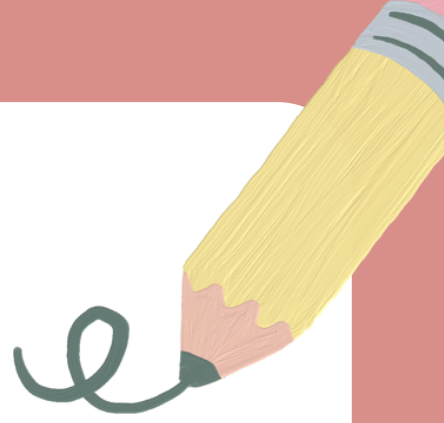
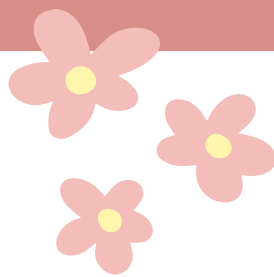
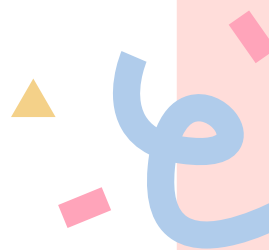




Current Pulse



— Monthly magazine —



Right to vote

Recently demands were raised to recognise Right to vote as a fundamental right.

About Right to Vote in India

- It is a **Constitutional Right**.
- **Related Constitutional Provisions:**
 - **Article 325:** No person to be ineligible for inclusion in electoral roll on grounds of religion, race, caste or sex.
 - **Article 326:** Elections to Lok Sabha and State Legislative Assemblies on the basis of adult suffrage (above 18 years of age).
- **Related Sections under Representation of the People Act (RPA)**
 - **Section 62 in RPA, 1951:** It deals with right to vote and specifies restrictions such as voting in no more than one constituency, disallowance in case of confinement in a prison etc.
 - **Section 16 of RPA, 1950:** It specifies disqualifications for registration in an electoral roll.

Key judgements

- **People's Union of Civil Liberties case (2003):** Right to vote is statutory, but freedom of voting is a fundamental right (Article 19(1)(a)).
- **Anoop Baranwal vs UoI (2023):** Recognised it as a constitutional right rather a statutory or fundamental right

Right to Legal Representation

Faizabad Bar Association resolved not to represent the accused in the Ayodhya Ram Temple embezzlement case.

Right to Legal Representation

- **Article 22 (Fundamental Right):** No arrested person shall be denied the right to consult and be defended by a legal practitioner of their choice.
- **Article 39A (Directive Principle):** The State must ensure that no citizen is denied access to justice due to economic or other disabilities.
- **Article 21:** The Supreme Court has interpreted the Right to Legal Representation as an essential part of the Right to Life and Personal Liberty under Article 21 because it ensures a fair trial.
- **Article 20(3):** Protects an accused from self-incrimination. Access to legal counsel helps safeguard this constitutional protection during investigation and trial.
- **Key Judgements:**
 - **Sheikh Mukhtar Case (2020):** The Supreme Court recognized the **right to a fair trial as an integral part of Article 21** (Right to Life and Personal Liberty).
 - **Kuldeep Agarwal Case (2019):** "Special circumstances" can justify an individual advocate refusing a case, but not a Bar Association doing so collectively.
 - **Mohd. Hussain @ Julfikar Ali v. State (Govt. of NCT of Delhi) (2012):** Conviction without effective legal representation amounts to denial of a fair trial.
 - **M. Rafi v. State of Tamil Nadu (2010):** All Bar Association resolutions that collectively deny legal representation to specific accused persons are null and void.
 - **Hussainara Khatoon v. State of Bihar (1979):** Held that free legal aid is an essential component of Article 21. Also recognized the Right to Speedy Trial.
 - **Khatri (II) v. State of Bihar (1981):** Free legal aid must be provided from the first production before a magistrate, not only during trial.
 - **Suk Das v. Union Territory of Arunachal Pradesh (1986):** Failure to provide free legal aid to an indigent accused violates Article 21 and can vitiate the trial.

Women-led Panchayati Raj

During BRICS Women Ministerial Meeting in Kochi, Kerala, Ministry of Panchayati Raj showcased India's transformative initiatives in empowering women through **democratic decentralisation**.

Context

- At the BRICS Women Ministerial Meeting held in Kochi, Kerala, the Ministry of Panchayati Raj showcased India's achievements in empowering women through democratic decentralisation. India highlighted how constitutional safeguards, grassroots participation and capacity-building initiatives have enabled women to become key decision-makers in local governance.

Women in Panchayati Raj Institutions (PRIs)

- As of July 2025, India has around 14.5 lakh Elected Women Representatives (EWRs) in Panchayati Raj Institutions, constituting about 46% of the total elected representatives, making it one of the largest experiments in grassroots women's political participation globally. Reflecting their growing leadership, 25 out of 42 Gram Panchayats recognised under the National Panchayat Awards (2024) were headed by women.

Constitutional Framework

- The 73rd Constitutional Amendment Act, 1992 gave constitutional status to Panchayati Raj Institutions by inserting Part IX (Articles 243–243O). Article 243D mandates not less than one-third reservation for women in seats as well as the offices of Chairpersons in Panchayats. Many States have voluntarily increased this reservation to 50%, further strengthening women's representation in local governance.

Significance of Women-led Panchayats

- Women representatives have made local governance more inclusive, participatory and gender-responsive by prioritising health, education, nutrition, sanitation, drinking water, skill development, livelihood generation, women's safety and social justice. They have also integrated a gender perspective in governance by addressing issues such as domestic violence, child marriage and gender-biased sex selection, while promoting women's economic empowerment through Self-Help Groups (SHGs) and financial inclusion.

Notable initiatives include:

- Namanguda Gram Panchayat (Odisha): Zero Tolerance Resolution against Domestic Violence.
- Nongarh Gram Panchayat (Bihar): Child Marriage Prevention Drive.
- Kishorinagar Gram Panchayat (Andaman & Nicobar Islands): Promotion of women-led SHGs and community vigilance.
- Jorhat Gram Panchayat (Assam): "Own Farm–Own Market" initiative connecting women farmers directly with markets.

Government Initiatives

- To strengthen women's leadership, the Sashakt Panchayat Netri Abhiyan, launched in March 2025, has already trained around 1.5 lakh Elected Women Representatives in leadership, governance and financial management. The regular conduct of Mahila Sabhas provides women with a dedicated forum to discuss local issues, build consensus and place collective proposals before the Gram Sabha, thereby ensuring gender-responsive planning and decision-making.

Way Forward

- Strengthening women's leadership in Panchayats requires continuous capacity building, elimination of proxy representation, greater fiscal and administrative devolution, and institutionalisation of gender-responsive planning. Empowered EWRs are essential for deepening grassroots democracy, promoting inclusive rural development, and achieving SDG 5 (Gender Equality) and SDG 16 (Peace, Justice and Strong Institutions).

Insurance Surety Bonds (ISBs)

Coal Blocks Allocation (Amendment) Rules, 2026 enabled the use of Insurance Surety Bonds (ISBs) in place of Performance Bank Guarantees (PBGs).

- The reform currently covers **coal blocks allocated under the Mines and Minerals (Development and Regulation) Act, 1957**, later proposed to be extended to coal blocks allocated under the **Coal Mines (Special Provisions) Act, 2015**.

Insurance Surety Bonds (ISBs) & Performance Bank Guarantees (PBGs)

- **Insurance Surety Bonds (ISBs):** A financial guarantee issued by an insurance company that compensates the government if the contractor or allocatee fails to meet contractual obligations.
- **Performance Bank Guarantees (PBGs):** A bank-issued guarantee ensuring that a project developer fulfils contractual obligations; if the developer defaults, the government can recover the guaranteed amount from the bank.

Why was this reform introduced?

- Earlier, companies had to submit Performance Bank Guarantees (PBGs), which blocked a large part of their bank credit.
- This increased the financial burden on companies, especially smaller firms.
- To reduce this burden and improve ease of doing business, the government allowed the use of Insurance Surety Bonds (ISBs) as an alternative.

Insurance Surety Bonds (ISBs)

- An Insurance Surety Bond (ISB) is a financial guarantee issued by an insurance company.
- If the company fails to complete its contractual obligations, the insurance company pays compensation to the government.
- Later, the company must repay the insurance company.

Performance Bank Guarantees (PBGs)

- A Performance Bank Guarantee (PBG) is a guarantee issued by a bank.
- If the company fails to fulfil the contract, the government can recover the guaranteed amount from the bank.

Benefits of ISBs

- Reduces financial burden on mining companies.
- Frees up bank credit for other business activities.
- Makes it easier for smaller companies to participate in coal block auctions.
- Increases competition in coal mining.
- Promotes Ease of Doing Business.

Challenges

- Insurance companies must properly assess the risk before issuing bonds.
- Claims should be settled quickly in case of default.
- Strong regulation is needed to prevent misuse.

Conclusion

The use of Insurance Surety Bonds (ISBs) reduces the financial burden on mining companies, improves ease of doing business, encourages greater participation in coal block auctions, and helps banks use their credit more efficiently.

Concentration of global investment

UNCTAD report highlights that global investment rose in 2025, but capital is becoming more concentrated, more selective and more closely tied to the industries that will shape future growth.

UNCTAD World Investment Report 2025

- The United Nations Conference on Trade and Development (UNCTAD), established in 1964 and headquartered in Geneva, Switzerland, publishes the World Investment Report (WIR) annually to assess global trends in Foreign Direct Investment (FDI).

Key Highlights

- Global FDI increased by 6% to US\$1.6 trillion in 2025. However, investment remained highly concentrated:
 - Developed economies: FDI inflows increased by 11%.
 - Developing economies: FDI grew by only 2%.
 - The top 20 host economies attracted over 80% of global FDI, indicating widening investment disparities.
- Shift towards Strategic Sectors: Greenfield investments were concentrated in sectors critical to future economic growth, including:
 - Artificial Intelligence (AI) infrastructure
 - Data centres
 - Semiconductors
 - Renewable energy and clean technologies
 - Oil & Gas (energy security)
- In contrast, investment in Global Value Chain (GVC)-intensive manufacturing continued to decline.
 - India's Performance: Inward FDI Rank: Improved from 13th (2024) to 11th (2025).
 - Outward FDI Rank: Improved from 20th (2024) to 18th (2025), reflecting the growing global footprint of Indian companies.

Why is Investment Shifting Towards Developed Economies?

- Strategic priorities such as technological leadership, economic security, and resilient supply chains are replacing low-cost production as key investment drivers.
- Industrial policies and large subsidies for semiconductors, electric vehicles, batteries, and clean energy in advanced economies are attracting capital-intensive investments.
- Supply chain diversification and geopolitical uncertainties have encouraged multinational enterprises to invest in countries with stable regulations, advanced technology ecosystems, skilled workforce, and reliable infrastructure.

Way Forward for Developing Countries

- Strategic Prioritisation: Focus on niche opportunities within GVCs instead of competing through large subsidies.
- Strengthen Investment Ecosystem: Improve digital connectivity, renewable energy, logistics, quality infrastructure, and human capital.
- Performance-based Incentives: Link incentives to local value addition, employment generation, exports, and technology transfer rather than broad tax exemptions.
- Catalytic Public Finance: Use development banks, sovereign wealth funds, and blended finance to de-risk private investments.
- Regional Integration: Promote cross-border industrial corridors, production networks, and shared infrastructure to enhance competitiveness.

Conclusion

The report highlights that future FDI will increasingly flow towards technology-driven, resilient, and strategically important economies. For India, sustaining investment growth will require continued reforms, infrastructure development, innovation, and deeper integration into global value chains to strengthen its position as a preferred global investment destination.

Concentration of global investment

India achieved 20% ethanol blending (E20) in petrol during 2025–26, meeting the target five years ahead of the original 2030 timeline under the Ethanol Blended Petrol (EBP) Programme.

What is Ethanol?

- Ethanol (C_2H_5OH) is a renewable biofuel produced by fermenting sugar- and starch-rich feedstocks such as sugarcane juice, molasses, maize, rice, wheat, and damaged food grains.
- It is a high-octane fuel (Research Octane Number ≈ 108.5) compared to petrol (~ 84.4), enabling cleaner and more efficient combustion.

Ethanol Blended Petrol (EBP) Programme

- Launched: 2003
- Nodal Ministry: Ministry of Petroleum & Natural Gas (MoPNG)
- Objective: To reduce crude oil imports, enhance energy security, lower vehicular emissions, improve farmers' income, and promote a biofuel-based circular economy.

Significance

- Energy Security: Reduces dependence on imported crude oil and saves foreign exchange.
- Environmental Benefits: Lowers emissions of carbon monoxide, hydrocarbons and particulate matter, supporting India's Nationally Determined Contributions (NDCs) and Panchamrit commitments.
- Agricultural Benefits: Provides an additional market for sugarcane and grain farmers while helping clear sugar mill dues.
- Rural Economy: Encourages investment in distilleries and generates rural employment.

Key Challenges

- Vehicle Compatibility: Ethanol is hygroscopic (absorbs moisture), increasing corrosion risks in older vehicles not designed for E20 fuel.
- Lower Fuel Efficiency: Ethanol contains less energy than petrol, leading to reduced mileage in conventional engines.
- Water Stress: Heavy dependence on sugarcane, a water-intensive crop, can aggravate groundwater depletion.
- Food vs Fuel Debate: Diversion of food grains towards ethanol production may affect food security and prices.
- Consumer Choice: Unlike Brazil, India currently offers limited choice between fuel blends and no differential pricing.

Government Initiatives

- National Policy on Biofuels, 2018 (Amended 2022): Advanced the E20 target from 2030 to 2025–26 and promoted 1G, 2G and advanced biofuels.
- Pradhan Mantri JI-VAN Yojana: Supports 2G ethanol plants using agricultural residues such as rice straw.
- SATAT Initiative: Promotes production of Compressed Bio-Gas (CBG) from organic waste.

Global Comparison

- Brazil: Standard E27 blend; widespread flex-fuel vehicles capable of running on E27–E100.
- United States: E10 nationwide, E15 expanding, with millions of flex-fuel vehicles using up to E85.
- Japan: Phased implementation of E10 blending.

Way Forward

- India should emulate Brazil's phased approach by promoting flex-fuel vehicles, diversifying feedstocks towards maize and second-generation (2G) ethanol, reducing dependence on water-intensive sugarcane, expanding blending infrastructure, and introducing consumer choice with differential pricing to ensure sustainable and efficient ethanol adoption.

Sustainable Harnessing of Fisheries

The Government of India has operationalized the Union Budget 2025–26 announcement by launching the National Programme for Issuance of Letters of Authorisation (LoA). The initiative provides a regulatory framework for the sustainable harnessing of fisheries resources in India's Exclusive Economic Zone (EEZ) and the High Seas by Indian-flagged fishing vessels, while promoting the Blue Economy.

Background

- High Seas are marine waters beyond areas of national jurisdiction, i.e., beyond the 200 nautical miles Exclusive Economic Zone (EEZ) as provided under the United Nations Convention on the Law of the Sea (UNCLOS).
- While coastal States exercise sovereign rights over resources within the EEZ, fishing in the High Seas is governed by international law and conservation measures.

Key Features of the Programme

- Letter of Authorisation (LoA): A mandatory, vessel-specific and non-transferable permit, valid for 3 years, for Indian-flagged fishing vessels operating in the High Seas.
- Issued under the Guidelines for Sustainable Harnessing of Fisheries in the High Seas by Indian-Flagged Fishing Vessels, 2025.
- Integrated with the ReALCraft (Registration and Licensing of Fishing Craft) Portal for end-to-end digital processing, monitoring and compliance.
- Priority is accorded to Fisheries Cooperatives, Fish Farmer Producer Organisations (FFPOs) and Indian fishermen.
- Mandates adherence to conservation measures prescribed by Regional Fisheries Management Organisations (RFMOs), including catch limits, bycatch mitigation, reporting requirements and sustainable fishing practices, thereby curbing Illegal, Unreported and Unregulated (IUU) Fishing.

Significance

- Enables sustainable exploitation of untapped high-value tuna fisheries and other pelagic resources.
- Enhances fisher incomes, seafood exports, traceability and international certification of marine products.
- Strengthens India's Blue Economy, marine resource governance and food security.
- Promotes youth entrepreneurship, employment generation and scientific fisheries management.

Related Initiative

Odisha Deep Sea Fishing Mission (2026–2036)

- A flagship Blue Economy initiative to develop Odisha as a deep-sea fishing and marine export hub through modern fishing infrastructure, scientific fisheries management, value-chain development and market linkages.

Value Addition

- India is the 2nd largest fish producer globally, contributing ~8% of global fish production.
- Fish production reached 197.75 lakh tonnes (FY 2024–25), recording a 106% increase over FY 2013–14.
- Fisheries contribute 7.43% to Agricultural Gross Value Added (GVA).
- Seafood exports crossed ₹73,891 crore (2025–26).
- The sector supports the livelihoods of ~3 crore fishers and fish farmers, making it crucial for nutrition security, rural employment, export earnings and coastal economic development.

Sustainable Harnessing of Fisheries

Since its inception, 21.61 lakh agricultural machines worth ₹9,404 crore have been distributed to individual farmers under the Sub-Mission on Agricultural Mechanization (SMAM). Between 2014–15 and 2025–26, 27,554 Custom Hiring Centres (CHCs), 25,608 Farm Machinery Banks (FMBs) and 646 Hi-Tech Equipment Hubs have been established. Further, 40,928 drone demonstrations covering 40,918 hectares have been conducted.

About SMAM

- Ministry: Ministry of Agriculture & Farmers' Welfare
- Launch: 2014–15
- Type: Centrally Sponsored Scheme (CSS) under Rashtriya Krishi Vikas Yojana (RKVY-RAFTAAR).

Objectives

- Promote inclusive farm mechanization to enhance agricultural productivity, reduce labour drudgery and cultivation costs.
- Improve timeliness of farm operations, resource-use efficiency and farm income.
- Extend mechanization benefits to small & marginal farmers, women, SC/STs, Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs) and rural entrepreneurs.

Key Features

- Financial Assistance (DBT): 40% subsidy for general farmers and 50% subsidy for SC/STs, small & marginal farmers and beneficiaries in the North-Eastern Region (NER).
- Small & marginal farmers receive ₹2,000/ha for mechanized services (including drones) through CHCs, FPOs and SHGs.
- Financial support for establishing CHCs, FMBs and Hi-Tech Equipment Hubs.
- Promotes training, testing, demonstrations, post-harvest mechanization and crop residue management (e.g., Happy Seeder, Mulcher, Baler, Super SMS).
- NER: Up to 100% subsidy for selected small machinery and 95% support for FMBs.
- 30% of funds earmarked for women farmers.
- Promotes Kisan Drones with assistance of up to ₹10 lakh per drone for ICAR institutes, Krishi Vigyan Kendras (KVKs) and State Agricultural Universities (SAUs), and 75% grant for FPOs for precision farming, crop monitoring and pesticide/nutrient application.

About Rashtriya Krishi Vikas Yojana (RKVY-RAFTAAR)

- Launched: 2007; restructured as RKVY-RAFTAAR in 2017–18.
- Ministry: Ministry of Agriculture & Farmers' Welfare.
- Objective: Promote holistic agricultural development through higher public investment, infrastructure creation, productivity enhancement, mechanization, value addition, agri-startups and post-harvest management, while providing States flexibility to design need-based agriculture and allied sector projects.
- Supports major schemes such as SMAM, National Food Security Mission (NFSM) and Mission for Integrated Development of Horticulture (MIDH).

Prelims Facts: SMAM is implemented through DBT, promotes Custom Hiring Centres for rental access to machinery, encourages precision agriculture through Kisan Drones, and contributes to SDG 2 (Zero Hunger) and SDG 13 (Climate Action).

World Intangible Investment Report 2026

World Intangible Investment Report 2026 reaffirms **India's** status as a **global innovation powerhouse**, recording the fastest growth in intangible investments among the world's 15 largest economies.

About the Report

- Published annually by **World Intellectual Property Organization (WIPO)** and Italy's **Luiss Business School (LBS)**.
- **Tangible Investment:** Spending on **physical assets** E.g. factories, machinery, buildings etc.
- **Intangible Investment:** Spending on **non-physical assets** such as R&D, software, databases, organizational know-how, brands, design, and intellectual property (IP).
 - **Significance:** Drives innovation, productivity, product quality, brand value, and long-term economic competitiveness.

Key Findings

- Intangible investment has grown over **3 times faster** than tangible investment since 2008 and is more resilient to economic shocks.
- **Global Leaders:** **US** leads in total intangible investment; **Sweden** ranks highest in intensity.
- **Asset Trends:**
 - In India, **Software & databases** are the fastest-growing category;
 - Globally, **organizational capital and R&D**

Negotiated Dealing System-Order Matching (NDS-OM)

Bloomberg has launched an electronic trading platform that enables foreign portfolio investors to **directly trade Indian Government securities** by connecting to the RBI's **Negotiated Dealing System-Order Matching (NDS-OM)**.

About NDS-OM

- **Launched:** In 2005 by the RBI.
- NDS-OM is a **screen based electronic anonymous order matching system for secondary market trading in Government securities**, including Central Government bonds, State Development Loans (SDLs), and Treasury Bills (T-Bills).
 - **Order Matching:** The best price gets matched first; if prices are equal, the earlier order takes precedence.
- **Settlement:** Trades settled at **T+1** and guaranteed by **Clearing Corporation of India Limited (CCIL)**.
- **Restriction:** Gilt Account Holders (GAHs) cannot undertake **short selling** of Government securities.

16th India-Japan Annual Summit held in New Delhi

Key-Outcomes of the Summit

- **Joint Declaration on Economic Security:** Includes key sectors like semiconductors, critical minerals, information and communication technology, including AI, clean energy etc.
- **Next Generation Mobility Partnership Framework:** Accelerate investment in mobility sectors including rail, automotive and road infrastructure, aviation, etc.
- **Biogas Initiative:** Supports the establishment of 1,000 biogas and organic fertilizer plants in India.
- **First India-Japan defence co-development project:** Naval Radio Antenna project
- **Other cooperation areas:** Pharma through Active Pharmaceutical Ingredients (APIs), internet registry operations, geology and mineral exploration, etc.

Significance of India-Japan Relations

- **Infrastructural development:** E.g., **Mumbai-Ahmedabad High Speed Rail (MAHSR) project**, which is being implemented with Japanese technical and financial assistance.
- **Foreign Investment:** Japan is the **fifth-largest** source of Foreign Direct Investment (FDI) into India and accounts for 6% of total FDI into India.
- **Economic relations:** E.g., India- Japan Comprehensive Economic Partnership Agreement (CEPA) came into effect from **2011**.
- **Strategic Alignment:** E.g., both countries are part of QUAD Initiative
- **Space Exploration:** ISRO and Japan's space agency, JAXA, are collaborating on the Lunar Polar Exploration Mission.

Challenges in India-Japan Relations

- Bilateral trade remains below potential.
- Slow implementation of some infrastructure projects.
- Regulatory and land acquisition issues.
- Limited private sector investment compared to expectations.
- Different approaches towards regional security issues.
- Competition from other investment destinations in Asia.

Way Forward

- Expand cooperation in semiconductors and AI.
- Fast-track high-speed rail and connectivity projects.
- Strengthen defence manufacturing under Make in India.
- Deepen collaboration in critical minerals and resilient supply chains.
- Promote green hydrogen, clean energy, and carbon-neutral technologies.
- Increase people-to-people exchanges, skill development, and innovation partnerships.

I-2SEA Submarine Cable System (SCS)

A consortium comprising Microsoft, Singtel, Tata Communications, and Lightstorm has announced the construction of the 3,600 km long I-2SEA submarine cable system connecting India, Malaysia, and Singapore.

- It is expected to become operational in 2029.

About I-2SEA Submarine Cable System (SCS)

- It is **designed** to support the growing demand for AI training and inference, hyperscale cloud services, GPU infrastructure, and enterprise connectivity.
- It will connect Machilipatnam (Andhra Pradesh) and South Chennai (Tamil Nadu) in India, Kuala Lumpur (Malaysia), Singapore.

About Submarine Cable System

- They are **fibre optic cables** laid on the **ocean floor** that **connect countries** across the world to **provide internet and telecommunications**.
 - Optical fibres are used to **transmit information** as **light pulses**.
 - It works based on a principle called '**total internal reflection**'-where the **light in a fibre-optic cable** travels through the **core (hallway)** by **constantly bouncing from the cladding (mirror-lined walls)**.
- These "**invisible highways**" **transmit between 95% and 99%** of all **international data traffic**.
- **United Nations General Assembly (UNGA) in 2010** had described the Submarine cable as **critical communication infrastructure**.
- **Major Challenges to SCS:** Risks from accidental or deliberate damage (e.g., anchoring) Environmental factors like earthquakes, Ageing infrastructure, etc.

Strategic Importance

- Strengthens India–ASEAN digital connectivity under the Act East Policy and supports a Free, Open and Inclusive Indo-Pacific (FOIP).
- Enhances India's position as a regional data centre and AI hub by supporting cloud computing, AI, fintech, and digital trade.

Challenges

- Natural: Earthquakes, tsunamis, underwater landslides.
- Human-induced: Ship anchors, fishing activities, sabotage, cyber threats, and ageing infrastructure.
- High repair costs and limited specialised cable repair vessels.

Governance

- Protected under the United Nations Convention on the Law of the Sea (UNCLOS).
- Recognised by the UN General Assembly (2010) as Critical Communication Infrastructure.

Related Government Initiatives

- Digital India, IndiaAI Mission, BharatNet, National Broadband Mission, India Semiconductor Mission.

Indus Waters Treaty to remain suspended: India

India has reiterated that the Indus Waters Treaty will remain suspended until Pakistan credibly and irreversibly ends its support for cross-border terrorism.

- India had put the Treaty under abeyance post Pahalgam terrorist attack in April 2025.
- About Indus Waters Treaty
- **Signed:** On 19 September 1960 at Karachi between India and Pakistan, with the World Bank (IBRD) as a signatory/facilitator.
 - Came into force with retrospective effect from 1 April 1960.
 - **Rivers Covered:**
 - **Eastern Rivers (Ravi, Beas and Sutlej):** Allocated to India for unrestricted use.
 - **Western Rivers (Indus, Jhelum and Chenab):** Allocated to Pakistan.
 - India is permitted limited use for domestic purposes, non-consumptive uses, irrigation and run-of-the-river hydroelectric projects, in accordance with the Treaty.
 - **Dispute Resolution under IWT:**
 - **Step 1: Permanent Indus Commission (PIC)** with a commissioner from each country. (Meets annually alternatively in both countries).
 - **Step 2: Neutral Expert (appointed by World Bank)** and involves rendering a binding decision.
 - **Step 3: Court of Arbitration** upon agreement between parties or at the request of either party.

Implications of the Suspension of the Indus Waters Treaty	
For Pakistan: • Food insecurity: The Indus system irrigates over 80% of Pakistan's food crops (World Bank). • Economy: Wheat, rice and cotton, dependent on the Indus system, earned USD 4.8 billion in exports (2022). • Electricity and water stress: Around one-third of Pakistan's electricity comes from hydropower, while the country is already water-stressed.	For India: • Weaponisation of water resources: Global focus on Pakistan' State-terror nexus. ◦ However, it might set a precedent for upstream countries, particularly China on the Brahmaputra, to adopt similar strategies. • Credibility as a responsible international actor: Unilateral suspension may be perceived as undermining treaty commitments. • Ecological imbalance: New water infrastructure projects may affect the biodiversity-rich and seismically sensitive Indus basin.

India-US Relations

India-US Relations on the 250th Anniversary of US Independence The relationship between the world's largest democracy (India) and oldest democracy (United States) has transformed dramatically from Cold War estrangement to a robust strategic partnership.

Historic Evolution of India-US Relations

- **The Cold War Era and Estrangement (1947–1990):**
 - **Policy of Non-Alignment:** Following independence, India adopted non-alignment to preserve **strategic autonomy**, creating geopolitical distance with Washington.
 - **Key Points of Friction:**
 - **1971 India-Pakistan War:** India signed the **Indo-Soviet Treaty of Friendship**; US deployed the **USS Enterprise task force in the Bay of Bengal in support of Pakistan**.
 - **Nuclear Tensions:** India's **1974 "Smiling Buddha"** test triggered US export controls. The **1998 Pokhran-II tests** led to immediate economic sanctions.
- **The Thaw and Turning Point (1991–2024):**
 - **Economic Opening (1991):** The end of the Cold War and **India's 1991 economic reforms opened markets** and initiated a thaw in relations.
 - **Diplomatic Shifts (1999–2001):** During the **1999 Kargil conflict**, the US pressured Pakistan to withdraw forces. By 2001, remaining nuclear sanctions were lifted.
 - **The Breakthrough (2008):** The **India-US Civil Nuclear Agreement** ended India's nuclear isolation and built foundational trust between the two democracies.
 - **India designated as Major Defense Partner (2016):** **Foundational Defense Agreements** such as LEMOA (logistics), COMCASA (communications), BECA (geospatial), etc. were signed.
 - **The Indo-Pacific Focus (2017):** Mutual concerns over China led to the revival of the **Quadrilateral Security Dialogue (Quad)** with Japan and Australia.

Current Status of India-US Relations (2025-26)

- **Economic and Trade Dynamics:**
 - The US is **India's 2nd largest trading partners** with **bilateral trade (goods + services) exceeding \$200 billion (India having a surplus)** and ambitions to reach \$500 billion.
 - **2025 Tariff Tensions:** US imposed reciprocal tariffs (escalating to 50%) partly due to India's purchases of Russian oil.
 - **2026 Interim Trade Framework:** Tariffs **reduced to ~18%** on many Indian goods.
- **Defense and Security Cooperation**
 - **Key Platforms Acquired/Integrated:** C-17 Globemaster, C-130J, P-8I Poseidon, Apache helicopters, Chinook, MH-60R Seahawk.
 - **2025 10-Year Framework:** Signed for Major Defense Partnership, focuses on interoperability (land, sea, air, space, cyber), co-development, and industrial collaboration.
 - **Joint Exercises:** Routine drills like Yudh Abhyas (Army), Vajra Prahar, Malabar (naval with Quad partners).

World Bank Income Classification

World Bank (WB) elevated **Vietnam, Sri Lanka, Philippines, Jordan, and Micronesia** to upper-middle income status.

- **India** remains an **Lower-Middle-Income Economy**.

About WB Income Classification

- **Methodology Used:** GNI per capita measured in USD dollars — using the Atlas methodology.
- **Current Classification**
 - **Low-income economies:** GNI \$1,175 or less.
 - **lower middle-income economies:** GNI between \$1,176 and \$4,635.
 - **upper middle-income economies:** between \$4,636 and \$14,375.
 - **high-income economies:** More than \$14,375.
- On July 1 each year, WB updates classifications estimates from previous calendar year.
- **Significance:** Classifications inform which countries can **access concessional loans and development assistance**.

Global Passport Index

India's ranking in the **Global Passport Index (GPI)** has fallen one rank from last year to **125th spot**.

About Global Passport Index

- It evaluates how **effectively a passport enables citizens to travel, invest, live securely, and access global opportunities**.
- **Published by:** Global Citizen Solutions
- Covers **200 countries**.
- Uses **Three core pillars (Enhanced Mobility, Investment Potential, and Quality of Life)** and **15 indicators** to assess passport strength.

Guwahati Declaration

BRICS nations adopted the **Guwahati Declaration** to combat drug trafficking.

About Guwahati Declaration

- **Purpose:** Declaration strengthens cooperation against transnational organized crime and illicit drug trafficking.
- **Information & Technology Exchange:** Strengthen intelligence sharing, data-driven approaches, and innovative technologies to combat drug trafficking.
- **Reducing drug Demand:** Promote initiatives for drug demand reduction and promote healthy lifestyles.

India-Israel Bilateral Investment Agreement

The agreement replaces the **India–Israel Bilateral Investment Treaty (BIT), 1996** which was **terminated in 2017**.

- It aims to **promote investment while balancing investor protection** with the **sovereign right of governments to regulate**.
- Under the **Vienna Convention on the Law of Treaties (1969)**, there is **no substantive legal difference** between a "Treaty" and an "Agreement".

About BIT

- **Definition:** They are **reciprocal agreements between two countries** that promote and protect **foreign investments in each other's territories**.
- **Purpose:** They provide a **legal framework** to ensure fair treatment of investors and **create a stable investment environment**.
- **International Law:** BITs come within **Art. 38 (1) (a) Statute of the International Court of Justice** as primary sources of obligations under public international law.
- **Indian framework:** India approved **new Model BIT Text in 2015**, which replaced **Indian Model BIT, 1993**.
 - Since then, Model text 2015 is used for (re)negotiations of BITs and investment.
 - **In Budget 2025-26**, the Government announced a review of the BIT framework.

About India–Israel BIT

- **Investment Protection:** Protects investments made by **investors of both countries**.
- **Compensation during Armed Conflict:** Investors suffering losses **due to War, Armed conflict or Civil unrest** will receive **non-discriminatory treatment** regarding compensation.
- **Right to Regulate:** Preserves the government's authority to regulate for **public health, environment, security, and public welfare**.
- **Investor–State Dispute Settlement:** Provides a mechanism to **resolve disputes through international arbitration**.

Other BITs of India

India – Uzbekistan BIT (2024)

India – United Arab Emirates BIT (2024)

Brazil – India BIT (2020)

India – Kyrgyzstan BIT (2019)

Belarus – India BIT (2018)

India - Indonesia Bilateral Relations

The Prime Minister visited Indonesia to strengthen the Comprehensive Strategic Partnership through enhanced defence, economic and Indo-Pacific cooperation.

Why is Indonesia Important for India?

- Indonesia occupies a pivotal place in India's Act East Policy, MAHASAGAR Vision, and Indo-Pacific strategy owing to its strategic location, economic significance, and growing regional influence.

Strategic & Maritime Importance

- Indonesia is India's closest maritime neighbour in ASEAN through the Andaman & Nicobar Islands.
- It lies near the Strait of Malacca, one of the world's busiest Sea Lines of Communication (SLOCs), through which a major share of India's trade and energy imports passes.
- Cooperation on Sabang Port enhances maritime connectivity, logistics, and India's strategic presence in the eastern Indian Ocean.

Defence & Security Cooperation

- Regular joint exercises such as Garuda Shakti, Samudra Shakti, and IND-INDO CORPAT strengthen maritime security, interoperability, and regional stability.
- Defence ties are expanding through collaboration in BrahMos missiles, Astra systems, defence manufacturing, and capacity building.

Economic & Technology Partnership

- Indonesia is India's second-largest trading partner in ASEAN, with bilateral trade exceeding US\$30 billion.
- Cooperation in critical minerals (nickel and rare earths), Digital Public Infrastructure (ONDC/ION), agriculture, and resilient supply chains supports India's manufacturing and clean energy transition.

Regional & Global Cooperation

- Both countries support ASEAN Centrality, a free, open, inclusive, and rules-based Indo-Pacific, and cooperate through forums such as G20, East Asia Summit (EAS), IORA, ASEAN Regional Forum (ARF), and ADMM-Plus.

Civilisational & Cultural Linkages

- India and Indonesia share centuries-old Hindu-Buddhist maritime links, are founding members of the Bandung Conference (1955) and the Non-Aligned Movement (NAM), and maintain strong people-to-people ties through the Indian diaspora.

Why This Visit Matters?

- The recent outcomes—including cooperation in defence exports, digital public infrastructure, critical minerals, maritime connectivity (Sabang Port), agriculture, space, and cultural diplomacy—reflect the broadening of India–Indonesia relations from traditional diplomacy to a comprehensive strategic partnership, reinforcing India's role as a key stakeholder in the Indo-Pacific.

Kyrgyzstan

The Delhi-based Centre for Studies of International Relations (CSIR), in collaboration with the Manas National Academy, established the International Centre for Civilizational Studies "Manas and Mahabharata" in Bishkek, Kyrgyzstan. The first Hindi translation of the Kyrgyz national epic Manas was also released, strengthening India–Kyrgyzstan cultural and civilizational ties.

Political Profile

- Capital: Bishkek
- Location: Landlocked country in Central Asia.
- Borders: Kazakhstan (North), Uzbekistan (West), Tajikistan (South), and China (East).
- Official Languages: Kyrgyz and Russian.
- Currency: Kyrgyzstani Som (KGS).
- Member of: UN, Shanghai Cooperation Organisation (SCO), Commonwealth of Independent States (CIS), Eurasian Economic Union (EAEU), Collective Security Treaty Organization (CSTO), and Organisation of Islamic Cooperation (OIC).

Geographical Features

- Over 90% of the country is mountainous.
- Major Mountain Ranges: Tian Shan (dominant range extending into China and Kazakhstan), Pamir, Talas, and Chatkal ranges.
- Highest Peak: Jengish Chokusu (Victory Peak, 7,439 m)—the highest peak of the Tian Shan Range.
- Major Valleys: Fergana Valley (shared with Uzbekistan and Tajikistan) and Alay Valley.
 - Important Water Bodies: Lake Issyk-Kul – world's second-largest saline lake after the Caspian Sea and one of the largest alpine lakes.
 - Lake Song-Köl – high-altitude freshwater lake.
 - Naryn River – principal river, which joins the Kara Darya to form the Syr Darya.

India–Kyrgyzstan Relations

- Diplomatic relations were established in 1992.
- Key areas of cooperation include defence, counter-terrorism, education, IT, pharmaceuticals, traditional medicine, and capacity building.
- Exercise KHANJAR is the annual India–Kyrgyzstan Special Forces Joint Exercise, focusing on counter-terrorism and mountain warfare.
- Kyrgyzstan is important for India's Connect Central Asia Policy and cooperation within the SCO.

Manas Epic

- The Manas is the national epic of Kyrgyzstan, comprising over 500,000 lines, making it one of the longest epic poems in the world. It narrates the life of the legendary hero Manas and is inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity. The newly established "Manas and Mahabharata" Centre highlights the shared civilizational heritage and cultural diplomacy between India and Kyrgyzstan.

India-Australia Sign 'PACTS' Arrangement

During the Prime Minister of India's visit to Australia, both countries signed the Partnership for Advanced Critical and Emerging Technologies (PACTS), replacing the 2020 Framework Arrangement on Cyber and Cyber-Enabled Critical Technology Cooperation. It broadens bilateral cooperation from cyber issues to strategic technologies, defence, and resilient supply chains.

About PACTS

- **Objective:** To strengthen national security, build resilient critical supply chains, enhance global cyber resilience, and promote trusted digital technologies in the Indo-Pacific.
- **Governance:** Jointly led by India's Deputy National Security Advisor (DNSA) and Australia's Deputy Secretary (International and Security Group), with Annual Senior Officials' Meetings (SOMs) for implementation and review.

Five Pillars

1. Supply Chain Resilience & Diversification: Cooperation on critical minerals (lithium, cobalt, rare earths), semiconductors, and trusted undersea communication cables.
2. Critical Technologies: Collaboration in Artificial Intelligence (AI), space technology, telecommunications, biotechnology, advanced materials, and development of global technology standards.
3. Cybersecurity: Joint efforts to combat cybercrime, protect critical infrastructure, share cyber threat intelligence, and establish a Cyber Technology Skill Incubator Hub.
4. Digital Resilience: Promotion of India's Digital Public Infrastructure (DPI)—including UPI, Aadhaar, DigiLocker, CoWIN, and Account Aggregator—to support digital transformation in developing Indo-Pacific countries.
5. Defence Research Collaboration: Joint R&D, defence innovation, maritime technologies, and collaboration between DRDO (India) and Australia's Defence Science and Technology Group (DSTG).

Significance for India

- Secures access to Australian lithium and cobalt, supporting the EV ecosystem, battery manufacturing, renewable energy, and the India Semiconductor Mission.
- Strengthens trusted semiconductor supply chains and critical technology cooperation.
- Enhances maritime domain awareness and security in the Indian Ocean Region (IOR).
- Expands India's DPI diplomacy, positioning India as a trusted digital partner in the Indo-Pacific.
- Promotes ethical and democratic AI governance, ensuring shared access to AI infrastructure, compute capacity, and Large Language Models (LLMs) while reducing dependence on monopolistic technology ecosystems.

Value Addition

- Replaces: 2020 Framework Arrangement on Cyber and Cyber-Enabled Critical Technology Cooperation.
- **Key Areas:** Critical Minerals, Semiconductors, AI, Cybersecurity, DPI, Defence R&D.
- **Related Initiatives:** Comprehensive Strategic Partnership (2020), India–Australia ECTA (2022), Quad, Indo-Pacific Oceans Initiative (IPOI), India Semiconductor Mission (ISM).

3rd India-Australia Annual Summit 2026

During the Prime Minister of India's visit to Australia, both leaders agreed to fast-track the Comprehensive Economic Cooperation Agreement (CECA) and elevate bilateral ties from the 'Three Cs' (Cricket, Curry and Commonwealth) to the 'Four Ds' (Democracy, Defence, Diaspora and Dosti).

Key Outcomes

- **Civil Nuclear Cooperation:** Operationalisation of the 2015 Civil Nuclear Agreement, enabling commercial export of Australian uranium to India for peaceful nuclear energy and supporting India's clean energy transition.
- **Defence & Maritime Security:** Renewed Joint Declaration on Defence and Security Cooperation (updating the 2009 declaration), focusing on interoperability, defence-industrial collaboration and capacity building. Launched the Maritime Security Collaboration Roadmap (MSCR) and announced an Indian Military Instructor at the Australian Defence College (2028–29).
- **Technology & Space:** Signed the Australia–Canada–India Technology and Innovation (ACITI) MoU for cooperation in emerging technologies. Australia will support ISRO's Gaganyaan Mission through a tracking station at Cocos (Keeling) Islands.
- **Education & Skills:** Letters of Intent for Flinders University (Bengaluru) and Victoria University (Gurugram) campuses; establishment of a Centre of Excellence in Mining at Bhubaneswar.
- **Culture & Heritage:** Return of three 11th–12th century antiquities and Australian access to Traditional Knowledge Digital Library (TKDL) to prevent biopiracy.
- **Sports Diplomacy:** India–Australia Sports Collaboration Roadmap and Australia's support for India's 2036 Olympic bid.

India–Australia Relations

- **Comprehensive Strategic Partnership (2020):** Based on shared democratic values and a Free, Open, Inclusive and Prosperous Indo-Pacific.
- **Economic Relations:** Bilateral trade is nearing US\$50 billion. ECTA (effective December 2022) removed tariffs on over 85% of Australian exports to India. CECA aims to expand trade in goods, services, investment and digital economy.
- **Strategic & Defence Cooperation:** Mutual Logistics Support Agreement (2021); joint exercises AUSINDEX (Navy), AUSTRALIND (Army) and Malabar (Quad).
- **Multilateral Platforms:** Both cooperate in the Quad, G20, East Asia Summit (EAS), Indian Ocean Rim Association (IORA) and Commonwealth.
- **Diaspora:** Around 1 million Indians live in Australia, including over 137,000 Indian students, making it Australia's largest and fastest-growing overseas-born community.

Prelims Facts: CSP–2020 | Civil Nuclear Agreement–2015 | ECTA–Dec 2022 | MLSA–2021 | CECA–Under negotiation | Australia is a major source of uranium, lithium, cobalt, nickel and rare earth minerals, crucial for India's clean energy and critical mineral security.

Sabang Port

India and Indonesia agreed to jointly develop **Sabang Port**.

About Sabang Port

- **Location:** Weh Island in Indonesia's Aceh province, at northern tip of Sumatra.
- **Significance:**
 - **Proximity to Strait of Malacca:** One of world's most critical maritime chokepoints.
 - It is a waterway connecting **Andaman Sea (Indian Ocean)** and **South China Sea (Pacific Ocean)**.
 - **Enhance India's strategic position:** Combined with upcoming Great Nicobar port, India would be able to further fortify its **Indo-Pacific presence**.
 - **Can Counter China's String of Pearls:** Chinese military, trade facilities and maritime links that stretch from mainland China to south of Port Sudan.

PROTACs

U.S. Food and Drug Administration (FDA) approved drug **vepdegestrant**, the **world's first PROTAC-based therapy**, for **ESR1-mutated, ER-positive, HER2-negative advanced breast cancer**, where it degrades the oestrogen receptor.

About Proteolysis-targeting chimaera (PROTAC)

- **Definition:** It is a molecule that selectively degrades disease-causing proteins.
- **Mechanism (Targeted Protein Degradation):** Bridges the **target protein** with an **E3 ligase** (enzyme involved in cell's protein degradation), triggering the cell to destroy the target protein.
- **Catalytic Action:** Reusable molecule that degrades multiple protein copies, enabling **lower-dose** therapy.
- **Advantage:** Can target proteins that are difficult for conventional drugs to inhibit.
- **Challenges:** Poor absorption due to large size, reduced efficacy at high concentrations, potential resistance etc.

Mount Erebus

Scientists have discovered that Mount Erebus emits volcanic gases containing microscopic crystals of pure gold.

About Mount Erebus

- **Location:** Ross Island in the Ross Sea, Antarctica,
- **Key features**
 - It is the **world's southernmost active volcano**
 - It has a **permanent lava lake**
 - It is a **stratovolcano** and is part of the Pacific **Ring of Fire** that encircles the Pacific Ocean basin.

Lonar lake

Recently, rising water levels in Lonar Lake have submerged parts of nearby temples, including the Kamalja Devi Temple.

About Lonar lake

- **Location:** Vidarbha region, Maharashtra.
- **Origin:** Formed nearly 50,000 to 52,000 years ago when a meteorite impacted the Earth in the basalt formations of the Deccan Plateau.
 - It is the one of the largest crater lake.
- **Conservation:** It has been designated a Wildlife Sanctuary, National Geo-Heritage Site and Ramsar Site
- **Key features**
 - **Unique Biodiversity:** It has 2 distinct layers (alkaline and saline) of water, harboring microorganisms not found anywhere else.
 - **Endorheic basin:** a closed drainage basin with no outflow.
 - **Moon resemblance:** Minerals in the lake soil closely resemble those found in moon rocks

Norwegian Sea

UK fighter jets intercepted a Russian patrol aircraft over Norwegian Sea.

Norwegian Sea

- **Geography**
 - **Location:** Marginal sea of Arctic Ocean between Norway, Greenland, and Iceland.
 - **Boundaries:** Barents Sea (North-East) and Greenland Sea (North); separated from the Atlantic Ocean by Greenland–Iceland–Faroe–Scotland Ridge and from Greenland Sea by Jan Mayen Ridge.
 - **Formation:** ~250 million years ago due to separation of Eurasian and North American plates.
- **Oceanography & Climate**
 - **Currents:** Warm Norwegian Current keeps the sea ice-free year-round.
 - **Thermal Mixing:** Interaction with the East Iceland Current creates rich fishing grounds.



Flash Floods

Intense rainfall triggered massive flash floods and landslides in Jammu & Kashmir's Chenab Valley Increasing extreme weather events in the fragile Himalayan region are triggering flash floods.

About Flash Flood

- **Definition:** Sudden, short-duration and highly localised floods triggered within hours by intense rainfall, rapid snowmelt, dam/levee failure or ice jams, leaving very little time for warning and response.
- **Other recent occurrences:** Chennai (2015), Kerala (2018), Assam (2024), etc.

Key Causes of Flash Floods in the Himalayas

- **Climatic & Meteorological Factors:** Cloudbursts, intense rainfall, western disturbance–monsoon interaction, climate change, and atmospheric aerosols trigger extreme precipitation and flash floods.
- **Glacial Lake Outburst Floods (GLOFs):** Sudden release of large quantities of bounded water due to the melting of ice blocks in glacier-fed rivers.
- **Geographical Factors:** High elevations and steep slopes promote intense rainfall and rapid surface runoff.
- **Anthropogenic (Human-Induced) Factors:** Unplanned infrastructure (dams, roads etc.), unscientific hill cutting, poor slope stabilisation, and improper muck (construction debris) disposal destabilise slopes, obstruct drainage, and intensify flash floods

Way Forward

- **Strengthen Early Warning Systems:** Expand India Meteorological Department's **Flash Flood Guidance Services (FFGS)**, satellite monitoring and ensure that real-time alerts reach vulnerable communities.
- **Disaster-Resilient Infrastructure:** Adopt scientific drainage planning, slope stabilisation and regulate construction in fragile Himalayan regions.
- **Risk-Based Planning:** Recognise flash floods as a distinct disaster, undertake localised vulnerability mapping and develop state-specific SOPs.
- **Community-Based Resilience:** Integrate indigenous knowledge into local early warning and disaster preparedness systems.

Indus River

An IIT-Gandhinagar study found a 20% decline in precipitation (1951–2024) in the eastern Indus basin (Ravi, Beas, Sutlej), reducing reservoir inflows to Pong, Bhakra, and Thein, while the western rivers (Indus, Jhelum, Chenab) recorded only a 6% decline with largely stable flows and better groundwater conditions.

About the Indus River

- **Origin:** Glacier near **Bokhar Chu (near Lake Mansarovar)** in the **Kailash Range, Tibet**; known as **Singi Khamban**.
- **Course:** Flows through **Ladakh**, enters **Pakistan** near Chilas, and drains into the **Arabian Sea** east of Karachi.
- **Left-bank Tributaries:** Zaskar, Astor, Jhelum, Chenab, Ravi, Beas, Sutlej
- **Right-bank Tributaries:** Shyok, Shigar, Gilgit, Kabul, Khurram, Tochi, Gomai, Viboa, Sangar.

Water Security in a Rapidly Drying India

Research by the **Council on Energy, Environment and Water (CEEW)** indicates that

- **11 out of 15 major river basins in India are experiencing water stress** (with annual water availability below 1,700 m³ per person).
- Water crisis has evolved from a **seasonal inconvenience into a permanent structural risk**, threatening households, agriculture, industry, and urban economies (like Bengaluru, Delhi, etc.).

Challenges in ensuring water security in India

- **Limited Freshwater Resources:** India has nearly **18% of the world's population** but **only about 4% of global freshwater resources**.
- **Declining Urban Water Availability:** E.g. in Delhi, the actual water supply has plummeted to **~70% of its total daily demand** of 1,250 million gallons.
- **Seasonal Rainfall Pattern:** **~ 70% of annual rainfall occurs within three months**, making water availability highly uneven across seasons.
 - Factors like El Nino have led to a **40% deficit even in monsoon rainfall in June 2026**.
- **Infrastructure Gaps:** Such as inadequate facilities for **treating wastewater (only 30% gets treated as per CPCB)**, high levels of **water pollution**, etc.

Strategies to achieve water security in India

- **Climate-Proofing:** Through **granular climate risk mapping of water infrastructure** to protect critical urban infrastructure (like grids and schools) in low-lying or coastal areas.
 - Leverage existing mechanisms like the **Urban Challenge Fund (UCF)** to finance **resilient municipal water systems**.
- **Urban Water Reuse:** Shifting to a **circular water approach** by treating and reusing wastewater for activities such as cooling data centres.
- **Scale up Micro-Irrigation (beyond the current 20% coverage):** Requires **redesigning subsidies for smallholder farmers**, providing low-cost insurance with faster claims under PMFBY.
- **Generate River Basin-Level Data:** Closing metrics gaps **by measuring actual consumption, withdrawals, and losses** instead of merely estimating raw availability by **leveraging AI technology at scale**.

Landslide Risks in India

The Wayanad (Kerala) landslides (2024) were triggered by extreme torrential rainfall, steep terrain, and highly fractured slopes of the Vellarimala mountain ranges in the Western Ghats. Similar landslides have occurred in Chamoli (Uttarakhand) and Jammu & Kashmir, highlighting the growing risk due to climate change and unscientific developmental activities.

About Landslides

- A landslide is the downward movement of rock, soil, debris, or earth material under the influence of gravity. It is triggered by natural factors such as heavy rainfall, earthquakes, cloudbursts, and weathering, as well as anthropogenic factors like deforestation, mining, hill cutting, road construction, hydropower projects, and unplanned urbanization.

Landslide Vulnerability in India

According to the Landslide Atlas of India (ISRO–National Remote Sensing Centre, NRSC):

- India is among the top four landslide-prone countries globally.
- About 12.6% of India's geographical area (excluding snow-covered regions) is landslide-prone.
- Regional contribution: Northwest Himalayas (66.5%), Northeast Himalayas (18.8%), and Western Ghats (14.7%).

Major Causes

Himalayan Region

- Young fold mountains with active tectonics and frequent earthquakes.
- Loose and highly weathered sediments.
- Heavy monsoon rainfall, cloudbursts, and GLOFs.
- Hydropower projects, road widening, tunnelling, quarrying, and deforestation.

Western Ghats

- Intense southwest monsoon rainfall and steep slopes.
- Neo-tectonic activity and highly weathered rock formations.
- Deforestation, mining, quarrying, hill cutting, and climate change-induced extreme rainfall.

Measures Taken

- Geological Survey of India (GSI) under the Ministry of Mines is the nodal agency for landslide studies and mitigation.
- NDMA Guidelines (2009) recommend Hazard Zonation Mapping, slope stabilization, retaining structures, drainage improvement, afforestation, and regulated land use.
- National Landslide Risk Management Strategy (2019) focuses on hazard mapping, monitoring, early warning, capacity building, and awareness.
- Landslide Early Warning System (LEWS) developed by IIT Mandi provides daily forecasts for the Indian Himalayas.
- Persistent Scatterer Synthetic Aperture Radar (PSInSAR) Interferometry is used to detect millimetre-level ground deformation and monitor slope instability.

Way Forward

- Scientific land-use planning, enforcement of environmental regulations, nature-based solutions, expansion of early warning systems, and the use of GIS, Remote Sensing, AI, and satellite monitoring are essential to reduce landslide risk and build climate-resilient mountain ecosystems.

Red Alert on urban flooding in India

Heavy monsoon rainfall triggered **flooding in cities such as Delhi and Surat**, disrupting normal life and drawing attention to the **recurring challenge of urban floods in India**.

Context

- Heavy monsoon rainfall recently caused severe flooding in Delhi, Surat and other cities, highlighting the recurring challenge of urban flooding amid rapid urbanisation and climate change.

What is Urban Flooding?

- Urban flooding refers to the temporary inundation of land, roads, or property in urban areas when intense rainfall generates runoff beyond the carrying capacity of storm-water drainage systems. According to NDMA, urbanisation increases flood peaks by 1.8–8 times and flood volumes by up to 6 times compared to rural catchments.

Major Causes

- Extreme rainfall & climate change: Cloudbursts, intense precipitation, changing monsoon patterns (e.g., Mumbai floods, 2005).
- Unplanned urbanisation: Concretisation and impervious surfaces reduce groundwater infiltration and increase runoff.
- Encroachment of wetlands, lakes, floodplains and natural drains: Example—Bengaluru has lost nearly 65 lakes in the last two decades.
- Inadequate storm-water drainage: Undersized, poorly maintained and solid waste-clogged drains.
- Poor urban water management: Sudden reservoir releases (e.g., Chembarambakkam Reservoir during Chennai floods, 2015), loss of natural catchments and weak land-use planning.

Impacts

- Loss of lives and property; disruption of transport, power, water supply and communication; economic losses; contamination of water bodies; spread of water-borne diseases; and degradation of urban ecosystems.

Government Initiatives

- NDMA Guidelines on Urban Flooding (2010): Framework for prevention, preparedness, mitigation and response.
- Central Water Commission (CWC): Real-time flood forecasting and warning.
- IFLOWS-Mumbai & CFLOWS-Chennai (MoES): GIS-based Integrated Flood Early Warning Systems.
- Mission Mausam (MoES): Expansion of Doppler Weather Radars, nowcasting and weather forecasting.
- AMRUT 2.0: Strengthens storm-water drainage, rainwater harvesting and urban water management.
- Smart Cities Mission: ICT-enabled resilient urban infrastructure and disaster management.

Way Forward

- Expand Doppler Weather Radars, Automatic Weather Stations (AWS), Automatic Rain Gauges (ARGs) and AI-based forecasting; prepare GIS-based flood hazard maps and drainage inventories; modernise storm-water drains with regular desilting; protect wetlands and floodplains; adopt China's Sponge City approach (permeable pavements, green roofs, rain gardens); establish dedicated Urban Flood Cells, strengthen coordination among IMD, CWC, NDMA, SDMAs and ULBs, enforce floodplain zoning and building bye-laws, and promote community participation.

Zoological Survey of India (ZSI)

Animal Discoveries–2025, released by the **Zoological Survey of India (ZSI)** reported 709 new faunal records, including **483 new species and 226 species recorded** in India for the first time.

About Zoological Survey of India (ZSI)

- It is India's premier institution for survey, exploration, taxonomy, documentation, and conservation of the country's faunal diversity.
- **Established** in 1916
- It functions under the Union Ministry of Environment, Forests and Climate Change.
- **Key Objectives:**
 - Maintenance & Development of National Zoological Collections
 - Periodic review of the Status of Threatened and Endemic species, etc.
- **HQ: Kolkata** and has 16 regional centers spread across the country.

Borjuli wetland

The Borjuli wetland has been notified as a **Biodiversity Heritage Site**.

About Borjuli Wetland

- **Location:** Sonitpur District, Assam; part of the Brahmaputra floodplain ecosystem.
- **Type:** Freshwater wetland supporting rich aquatic biodiversity.
- It is known for harbouring a variety of **wild rice (Oryza rufipogon)**
 - It is the **progenitor** of present-day cultivated rice, **Oryza sativa**.
 - It is disease- and pest-resistant and can tolerate flooding and saline conditions.

Biodiversity Heritage Site

- They are unique, ecologically fragile ecosystems having rich biodiversity comprising some specific components. E.g., high endemism, presence of threatened species etc.
- **Notification:** by the State Government in consultation with local bodies under the **Biological Diversity Act, 2002**.
 - **Declared by: State Government in consultation with local bodies.**
- **National Biodiversity Authority**, under ministry of Environment, advises the State Government in the selection and management
- Recommendation/Advice: National Biodiversity Authority (NBA).
- Management: Through Biodiversity Management Committees (BMCs) and local communities.
- Ownership: Declaration as a BHS does not change ownership or land rights.
 - Objective: Conserve areas of ecological, evolutionary, cultural, or aesthetic importance.
 - Protect habitats of rare, endemic, threatened, and keystone species.
 - Preserve crop wild relatives and traditional genetic resources.

Why is conservation of wild rice important?

- Ensures agricultural biodiversity.
- Strengthens food and nutritional security.
- Helps develop climate-resilient crops under climate change.
- Conserves genetic diversity, supporting sustainable agriculture and India's commitments under the Convention on Biological Diversity (CBD) and the Kunming–Montreal Global Biodiversity Framework.

Direct-Seeded Rice

Direct-Seeded Rice (DSR) is witnessing increased adoption by farmers amid El Niño-induced water stress.

About Direct-Seeded Rice

- A **water- and labour-saving** method of rice cultivation in which **seeds are sown directly in the field**, eliminating the need for nursery raising and transplanting.
- Can be practised through **dry seeding, wet seeding or water seeding**, using broadcasting or seed drills.
- Reduces **cultivation cost and methane emissions**, while enabling timely sowing.
- Requires **effective weed management** and proper water control for optimum yields.

Note: System of Rice Intensification (SRI) is a rice cultivation method using **young seedlings, wider spacing and intermittent irrigation** to enhance yield while reducing water use.

Microgastrinae

A new study focused on **Microgastrinae** found that Earth could hold 14.2 million to 20.3 million insect species.

About Microgastrinae

- They belong to a subfamily of **parasitoid wasps** that live on the larvae of butterflies and moths.
- **Ecological Importance:**
 - Many species act as **natural biological control agents for managing agricultural and forestry pests**.
 - Provide an effective way to **estimate overall insect richness** due to their exceptional diversity and close association with their hosts.

Cyttopsis indica (Indian dory)

ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), Kochi has discovered a **new deep-sea fish 'Cyttopsis indica' (Indian dory)** from the Arabian Sea off Kerala.

About Cyttopsis indica (Indian dory)

- It was found at depths of **350-500 metres** along the continental slope of the **eastern Lakshadweep Sea**.
- **The DNA analysis** revealed a **stark genetic divergence from all other known species in its genus**, correcting a long-standing taxonomic error.
- **Until now**, the fish seen in the **Indian Ocean** was believed to be *Cyttopsis rosea*, a species with distribution now confined to the **Atlantic Ocean**.

World Bank (WB) Drops Key Climate Finance Targets

Following disapproval from **United States** (bank's largest shareholder), WB indicated to retire **45% climate co-benefits target** and **35% target in the Climate Change Action Plan [CCAP]**.

- While agreeing to continue its CCAP plan, WB clarified its work on climate is and will remain **firmly client driven**.

About CCAP

- **Genesis:** Launched In 2016 after Paris Agreement as a five-year **Climate Change Action Plan 2016–2020**.
 - Building on its achievements, the **second CCAP covering 2021–2025** allocated 35% to climate finance.
 - It was **extended until June 30, 2026**.
- **Purpose:** Increase financial and technical support to client countries and private sector clients for **mitigation and adaptation**.

Key Implications of WB Withdrawal

- **Important Role of WB:** In FY 2025, **48% of WB financing had climate co-benefits**, with important projects in India targeting states like UP, Maharashtra, Kerala, etc.
 - **Climate Co-Benefits** are financial resources which deliver positive benefits associated with climate change **mitigation and adaptation**.
- **Difficulty Achieving Global Targets:** **New Collective Quantified Goal (NCQG)** adopted at CoP29 of UNFCCC demands scaling up financing for **developing countries to at least USD 1.3 trillion annually by 2035** from all sources.
- **Existing Climate Finance Gaps:** **Adaptation financing needs** in developing countries is **12-14 times** as much as current flows (UNEP's 2025 Adaptation Gap Report).
 - India needs cumulative investment requirements of **USD 22.7 trillion by 2070** (NITI Ayog).
- **Energy Security as core driver of development:** E.g., Iran war has cast doubt on viability of liquefied natural gas as 'transition fuel' demanding **renewable alternatives**.

Himalayan Pangolin

Himalayan pangolin, earlier classified as subspecies of Chinese pangolin (*Manis pentadactyla*), confirmed as a **distinct species**.

- Scientists found that **climate change** played a key role in diverging the two lineages ~1.8 million years ago during the early Pleistocene Epoch.

About Himalayan Pangolin (*Manis aurita*)

- **Distribution:** Restricted to southern Himalayan foothills (Nepal, South Tibet, and Northeast India, including Assam).
- **Features:**
 - It is **larger** on average compared to the Chinese pangolin.
 - It paradoxically has markedly **smaller ears**.
 - It also has a **shorter and broader nasal bone**.

About Pangolins

- **Highly olfactory reliant scaly mammals**, exhibiting significantly **enlarged olfactory bulb and turbinates**, using smell to forage for **ants and termites**.
- They **roll up into a ball** for protection.
- **Threat:** Poaching, Inbreeding, Illegal wildlife trade.
- **Eight species** of Pangolins exist globally including **Indian Pangolin** (*Manis crassicaudata*).

Indo-Burma Biodiversity Hotspot

Mizoram University's Natural History Museum which is strategically located within the Indo-Burma Biodiversity Hotspot has been designated as India's 21st biodiversity repository.

- Designation has been provided under the Biological Diversity Act, 2002.

About Indo-Burma Biodiversity Hotspot

- **Geographical Extent:** Covers parts of Cambodia, Lao PDR, Myanmar, Thailand, northeast India (excluding Assam) and Vietnam, plus parts of southern China.
- **Global Significance:** It ranks among the top 10 biodiversity hotspots globally for "irreplaceability" and the top five for the level of threat it faces.
- **High Species Richness:** The hotspot harbors roughly 500 mammal species, 1,330 bird species, over 815 reptile species, and more than 500 amphibian species.
- **Endemism:** More than a third of its reptile species and nearly half of its amphibian species are endemic (found nowhere else).

Other Biodiversity Hotspots in India: Himalaya biodiversity hotspot, Western Ghats–Sri Lanka biodiversity hotspot, and Sundaland biodiversity hotspot (Nicobar Islands in India).

Egyptian Vulture (Neophron percnopterus)

Egyptian Vulture has become locally extinct in Nilgiris and is disappearing from much of its range especially **Tamil Nadu**.

About Egyptian Vulture

- **Distribution:** Across southern Europe, northern and central Africa, Middle East, Central Asia and Indian subcontinent
- **Threats:** Use of veterinary anti-inflammatory drug diclofenac, electrocution by power lines, etc.
- **Characteristics:**
 - **World's smallest** and only **tool using vulture**.
 - breeds later in the year than other vulture species.
 - Rub themselves with soil rich in ferric oxides.
 - plays **vital ecological role** by removing animal carcasses from landscape.
- **Conservation Status:** IUCN (Endangered); **Wildlife Protection Act, 1972** (Schedule I).

Species at Risk of Extinction

IUCN stated that **Molluscs** and **Desert Rain Frog** are at risk of extinction due to deep-sea mining and diamond mining respectively.

About Molluscs

- Molluscs are **invertebrates**, which mean they're animals that don't have a backbone.
- All molluscs have a **mantle**, a **cavity** for breathing and excretion, and a **nervous system**.
- **Classes of Molluscs:**
 - **Cephalopods:** Includes **octopuses**, **squids**, **cuttlefishes**, **nautilus** and an extinct group known as **ammonites**.
 - **Gastropods:** Includes **slugs** and **snails**.
 - **Bivalves:** Includes **Clams**, **oysters**, **scallops**, and **mussels**.

About Desert Rain Frog (*Breviceps macrops*)

- **Fossorial:** Adapted for **burrowing and underground life**, spending most of its time beneath sandy soils.
- **Habitat:** Sand dunes with sparse vegetation along the Namaqualand coast of **South Africa** and **coastal south-western Namibia**.
- **IUCN Status:** Vulnerable.

Mugger Crocodiles

A **banned pesticide Aldrin** led to deaths of mugger crocodiles (*Crocodylus palustris*) in the Chandraloi river of Rajasthan's Kota district.

- **Aldrin** is a banned organochlorine pesticide in India due to its persistent nature, soil and water contamination, bioaccumulation in the food chain, and toxic effects on the nervous system of humans and wildlife.

About Mugger Crocodiles

- **Medium-sized crocodile** (up to 4–5 m) with the broadest snout among living *Crocodylus* species.
- **Distribution:** Mainly Indian subcontinent (India, Pakistan, Sri Lanka, and Iran).
- **Habitat:** Rivers, lakes, marshes, reservoirs, irrigation canals, and man-made ponds.
- **Status:**
 - **Schedule I** of the Wildlife Protection Act, 1972
 - **CITES:** Appendix I
 - **IUCN Red List:** Vulnerable
- **Characteristics:** Hole-nesting species; known to dig burrows etc.
- **Threats:** Habitat destruction, fragmentation, and transformation, mortality due to increased fishing activities.

Cyanobacteria (Blue-Green Algae)

IIT Guwahati team finds blue-green algae can remove lead from contaminated water.

- **Bioremediation** uses micro-organisms to reduce pollution through the biological degradation of pollutants into non-toxic substances.

About Cyanobacteria (Blue-Green Algae)

- Photosynthetic, prokaryotic microorganisms belonging to the Kingdom Monera (Bacteria).
- Commonly found in freshwater, marine and moist terrestrial habitats.
- Many varieties fix atmospheric nitrogen (e.g., *Anabaena*, *Nostoc*).
- Act as biofertilisers in paddy cultivation due to their nitrogen-fixing ability.

Other Bioremediation Techniques

- **Phytoremediation:** Plants remove or degrade pollutants.
- **Mycoremediation:** Fungi degrade toxic contaminants.
- **Microbial bioremediation:** Microorganisms break down pollutants.
- **Bioaugmentation:** Introduces selected microbes to enhance pollutant removal.

AI hallucination

The Supreme Court set aside an order of the National Company Law Tribunal (NCLT) for Using AI-Hallucinated Citations.

About AI hallucination

- These are **incorrect or misleading results** that AI models generate.
- It perceives **patterns or objects that are non-existent** or imperceptible to human observers, creating outputs that are **nonsensical** or altogether inaccurate.
- E.g., Google's **Bard chatbot** incorrectly claimed that the James Webb Space Telescope had captured the **world's first images** of a planet outside our solar system.
- **Factors responsible** are insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model.

Green Ammonia and Methanol

Recently an **Indian company secured long-term offtake deal** with leading Japanese companies for **Green Ammonia and Green Methanol**.

Green ammonia

- It is a pungent gas primarily used to make fertilizers (China is the largest producer of ammonia)
- **Production:** using the **Haber-Bosch process**, where hydrogen and nitrogen are combined.
- **Significance:** Reducing GHG emissions, can be used as a fuel (has higher density in relation to other chemicals produced via renewable processes), can be used to produce hydrogen

Green Methanol

- **Methanol** is a colourless liquid
- **Applications** : mainly used for producing other chemicals such as formaldehyde, acetic acid and plastics
 - It can be used as a fuel source for engines, but it is also expensive, flammable and requires double the fuel tank size compared to its oil equivalent.
- **Production:** Green methanol is produced from low-carbon sources such as biomass, or via carbon capture.

Large Hadron Collider

The European Organization for Nuclear Research (CERN) has shut down the **Large Hadron Collider (LHC)** for its **third Long Shutdown (2026–2030)** to upgrade it into the **High-Luminosity LHC (HL-LHC)**.

About LHC

- **World's largest and most powerful** particle accelerator, operated by European Organization for Nuclear Research (CERN).
- **Began** operations on 10 September **2008**.
- **Located in a 27-km circular tunnel** underground, on the France–Switzerland border near **Geneva**.
- **Accelerates** and collides **protons and heavy ions** to nearly the speed of light to study the fundamental constituents of matter and conditions immediately after the Big Bang.
- Includes four particle detectors – **ATLAS, CMS, ALICE and LHCb**.
- Discovered the **Higgs boson in 2012**.
 - **Higgs boson** explains how fundamental particles acquire mass.
- Uses superconducting magnets cooled to -271.3°C with liquid helium.

Artificial Intelligence in Modern Warfare

From the **Cold War's ideological and nuclear arms race** to the **21st century's Autonomous weapons and algorithmic warfare**, Artificial Intelligence (AI) is reshaping modern warfare.

How AI is Reshaping Modern Warfare

- **AI-enabled battlefield awareness:** AI platforms integrate data from satellites, radar, sensors, and social media to form a digital 'kill web' to compress engagement times. E.g. **Ukraine's Delta platform**.
- **Real-Time Data Analysis:** To process huge data from surveillance systems. E.g. **Project Maven**, a U.S. initiative to analyse large quantities of surveillance data.
- **Minotaur warfare:** AI and human commanders operate as an integrated combat network. E.g. **YFQ-44A Fury**, an AI-enabled Collaborative Combat Aircraft of USA.
- **Intelligence, surveillance, and reconnaissance (ISR):** AI analyzes massive datasets to track enemy movements, predict behavior. E.g. **"Lavender" AI system** used by Hamas targets.

What India needs to do in AI Warfare?

- **Develop an AI Battlefield Platform:** Build an indigenous AI-enabled data analytics platform.
- **Enable Autonomous Drone Swarms:** Develop AI software for swarm coordination, target identification, and autonomous engagement.
- **Enhance Space-based ISR:** Expand low-Earth orbit (LEO) satellite constellations for persistent surveillance and offensive ISR.
- **Others:** Increase Defence-Tech Investment, Expand Drone Inventory etc.

India's AI Initiatives in Defence

- **Evaluating Trustworthy Artificial Intelligence Framework and Guidelines:** Launched by the Chief of Defence Staff to promote responsible AI adoption in the Armed Forces.
- **AI-based Crime & Threat Prediction:** Use of ANANT (Adversary Network Analysis Tool) developed by BEL for predictive intelligence and attack forecasting.
- **Project Seeker:** AI-enabled system developed by the Indian Army for surveillance, garrison security, and population monitoring.
- **AI Task Force:** Strategic Implementation of AI for National Security and Defence Task Force, chaired by C. Chandrasekaran.

e-MERLIN Radio Array

Astronomers, including from India, discovered a hidden population of faint, weakly active supermassive black holes in nearby galaxies using **e-MERLIN (enhanced Multi-Element Remotely Linked Interferometer Network) radio array**.

About e-MERLIN Radio Array

- It is **UK's national radio telescope interferometer**.
- **Infrastructure:** Network of **7 radio telescopes** spread over **217 km** across Great Britain.
- **Connectivity:** Linked by optical fibre to **Jodrell Bank Observatory**; operated by the **University of Manchester**.
- **Resolution:** Hubble-like angular resolution with high-sensitivity centimetre-wave radio observations.
- **Capabilities:** 2 GHz wide-band correlator for advanced spatial-scale coverage.

Gaganyaan missions

ISRO conducts first SOLVE ground test important for Gaganyaan missions Sub-Orbital Launch Vehicle for Experiments (SOLVE) solid motor was successfully tested at the Static Test Facility, Satish Dhawan Space Centre, Sriharikota.

- ISRO is developing a solid motor based SOLVE as a test platform to carry out Integrated Parachute Tests.

About SOLVE

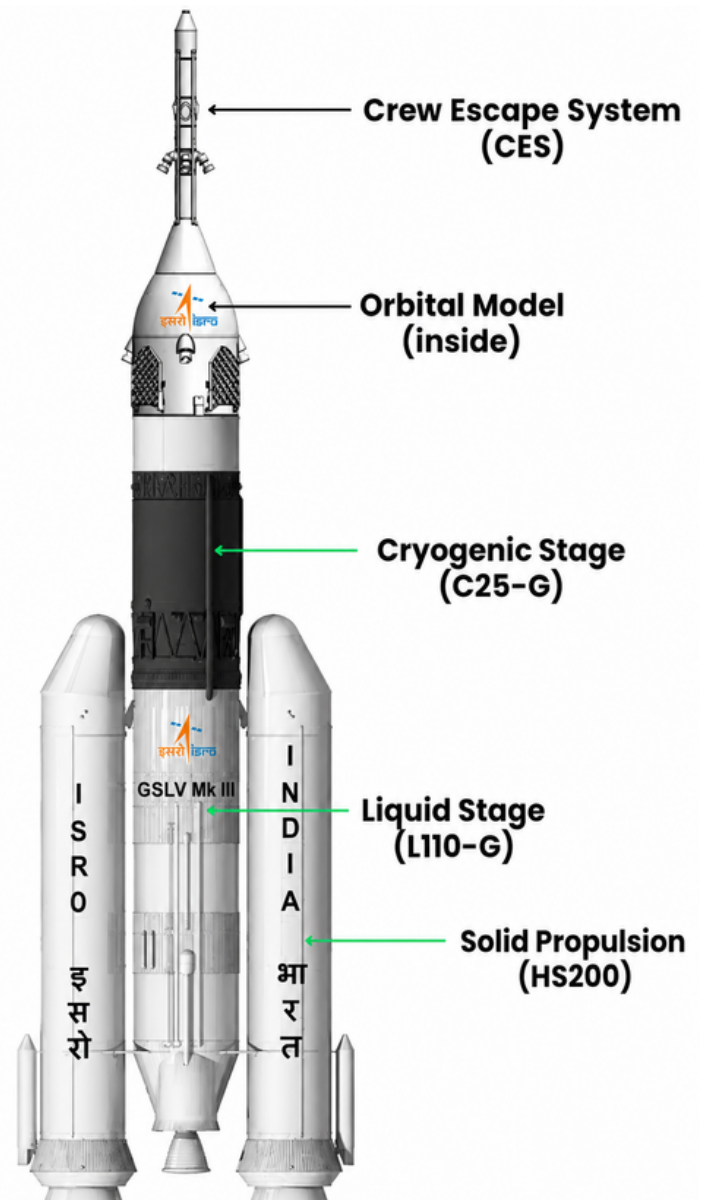
- **Objective:** It will serve as a test platform for validating the deceleration (parachute) system of the Gaganyaan Mission Crew Module.
- **Function:** Carries Crew Module to 10–17 km, followed by separation and sea splashdown using 10 parachutes.
- **Component:** Solid motor is derived from the Polar Satellite Launch Vehicle (PSLV) Strap-on Motor with modifications.

About Gaganyaan Mission

- India's first human spaceflight mission aims to send 3 astronauts to a 400 km Low Earth Orbit for 3 days, followed by a safe splashdown in Indian waters.
- Gynoid (female robot) Vyommitra will undertake the first uncrewed mission of Gaganyaan.

Components of the Gaganyaan Mission

- **Human-Rated LVM3 (HLVM3):** Modified LVM3 rocket designed to safely carry astronauts, equipped with a Crew Escape System (CES). It is a three-stage rocket. (Refer Image)
- **Crew Escape System (CES):** Emergency escape mechanism that rapidly separates the Crew Module from the launch vehicle.
- **Orbital Module (OM):** Spacecraft comprising:
 - **Crew Module (CM):** Pressurized, habitable module with life support.
 - **Service Module (SM):** Provides propulsion, power, and thermal control.
- **Life Support System (LSS):** Maintains an Earth-like environment inside the Crew Module.
- **Thermal Protection & Recovery Systems:** Includes heat shield, parachutes, and sea recovery systems etc.
- **Human-Centric Technologies:** Human Factors Engineering, Bioastronautics, etc.



Placenta Functions on a Chip

Researchers from ICMR-NIRWoH (Mumbai) and IIT Bombay have developed an indigenous, lab-grown placenta-on-a-chip platform that replicates key functions of the human placental barrier.

- The **placenta-on-chip** offers novel advancements in making pregnancies safe.
 - It enables stage-specific pregnancy modeling, gestational diabetes study, and drug safety testing, reducing animal model dependency.
- **Placenta** is a temporary mammalian organ regulating maternal-fetal nutrient-oxygen transfer, waste clearance, and hormone secretion

About Organ on Chip Technology

- Miniature devices containing living human cells that mimic the structure and function of specific tissues/organs.
 - It combines **tissue engineering** and **microfabrication** to control cell microenvironments and replicate organ-level physiology outside the body.
- **Components:** Comprises **microchannels**, porous polymeric membranes, and human cells.
- **Types:** Single-organ chips, Multi-organ/body-on-chip systems, and Parenchymal/mesenchymal-tissue chips.
- **Significance:**
 - Reduces dependence on animal testing,
 - Enables personalized medicine and disease modelling using human cells, and
 - Supports drug discovery, toxicity screening, and clinical trial design.
- **Challenges:** Difficulty replicating the full complexity and changing structure of organs (placenta evolves across gestation stages).
 - Scalability, standardisation, and regulatory validation for clinical use remain limited.

Mission Drishti and OptoSAR satellite

Mission Drishti, **world's first OptoSAR satellite** from an Indian space start-up **GalaxEye**, loses communication after a geomagnetic solar storm.

About Mission Drishti

- It is the first commercial **Earth Observation satellite** to carry both **Synthetic Aperture Radar (SAR)** and **Multi-Spectral Imaging (MSI)** sensors on a single platform.
- It is India's largest privately built satellite.
- **Benefits of OptoSAR Technology**
 - **Single-Pass Capture:** By capturing both SAR and MSI data streams simultaneously, the satellite removes the need to fuse data from separate sources.
 - **Analysis-Ready Data:** This single-pass method delivers an inherently aligned product that provides three times more information than standalone sensors
 - **All-Weather Reliability:** The combination of optical clarity and SAR allows for all-weather, day-and-night imaging capability, ensuring that cloud cover or darkness do not disrupt operations.

Battery Energy Storage System

A report released by the India Energy Storage Alliance (IESA) and Customised Energy Solutions (CES) projects that India will require 888 GWh of Energy Storage System (ESS) capacity by 2035–36, including 321 GWh of Battery Energy Storage Systems (BESS), to support rising electricity demand and renewable energy integration.

What is ESS?

- An Energy Storage System (ESS) stores energy when supply exceeds demand and releases it when required, ensuring reliable and uninterrupted power supply. It improves grid stability and facilitates large-scale integration of renewable energy.

Major Types of ESS

- Battery Energy Storage Systems (BESS)
- Pumped Storage Hydropower (PSH)
- Thermal Energy Storage
- Hydrogen-based Storage
- Compressed Air Energy Storage (CAES)

What is BESS?

- A Battery Energy Storage System (BESS) is an electrochemical device that converts electrical energy into chemical energy during charging and reconverts it into electrical energy during discharging. BESS is a subset of ESS.

Main Categories of Batteries

1. Traditional Rechargeable Batteries: Store chemical energy in solid metal electrodes. Examples: Lead-Acid, Lithium-Ion, Zinc-Air batteries.
2. Flow Batteries: Store chemical energy in liquid electrolytes contained in external tanks. Examples: Vanadium Redox Flow, Zinc-Iron Flow, Zinc-Bromine batteries.

Why is ESS/BESS Important?

- Rising Electricity Demand: India's peak electricity demand is expected to reach 300 GW next year.
- Renewable Energy Integration: As of January 2026, India's installed power generation capacity is 520 GW, of which 52.3% comes from non-fossil fuel sources. Since renewable energy is intermittent, storage systems are essential.
- Grid Stability: ESS provides ancillary services such as frequency regulation, voltage control, black start capability, reserve power and peak load management.
- Energy Security: Reduces renewable energy curtailment, improves grid reliability and supports India's clean energy transition and Net Zero goals.

Government Initiatives

- Production-Linked Incentive (PLI) Scheme by the Ministry of Heavy Industries to establish 50 GWh of Advanced Chemistry Cell (ACC) manufacturing capacity.
- Two Viability Gap Funding (VGF) schemes to support development of around 43 GWh of BESS.
- ESS recognised as an integral part of the power system and included in the Harmonised List of Infrastructure, improving access to long-term finance.

Value Addition

- ACC Batteries: High energy density, longer life, faster charging and improved safety.
- Black Start Capability: Ability to restore the power grid after a complete blackout without external power.
- Key Report Projections: ESS requirement – 888 GWh; BESS requirement – 321 GWh by 2035–36.

Quantum Advantage

Scientists from BITS Pilani, in collaboration with IBM Quantum, simulated the behaviour of subatomic particles using 120 qubits on an IBM quantum processor, demonstrating Quantum Advantage.

What is Quantum Computing?

- Quantum Computing is an advanced computing technology that uses the principles of Quantum Mechanics to solve problems beyond the capability of classical computers. Unlike classical computers that use bits (0 or 1), quantum computers use qubits, which can exist in multiple states simultaneously through superposition. Other key principles include entanglement (strong correlation between qubits) and quantum interference, enabling massive parallel computation.

Quantum Advantage

- It refers to the ability of a quantum computer to perform specific, practical computational tasks faster, more accurately, or more efficiently than the most powerful classical supercomputers. It differs from Quantum Supremacy, which merely demonstrates computational superiority on a particular task without necessarily having practical utility.

Applications

- Drug discovery, protein folding, Artificial Intelligence, optimization, financial modelling, climate modelling, advanced material discovery, cybersecurity, defence simulations, and Quantum Key Distribution (QKD) for ultra-secure communication.

Challenges

- Decoherence and noise reduce qubit stability and computational accuracy.
- Quantum error correction requires thousands of physical qubits to create one reliable logical qubit.
- Hardware requires cryogenic temperatures close to absolute zero.
- Indigenous fabrication of qubit-grade materials, cryogenic systems, and skilled manpower remains limited.
- Future quantum computers could threaten existing cryptographic systems, necessitating Post-Quantum Cryptography (PQC).

National Quantum Mission (NQM)

- Implemented by the Department of Science and Technology (DST) with an outlay of ₹6,003.65 crore (2023–2031).

Objectives

- Develop quantum computers with 50–1,000 physical qubits.
- Establish secure quantum communication infrastructure and inter-city QKD over 2,000 km.
- Develop multi-node quantum networks, quantum sensors, magnetometers, atomic clocks, and quantum materials for indigenous device fabrication.
- The Mission is implemented through four Thematic Hubs (T-Hubs)—Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices—following the Hub–Spoke–Spike model across premier institutions.

Significance:

- Quantum computing will strengthen India's technological sovereignty, cybersecurity, strategic capabilities, and innovation ecosystem, supporting initiatives such as Digital India and Atmanirbhar Bharat, while positioning India among the global leaders in frontier technologies.

Pinaka Long Range Guided Rocket (LRGR)

DRDO conducts successful flight-test of Pinaka LRGR for its user-specified minimum range of 60 km at the Integrated Test Range (ITR), Chandipur

About Pinaka LRGR

- Pinaka Long Range Guided Rocket is the guided version of the indigenous Pinaka multi-barrel rocket launcher (PMBRL) system which is an all-weather artillery rocket system.
 - PMBRL mission is to deliver a large volume of fire within a very short time against critical and sensitive area targets.
- **Designed by** Armament Research and Development Establishment (DRDO) with other DRDO labs.
- **Range:** 60-120km

Astra missiles

Indonesia became the first country that signed a pact to import India's ASTRA missiles (Astra Mk 1)

About Astra Missiles (Astra MK1)

- **Type:** beyond-visual-range air-to-air missiles' (BVRAAM) for airforce and navy
 - BVR missiles are those capable of engaging beyond the range of 20 nautical miles, or 37 km
- **Developed by** the Defence Research and Development Organisation (DRDO)
- **Features**
 - **Range** :80 to 110 km
 - **Altitude:** up to 20 km
 - **Speed:** Mach 4.5 (4.5 times the speed of sound)
 - **Capabilities:** inertial guidance, mid-course update and terminal active radar homing.

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Pandavani

The President and Prime Minister expressed grief over the demise of the renowned Pandavani singer Teejan Bai.

- Teejan Bai was the only person from Chhattisgarh to have been awarded the Padma Vibhushan.

About Pandavani

- Pandavani is a **traditional narrative folk-art** form that originates **Chhattisgarh**.
- Rooted in the ancient Indian epic, **the Mahabharata**,
 - Performances combine music, narration, dialogue, and dramatic acting.
- It has **two main styles**:
 - **Vedamati**: The narrator, known as the Vedamati, recites the stories playing the musical instrument called the “Bhumbo,” a stringed instrument.
 - **Kapalik**: It involves a solo performance where the artist not only narrates but also enacts the different characters of the epic.

Changpa Community

The Ladakh administration has taken measures to strengthen the Pashmina value chain and enhance the livelihoods of the Changpa pastoral community.

About Changpa

- A **semi-nomadic pastoral community** inhabiting the **Changthang Plateau** of Ladakh.
- Primarily inhabit the **Changthang Cold Desert Wildlife Sanctuary**.
- Rear the indigenous **Changthangi (Changra)** goats, which produce the world-famous **Pashmina (cashmere) wool**.
- Practise **seasonal transhumance** and also rear **yaks and sheep**.
- Recognised as a **Scheduled Tribe (ST)** in India.
- Custodians of Ladakh's high-altitude pastoral ecosystem and traditional Pashmina heritage.

TribeX

Ministry of Tribal Affairs launched TribeX.

About TribeX

- It is a **first-of-its-kind** digital learning platform for India's tribal art, culture and traditional knowledge systems.
- **Objective**: To develop a comprehensive platform that facilitates structured learning, scholarly research, and digital documentation of tribal art forms and cultural practices.
- It offers five UGC-recognized one-year hybrid diploma programmes, including courses in tribal languages Santali (Ol Chiki).

Prambanan Temple

India will assist in the conservation and restoration of the over 1,000-year-old Prambanan Temple in Indonesia.

About Prambanan Temple

- It is an over 1,000-year-old ancient complex located near Yogyakarta on Indonesia's Java Island.
- It is currently the largest Hindu temple complex in Indonesia.
- **Built by** the Ruler of Sanjaya vamsha (dynasty).
- **Heritage Status:** The complex is a UNESCO World Heritage Site
- **Dedicated Deities:** It is dedicated to the Hindu Trinity, specifically Lord Shiva, Lord Vishnu, and Lord Brahma
- **Artistic Features:** The temple is renowned for its intricate stone reliefs that depict the Indonesian version of the Ramayana epic.

Safety and sustainability of Roads in India

The Ministry of Road Transport and Highways (MoRTH) released the **Road Accidents in India 2024 report**, highlighting rising road accidents and fatalities, emphasizing the need for safe, sustainable, and technology-driven road infrastructure.

Road Safety as a concern in India

- India accounts for **11% of global road fatalities with just 1% of the world's vehicles** (World Bank).
- In 2024, India recorded **485 road deaths per day**, exceeding the 10-year average (MoRTH).

Technological Solutions for Safer Roads

- **Vehicle-to-Vehicle (V2V) Communication:** Shares real-time vehicle data to prevent collisions.
- **Automated Incident Detection:** Enables faster emergency response to crashes and breakdowns.
- **Intelligent Transport Systems (ITS):** AI-enabled CCTV, Advanced Traffic Management Systems, and automated incident detection.
- **AI-based Surveillance:** Detects traffic violations and accidents in real time.
- **Speed Detection Systems:** Identify over-speeding and enable e-challans.

Key Measures for sustainable roads

- **Green Construction:** Use of waste plastic, fly ash, and industrial slag in highway construction.
- **Green Engineering:** Conserves natural resources and reduces industrial waste.
- **Global Best Practices:** Netherlands (solar roads), Germany (eHighways), Sweden (dynamic wireless charging roads), and Norway (EV highway charging networks) showcase innovative models for sustainable and energy-efficient road infrastructure.

Defence Acquisition Council

Defence Acquisition Council (DAC) approves capital acquisition for the procurement several weapon systems.

- **DAC (chairman: Defense Minister)** gives 'in principle' approval to Capital acquisitions in the Long Term Perspective Plan and Grants acceptance of necessity for acquisition proposals.

Key Weapon System Approved

- **AKASH TARANG:** Anti-Unmanned Aerial Vehicles (UAV) Electronic Warfare System for the Indian Army.
 - Unlike hard kill it just **disrupts the frequency, jamming GPS/GNSS and severs communication (soft kill)** between the drone and operator.
- **Medium Range Surface-to-Air Missile (MR-SAM):** Developed by Israel Aerospace Industries and DRDO with **range over 70 km** and is based on the Barak-8 missile.
- **Very Short Range Air Defence System (V-SHORADS):** To neutralize **low altitude aerial threats** at short ranges.
 - It is an indigenously developed **Man Portable Air Defence System**.

Shift towards Whole-of-Government Approach in Governance in India

Whole of Government (WoG) approach refers to a mode of governance where **different government departments & ministries work together** (rather than in silos) to **achieve shared goals** that no single agency can tackle alone.

- E.g. climate change, poverty etc.

Key Benefits of WoG Approach

- **Enhanced Policy Coherence:** It ensures that different departments are not working at cross-purposes, leading to more consistent governance.
 - E.g. new highways are often dug up soon after construction to lay optical fiber cables.
- **Improved Efficiency and Effectiveness:** Streamlined processes and integrated service delivery reduce redundancy and optimize resource allocation.
 - E.g. **POSHAN Abhiyaan** brings together > 26 ministries to tackle malnutrition as it cannot be solved by food alone but requires clean water, immunization etc.
- **Resource Optimization:** Pools financial, human, and technological resources, which reduces delays, cost overruns and allows sharing of knowledge.
- **Increased Public Trust:** Instead of citizens navigating multiple departments for approvals, integrated platforms provide single-window solutions.
 - E.g. **Jan Samarth portal** integrates 13 credit-linked government schemes from various ministries onto one digital platform.
- **Rapid Crisis Response:** As demonstrated during the **COVID-19 pandemic**, a WoG approach allows for a unified and timely response to national emergencies.
- **Others:** Reduces duplication, enhances transparency and accountability, etc.

Key Initiatives taken in India

- **PM GatiShakti National Master Plan:** Integrates 44 Central Ministries and 36 States/UTs for infrastructure planning.
- **India Stack:** Integration of foundational digital public infrastructure, such as Aadhaar, UPI, DigiLocker represents WoG in digital service delivery.
- **PRAGATI Platform:** Implemented by Prime Minister's Office, it removes administrative silos by involvement of various government agencies for expeditious project implementation.

National SC-ST Hub (NSSH) Scheme

The National SC-ST Hub (NSSH) Scheme is a focused initiative designed to empower entrepreneurs from Scheduled Castes and Scheduled Tribes.

About NSSH Scheme

- **Launched:** In 2016 under the **Ministry of Micro, Small and Medium Enterprises (MSME)**.
- **Implementing Agency:** National Small Industries Corporation (NSIC).
- **Objectives:**
 - Provide professional support to SC/ST entrepreneurs.
 - Designed to help SC/ST enterprises meet the **mandatory 4% procurement sub-target** under the **Central Government Public Procurement Policy for MSEs, 2012**.
 - Promote adoption of best business practices.
 - Leverage opportunities under the Stand-Up India initiative.

Regional Connectivity Scheme (RCS) – Modified UDAN Launched

Approved by the Union Cabinet on 25 March 2026, the scheme aims to accelerate aviation-led development and advance the vision of **Viksit Bharat 2047**.

Modified UDAN (Ude Desh Ka Aam Nagrik) Scheme

- **Duration:** 10 years (FY 2026–27 to FY 2035–36)
- **Outlay:** ₹28,840 crore
- **Key Components:**
 - **Development of Aerodromes (CAPEX):** Develop 100 airports from existing unserved airstrips.
 - **Operation & Maintenance (O&M) support:** For 3 years for ~441 RCS-only aerodromes.
 - **Development of 200 Modern Helipads:** In hilly, remote, island and aspirational regions to improve last-mile connectivity and emergency response.
 - **Viability Gap Funding (VGF):** ₹10,043 crore support over 10 years for airline operators to sustain regional routes.
 - **Atmanirbhar Bharat Aviation:** Promote indigenous aircraft procurement (**HAL Dhruv helicopters and HAL Dornier aircraft**) to strengthen aviation capacity in remote and difficult terrains.

About UDAN Scheme

- **Launch:** October 2016 (Conceptualised under **National Civil Aviation Policy (NCAP) 2016**)
- **Type:** Central Sector Scheme.
- **Ministry:** Ministry of Civil Aviation
- **Implementing Agency:** The Airports Authority of India (AAI).
- **Objective:** Democratize aviation by **making flying accessible and affordable** and strengthening connectivity to Tier-2 and Tier-3 cities.
- **Achievements:**
 - **669 routes** operationalised across **95 airports, heliports and water aerodromes**, benefitting over **1.66 crore passengers**.
 - **₹4,593.28 crore** disbursed as **Viability Gap Funding (VGF)**.
 - Contributed to the expansion of India's airport network from **74 (2014)** to **159 (2024)**.

National Action Plan for Drug Demand Reduction

The Ministry of Social Justice and Empowerment has launched the **National Action Plan for Drug Demand Reduction**.

About National Action Plan for Drug Demand Reduction

- A comprehensive national framework for **drug demand reduction**.
 - Over 7 crore people in India affected by substance use disorder (2019 survey).
- Focuses on **prevention, awareness, capacity building, treatment, rehabilitation and social reintegration**.
- Forms the policy framework for the **Nasha Mukta Bharat Abhiyaan (2020)**.
- Supports **NGOs, Integrated Rehabilitation Centres for Addicts (IRCAs), and Community-based Peer-led Interventions (CPLI)**.
- Promotes **research, training, IEC activities and livelihood support**.
- Adopts a **whole-of-government and whole-of-society** approach.

Online Child Sexual Exploitation and Abuse

Government issues notice to Meta to Prevent Online Child Sexual Exploitation and Abuse The Ministry of Electronics and Information Technology directed Instagram to disable all ads and content facilitating access to child sexual exploitative and abuse material (CSEAM).

- **Online Child Sexual Exploitation and Abuse (OCSEA)** involves the use of information and communication technology as a means to sexually abuse and/or sexually exploit children.

Types of OCSEA

- **Online Grooming:** Building trust with a child online to facilitate sexual exploitation or abuse.
- **CSEAM:** Creation, possession, sharing, or distribution of images/videos depicting child sexual abuse.
- **Sextortion:** Coercing or blackmailing a child using intimate images or videos.
- **Online Enticement/Solicitation:** Persuading or coercing a child to engage in sexual conversations or activities.
- **Others:** Live-streaming Child Sexual Abuse, Online Trafficking and Recruitment, Exposure to Harmful Sexual Content, Identity Theft and Impersonation.

Steps to be taken to Prevent Online Child Abuse

- **Strengthen Legal Enforcement:** Of POCSO Act, IT Act, and SC judgements.
 - E.g. **Just Rights for Children Alliance v. S. Harish (2024)** held that possession and circulation of CSEAM is punishable under the POCSO and IT Act.
- **Sex Education:** Introduce age-appropriate sex education focusing on consent, online safety, and digital ethics.
- **Awareness and Prevention:** Conduct nationwide campaigns on child protection, cyber safety, and POCSO provisions.
- **Early Intervention:** Identify at-risk children and youth and provide timely counselling and behavioral support.
- **Victim Support:** Expand psychological counselling, rehabilitation, and educational assistance for survivors.

Initiatives taken by India

- **POCSO Act, 2012:** Section 15 criminalizes the storage and possession of CSEAM.
- **Information Technology Act, 2000 (Amended 2008):** Section 67B criminalizes publishing, browsing, transmitting, or collecting child sexual abuse content electronically.
- **IT Rules, 2021:** Mandate social media intermediaries to proactively identify, remove, and block access to CSEAM.
- **Juvenile Justice Act, 2015:** Provides care, protection, and rehabilitation for children vulnerable to sexual exploitation.
- **UN Convention on the Rights of the Child (1989):** India's ratification reinforces commitments to protect children from online and offline sexual exploitation.

EAC-PM Report on Unconditional Cash Transfer to Women

An analysis by the **Economic Advisory Council to the Prime Minister (EAC-PM)** evaluates the **socio-economic impacts of cash transfer schemes (in Maharashtra and Odisha) to women** with annual family income below Rs 2.5 lakh.

- **Majhi Ladki Bahin Yojana (Maharashtra):** Provides a monthly direct benefit transfer of Rs 1,500 (Rs 18,000 annually) to eligible women aged 21 to 65.
- **Subhadra Yojana (Odisha):** Provides a biannual transfer totaling Rs 10,000 per year to eligible women aged 21 to under 60.

Key Findings of Report

- **Financial Security:** Significantly increased **women's savings** (up 84% in Maharashtra and 45% in Odisha) and **monthly spending** (up 46% and 28%, respectively).
- **Financial Autonomy:** E.g. Odisha's Subhadra yojna led to spending decisions **independent of family's financial status**.
- **Financial Inclusion:** Accelerated **use of digital platforms** e.g. UPI due to direct bank transfers.
- **Spending Quality:** Women used the extra income to upgrade their spending **toward welfare-improving categories** like lifestyle, healthcare, and education.

Policy Recommendations by EAC-PM

- **"Cash-Plus" Framework:** Combining the financial support with **capacity-building, digital literacy, and linkages to Self-Help Groups (SHGs)**.
- **Strengthen Targeting:** Ensuring no deserving woman is excluded while removing ineligible users.
- **Moving toward outcome-based transfers:** Such as children's nutrition-based outcomes.
- **Periodic Review:** To align with inflation and evolving **household expenditure patterns**.

Issues Related to Unconditional Cash Transfer

- **Limited Impact:** As cash transfers alone may not be sufficient to transform **"entrenched gender norms"**.
- **Fiscal strain:** State's combined public debt stood at **23.27% of GSDP** while total liabilities reached **27.89% of GSDP**.
- **Gaps in Digital Literacy and Infrastructure:** E.g. Jan Dhan-Aadhaar-Mobile can act as a barrier to receiving benefits as **only 38% of households are digitally literate**.

UDISE+ 2025-26 report

The Ministry of Education has released the Unified District Information System for Education Plus (UDISE+) Report 2025–26, highlighting improvements in teacher availability, enrolment, retention, school infrastructure, and gender parity in India's school education system.

About UDISE+

- The Unified District Information System for Education Plus (UDISE+) is India's Educational Management Information System (EMIS), managed by the Department of School Education & Literacy, Ministry of Education. It serves as the country's official school education database, covering approximately 14.67 lakh schools, 24 crore students, and 1.02 crore teachers. The platform enables schools to digitally upload data on infrastructure, student enrolment, teacher profiles, and school facilities, providing reliable evidence for educational planning, policy formulation, monitoring, and implementation.

Key Highlights of the Report

- **Teacher Strength:** The number of teachers exceeded 1.02 crore, registering an 8.3% increase over 2022–23.
- **Pupil–Teacher Ratio (PTR):** Improved across all stages—10:1 (Foundational), 12:1 (Preparatory), 17:1 (Middle), and 21:1 (Secondary), well below the NEP 2020 benchmark of 30:1.
- **Lower Dropout Rates:** Dropout rates declined to 1.8% at the preparatory stage (from 2.3%) and 7.0% at the secondary stage (from 8.2%).
- **Higher Student Retention:** Retention improved to 83.7% at the middle stage and 51.9% at the secondary stage.
- **Improved Gross Enrolment Ratio (GER):** Secondary GER increased from 68.5% (2024–25) to 71.7% (2025–26).
- **Better School Infrastructure:** Schools with computer facilities increased from 64.7% to 69.9%. Additionally, 95% of schools have electricity, while 98.5% have separate girls' toilets.
- **Greater Gender Inclusion:** Women constitute 54.9% of the teaching workforce, while girls account for 48.4% of total enrolment. The Gender Parity Index (GPI) remained above 1 at all educational levels, indicating proportionately higher participation of girls than boys.

Significance

The report demonstrates steady progress in improving the quality, accessibility, and inclusiveness of school education in India. Better teacher availability, improved infrastructure, reduced dropout rates, and enhanced gender parity contribute to stronger learning outcomes and human capital formation. The findings also support the achievement of SDG 4 (Quality Education) and SDG 5 (Gender Equality) while providing a robust evidence base for implementing the National Education Policy, 2020.

Important Terms

Gross Enrolment Ratio (GER)

- Ratio of total enrolment in a level of education (irrespective of age) to the population of the official age group corresponding to that level.
- GER can exceed 100% due to over-age or under-age enrolment.

Pupil–Teacher Ratio (PTR)

- Average number of students per teacher in a school or education system.
- A lower PTR generally reflects better classroom attention and improved learning outcomes.

Gender Parity Index (GPI)

- Ratio of GER of girls to GER of boys.
- GPI = 1: Equal participation.
- GPI > 1: Higher participation of girls.
- GPI < 1: Higher participation of boys.

All India Survey on Higher Education (AISHE)

The report collects information from **Higher Education Institutions (HEIs) on enrolment, faculty, infrastructure, and examination outcomes to support evidence-based policymaking.**

About AISHE

- The Annual Survey of Higher Education (AISHE) is the official database of India's higher education sector, conducted annually by the Ministry of Education (Department of Higher Education) since 2010–11. It collects self-reported and voluntary data from Higher Education Institutions (HEIs) on enrolment, faculty, infrastructure, courses and examination outcomes through the AISHE portal. The survey provides reliable statistics for evidence-based policymaking, monitoring the implementation of National Education Policy (NEP) 2020, and assessing progress towards SDG-4 (Quality Education).

Key Findings (2023–24)

- Gross Enrolment Ratio (GER): Increased from 23.7 (2014–15) to 30.0 (2023–24), indicating improved access to higher education. GER measures the proportion of students enrolled in higher education to the 18–23 years population.
- Female GER: Rose from 22.9 to 31.2, surpassing the overall GER and reflecting greater participation of women.
- Gender Parity Index (GPI): Stood at 1.08 in 2023–24. Female GER has exceeded male GER for seven consecutive years, indicating significant progress towards gender equality.
- Social Inclusion: Compared to 2014–15, enrolment increased by 51.4% for SCs (69.72 lakh), 75.7% for STs (28.83 lakh—the highest growth) and 60.2% for OBCs (1.80 crore), reflecting improved access for disadvantaged groups.
- STEM Education: Women's share in Science, Technology, Engineering and Mathematics (STEM) increased from 38.4% to 44%, promoting gender diversity in innovation and research.
- Faculty Strength: Total faculty reached 17.32 lakh, with 55.1% male and 44.9% female teachers.

Key Government Initiatives

- Higher Education Financing Agency (HEFA): Funds infrastructure development in higher educational institutions.
- Institutions of Eminence (IoE) Scheme: Supports globally competitive universities.
- Anusandhan National Research Foundation (ANRF): Strengthens research, innovation and industry-academia collaboration.
- PM Vidyalaxmi Scheme and Central Sector Interest Subsidy Scheme (CSIS): Improve access to higher education through education loans and interest subsidies.

Value Addition

- Despite steady improvements, challenges such as regional disparities, faculty shortages, research quality and employability persist. Strengthening NEP 2020, increasing public investment, improving accreditation, promoting digital learning and expanding research funding through ANRF are essential for building a globally competitive higher education system.

The Global Status Report on Cancer 2026

The World Health Organization (WHO) and the International Agency for Research on Cancer (IARC) released the first-ever global survey of people affected by cancer, highlighting the rising health, economic and social burden of cancer and the urgent need for equitable cancer care.

Key Findings

- **Global Burden:** Cancer accounts for 20.6 million new cases and nearly 10 million deaths annually, making it the second leading cause of death globally after cardiovascular diseases.
- **Future Projection:** Annual cancer cases are projected to increase to around 35 million by 2050, driven by population growth, ageing and lifestyle-related risk factors.
- **Leading Killer:** Lung cancer remains the leading cause of cancer-related deaths worldwide.
- **Regional Burden:**
 - Asia bears the largest burden, accounting for 50.7% of global cancer cases and 56.5% of global cancer deaths.
 - Europe records 21% of global cancer cases despite having only 9% of the world's population, indicating a disproportionately high disease burden.
- **Financial Burden:** Around 45% of surveyed patients reported severe financial hardship, with many households facing catastrophic health expenditure and medical bankruptcy.

Major Challenges

- **Systemic Gaps:** Political commitments are often not matched by adequate domestic health financing. Many countries continue to follow fragmented, cancer-specific programmes instead of integrated national cancer control strategies, accompanied by weak monitoring and accountability.
- **Health Inequality:** The 5-year survival rate for breast cancer is 87% in high-income countries, compared to only 42% in low-income countries, reflecting disparities in diagnosis, treatment and healthcare access.
- **Limited Prevention:** Coverage of the first dose of Human Papillomavirus (HPV) vaccine among girls is only 31%, far below the WHO target of 90% by 2030 under the Global Strategy for Cervical Cancer Elimination.

Key Recommendations

- **Promote Public–Private Partnerships (PPPs)** to leverage private-sector expertise while governments strengthen national cancer control programmes.
- **Adopt a People-Centred Cancer Control Agenda** based on three pillars: Better Capabilities (health workforce and infrastructure), Better Protection (financial and social protection), and Better Value (evidence-based research and cost-effective interventions).
- **Strengthen multilateral cooperation** through international collaboration, equitable access to cancer prevention and treatment, and sustained political and financial commitments.

Value Addition

- **IARC**
 - Established: 1965
 - Headquarters: Lyon, France
 - Specialized cancer research agency of the WHO.
- **WHO Cervical Cancer Elimination Targets (90–70–90 by 2030):**
 - 90% girls fully vaccinated against HPV by age 15.
 - 70% women screened by ages 35 and 45.
 - 90% women with cervical disease receive appropriate treatment.

Performance Grading Index

The Ministry of Education released the Performance Grading Index 2.0 for States/UTs (PGI-S) and Districts (PGI-D) reports for 2025-26.

About Performance Grading Index

- **Objective:** Developed to evaluate school education systems and drive state and district-level systemic improvements.
- **PGI-S (States/UTs):** Grades performance out of 1,000 points across 70 indicators comprising **six domains**:
 - Learning Outcomes and Quality,
 - Access,
 - Infrastructure & Facilities,
 - Equity,
 - Governance Processes, and
 - Teachers Education & Training.
- **PGI-D (Districts):** Evaluates districts out of 600 points across 70 indicators which are **grouped under 6 categories viz.**, Outcomes, Effective Classroom Transaction, Infrastructure Facilities & Student Entitlements, School Safety & Child Protection, Digital Learning and Governance Process.

ULLAS (Understanding Lifelong Learning for All in Society)

Uttarakhand has become the **sixth fully literate state** under the National Education Policy (NEP) 2020 and the 'ULLAS' (Understanding Lifelong Learning for All in Society) scheme.

- Uttarakhand joins Mizoram, Goa, Tripura, Himachal Pradesh and Sikkim.

About ULLAS Scheme:

- It is a **centrally sponsored initiative** that aligns with the National Education Policy (NEP) 2020.
- **Implementation Period:** 2022-2027.
- **Vision:** To make Bharat –‘Jan Jan Saakshar’. The scheme is based on the spirit of ‘Kartvya Bodh’ (DUTY) and is being implemented through volunteerism.
- **Objective:** To cover **non-literates of the age group of 15 years and above** in all States/UTs.
- **Target:** to provide Foundational Literacy and Numeracy to 5 crore learners, with 1 crore learners per year by using Hybrid Mode.