more trustworthy digital ecosystem while preserving the benefits of technological innovation.

Artificial Intelligence and the Transformation of Modern Warfare



Why in News?

- The nature of warfare is undergoing a major technological shift, often described as a “**Manhattan Project moment**” due to the rapid rise of software-driven military capabilities.
- The combination of **Artificial Intelligence (AI), autonomous weapons, drones and algorithm-based decision-making systems** is reshaping battlefield operations, deterrence strategies and military planning.
- As software innovation advances faster than traditional defence hardware development, India needs to strengthen its capabilities in autonomous systems, military AI and secure digital networks to maintain future combat readiness and strategic independence.

- Modern warfare is increasingly being defined by **AI-enabled decision-making, autonomous platforms, drone warfare and algorithmic operations.**
- Technologies such as AI-based intelligence fusion and autonomous weapons are reducing the time between target detection and engagement, creating faster and more precise combat systems.
- India must develop **indigenous military AI capabilities, secure battlefield networks, sovereign defence data infrastructure and multi-domain integration** to compete in future conflicts.

How is AI Transforming Modern Warfare?

1. Algorithmic Warfare and the Emergence of “Kill Webs”

- AI is significantly reducing the traditional **sensor-to-shooter cycle**, which refers to the time taken from identifying a target to launching an attack.
- Modern AI systems combine data from multiple sources such as:
 - Satellites
 - Radars
 - Drones
 - Sensors
 - Open-source intelligence
- This creates interconnected digital “**kill webs**”, where commanders can rapidly identify threats and assign the most suitable weapon system.
- Unlike traditional linear command structures, AI-enabled warfare allows real-time coordination between multiple platforms.

Example:

- The US **Project Maven**, launched in 2017, uses AI to analyse surveillance and drone imagery to improve target identification and accelerate military decision-making.

2. Expansion of Autonomous Military Systems

- Autonomous systems are increasingly being deployed across:
 - Land warfare

- Naval operations
- Air combat
- Logistics support

- AI-powered platforms are enabling greater cooperation between humans and machines.
- The development of autonomous fighter platforms, such as AI-enabled aircraft concepts being explored by the US, indicates a transition towards **man-machine collaborative warfare.**
- Future naval platforms may increasingly depend on autonomous software systems for navigation, surveillance and combat functions.

3. Transformation Through Mass Drone Warfare

- The Russia-Ukraine conflict has demonstrated the strategic impact of large-scale drone deployment.
- Persistent surveillance and First-Person View (FPV) drones have created highly monitored battlefield zones where traditional platforms such as tanks face increased vulnerability.
- Modern battlefields are shifting from heavy platform dominance towards:
 - Low-cost autonomous systems
 - Swarm operations
 - Precision strikes
- Ukraine’s rapid expansion of drone production highlights the importance of scalable unmanned warfare capabilities.

4. AI-Based Intelligence and Electronic Warfare

- AI-powered unmanned systems and High Altitude Pseudo Satellites (HAPS) allow continuous monitoring of adversary positions without exposing human pilots.
- AI is also strengthening:
 - Electronic warfare
 - Signal intelligence
 - Cyber operations
 - Directed-energy weapons
- High-energy laser systems are being developed to counter large-scale drone attacks.

5. Software Advantage in Cyber and Logistics

- The modern defence competition is increasingly becoming a software race.
- AI is improving military logistics by:
 - Predicting equipment failures
 - Optimising supply chains
 - Managing battlefield resources
 - Forecasting environmental challenges
- Cyber capabilities and advanced semiconductor technologies are becoming essential components of military power.

What are India's Initiatives in Military AI?

1. Project SANJAY and TRINETRA System

- The Indian Army has integrated AI-based systems with **Project SANJAY (Battlefield Surveillance System)** to develop a common operational picture.
- These systems:
 - Collect battlefield information
 - Process data from multiple sensors
 - Provide real-time intelligence support
- TRINETRA enhances command, control, communication, computers, intelligence, surveillance and reconnaissance (C4ISR) capabilities across multiple domains.

2. Evaluating Trustworthy AI (ETAI) Framework

- Developed by DRDO and the Chief of Defence Staff, the ETAI framework focuses on ensuring responsible military AI deployment.
- It aims to make defence AI systems:
 - Reliable
 - Transparent
 - Secure
 - Resistant to adversarial attacks

3. iDEX and ADITI Scheme

- The **ADITI scheme under Innovations for Defence Excellence (iDEX)** promotes indigenous defence technologies.
- It supports projects involving:
 - AI-based unmanned systems

- Cognitive electronic warfare
- Quantum technologies
- Advanced surveillance capabilities

4. Operational Deployment of AI Systems

The Indian Army has demonstrated AI-based technologies including:

- Driver fatigue monitoring systems for high-altitude operations
- **Prakshepan**, a disaster prediction system for forecasting avalanches and floods

These applications show the movement of AI from laboratories to operational environments.

5. Specialised Drone Units

- The Army has established specialised **Baaz Battalions** focused on:
 - Long-range drone surveillance
 - Precision strikes
 - Autonomous battlefield operations
- India is also exploring advanced systems such as HAPS and loitering munitions.

What are the Major Challenges for India in AI-Driven Warfare?

1. Growing Technological Gap with China

- China's military modernisation focuses on integrating:
 - Artificial intelligence
 - Cyber warfare
 - Space systems
 - Electronic warfare
 - Autonomous platforms
- The PLA's concept of **System Destruction Warfare** aims to disable an adversary's command and information networks.
- India faces the challenge of developing comparable capabilities despite resource constraints.

2. Fragmented Military Networks

- Future warfare requires seamless communication between:
 - Army
 - Navy
 - Air Force
 - Space and cyber assets

- Existing service-specific networks and incomplete theatre command reforms limit joint operational effectiveness.

3. Limited Battlefield Connectivity

- AI warfare requires massive volumes of real-time data.
- Challenges include:
 - Limited tactical bandwidth
 - Electromagnetic interference
 - Difficult Himalayan terrain
 - Connectivity limitations near the LAC

4. Lack of Indigenous Military Data

- AI systems require large amounts of accurate, specialised training data.
- Imported AI models may fail in Indian operational environments such as:
 - Ladakh
 - Siachen
 - High-altitude regions
- India requires sovereign battlefield datasets and indigenous AI models.

5. Electronic Warfare and Navigation Vulnerabilities

- Autonomous systems depend on reliable Position, Navigation and Timing (PNT) systems.
- Enemy jamming and spoofing can disrupt drone operations.
- India needs stronger:
 - NavIC-based navigation
 - Anti-jamming technologies
 - AI-assisted navigation systems

6. Slow Defence Procurement System

- Traditional defence acquisition cycles are not suited for software-driven warfare.
- AI systems require continuous upgrades, unlike conventional platforms that remain unchanged for decades.
- India needs a faster, innovation-oriented defence ecosystem.

7. Dependence on Foreign Technology

- Dependence on imported:
 - GPUs
 - Semiconductors

- Sensors
- AI models

creates risks related to:

- Supply chain disruption
- Data manipulation
- Embedded vulnerabilities
- Technological self-reliance is therefore critical for defence security.

8. Human Control and Ethical Concerns

- Fully autonomous weapons raise questions regarding:
 - Accountability
 - Civilian casualties
 - Compliance with International Humanitarian Law
- India needs clear guidelines regarding human oversight in autonomous warfare.

9. AI-Based Grey Zone Warfare

- AI-enabled misinformation, deepfakes and cyber operations allow adversaries to influence societies without conventional warfare.
- Such activities create new challenges for national security and deterrence.

10. Innovation-to-Deployment Gap

- India has a growing defence startup ecosystem but faces difficulties in:
 - Testing technologies
 - Scaling production
 - Rapid battlefield deployment

What Measures are Needed to Strengthen India's AI Warfare Preparedness?

1. Develop AI-Based Border Defence Networks

- India should establish integrated counter-drone and surveillance systems along:
 - Line of Control (LoC)
 - Line of Actual Control (LAC)
- Technologies such as:
 - Laser weapons
 - Microwave systems
 - AI-based detection networks

should be deployed for border security.

2. Expand Space-Based Intelligence Capabilities

- India should strengthen Low Earth Orbit (LEO) satellite networks for:

- Persistent surveillance
- Real-time intelligence gathering
- Strategic reconnaissance

3. Create Sovereign Military Data Infrastructure

- India needs a secure defence data ecosystem to:
 - Train indigenous AI models
 - Prevent data poisoning
 - Improve battlefield reliability

4. Build Unified Tri-Service Networks

- Systems such as:
 - Project SANJAY
 - Akashteer

should be integrated into a secure joint operational network.

- This will enable coordinated operations across land, air, maritime, space and cyber domains.

5. Adopt Multi-Domain Warfare Frameworks

- India should accelerate transition towards integrated **All Realm All Domain Operations (ARADO)**.
- Such a framework would improve coordination among:
 - Land forces
 - Air power
 - Naval assets
 - Space systems
 - Cyber capabilities

6. Increase Investment in Defence Software

- Defence modernisation should move beyond traditional platforms towards:
 - AI systems
 - Cyber resilience
 - Autonomous technologies
 - Advanced software capabilities
- A greater share of defence resources should support deep-tech innovation.

Conclusion

Artificial Intelligence is transforming warfare by shifting the focus from traditional platforms towards **data, algorithms, autonomy and rapid decision-making**. For India, achieving military preparedness in the AI era requires **indigenous defence technologies, secure digital**

infrastructure, integrated command networks and faster innovation cycles. Building sovereign military AI capabilities will be essential for maintaining strategic autonomy and ensuring effectiveness in future multi-domain conflicts.

Pinaka Long Range Guided Rocket (LRGR)

Why in News?

- The **Defence Research and Development Organisation (DRDO)** successfully tested the **Pinaka Long Range Guided Rocket (LRGR)** at the **Integrated Test Range (ITR), Chandipur, Odisha**.
- The trial validated the rocket's **minimum strike range of 60 km** with high precision, confirming its operational capability across its full engagement range.

Pinaka Long Range Guided Rocket (LRGR)

About

- The **Pinaka LRGR** is an **indigenously developed long-range guided artillery rocket** designed to engage:
 - Enemy troop concentrations.
 - Artillery positions.
 - Bunkers.
 - Logistics hubs.
 - Other high-value military targets deep inside hostile territory.
- It provides stand-off precision strike capability for the Indian Armed Forces.

Range

- The rocket has an operational strike range of **60–120 km**.
- Earlier trials validated its **maximum range (120 km)**, while the latest test confirmed accurate engagement at the **minimum range (60 km)**.

Key Features

1. High-Precision Guided Rocket

- Equipped with guidance technology for accurate engagement of targets across its operational range.

2. No Operational Dead Zone

- The successful minimum-range trial demonstrated that the rocket can effectively engage targets throughout the entire **60–120 km** range.
- It achieved this by shedding excess energy and performing steep in-flight manoeuvres.

3. Launcher Compatibility

- Fired from an **in-service Pinaka launcher**.
- Demonstrates that the existing launcher can deploy multiple Pinaka rocket variants of different ranges without requiring a separate launch platform.

4. Indigenous Development

- Developed by the **Armament Research and Development Establishment (ARDE), Pune**.
- Supported by:
 - **High Energy Materials Research Laboratory (HEMRL)**.
 - **Defence Research and Development Laboratory (DRDL)**.
 - **Research Centre Imarat (RCI)**.

System Features

Pinaka Rocket Launcher

- A single launcher can fire **12 rockets** in approximately **44 seconds**.
- A battery consisting of **six launchers** can launch **72 rockets** in a short duration.

Area Saturation Capability

- A full battery can rapidly saturate an area of approximately **one square kilometre**, providing intense battlefield firepower.

Shoot-and-Scoot Capability

- The **truck-mounted** launcher has high mobility.
- It follows the **"shoot and scoot"** doctrine by:
 - Launching rockets rapidly.
 - Relocating immediately to avoid enemy counter-battery fire.

Operational Utility

The Pinaka LRGR enhances India's capability in:

- **Long-range precision strikes.**

- **Counter-artillery operations.**
- **Destruction of enemy logistics and command centres.**
- **Battlefield area denial.**
- **Rapid deployment and mobile fire support.**

Significance

- Strengthens India's **indigenous long-range artillery capability** under the vision of **Atmanirbhar Bharat**.
- Enhances the operational effectiveness of the **Pinaka Multi-Barrel Rocket Launcher (MBRL)** system.
- Builds upon the successful combat performance of the **Pinaka system** since the **1999 Kargil War**.
- Demonstrates the versatility of existing launch platforms by supporting multiple guided rocket variants.
- Supports the future development of **extended-range Pinaka variants**, including reportedly planned **300 km** and **450 km** versions, thereby improving India's long-range precision strike capabilities.

Digital Threat Report 2025–26



Why in News?

- The **Ministry of Electronics and Information Technology (MeitY)**, along with **CERT-In**, **CSIRT-Fin**, and **SISA**, has released the **second edition of the Digital Threat Report 2025–26**.
- The report assesses the evolving cyber threat landscape facing India's **Banking**,

Financial Services and Insurance (BFSI) sector and digital payments ecosystem, while suggesting measures to enhance cyber resilience.

Key Highlights of the Digital Threat Report 2025–26

AI-Driven Cyber Threats Become a Major Concern

- The report identifies **AI Asymmetry** as one of the most significant emerging cybersecurity challenges.
- It highlights that cybercriminals are adopting Artificial Intelligence much faster than organisations can strengthen their defence systems or regulators can update safeguards.
- As a result, even attackers with limited technical expertise can launch sophisticated cyberattacks using AI-powered tools.

AI Asymmetry

- AI Asymmetry refers to the growing imbalance where attackers exploit Artificial Intelligence to execute cyberattacks more rapidly than organisations can detect, prevent or respond to them.

Cyber Threats are Evolving Faster

- The time taken for new cyber vulnerabilities to be exploited has reduced significantly.
- Threats that previously took years to emerge are now being weaponised within weeks or months, leaving organisations with limited response time.

Changing Nature of Cyberattacks

Modern cyberattacks increasingly involve:

- Social engineering techniques.
- Theft of user credentials.
- Supply-chain compromises.
- Cloud infrastructure attacks.
- AI-assisted financial fraud.
- Misuse of legitimate user sessions to evade detection.

These methods make cyber intrusions more difficult to identify before substantial damage occurs.

4-Layer Gap Archetype Framework

- The report introduces the **4-Layer Gap Archetype Framework** to explain how major cyber incidents usually result from multiple interconnected weaknesses rather than a single security failure.
- The framework enables organisations to identify critical vulnerabilities and prioritise cybersecurity investments more effectively.

18-Month Cyber Resilience Roadmap

The report proposes an action plan over the next **18 months**, focusing on:

- Strengthening basic cybersecurity controls.
- Continuous monitoring of cyber risks.
- Faster and coordinated incident response.
- Greater sharing of cyber threat intelligence.
- Building resilient and adaptive security infrastructure.

Major Recommendations

The report recommends:

- Moving from periodic cybersecurity audits to **continuous risk assessment**.
- Strengthening **real-time cyber threat intelligence sharing** among stakeholders.
- Enhancing **Digital Forensics and Incident Response (DFIR)** capabilities.
- Improving cloud security and supply-chain protection.
- Deploying **AI-based cybersecurity solutions** to counter AI-enabled attacks.
- Promoting stronger coordination among regulators, financial institutions and cybersecurity agencies to safeguard India's digital financial ecosystem.

Key Institutions

Indian Computer Emergency Response Team (CERT-In)

About

CERT-In is India's national agency for handling cybersecurity incidents.

It functions under the **Ministry of Electronics and Information Technology (MeitY)**.

Functions

- Monitors and analyses cyber incidents.
- Issues security alerts, advisories and vulnerability reports.
- Coordinates responses to cyberattacks.
- Publishes cybersecurity guidelines and best practices.
- Strengthens the country's overall cyber preparedness.

Computer Security Incident Response Team in Finance (CSIRT-Fin)

About

- **CSIRT-Fin** is the dedicated cybersecurity response agency for India's financial sector.

Functions

- Supports cybersecurity across:
 - Banking.
 - Insurance.
 - Securities markets.
 - Pension sector.
- Issues sector-specific cyber advisories.
- Coordinates responses to cyber incidents.
- Monitors cyber resilience across regulated financial institutions.
- Promotes cybersecurity awareness and preparedness.

Strategic Information Services Agreement (SISA)

About

- **SISA** is an India-origin cybersecurity company specialising in the **banking, financial services and digital payments** sector.

Core Areas

- Artificial Intelligence-driven cybersecurity.
- Digital forensics.
- Incident response.
- Payment security.
- Breach intelligence.
- The company supports financial institutions across **more than 40 countries** in strengthening their cyber resilience.

Significance

- The report highlights the rapidly changing nature of cyber threats in India's expanding digital economy.
- It emphasises the need for **AI-enabled defence systems**, continuous cyber risk monitoring and stronger collaboration between government agencies and financial institutions.
- Implementing its recommendations can improve the security of India's **BFSI sector**, strengthen trust in digital payments and enhance the resilience of the country's digital financial infrastructure.

Sundarbans



Why in News?

- The **Ministry of Home Affairs (MHA)** plans to fence nearly **90 km** of the **Sundarbans** along the **India–Bangladesh border** in **West Bengal** to strengthen border security in this challenging terrain.
- The **Border Security Force (BSF)** has initiated feasibility and technical studies for the project.
- Border management in the region is difficult due to:
 - Dense mangrove forests
 - Tidal swamps
 - Creeks
 - Marshes
 - River channels
 - Embankments
- At present, there are **no physical border fences** in this area, and the BSF secures the riverine stretches using **Floating Border Outposts (BOPs)**.

- The **India–Bangladesh border** in West Bengal extends for approximately **2,216.7 km**.

Sundarbans

About

- The **Sundarbans** is the **world's largest mangrove forest**, situated on the delta formed by the **Ganga, Brahmaputra, and Meghna rivers** along the **Bay of Bengal**.

Flora and Fauna

- The ecosystem supports rich biodiversity, including:
 - **84 species of flora**, including **26 mangrove species**
 - **453 species of fauna**
 - **120 species of fish**
 - **290 species of birds**
 - **42 species of mammals**
 - **35 species of reptiles**
 - **8 species of amphibians**

Human Population

- More than **12 million people** depend on the Sundarbans ecosystem.
 - Around **4.5 million** live in India.
 - Around **7.5 million** live in Bangladesh.

Important Wildlife

The Sundarbans is home to several rare and threatened species, including:

- **Royal Bengal Tiger**
- **Estuarine Crocodile**
- **Gangetic Dolphin**
- **Water Monitor Lizard**
- **Olive Ridley Turtle**

Protection Status

Indian Share

- Approximately **40%** of the Sundarbans lies in **India**, while the remaining portion is in **Bangladesh**.

UNESCO World Heritage Site

- **India: 1987**
- **Bangladesh: 1997**

Ramsar Site

- The **Indian Sundarbans** was designated a **Ramsar Site (Wetland of International Importance)** in **January 2019**.

Project Tiger

- The Sundarbans forms one of India's important **Project Tiger** landscapes and supports the unique population of **Royal Bengal Tigers** adapted to mangrove habitats.

Biosphere Reserve

- The Sundarbans is recognised as a **Biosphere Reserve**, comprising several protected areas.

Major Protected Areas in the Sundarbans

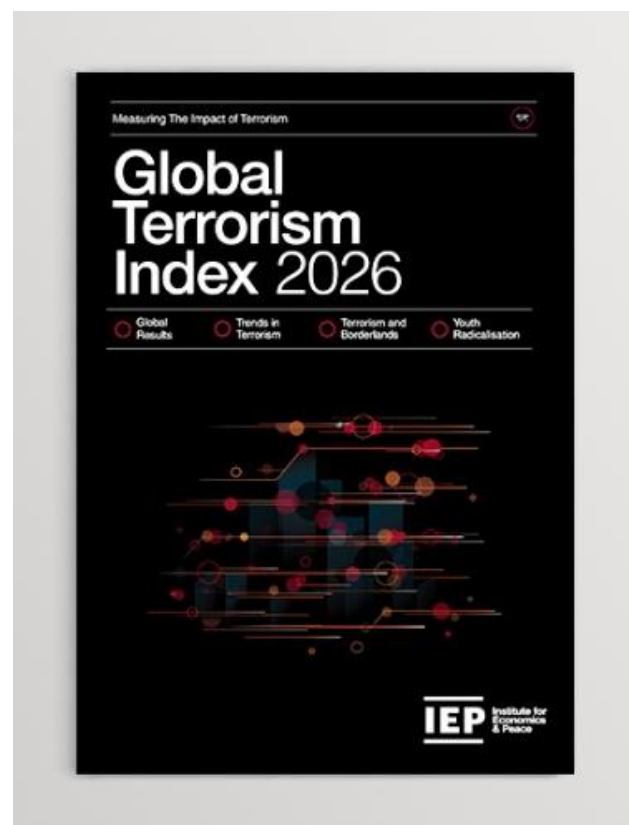
India

- **Sundarbans National Park**
- **Sundarbans East Wildlife Sanctuary**
- **Sundarbans South Wildlife Sanctuary**
- **Sundarbans West Wildlife Sanctuary**

Bangladesh

- **Sundarbans Reserve Forest**

Global Terrorism Index (GTI) 2026



Why in News?

- The **13th edition of the Global Terrorism Index (GTI) 2026** reported a significant decline in global terrorism during **2025**, with:
 - **Terrorism-related deaths decreasing by 28%**
 - **Terrorist incidents declining by 22%**
- Despite this improvement, the report warns that terrorism is becoming **more concentrated, decentralised, technologically advanced, and closely linked to armed conflicts**, creating new security challenges.

Global Terrorism Index (GTI)

About

- The **Global Terrorism Index (GTI)** is an annual report published by the **Institute for Economics & Peace (IEP)**, an independent, non-profit think tank headquartered in **Sydney, Australia**.

Key Findings of GTI 2026

Growing Geographical Concentration

- Nearly **70% of global terrorism-related deaths** occurred in just **five countries**:
 - Pakistan
 - Burkina Faso
 - Nigeria
 - Niger
 - Democratic Republic of the Congo (DRC)
- The **Sahel region** accounted for more than **half of all terrorism fatalities** worldwide.
- **Pakistan** ranked as the **most terrorism-affected country**, while **India** ranked **13th** globally.

Strong Link with Armed Conflict

- Around **99% of terrorism-related deaths** occurred in countries experiencing armed conflict or political instability, highlighting the connection between weak governance and violent extremism.

Rise of Digital and Decentralised Terrorism

- Terrorist organisations are increasingly relying on:
 - Lone-wolf attacks
 - Small autonomous cells
 - Online radicalisation
- These evolving tactics make attacks more difficult to predict and prevent.

Border Areas as Terrorism Hotspots

- More than **60% of terrorist attacks** take place within **100 km of international borders**, facilitating cross-border infiltration, arms smuggling, and terror financing.

Adaptive Terror Networks

- Modern terrorist groups have become more resilient by:
 - Splitting into smaller cells
 - Exploiting local grievances
 - Quickly adapting to counter-terrorism measures.

Dominance of Major Terror Organisations

The global terrorist landscape continues to be dominated by organisations such as:

- Islamic State (IS)
- Jama'at Nusrat al-Islam wal-Muslimin (JNIM)
- Tehrik-e-Taliban Pakistan (TTP)
- Lashkar-e-Taiba (LeT)
- Al-Shabaab.

Impact of Geopolitical Conflicts

- Ongoing conflicts, particularly in **West Asia**, continue to create favourable conditions for the rise and resurgence of extremist organisations.

What is Terrorism?

Definition

- There is **no universally accepted legal definition** of terrorism because countries have not reached a consensus on a single binding definition.

Common Characteristics

Most definitions include:

- Use or threat of violence.

- Targeting civilians or non-combatants to spread fear.
- Pursuing political, ideological, or religious objectives by coercing governments or societies.

United Nations Definition

- The **United Nations** broadly describes terrorism as criminal acts intended to:
 - Cause death or serious injury.
 - Spread fear among the public.
 - Compel governments or international organisations to act.

Legal Definition in India

- The **Bharatiya Nyaya Sanhita (BNS), 2023** defines terrorist acts as activities threatening India's sovereignty, unity, integrity, security, or economic stability.
- **Section 15 of the Unlawful Activities (Prevention) Act, 1967 (UAPA)** provides the statutory definition of a terrorist act in India.

Why Does the Decline in Terrorism Not Mean the World is Safer?

False Sense of Security

- Terrorism has become concentrated in fragile states, causing many regions to underestimate the overall global threat.

Increasing Lone-Wolf Attacks

- Terror groups increasingly rely on lone actors and small independent cells, making attacks more unpredictable.
- In Western countries, **93% of fatal terrorist attacks** over the past five years were carried out by lone individuals.

Digital Radicalisation

- Social media, encrypted communication platforms, and Artificial Intelligence have accelerated extremist recruitment and online radicalisation.

Weak Governance

- Terrorism continues to flourish in regions affected by conflict, institutional collapse, and poor governance.

Resilient Terror Networks

- Modern terrorist organisations have become fragmented and locally

embedded, enabling them to survive sustained counter-terrorism operations.

India's Counter-Terrorism Strategy

Zero-Tolerance Policy

- India follows a **zero-tolerance approach**, rejecting any distinction between terrorists and those who support or sponsor them.

Proactive Security Doctrine

- India's strategy focuses on:
 - Intelligence-led prevention.
 - Precision operations.
 - Calibrated retaliatory responses.
- Examples include:
 - **2016 Surgical Strikes**
 - **2019 Balakot Air Strike**
 - **Operation Sindoor (2025).**

PRAHAAR Framework

- India's **PRAHAAR Framework** shifts national security from a reactive model to an intelligence-driven, preventive approach while maintaining that terrorism has no association with any religion or community.

Four Pillars of India's Counter-Terror Policy

- **Legislative Empowerment**
- **Institutional Strengthening**
- **Decisive Action against Cross-Border Terrorism**
- **International Counter-Terror Cooperation**

Key Outcomes

- Significant decline in terrorist incidents in **Jammu & Kashmir**.
- Reduction in civilian and security force casualties.
- Better intelligence coordination and technology-driven surveillance.
- Increased economic development and restoration of normalcy in affected regions.
- Very few major urban terrorist attacks since the **2013 Hyderabad blasts**, reflecting improved preventive capabilities.

Pellet Guns and Shock Batons



Why in News?

- **Pellet guns** have come under renewed attention following allegations that they were used during the **July 2026 Delhi youth and student protest** organised by the **Cockroach Janta Party (CJP)**.

Pellet Guns

About

- Pellet guns are classified as **non-lethal crowd-control weapons**, along with tear gas and water cannons.
- They fire cartridges containing **hundreds of small lead pellets** intended to disperse crowds by causing temporary incapacitation.

Lethality

- Although regarded as non-lethal, pellet guns can cause:
 - Severe injuries.
 - Permanent blindness if pellets strike the eyes.
 - Fatal injuries when fired at close range into vulnerable body parts.

Manufacturing and Operational Protocol

- The ammunition is manufactured at the **Ordnance Factory, Ishapore**.
- Standard Operating Procedures (SOPs) require security personnel to:
 - Use **minimum necessary force**.
 - Aim **below the waist** while firing.

Deployment History

- Pellet guns were first deployed in **Jammu and Kashmir** during the **2010 summer unrest**.

- Their use during the **2016 Kashmir protests** attracted widespread criticism after numerous eye injuries and cases of permanent blindness were reported.
- In response, the government introduced **plastic bullets** in **2017** as an alternative crowd-control option.
- These plastic bullets were tested at the **Terminal Ballistics Research Laboratory (TBRL), Chandigarh**.

Shock Batons

About

- A **shock baton** is a handheld **electroshock device** used by security personnel for self-defence and crowd management.
- It delivers a **high-voltage, low-current electric shock**, temporarily disabling a person by causing pain and muscle disruption without intending permanent injury.

Use in India

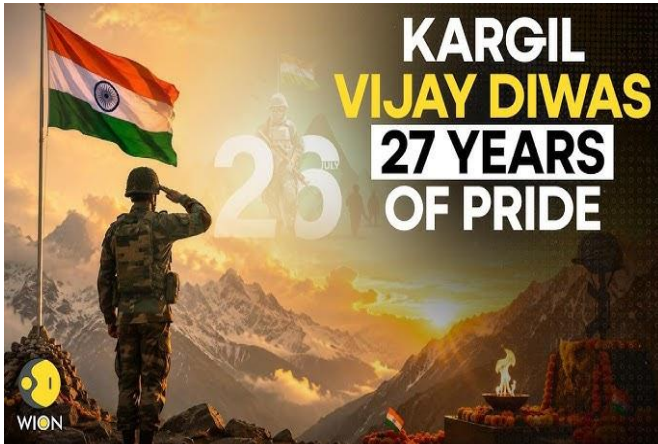
- Shock batons form part of the standard crowd-control equipment carried by the **Rapid Action Force (RAF)**.

MHA Specifications (2021)

In **2021**, the **Ministry of Home Affairs (MHA)**, through the **Border Security Force (BSF)**, prescribed technical standards for handheld shock batons, including:

- Maximum weight: **1 kg**.
- Length: **450–700 mm**.
- Operating temperature: **–20°C to +50°C**.
- Minimum service life: **5 years**.
- Rechargeable battery capable of delivering at least **1,000 quarter-second shock bursts** on a full charge.
- Construction using **high-impact-resistant** and **water-resistant** materials for field operations.

Kargil Vijay Diwas 2026



- India observed the **27th Kargil Vijay Diwas** on **26th July 2026** to honour the courage and sacrifice of Indian soldiers who recaptured the Kargil heights during the **1999 Kargil War**.
- The **Kargil War** is regarded as the **only conventional war fought between two nuclear-armed nations**.

Key Facts About the Kargil War

Background

- The war began in the **summer of 1999**, shortly after the **Lahore Declaration**, when Pakistani forces infiltrated Indian territory and occupied winter-vacated strategic posts.

Operation Badr

- Pakistan launched **Operation Badr**, under which soldiers disguised as militants crossed the **Line of Control (LoC)** and occupied heights overlooking the **Srinagar–Leh Highway**.

Pakistan's Objectives

- Disrupt the link between **Kashmir and Ladakh**.
- Isolate Indian troops in **Siachen Glacier**.
- Force India into negotiations on the **Kashmir issue**.

Detection of Intrusion

- On **3rd May 1999**, local residents reported suspicious movement.
- Reconnaissance patrols and aerial surveillance confirmed large-scale infiltration.

Difficult Terrain

- Indian soldiers fought at altitudes above **5,000 metres** under:
 - Freezing temperatures
 - Thin air
 - Steep mountains
 - Constant enemy fire

Operation Vijay

- India launched **Operation Vijay** to evict the intruders.
- The Government instructed the Armed Forces **not to cross the Line of Control**.

Tri-Service Response

- **Indian Air Force: Operation Safed Sagar** (26 May 1999).
- **Indian Navy:** Strategic deployment to demonstrate India's military preparedness.

Major Battles

- **Battle of Tololing:** Tololing and Point 4590 recaptured on **13 June 1999**.
- **Tiger Hill:** Recaptured on **4 July 1999**, turning the war decisively in India's favour.
- Other major battles:
 - Point 4875
 - Batalik
 - Mushkoh Valley
 - Kaksar

Victory

- India recaptured all occupied positions **without crossing the LoC**, earning international respect for restraint and professionalism.
- On **14 July 1999**, Prime Minister **Atal Bihari Vajpayee** declared **Operation Vijay** successful.

Heroes of Kargil

Iconic Heroes

- **Grenadier Yogendra Singh Yadav**
- **Captain Vikram Batra**
- **Captain Vijyant Thapar**
- Along with many other brave soldiers who became symbols of courage and sacrifice.

Gallantry Awards

- **Param Vir Chakra:** 4 soldiers.
- **Maha Vir Chakra:** 9 personnel.
- **Vir Chakra:** 55 soldiers.
- Other awards:
 - 1 **Sarvottam Yudh Seva Medal**
 - 6 **Uttam Yudh Seva Medals**
 - 8 **Yudh Seva Medals**
 - 83 **Sena Medals**
 - 24 **Vayu Sena Medals**

Defence Reforms After Kargil

Institutional Reforms

- Creation of the **Department of Military Affairs (DMA)**.
- Establishment of the **Chief of Defence Staff (CDS)** to improve joint military planning.
- **General Bipin Rawat** became India's first CDS in 2020.

Greater Defence Investment

- Defence Budget increased from **₹2.53 lakh crore (2013–14)** to **₹7.85 lakh crore (2026–27)**.
- Capital expenditure rose from **₹94,588 crore** to **₹2.19 lakh crore**.

Growth of Defence Manufacturing

- Defence production reached **₹1.78 lakh crore** in **2025–26**.
- Defence exports increased from **₹686 crore** to **₹38,424 crore**, with exports to **80+ countries**.

Atmanirbhar Defence

- Around **65%** of defence equipment is now manufactured domestically.
- Initiatives include:
 - **Srijan Defence Portal**
 - **Positive Indigenisation Lists**
 - Domestic procurement from Indian industries and MSMEs.
- Defence Industrial Corridors established in:
 - **Uttar Pradesh**
 - **Tamil Nadu**

Agnipath Scheme

- Introduced **Agniveers** for a **4-year service**.
- Focuses on creating a youthful, technology-driven and combat-ready military force.
- Provides skill development and educational opportunities.

Modern Military Capabilities

Major Platforms

- **Arjun Mk IA Tank**
- **INS Vikrant**
- **Rafale Fighter Aircraft**
- **Apache & Chinook Helicopters**
- **BrahMos Missile**
- **Project 17A Stealth Frigates**
- **Sandhayak-Class Survey Vessels**
- **Arnala-Class Anti-Submarine Warfare Craft**

Emerging Technologies

- **Mission Shakti (ASAT Test)** – 2019.
- AI-based defence technologies.
- **Mission Divyastra** (MIRV missile test).
- **Pinaka Long Range Guided Rocket**.
- Advanced Air Defence System.
- Hypersonic missile technology.
- **Kusha Long Range Surface-to-Air Missile**.
- Long Range Land Attack Cruise Missile.
- **Netra AEW&C System**.

Proactive Counter-Terrorism Doctrine

Surgical Strikes

- Conducted after the **Uri terror attack**, targeting terrorist launch pads across the LoC.

Balakot Air Strike

- Conducted after the **Pulwama attack**, targeting a **Jaish-e-Mohammed** training camp at Balakot.

Operation SINDOOR

- Launched after the **Pahalgam terror attack**.
- Targeted **nine terrorist camps** in Pakistan and Pakistan-occupied Jammu & Kashmir using precision weapons, drones and loitering munitions.

- Demonstrated India's technology-driven and proactive counter-terrorism strategy.

Conclusion

- **Kargil Vijay Diwas** commemorates India's victory in the **1999 Kargil War** and honours the courage, sacrifice and patriotism of the Armed Forces.
- The legacy of Kargil continues to drive **defence reforms, military modernisation, indigenous manufacturing, strategic preparedness and national security**, strengthening India's vision of a future-ready military.

BitChat and GitHub



Why in News?

- The **Indian Cyber Crime Coordination Centre (I4C)** under the **Ministry of Home Affairs (MHA)** directed **GitHub** to remove the repositories of **BitChat**, a decentralised messaging application, citing concerns over its potential misuse for coordinating unlawful activities and evading lawful surveillance.

BitChat

About

- BitChat is a **decentralised Bluetooth mesh messaging application** developed by **Jack Dorsey**.
- It functions **without internet connectivity, servers, SIM cards, or phone numbers**.

Working Mechanism

- Uses **peer-to-peer (P2P) communication**.
- Every device functions as both:
 - Client
 - Server

- Communication is extended through **Bluetooth mesh networking**.

Key Features

- Internet-independent communication.
- Censorship resistance.
- Surveillance resistance.
- Infrastructure independence.
- Remains functional during:
 - Internet shutdowns
 - Natural disasters
 - Low-connectivity situations

GitHub

About

- GitHub is a **cloud-based software development platform** used to store, manage, share and collaborate on source code.

Key Features

- Code repositories
- Version control
- Issue tracking
- Code review
- Collaborative software development

Legal Provisions Invoked

Section 79(3)(b), Information Technology Act, 2000

- Invoked along with **Rule 3(1)(d) of the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021** to issue the takedown notice.

Government's Rationale

- BitChat's **serverless, peer-to-peer architecture** makes lawful interception and user identification difficult.
- Users can communicate despite internet shutdowns.
- Authorities argue that this could facilitate activities affecting:
 - Public order
 - National security
- Since BitChat is **open source**, removing its GitHub repository does not affect users who have already installed the application.

Procedural Concerns

- Legal experts note that **Section 79** primarily deals with **safe harbour protection** for intermediaries and **does not provide blocking powers**.
- Blocking public access is generally carried out under:
 - Section 69A of the IT Act, 2000**
 - Information Technology (Procedure and Safeguards for Blocking for Access of Information by Public) Rules, 2009**
- These provisions require:
 - Formal hearing
 - Written reasons
 - Due process

Important Supreme Court Judgments

Shreya Singhal v. Union of India (2015)

- The Supreme Court held that intermediaries are required to remove content only:
 - On the basis of a court order, or
 - A valid government direction issued through due process.
- Reaffirmed protection of **freedom of speech under Article 19(1)(a)**.

Anuradha Bhasin v. Union of India (2020)

- Held that restrictions affecting digital communication must satisfy the **principle of proportionality**.
- Any restriction must be:
 - Necessary
 - Proportionate
 - Limited in scope
 - Limited in duration

Civil Society Response

- The **Internet Freedom Foundation (IFF)** argued that the mere possibility of future misuse is **not sufficient legal ground** to prohibit an entire technology without identifying specific unlawful content.
- It emphasised that restrictions on digital communication should comply with the **principle of proportionality** laid down by the Supreme Court.



EDITORIALS

Crux of The Hindu & Indian Express

Internal Security

India's Defence Transformation: A Decade of Modernisation, Self-Reliance, and Strategic Partnerships



Why in News?

- Over the past decade, India has significantly strengthened its defence capabilities through increased budgetary allocations, policy reforms, technological innovation, indigenous manufacturing, and strategic international partnerships.
- The country has transitioned from being largely dependent on defence imports to developing an increasingly **self-reliant defence ecosystem** in line with the

vision of **Aatmanirbhar Bharat** and **Viksit Bharat 2047**.

- This transformation has enhanced India's military preparedness, expanded its defence industrial base, and positioned it as an emerging global defence exporter.

India's Defence Transformation: An Overview

- India's defence modernisation over the last decade has been driven by four key pillars:
 - **Higher defence expenditure and military modernisation**
 - **Promotion of indigenous research, innovation, and manufacturing**
 - **Comprehensive defence acquisition and industrial reforms**
 - **Expansion of strategic defence partnerships and global cooperation**
- These initiatives collectively aim to build a technologically advanced, combat-ready, and self-reliant armed force capable of addressing both conventional and emerging security challenges.

How Has India Strengthened Its Defence Capability?

1. Rising Defence Budget

- India has consistently increased its defence expenditure to strengthen national security and modernise its armed forces.

Growth in Defence Budget

Financial Year	Defence Budget
FY 2013–14	₹2.53 lakh crore
FY 2026–27	₹7.85 lakh crore

This substantial increase reflects sustained government emphasis on:

- National security
- Military modernisation
- Indigenous defence production
- Technological advancement

Increase in Capital Expenditure

Capital expenditure finances:

- Acquisition of advanced weapon systems
- Military infrastructure
- Modernisation of existing platforms
- Creation of long-term defence assets

Capital Outlay

Year	Capital Expenditure
2014–15	₹94,587.95 crore
2026–27	₹2.19 lakh crore

The sharp rise strengthens India's future military capabilities across the Army, Navy, and Air Force.

Strengthening Defence through Research, Innovation and Technology

Growth in Defence Research & Development

India has substantially increased investments in indigenous defence research.

R&D Allocation

Year	Allocation
2014–15	₹13,716.14 crore
2026–27	₹29,100.25 crore

This represents an increase of **over 112%**, enhancing India's capability to develop advanced defence technologies domestically.

Opening Defence R&D to Private Sector

- A landmark reform was introduced in **2022–23**, under which:
- **25% of the Defence R&D budget** was opened to:
 - Private industry
 - Startups
 - MSMEs
 - Academic institutions
- This expanded participation in defence innovation and encouraged the development of indigenous technologies.

Industry-Linked R&D

- In **2024**, the Department of Defence invested: **₹1,757 crore** towards industry-linked research projects, promoting collaboration between government laboratories and private enterprises.

DRDO's Collaborative Research Ecosystem

- The **Defence Research and Development Organisation (DRDO)** has strengthened collaboration by:
 - Opening world-class facilities in **24 DRDO laboratories** to private industry.
 - Introducing **Standard Operating Procedures (SOPs)**.
 - Launching the **Defence Testing Portal** for transparent access to testing infrastructure.
- These initiatives have significantly improved industry participation in defence innovation.

Innovations for Defence Excellence (iDEX)

Innovations for Defence Excellence (iDEX) is the flagship innovation programme of the Ministry of Defence aimed at promoting indigenous technologies through:

- Startups
- MSMEs
- Individual innovators
- Research institutions
- Universities

The initiative has emerged as a major driver of innovation in India's defence and aerospace sectors.

Financial Support

- Two flagship funding mechanisms support defence innovation:

iDEX

- Outlay: **₹498.78 crore**
- Duration: **2021–22 to 2025–26**

ADITI (*Acing Development of Innovative Technologies with iDEX*)

- Outlay: **₹750 crore**
- Duration: **2023–24 to 2025–26**

Both schemes operate through the **Defence Innovation Organisation (DIO)**.

Achievements

As of **March 2026**:

- **676 startups, MSMEs and innovators** engaged.
- **551 design and development contracts** signed.

These achievements reflect the rapid growth of India's indigenous defence innovation ecosystem.

Development-cum-Production Partner (DcPP) Model

- The **Development-cum-Production Partner (DcPP)** model is a DRDO initiative designed to integrate Indian industry into defence technology development and production.

Major Features

- More than **2,200 industries** capable of manufacturing defence systems and subsystems.
- Stronger domestic supply chains.
- Faster technology commercialisation.

Achievements

By **March 2026**:

- **134 companies** associated as DcPPs or Production Agencies.
- **2,180 technology transfer agreements** signed.
- More than **2,780 Intellectual Property Rights (IPRs)** opened for industry utilisation.

Technology Development Fund (TDF)

About

The **Technology Development Fund (TDF)** is a Ministry of Defence initiative implemented by DRDO to encourage indigenous development of critical defence technologies.

The scheme particularly supports:

- MSMEs
- Startups
- Public and private industries

Financial Support

The TDF provides:

- Grants of up to **₹50 crore** per project.
- Additional corpus of **₹500 crore** for deep-tech and emerging technologies.

Progress

As of **June 2026**:

- **80 projects**
- Worth **₹334 crore**

Several technologies developed under TDF have already been successfully demonstrated, with **two systems flown aboard PSLV missions**, highlighting India's growing technological capabilities.

DRDO Industry-Academia Centres of Excellence (DIA-CoEs)

To strengthen defence research, DRDO has established:

- **15 Industry-Academia Centres of Excellence**

These centres focus on:

- **82 advanced research verticals**
- Futuristic defence technologies
- Collaborative research

Additionally, **Industry Interaction Groups (IIGs)** have been established across DRDO laboratories to facilitate technology transfer and industry engagement.

Defence Acquisition Reforms

Defence Acquisition Council (DAC)

- The DAC has promoted **Aatmanirbhar Bharat** by prioritising indigenous procurement.

Defence Acquisition Procedure (DAP) 2020

DAP 2020 emphasises:

- Domestic manufacturing
- Higher indigenous content
- Simplified procurement procedures
- Promotion of Indian defence industry

Acceptance of Necessity (AoN)

DAC has accorded AoN for:

- **Over ₹6 lakh crore**
- worth of DRDO-designed and Indian industry-manufactured defence systems.
- Many of these systems are either inducted or under induction into the Armed Forces.

Major Defence Acquisitions

Some landmark acquisitions include:

Platform	Quantity	Value
Tejas Mk-1A Fighter Aircraft	97	₹62,000 crore
Light Combat Helicopter (LCH) Prachand	156	₹62,700 crore
Rafale Marine Aircraft	26	Approved

These acquisitions significantly enhance India's combat readiness.

Building Human Capital for Defence Technology

Young Scientists Laboratories

DRDO established:

- **Five Young Scientists Laboratories (DYSLs)** in 2020.
- A **sixth laboratory** is planned in 2026.

These laboratories focus on next-generation defence technologies.

Laboratory Rationalisation

DRDO streamlined its organisational structure by maintaining:

- **36 specialised laboratories** to improve efficiency and promote focused research.

Skill Development

The **DRDO Skill Development Centre at Pilkhuwa (Uttar Pradesh)** provides training in:

- Fire safety
- Firefighting technologies
- Technical skill development

Agnipath Scheme

Launched on **15 June 2022**, the **Agnipath Scheme** recruits young men and women into the Armed Forces as **Agniveers** for a **four-year service tenure**.

Objectives

- Create a youthful armed force.
- Enhance technological adaptability.
- Improve combat readiness.
- Develop disciplined and skilled human resources.

Skill Development

Agniveers receive:

- Military training
- Educational opportunities through **IGNOU** and **NIOS**

- Nationally recognised skill certificates
- Post-service career support

Expansion of India's Defence Industrial Ecosystem

1. Defence Procurement Growth

India signed:

- **193 defence contracts worth ₹2,09,050 crore** during FY 2024–25.
- Contracts worth **₹1.82 lakh crore** in FY 2025–26.

This reflects accelerated procurement and industrial growth.

2. Rising Defence Production

India's defence production reached:

₹1,78,000 crore (2025–26)

This represents:

- **15.6% annual growth**
- **110% increase** since FY 2020–21

3. Sectoral Composition

In 2025–26:

- **Defence Public Sector Undertakings (DPSUs): 76%**
- **Private Sector: 24%**

The increasing private-sector contribution reflects greater industrial diversification.

4. Rapid Growth in Defence Exports

India's defence exports have witnessed unprecedented growth.

Year	Exports
2013–14	₹686 crore
2025–26	₹38,424 crore

This represents an increase of **over 5,500%** under the **Make in India** and **Aatmanirbhar Bharat** initiatives.

Global Reach

Indian defence equipment is now exported to:

- **More than 80 countries**
- **145 defence exporters**

The Government has set an ambitious target of **₹50,000 crore in defence exports by 2029**.

Expansion of Defence Manufacturing

- India's defence manufacturing ecosystem now comprises:

16 Defence Public Sector Undertakings (DPSUs)

- Approximately **500 licensed firms**
- Around **17,000 MSMEs**
- This reflects remarkable industrial expansion.

Corporatisation of Ordnance Factory Board

In **October 2021**, the Government:

- Dissolved the **Ordnance Factory Board (OFB)**.
- Reorganised **41 factories** into **7 Defence Public Sector Undertakings (DPSUs)**.

The reform aimed to improve:

- Efficiency
- Accountability
- Competitiveness
- Indigenous manufacturing

Ease of Doing Business

Industrial licences increased from:

- **258 (2015)**
- **834 (2026)**

demonstrating improved investor confidence.

Defence Industrial Corridors

- India established Defence Industrial Corridors in: **Uttar Pradesh**, Investment: **₹42,057 crore**
- **Tamil Nadu Investment: ₹32,699 crore**

These corridors promote regional manufacturing clusters, supply chains, and defence infrastructure.

Key Defence Sector Reforms under Aatmanirbhar Bharat

1. Ease of Doing Business

Industrial licence validity was enhanced:

- From **7 years** (extendable by 3 years)
- To **15 years** (extendable up to 18 years)

Further, under the **Arms Act**, licences are now valid for the **lifetime of the company**, subject to establishment timelines, providing greater regulatory certainty.

2. Revamped Defence Exim Portal

The digital platform provides:

- End-to-end online processing

- Automated verification
- Real-time application tracking
- Secure digital payments

This has improved transparency and export facilitation.

3. Srijan Defence Portal

Launched in **2020**, the **Srijan Defence Portal** enables:

- DPSUs and Service Headquarters (SHQs) to identify import-substitute items.
- Domestic industries, MSMEs, and startups to participate in indigenisation.
- Promotion of Positive Indigenisation Lists (2021), reducing dependence on imports.

4. Srijan DEEP Platform

The **Srijan DEEP (Defence Establishments and Entrepreneurs Platform)** serves as a digital database connecting defence manufacturers and suppliers.

Key Features

- Over **41,000 registered vendors**
- Around **2.7 lakh registered products**

The platform strengthens supply-chain resilience, resource sharing, and emergency preparedness.

5. Foreign Direct Investment (FDI) Reforms

The defence sector was opened to private participation in **2001**.

In **2020**, FDI limits were liberalised:

- **74% under the automatic route**
- **Up to 100% through the government route**

FDI Inflow

- By **March 2026: ₹6,670.59 crore**
- The reforms have encouraged technology transfer, co-development, and co-production with foreign Original Equipment Manufacturers (OEMs).

Major Achievements in Defence Diplomacy

India–United States

India–US defence cooperation has expanded through:

- **LEMOA (2016)**
- **COMCASA (2018)**
- **BECA (2020)**
- **Major Defence Partner designation**

- **STA-1 status**
- **Initiative on Critical and Emerging Technologies (iCET, 2023)**
- **TRUST (2025)**
- **10-Year Defence Partnership (2025)**

Cooperation now spans AI, semiconductors, space, joint exercises, and Indo-Pacific security.

India–Russia

Defence ties continue under the **IRIGC-M&MTC** framework through:

- S-400 air defence systems
- Su-30MKI upgrades
- Exercise INDRA
- MRO expansion
- Co-production under Aatmanirbhar Bharat

India–European Union

The **India–EU Security and Defence Partnership (2026)** covers:

- Maritime security
- Cyber defence
- Counter-terrorism
- Space cooperation

It is supported by an annual Defence Dialogue and Defence Industry Forum.

India–France

Defence cooperation includes:

- Rafale fighter aircraft (2016)
- Scorpene submarine programme
- Approval of 26 Rafale-M aircraft
- Dassault–TATA collaboration
- Safran–HAL partnership

These initiatives align with the **Horizon 2047** defence roadmap.

India–Japan

Key developments include:

- Acquisition and Cross-Servicing Agreement (ACSA, 2020)
- JIMEX 2025
- Enhanced logistics cooperation
- Maritime interoperability

India–UAE

Strategic cooperation expanded through:

- Dubai Air Show (2025)
- Strategic Defence Partnership (2026)

Areas include defence manufacturing, counter-terrorism, and special operations.

India–Australia

Under the **Comprehensive Strategic Partnership (2020)**, cooperation has expanded in:

- Maritime domain awareness
- Defence exercises
- Industrial collaboration
- Indo-Pacific security

Shanghai Cooperation Organisation (SCO)

India actively promotes:

- Counter-terrorism
- Counter-terror financing
- Prevention of Weapons of Mass Destruction (WMD) proliferation

while maintaining its policy of strategic autonomy.

ASEAN and ADMM-Plus

India's engagement in **ADMM-Plus** strengthens:

- Freedom of navigation
- Maritime security
- Capacity building

Defence cooperation with **Vietnam, the Philippines, and Indonesia** includes patrol support and BrahMos missile collaboration.

QUAD

The QUAD has emerged as a major strategic platform focusing on:

- Maritime security
- Critical minerals
- Counter-terrorism
- Indo-Pacific stability

Key initiatives include:

- Malabar Naval Exercise
- Quad-at-Sea Mission (2025)

India's Indo-Pacific Vision

India's Indo-Pacific strategy is anchored in:

- **SAGAR (Security and Growth for All in the Region)** – 2015
- **MAHASAGAR** – 2025

These initiatives position India as a **net security provider** in the Indian Ocean Region through enhanced naval presence, multilateral exercises, humanitarian assistance, and capacity-building partnerships.

Challenges

Despite significant progress, several challenges remain:

- Dependence on imports for certain critical technologies and advanced propulsion systems.
- Delays in the execution of some indigenous defence projects.
- Need for greater private-sector participation in high-end manufacturing.
- Strengthening cyber, space, and artificial intelligence capabilities to address emerging threats.
- Enhancing integration among the Armed Forces through theatre commands.
- Expanding defence exports while maintaining global competitiveness.
- Ensuring sustained investment in frontier technologies such as quantum computing, hypersonics, autonomous systems, and advanced semiconductors.

Way Forward

India's defence transformation over the past decade represents a paradigm shift towards self-reliance, technological innovation, and strategic resilience. Continued implementation of **Aatmanirbhar Bharat** and **Viksit Bharat 2047** will require sustained investment in indigenous R&D, deeper collaboration between DRDO, industry, startups, and academia, faster defence acquisition processes, and greater integration into global defence supply chains. Strengthening the domestic industrial ecosystem, expanding exports, fostering advanced technology partnerships, and enhancing military modernisation across all domains—land, air, sea, cyber, and space—will be critical to establishing India as a globally competitive defence power and a net security provider in the Indo-Pacific region.

Strait of Hormuz Transits Plummet Again: India's Energy Security Under Stress



Why in News?

- Vessel movements through the **Strait of Hormuz** have **fallen sharply** following renewed hostilities between the **United States and Iran**.
- Ship transits dropped to **14 vessels (12 July 2026)**—the lowest level since **14 June**, before the **US–Iran Memorandum of Understanding (MoU)** signed on **17 June 2026**.
- Iran has announced restrictions on commercial navigation, while attacks on merchant vessels have reignited fears of disruption in global energy supplies.
- Consequently, **Brent crude oil prices crossed \$80 per barrel**, raising concerns for energy-importing nations, including **India**.

Key Highlights

Decline in Maritime Traffic

- Ship transits through the Strait declined sharply:
 - **10 July:** 19 vessels
 - **11 July:** 24 vessels
 - **12 July:** 14 vessels
- Before the West Asia conflict:
 - Around **140 vessels** transited daily.
- After the June MoU:
 - Traffic recovered to **40–50 vessels per day**.
 - Peaked at **90+ vessels** on **24 June**.

- Renewed tensions have reversed this recovery.

Oil Prices Rise

- Brent crude increased by around **4%**, crossing **\$80 per barrel**.
- Markets fear:
 - Constrained oil supplies.
 - LNG shortages.
 - Higher shipping and insurance costs.

About the Strait of Hormuz

Location

- Connects the **Persian Gulf** with the **Gulf of Oman** and the **Arabian Sea**.
- Lies between:
 - **Iran** (north)
 - **Oman & UAE** (south)

Strategic Importance

The Strait of Hormuz is the **world's most important maritime energy chokepoint**.

Global Significance

- Around **20% of global crude oil trade** passes through it.
- Nearly **20–25% of global LNG exports** use this route.
- About **18–20 million barrels of oil per day** are transported through the strait.

Major Exporters

- Saudi Arabia
- Iraq
- Kuwait
- UAE
- Qatar
- Iran

Major Importers

- India
- China
- Japan
- South Korea
- European Union

Background of the Crisis

West Asia Conflict

- War erupted in **February 2026**.

- Triggered military confrontations involving:
 - Iran
 - Israel
 - United States

US–Iran Peace MoU (17 June 2026)

The agreement sought to:

- Reduce military hostilities.
- Restore commercial shipping.
- Ensure safe navigation.
- Reopen maritime trade routes.

However,

- Different interpretations of the agreement.
- Continued military retaliation.
- Maritime disputes.

have effectively collapsed the ceasefire.

Why Have Ship Transits Declined Again?

1. Iranian Attacks on Merchant Ships

- Iranian forces attacked vessels sailing outside:
 - Tehran-designated shipping lanes.
- Consequences:
 - Increased security risks.
 - Higher insurance premiums.
 - Reduced commercial confidence.

2. US Military Response

- US retaliated by striking Iranian military targets.
- Iran responded by targeting:
 - US military assets.
 - Facilities across West Asia.

Result:

- Regional conflict widened.

3. Iran's Maritime Restrictions

Iran insists that:

- Ships obtain prior permission before transit.
- Vessels follow only Iranian-designated routes.
- Transit fees may be imposed in future.

4. Security Concerns

Shipping companies fear:

- Missile attacks.
- Drone strikes.
- Naval mines.
- Detention of ships.
- Escalation into a wider conflict.

Hence,

- Many vessels have postponed voyages.

5. Rise of "Dark Shipping"

Many vessels have:

- Switched off their **Automatic Identification System (AIS)**.

This practice is known as:

Dark Shipping

Purpose

- Avoid detection during conflict.

Risks

- Navigation accidents.
- Reduced maritime surveillance.
- Increased security concerns.

Impact on Global Economy

Energy Markets

Reduced shipping has led to:

- Higher crude prices.
- Increased LNG prices.
- Rising freight charges.
- Expensive marine insurance.

Global Supply Chains

Higher transportation costs affect:

- Petrochemicals.
- Fertilizers.
- Aviation fuel.
- Manufacturing.
- Consumer goods.

Result:

- Global inflationary pressures.

India's Concerns

- India is among the countries **most vulnerable** to disruptions in the Strait of Hormuz.

India's Energy Dependence

Imports Through the Strait

Commodity	Share Passing Through Strait
Crude Oil	~40%
LNG	~60%
LPG	~90%

Overall Import Dependence

Energy Source	Import Dependence
Crude Oil	88%
LPG	60%
Natural Gas	50%

Economic Implications for India

1. Rising Oil Import Bill

- India imports around:
 - 1.8–2 billion barrels of crude annually.**
- Every **\$1 increase per barrel** raises India's import bill by nearly:
 - \$2 billion annually.**

2. Widening Current Account Deficit (CAD)

Higher crude prices increase:

- Trade deficit.
- Current account deficit.
- Pressure on foreign exchange reserves.

Nomura Estimate

- A **10% increase** in crude oil prices widens India's CAD by approximately:
 - 0.4% of GDP**

3. Inflationary Pressures

Higher crude prices lead to:

- Costlier petrol and diesel.
- Higher transportation costs.
- Rising food inflation.
- Increased fertilizer costs.
- Expensive electricity generation.

4. Fiscal Burden

Government may need to:

- Increase subsidies.
- Reduce fuel taxes.
- Support oil marketing companies.

This may widen:

- Fiscal deficit.

5. Industrial Impact

Gas-intensive sectors affected include:

- Fertilizers.
- Steel.
- Petrochemicals.
- Ceramics.
- City Gas Distribution (CGD).

India's Response

Diversification of Energy Sources

India has increased crude imports from:

- Russia
- USA
- Brazil
- Guyana
- West Africa

Objective: Reduce dependence on West Asia.

Strategic Petroleum Reserves (SPR)

India maintains emergency crude reserves at:

- Visakhapatnam
- Mangaluru
- Padur

Additional storage facilities are under development.

Fuel Supply Management

Government measures include:

- Prioritising LPG supplies for households.
- Rationing industrial gas during shortages.
- Monitoring fuel inventories.
- Preventing panic buying.

Diplomatic Efforts

India continues to advocate:

- Peaceful resolution.
- Freedom of navigation.
- Stability in West Asia.
- Respect for international maritime law.

International Maritime Law

UNCLOS Provisions

Transit Passage

According to the **United Nations Convention on the Law of the Sea (UNCLOS)**:

- Ships of all nations enjoy the right of:
 - Continuous.
 - Uninterrupted.
 - Expeditious passage.

through international straits.

Iran's Position

Iran argues that:

- Parts of the Strait fall under its sovereignty.
- Commercial ships should obtain prior permission.
- Security concerns justify regulation.

US Position

The United States maintains that:

- Strait of Hormuz is an international waterway.
- Navigation cannot be restricted unilaterally.
- Freedom of navigation must be protected.

Challenges Ahead

- Fragile US–Iran ceasefire.
- Militarisation of the Persian Gulf.
- Rising insurance premiums.
- Threat of complete closure of the Strait.
- Volatile oil prices.
- Supply chain disruptions.
- Pressure on India's macroeconomic stability.

Way Forward

Strengthen Energy Security

- Expand Strategic Petroleum Reserves.
- Diversify crude oil suppliers.
- Promote domestic exploration.

Reduce Import Dependence

- Increase ethanol blending.
- Accelerate Green Hydrogen Mission.
- Expand renewable energy.
- Promote electric mobility.

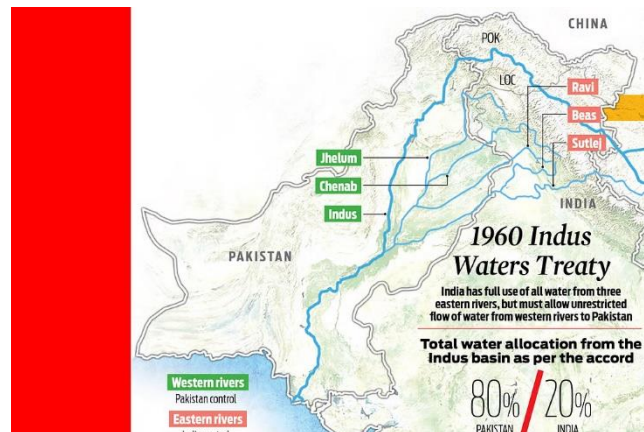
Enhance Maritime Security

- Strengthen naval deployments.
- Improve maritime domain awareness.
- Deepen cooperation with Gulf countries.
- Support freedom of navigation.

Build Economic Resilience

- Improve energy efficiency.
- Secure long-term LNG contracts.
- Strengthen fiscal preparedness against oil shocks.

Indus Waters Treaty : Why India Wants to Renegotiate the Pact with Pakistan



Why in News?

- India has reiterated its demand to **modify and renegotiate the Indus Waters Treaty (IWT), 1960**, while continuing to keep the Treaty **"in abeyance"** following the **Pahalgam terrorist attack (2025)** and Pakistan's continued support for cross-border terrorism.
- Pakistan has publicly opposed India's decision and recently organized an international conference on the Treaty, warning of serious consequences if river flows are disrupted.
- However, **Pakistan has not responded to India's two formal notices seeking modification/renegotiation of the Treaty**, issued under **Article XII**.

Important: India's decision to keep the Treaty **in abeyance** (linked to national security concerns) is **different** from its request for **renegotiation**, which seeks to modernize the 1960 agreement.

Key Highlights

- India seeks **modification or complete renegotiation** of the Indus Waters Treaty.
- Pakistan has **not replied** to India's renegotiation notices.
- Experts argue the Treaty has become **outdated** in light of:
 - Climate change
 - Population growth

- Technological advancements
- Groundwater depletion
- Environmental concerns
- Unlike most modern river agreements, the IWT **allocates entire rivers** rather than sharing water based on flows.

About the Indus Waters Treaty (IWT)

Background

- Signed on **19 September 1960**.
- Brokered by the **World Bank**.
- Signed between:
 - **India**
 - **Pakistan**

Signatories

- **Jawaharlal Nehru** (India)
- **Ayub Khan** (Pakistan)

Objective

To provide a **permanent framework** for:

- Sharing the waters of the **Indus River System**.
- Preventing disputes over river waters.
- Promoting cooperation between India and Pakistan.

The Six Rivers Under the Treaty

Eastern Rivers (Allocated to India)	Western Rivers (Allocated to Pakistan)
Ravi	Indus
Beas	Jhelum
Sutlej	Chenab

Water Allocation

India

Receives unrestricted use of:

- Ravi
- Beas
- Sutlej

Pakistan

Receives unrestricted use of:

- Indus
- Jhelum
- Chenab

India is permitted limited use of western rivers for:

- Domestic consumption.
- Non-consumptive use.
- Hydropower generation (Run-of-the-River projects).
- Irrigation within prescribed limits.

Institutional Mechanism

Permanent Indus Commission (PIC)

Composition

- One Commissioner from India.
- One Commissioner from Pakistan.

Functions

- Exchange hydrological data.
- Resolve technical issues.
- Conduct inspections.
- Ensure implementation of the Treaty.

Dispute Resolution Mechanism

The Treaty provides a **three-tier dispute resolution framework**:

Level 1: Permanent Indus Commission

- Technical discussions

Level 2: Neutral Expert

- Technical disputes

Level 3: Court of Arbitration

- Legal or interpretational disputes.

The **World Bank** plays a facilitative role in appointing Neutral Experts or arbitrators.

Why Does India Want to Renegotiate the Treaty?

1. Treaty Has Become Outdated

The Treaty was negotiated in **1960** under vastly different circumstances.

Since then:

- Population has increased significantly.
- Water demand has risen.
- New irrigation technologies have emerged.
- Better hydrological data is available.

Hence,

Water management cannot remain based on a static agreement.

2. Climate Change

The Treaty does not consider:

- Changing rainfall patterns.
- Glacier retreat.
- Increasing floods.
- Frequent droughts.
- Extreme weather events.

Recent Findings

A study by IIT Gandhinagar found:

- **Eastern river basins** have witnessed nearly **20% decline in rainfall** over the last 70 years.
- Western rivers have experienced relatively stable precipitation.

This has created an imbalance in water availability.

3. No Provision for Groundwater

The Treaty deals only with:

- Surface water.

It completely ignores:

- Shared groundwater aquifers.
- Groundwater recharge.
- Aquifer sustainability.

Modern Integrated Water Resources Management (IWRM) considers groundwater an essential component.

4. No Water Quality Provisions

The Treaty contains **no provisions** regarding:

- Pollution control.
- Sewage discharge.
- Industrial waste.
- Water quality monitoring.

Pakistan has alleged:

- Pollution in eastern rivers affects agriculture and soil health downstream.

5. No Environmental Flow Requirements

The Treaty does not address:

- Ecological flow maintenance.
- River biodiversity.
- Wetland conservation.
- Aquatic ecosystems.

These are standard features of modern river basin agreements.

6. Limited Scope of the Permanent Indus Commission

The PIC mainly:

- Implements the Treaty.
- Monitors compliance.

It **does not**:

- Manage the basin jointly.
- Develop integrated river basin plans.
- Revise operational rules.

7. Entire Rivers Were Allocated Instead of Shared

Unlike most international river agreements:

The Indus Waters Treaty:

- Allocates **entire rivers** to either India or Pakistan.

Most modern treaties instead share:

- Water volumes.
- Seasonal flows.
- Basin resources jointly.

Therefore,

The IWT is often described as:

A river partition agreement rather than a river-sharing agreement.

Why Renegotiation is Common International Practice

River systems are **dynamic**, not static.

Changes occur due to:

- Population growth.
- Urbanisation.
- Climate change.
- New technologies.
- Improved scientific understanding.

Hence,

Many international river treaties are periodically updated.

Global Trends

According to international studies:

- Around **250 transboundary river treaties** cover **113 river basins**.
- Over time, these have evolved into **800+ agreements**, including:
 - Amendments.
 - Supplementary protocols.
 - Data-sharing arrangements.
 - Basin management frameworks.

This demonstrates that **treaty revision is normal international practice**.

Comparison with Other River Treaties

India–Bangladesh Ganga Water Treaty (1996)

Features

- Valid for **30 years**.
- Requires renewal.
- Due for renewal in **2026**.

Shows:

- Water-sharing agreements are periodically reviewed.

Mekong River Agreement (1995)

The **Mekong River Commission** has powers to:

- Develop basin strategies.
- Revise water management plans.
- Improve data sharing.
- Formulate environmental rules.
- Coordinate basin development.

Compared to this, The Permanent Indus Commission has much narrower functions.

Relevant Provisions of the Indus Waters Treaty

Article VII

Provides for:

- Future cooperation.
- New engineering works.
- Joint projects.
- Mutual agreement.

However, This provision has **never been effectively utilized**.

Article XII

Allows:

- Modification of the Treaty.
- Amendment "from time to time."
- Changes through another government-level treaty.

India has invoked **Article XII** by issuing notices to Pakistan.

India's Stand

India argues that:

- Treaty modernization is essential.
- Climate realities must be incorporated.

- Efficient water utilisation is necessary.
- National interests require flexibility.
- Renegotiation is separate from the temporary decision to keep the Treaty in abeyance.

India also maintains that:

Pakistan can facilitate restoration of normal treaty implementation by engaging constructively in renegotiation.

Pakistan's Position

Pakistan contends that:

- The Treaty is binding and permanent.
- India's decision violates treaty obligations.
- River flows should not be interrupted.
- Water security is critical for Pakistan's agriculture and economy.

Pakistan has:

- Issued diplomatic protests.
- Organized international conferences.
- Warned of serious consequences if water flows are disrupted.

Challenges in Renegotiation

- Deep political mistrust.
- Cross-border terrorism.
- Security concerns.
- Climate uncertainty.
- Competing developmental needs.
- Legal complexities under the Treaty.
- Lack of bilateral dialogue.

Way Forward

Modernise the Treaty

- Incorporate climate resilience.
- Address changing hydrology.
- Update engineering provisions.

Adopt Integrated River Basin Management

Include:

- Surface water.
- Groundwater.
- Water quality.
- Environmental flows.
- Ecosystem conservation.

Strengthen the Permanent Indus Commission

Expand its mandate to:

- Basin planning.
- Scientific cooperation.
- Climate adaptation.
- Data sharing.
- Joint monitoring.

Enhance Scientific Cooperation

- Real-time hydrological data.
- Flood forecasting.
- Glacier monitoring.
- Satellite-based water assessment.

Promote Constructive Bilateral Engagement

- Resume technical dialogue.
- Separate water cooperation from political disputes where feasible.
- Encourage confidence-building measures under international law.

Indian Navy Receives Another MH-60R Seahawk Helicopter from the United States



1. Context

- The **Indian Navy** has received another **MH-60R Seahawk multi-role naval helicopter** from the **United States**, further strengthening its maritime combat capabilities.
- With this delivery, **21 out of the 24 helicopters** ordered by India have been delivered.
- The induction marks another milestone in the growing **India–U.S. strategic defence partnership** and enhances India's ability to safeguard its maritime

interests in the **Indian Ocean Region (IOR)** and the wider **Indo-Pacific**.

2. About the MH-60R Seahawk Helicopter

- The **MH-60R Seahawk**, popularly known as the "**Romeo**", is one of the world's most advanced shipborne multi-role naval helicopters.
- It is manufactured by **Lockheed Martin** under the **U.S. Foreign Military Sales (FMS) Programme**.
- The helicopter is primarily designed for **Anti-Submarine Warfare (ASW)** and **Anti-Surface Warfare (ASuW)** operations.
- It is capable of operating from aircraft carriers, destroyers, frigates, and other frontline naval warships.

3. Key Features

- The helicopter is equipped with an advanced **dipping sonar** for detecting submarines.
- It carries **sonobuoys** that help locate and track underwater threats.
- It is fitted with a **multi-mode radar** for surveillance and target detection.
- Electro-optical and infrared sensors enhance reconnaissance and targeting capabilities.
- The helicopter can deploy **Mk-54 lightweight torpedoes** against enemy submarines.
- It can also carry **AGM-114 Hellfire missiles** and machine guns to engage hostile surface targets.
- Its advanced avionics and network-centric warfare capabilities improve real-time situational awareness.

4. Operational Roles

The MH-60R performs a wide range of missions, including:

- Anti-Submarine Warfare (ASW).
- Anti-Surface Warfare (ASuW).
- Maritime surveillance and reconnaissance.
- Search and Rescue (SAR) operations.
- Medical evacuation (MEDEVAC).
- Logistics and personnel transport.

- Maritime interdiction and special operations support.
- Protection of aircraft carriers and naval task forces.

5. Procurement Details

- India signed an agreement with the **United States in 2020** to procure **24 MH-60R Seahawk helicopters**.
- The acquisition aims to replace the ageing **Sea King helicopter fleet** of the Indian Navy.
- In **December 2025**, India signed a **sustainment package** to support the long-term maintenance and operational readiness of the MH-60R fleet.
- With the latest delivery, **21 helicopters** have been inducted, while the remaining **three helicopters** are expected to be delivered soon.

6. Deployment in the Indian Navy

INAS 334 – "Seahawks"

- Commissioned in **March 2024**.
- Based at **INS Garuda, Kochi**.
- Operates the first batch of MH-60R helicopters.

INAS 335 – "Ospreys"

- Commissioned in **December 2025**.
- Based at **INS Hansa, Goa**.
- Supports deployment on both the eastern and western seabords.

The helicopters are deployed aboard:

- Aircraft carriers.
- Guided missile destroyers.
- Project 17A stealth frigates.
- Other frontline naval platforms.

7. Significance

- The induction significantly enhances the Indian Navy's **anti-submarine warfare capabilities**, which are increasingly important in the Indian Ocean Region.
- The helicopters improve maritime domain awareness through advanced surveillance and reconnaissance systems.

- They strengthen India's ability to protect critical Sea Lines of Communication (SLOCs) and maritime trade routes.
- The acquisition enhances interoperability between the Indian Navy and friendly navies, particularly the United States and Quad partners.
- The induction reflects the deepening strategic defence partnership between India and the United States.
- The helicopters support India's vision of maintaining a **free, open, inclusive, and rules-based Indo-Pacific**.
- They increase the combat effectiveness and operational reach of India's frontline naval warships.

8. India–U.S. Defence Cooperation

- The MH-60R acquisition has been carried out under the **U.S. Foreign Military Sales (FMS) Programme**.
- Defence cooperation between India and the United States has expanded through:
 - Defence technology transfers.
 - Joint military exercises.
 - Logistics cooperation agreements.
 - Maritime security collaboration.
 - Defence procurement and capacity building.
- The United States has described the delivery as a reflection of the growing strategic partnership between the two democracies.

9. Challenges

- Advanced helicopters require high maintenance standards and specialised technical support.
- Continuous training of pilots and maintenance personnel is essential for effective operations.
- Long-term sustainment costs remain significant.
- Integration of advanced platforms with existing naval systems requires continuous technological upgrades.

10. Way Forward

- The remaining MH-60R helicopters should be inducted without delay to complete the planned fleet.
- Indigenous maintenance, repair, and overhaul (MRO) capabilities should be strengthened to reduce dependence on external support.
- Greater integration of advanced helicopters with India's network-centric maritime surveillance systems should be promoted.
- Indigenous development of next-generation naval aviation technologies should continue under the **Aatmanirbhar Bharat** initiative.
- India should further strengthen maritime cooperation with friendly nations to ensure security and stability in the Indo-Pacific region.

Dark Eagle Hypersonic Missile Deployment



Why in News?

- The **U.S. Army** deployed its **Dark Eagle hypersonic missiles** during the multinational **Valiant Shield 2026** exercise in the **Western Pacific**.
- The deployment was revealed through recently released photographs, highlighting the missile's role in strengthening the U.S. military presence in the Indo-Pacific region.

About Dark Eagle

- **Dark Eagle** is the U.S. Army's **Long-Range Hypersonic Weapon (LRHW)**.

- It is based on the **Common-Hypersonic Glide Body (C-HGB)**, which is being developed for both the **U.S. Army** and the **U.S. Navy**.
- The Navy's version is known as **Conventional Prompt Strike (CPS)**.

Key Features

- Designed to provide commanders with the ability to respond rapidly to threats at extended ranges.
- Intended for long-range precision strikes.
- Deployed through mobile ground-based missile platforms.

Deployment during Valiant Shield 2026

- Operated by troops assigned to **Multi-Domain Command-Pacific**, formed through the merger of:
 - **7th Infantry Division**.
 - **1st Multi-Domain Task Force**.
- The deployment was reviewed by **U.S. Indo-Pacific Command Chief Admiral Samuel Paparo**.
- Photographs of the deployment were taken in **Guam**.

Valiant Shield 2026

About

- A multinational military exercise conducted in the **Western Pacific**.
- Focused on operations in a **contested environment** across:
 - Land.
 - Air.
 - Sea.
- Recent editions have increasingly incorporated scenarios relevant to a potential conflict between the **United States and China**.

Major Highlights (2026)

- Participation of a **Royal Australian Air Force fighter drone**.
- Sinking of a decommissioned amphibious assault ship by a **Japan Maritime Self-Defense Force** attack boat.
- Live-fire demonstration of the **U.S. Marine Corps Iron Dome** air defence system.

Strategic Importance of Guam

- **Guam** serves as a major hub for U.S. military operations in the Indo-Pacific.
- It hosts:
 - A strategic airfield.
 - A naval base.
- As a **U.S. territory**, it allows the deployment of intermediate-range missile systems without concerns related to overseas basing rights.
- From Guam, **Dark Eagle** can strike targets up to **2,175 miles away**, reaching **China's coastal provinces**.

Role in U.S. Indo-Pacific Strategy

- Ground-based missile systems such as **Dark Eagle** are central to the U.S. Army's preparations for potential operations in the Indo-Pacific.
- The Army is shifting from traditional mechanised formations towards **motorised units** suited for:
 - Littoral areas.
 - Jungle terrain.
 - Maritime environments.

Related Missile Capabilities

Mid-Range Capability (MRC)

- A **ground-based Mark 41 Vertical Launching System** developed for maritime strike operations.
- Since **2024**, it has been deployed to:
 - Philippines.
 - Australia.
 - Japan.
- The system has conducted live-fire exercises using:
 - **SM-6 missiles**.
 - **Tomahawk missiles**.

Previous Deployments

- **Dark Eagle** was first deployed west of the **International Date Line** during the **Talisman Sabre** exercise with Australia.
- Expeditionary deployment exercises were also conducted within the continental United States in **2024**.

Significance

- Demonstrates the operational deployment of the U.S. Army's **Dark Eagle hypersonic missile** in the Indo-Pacific.

- Reflects the increasing emphasis on **long-range hypersonic capabilities** in the region.
- Highlights the strategic importance of **Guam** as a forward military base.
- Forms part of broader U.S. efforts to enhance military readiness and long-range strike capabilities in the Indo-Pacific region.

India Rejects Pakistan's Allegations on Chenab River Flooding



Why in News?

- India rejected Pakistan's allegations that it deliberately created a flood-like situation in **Pakistan's Punjab province** by increasing the flow of the **Chenab River**.
- The **Ministry of External Affairs (MEA)** stated that India will continue to share **high-flood data** with Pakistan on **humanitarian grounds**.

Key Highlights

India's Response

- The **MEA** described Pakistan's allegations as:
 - **Baseless**.
 - **Without factual basis**.
 - **Contrary to facts**.
- According to India, the increase in the Chenab's flow resulted from a **natural hydrological response** caused by heavy monsoon rainfall in the upper catchment areas near Jammu.

Flood Data Sharing

- India stated that it will continue to share **high-flood data** with Pakistan:
 - On **humanitarian grounds**.
 - Through **diplomatic channels**.
 - Whenever the situation requires.

Flood Situation

- The **Chenab River** remained in a **high-flood state** during the previous week due to continued monsoon rainfall over **Jammu and Punjab**.
- India stated that the river discharge did not reach extraordinary levels requiring the issuance of **special flood warnings**.
- The observed river flows were consistent with prevailing monsoon conditions.

Indus Waters Treaty (IWT) and Data Sharing

Current Status

- India stated that the **non-operational status** of the **Indus Waters Treaty (IWT)** has **not affected water-related cooperation** between the two countries.

Flood Data Shared

- Despite the **Indus Waters Treaty** being placed in **abeyance** following the **April 2025 Pahalgam terror attack**, India shared **flood-related data** with Pakistan on **23 occasions in 2025**.
- India stated that similar information would continue to be shared whenever necessary.

India's Position

- The rise in river flow was attributed solely to **heavy monsoon rainfall**.
- India stated that attempts to portray a **weather-driven flood event** as the result of an upstream intervention are:
 - Factually incorrect.
 - Technically untenable.
 - Contradicted by Pakistan's own flood advisories.

Significance

- Highlights India's position that **humanitarian cooperation** on flood information will continue despite the current status of the **Indus Waters Treaty**.
- Reaffirms India's rejection of allegations regarding deliberate release of water into Pakistan.
- Emphasises that the increase in the **Chenab River's flow** was due to **natural monsoon conditions** rather than any upstream intervention by India.

□□□



History, Art & Culture

Arul Mihu Navasakthi Vinayagar Temple, Seychelles



Why in News?

- The Prime Minister recently visited the **Arul Mihu Navasakthi Vinayagar Temple** during his three-day State visit to Seychelles.
- The visit highlighted the cultural and historical connections between India and the Indian diaspora abroad.

About Arul Mihu Navasakthi Vinayagar Temple

About

- The **Arul Mihu Navasakthi Vinayagar Temple** is a Hindu temple located in **Victoria**, the capital city of Seychelles.
- It is the **only Hindu temple in Seychelles**.
- The temple was constructed in **1992** by the Hindu community residing in Seychelles.
- Hindus constitute around **2% of Seychelles' population**.
- The temple is dedicated to **Lord Vinayagar (Lord Ganesha)**.
- It is situated in the heart of Victoria on **Mahé Island**.

Architectural Features of the Temple

Dravidian Style Architecture

- The temple architecture closely resembles traditional temples of **Tamil Nadu and South India**.

- It reflects the influence of **Dravidian architectural traditions** through its design, sculptures and decorative elements.

Gopuram (Entrance Tower)

- The most prominent feature of the temple is its colourful **gopuram**.
- The entrance tower rises nearly **100 feet** above the ground.
- It is decorated with intricately carved sculptures of:
 - Hindu gods and goddesses.
 - Mythological figures.
 - Religious symbols.

Colourful Sculptures

- The statues on the gopuram are painted in vibrant colours.
- The colourful design makes the temple visually distinct against the surrounding green landscape of Seychelles.

Garbha Griha

- The central sanctum of the temple is known as the **garbha griha** or “womb chamber”.
- It houses the idol of **Lord Vinayagar** in a simple inner chamber.

Mandapam

- The temple also contains a **mandapam**, an open hall used for:
 - Religious ceremonies.
 - Prayers.
 - Festivals and community gatherings.

Cultural Significance

- The temple represents the cultural identity of the Indian-origin community in Seychelles.
- It acts as a centre for Hindu religious practices, festivals and social activities.
- It reflects India’s historical cultural links with the Indian Ocean region and the Indian diaspora.

Significance of the Temple

- Serves as an important symbol of India-Seychelles cultural relations.

- Preserves South Indian religious traditions outside India.
- Promotes cultural exchange and strengthens people-to-people connections between the two countries.

Conclusion

- The Arul Mihi Navasakthi Vinayagar Temple is not only a religious centre but also a symbol of Indian heritage and diaspora identity in Seychelles.
- Its Dravidian architecture and cultural importance highlight the global spread of Indian traditions and the enduring connection between India and the Indian Ocean region.

Swami Vivekananda: Contributions to Indian Spiritual Thought and National Awakening



“The salvation of India depends on the strength of the individual, and the realisation by each man of the divinity within.”

SWAMI VIVEKANANDA

Why in News?

The Prime Minister paid homage to **Swami Vivekananda on his Nirvana Day**, recalling his role in projecting India’s spiritual heritage, cultural traditions and philosophical ideas on the global stage.

Swami Vivekananda’s teachings continue to influence discussions on spirituality, education, social service, nationalism and India’s civilisational identity.

About Swami Vivekananda

- Swami Vivekananda was born as **Narendra Nath Datta on 12 January 1863** in Kolkata.
- He was a spiritual leader, philosopher and the principal disciple of **Ramakrishna Paramhansa**.
- Initially, he used the name **Sachidananda**.
- In 1893, at the suggestion of **Maharaja Ajit Singh of Khetri State**, he adopted the name **Vivekananda**.

Enlightenment and Spiritual Journey

- In 1892, Vivekananda travelled to Kanyakumari and meditated on a rocky island in the Indian Ocean, which later became known as the **Vivekananda Rock Memorial**.
- He spent three days in deep meditation there and is believed to have attained spiritual realisation.
- This experience shaped his vision of serving humanity and revitalising Indian civilisation.

Contributions of Swami Vivekananda

Philosophical Contribution

- Vivekananda introduced Indian philosophical traditions, especially **Vedanta and Yoga**, to the Western world.
- He developed the concept of **Neo-Vedanta**, presenting Hindu philosophy in a modern form that could engage with Western scientific and rational thinking.
- He emphasised the harmony between:
 - Spiritual development
 - Scientific progress
 - Material advancement

Spiritual Teachings

- His ideas were influenced by:
 - Upanishads
 - Bhagavad Gita
 - Teachings of Buddha and Jesus Christ
- He stressed:
 - Self-realisation

- Compassion
- Universal brotherhood
- Selfless service

Doctrine of Service

- Vivekananda promoted the idea that serving humanity is a form of worship.
- His famous principle, **“Jiva is Shiva”**, means that serving living beings is equivalent to serving God.

Paths to Liberation

Through his writings, he explained four major paths for attaining **moksha (liberation)**:

- **Raja Yoga** – Path of meditation and mental discipline
- **Karma Yoga** – Path of selfless action and service
- **Jnana Yoga** – Path of knowledge and wisdom
- **Bhakti Yoga** – Path of devotion and spiritual surrender

Educational and Social Reform Ideas

- Vivekananda considered education as the foundation for national regeneration.
- He advocated **“man-making education”**, focusing on:
 - Character building
 - Self-confidence
 - Moral values
 - Social responsibility

Contribution to Indian Nationalism

- Vivekananda's nationalism was rooted in:
 - Humanism
 - Universalism
 - Spiritual values of Indian civilisation
- He emphasised:
 - Welfare of the masses
 - Equality
 - Freedom
 - Selfless action through Karma Yoga
- His ideas inspired India's freedom movement by promoting cultural confidence and social awakening.

Associated Organisations

Ramakrishna Mission

- Vivekananda founded the **Ramakrishna Mission in 1897**.
- The organisation works towards:
 - Education
 - Healthcare
 - Social service
 - Spiritual development

Belur Math

- In 1899, he established **Belur Math** in West Bengal.
- It became the headquarters of the Ramakrishna Math and his permanent spiritual residence.

International Recognition

Parliament of Religions, Chicago (1893)

- Vivekananda represented Hinduism at the **World's Parliament of Religions held in Chicago in 1893**.
- His speech introduced Indian spiritual philosophy to a global audience.

London Hindu Association Conference (1896)

- In July 1896, he addressed the London Hindu Association, further spreading Indian philosophical ideas internationally.

Death and Nirvana Day

- Swami Vivekananda passed away on **4 July 1902** while meditating at **Belur Math**.
- His death anniversary is observed as **Nirvana Day**.

Legacy of Swami Vivekananda

- Vivekananda remains an important figure in modern Indian thought due to his efforts to:
 - Revive Indian philosophical traditions
 - Promote social service
 - Encourage youth empowerment
 - Present India's spiritual heritage globally
- His message of combining spirituality with service continues to influence social and educational movements in India and beyond.

Dr. Syama Prasad Mookerjee: Contributions to Nationalism, Industry and Education



Why in News?

- The Prime Minister paid tribute to **Dr. Syama Prasad Mookerjee on his birth anniversary (6 July)**, remembering his contributions to national integration, industrial development, education and public life.
- His ideas on nationalism, economic development and institutional building continue to remain relevant in discussions on India's political and developmental journey.

Early Life and Education

- Dr. Syama Prasad Mookerjee was born in **Calcutta (present-day Kolkata)**.
- He was the son of **Sir Ashutosh Mookerjee**, a distinguished educationist and former Vice-Chancellor of the University of Calcutta.
- He showed exceptional academic ability from an early age and represented the **University of Calcutta at the Conference of the Universities of the British Empire in England**.
- In **1934**, at the age of 33, he became the **youngest Vice-Chancellor of the University of Calcutta**.

Contribution to Journalism

- Dr. Mookerjee used journalism as a medium to express his ideas on society, education and nationalism.
- He launched:
 - **Bang Wani** (1922), a Bengali journal
 - **The Nationalist** during the 1940s

Political Career

Early Political Journey

- In the 1920s, Dr. Mookerjee entered politics by joining the **Indian National Congress**.
- Later, he separated from the Congress due to differences with its leadership on political issues.
- He subsequently joined the **Hindu Mahasabha** and became an important political figure.

Role in Bengal Politics

- In 1937, he played a major role in the formation of the **Progressive Coalition Government in Bengal**.
- He served as the **Finance Minister of Bengal** in this government.
- In 1940, he became the acting President of the Hindu Mahasabha and supported the demand for complete independence from British rule.

Role After Independence

Ministerial Responsibilities

- After independence, Dr. Mookerjee served as the **Minister for Industry and Supply in the Interim Government of India**.
- He focused on strengthening India's industrial foundation and economic self-reliance.

Contribution to Industrial Development

He played an important role in establishing major industrial institutions, including:

- **Chittaranjan Locomotive Factory**
- **Sindri Fertilizer Corporation**
- **Hindustan Fertilizer Corporation**

These institutions contributed to India's industrial growth and public-sector development in the early years after independence.

Ideological Views

Nationalism and Unity

- Dr. Mookerjee advocated:
 - National unity
 - Cultural nationalism
 - A strong and integrated India

- He opposed policies that, according to him, could weaken national integration.

Opposition to Article 370

- He strongly opposed the special status provided to Jammu and Kashmir under **Article 370**.
- He argued for the principle of "**One Nation, One Constitution, One Head, One Flag**", emphasising complete constitutional integration.

Views on Linguistic Reorganisation

- Dr. Mookerjee opposed the division of states solely on linguistic grounds.
- He believed administrative efficiency, national security and economic development should remain important considerations in state reorganisation.

Formation of Bharatiya Jana Sangh

- In **1951**, Dr. Mookerjee founded the **Bharatiya Jana Sangh (BJS)**.
- The organisation later became the ideological predecessor of the **Bharatiya Janata Party (BJP)**.

Arrest and Death

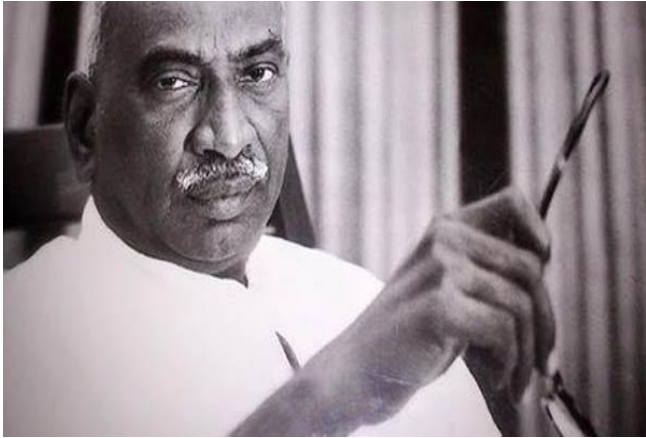
- Dr. Mookerjee was arrested during a protest against Jammu and Kashmir's special status.
- He died in **1953** while in detention under circumstances that remain a subject of debate.

Legacy

- Dr. Syama Prasad Mookerjee is remembered as "**The Lion of Parliament**" due to his powerful speeches, sharp debates and strong positions on national issues.
- His contributions continue to be associated with:
 - Educational reforms
 - Industrial development
 - National integration
 - Political organisation building

His life remains an important chapter in India's post-independence political and institutional history.

K. Kamaraj



Why in News?

- Prime Minister Narendra Modi paid tribute to **Thiru K. Kamaraj** on his birth anniversary, remembering his immense contribution to India's freedom struggle, public life, and nation-building.

Who was K. Kamaraj?

About

- **Kumaraswami Kamaraj (1903–1975)** was a prominent freedom fighter, statesman, and one of India's most respected political leaders.
- Popularly known as the "**Kingmaker**" of Indian politics, he was widely admired for his simplicity, integrity, and commitment to public welfare.

Contribution to the Freedom Movement

Participation in the National Movement

- Born in **1903** in present-day **Tamil Nadu**, Kamaraj was inspired to join the freedom movement after the **Jallianwala Bagh massacre**.
- He actively participated in the **Salt Satyagraha (1930)** and was imprisoned for his role in the **Quit India Movement (1942)**.
- In **1946**, he became a member of the **Constituent Assembly**, contributing to the process of framing independent India's Constitution.
- He was later elected to the **Lok Sabha** in **1952**.

Contribution to Nation-Building

Chief Minister of Madras State

- Kamaraj served as the **Chief Minister of the erstwhile Madras State** from **1954**.
- He is regarded as one of the earliest **non-English-speaking Chief Ministers** of independent India.

Education Reforms

- He gave top priority to expanding education by:
 - Introducing **free education**.
 - Expanding access to schools across rural areas.
 - Launching the **Mid-Day Meal Scheme**, which improved school enrolment and reduced dropout rates.

Kamaraj Plan (1963)

- In **1963**, Kamaraj proposed that senior Congress leaders should voluntarily resign from ministerial positions and devote themselves to strengthening the party organisation.
- This proposal became known as the **Kamaraj Plan**, aimed at promoting organisational development over the pursuit of political office.

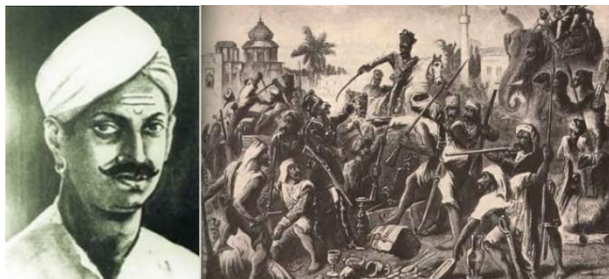
Leadership in the Indian National Congress

- He served as the **President of the Indian National Congress** from **1963**, playing an important role in shaping the party during a critical period.

Legacy

- Kamaraj is remembered as a leader who dedicated his life to public service, education, and social welfare.
- His birth anniversary is observed as **Education Development Day** in **Tamil Nadu**, recognising his lasting contribution to educational development.
- He passed away in **1975** at the age of **72**.
- In **1976**, he was posthumously awarded the **Bharat Ratna**, India's highest civilian honour, in recognition of his exceptional service to the nation.

Mangal Pandey (1827–1857)



Why in News?

- The Prime Minister paid tribute to **Mangal Pandey** on his **birth anniversary (19 July)**, remembering his courage and contribution to India's freedom struggle.

Who was Mangal Pandey?

Early Life

- Mangal Pandey was born on **19 July 1827** in **Ballia district, Uttar Pradesh**.
- At the age of **22**, he joined the **34th Bengal Native Infantry** of the **East India Company's army**.

Role in the Revolt of 1857

Beginning of the Revolt

- He opposed the use of the newly introduced **Enfield Pattern 1853 rifle-musket**, as its cartridges were believed to be greased with **cow and pig fat**, offending the religious beliefs of both Hindus and Muslims.
- On **29 March 1857**, he openly rebelled and fired at his **Senior Sergeant Major**, becoming one of the first soldiers to challenge British authority.

Impact of His Revolt

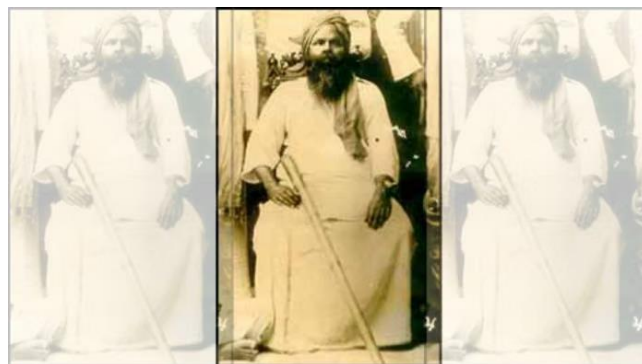
- His act of defiance became one of the major triggers of the **Revolt of 1857**, popularly known as:
 - **Sepoy Mutiny**, or
 - **First War of Independence**.
- Although the revolt of the **7th Awadh Regiment** was suppressed, unrest quickly spread to **Ambala, Lucknow**, and **Meerut**.
- On **10 May 1857**, sepoys at **Meerut** revolted, marched to **Delhi**, and declared **Bahadur Shah Zafar II** as **Shah-en-**

Shah-i-Hindustan, giving the uprising symbolic national leadership.

Execution and Legacy

- Mangal Pandey was **hanged on 8 April 1857** at **Barrackpore**.
- His regiment was later disbanded after showing sympathy towards his actions.
- He is remembered as one of the earliest heroes of India's freedom movement, symbolising resistance against British rule and inspiring generations through his courage and sacrifice.

Subramania Siva



- The **Vice-President of India, Shri C. P. Radhakrishnan**, paid floral tributes to freedom fighter **Thiru Subramania Siva** on his **death anniversary (23rd July)**.

Early Life

- **Subramania Siva** was born on **4th October 1884** at **Batlagundu** in the present-day **Dindigul district of Tamil Nadu**.
- In **1902**, he became a disciple of **Sadananda Swami**, after which he adopted the name **"Sivam"** and developed a strong spiritual and nationalist outlook.

Literary and Cultural Contributions

- He was one of the pioneers of the **Tanittamil (Pure Tamil) Movement**, which promoted the use of Tamil with minimal Sanskrit influence.
- In **1913**, he started the nationalist journal **Gnanabhanu** to spread patriotic ideas.
- During his lifetime, he authored more than **30 books**, including:
 - **Ramanuja Vijayam**

- **Madhva Vijayam**
- **Vitutalaipporil Tamil Valarnta Varalaru**

Role in the Nationalist Movement

- Inspired by the speeches of **Arya Samaj leader Thakur Kahan Chandra Verma**, Subramania Siva emerged as a powerful nationalist orator.
- Along with **V.O. Chidambaram Pillai** and **Subramania Bharati**, he actively propagated the nationalist ideals of **Bal Gangadhar Tilak**.
- In **1906**, he established the **Dharma Paripalana Samajam** to promote patriotism and social reform.

Contribution to India's Freedom Struggle

- He played an important role in the **Swadeshi Movement** and worked closely with **V.O. Chidambaram Pillai**.
- He mobilised workers during the historic **Coral Mill Strike (1908)** at **Thoothukudi** and continued organising public meetings despite British restrictions.
- His nationalist speeches transformed **Tirunelveli** into an important centre of the freedom movement.
- He was arrested on charges of **sedition**, becoming the **first recognised political prisoner of the Madras Presidency**.
- In **1923**, he laid the foundation stone of the **Bharat Mata Temple** at **Pappalapatti (Dharmapuri)**, reflecting his vision of cultural nationalism.

Later Life and Legacy

- During imprisonment, Subramania Siva contracted **leprosy** due to the harsh prison conditions.
- Despite deteriorating health, he remained actively associated with the freedom movement until his death on **23rd July 1925**.
- He is remembered as a **freedom fighter, nationalist leader, social reformer, writer and champion of the Pure Tamil Movement**, whose contributions inspired the nationalist movement in South India.



EDITORIALS

Crux of The Hindu & Indian Express

History, Art & Culture

Kala Sanskriti Vikas Yojana (KSVY): Government Scheme for Promotion and Preservation of India's Cultural Heritage



1. Context

- The **Ministry of Culture** implements the **Kala Sanskriti Vikas Yojana (KSVY)** to promote, preserve, and develop India's rich cultural heritage.
- The scheme provides **financial assistance** to eligible **cultural organisations, individual artists, tribal artists, rural artists, and performing arts groups** across the country.
- The scheme supports the preservation of traditional art forms while encouraging emerging artists to pursue cultural activities as sustainable livelihoods.

2. About Kala Sanskriti Vikas Yojana (KSVY)

- **Kala Sanskriti Vikas Yojana (KSVY)** is a **Central Sector Scheme** implemented by the **Ministry of Culture**.
- Financial assistance is released directly from the **Consolidated Fund of India** through annual budgetary allocations.
- The scheme aims to preserve India's tangible and intangible cultural heritage by supporting artists, scholars, cultural institutions, and infrastructure.
- It promotes performing arts, folk traditions, tribal culture, literature, research, cultural infrastructure, and capacity building.

3. Objectives of KSVY

- To preserve and promote India's diverse cultural heritage.
- To provide financial assistance to artists and cultural organisations.
- To protect traditional folk, tribal, and indigenous art forms.
- To strengthen the **Guru–Shishya Parampara** (traditional teacher-disciple system).
- To encourage research, documentation, and dissemination of cultural knowledge.
- To create and modernise cultural infrastructure across the country.
- To support young artists, researchers, and veteran artists.
- To strengthen India's cultural and creative economy.

Major Components of Kala Sanskriti Vikas Yojana

4. Financial Assistance for Promotion of Guru–Shishya Parampara (Repertory Grant)

- The scheme provides financial support to organisations engaged in training artists through the traditional **Guru–Shishya Parampara**.
- It covers theatre groups, music ensembles, dance institutions, children's theatre, and other performing arts organisations.
- Assistance is provided for:
 - **One Guru**
 - Up to **18 Shishyas (students)**.
- Financial assistance includes:
 - **Guru:** ₹15,000 per month.
 - **Shishya:** ₹2,000–₹10,000 per month depending upon age.

5. Financial Assistance for Promotion of Art and Culture

(a) Financial Assistance to Cultural Organisations with National Presence

- Financial support is provided to registered cultural organisations having a **pan-India presence**.
- Eligible organisations should have spent at least **₹1 crore** on cultural activities during **three of the last five years**.

- Financial assistance:
 - Normally up to **₹1 crore**.
 - Up to **₹5 crore** in exceptional cases.

(b) Cultural Function and Production Grant (CFPG)

- Assistance is provided to NGOs, Trusts, Universities, and Societies for organising:
 - Seminars.
 - Conferences.
 - Workshops.
 - Festivals.
 - Exhibitions.
 - Research programmes.
 - Dance, drama, theatre, and music productions.
- Financial assistance:
 - Up to **₹5 lakh**.
 - Up to **₹20 lakh** in exceptional cases.

(c) Preservation and Development of Cultural Heritage of the Himalayas

- The scheme promotes preservation of the cultural heritage of Himalayan States through:
 - Research.
 - Documentation.
 - Training.
 - Audio-visual dissemination.
- Applicable States:
 - Jammu & Kashmir.
 - Himachal Pradesh.
 - Uttarakhand.
 - Sikkim.
 - Arunachal Pradesh.
- Financial assistance:
 - Up to **₹10 lakh annually**.
 - Up to **₹30 lakh** in exceptional cases.

(d) Preservation and Development of Buddhist/Tibetan Organisations

- Financial support is provided to Buddhist and Tibetan organisations, including monasteries.

- The scheme promotes:
 - Buddhist cultural traditions.
 - Scientific research.
 - Cultural preservation.
- Financial assistance:
 - Up to **₹30 lakh annually**.
 - Up to **₹1 crore** in exceptional cases.

(e) Building Grants Including Studio Theatres

- Financial assistance is provided for creating cultural infrastructure such as:
 - Auditoriums.
 - Studio theatres.
 - Rehearsal halls.
 - Classrooms.
 - Exhibition spaces.
- Assistance also covers:
 - Air-conditioning.
 - Acoustics.
 - Electrical systems.
 - Lighting and sound facilities.
- Financial assistance:
 - **₹50 lakh** in metro cities.
 - **₹25 lakh** in non-metro cities.

(f) Domestic Festivals and Fairs

- The scheme supports organisation of **Rashtriya Sanskriti Mahotsavs (RSMs)** through **Zonal Cultural Centres (ZCCs)**.
- These festivals showcase artists from different regions and promote India's cultural diversity.
- Since **2015**, **14 Rashtriya Sanskriti Mahotsavs** have been organised.

6. Financial Assistance for Construction of Tagore Cultural Complexes (TCC)

- The scheme supports the construction and modernization of:
 - Auditoriums.
 - Cultural complexes.
 - Rabindra Bhawans.
 - Rangshalas.
 - Exhibition halls.
 - Green rooms.
- Eligible beneficiaries include:
 - State Governments.

- Universities.
- Municipal bodies.
- NGOs.
- Cultural organisations.

- Financial assistance:
 - Up to **₹15 crore** per project.
- Funding Pattern:
 - **90:10** (Centre:Recipient) for North Eastern Region projects.
 - **60:40** (Centre:State/Organisation) for other States.

7. Scholarship and Fellowship Schemes

(a) Fellowship to Outstanding Persons in Culture

- Up to **400 Fellowships** are awarded in each batch.
- Categories:
 - Junior (25–40 years).
 - Senior (Above 40 years).
- Fellowship amount:
 - Junior: **₹10,000 per month**.
 - Senior: **₹20,000 per month**.
- Duration:
 - **Two years**.

(b) Scholarships for Young Artists

- Up to **400 scholarships** are awarded.
- Eligible age:
 - **18–25 years**.
- Fields covered:
 - Classical music.
 - Classical dance.
 - Theatre.
 - Mime.
 - Folk arts.
 - Indigenous arts.
 - Visual arts.
- Scholarship amount:
 - **₹5,000 per month for two years**.

(c) Tagore National Fellowship for Cultural Research

- Supports research in cultural institutions under the Ministry of Culture.
- Provides:
 - Up to **15 Fellowships**.
 - Up to **25 Scholarships**.

- Fellowship:
 - ₹80,000 per month plus contingency.
- Scholarship:
 - ₹50,000 per month plus contingency.
- Duration:
 - Maximum **two years**.

8. Financial Assistance for Veteran Artists

- Financial assistance is provided to senior artists and scholars aged **60 years or above**.
- Eligibility:
 - Annual income should not exceed **₹72,000**.
- Assistance:
 - Up to **₹6,000 per month**.
- In case of the beneficiary's death, assistance may be transferred to the surviving spouse.

9. Role of Zonal Cultural Centres (ZCCs)

The Government has established **seven Zonal Cultural Centres (ZCCs)** to preserve and promote regional and tribal culture.

Headquarters

- Patiala.
- Nagpur.
- Udaipur.
- Prayagraj.
- Kolkata.
- Dimapur.
- Thanjavur.

Functions

- Organise cultural festivals and exhibitions.
- Promote tribal and folk art.
- Conduct workshops and cultural exchange programmes.
- Provide platforms for emerging artists.
- Preserve regional cultural traditions.

10. Rachnatmak Bharat Initiative

- The Ministry of Culture has introduced **Rachnatmak Bharat**, a Cultural and Creative Economy initiative.

- The programme focuses on:
 - Capacity building.
 - Innovation.
 - Market access.
 - Digital enablement.
 - Institutional strengthening.
 - Promotion of creative industries.
- It aims to strengthen India's cultural economy and improve livelihood opportunities for artists and creative professionals.

11. Significance

- KSVY preserves India's diverse cultural heritage and traditional knowledge systems.
- It strengthens the **Guru-Shishya Parampara**, ensuring continuity of traditional performing arts.
- The scheme provides financial security to artists, scholars, and cultural organisations.
- It promotes tribal, folk, and indigenous art forms that are vulnerable to decline.
- Investment in cultural infrastructure encourages tourism, education, and local economic development.
- The initiative contributes to India's soft power by promoting cultural diplomacy and preserving intangible cultural heritage.

12. Challenges

- Many artists in remote areas remain unaware of available financial assistance.
- Documentation and preservation of endangered art forms require sustained efforts.
- Monitoring the effective utilisation of grants remains challenging.
- Limited digital access may restrict participation by artists from rural and tribal regions.
- Cultural institutions require greater institutional capacity and infrastructure support.

13. Way Forward

- Awareness campaigns should be expanded to improve outreach among rural and tribal artists.
- Digital platforms should simplify application and grant monitoring processes.
- Greater collaboration with educational institutions and civil society should be encouraged.
- Documentation of endangered languages, art forms, and oral traditions should be prioritised.
- Regular impact assessment should be undertaken to improve the effectiveness of KSVY.
- Market linkages and digital platforms should be strengthened to enhance artists' livelihoods and promote India's creative economy.

India's First Immersive Language Museum – *Shabdlok (Museum of Word)*



1. Context

- Union Home Minister **Amit Shah** inaugurated **India's first immersive language museum**, known as the **Museum of Word (Shabdlok)**, at the **National Library campus in Kolkata** on **19 July 2026**.
- The museum has been developed by the **National Library** under the aegis of the **Ministry of Culture**.
- The initiative aims to preserve and promote India's rich linguistic heritage through interactive, technology-driven exhibits.

2. About the Museum of Word (Shabdlok)

- **Shabdlok** is India's first **immersive language museum**, dedicated to showcasing the evolution of India's diverse languages, scripts, and literary traditions.
- The museum presents language as a living and evolving entity that has continuously shaped Indian society, culture, and civilization.
- It combines traditional knowledge with modern digital technologies to create an engaging learning experience.
- The initiative aligns with the Government's vision of preserving India's **"Virasat (Heritage) along with Vikas (Development)."**

3. Key Features

- The museum contains **nine thematic galleries** exploring different dimensions of India's linguistic history.
- It showcases the evolution of **oral traditions, ancient manuscripts, printed literature, and modern digital texts**.
- Visitors experience interactive exhibitions using:
 - Digital displays.
 - Holographic presentations.
 - Motion-sensor technology.
 - Multimedia installations.
- The museum has been designed as an experiential learning centre rather than a conventional repository of artifacts.

4. Focus Areas

The museum highlights:

- The diversity of Indian languages and scripts.
- The historical evolution of oral and written traditions.
- Ancient manuscripts and literary heritage.
- The development of printing and publishing in India.
- Modern digital communication and electronic texts.
- The relationship between language, culture, and civilization.
- India's multilingual identity and linguistic diversity.

5. Recognition of India's Linguistic Diversity

- **Shabdlok** celebrates all **22 languages listed in the Eighth Schedule of the Constitution**.
- It traces the journey of these languages from:
 - Oral traditions.
 - Ancient manuscripts.
 - Classical literature.
 - Printed books.
 - Contemporary digital formats.
- The museum emphasizes India's unique tradition of linguistic pluralism and cultural coexistence.

6. Digitisation of Manuscripts

- The Government is undertaking a major initiative to **digitise more than one lakh manuscripts** preserved by the National Library and other institutions.
- Digitisation aims to:
 - Preserve fragile historical documents.
 - Improve accessibility for researchers and scholars.
 - Protect valuable cultural heritage for future generations.
 - Promote academic research on India's intellectual traditions.

7. Significance

- The museum strengthens efforts to preserve India's linguistic and cultural heritage.
- It promotes awareness about India's multilingual identity among younger generations.
- The use of immersive technologies enhances public engagement with language and literature.
- The initiative supports the preservation of endangered languages, scripts, and literary traditions.
- It contributes to cultural tourism and educational outreach.
- The museum reflects India's commitment to integrating heritage conservation with technological innovation.

8. National Library of India

- The **National Library**, located in **Kolkata**, is the largest library in India by volume.

- It functions under the **Ministry of Culture**.
- The library serves as the country's principal repository of books, manuscripts, government publications, and archival materials.
- It plays an important role in preserving India's literary and documentary heritage.

9. Constitutional and Policy Relevance

Constitutional Provisions

- **Article 29:** Protection of the cultural and educational rights of citizens.
- **Article 51A(f):** Fundamental Duty to value and preserve India's rich heritage and composite culture.
- **Eighth Schedule:** Recognises **22 scheduled languages** of India.

Related Policies

- National Education Policy (NEP) 2020 encourages the promotion of multilingualism and mother-tongue education.
- The initiative also complements national efforts for digital preservation of cultural heritage.

10. Challenges

- Preserving endangered and lesser-known languages requires continuous institutional support.
- Digitisation of manuscripts is a resource-intensive process involving conservation and technological expertise.
- Increasing public awareness about linguistic heritage remains a challenge.
- Balancing technological innovation with the preservation of original historical materials requires careful planning.

11. Way Forward

- Digitisation of manuscripts and rare books should be accelerated across libraries and archives.
- Similar immersive museums should be established in other regions to promote India's diverse linguistic traditions.
- Greater research on endangered languages and indigenous scripts should be encouraged.
- Educational institutions should integrate linguistic heritage into academic curricula.
- Public participation in preserving local languages and oral traditions should be strengthened through community initiatives.

Ancient Buddhist Site of Sarnath Inscribed on the UNESCO World Heritage List



Why in News?

- At the **48th Session of the World Heritage Committee** held in **Busan, South Korea**, the **Ancient Buddhist Site of Sarnath** was inscribed on the **UNESCO World Heritage List**.
- It was India's official nomination for the **2025–26 cycle**.
- With this inscription, **Sarnath** became **India's 45th World Heritage Property**.

Ancient Buddhist Site of Sarnath

About

- The inscribed property is a **serial property** comprising:
 - **Chaukhandi Stupa**.
 - **Archaeological Remains of Sarnath**, including:
 - **Dhamekh Stupa**.
 - **Dharmarajika Stupa**.
 - **Mulagandhakuti Vihara**.
 - **Ashokan Pillar**.
 - Other associated monuments.
- Located in **Varanasi, Uttar Pradesh**.
- The site is known in Buddhist tradition by different names:
 - **Rishipatana**.
 - **Ishipatana**.
 - **Mrigadava**.
- It is regarded as the place where **Gautama Buddha** delivered his **first**

sermon (Dharmachakra Pravartana) in the **6th century BCE**.

- The event marked:
 - The beginning of the **Buddhist Sangha**.
 - The establishment of the **Noble Eightfold Path**.

Historical Development

- Identified by the Buddha as one of the **four principal Buddhist pilgrimage sites**.
- Developed over centuries through:
 - **Royal patronage**.
 - **Monastic patronage**.
 - **Lay patronage**.
- Numerous **stupas, temples and viharas** were constructed around the site of the first sermon.
- Declined during the **12th century CE** and subsequently suffered destruction.
- Rediscovered during the **18th century**.

Archaeological Importance

- Contains monuments dating from:
 - **Pre-Mauryan period (5th–4th century BCE)**.
 - Up to the **12th century CE**, with some later additions.
- One of the **most extensively excavated sites** by the **Archaeological Survey of India (ASI)**.
- Excavations reveal a **continuous settlement spanning nearly 16 centuries**.

UNESCO Inscription Process

- Included in the **UNESCO Tentative List** in **1998**.
- Nomination submitted to the **World Heritage Committee** in **January 2025**.
- Followed an **18-month evaluation process**, including:
 - Technical meetings with UNESCO advisory bodies.
 - Site evaluation mission by **ICOMOS**.
- Final inscription approved at the **48th Session of the World Heritage Committee** in **Busan, South Korea**.

Criteria for Inscription

Criterion (iii)

- Recognises **Sarnath's enduring spiritual significance** as one of the **four principal Buddhist pilgrimage destinations**.
- Reflected through the large number of religious monuments constructed and reconstructed over centuries.

Criterion (vi)

- Recognises the site's **direct association with events in the life of the Buddha**, namely:
 - His **first sermon**.
 - His **meeting with the first disciples**.
- The monuments at Sarnath embody the Buddha's teachings and the concept of **Triratna**.

Important Discoveries at Sarnath

- **Mauryan Lion Pillar**, later adopted as the **National Emblem of India**.
- **Dharmachakrapravartan Buddha** of the **Classical Gupta period**.
- These artefacts are displayed at **India's earliest site museum**, established in **1904**.

World Heritage Context

- Following the inscription of Sarnath, **three of the four most significant Buddhist pilgrimage sites** are included in the **UNESCO World Heritage List**:
 - **Lumbini (Nepal)**.
 - **Mahabodhi Temple, Bodh Gaya (India)**.
 - **Sarnath (India)**.
- Other important Buddhist World Heritage Sites mentioned include:
 - **Sanchi**.
 - **Nalanda**.
 - **Ajanta**.
 - **Anuradhapura (Sri Lanka)**.
 - **Paharpur (Bangladesh)**.
 - **Taxila (Pakistan)**.
 - **Takht-i-Bahi (Pakistan)**.

India and UNESCO World Heritage

Current Status

- India now has **45 World Heritage Sites**.

- India ranks:
 - **6th globally**.
 - **2nd in the Asia-Pacific Region** in terms of the number of World Heritage Sites.
- **196 countries** have ratified the **World Heritage Convention, 1972**.
- India has **69 sites** on the **Tentative List**, which is a prerequisite for future nominations.
- Each State Party can nominate **one site annually** for inscription.

Role of ASI

- The **Archaeological Survey of India (ASI)** is the **nodal agency** for all World Heritage-related matters in India.
- For over **150 years**, ASI has undertaken excavation and conservation work at Sarnath.

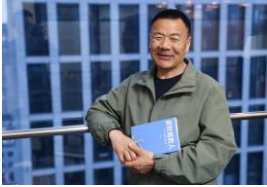
Significance

- Recognises the **Outstanding Universal Value (OUV)** of Sarnath.
- Highlights India's rich **Buddhist heritage** and cultural legacy.
- Reinforces India's identity as the **birthplace of Buddhism**.
- Strengthens cultural engagement with Buddhist-majority countries such as:
 - Japan.
 - Thailand.
 - Sri Lanka.
 - Myanmar.
 - Cambodia.
 - Vietnam.
 - South Korea.
 - Mongolia.
- Showcases India's expertise in **heritage conservation** and the **World Heritage nomination process**.
- Reaffirms India's commitment to:
 - Protect the site's **Outstanding Universal Value**.
 - Promote **sustainable tourism**.
 - Prevent unplanned development in the buffer zone.
 - Preserve the **authenticity and integrity** of the property.

□□□

PERSONS IN NEWS

Person	Why in News?	Important Facts
Hira Singh Bisht 	Died on 26 July 2026	Former Uttarakhand Minister; 3-term MLA; served as Cabinet Minister under N.D. Tiwari; associated with Congress and INTUC.
Pralhad Joshi 	Appointed Union Education Minister	Five-time BJP MP from Dharwad; earlier held Coal, Mines & Parliamentary Affairs; continues Consumer Affairs and New & Renewable Energy.
Viswanathan Anand 	Became interim FIDE President	Five-time World Chess Champion; former FIDE Deputy President; took charge after Arkady Dvorkovich suspended his duties.
Anurag Jain 	Appointed CEO of NITI Aayog	1989-batch IAS officer, Madhya Pradesh cadre; former Chief Secretary of Madhya Pradesh.

James Gray 	To receive Pardo alla Carriera	American filmmaker; known for <i>Ad Astra</i>, <i>The Immigrant</i>, <i>Two Lovers</i> and <i>We Own the Night</i>.
Wang Jibing 	Won Lu Xun Literary Prize	Chinese food-delivery rider and poet; won poetry category for <i>Low Flight</i>; writings focus on gig-economy workers.
Poomani 	Died on 12 July 2026	Renowned Tamil writer; received Sahitya Akademi Award in 2014 for <i>Agnyaadi</i>; <i>Vekkai</i> was adapted into <i>Asuran</i>.
Soumya Swaminathan 	Became Fellow of Royal Society	Second Indian woman scientist to receive the fellowship; former WHO Chief Scientist; known for work on TB, vaccines and immunisation.
Acharya Shri Ranchhodlalji Goswami 	Received Ustad Bismillah Khan Yuva Puraskar	Haveli Sangeet scholar; 16th Acharya of Goswami Haveli, Kalupur; composed 22,000+ devotional hymns.
Girish Bharadwaj 	Died on 7 July 2026	Known as “Bridge Man of India”; built 140+ low-cost suspension bridges; received Padma Shri in 2017.

PM Narendra Modi 	Received Bintang Adipurna	Indonesia's highest civilian honour; presented by President Prabowo Subianto; recognised contribution to India-Indonesia relations.
Ravi Shankar 	Appointed RBI Executive Director	Took charge from 1 July 2026; associated with Department of Statistics and Information Management; career central banker with 30+ years' experience.
PM Narendra Modi 	Received "Guardian of the Blue Horizon"	Seychelles' Presidential Distinction linked to environmental conservation, sustainable development and Blue Economy.



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