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ECONOMIC DEVELOPMENTS

New CPI Framework for Inclusive Price Indexing

The **Ministry of Statistics and Programme Implementation** has proposed major changes to the **Consumer Price Index (**CPI**) methodology** to make the **housing index** more representative.

- In the **existing** CPI, housing is weighed **at 21.67%** in urban areas and **10.07%** at the **all-India level**.
- However, the current index considers **only urban housing data** and, in many cases, uses government employees' **House Rent Allowance (HRA)** as a **proxy** for rent.
- Economists have long argued that this system fails to reflect **real rental market conditions**, especially in smaller towns and **rural areas**.

Key Proposed Changes:

1. Inclusion of Rural Housing Data

- The revised CPI will now compile housing inflation for **both rural and urban sectors**, a shift from the current series, which **only includes** urban data.
- This is based on the Household Consumption Expenditure Survey (HCES) 2023-24, which captures rent data for rural areas, including imputed rent for owner-occupied homes.

2. Exclusion of Employer-Provided Dwellings

- Rents for **government** or **employer-provided accommodation** will be **excluded** as they distort real rental trends.
- In such cases, HRA is based on **pay grade**, **not market value**, leading to **non-representative inflation readings**.

3. Monthly Rent Data Collection

- **Monthly** data collection will **replace the current six-monthly cycle**, improving accuracy and responsiveness to price changes.
- Rent data will now be gathered from all selected dwellings each month, instead of **only one-sixth** of the sample.

4. Expanded Sample and IMF Consultation

- Methodological improvements follow **technical advice from IMF experts**, recommending broader panel-based rent tracking.
- The new approach will ensure consistent month-to-month comparability and **minimise biases** in **price change calculations**.

New Guidelines for Underground Coal Gasification

- The **Ministry of Coal** has released **the Draft Guidelines** for **Mining and Mine Closure Plan** for Underground Coal and Lignite Gasification (UCG) Blocks, 2025.

Key Provisions of the Draft Guidelines

- A pilot **feasibility study** by an **accredited institution is mandatory** before project approval, assessing technical, environmental, and risk parameters.

- **Environmental Safeguards:** Target seams should lie **below 300 metres** in **low-permeability strata**, ensuring a safe distance from aquifers and **excluding seismic** or eco-sensitive zones.
- Gasification must focus on **optimal syngas output**, minimal waste, and sustainable resource use.

- **Financial Accountability**: A **mine closure fund** must be deposited in an **escrow account** before operations begin.

- **Base contribution:** ₹50,000 per hectare, indexed to the **Wholesale Price Index (**WPI**)**.
- Up to **75% of funds** may be released after verified progressive closure; non-compliance could result in licence forfeiture or revocation.

- **Institutional Oversight:** The **Coal Controller Organisation** will evaluate and approve projects, supported by a Technical Committee comprising experts from the Ministry of Coal, the DGMS, and the Ministry of Petroleum and Natural Gas.

The **Secretary (Coal)** will act as the **appellate authority** for grievances.

Deendayal Antyodaya Yojana – National Rural Livelihood Mission (DAY-NRLM)

- The DAY-NRLM implemented by the **Ministry of Rural Development** is among the world's largest poverty eradication and livelihood promotion programmes.
- Launched in 2011 (restructured from the **Swarnajayanti Gram Swarozgar Yojana**), it was renamed in 2016 to honour Pandit Deendayal Upadhyaya's Antyodaya philosophy, uplifting the poorest of the poor.
- The mission aims to organise rural households, especially women, into Self Help Groups (SHGs) to achieve financial inclusion, livelihood diversification, and social empowerment.
- It is a **Centrally Sponsored Scheme** with funding shared between the Centre and States at a **75:25** ratio, and at a 90:10 ratio for North Eastern and Special Category States.

How DAY-NRLM is Empowering Rural Communities Across India?

- Mass Mobilisation: Over 10 crore rural women have been **organised into 90 lakh SHGs**.

- Financial Empowerment: SHGs have accessed ₹11 lakh crore in collateral-free loans, with a repayment rate exceeding 98% (Ministry of Rural Development, 2025).
- Community Workforce: Nearly 3.5 lakh **Krishi and Pashu Sakhis** and **48,000 Bank Sakhis** are active nationwide, delivering doorstep financial and livelihood services.
- Market Integration: **SARAS Aajeevika Melas** provide market linkages for SHG products, supported by the National Institute of Rural Development and Panchayati Raj through branding and marketing.

Livelihood Diversification:

- Agriculture: Around 4.62 crore Mahila Kisans (women farmers) trained in sustainable practices
- Entrepreneurship: Over 3.7 lakh microenterprises supported through the **Start-up Village Entrepreneurship Programme (SVEP)** in food processing, handicrafts, and services.
- Skill Development: 17.5 lakh youth trained and 11.48 lakh placed in wage employment through **Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY),** and 56.69 lakh youth trained, with 40.99 lakh settling in self-employment ventures through **Rural Self Employment Training Institutes (RSETIs).**

Gender Disparity in the Informal Labour Market

- Despite India's rising female workforce participation rates (FWPR), particularly in the informal and agricultural sectors, women continue to face deep structural inequalities.

Inequalities Faced by Women in the Informal Sector

- **Wage Gap:** Women's wages are **30–40%** lower than men's (PLFS 2023).
- **Job Insecurity:** Absence of contracts leaves workers vulnerable to dismissal without notice. E.g. **90% of informal women** lack written contracts (ILO 2022).
- **Limited Mobility:** Safety concerns and social norms limit travel to better jobs. E.g. **70% rural women** prefer workplaces within a **5 km radius** (NCAER 2021).
- **No Social Security:** Informal status denies access to pensions, insurance or maternity benefits. E.g. Just **12%** have any form of social protection (SIDBI 2023).

Way Forward

- **Wage Parity:** Enforce equal pay audits across sectors. E.g. **Iceland's pay-equality certification model**.
- **Micro-Credit:** Expand Mudra Yojana and DAY-NRLM **SHGs** for financial autonomy. E.g. **Bangladesh's Grameen model** for rural credit.
- **Social Protection:** Integrate women into E-Shram and the Social Security Code 2020.
- **Child-Care Support:** Strengthen the Palna Scheme for working mothers. E.g. **Nordic subsidised childcare** improves female retention.

- **Safe Mobility:** Develop safe public transport under the Nirbhaya Fund.
- **Market Linkages:** Link SHGs to ODOP and FPO clusters for formal value chains. E.g. **Kerala's Kudumbashree** success in local marketing.

India's Technological Future

- Union Minister Piyush Goyal stressed that India must shift from digital adoption to technological creation, cutting reliance on foreign inputs and achieving deeptech-led sovereignty.

India's Dependence on Foreign Technology

- **Electronics:** Over **65 % of chips** and **80 % of high-end components** are imported (MeitY 2024).
- **Defence Systems:** Around **60 %** of India's defence equipment depends on foreign OEMs (SIPRI2023).
- **Renewable & EV Sectors:** **90 % of solar wafers** and **70 % of Li-ion cells** come from China.
- **Pharma Inputs:** **68 % of APIs** are still sourced abroad despite PLI efforts.
- **Consequences of Foreign Technology Dependence**
- **Economic Drain:** High import bills widen current-account deficit; **electronics imports > $70 bn** (2024).
- **Innovation Deficit:** Domestic firms rely on foreign patents. E.g. India holds **< 1 % of global AI patents**.
- **Employment Loss:** Value creation shifts abroad; limits high-skill job growth. E.g. Deeptech manufacturing employs **less than 2%** of India's tech workforce (NASSCOM, 2023).
- **Digital Sovereignty Risk:** Dependence on foreign software & cloud systems threatens data autonomy. E.g.: **Over 75% of India's cloud infrastructure** is operated by U.S. firms (IDC, 2024).

Way Forward

- **Deeptech Push:** Strengthen India's innovation base in AI, quantum, and semiconductors through targeted funding. E.g. **₹1 lakh crore** Anusandhan Fund **(2025)** to promote deeptech R&D.
- **R&D Incentives:** Raise national R&D spending and incentivise private innovation through fiscal benefits. E.g. **Israel's Innovation Authority Model** offers up to 50% R&D cost-sharing.
- **Chip Independence:** Localise semiconductor design and fabrication to reduce import reliance. E.g. India Semiconductor Mission (2021) provide $10 billion incentive scheme.
- **Skill Pipeline:** Build world-class talent in STEM and retain researchers through global collaboration. E.g. VAIBHAV Summit & **SERB Overseas Fellowship** for diaspora scientists.
- **Startup Boost:** Support early-stage deeptech ventures through risk capital and mentorship. E.g. **Startup Fund of Funds 2.0** focused on indigenous technologies.

Seed Processing Plants

- The National Seeds Corporation's (NSC) advanced seed processing plants were inaugurated in New

Delhi and five other locations — Bareilly, Dharwad, Hassan, Suratgarh, and Raichur.

- The **Seed Management 2.0** system with an online seed booking platform for farmers was also launched.
- **Objective:** The new facilities aim to improve seed quality and ensure a nationwide supply of high-quality seeds to farmers, while the digital platform offers greater transparency and accessibility.

NSC: *Established in 1963, it is a **Schedule 'B' Mini Ratna Category-I** company under the Ministry of Agriculture and Farmers' Welfare. It plays an important role in the production and supply of quality seeds across the country.*

Rise in Private Sector Project Announcements

- Recent data from the Centre for Monitoring Indian Economy **(CMIE)** show **private sector project announcements** reached a **15-year high** in the **first half** of **FY 2025–26**, while government and foreign companies' announcements declined sharply.
- *The CMIE is a **Mumbai**-based independent think tank founded in **1976** that **conducts independent surveys** on employment, consumption, and business activity to provide insights into the Indian economy.*

Key Trends from CMIE Data

- **Private Investment:** Private sector projects totalling ₹9.95 lakh crore were announced, showing a **30.4% increase** compared to last year, marking the **second-highest** investment level for a half-year in 15 years.
- **Domestic Share:** Indian firms accounted for **94% of the total project value**, indicating strong confidence and capital mobilisation among domestic investors.
- **Government Slowdown:** Central and State government project proposals declined to ₹1.51 lakh crore, a **71% drop**, reaching their **lowest in at least 15 years**.
- **Foreign Investment:** Foreign announcements fell to ₹0.6 lakh crore, a **28% year-on-year decline** and a five-year low. This also signifies the third consecutive half-year decline in foreign investment proposals.
- **Global Contrast:** According to UNCTAD, **global** FDI **increased by 11%** in 2024, indicating that the decline in India's foreign initiatives is due to country-specific investor caution.

World's First $5 Trillion Company

- **Nvidia**, the AI chipmaker, has become the world's first company with a **market capitalisation of $5 trillion**.
- It is a leading designer of **graphics processing units (**GPUs**)**, which are essential for **Large language models (**LLMs**)** and data centres.
- Nvidia is partnering with **Nokia** on **AI 5G–6G networks** and with the US government to

build **seven AI supercomputers**, reflecting the growing global reliance on AI-driven computing.

*The **GPU** is a **chip with thousands of tiny processors** working simultaneously to generate images and videos. They also possess "**parallel processing**" capabilities to accelerate complex tasks such as AI and scientific research.*

Payments Regulatory Board

- The Reserve Bank of India has constituted a **six-member Payments Regulatory Board (PRB)** to oversee the functioning of payment systems in the country.
- **Composition:** The PRB is **chaired by the RBI Governor** and includes the Deputy Governor, the Executive Director of RBI, and three representatives nominated by the Central government.
- **Predecessor Body:** It replaces the Board for Regulation and Supervision of Payment and Settlement Systems (**BPSS**), which was a five-member RBI committee with no government representatives.
- **Legal Authority:** PRB derives its statutory powers from the **Payment and Settlement Systems Act 2007**.

Regulation of Payment Systems in India

- Payments and Settlement Systems Act, 2007, **empowers RBI** as the **apex regulator** to license operators, like National Payments Corporation of India (NPCI), to establish and operate payment systems.
- The NPCI functions as the umbrella organisation for **retail payment systems**, overseeing UPI and **RuPay platforms**.

PM-SETU Scheme

- PM Modi launched the **Pradhan Mantri Skilling and Employability Transformation through Upgraded ITIs** (PM-SETU) to enhance youth employability.
- PM-SETU is a **centrally sponsored scheme** aimed at **upgrading 1,000 Government** Industrial Training Institutes (ITIs) under a hub-and-spoke model for inclusive skill development.
- **Objective:** It seeks to make **Indian youth job-ready by aligning ITI courses** with current and emerging industry skill demands.
- **Nodal Ministry:** The **Ministry of Skill Development and Entrepreneurship** (MSDE) implements the scheme with support from state governments and industry partners.
- **Financing Structure:** With a total outlay of ₹60,000 crore, the project is co-financed by the World Bank and the Asian Development Bank.
- **Hub-and-Spoke Model:** This model includes **200 advanced "hub" ITIs** functioning as innovation and placement centres, connected to **800 "spoke" ITIs** for broader access.
- **Cluster Network: Each hub** will connect to an average of **four spokes**, **creating a cluster** with

advanced infrastructure and incubation facilities.
    - A cluster will be managed by a **Special Purpose Vehicle** (SPV) with an '**anchor industry partner**'.
- **Centres of Excellence: Five National Skill Training Institutes** at Bhubaneswar, Chennai, Hyderabad, Kanpur, and Ludhiana are being upgraded to Centres of Excellence.

Powering India's Green Transition

- India has launched the National Critical Mineral Mission (2025) to build self-reliance in the exploration, mining, and processing of rare earth and critical minerals that are vital for clean energy, electronics, and defence technologies.

Importance of Rare Earths and Critical Minerals:

- **Backbone of Modern Technology:** Power electronics, EVs, wind turbines, solar panels, and digital infrastructure.
- **Enabler of Green Transition:** Essential for achieving global climate targets and net-zero commitments.
- **Strategic Resource:** Critical for national defence, aerospace, and advanced communication systems.
- **Economic Driver:** Integral to the clean-tech value chain, boosting innovation and manufacturing competitiveness.

Difference between Rare Earth Elements (REEs) and Critical Minerals

Aspect	Rare Earth Elements (REEs)	Critical Minerals
Definition	17 metallic elements with similar properties, often found together	Broader group defined by economic importance & supply risk
Use	Magnets, lasers, EV motors, wind turbines	EV batteries, solar cells, semiconductors, defence equipment
Scope	Subset of critical minerals	Includes REEs + others like lithium, cobalt, nickel, graphite

Supply Risk	Highly concentrated (mostly China)	Varies across elements but globally vulnerable

India's Context and Climate Goals:

- India targets a **45% reduction in emissions intensity by 2030** and aims for **net-zero emissions by 2070**, aligning with global climate goals.
- To achieve this, India needs **secure access to critical minerals** for renewable energy, battery storage, and EV expansion.
- Although India ranks **5th globally in rare earth reserves**, it lacks large-scale refining, magnet, and downstream processing capacity.
- The **National Critical Mineral Mission (2025)** ensures supply chain security, industrial competitiveness, and strategic self-reliance.

Applications:

- **Renewable Energy:** Minerals like silicon, indium, and gallium power solar panels, while neodymium and dysprosium enable high-efficiency wind turbines.
- **Electric Vehicles & Storage:** Lithium, cobalt, and nickel are essential for lithium-ion batteries driving EVs and grid storage systems.
- **Electronics:** Copper, tungsten, and tin are vital for semiconductors, printed circuits, and microprocessors in high-tech manufacturing.
- **Defence & Aerospace:** Titanium and rare earth magnets are used in jet engines, missiles, and satellite communication systems.
- **Medical Equipment:** Critical minerals form components in MRI scanners, pacemakers, and diagnostic imaging technologies.

Challenges Associated

- **High Import Dependence:** Over 60% of the world's refining capacity lies in China, posing geopolitical and supply risks.
- **Technology Gaps:** India lacks advanced refining, metallisation, and magnet-making infrastructure to process critical minerals efficiently.
- **Environmental Concerns:** Mining and refining can cause soil and water pollution, demanding strict ecological safeguards.
- **Regulatory Delays:** Slow clearances and fragmented governance across agencies hinder timely project execution.
- **Funding & Skill Deficit:** Capital-heavy exploration and limited technical expertise slow innovation and industrial scalability.

Initiatives Taken

- **National Critical Mineral Mission (2025):** Aims for end-to-end value creation—exploration,

mining, processing, and recycling.

- **MMDR Act Amendment (2023):** Added 24 critical minerals for centralised auction and improved transparency in allocation.
- **KABIL JV:** Secured lithium assets in **Argentina** and partnered with **Australia** for strategic critical mineral collaborations.
- **Customs Duty Exemption (2025):** Reduces input costs for domestic processing and encourages industrial-scale refining.
- **Processing Parks & Recycling:** Promotes circular economy models and value addition across the mineral supply chain.

Way Ahead

- **Develop Domestic Value Chain:** Build capacity from exploration to magnet and battery component manufacturing.
- **Foster R&D & Startups:** Encourage innovation in refining, separation, and recycling technologies through targeted funding.
- **Diversify Imports:** Establish strategic partnerships with resource-rich nations to reduce overdependence on China.
- **Environmental Safeguards:** Enforce sustainable mining practices and strengthen recovery from secondary sources.
- **Policy Integration:** Align mineral strategy with Make in India, Green Hydrogen Mission, and energy transition policies.
- Critical minerals are the **foundation of India's green and digital economy**, linking climate goals with strategic autonomy. The mission represents a **shift from dependence to resilience**, ensuring long-term sustainability and technological leadership. By investing in exploration, innovation, and circularity, India can become a global hub for green-critical mineral value chains.

Maldives Becomes First to Impose Generational Tobacco Ban

- **Maldives** became the world's first country to enforce a **nationwide generational tobacco ban** under the **global Tobacco Endgame framework**.
- **Ban Scope:** The law applies to everyone born on or after **January 1, 2007**, covering all forms of tobacco for **both residents and tourists**.
- **E-Cigarette Ban:** It has also **fully banned** the import, sale, possession, and use of e-cigarettes and vaping products for **all age groups**.
- **Policy Framework:** The initiative is part of the **Tobacco-Free Generation (TFG) model** under the global Tobacco Endgame movement.
- **Global Alignment:** The policy aligns with the World Health Organization Framework Convention on Tobacco Control (**WHO FCTC**).

Tobacco Endgame Movement

- The Tobacco Endgame movement is a global public health initiative that aims to **eliminate commercial tobacco** products and usage permanently.
- It shifts the focus from '**controlling'** tobacco consumption **to actively** '**eliminating**' it.
- **Goal:** To achieve a '**tobacco-free**' world with **smoking prevalence below 5%** within a defined timeline.
- **Core Strategies:** Tobacco-Free Generation laws, reduced nicotine content, supply caps (sinking-lid), and higher excise taxes.
- **Participation:** **Maldives**, **New Zealand**, **United Kingdom**, Finland, Canada, Australia, Malaysia etc.
- **India** has **not yet** officially adopted a national "Tobacco Endgame" target.

World Health Organization Framework Convention on Tobacco Control (WHO FCTC)

- The WHO FCTC is a **legally binding**, **evidence-based** global treaty adopted to address the spread of the tobacco epidemic.
- **Adoption:** Adopted in **2003** and effective from **2005**, it was **WHO's first international health treaty**; **India** ratified it **in 2004**.
- **Objective:** To protect present and future generations from the health, social, environmental, and economic harms of tobacco.
- **Supplementary Protocol:** The **2012 Protocol to Eliminate Illicit Trade in Tobacco Products** combats smuggling through global tracking and tracing mechanisms.
- **Key Provisions of the WHO FCTC**
- **Demand Reduction:** **Higher taxes** and pricing policies (Article 6), large **health warnings** (Article 11), and a **total ban** on tobacco **advertising** and promotion (Article 13).
- **Second-hand Smoke:** Complete protection from second-hand smoke in **all indoor public areas**, workplaces, and public transport (Article 8).
- **Trade Regulation:** Eliminate illicit tobacco trade (Article 15) and prohibit tobacco **sales to or by minors** (Article 16).
- **Policy Safeguards:** Protect public health policies from **tobacco industry influence** (**Article 5.3**) and promote public awareness on tobacco harms (Article 12).

India's $30 Trillion Economy Projection

- According to the Commerce and Industry Minister, India is projected to become a **$30 trillion economy** within the **next 20-25 years**.
- India's GDP for FY 2024 stood at **$3.9 trillion**, while the U.S. GDP was **$29.2 trillion**, roughly eight times.
- The size of an economy is measured by its **Nominal Gross Domestic Product (**GDP**)**, the **total market value of goods** and **services produced in a year**, expressed in U.S. dollars for global

comparison.

Two key factors determine this figure:

1. **Nominal GDP growth** in rupee terms (domestic economic expansion).
2. **Rupee-dollar exchange rate**, which converts domestic value into global terms.

Historical Growth Patterns of India-

- Over the **past 25 years** (2000-2024), India's nominal GDP **grew at a CAGR of 11.9%,** and the **rupee depreciated** at a **CAGR of 2.7%**.
- Based on this trend, India could **reach $30 trillion by 2048** within 25 years, consistent with the ministry's forecast.
- However, in the **past 11 years** (2014-2025), Nominal GDP growth **slowed to 10.3%**, and **rupee depreciation** quickened to 3.1%.
- Under these conditions, India may **reach $30 trillion** only by 2055, nearly a decade later.

Factors Influencing the Projection-

- **Exchange Rate Volatility:** A **stronger rupee accelerates** progress toward the $30 trillion mark while **sustained depreciation** delays it.
- **Growth Moderation:** As economies mature, growth rates **tend to moderate**. India, however, remains at a stage where higher growth is still feasible and necessary.
- **Structural Reforms:** It will be **crucial to continue focusing** on **manufacturing**, **infrastructure**, **digital transformation**, and ease of doing business.
- **Inflation and Fiscal Health:** Maintaining **macroeconomic stability** and low inflation is essential to sustain long-term growth.
- As the analysis highlights, each **decade's performance matters**; even **minor shifts** in growth trajectory can lead to **large divergences** over time.

Food and Agriculture Organization (FAO) released The State of Food and Agriculture (SOFA) 2025 Report

- SOFA 2025 provides the most comprehensive analysis of how **human-driven land degradation impacts agricultural productivity, food security and ecosystem resilience**.

Key Highlights of Report

- **Land Degradation** is defined as a long-term decline in the land's ability to deliver essential ecosystem functions and services.
- It is driven by natural causes (soil erosion and salinization) and anthropogenic causes (deforestation, overgrazing, unsustainable cropping and irrigation practices etc.)

Impact of Land Degradation

- **Yield Loss:** For about 1.7 billion people, crop yields are 10% lower because of human-induced degradation.
- **Asian countries are the most affected** - both because of their accumulated degradation debt and their high population densities.
- **Productivity Loss: Total factor productivity growth,** which reflects technological advancement and efficiency improvements, has **declined since the 2000s**, particularly in the Global South.
- **Convergence with Food Security:** Globally, 47 million children under five years of age suffer from stunting live in hotspots where stunting overlaps with significant yield losses.
- **Ecosystem Impact:** Degradation affects all agricultural systems, **undermining livestock production** in rangelands and – through forest loss driven by agricultural expansion – **disrupting climate patterns and biodiversity**.

Policy Options for Sustainable Land Use

- **Regulatory Policies:** Land use zoning, deforestation bans, soil conservation mandates etc.
- **Incentive-based Policies:** Uses voluntary and flexible financial rewards for sustainable practices such as payments for ecosystem services.
- **Cross-compliance Mechanisms:** Link government subsidies or government support to adherence to environmental standards.
- **Land Degradation Neutrality (LDN) Hierarchy** of avoid > reduce > reverse land degradation.

International Migration Outlook 2025

- **Recently, the International Migration Outlook 2025 report has been released by the Organization for Economic Co-operation and Development (OECD).**
- **Major Findings**
- In 2023, 225 000 Indian citizens acquired the nationality of an OECD country.
- China and India continued to account for a third of all international students in OECD countries.

Emerging Science & Technology Innovation Conclave

- PM Narendra Modi inaugurated the **first Emerging Science, Technology and Innovation Conclave (ESTIC) 2025** at Bharat Mandapam, **New Delhi**.
- The PM also launched the **₹1 lakh crore Research, Development, and Innovation (**RDI**) Scheme Fund**.

ESTIC 2025

- The **ESTIC** has been established as an annual **flagship government event** in science and technology.
- **Objective:** It aims to foster **collaboration** among researchers, industry leaders, and young

innovators to strengthen India's **research and** innovation ecosystem.

- **Participation:** Over 3,000 delegates, including **Nobel Laureates**, eminent scientists, **global policymakers**, and representatives from **academia**, industry, and government, are participating.
- **Focus Areas:** The conclave emphasises **11 key areas**, including **Artificial Intelligence (**AI**)**, Quantum Science and Technology, Space Technologies, Bio-Manufacturing, and Semiconductor Design.
- **Innovation Milestones:** The PM highlighted that India's **R&D spending has doubled**, and **patent registrations** have **increased 17-fold** over the past decade.

RDI Scheme Fund

- The **RDI Scheme Fund** is a program launched by the Indian government to **encourage private sector investment** in **emerging and strategic sectors** through R&D **financing**.
- It offers **long-term low or zero-interest loans**, startup equity investments, and a **Deep-Tech Fund of Funds** for advanced technology projects.
- **Key Feature:** It functions through a **Special Purpose Fund (SPF)** managed by the **Anusandhan National Research Foundation (ANRF)**, which directs resources to **secondary fund managers** for distribution.

Enshittification

- The digital spaces that once symbolised freedom, creativity, and connectivity are increasingly seen as exploitative ecosystems prioritising profit over user experience.

Understanding Enshittification

- **Definition:** The term ***"enshittification"*** by technologist **Cory Doctorow** is the **deliberate worsening of digital platforms** to maximise profits, often by exploiting users.
- **Stages of Decay:** Platform benefits users **(growth phase)** → Platform prioritises advertisers **(monetisation phase)** → Platform exploits all for profit **(decline phase)**.

Symptoms of Enshittification

- **Ad Saturation:** Excessive unskippable ads and paywalls replacing once-free experiences. E.g. YouTube Premium and Netflix ad tiers (2024).
- **Algorithmic Manipulation:** Prioritising viral or paid content over authentic connections. E.g. Instagram's algorithm now favours reels over user posts.
- **Self-Preferencing:** Tech giants promote their own content or products over competitors. E.g., Amazon's sponsored results dominate search listings (FTC case, 2024).
- **Data Exploitation:** User data repurposed for micro-targeted advertising without transparency. E.g. Cambridge Analytica scandal (2018) exposed large-scale political profiling.
- **Loss of Authenticity:** Paid verifications and bots distort discourse and trust. E.g., X (Twitter)

verification is now purchasable by anyone, including fake accounts.

Alternative Investment Fund (AIF)

- Real Estate is now the single largest recipient of AIF capital in India.
- AIF means any fund established or incorporated in India which is a **privately pooled investment vehicle** which collects funds from sophisticated investors, whether **Indian or foreign,** for investing it in accordance with a defined investment policy for the benefit of its investors.
- It can be set up in the form of a **trust or a company or a limited liability partnership or a body corporate**
- **Regulated by: Securities and Exchange Board of India**

Types:

- **Category I - Investments in Startups & Social Ventures.**
- E.g: Venture Capital Funds (VCFs), SME Funds, Social Venture Funds, Infrastructure Funds
- **Category II** - which do not fall in Category I and III and which do not undertake leverage or borrowing other than to meet day-to-day operational requirements
- E.g: Real Estate, Private Equity Funds, funds for distressed assets
- **Category III** - employ diverse or complex trading strategies and may employ leverage including through investment in listed or unlisted derivatives
- E.g: Hedge Funds, Private Investment in Public Equity (PIPE) Funds
- **Note**: AIF does not include funds covered under the **SEBI (Mutual Funds) Regulations, 1996, SEBI (Collective Investment Schemes) Regulations, 1999** or any other regulations of the Board to regulate fund management activities.

Research, Development, and Innovation (RDI) Scheme gets approval from Cabinet

- **The scheme aims to** strengthen India's capabilities in strategic technologies and promote technological self-reliance, aligning with the nation's long-term innovation and Atmanirbhar Bharat vision.

Funding Mechanism

- **Corpus**: ₹1 lakh crore / Rs. One lakh Crore

Two-tiered funding mechanism.

- Level 1 (Custodian): Special Purpose Fund (SPF) established within the ANRF.
- Level 2 (Disbursement): Funds allocated to a variety of Second-Level Fund Managers

Mode of Funding: **Long-term concessional loans** (at low or nil interest rates), **Equity infusion** (especially for startups), **Contributions to Deep-Tech Fund of Funds** (FoF)

Key Objectives

- Encourage private sector to scale up RDI in sunrise domains and sectors relevant for economic security, strategic purpose, and self-reliance
- **Finance transformative projects at higher Technology Readiness Levels**
- Support **acquisition of critical technologies** or those of **high strategic importance**
- Facilitate establishment of a **dedicated Deep-Tech Fund of Funds**

Targeted Sectors:

- **Sunrise Sectors:** Energy Security, Deep Technology(includes quantum computing, robotics & space), Artificial Intelligence, Biotechnology & Health, Digital Economy.
- **Strategic Sectors:** Technologies whose indigenization is necessary for strategic reasons, economic security, or Atmanirbharta.
- **Public Sector:** Any other sector or technology where it is deemed necessary in public interest.

Governance and Implementation Frameworks:

- **Nodal Department: Department of Science and Technology (DST).**
- **Strategic Direction**: Provided by the Governing Board of **ANRF** chaired by the Prime Minister.
- **Approval of Scheme Guidelines:** Handled by the **Executive Council (EC)** of ANRF
- **Changes in Schemes**: Managed by an **Empowered Group of Secretaries (EGoS)** led by the Cabinet Secretary.

NITI Aayog's Frontier Tech Hub Unveils "Reimagining Agriculture: A Roadmap for Frontier Technology Led Transformation"

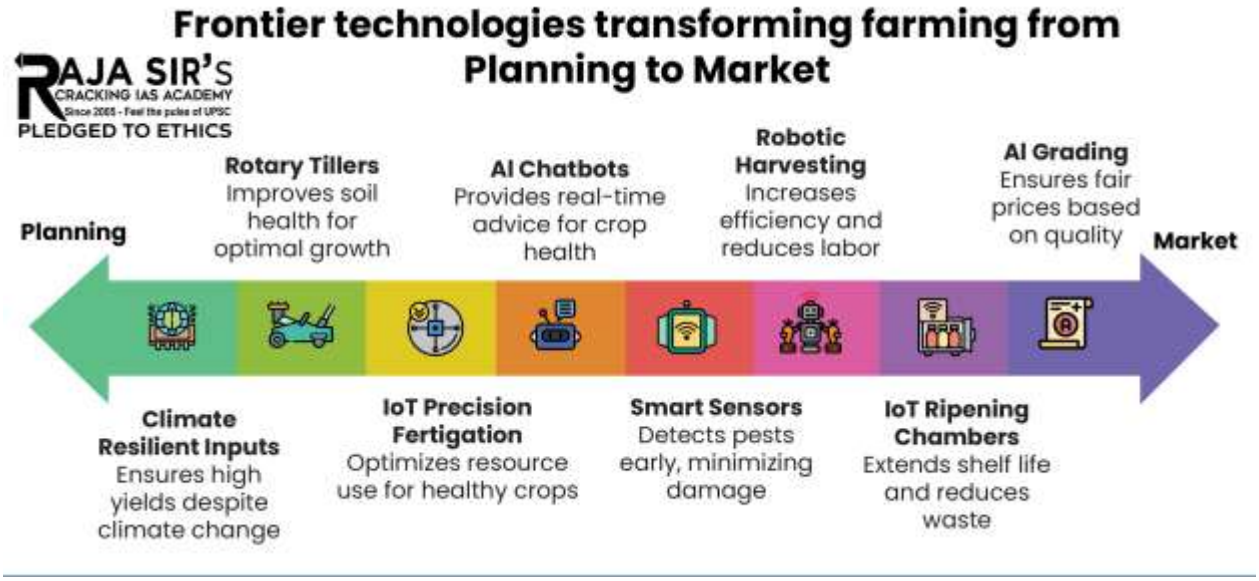
- The report highlights the structural barriers slowing agricultural transformation and shows how frontier technologies can directly address these gaps to drive higher productivity, resilience, and farmer incomes.

Barriers affecting Agricultural Transformation

- **Data**: Siloed data, no single-source of truth, lack of localized, high-quality Al-ready datasets
- **Limited Phygital Approach**: Limited internet access, inadequate physical infrastructure, field force and touchpoints to integrate with digital solutions
- **Fragmentation**: Limited coordination and siloed functioning across industry, academia, policymakers & regulatory bodies
- **Capital**: Gap in funding for high-risk, slow-scaling AgTech innovations, constrained credit access for farmers

Role of Frontier Technologies in Agricultural Transformation

- Frontier technologies include **seed technologies, vertical farming, digital twins, precision tools and smart sensors, agentic AI, predictive analytics, and advanced mechanisation** aimed at boosting productivity, sustainability, and farmer incomes.



Path ahead for scaling up of frontier technologies

- A **three-pillar framework for a Digital Agriculture Mission 2.0**
- **Enhance foundational systems to be frontier-tech ready:** by 360-degree data ecosystem, digital enablement of the last-mile interventions and upgrading the AgriTech startup accelerator ecosystem.
- **Reimagine Agri-Innovations & Agri-Talent Systems for Future-readiness:** by globally competitive talent & innovation ecosystems, focusing on a shift to translational R&D, interdisciplinary industry-aligned talent and revamping the institutional architecture for innovation.
- **Converge public-private efforts to accelerate agricultural transformation:** by building instruments for public-private dialogue to align industry and government efforts for agile policy making.

India's Information Technology Industry is undergoing a transformation

The Indian IT industry is undergoing major transformation due to automation, shifting global trends, steepest workforce layoffs, and evolving skill needs.

Indian IT Industry

- Contributes about **12%** to total services GVA and nearly **7%** to India's GDP, adding over **$280 billion** to the economy.
- Employs around **1%** of the workforce, with nearly **6 million people** working in the sector.
  - **Women** form about **36%** of the total workforce, reflecting growing gender inclusion.
- Industry has positioned India as a **global hub for software services and digital innovation** while providing **upward mobility** for youth, especially from smaller towns.

Transformations in the IT Industry

- **Technology transformation:** AI-driven automation is disrupting the sector by **automating routine work** like reporting, basic coding, and coordination.
  - It is drastically **improving developer productivity**, and shifting the industry's focus towards high-value, AI-driven digital transformation.
- **Global Realignments:** Restrictive U.S. immigration policies with hike in H-1B visa fees and tariff threats are prompting Indian IT firms to localise their overseas workforce.
- **Outdated outsourcing model:** Mass hiring and cost-based services are giving way to solution-driven demand powered by specialised expertise and AI fluency.
- **Skill gap:** Many professionals lack expertise in evolving fields of AI, cloud, and cybersecurity.

Way Forward

- **Reimagine skilling:** Include AI, emerging technologies and product thinking in regular school curriculum and provide industry-oriented large scale upskilling.
  - For instance, government has announced that **AI curriculum** will be introduced in all schools from **Class 3** from **2026–27**.
- **Support startups:** Strengthen AI and deep-tech ecosystems through policy and funding, shifting focus from outsourcing to product innovation.
- **Policy and social protection:** Mandate **6–9 months'** salary compensation, provide retraining, career transition aid, and mental health support to employees.

Specialty Steel Incentive Scheme (PLI 1.2)

- Union Minister of Steel launched the Third Round (PLI 1.2) of Specialty Steel Incentive Scheme.

PLI Scheme

- Approved by the **Union Cabinet in July 2021** to encourage production of **high-value, high-grade steels** used in sectors like defence, aerospace, energy, automobiles, and infrastructure.
- **Key Highlights of Third Round PLI 1.2**
- **Scope:** Covers **22 product sub-categories** across five broad target segments including strategic steel grades, etc.
- **Incentives:** Range from **4% to 15%** of incremental sales with revised base year of 2024-25.
- **Incentive Period:** Maximum of **5 years** starting from FY 2025–26.

National Company Law Appellate Tribunal

- Recently, National Company Law Appellate Tribunal (NCLAT) lifted the ban WhatsApp from sharing data with Meta platforms for advertising purposes for five years.

NCLAT

- **Constituted under:** Section 410 of the **Companies Act, 2013**.
- **Jurisdiction:** It hears appeals against orders passed by –

1. National Company Law Tribunal(s) (NCLT);
2. Insolvency and Bankruptcy Board of India under Section 202 and Section 211 of IBC;
3. Competition Commission of India (CCI) under Section 410 of the Companies Act, 2013;
4. National Financial Reporting Authority under the Companies Act, 2013.

Amul and IFFCO ranked World's Top Two Cooperatives

- Rankings were given in the **World Cooperative Monitor 2025**, produced by **International Cooperative Alliance (ICA**).
- **Cooperatives in India**
- **Meaning:** It is an **autonomous association of persons**, united voluntarily to meet their common economic, social, and cultural needs through **jointly owned and democratically member-controlled enterprise.**

Genesis: Cooperative Credit Societies Act, 1904.

- **Constitutional Recognition:** 'Cooperative societies' is a **state subject** under the Seventh Schedule.
- **97th Amendment Act, 2011** granted citizens the fundamental right to form cooperative societies and included **Article 43B** in the Directive Principles of State Policy.
- Above Amendment also inserted **Part IXB** containing **Articles 243ZH to 243ZT** to the Constitution. [However, Supreme Court in Union of India V. Rajendra N Shah (2021) held Part IXB to be operative only for Multi State Cooperative Societies and not for Single State ones].
- **Legal Framework:** Cooperative societies functioning in more than one state/UT are governed by **Multi-State Cooperative Societies Act, 2002 (amended in 2023).**
- While those in a single state are governed by the respective state/UT acts.
- **Status:** India has more than **one-fourth** of the world''s cooperatives (over **8.44 lakhs**).
- **Top States: Maharashtra, Gujarat**, Telangana, Madhya Pradesh, and Karnataka.

Key Initiatives to Strengthen Cooperatives in India

- **Establishment of the National Cooperative Development Corporation (NCDC)** in 1963.
- **National Bank for Agriculture and Rural Development (NABARD)** in 1982
- Establishment of the **Ministry of Cooperation** in 2021.
- **National Cooperation Policy 2025.**

Gujarat Cooperative Milk Marketing Federation Ltd or AMUL (HQ: Anand, Gujarat)

- It is kind of **Cooperative Marketing society** established in 1946 by Tribhuvandas Patel.
- It covers 33 districts, representing **3.6 million milk producer members.**
- **IFFCO or Indian Farmers Fertiliser Cooperative Limited (HQ: New Delhi)**
- Established as **Multi-state Cooperative Society** in 1967.

Pradhan Mantri Kaushal Vikas Yojana

- The **Pradhan Mantri Kaushal Vikas Yojana (**PMKVY**)** is facing irregularities and corruption issues in its implementation.
- PMKVY is a flagship outcome-based **skill development scheme** launched in **2015** by the **Ministry of Skill Development and Entrepreneurship (MSDE)**.
- **Objective:** The scheme aims to provide large-scale, **short-term skill training** to Indian youth to enhance their **employability** and livelihood opportunities.
- **Implementation:** It is implemented under the Skill India Mission through the **National Skill Development Corporation (NSDC)**.
- **Current Phase: PMKVY 4.0** (FY 2022–23 onwards) functions as a **Central Sector Scheme** emphasising new-age skills like AI, robotics, and data analytics, while mandating **On-the-Job Training (OJT)**.

Training Components:

- **Short-Term Training (STT):** Offers **National Skills Qualification Framework (NSQF)**-aligned courses for **school dropouts** and **unemployed youth**.
- **Recognition of Prior Learning (RPL): Certifies informal skills** of existing workers with industry-recognised credentials.
- **Special Projects:** Provides **customised training** for **marginalised groups**, aspirational districts, and emerging job sectors.
- **Achievements:** PMKVY has trained **over 1.64 crore youth**, with **45%** of beneficiaries being **women** and a significant share from the SC, ST, and OBC categories.

Sports Need to Be a National Priority Sector

- India's recommendation to host the 2030 Commonwealth Games in Ahmedabad coincides with the release of the National Sports Policy 2025.
- Together, they underline the need to treat sports as a national investment, not discretionary spending, integral to achieving Viksit Bharat 2047.

Current Scenario

- **Limited Economic Share:** **Sports and Physical Activity (SAPA)** contribute only **0.1% of India's GDP** and **0.5% of total employment** (NSP 2025).
- **Demographic Dividend:** 65% of India's population is below 35 years, a potential workforce for sports, fitness, and allied industries.
- **Rising Health Burden:** Non-communicable diseases (NCDs) cause over **60% of deaths** in India (MoHFW, 2024), underscoring the need for **preventive health** through active living.

Economic & Social Significance of the Sports Sector

- **GDP Boost Potential:** SAPA can contribute up to **2% of GDP** and **4% of national jobs** by 2047.
- **Employment Engine:** Expanding sports tech, fitness services, and sports media.
- **Preventive Healthcare:** Active lifestyles could save up to **₹15 lakh crore** in health costs by 2047.
- **Social Cohesion:** Sports build inclusivity, national pride, and community participation.

Key Challenges Faced by the Sports Sector

- **Infrastructure Gaps:** **Only 30% of rural schools** have playgrounds (UDISE+ 2022–23), limiting early participation and grassroots sports development.
- **Funding Deficit:** Sports receives **less than 0.08%** of the Union Budget, far below the 1–2% allocation seen in sports-driven economies (NSP Draft, 2025).
- **Fragmented Governance:** India has **10+ agencies** managing sports at different levels, leading to poor coordination and duplication of efforts (NITI Aayog Review 2024).
- **Low Private Participation:** Private-sector contribution to sports infrastructure is **below 20%,** compared to **60–70% in developed economies** (CII Sports Report 2023).
- **Talent Pipeline Weakness:** **Only 15%** of athletes identified at sub-junior levels reach state-level championships (Sports Authority of India Data 2024).
- **Gender Disparity:** Female participation in organised sports remains **below 30%**, especially in rural belts (Ministry of Youth Affairs and Sports, 2024).

Way Forward

- **Grassroots Integration:** Include daily sports periods in schools under the **National Education Policy (**NEP**) 2020**; expand Khelo India School Games to every district.
- **Health Mainstreaming:** Integrate **SAPA goals** into the **National Health Mission (NHM)** for NCD prevention through active lifestyle campaigns.
- **Private Sector Incentives:** Introduce **sports infrastructure PPP models** with CSR tax deductions and viability gap funding for private academies. E.g. **Australia's "Sport Investment Framework"**
- **Infrastructure Development:** Create district-level sports complexes under the **PM YASASVI Scheme** and **urban planning mandates** for open play spaces.
- **Sports Industry Boost:** Align sports tech, apparel, and analytics startups with **Make in**

India 2.0 to localise production and create employment. E.g. The **U.S. "SportTech Innovation Network"** links startups with training academies and research institutions for scalable innovation.

Threat of US Secondary Sanctions on Russian Oil Producers

- The **US-imposed sanctions on Russian oil producers** Rosneft and Lukoil have raised concerns among Indian refiners about potential secondary sanctions.
- **Russia's crude oil exports to India declined** to **1.19 million bpd** in late October from **1.95 million bpd**.

Sanctions

- Sanctions are **economic restrictions** imposed to influence the actions of a state or entity.
- **Primary Sanctions:** They prohibit **US citizens** and **companies** from engaging with sanctioned entities.
- **Secondary Sanctions:** They penalise **non-US actors** for dealing with sanctioned entities by restricting access to US markets and financial systems.

Key Concerns for India

- **Supply Disruption:** The sanctions threaten India's crucial **energy security** since India is the **second-largest importer** of Russian crude, **sourcing over 35%** of its oil from Russia.
- **Rising Import Costs:** Decline in discounted Russian oil, which saved India nearly **$13 billion** between 2022 and 2024, significantly **increases import expenses** and **fiscal pressure**.
- **Refinery Adjustments:** Refineries optimised for Russian crude blends need to reconfigure their operations, which reduces **efficiency** and **profits**.
- **Diplomatic Strain:** The sanctions complicate India's **strategic balance** between the United States and Russia, limiting its **energy autonomy** and challenging its **policy of non-alignment**.

Inequalities in Global Health Security

- The UNAIDS Global Council warned that widening inequalities are making pandemics more severe and prolonged, urging nations to embed equity into health-security planning.

Inequality in Global Health Security

- **Unequal Access:** Low-income nations received **< 20 % of vaccines** during COVID-19 (WHO 2023).
- **Fiscal Divide:** Developed economies spend **≈ 2 % of GDP** on preparedness; poorer nations **< 1 %.**
- **Health Infrastructure Gap:** Weak primary-care and surveillance systems heighten disease impact.
- **Gender Inequity: 70 %** of the health workforce is Women, but underpaid and underprotected.

- **Impact of Global Health Inequality**
- **Higher Fatality Rates:** Countries with high income gaps recorded **2× COVID-19 mortality** (Lancet 2023).
- **Slower Recovery:** Poorer economies lost **> 6 % GDP** vs **3 % global average** (IMF 2023).
- **Poverty Surge:** **120 million** pushed into extreme poverty (World Bank 2023).
- **Education Loss:** School closures deepened learning inequality and child malnutrition.
- **Cycle Effect:** Pandemics worsen inequality, which in turn amplifies future pandemic risk.

Way Forward

- **Fiscal Reform:** Expand the **global Pandemic Fund** to support low-income countries (World Bank 2022).
- **Technology Sharing:** Adopt open licensing for vaccines. E.g. **WHO mRNA Hub**, South Africa.
- **Public Health Systems:** Strengthen primary care and data surveillance – E.g. **India's IHIP Platform 2023**.
- **Gender Mainstreaming:** Equal pay for frontline workers – E.g. **UN Women Health Leadership 2024**.
- **Global Treaty:** Advance the **WHO Pandemic Accord** for equitable access to countermeasures.

SEBI Proposes Changes to Mutual Fund Regulations

- The **Securities and Exchange Board of India (**SEBI**)** has proposed changes to **mutual fund regulations** aimed at reducing costs and improving transparency for investors.

> ***SEBI*** *functions as India's* ***capital market regulator*** *under the* ***Ministry of Finance****. It was established in* ***1988*** *and was granted* ***statutory powers*** *under the* ***SEBI Act, 1992****.*

Key Proposals

- **Statutory Levies:** GST, **Securities Transaction Tax (**STT**)**, **Commodity Transaction Tax (CTT)**, and **stamp duty** will be excluded from the **Total Expense Ratio (TER)**; they will be charged separately.
- **Exit-Load Charge:** The additional **five bps charge** on schemes introduced in **2012** that levies an **exit load** will be removed.
- **Revised TER Slabs:** A slight **five basis points increase** in the **base TER slabs** for initial assets of active schemes to offset revenue loss.
- **Performance-Based Fees:** SEBI is considering a **voluntary framework** that allows AMCs to charge fees based on a **scheme's performance**.
- **Brokerage Fees:** Maximum brokerage fees will be **reduced**; **execution** and **research costs** will be separated to prevent **double-charging** investors.

Total Expense Ratio (TER)

- The TER represents the **annual cost** to **manage** and **operate** a mutual fund, expressed as a percentage of its average **Assets Under Management (AUM)**.
- It includes **fund management fees**, administrative and operational expenses, marketing and distribution costs, and transaction charges like brokerage fees.
- These expenses are charged **indirectly** to investors as **daily deductions** from the fund's assets.
- **Use:** TER helps investors compare the **cost efficiency of funds**, with actively managed schemes usually having higher TERs than passive index funds.

Enforcement Directorate (ED)

- Cases investigated by ED have been cited as models of effective asset recovery practice by Financial Action Task Force in 'Asset Recovery Guidance and Best Practices' guidelines.
- **ED (HQ: Delhi)**
- **Genesis**: 1956.
- **Administrative Control**: Department of Revenue, Ministry of Finance.
- It is a **multi-disciplinary organization** mandated with investigation of the offence of money laundering and violations of foreign exchange laws.

Key Laws Enforced:

1. **The Prevention of Money Laundering Act, 2002 (PMLA)**
2. **The Foreign Exchange Management Act, 1999 (FEMA)**
3. **The Fugitive Economic Offenders Act, 2018 (FEOA)**

- **Powers**: Searches and seizures, summon any person, arrest and prosecute, etc.

India's Rising Computer Services Exports and AI Integration

- According to the World Bank's Chief Economist for the South Asia Region, India has seen a **30% increase** in the **export of computer services** since 2022.
- Computer services refer to a broad category of Information and Communication Technology (ICT) and IT-enabled Services (ITES), making up India's **largest service export category**.
    - According to recent RBI data, software services exports totalled $47.32 billion in April–June 2025, reflecting **a 13% year-on-year increase**.
- **AI Integration:** The Business Process Outsourcing (BPO) sector is increasingly adopting AI, with **12%** of job postings now demanding related skills.
- **Institutional Readiness:** India ranked **46th** in Oxford Insights' **2024 Government AI Readiness Index**, outperforming most emerging economies, which reflects progress in policy preparedness.

India's Fortified Rice Kernel Export to Costa Rica

- Agricultural and Processed Food Products Export Development Authority (APEDA) facilitated India's **first export** of **Fortified Rice Kernels** (FRK) from **Chhattisgarh** to **Costa Rica**.

*CostaRica is a **Central American** country bordered by **Nicaragua** (north), **Panama** (southeast), **Pacific Ocean** (west), and the **Caribbean Sea** (east). Its capital is **San José,** and the official language is **Spanish**.*

Fortified Rice Kernels

- Fortified Rice Kernels (FRK) are **reconstructed grain kernels** created from **rice flour** enriched with **micronutrients** like iron, folic acid, and vitamin B12.
- **Process:** They are produced through **hot extrusion**, where rice flour and micronutrients are blended, cooked, and shaped to **resemble natural rice grains**.
- **Purpose:** FRK aims to tackle '**hidden hunger**' and reduce **micronutrient deficiencies** (e.g., anaemia) in rice-dependent populations.
- **Standards:** FSSAI mandates fortification with **iron**, **folic acid**, and **vitamin B12**, while zinc, vitamin A, and other B-vitamins remain optional.
- **Blending Ratio:** FRK is blended with regular rice in a **1:100** ratio.
- **Framework:** The **Food Safety and Standards (Fortification of Foods) Regulations, 2018**, govern FRK production, quality, and labelling across India.

G20 releases a report on Global Inequality

Findings of the report:

- **Income**: 83% of countries have **high income inequality (i.e., a Gini coefficient above 0.4)**, accounting for 90% of the world's population.
- **Wealth**: Between 2000 and 2024, the **richest 1% captured 41% of all new wealth**, in contrast to just 1% being captured by the bottom 50%.
- In **India**, the **top 1%** has grown their share of wealth by 62% over this period.

Drivers of Inequality

- **Neoliberal Policies:** Deregulation of financial and labor markets, the weakening of competition policies, and a shift toward less progressive taxation.
- **Growth of monopoly power:** Increases corporate owners'' incomes and decreases workers'' real incomes.
- **International Setting:** Greater mobility of capital across borders and new technologies used in production have lowered bargaining power of less-skilled workers.
- **Influence of economically powerful elites:** on politics and policymaking both drives and reinforces economic inequality
- **Historical legacy of high inequality** in developing countries. E.g. Distribution of land.

Recommendations

- **Establishing an International Panel on Inequality (IPI)** to provide policy-relevant assessments on inequality trends, drivers and impact.
- **Implementing more progressive taxation** through a **global minimum tax on ultra-rich individuals.**
- **Rewriting IP rules to include compulsory licenses/waivers** for critical technologies, especially related to climate change and pandemics.
- **Ensuring universal access to high-quality essential services** such as health, education, and social security.

PRS Legislative research releases State of state Finances 2025 Report

- According to report, **rising levels of committed expenditure** are constraining the fiscal space of states, thereby **squeezing their ability to undertake development-oriented spending.**

Key findings of the Report

- **High committed spending:** States spent **62% of revenue receipts** on salaries, pensions, interest, and subsidies in 2023-24.
- **Lower GST revenue share:** Revenue from GST-subsumed taxes **fell from 6.5% of GDP (2015-16) to 5.5% (2023-24)**, leaving states with weaker own-tax capacity.

- 15th Finance Commission had estimated a medium-term ratio of 7% revenue from GST.
- **Reduction in untied transfers:** Untied transfers **fell to 64%** under the 15th Finance Commission, reducing states' flexibility in spending priorities.
- **High debt burden:** Outstanding debt of states at **27.5% of GDP (2024-25)** is far above the FRBM target of 20%; only Gujarat, Maharashtra, and Odisha meet the benchmark.
- **Interest payments rising fast:** Interest costs grew **10% annually** (2016-17 to 2024-25), outpacing revenue growth.
- **Unconditional cash transfers for women led to fiscal pressure:** In 2025-26, the number of states providing unconditional cash transfers to women has increased to 12 states.
- **Per-capita income gaps between states have increased:** Because high-income states raise **more revenue per capita** and **spend more on development.**

Way Forward

- **Enforce fiscal discipline:** States must **cut revenue deficits,** avoid borrowing for routine expenses, and end off-budget loans.
- Bring debt closer to the **20% target** to reduce rising interest burdens.
- **Boost revenues smartly:** Streamline **GST slabs**, raise **non-tax revenue** through better user charges, mining royalties, asset monetization, and stronger property tax and excise systems.
- **Spend wisely:** Rationalize subsidies and cash transfers, control committed expenditure, protect capital spending, and expand untied transfers.

Supreme Court Allows Reassessment of AGR Dues

- The Supreme Court has permitted a **complete reassessment of Vodafone Idea's (Vi) Adjusted Gross Revenue (**AGR**)** dues up to FY 2016–17.

Adjusted Gross Revenue (AGR)

- AGR is the **revenue base** used by the **Department of Telecommunications (DoT)** to determine **usage** and **licensing fees** that the GoI charges telecom operators.
- India shifted from a **fixed annual license fee** to a **revenue-sharing model** in **1999** to support the struggling telecom sector; operators now pay a **percentage of their AGR** to the government.

AGR Dispute

- A legal dispute over the **definition of AGR** emerged after the **1999 revenue-sharing reforms**, with court challenges appearing soon afterwards.
- **DoT's Stance:** AGR should include **total company revenues**, both **telecom income** (calls, data, SMS) and **non-telecom income** (interest, asset sales, rent, dividends, etc.).
- **Telcos' Stance:** AGR should only include **revenues** from **core telecom services**, excluding non-telecom sources of income.
- **2019 Ruling:** The Supreme Court **upheld DoT's broader definition**, directing firms to pay dues

based on **total revenues**.

- **2025 Ruling:** The Supreme Court allowed a **review of AGR dues**, including **interest** and **penalties**, specifically limiting the decision to **Vodafone Idea**.

Insolvency and Bankruptcy Code (IBC) and the Prevention of Money Laundering Act (PMLA)

- The Insolvency and Bankruptcy Board of India (IBBI) has issued new guidelines to address conflicts between **Insolvency and Bankruptcy Code (IBC)** and the **Prevention of Money Laundering Act (PMLA)**, to expedition resolution for distressed companies.

Key Highlights

- Insolvency professionals can now approach **special PMLA courts** and to seek **unfreezing** of assets attached by **Enforcement Directorate** rather than **National Company Law Tribunal (NCLT)** dealing with bankruptcy cases.

IBC and PMLA

- While **IBC** deals with maximizing asset value and ensuring time-bound resolution, **PMLA** aims to deprive offenders of criminal proceeds.
- PMLA and IBC have **non-obstante clauses** (Section 71 under PMLA and Section 238 under IBC), i.e., conferring certain provisions with an **overriding effect** over conflicting statute.

Arbitration and Conciliation Act, 1996

- Supreme Court (SC) held that an Arbitral award could be **scrapped** if delay taints its **decision-making.**
- As per SC, even though delay **alone is not an independent ground** to strike down an award yet such delays can vitiate the award if it undermines its quality, reasoning or fairness.
- It seeks to **consolidate and amend** the law relating to domestic arbitration, international commercial arbitration and enforcement of foreign arbitral awards.
- Based on **United Nations Commission on International Trade Law (UNCITRAL) Model Law** adopted in 1985.

New Special Economic Zones (SEZ) Norms for Exporters

- A government panel involving the Commerce Ministry, NITI Aayog, and exporters is drafting new SEZ norms to allow limited domestic sales and "reverse job work" amid low SEZ utilisation.

Reverse Job Work: *A policy that allows manufacturing units within an SEZ to perform job work (manufacturing services) for companies in the Domestic Tariff Area (DTA).*

Current Status of SEZs in India

- **Exports:** SEZ exports reached **$172 billion in FY25**, contributing **≈30 %** of India's total exports.
- **Coverage:** About **276 operational SEZs**; domestic sales currently capped at 2 % of total output.
- **Declining Utilisation:** Gems & jewellery units dropped from **≈500 (2018) to ≈360 (2022)**.
- **FDI Weakness:** FDI inflows to SEZs remain **under 3 %** of India's total.
- **R&D Deficit:** Only **4 of 14 SEZ units** surveyed invested in R&D, signalling low innovation capacity.
- **Legislative Delay:** The proposed **Development of Enterprise and Services Hub (DESH) Bill** remains pending; reforms are now being explored through the executive route.

Consequences of Outdated SEZ Norms in India

- **Export Losses:** U.S. tariffs and policy rigidity have cut SEZ export growth to **< 4 % YoY** (FY24-25).
- **Idle Capacity:** Nearly **25–30 %** of SEZ production capacity is underutilised during seasonal demand dips.
- **Competitiveness Decline:** Vietnam's zones attract 3× more FDI due to liberal domestic-linkage rules.
- **Fiscal Loss:** Over 35 SEZ units have applied for de-notification since 2023, leading to an estimated ₹2,800 crore annual shortfall in customs duties and income-tax revenue (MoC&I 2025).
- **Employment Risk:** The gems and jewellery SEZ sector employ around **1.05 lakh artisans**, and declining U.S. orders have caused job losses exceeding **12,000 positions** in FY 2024-25 (GJEPC 2025).

Challenges Faced by SEZs in India

- **Limited Market Access:** SEZ units **cannot sell freely** in the Domestic Tariff Area (DTA), restricting capacity use during export slowdowns
- **High External Dependence:** Nearly **40 % of SEZ exports** cater to the U.S. market; new tariff barriers of 10–25 % on gems, jewellery, and textiles have eroded profit margins (DGFT 2025).
- **Withdrawal of Incentives:** Post-2019 removal of **Section 10AA** tax holidays and imposition of MAT @ 15 % + DDT @ 20 % led to a **25 % fall** in new SEZ registrations (CAG 2024).
- **Skill & R&D Gap:** **Only 28 %** of SEZ firms have access to technology-training modules (ICRIER 2024).
- **Low FDI & Brand Linkages:** SEZs attracted barely **3 % of total FDI** inflows (2023-24) versus **Vietnam's 11 %**, reflecting weak global promotion (DPIIT 2024).
- **Negative Trade Balance Risk:** Imports of raw materials like gold and diamonds rose **12 % YoY**, while exports stagnated at **3 %**, causing deficit trade positions in select SEZs (ICRIER 2024).

Way Forward

- **Reverse Job-Work Policy:** Permit SEZs to undertake **domestic subcontracting** under fair-duty adjustment like **China's dual-use SEZ model**.

- **Duty-Neutral Framework:** Create an **equal tax structure** for inputs used by both SEZ and DTA units, as in **Malaysia's Free-Trade Zone policy**.
- **R&D and Skill Incentives:** Launch **SEZ Innovation & Skill Mission** offering tax rebates for technology upgradation and design training.
- **Digital Integration:** Link SEZ operations with the **National Single-Window System** for faster approvals.
- **Strengthen FDI Environment:** Conclude investment-protection pacts and branding campaigns similar to **Vietnam's Industrial Parks Strategy 2022**.
- **Sustainable Incentives:** Replace blanket tax holidays with **performance-based incentives** tied to exports, jobs, and domestic-value addition.

Malaysia to Accept UPI

- **Malaysia** has become the **9th country** to **accept** UPI transactions for Indian travellers, following **Bhutan** (**first**), **France**, **Mauritius**, **Nepal**, **Singapore**, **Sri Lanka**, **UAE**, and **Qatar**.
- **Failure to supply Written Grounds of Arrest Renders the Arrest Illegal: Supreme Court (SC)**
- In **Mihir Rajesh Shah vs. State of Maharashtra & Anr,** SC held that failure to furnish such an information would be **violative** of the **Fundamental Rights under Article 21.**

Key Highlights of the Judgement

- **Right to be Informed of the Grounds of Arrest:** It is a fundamental and mandatory safeguard under **Article 22(1)** of the Constitution and **applies to all offences** including those under the **Bharatiya Nyaya Sanhita (BNS).**
- Hence, the ruling expands the constitutional safeguards to all statutes ending the perception of such protection being limited to only special laws like **Unlawful Activities Prevention Act (UAPA)** or **Prevention of Money Laundering Act (PMLA).**
- **Exceptional Circumstances:** In cases, when it is not possible to supply written grounds immediately, the ground could be **conveyed orally.**
- This would ensure a **judicious balance** between safeguarding the arrestee's **constitutional rights under Article 22(1**) and **preserving the operational continuity of criminal investigations.**
- However, **written grounds must be furnished within two hours** before producing the accused to the magistrate for remand proceedings.
- **Mode of Communication:** Must be in writing and in a **language understandable** by the arrestee.

- **Article 21:** No person shall be deprived of his life or personal liberty except according to **procedure established by law.**
- **Article 22 (1):** Arrested person should be **informed of the grounds for arrest** (as soon as possible) and be provided with the **right to consult, and to be defended** by, a legal practitioner of his choice.

Financial Sector Assessment Program (FSAP) Report by World Bank

- The FSAP report has urged India to accelerate financial sector reforms to achieve its long-term goal of becoming a **USD 30 trillion economy by 2047.**

Key Highlights of the Report

- **Resilient system:** Financial system is stronger and more diversified, with assets rising to about **175% of GDP (from 144% in 2017) with the state playing a dominant role**.
- **Digital strength:** Digital public infrastructure has improved access, efficiency, and financial inclusion.
- **Regulatory progress:** Reforms by the RBI and SEBI have enhanced supervision, though challenges persist in NBFC oversight and risk management.
- India's expansion of regulatory authority on cooperative banks, tightening of key prudential rules has been appreciated.
- **Market development:** Corporate bond and infrastructure financing remain shallow, with investors preferring government securities.
- **Tax disparities:** Uneven tax treatment between debt and equity discourages bond market participation.

Required Reforms

- **Boost private capital mobilisation:** Deepen bond and securitisation markets to attract long-term investors.
- **Strengthen NBFC regulation:** Refine scale-based frameworks and align with global prudential norms.
- **Integrate digital and financial reforms:** Link fintech innovations with broader financial inclusion goals.
- **Sustain reform momentum:** Maintain coordination among financial regulators to ensure market stability and growth.
- **Mobilise green finance:** Use **DFIs** (Development Finance Institutions) to fund low-carbon projects and reduce investor risk.

FSAP

- **Genesis: FSAP is a joint World Bank-IMF** program started in 1999.
- **Conduct**: FSAPs in advanced economies are conducted **by the IMF**. In developing and emerging market economies, **FSAPs are conducted jointly with the World Bank.**
- **India's previous FSAP was conducted in 2017.**

International Conference on Green Hydrogen

- The **Ministry of New and Renewable Energy (MNRE)** will host the **third edition** of

the **International Conference on Green Hydrogen (ICGH 2025)** at Bharat Mandapam, New Delhi.

Green hydrogen is produced through the electrolysis ***of water*** *using electricity from* ***renewable sources****, such as solar, wind, or hydropower.*

- **Objective:** Bring together global stakeholders to discuss increasing green hydrogen production, developing infrastructure, and creating markets under India's **National Green Hydrogen Mission (**NGHM**).**
- **Participation:** Government officials, **industry leaders**, **researchers**, students, and delegations from IRENA and the **Port of Rotterdam Authority** will attend the ICGH 2025.
- **Inception:** India launched the ICGH in **2023** to advance the **green hydrogen ecosystem** and support **global decarbonization** efforts.

National Green Hydrogen Mission (NGHM)

- **National Green Hydrogen Mission (NGHM)** is a flagship initiative by the government to position India as a global leader in the production, utilisation, and export of green hydrogen.
- **Targets:** To produce **5 MMT of green hydrogen annually** and develop around **125 GW of renewable energy capacity** dedicated to hydrogen production **by 2030**.

PRIP Scheme

- The Centre has extended the deadline for applying for Promotion of Research and Innovation in Pharma & MedTech (PRIP) Scheme.
- **Launched by**: the Department of Pharmaceuticals, **Ministry of Chemicals and Fertilizers.**
- **Financial outlay**: ₹5000 crores
- **Aim**: Transforming India into a global powerhouse for R&D in the Pharma MedTech sector.

Features:

- **Component A:** Strengthening the research Infrastructure with setting up of **Centres of Excellence** at National Institute of Pharmaceutical Education & Research (NIPERs).
- **Component B**: Promotion of Research and Innovation in the Pharma MedTech sector.

World Economic Forum (WEF) releases "Shaping the Deep-Tech Revolution in Agriculture"

- The report has been released by **WEF AI for Agriculture Initiative (AI4AI).**
- **AI4AI** brings together public and private sector partners **to scale agritech solutions and accelerate the transformation** of global food systems.

Seven Deep-Tech Domains Driving Change

- **Generative AI:** Plans sowing and **predicts pest attacks** so farmers can act early and avoid losses.
- **Computer Vision:** Detects crop diseases and **grades produce** automatically to reduce spoilage.
- **Robotics and Drones:** Handle sowing, spraying, & harvesting **to save labour and improve accuracy**.
- **Edge IoT:** Uses **local sensors** to control irrigation and fertiliser even without stable internet access.
- **Remote Sensing:** Tracks **soil moisture** and **crop health** with satellites for accurate farm planning.
- **CRISPR:** Develops drought- and pest-**resistant crop varieties** for higher yield and durability.
- **Nanotechnology:** Applies fertilisers and pesticides **directly to plants**, saving input and protecting soil.

Convergence of Technologies in Agriculture

- **Swarm Robotics:** Uses small **coordinated robots** powered by AI and edge IoT to carry out tasks such as weeding and harvesting.
- **Precision Farm Management:** Combines data from sensors, satellites, and AI models to **determine the best use** of water and fertiliser.
- **Agentic AI:** Works independently to plan and **manage crop cycles** or **supply chains** without continuous human input.
- **Carbon Reporting:** Uses AI and satellite data to **measure soil carbon** accurately and help farmers access carbon markets.

Case Studies Demonstrating Feasibility of Deep-Tech in Agriculture

- **CRISPR Rice:** ICAR developed drought- and salinity-resistant rice varieties that produce up to **30% higher yields** while emitting **less methane**.
- **Crop Insurance:** The PMFBY uses drones and satellite data to assess crop loss, making **insurance claims faster** and more transparent.
- **Digital Infrastructure:** The Bhashini platform provides AI farm tools in Indian languages to assist small farmers in accessing technology.
- **Barriers to Technology Adoption**
- **High Costs:** Advanced tools like drones and IoT systems are expensive, making them **out of reach** for small farmers.
- **Regulatory Delays:** Gene-editing methods like CRISPR face slow approval and **public concerns**, which restrict their wider use.
- **Data Gaps:** **Poor internet networks** and limited data sharing reduce the accuracy and reliability of AI systems in rural areas.
- **Environmental Risk:** Nanotechnology **lacks sufficient long-term studies** on its environmental

impacts.

- **Field Variability:** Computer vision performs poorly under **uneven lighting** and **varying crop stages**.

Emerging Challenges for Agriculture

- **Shrinking Workforce:** Farm labour is decreasing as rural workers migrate to cities, leaving an **ageing farming population** behind.
- **Climate Pressure:** Unpredictable rainfall and rising temperatures are decreasing yields and heightening the risk of food insecurity.
- **Resource Depletion:** The excessive use of water and fertilisers has **depleted 71% of groundwater** and degraded **one-third** of the world's **soil**.
- **Demand-Waste Gap:** Food production needs to **increase by 70% by 2050**, yet **a third** of the harvest still **goes to waste**.
- **Geopolitical Disruptions:** Wars and trade barriers have driven up fertiliser prices, threatening food security in countries that rely on imports.

Five Foundational Pillars for Implementing Deep-Tech in Agriculture

- **Policy and Regulations:** Governments should introduce **adaptive rules** and **regulatory sandboxes** for AI, data use, and gene editing.
- **Finance and Investments:** Blended finance and **concessional loans** enable small farmers to adopt advanced agricultural tools.
- **Human Capital:** Skilled professionals trained in both agronomy and emerging technologies are essential for applying deep-tech solutions effectively.
- **Data and Digital Infrastructure:** Reliable rural connectivity and **unified data standards** ensure accuracy and scalability in AI-driven farm operations.
- **Innovation Support:** Collaboration among universities, startups, and international partners drives research, testing, and expansion of deep-tech in agriculture.

Key Challenges in Agriculture

- **Declining Agricultural Workforce**: Rural-to-urban migration and an ageing farmer population reduce labour availability.
- **Climate Change and Weather Extremes**: Global **calorie yield from staple crops could fall by 24% by 2100** without emission cuts.

Degradation of Natural Resources:

- Agriculture uses **70% of freshwater; 71% of aquifers** are depleted.
- **One-third of soils degraded**; **90% of topsoil may be degraded** by 2050.

Key Use Cases for Deep Tech in Agriculture highlighted by the Report

- **Intello Labs** AI and computer vision-based solution **Fruitsort**: It uses advanced cameras and

machine learning to rapidly analyse fresh produce, identifying defects.

- **Pradhan Mantri Fasal Bima Yojana (PMFBY)**: It uses **Remote sensing (**satellite imagery) for efficient crop insurance along with High-resolution drones and a dedicated mobile app.
- **Infosys "5G.NATURAL" programme**: It focuses on creating a scalable, modular and intelligent swarm system, specifically for harvesting.
- **Boomitra launched Vital Agricultural Regeneration and Adaptation (URVARA) project** for carbon monitoring, reporting and verification (MRV).

India's Push for World-Class Banks

- Finance Minister announced that the government and the Reserve Bank of India (RBI) are in discussions **to create an ecosystem for developing large, globally competitive banks**.
- The move follows earlier rounds of public sector bank (PSB) consolidation and aims to build financial institutions capable of supporting **India's $10-trillion economy vision by 2047**.

Why India Needs Big and World-Class Banks?

- **Global Financial Scale:** India's GDP is projected to cross **$7 trillion by 2030** (IMF forecast); large universal banks are needed to fund major infrastructure and industrial projects.
- **Credit Deepening:** Total bank credit surged to **₹192.19 lakh crore** (Oct 2025), double the previous year's growth, indicating rising demand for institutional financing.
- **International Competitiveness:** None of India's banks feature among the top 25 global banks by market cap; stronger balance sheets are required for international expansion.
- **Support for Private Capex:** With private investment recovering post-GST reforms, large banks are vital to finance big-ticket manufacturing, green, and digital projects.
- **Consolidation Legacy:** Earlier mergers (2017–2020) like **SBI associates**, **Vijaya–Dena–BoB**, and **10 PSBs into 4** have improved capital efficiency and governance, setting a base for scale expansion.

Banking System in India

- It comprises Scheduled Commercial Banks (SCBs), including public and private sector banks, Regional Rural Banks (RRBs), Small Finance Banks (SFBs), and Payments Banks.
- The system follows a **two-tier structure**, commercial banking and cooperative banking, ensuring credit delivery from metropolitan hubs to rural areas.
- RBI regulates all banks under the **Banking Regulation Act, 1949**, ensuring monetary stability.
- Public Sector Banks still **account for over 60% of total** deposits and advances, though private banks are expanding rapidly.
- With initiatives like **Digital Banking Units (DBUs)** and Jan Dhan–UPI integration, India's banking network has evolved into one of the world's largest inclusive financial ecosystems.

Ethiopia to adopt Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM)

- Ethiopia has announced plans to adopt India's Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM) model to tackle rural poverty and promote women's empowerment.
- DAY-NRLM is India's **flagship poverty alleviation and women's empowerment programme** under the **Ministry of Rural Development**, focusing on sustainable livelihoods, financial inclusion, and social mobilization through Self-Help Groups (SHGs).
- **Launched in:** 2011 as National Rural Livelihoods Mission (NRLM) by restructuring the Swarnajayanti Grameen Swarozgar Yojana (SGSY).
- It has been renamed as Deendayal Antyodaya Yojana – NRLM (DAY-NRLM) in 2016.
- **Aim:** To reduce rural poverty by enabling poor households, especially women, to access gainful self-employment and skilled wage opportunities through community institutions, skill training, and access to credit.

History:

- The mission represents a paradigm shift from subsidy-driven programmes to **self-reliance through institution-building**.
- It is jointly funded by the **Centre and States** and is among the **world's largest community-mobilisation programmes**, aligning with SDGs 1 (No Poverty) and 5 (Gender Equality).

Key Features:

- **Social Mobilization & SHG Formation:** Over 10.05 crore rural women organized into 90.9 lakh SHGs across 28 States and 6 UTs.
- **Community Resource Persons:** Deployment of Bank Sakhis, Krishi Sakhis, and Pashu Sakhis to deliver last-mile financial, agricultural, and livestock services.
- **Financial Inclusion:** Over ₹11 lakh crore in collateral-free credit disbursed to SHGs with a 98% repayment rate, making it a global model of credit discipline.
- **Livelihood Diversification:** Promotion of farm and non-farm activities, including 4.62 crore Mahila Kisans, 1.95 lakh producer groups, and 3.74 lakh rural enterprises supported under SVEP.
- **Skill Development:** Implementation of **DDU-GKY** (placement-linked training for youth) and **RSETIs** (entrepreneurship training), training over **74 lakh youth** cumulatively by mid-2025.
- **Sustainable Agriculture:** Creation of 6,000 integrated farming clusters and scaling of agro-ecological practices to improve rural resilience.
- **Digital Inclusion:** Integration with Direct Benefit Transfer (DBT) and Digital Public Infrastructure to ensure transparency and last-mile delivery.

Demographic shift and India

- India's **elderly population** (60+) is rapidly increasing, from **149 million** in 2023 (10.5% of the

population) to an estimated **347 million** by 2050 (20.8%).

Challenges of an Ageing Population

- **Rising Dependency Ratio:** India's old-age **dependency ratio** is **15.7** per 100 (2023), increasing economic pressure on public resources.
- **Healthcare Burden:** **30%** of elderly women and **28%** of elderly men suffer from **chronic conditions** like diabetes and hypertension, especially in rural areas (Longitudinal Ageing Study of India, LASI 2017-18).
- **Financial Insecurity:** According to **India Ageing Report 2023,** 40% of India's elderly are in the poorest quintile, with **18.7%** lacking income.
- **Inadequate Pension & Insurance Coverage:** Less than 20% of elderly Indians have health insurance, leading to significant **out-of-pocket health expenses**.
- **Social Isolation:** **Migration** of younger family members leaves many elderly, especially in Kerala (16.5% elderly), facing loneliness and depression.
- **Labour Force Shrinkage:** The growing elderly population in states like **Kerala** and **Tamil Nadu** threatens economic productivity due to a shrinking workforce.
- **Caregiving Pressures:** **58%** of elderly men and **68%** of elderly women need **daily assistance**, burdening family caregivers (LASI, 2017-18).
- **North-South Demographic Divide:** Southern states are ageing rapidly due to lower fertility and better healthcare, which leads to uneven pressure on southern states.

Government Initiatives for the Aging Population

- **National Policy on Older Persons (NPOP),1999:** Promotes senior citizens' health, safety, and well-being through financial security, healthcare, and shelter. It also focuses on **family** as a **support system**.
- **Indira Gandhi National Old Age Pension Scheme (IGNOAPS):** This scheme provides monthly **pensions** to **BPL elderly** (60+) to ensure basic financial security.
- **Rashtriya Vayoshri Yojana (RVY):** Provides physical aids (vision, hearing, mobility devices) to elderly BPL citizens with age-related disabilities.
- **Pradhan Mantri Vaya Vandana Yojana (PMVVY):** Pension scheme offering guaranteed returns for senior citizens, ensuring post-retirement financial security.
- **Varishtha Pension Bima Yojana (VPBY):** **Monthly pension** scheme for citizens aged 60+, offering **regular income** as a social security measure.
- **Atal Vayo Abhyuday Yojana (AVYAY):** Consolidates elderly welfare programs, focusing on helplines, healthcare access, and reducing social isolation.
- **National Programme for Health Care of the Elderly (NPHCE), 2010:** Provides specialised healthcare for the elderly, focusing on chronic disease management and geriatric healthcare units.
- **Integrated Programme for Senior Citizens (IPSrC):** Offers financial aid to **NGOs for old-age homes**, daycare centers, and mobile healthcare for the elderly in underserved areas.

- Ayushman Bharat (PM-JAY) Provides free **secondary** and **tertiary healthcare services** for senior citizens.

Way Forward

- **Promoting Older Worker Employment:** Offer **tax incentives** for companies hiring older workers.
- **Leveraging Experience:** Establish mentorship programs for older adults to share expertise. **Singapore's "SkillsFuture"** initiative encourages this knowledge transfer.
- **Flexible Work Opportunities:** Create part-time jobs for older adults without compromising health. **Australia's "Workplace Gender Equality Agency"** promotes such flexible arrangements.
- **Investing in Age-Friendly Infrastructure:** Develop accessible public spaces and transportation.
- **Strengthening Healthcare Infrastructure:** Invest in **geriatric care**, especially in rural areas, where **79.9%** of Community Health Centers lack specialists.
- **Developing Long-term Care Systems:** Create care facilities and home-based support for chronic conditions like **dementia**. Norway's comprehensive home care model supports seniors with chronic illnesses.
- **Promoting Age-Friendly Environments:** Implement urban planning policies that enhance mobility and social engagement. **New Zealand's "Age-Friendly Cities"** initiative aims for inclusive environments.
- **Expanding Social Security Coverage:** Strengthen pension schemes like **PMVVY** and **IGNOPS** for financial stability, similar to **Denmark's flexible pension system**.
- **Leveraging Technology for Elderly Care:** Expand telemedicine services and promote digital literacy.

India's Electronics Export Boom

- In FY2024–25 and FY2025–26, electronics goods became India's **third-largest export category**, driven by PLI schemes, policy reforms, and global supply-chain diversification.
- With exports crossing **$40 billion (FY25)** and **$22.2 billion in the first half of FY26** (↑41.9% YoY), India's electronic sector has emerged as a new growth frontier.
- **India's Electronics Export Performance Overview**
- **Rapid Rise:** Electronics now form **10.1% of India's total exports** (FY26 H1), up from 3.5% in FY17.
- **Rank Progression:** 8th in FY17 → 6th in FY22 → **Top 3 by FY25**, surpassing gems, pharma, and textiles.
- **Major Market:** U.S. remains top destination, exports to U.S **↑100%** aided by 50% tariff exemption.
- **Comparative Growth:** Electronics exports **doubled** vs FY20–FY24 average, while engineering goods grew 20.1% and pharma 24.1%.
- **Dominant Segment:** Telecom equipment (mainly smartphones) comprises **64.1% of electronics**

exports (FY25), up from 51% (FY23).

Operation White Cauldron

- The Directorate of Revenue Intelligence (DRI) busted a clandestine factory in Valsad, Gujarat, manufacturing the psychotropic drug Alprazolam, seizing drugs worth ₹22 crore and arresting four people under "Operation White Cauldron."
- A nationwide anti-narcotics operation led by the DRI targeting clandestine drug manufacturing units involved in producing psychotropic substances under the NDPS Act, 1985.
- **Aim:** To dismantle inter-state synthetic drug networks, curb illegal trade of chemical precursors, and support India's Nasha Mukt Bharat Abhiyaan.

Significance of Operation White Cauldron:

- **Curbing Synthetic Drug Trade:** Dismantled a major illegal Alprazolam unit, stopping large-scale synthetic drug circulation across states.
- **Boosting Inter-State Coordination:** Strengthened cooperation among enforcement agencies to track and eliminate narcotic networks under the NDPS Act.
- **Advancing Anti-Drug Mission:** Reinforced the goals of Nasha Mukt Bharat Abhiyaan through proactive surveillance and public health protection.

Wind Power Capacity in India

- Union Minister for New and Renewable Energy (MNRE) Pralhad Joshi announced that **6 GW of new wind capacity** will be **added by FY 2025-26**.
- **Installed Capacity:** India **ranks 4th** globally (after **China**, the **US**, and **Germany**) with **54 GW** of installed wind capacity and **30 GW** under implementation.
- **Power Contribution:** Wind energy accounted for **4.43% of India's total electricity generation** in FY 2024-25 and is on course to achieve **100 GW capacity target by 2030**.
- **Regional Concentration:** Wind power capacity is concentrated in **southern** and **western India**, led by **Gujarat**, with **Tamil Nadu**, **Karnataka**, and **Rajasthan** following.

Government Initiatives for Wind Energy

- **National Wind-Solar Hybrid Policy:** Supports large-scale **grid-connected hybrid projects** that combine wind and solar PV to maximise land and grid efficiency.
- **National Offshore Wind Energy Policy:** Establishes the framework for offshore wind development within India's **Exclusive Economic Zone** (EEZ) under MNRE supervision.
- **Viability Gap Funding (VGF) Scheme for Offshore Wind:** Allocates ₹7,453 crore to support initial 1 GW offshore projects (**500 MW** each off **Gujarat** and **Tamil Nadu**).
- **Inter-State Transmission System (ISTS) Waiver:** Grants **a complete waiver** of ISTS charges

for wind and solar projects commissioned before July 2025; applicable **for 25 years**.

Urban Mobility India Conference 2025

- The **18th Urban Mobility India (UMI) Conference & Exhibition 2025** was inaugurated in **Gurugram** by the **Ministry of Housing & Urban Affairs and Power**.
- **Key Initiatives & Announcements**
- **Metro Expansion:** India now has ~1,100 km of operational metro network, the 3rd-largest globally; it aims to become the 2nd-largest soon.
- **Electric Mobility:** Under **PM e-Bus Sewa**, 10,000 e-buses to be deployed in smaller cities; 100 e-buses earmarked for Gurugram.
- DMRC's international subsidiary, **Delhi Metro International Limited (DMIL),** will now act as the nodal agency for consultancy, construction, and MRTS projects in India and overseas.
- **Transit-Oriented Development (TOD)** and **National Common Mobility Card (NCMC)** are highlighted as game-changers for seamless travel.

Awards for Excellence in Urban Transport (2025)

Award Category	Winner
1. Best Public Transport System	1. Chennai (Metropolitan Transport Corporation)
2. Best Non-Motorised Transport System	2. Udaipur (Udaipur Smart City Ltd.)
3. Most Innovative Financing Mechanism	3. Pimpri Chinchwad Municipal Corporation
4. Best Green Transport Initiative	4. Hyderabad (TGREDCO)
5. Best Multimodal Metro Integration	5. Chennai Metro Rail Ltd.
6. Best Passenger Services (Metro Rail)	6. Delhi Metro Rail Corporation (DMRC)
7. Running Trophy-Best Urban Transport Projects (State/UT)	7. Kolkata & Mysuru (Joint Winners); Special Mention: Bhubaneswar
8. Special Award – Traffic Management	8. Aizawl, Mizoram

Government to establish UCBs in all cities with populations over 2 lakh within five years

- The Union Minister of Cooperation committed it, while addressing the international conference on the urban cooperative credit sector-**Co-Op Kumbh 2025** in New Delhi.

- The government also launched **Sahkar Digi-Pay and Sahkar Digi-Loan applications** that will enable even the smallest UCBs to offer digital payment and loan facilities.

Urban Cooperative Banks (UCBs)

- They are a **subset of cooperative banks** in India that operate **primarily in urban and semi-urban areas**.
- **History**: **Cooperative Credit Societies Act of 1904** and its 1912 amendment laid the legal foundation.
- They are **registered as cooperative societies** under the respective State Cooperative Societies Acts (for single-state operations) or the Multi-State Cooperative Societies Act, 2002 (for operations across multiple states).
- **Control and Regulation**: UCBs function under a dual regulatory framework:
- **Banking Regulation Act, 1949**: They were brought under the purview of the Banking Regulation Act, 1949 through an Amendment in 1966.
- **The Banking Regulation (Amendment) Act, 2020** has given RBI more control over UCBs, allowing it to intervene in their management and governance.
- **Registrar of Cooperative Societies (RCS)**: The respective state governments or the central government control administrative functions through the RCS.

Significance of UCBs

- **Financial Inclusion**: UCBs primarily cater to small borrowers, lower-income groups.
- **Local Focus**: UCBs operate within specific communities and provide tailored financial services.
- **Priority Sector Lending (PSL)**: UCBs have to allocate 60% to PSL.
- **Challenges to UCBs: Concentrated in few states (Like Andhra Pradesh, Maharashtra, Gujarat),** Dual regulation by RBI and state cooperative bodies, **acute market competition** with Small Finance Banks (SFBs), FinTechs, etc.

Climate investment fund (CIF)

- Recently, Spain and Germany committed $100 million for the **CIF's Accelerating Resilience Investments and innovations for Sustainable Economies (ARISE)** during COP 30 of UNFCCC in Brazil
- ARISE, aims to help developing countries "turn climate risk into opportunity" and to strengthen the "adaptive capacity" of economies

CIF

- **Established:** In 2008 by world and regional multilateral development banks.
- **About:** It is a multilateral climate fund that enables climate action in over 70 low- and middle-income countries
- **key feature:** Providing funding that allows developing nations to incorporate low-carbon programmes into their national development plans**.**

- **Currently, the CIF has 2 main funds:** Clean Technology Fund and Strategic Climate Fund.

Nine Years After Demonetisation

- Even nine years after demonetisation, police in Ghaziabad uncovered a **fraud racket targeting people** still holding old ₹500 and ₹1,000 notes.
- The arrests show that a small underground market for these **demonetised notes still exists**.

Key Data Facts

- Currency held by the public **dropped sharply** from ₹17.97 lakh crore in November 2016 to **₹7.8 lakh crore** in January 2017, immediately after demonetisation.
- As of 17 October 2025, the amount of currency with the public has climbed to **₹37.29 lakh crore** (RBI data), more than double the pre-demonetisation level.
- This shows that, despite the expansion of digital payments, cash remains **deeply embedded** in the **economy** and that **overall cash usage** has **not structurally decreased**.

Currency-to-GDP Ratio

- As per RBI, India's **Currency-in-Circulation (CIC)** to **GDP** ratio fell to **11.11% in 2025**, lower than the pandemic peak of 14.5% (2020-21). Before demonetisation (2016-17), the ratio was 8.7%.
- The fall in the ratio suggests that, although the **total amount of cash** has **increased**, the economy has **grown faster**, reducing cash's share of GDP.
- India's **Currency-to-GDP ratio** stands at **11.1% (2025)**, higher than major economies like the **U.S.** (**7.96%**), **Russia (8.3%)**, and **China (9.5%)**.
- Despite this high ratio, UPI digital payments **grew at a 49% CAGR** between FY23 and FY25.
- Reasons India's ratio is on the higher side include a large informal sector that still relies on cash and **lower adoption of cards** and **bank-based digital solutions** in many regions.

Mandatory 'Country of Origin' Filter on E-commerce Platforms

- The **Ministry of Consumer Affairs** has issued the **Draft Legal Metrology (Packaged Commodities) (Second) Amendment Rules, 2025**.

Legal Metrology (Packaged Commodities) (First Amendment) Rules, 2025

- Notified by the **Department of Consumer Affairs** (Ministry of Consumer Affairs, Food & Public Distribution) in October 2025.
- The amendment aims to **harmonise labelling requirements** for **packaged medical devices**.
- Aligns provisions of the **Legal Metrology (Packaged Commodities) Rules, 2011,** with the **Medical Devices Rules, 2017**, avoiding duplication or conflicting compliance.

Key Features of the Amendment

- **E-commerce platforms** will be required to provide a **searchable** and **sortable** filter that clearly displays the **country of origin** for **all packaged products** listed online.
- The provision will apply **especially to imported goods**, enabling users to identify origin information before purchase.
- This requirement will be inserted under **Rule 6(10)** of the **Legal Metrology (Packaged Commodities) Rules, 2011**.
- **Objective:** To enhance **consumer empowerment** and **transparency** in online shopping.
- It enables buyers to **make informed decisions** by easily identifying whether a product is Indian or imported.

*Thousands of Indian artisans and small businesses have faced losses after the **United States doubled import tariffs** on select **Indian goods to 50%** from August 27, 2025.*

Legal Metrology (Packaged Commodities) Rules, 2011

- The Legal Metrology (Packaged Commodities) Rules, 2011, under the **Legal Metrology Act, 2009**, regulate labelling and pricing of pre-packaged goods to protect consumers.
- The rules require precise and accurate disclosure of quantity, price, and other essential information, preventing misleading or unfair trade practices.
- **Dual pricing** (multiple MRPs) on the **same pre-packaged product** is **prohibited**.
- **Compliance is monitored** through inspections by **State Legal Metrology Departments** and the **Department of Consumer Affairs**, along with a public grievance system.

India's Need for Nutritional Transformation

- India's food policy is evolving from food security to nutritional security, with growing emphasis on **functional foods** and **smart proteins** to meet health, economic, and sustainability goals.

Functional Foods and Smart Proteins

- **Functional Foods:** Nutrient-enriched foods that promote health. E.g., Bio-fortified crops like zinc rice (IIRR Hyderabad) and iron pearl millet (ICRISAT) developed under ICAR programmes.
- **Smart Proteins:** Bio-manufactured proteins that reduce livestock dependence, including plant-based, fermentation-derived, and cultivated meat proteins. E.g., Startups like GoodDot and Blue Tribe Foods are pioneering plant-based alternatives; **Zydus LifeSciences** entered fermentation-based protein R&D.

Why India Needs Nutritional Transformation?

- **Persistent Malnutrition:** Around **35.5% of children** are stunted and **19% wasted** (NFHS-5, 2021), showing that food quantity does not ensure nourishment.
- **Protein Deficit:** Average protein intake at **~47 g/day** is below the FAO-recommended **60 g/day**, contributing to poor muscle mass and fatigue.
- **Urban-Rural Gap:** Urban households consume **25–30%** more protein than rural ones (NITI Aayog, 2023).
- **Rising Non-Communicable Diseases:** India has **77 million diabetics** and **25 million obese adults** (IDF 2023, WHO 2024), demanding nutrition-dense, low-sugar diets.
- **Environmental Pressure:** Agriculture contributes **18–20%** of India's GHG emissions (FAO 2022); shifting to smart proteins can lower emissions by up to **90%** compared to livestock.
- **Economic Opportunity:** The global alternative-protein market, projected at **$240 billion by 2030**, can generate jobs in India's bio-manufacturing sector.

Challenges in India's Nutritional Shift

- **Regulatory Vacuum:** FSSAI has **no defined standards** for cultivated meat or fermentation-based foods.
- **Public Perception:** **Only 28%** of Indians trust lab-made foods, limiting adoption (NCAER 2024).
- **Infrastructure Deficit:** India has **fewer than 15 large-scale fermentation plants** (DBT 2024), constraining protein manufacturing capacity. The EU Farm-to-Fork Strategy funds >100 pilot bio-s.
- **Cost Accessibility:** Functional foods cost **20–30% more** than conventional staples (NCAER 2024). E.g. A fortified rice pack costs **₹50/kg versus ₹38/kg** for regular rice.
- **Skill Gaps:** **Less than 10%** of food-science graduates specialise in nutritional biotechnology (AICTE 2023).

Way Forward

- **National Nutrition Innovation Policy:** Formulate an inter-ministerial policy integrating DBT, MoHFW, and FSSAI. E.g., **Japan's FOSHU Model** ensures pre-market validation and consumer safety.
- **FSSAI Regulatory Framework:** Establish clear definitions, safety tests, and labelling norms for smart proteins and bio-fortified foods. E.g., **Singapore's Novel Foods Safety Protocol (2020)**.
- **Public–Private Collaboration:** Foster partnerships under **BIRAC** and **NITI Aayog** for R&D infrastructure. E.g. **India's BioE^3 incubators** can replicate the EU's BioManufacturing Valley concept.
- **Consumer Awareness Campaigns:** Promote acceptance of new food technologies through **Eat Right India** and school nutrition education.
- **Farmer Inclusion:** Integrate small farmers into bio-fortified crop value chains with MSP incentives and assured procurement. E.g., **ICRISAT's model** of community millet fortification networks in Maharashtra.
- **R&D and Skill Development:** Introduce **nutritional biotechnology** courses in agricultural and

food institutes to build human capital. E.g., **China's National Innovation Centre** for Smart Food.

India's Defence Manufacturing Landscape

- Defence Minister Rajnath Singh inaugurated the **Defence Public Sector Undertakings** (DPSUs) **Bhavan** in New Delhi and highlighted the central role of DPSUs in India's defence manufacturing.
- **Record Output:** Defence production hit an **all-time high** of **₹1.51 lakh** crore in FY 2024-25, marking an **18% growth** over FY 2023-24 and nearly **doubling** since **FY 2019-20**.
- **Sectoral Contribution:** **DPSUs** accounted for **71.6%** of total output, while the private sector contributed 23%.
- **Export Record:** Defence exports increased to **₹23,622 crore** in FY 2024-25, marking a **12% rise** from the previous year.
- **DPSU Export:** DPSUs contributed **₹8,389 crore** to total exports, a 43% increase year-on-year.

*India has **16** Defence Public Sector Undertakings (DPSUs) under the **Ministry of Defence**, including **seven companies** formed by corporatising the **Ordnance Factory Board** (OFB) in 2021.*

Struggle to Produce Indian Nobel Laureates

- India has not produced a Nobel laureate in science in nearly a century, despite a vast scientific talent base and expanding research network.

Current Status of Indian Science and R&D

- **Low Research Investment:** India's R&D expenditure remains at **0.7% of GDP**, far below **China (2.4%)**, **Japan (3.3%)**, and **South Korea (4.9%)** (UNESCO, 2023).
- **Public-Dominated Research:** Over **80% of total R&D** spending comes from government sources, while the private sector's share remains **under 15%** (DST, 2024).
- **Talent Drain:** India contributes **nearly 10% of global STEM graduates**, yet loses thousands of researchers annually to advanced ecosystems abroad.
- **Publication–Innovation Gap:** India ranks **3rd globally** in research output but **only 36th in citation impact** (Scopus, 2024), reflecting a focus on volume, not value.
- **Fragmented Institutions:** The country hosts over **1,400 R&D institutions**, but many operate in silos with limited inter-agency collaboration

Barriers to Scientific Excellence in India

- **Opaque Recruitment:** Hiring in major research institutions lacks transparency, with reports of regional bias and patronage overshadowing merit-based selection (CAG, 2022).
- **Weak Research Infrastructure:** **Equipment shortages** and **maintenance delays**, especially in universities, result in under-utilisation of up to **40% of laboratory capacity (NITI Aayog, 2023).**
- **Leadership Deficit:** Top posts in bodies like the Council of Scientific and Industrial Research and

Department of Biotechnology (DBT) often remain vacant for long periods (Parliamentary Committee, 2020).

- **Overlapping Governance:** The **2021 NITI Aayog Science and Technology Index** found overlapping mandates among agencies, causing duplication and underutilisation of research grants.

Way Forward

- **Younger Leadership:** Reserve half of top posts – **Directors, Vice-Chancellors, and Secretaries of DST/DBT/CSIR** – for mid-career scientists (40–50 years), replicating the **reformist model** once led by **Homi Bhabha and Vikram Sarabhai**.
- **Higher R&D Spending:** Raise research outlay to **3% of GDP** as envisaged in **STIP-2020**, with separate funds for basic sciences, clean energy, and space technology to build global-scale labs.
- **Industry Collaboration:** Provide tax credits and grants for companies partnering with public labs – similar to the **ISRO-L&T** and **DRDO-Tata Advanced Systems** models to scale applied research.
- **Outcome-based evaluation:** Under the **National Research Foundation (NRF)**, rank institutions by patents, technology transfers, and societal impact instead of publication count.

Digital Gold

The **Securities and Exchange Board of India (SEBI)** issued a **public advisory** warning investors against investing in **'Digital Gold' or 'E-Gold' products** offered via various **online platforms**, clarifying that such products **do not fall under SEBI's regulatory framework**.

- Digital gold refers to **buying gold without physically possessing the precious metal**.
- The price of digital gold is **linked to that of physical gold**.
- Digital gold is **created using blockchain technology** and allows investors to buy, sell and store gold electronically.
- These products are **neither notified as securities nor regulated as commodity derivatives**.

Credit Guarantee Scheme for Exporters

- The Union Cabinet approved the **Credit Guarantee Scheme for Exporters (CGSE)** under the **Ministry of Finance** to enhance India's export sector.
- **Objective:** Enhance the **global competitiveness** of Indian exporters and promote market diversification.
- **Credit Guarantee:** It provides a **100% credit guarantee** to **Member Lending Institutions (**MLI**)** that provide additional credit facilities to exporters.
- **Credit Support:** It offers up to **₹20,000 crore** in **collateral-free** credit support to eligible exporters, including **Micro, Small, and Medium Enterprises (**MSMEs**)**.
- **Implementation:** The Department of Financial Services (DFS) will carry out the scheme through

the **National Credit Guarantee Trustee Company Limited (NCGTC)**.

- **Significance:** The initiative advances India's progress toward the **USD 1 trillion export target**, thereby strengthening the vision of **Aatmanirbhar Bharat**.

India's Export Landscape

- India's **total exports** reached a record **USD 824.9 billion** in FY 2024–25, accounting for nearly **21% of India's GDP**.
- **Employment:** Export-linked industries employ over **45 million people** directly and indirectly.
- **Composition:** Services constitute about **46.91%** of India's exports, while **MSMEs** account for nearly **45%** of the total exports.
- **Global Standing:** India ranks **seventh** in exports of **commercial services** and **second** in **telecommunications**, **computer**, and **information services**.

Protection of Plant Varieties and Farmers' Rights (PPV&FRA) Act, 2001

- **'Plant Genome Saviour Awards Ceremony'** was held to celebrate **25 years** of the **Protection of Plant Varieties and Farmers' Rights (PPV&FRA) Act, 2001.**

About PPV&FRA Act, 2001

- **Objectives:** To establish an effective protection system for plant varieties, farmers'' and breeders'' rights; encourage new variety development and seed industry growth.
- It recognizes following **rights**:
- **Farmers' rights**: Registration and protection of new, farmers'', and extant varieties; rewards for conservation.
- **Researchers' rights**: Use of any registered variety for experiments.
- **Breeders' rights**: Exclusive rights to produce, sell, import or export etc.
- **Protection of Plant Varieties and Farmers'' Rights Authority (PPV&FRA):** Established in **2005** as a **statutory body** under **Ministry of Agriculture and Farmers Welfare.**
- **Functions:** Registration of new plant varieties, national gene bank etc.

Global Inequality Report 2025

- The **Global Inequality Report 2025** was recently commissioned by the **South African Presidency** of the G20.
- It was prepared by the **G20 Extraordinary Committee of Independent Experts on Global Inequality**, led by Nobel laureate **Joseph E. Stiglitz**.

Key Findings of the Report

1. The Scale of Inequality

- **Wealth Gap:** The **wealthiest 1% gained 41% of all new global wealth since 2000**, while the bottom half received only 1%.
- **Income Divide:** Around **83%** of **countries**, covering **90%** of the world's **population**, face high income inequality with Gini scores **above 0.4**.
- **Food Crisis:** **One in four** people (2.3 billion) experience moderate or severe food insecurity, an increase of 335 million since 2019.
- **Inherited Wealth:** About **$70 trillion** will be transferred **via inheritance** in the next decade, continuing intergenerational inequality.

Key Drivers of the Inequality

- **Capital Dominance:** Since 1990, **56% of countries** have seen a rise in income **share for capital**, while the overall labour share has declined globally.
- **Concentrated Ownership:** Nearly **85%** of the population **derives no income from capital**, highlighting the extreme concentration in capital ownership.
- **Wage Disparity:** Between 2019 and 2024, the average CEO pay increased by 50%, while the average **worker's income** rose by **less than 1%**.
- **Public Wealth Erosion:** Rapid **private wealth growth outpaced public asset expansion**, leading to governments with high net debt and limited investment capacity.

Consequences of High Inequality

- **Democracy Collapse:** High inequality makes democratic systems **seven times** more likely to **weaken** or eventually **collapse**.
- **Health & Social Gaps:** Health and social outcomes decline sharply under inequality; e.g. African American women are twice as likely to die in childbirth as white women or women in Kerala.

India-Specific Findings

- **Wealth Concentration:** India's **richest 1%** increased their **wealth share by 62%** between 2000 and 2023.
- **Capital Divide:** Nearly **97%** of Indians earn **negligible income from capital**, highlighting a sharp labour–capital divide
- **Rising Ultra-Wealthy:** India's **millionaire population** grew by **6%** in **2024**, with **191 billionaires** recorded nationwide.
- **Global Role:** Rising per capita incomes in India and China have slightly narrowed income inequality between countries.

Key Policy Recommendations

- **New Global Body:** Establish an **International Panel on Inequality (IPI)**, modelled on the IPCC, to provide authoritative and data-driven assessments on inequality.
- **Global Tax Reform:** Implement a global minimum tax on ultra-rich individuals and promote stronger **progressive taxation** on income and wealth.

- **Fair Trade Rules:** Revise **global trade** and **IP laws** to give developing countries better access to health and clean-energy technologies.
- **Public Investment:** Increase funding for universal education, healthcare, and social protection to build fair and equal opportunity systems.

SEBI Warns Against Digital Gold Investments

- The **Securities and Exchange Board of India (**SEBI**)** has issued a **public advisory** cautioning investors against **investing in digital gold** and **e-gold products**.

What is Digital Gold?

- Digital gold refers to the **online purchase of gold** without physically possessing it.
- The **value of digital gold is linked to the price of physical gold**, and it is often created and traded using blockchain technology.
- It allows investors to **buy, sell, and store gold electronically** and even **convert holdings** into physical gold, such as coins, bars, or jewellery.
- **Advantages:** Eliminates **storage and security concerns**, enables investment in **small denominations** and **offers quick liquidity** during emergencies.

Why Did SEBI Issue a Warning?

- SEBI noted that several digital platforms are **marketing digital gold** as an investment alternative to physical gold, **without regulatory oversight**.
- Such products are **neither classified** as **securities** nor **regulated as commodity derivatives**, meaning they operate **outside SEBI's jurisdiction**.

Risks Associated with Digital Gold

- **Lack of Regulation:** Operates **outside SEBI's framework**, making **redressal difficult** in case of disputes or fraud.
- **Counterparty Risk:** Since digital gold is **not traded on exchanges**, investors **depend entirely** on the **platform's reliability**. A default or insolvency can lead to a total loss.
- **Operational Risk:** Issues such as mismanagement, technical glitches, or fraudulent storage claims pose additional threats.
- **No Transparency:** Absence of standardised pricing and storage audits increases investor vulnerability.
- **Market Influence:** Aggressive marketing & social media promotions often obscure the associated risks.

SEBI-Approved Avenues for Safe Gold Investment

- SEBI recommends **investors opt** for regulated gold investment products such as:
- **Gold Exchange-Traded Funds (**ETFs**):** Traded on stock exchanges, backed by physical gold

holdings, and governed by SEBI norms.

- **Sovereign Gold Bonds (**SGBs**):** Issued by the RBI on behalf of the government, offering fixed interest and capital appreciation.
- **Electronic Gold Receipts (EGRs):** Tradeable instruments on exchanges representing actual gold holdings.
- **Commodity Derivatives (MCX/NSE):** Offer exposure to gold prices with risk management, mark-to-market settlements, and clearing corporation guarantees, reducing default risks.

Export Promotion Mission

- The Union Cabinet has approved the flagship **Export Promotion Mission** (EPM) to provide a comprehensive, flexible, and digitally driven framework for export promotion.

Export Promotion Mission

- The Export Promotion Mission (EPM) is a flagship **central sector scheme** of the **Ministry of Commerce and Industry** to improve India's export competitiveness.
- **Announcement:** Announced in the **Union Budget 2025-26**, it prioritises **MSMEs**, **new exporters**, and labour-intensive sectors.
- **Nodal Body:** The **Directorate General of Foreign Trade** (DGFT) is the primary implementing agency.
- **Export Targets:** The mission supports India's goal to achieve **USD 2 trillion** in total exports **by 2030** and raise the **export-to-GDP ratio** to **15%**.
- **Financial Outlay:** A total allocation of **₹25,060 crore** will be implemented over **six financial years** from FY 2025-26 to **FY 2030-31**.
- **Outcome Orientation:** A **data-driven monitoring system** will track exporter performance and scheme utilisation to guide timely policy adjustments.
- **Scheme Consolidation:** The mission consolidates fragmented schemes like the **Interest Equalisation Scheme** (IES) and the **Market Access Initiative** (MAI) into a unified support mechanism.
- **Priority Sectors:** **Labour-intensive** sectors such as **textiles**, **gems**, **leather**, and **marine products** will receive focused support in response to global tariff escalations.
- **Digital Platform:** A dedicated digital portal integrates all submissions and disbursals processes with existing trade systems for seamless digital handling.
- **Sub-Schemes:** The mission will operate through two coordinated components: (1) **NIRYAT PROTSAHAN** and (2) **NIRYAT DISHA**.

1. NIRYAT PROTSAHAN

- **Objective:** NIRYAT PROTSAHAN expands exporters' access to **affordable trade finance** and reduces their overall cost of borrowing.
- **Financial Tools:** It provides **interest subvention**, **collateral-free credit guarantees**, and export

factoring support to broaden available financing options.

2. NIRYAT DISHA

- **Purpose:** NIRYAT DISHA delivers **non-financial support** that strengthens exporters' market preparedness and trade competitiveness.
- **Support Areas:** It covers **quality certification**, **international branding**, trade fairs, warehousing, and inland transport reimbursements to ease non-financial barriers.

Cabinet approves Credit Guarantee Scheme for Exporters (CGSE)

- **Total Credit Support:** Up to additional **₹20,000 crore collateral-free** with 100% guarante coverage by **National Credit Guarantee Trustee Company Limited (NCGTC).**
- **Beneficiaries:** Both MSME and non-MSME exporters.
- **Objective:** To enhance liquidity, support market diversification, boost employment, and improv global competitiveness.
- **Implementing Agency**: Department of Financial Services (DFS) through NCGTC
- **Oversight Body**: A management Committee formed under the chairmanship of Secretary, DFS.

Pratyush Sinha Committee

- A SEBI-appointed High-Level Committee (HLC), under the chairmanship of Pratyush Sinha recommended stronger rules to prevent conflicts of interest among top officials within SEBI.

Key Recommendations of the Committee

- Mandatory Disclosure: Of assets and liabilities by the Chairperson, whole-time members and senior officers.
- Insider Classification: Top SEBI leadership to be categorised as "insiders" under insider-trading regulations.
- Investment Restrictions: Senior officials and dependent family members allowed investing only through pooled, professionally-managed funds.
- Ethics Oversight: Creation of an Office of Ethics & Compliance, digital disclosure registry, and formal recusal reporting.
- Dedicated whistleblower channel for conflict-of-interest reporting.

National Migration Survey 2026

- MoSPI will launch a year-long national migration survey from July 2026, the **first full migration survey** since 2007–08.
- As per the most recent migration data collected by the statistics ministry part of its Periodic Labour Force Survey (2020-2021), **India's percentage of migrants** in the population was **28.9%.**

Significance of the Migration Survey

- **Labour Mapping:** Tracks work-driven mobility; E.g., **67% male migration** for jobs (PLFS 2021).
- **Gender Trends:** Captures female patterns; E.g., **48% rural women** are migrant's vs **5.9% men**.
- **Crisis Insight:** Builds post-COVID understanding for planning. E.g. **11 million** reverse migrants (IGC).
- **Regional Equity:** Shows source–destination imbalances; E.g. **UP–Bihar** has the highest out-migration.
- **Skill Policy:** Enables **skill–mobility corridor** design; E.g. **Kerala migration–skills model**.

Key Changes to be made in the 2026 Survey

- **Revised Short-Term Definition:** Short-term migration now means staying away **15 days–6 months** (earlier 1–6 months), improving capture of gig, festival-season, and circular workers across sectors.
- **Removal of Household Migration:** Eliminates the "entire household migrated" category as its share has been consistently **below 1%**, sharpening the survey's focus on individual mobility.
- **Addition of Impact Indicators:** Adds questions on **income change**, **healthcare access**, **safety**, and **basic amenities**, allowing a clearer assessment of welfare outcomes associated with migration.
- **Capturing Migration Intent:** Introduces a module on whether migrants plan to move again, enabling forward-looking analysis and better prediction of future mobility flows.
- **Exclusion of Hard-to-Reach Areas:** Leaves out remote **A&N Island villages** due to severe access constraints, while maintaining national-level representativeness and operational feasibility.
- **Expanded Reason Categories:** Broadens reasons for migration into **work**, **search-work**, **education**, **marriage**, and **distress**, providing a more accurate and behaviour-sensitive classification.

Draft Shram Shakti Niti 2025

The **Ministry of Labour and Employment** released the Draft Shram Shakti Niti 2025 to modernise labour governance and accelerate the government's **shift toward labour facilitation**.

- Draft Shram Shakti Niti 2025 is **India's first comprehensive National Labour and Employment Policy** aimed at creating a fair, inclusive and technology-enabled labour ecosystem.
- **Social Security:** It proposes a **Universal Social Security Account** (USSA) that integrates EPFO, ESIC, PM-JAY, e-SHRAM and state welfare boards **to ensure lifelong** and **portable worker benefits**.
- **Workplace Safety:** The framework commits to enforcing the **Occupational Safety and Health (OSH) Code 2020** using AI-based risk inspections to achieve **near-zero workplace fatalities by 2047**.
- **Future Workforce:** To build a skilled and adaptable workforce, the policy converges Skill India and PMKVY with an upgraded **National Career Service platform** for more accurate job matching.

- **Digital Backbone:** The **Labour and Employment Stack** will integrate worker identities, enterprise databases and social security entitlements through a unified digital architecture.
    - **DPI:** It will link with the National Career Service to function as a **Digital Public Infrastructure (DPI) for Employment**.
- **Women's Participation:** It aims to raise **female labour force participation** to **35% by 2030** through flexible working arrangements, safer workplaces and expanded childcare support.
- **Compliance Ease:** A **single-window digital portal** will simplify labour administration by enabling **self-certification** and conducting transparent, **risk-based inspections**.
- **Governance Reform:** A new **Labour & Employment Policy Evaluation Index** will assess implementation progress and provide **real-time performance monitoring** across states and ministries.

Challenges Associated with the Draft Policy

- **Funding Gap:** The policy lacks a clear **financing formula for the USSA**, creating uncertainty about long-term social security for informal and gig workers.
- **Digital Divide:** Heavy reliance on digital platforms risks excluding rural workers, women, and older workers who have **limited digital literacy**.
- **Regulatory Shift:** Transitioning the government into a **facilitator role may dilute oversight** and weaken enforcement.
- **Informal Sector:** The policy does not adequately address the protection of rights and dispute resolution mechanisms for informal and gig workers.
- **Dialogue Weakening:** Absence of a formal tripartite negotiation system restricts the role of trade unions and weakens **participatory labour governance**.
- **AI Risks:** AI-based labour platforms can embed **caste**, **gender**, or **regional biases** without robust safeguards and stringent data protection rules.

Way Forward

- **Co-Funded Security:** Introduce a **tripartite contribution model** for the USSA with fixed funding rules and offline enrolment centres
- **Safety Mission:** Establish a **National Workplace Safety Mission** with a dedicated **OSH inspectorate** financed by a **high-risk industry cess**.
- **Childcare Fund:** A **National Childcare Infrastructure Fund**, utilising earmarked CSR allocations, can expand workplace creches and neighbourhood childcare facilities.
- **AI Oversight:** Set up a **statutory Labour AI Audit Body** to assess job-matching and monitoring algorithms and enforce strict data-protection safeguards.
- **Transition Support:** Launch a **Just Transition Income Support** programme that offers temporary income and reskilling supports to workers in **sunset sectors**.

World Bank Calls for Stronger Financial Sector Reforms in India

- The Financial Sector Assessment (FSA) Report 2025, jointly prepared under the IMF–World Bank FSAP, praised India's advances in banking stability while urging reforms in capital mobilisation.

Why Financial Sector Reform is Crucial?

- **Capital Mobilisation:** India needs private investment of **30–35% of GDP** to sustain high growth rates. E.g. Capital markets grew from 144% to 175% of GDP (2017–2025), but still lag behind China (>300%).
- **Banking Stability:** Indian banks have recovered from **twin balance sheet stress** due to better provisioning, yet credit expansion remains limited. E.g. MSMEs receive **only 15%** of total bank credit (RBI, 2024).
- **Vision 2047 Goal:** To achieve **$30 trillion GDP**, India must ensure robust financial intermediation, diversified markets, and resilient governance frameworks.

Key Highlights of the World Bank's FSA 2025 Report

- **Banking Reforms:** Acknowledges India's progress through expanded RBI oversight of cooperative banks, scale-based NBFC regulation, and strengthened prudential norms.
- **Credit Risk Management**: Recommends enhancing credit risk evaluation systems and supervisory convergence between banks and NBFCs to prevent systemic risks.
- **Capital Market Deepening:** Calls for credit enhancement facilities, securitisation platforms, and risk-sharing frameworks to boost bond market liquidity.
- **Mutual Fund Oversight:** Appreciates SEBI's reforms on liquidity norms and sustainable investment disclosure, but advises tighter conduct risk monitoring and self-regulatory standards.
- **Financial Inclusion:** Recognises India's success through PM Jan Dhan Yojana **(over 51 crore accounts)** and UPI-led digital penetration, contributing to greater inclusivity.

Proposal to Remove Closed Factories from the IIP Database

- The MoSPI has proposed an **automatic substitution mechanism** to **replace closed factories** with active units in the **Index of Industrial Production** (IIP) database.

Proposed Automatic Substitution Mechanism

- **Mechanism:** The proposed system will **replace closed or inactive factories** in the IIP sample with verified operational units drawn from updated databases.
- **Objective:** It will ensure that the IIP reflects current production trends and captures ongoing structural shifts across industries.
- **Data Reliability:** By eliminating **around 8.9%** inactive factories, the mechanism will minimise data gaps and enhance the overall credibility of industrial estimates.

Selection Process for Substitutes

- **Selection Basis:** Substitute factories will be selected from the latest **Annual Survey of Industries** (ASI) to ensure the reliability of the data.
- **Eligibility:** Only factories producing **identical** or **comparable products** to the replaced units will be selected to maintain comparability.
- **Output Match:** The new factory's **Gross Value Added** (GVA) or **Gross Value of Output** (GVO) should closely match that of the outgoing unit.
- **Verification:** If a factory reports zero output or fails to share data for **three consecutive months**, its status will be reviewed before substitution.
- **Continuity:** The new factory must have at least **12 months of production data** available before substitution to preserve time-series consistency.

Index of Industrial Production (IIP)

- The Index of Industrial Production (IIP) is a **composite indicator** that tracks **short-term changes** in the **production volume** of selected industrial goods.
- **Nodal Agency:** The index is compiled and released by the **National Statistical Office** (NSO) under the Ministry of Statistics and Programme Implementation (**MoSPI**).
- **Base Year:** The current base year is **2011-12**. MoSPI is in the **process of revising** the base year to **2022-23** to accurately reflect the industrial output.
- **Coverage:** The IIP uses data from **14 source agencies**, covering **407 items** across **three sectors**: **Manufacturing** (77.6%), **Mining** (14.4%), and **Electricity** (8.0%).
- **Core Industries:** **Eight key sectors** (Coal, Crude Oil, Natural Gas, Refinery Products, Fertilisers, Steel, Cement, and Electricity) together account for **40.27%** of the total weight.
- **Use-Based Classification:** Industrial output is grouped under **six categories**: Primary, Capital, Intermediate, Infrastructure, Consumer Durables, and Non-Durables.
- **Methodology:** It is calculated using the **Laspeyres fixed-base formula**, applying GVA-based weights to measure changes in aggregate output.
- **Frequency:** **Quick Estimates** are published **monthly** with a **28-day lag** and are revised the following month based on updated data.

China's Rare Earth Export Restrictions

In November 2025, China imposed export controls on seven rare earth elements, citing national security and non-proliferation reasons.

Rare Earth Elements

- **Composition:** **17 metallic elements**, including neodymium, dysprosium, and yttrium, used in defence, electronics, renewable energy, and EV manufacturing.
- **Unique Properties:** Possess strong magnetic, catalytic, and luminescent characteristics vital

for batteries, wind turbines, fighter jets, and smartphones.

- **Global Share:** China **controls 85–95%** of the world's refining and processing capacity (USGS 2024).
- **India's Status:** Holds the **fifth-largest reserves**, mainly in **coastal monazite sands**, but contributes **<2% of global output** (GSI 2024).

Impacts of Export Restrictions by China

- **Supply Shock:** Immediate rise in **global prices**, **dysprosium** projected to reach **$300/kg**.
- **Defence Vulnerability:** REEs are critical for missile guidance systems, radar, and jet engines; strategic dependency may affect Western defence supplies.
- **Diversification Efforts:** **Japan** cut its REE dependence on China from 90% (2010) to 60% (2023) by investing in **Australian mines**. The **US** are reviving mining under the Mineral Security Partnership.
- **India's Initiative:** Through KABIL **(2023)**, India secured five lithium blocks in **Argentina** and is exploring REE extraction in **Odisha** and **Kerala**.

Way Forward

- **Global Collaboration:** Diversify rare-earth supply through **India–Australia Critical Minerals Alliance** and QUAD **Rare Earth Working Group**.
- **Sustainable Mining:** Promote ESG-based standards via the UNEP **Global Mineral Governance Framework**, ensuring low-impact extraction and rehabilitation.
- **Recycling & Substitution:** Promote urban mining and non-REE magnetic materials (e.g. **ferrites**).
- **Strategic Stockpiling:** Establish a **National Critical Minerals Reserve**, similar to Japan's JOGMEC model.

Japan's JOGMEC Model *combines government-industry partnership for mineral stockpiling, overseas investment, and recycling to ensure long-term supply security.*

Quality Control Orders

- A **NITI Aayog report** has flagged **serious concerns** over the **government's aggressive rollout** of Quality Control Orders (QCOs) across industries.

QCOs: *Legal directives issued by Ministries under the Bureau of Indian Standards (BIS) Act, making BIS certification mandatory for manufacturing or importing certain products.*

Key Findings of NITI Aayog

- The majority of QCOs target **raw materials** and intermediate goods, **not finished products**.
- In several cases, standards imposed in India are **not aligned** with global norms.

- **Limited BIS-accredited labs** lead to **testing delays**, longer production cycles, and higher costs.
- **Impact on Imports and Exports**
- **Centre for Social and Economic Progress** (CSEP) research shows that **imports fall by 13%** in the first year after a **QCO** and **by 24%** in the long term.
- **Exports** initially rise **10.6%**, but drop **12.8%** in the second year, showing **no** long-term export gains.
- **Intermediate goods** (e.g., yarn, fibres, steel) show the **sharpest decline** in imports (up to 30%), affecting domestic supply.
- **Downstream Industry Impact**
- Sectors **hit hardest** are footwear, electronics, apparel, and **employment-intensive clusters**.
- Many intermediate inputs are not available domestically, leading to QCOs, shortages & cost escalations.
- **For example**, polyester yarn, fibres, and steel now cost **15-30%** above global prices.
- **Result:** Reduced design flexibility, higher production costs, and loss of **export competitiveness**.

QCOs

- **Legal Framework:** Published by **Central Government** after consulting BIS (Bureau of Indian Standards) under **BIS Act, 2016**.
- **Mandatory Nature:** While BIS certification is basically voluntary.
- A number of products owing to public interest, protection of human, animal or plant health, national security, etc., are subjected to **mandatory use** of **Standard Mark** under a **Licence or Certificate of Conformity (CoC)** from BIS **through issuance of QCOs.**

Impact on MSMEs

- MSMEs **struggle the most** with **certification fees**, factory inspections, and repeated paperwork.
- Certification and testing costs of **₹10,000-₹15,000** per consignment, with approvals taking months.
- **Domestic tariff-area** MSMEs (unlike SEZ exporters) **cannot** bypass QCO restrictions, resulting in a **loss of competitiveness** in both domestic and export markets.

Deflation & WPI

- Wholesale prices fell to a 27-month low and slipped back into deflation in October, owing to a drop in prices.
- **Wholesale Price Index (WPI)**
- WPI measures the change in **prices in the wholesale market**, where goods are traded in bulk.
- **Considers only basic prices** and does not include taxes, rebate/trade discounts, transport and

other charges.

- **Released by:** Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Union Ministry of Commerce & Industry.
- **Base year:** 2011-12.
- **Deflation**
- Deflation is a **sustained decrease in the general price level of goods and services** in an economy, essentially negative inflation.

Indian Railways to Install AI Freight Safety System

- **Indian Railways** is planning to install an **AI-based Locking Monitoring System 'DRISHTI'** to improve the **safety of freight trains**.
- **Objective:** To **identify unlocked** or **tampered doors** on **moving freight wagons**, which pose significant security threats.
- **Institutional Partnership:** It is a joint effort between the **Northeast Frontier Railway (NFR)** and the IIT Guwahati Technology Innovation and Development Foundation **(IITG-TIDF)**.
- **Key Benefit:** The automated monitoring system decreases reliance on **manual checks**, thereby **reducing human error** and improving overall freight management.
- **Key Features of the DRISHTI System**
- **Real-Time Monitoring:** The system uses **AI-powered cameras** and **sensors** to monitor and analyse door-lock conditions even when trains are moving.
- **Automated Alerts:** The system sends **instant alerts** to the operators when it detects unlocked, open, or tampered wagon doors.
- **Digital Analytics:** The system uses **digital logs** and analytics to provide **real-time updates**, aiding **data-driven decision-making**.

One-Stop Travel System

- The **Gulf Cooperation Council (GCC)** has approved a **landmark one-stop travel system** designed to streamline movement across member states. It Enables travellers to complete **all procedures- immigration, customs, and security at a single checkpoint** before departure.

Gulf Cooperation Council

- **Established:** 1981.
- **Members:** 6 Gulf states (UAE, Bahrain, Saudi Arabia, Oman, Qatar, and Kuwait)
- **Objectives:** To have coordination, integration and inter-connection between Member States in all fields.

Cooperative Kumbh 2025

- The **Co-Op Kumbh 2025**, an international conference on the urban cooperative credit sector, was

recently held in **New Delhi**.

- It was organised by the **Ministry of Cooperation**, Government of India, as part of the **United Nations' International Year of Cooperatives (**IYC**) 2025**.

Key Highlights

- **Delhi Declaration 2025:** A **strategic roadmap** for expanding and reforming **Urban Cooperative Banks (**UCBs**)** was adopted to steer future policy and growth.
- **UCB Expansion:** A plan was announced to establish a **UCB in every city** with a **population over two lakhs** within the **next five years**.
- **Digital Platforms:** Two new digital platforms, **Sahkar Digi-Pay** and **Sahkar Digi-Loan**, were launched to help small UCBs in providing **online payment** and **credit services**.

Urban Cooperative Banks (UCBs)

- UCBs are **member-owned financial institutions** serving **urban** and **semi-urban communities**, small borrowers, and micro-businesses.
- **Legal Basis:** They are registered as cooperative societies under either the **State Cooperative Societies Act** or the **Multi-State Cooperative Societies Act**.
- **Regulation:** UCBs operate under a dual regulatory framework —
- The **Reserve Bank of India (**RBI**)** oversees **banking functions** such as licensing, capital adequacy, and risk norms.
- The **Registrar of Cooperative Societies (RCS)** manages registration, internal governance, audits, and liquidation processes.

Smart Highways in India

- India is transforming highways into **smart**, **data-driven corridors** under the **Ministry of Road Transport and Highways** to improve mobility, efficiency, safety, and transparency.
- **Need:** India's road network is the **2nd largest globally**, and its **National Highway** network has **expanded** by about **60% in ten years**, requiring advanced digital management.

Key Initiatives

- **Digital Tolling:** The Government is incentivising FASTag usage by **doubling toll charges** for **cash users** and charging **25% higher tolls** for **UPI users**.
- **MLFF Rollout:** India launched its **first Multi-Lane Free Flow (MLFF) Tolling system** in **Gujarat**, enabling fully barrier-free, in-motion toll collection.

***MLFF** is an **electronic tolling system** that utilises overhead structures equipped with **cameras and sensors** to read a vehicle's FASTag or number plate as it passes, enabling **automatic toll collection**.*

- **FASTag Pass:** A new **annual FASTag pass** offers a fixed number of trips per year for a **one-time**

fee, simplifying payments for frequent travellers.

- **Advanced Planning:** The **PM Gati Shakti National Master Plan (**NMP**)** functions as India's primary digital planning tool. NHAI's Data Lake and NHAI One app facilitate **real-time monitoring**.
- **Citizen-Centric App:** The RajmargYatra **mobile app** improves the commuter experience by allowing users to **report safety concerns** directly.
- **OFC Corridors:** A pilot project is installing Optical Fibre **Cables (OFC)** along 10,000 km of highways to create corridors supporting **5G/6G networks**.
- **Sustainable Practices:** NHAI used **recycled materials** like **fly ash** and **plastic waste** in 2023–24 to promote environmentally sustainable road construction.

Global Finance Stability Report (GFSR)

- **International Monetary Fund (IMF)** recently released the **Global Finance Stability Report (GFSR),** April 2025.

GFSR

- **Purpose:** Provide a regular assessment of **global financial markets** and identify **potential systemic weaknesses** before they lead to crises.
- **Key Findings**
  - **Tightened Global Financial Conditions:** Have caused significant increase in the Global financial stability risks.
  - **Role of Major geopolitical risk events:** Especially **military conflicts**, can lead to substantial decline in stock prices and increases in **sovereign risk premiums.**
- **Other Key Reports by IMF:** World Economic Outlook, Fiscal Monitor.

New Mangalore Port

- The Government of India has launched ₹1,500 crore worth of modernisation projects at the New Mangalore Port as part of its Golden Jubilee (50 years) celebrations in 2025.
- New Mangalore Port is an **all-weather, deep inner-harbour major port** on India's west coast, and the **only major port in Karnataka**. It is among India's **top 10 major ports** and a key gateway for petroleum, coal, container, and agricultural cargo.

Location:

- Situated at **Panambur, Mangaluru**, on the **Arabian Sea** coast.
- Lies north of the **Gurupur (Phalguni) River** estuary.
- 170 nautical miles south of Mormugao Port (Goa) and 191 nautical miles north of Kochi Port.

Established In:

- **1962** – Mangalore Harbour Project initiated
- **1968** – Maritime works commenced
- **4 May 1974** – Declared **India's 9th Major Port**
- **11 January 1975** – Formally inaugurated by PM **Indira Gandhi**
- **1 April 1980** – Came under Major Port Trust Act, 1963
- **3 November 2021** – Renamed as **New Mangalore Port Authority (NMPA)** under the Major Port Authorities Act, 2021

History:

- Ancient port city referenced in **Roman, Greek, and Ptolemaic** records; known as **Mangala** in classical geography.
- Arab traders used the port for spice and silk trade during the **Vijayanagara Empire**.
- Old Mangalore Port (Bunder) became inadequate for rising trade needs, leading to the creation of a new deep-water port at Panambur.
- Grew from handling **<1 lakh tonnes** to **46 million tonnes (2024–25)**.

Key Features:

- Deepest inner harbour on India's west coast.
- **Total area:** ~480 hectares (1,200 acres).
- **Handles major export cargo**: POL products, iron ore pellets, container cargo.
- **Handles major import cargo:** crude oil (for MRPL), coal, fertilizer, edible oil, liquid chemicals, containers.
- Excellent connectivity via **NH-66**, **Konkan Railway (Surathkal station)** and **Mangaluru International Airport**.
- Plays a vital role in **export-led growth**, reducing logistics costs, and supporting Karnataka's industrial hinterland.

White-Collar Terrorism

- The involvement of **several doctors** in the recent **Red Fort car blast** has renewed national concern about **white-collar terrorism**.

White-Collar Terrorism

- White-collar terrorism refers to **educated professionals** using their **expertise**, **positions**, or **resources** to support or conduct terror activities.

Dimension	White-Collar Terrorism	Traditional Terrorism
Profile	**Educated** professionals from an **urban**, **middle-**	Recruits often come from **marginalised**

	class background with **stable jobs** and clean records.	**communities**, **conflict zones**, or economically vulnerable backgrounds.
Method	Uses **technical**, **medical**, or **digital expertise** to plan and execute attacks with precision.	Relies mainly on **physical violence**, **conventional weapons**, or easily assembled explosives.
Concealment	Operatives **blend into society** using professional credibility as natural cover.	Operatives are **more visible** through known networks, sleeper cells, or conflict-linked movements.
Recruitment	Driven largely by **ideology** and **online radicalisation** via encrypted platforms.	Driven by **socio-economic grievances** or direct, **in-person radicalisation** efforts.
Funding	Funded through **legitimate income** or professional networks using clean, traceable money.	Funded through **illicit activities** like hawala, extortion, kidnapping, or external donations.
Targets	Focuses on **high-impact**, **strategically chosen** targets requiring technical planning.	Targets **vary widely**, including markets, security forces, or public spaces.
Surveillance	**Hard to detect** because operatives are "**clean skins**" with strong social integration.	**Easier to monitor** due to **known hotspots**, networks, or prior intelligence patterns.

Key Drivers of White-Collar terrorism

- **Veil of respectability:** Professional status enables operatives to work "**above ground**" and "**in plain sight**" without community suspicion or security attention.
- **Clean Financing:** High incomes allow operatives to use **their own clean money** for terror activities without raising financial monitoring alerts.
- **Urban Anonymity:** Metropolitan life offers **natural anonymity** that supports discreet movements and secondary residences without the scrutiny common in smaller communities.

- **Digital Radicalisation:** Encrypted platforms let professionals' **self-radicalise in isolation** through social media, closed chat groups, and extremist online forums.

Core Challenges Associated with White-Collar Terrorism

- **Profiling Limits:** White-collar operatives are "**clean skins**" with **professional credibility** and **strong social integration**, which makes them invisible to traditional profiling systems.
- **Financial Blindspots:** Self-funded operations utilise personal income, reducing the ability of financial intelligence tools to flag suspicious transfers.
- **Deradicalisation Gaps:** Existing deradicalisation models focus on socio-economic vulnerabilities and often fail against **ideologically driven**, **opportunity-rich** professionals.
- **Insider Threats:** Embedded professionals within hospitals, laboratories, universities, or IT systems create **complex internal vulnerabilities** that are hard to detect and mitigate.

Way Forward

- **AI Analytics:** Use AI-based analysis to identify **subtle behavioural anomalies** that conventional identity-focused profiling systems usually overlook.
- **KYE Protocols:** Require sensitive institutions to implement strict **Know-Your-Employee checks** to track access patterns and recognise unusual behavioural shifts.
- **Dual-Use Tracking:** Establish a national system that monitors **chemical and electronic precursor purchases** in real-time to flag clustered procurement.
- **Metadata & HUMINT:** Prioritise **metadata mapping** and **human infiltration** of online extremist spaces instead of attempting to break encrypted communication.

Rationalising Royalty on Critical Minerals

Union Cabinet approved revised royalty rates for **Graphite**, **Caesium**, **Rubidium**, and **Zirconium** under the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act)**.

Royalty Rate: *It is the payment made by mining lease holders to the government for the right to extract minerals from the earth, calculated as a percentage of the mineral's value or a fixed amount per tonne.*

Revised Royalty Rates for Critical Minerals

- For **Caesium**, it is 2% of Average Sale Price (ASP) on metal content in ore, and for **Rubidium**, it is 2% of ASP on metal content in ore.
- For **Zirconium**, 1% of ASP on metal content in ore and for **Graphite**, if it is 80% fixed carbon, 2% of ASP and < 80% fixed carbon, 4% of ASP.

Significance of the Revision of Royalty Rates

- **Boosts Auctions:** Enables fair valuation and promotes the auction of blocks containing critical

minerals.

- **Enhances Domestic Supply:** Expected to reduce import dependence because India currently imports **60% of its graphite demand**.
- **Employment & Growth:** Rationalisation of royalties supports critical mineral exploration, employment creation, and industrial self-reliance.
- **Green Energy Transition:** **Graphite** (EV batteries), **Zirconium** (nuclear & aerospace), **Caesium** (atomic clocks & GPS), and **Rubidium** (telecom & fibre optics) are vital for high-tech & renewable applications.

MMDR Act, 1957

- **Purpose:** Governs mining and regulation of minerals across India, **excluding petroleum** and **natural gas**, and to **ensure fair revenue sharing** between the Centre and States.
- **Jurisdiction:**
  - **Central Government:** Formulates policy, approves royalty rates, and regulates major minerals.
  - **State Governments:** Grant mineral concessions for minor minerals and collect royalties.
- **Royalty Fixation:** Central Government specifies royalty rates under **Section 9(3)** of the Act.
- **Key Agencies:** The **Indian Bureau of Mines (IBM)** is the technical regulator for mining and data reporting, and the **Geological Survey of India (GSI)** conducts exploration and mapping.
- **Amendments:**
  - **2015 Amendment:** Introduced auction-based allocation of mineral blocks and District Mineral Foundation (DMF) for local development.
  - **2021 Amendment:** Allowed transfer of clearances, permitted private sector exploration, and empowered the Centre to auction minerals in case of State delay.
  - **2023 Amendment:** Added 24 critical and strategic minerals to promote energy transition.

Tungsten Mining in Andhra Pradesh

Hindustan Zinc Ltd. has received a **composite licence** from the **Andhra Pradesh** government to explore and potentially mine a tungsten mineral block.

- **Licence Type:** A composite licence grants **both exploration** and **subsequent mining rights** if commercially viable minerals are discovered.

*Hindustan Zinc Ltd. is the world's **largest integrated zinc producer** and among the top five global silver producers. It operates the world's **largest underground zinc mine** at **Rampura Agucha** in **Rajasthan**.*

Tungsten

- Tungsten, also known as **wolfram**, is a rare, dense, **steel-grey transitional metal** known for exceptional **heat resistance** and remarkable hardness.
- **Major Mineral:** It is classified as a major mineral under the Second Schedule of the **Mines and Minerals (Development and Regulation) Act, 1957**.
- The MMDR Amendment Act 2023 lists tungsten as both a **critical** and **strategic mineral** in Part D of the First Schedule.
- **Thermal Properties:** Tungsten has the **highest melting point** among all metals at **3422°C** and the **lowest vapour pressure** at high temperatures.
- **Mechanical Strength:** It possesses the **highest tensile strength** above 1650°C, while **pure single-crystal** tungsten remains **ductile** under controlled conditions.
- **Natural Occurrence:** This element is relatively rare and found mainly in **wolframite** and **scheelite ores**.
- **Global Reserves:** **China** holds **over 50%** of global tungsten reserves, with significant deposits also found in **Russia**, **Canada**, and **Vietnam**.
- **China** produces more than **80%** of the tungsten output and supplies around **30%** to **global exports**.
- **Indian Deposits:** **Karnataka** accounts for 42% of India's tungsten resources, followed by **Rajasthan** with 27% and **Andhra Pradesh** with 17%.
- **Health Aspect:** It is **generally non-toxic**, though inhaled dust may cause respiratory issues. Soluble tungsten compounds pose higher risks than insoluble forms.
- **Key Applications:** Tungsten is widely used for hard cutting tools, **incandescent filaments**, high-strength alloys, **radiation shielding**, and specialised defence and aerospace components.

India's Retail Inflation and Consumer Price Index (CPI)

- **India's retail inflation** in October 2025 **declined to a historic low** following GST rate reductions and food-price corrections.

Key Findings from India's Retail Inflation Data (October 2025)

- **Headline Drop:** Year-on-Year retail inflation fell to a **record low** of **0.25%** while the **Consumer Food Price Index** (CFPI) registered **–5.02%** due to sharp price drops of key food items.
- **Rural-Urban:** **Rural India** showed overall **deflation for the first time** with the CPI-Rural at **–0.25%**, and **urban inflation** eased to **0.88%** from 1.83% in September.
- **Core Stability:** Core inflation stayed near **4.4%** because precious **metal prices** (e.g., gold and silver) remained elevated.

Consumer Price Index (CPI)

- The Consumer Price Index (CPI) is a **composite indicator** that tracks **short-term**

changes in **retail prices** for a representative **household consumption basket**.

- **CPI Variants:** The **National Statistical Office** (NSO) publishes **CPI-Rural** (CPI-R), CPI-**Urban** (CPI-U), and CPI-**Combined** (CPI-C) to measure household retail inflation.
- **Labour Indices:** The **Labour Bureau** publishes **CPI-Industrial Workers** (CPI-IW), CPI-**Agricultural Labourers** (CPI-AL), and **CPI-Rural Labourers** (CPI-RL) for wage indexation and policy planning.
- **Base Year:** The current base year is **2012**, but MoSPI is planning to revise it to 2024 to reflect the latest consumption patterns.
- **Methodology:** CPI is calculated using the **Modified Laspeyres fixed-base formula**, applying base-year expenditure weights to measure changes in household consumption.
- **Coverage:** Price data are collected from 1,181 villages and 1,114 urban markets, covering **six major consumption groups**.
- **Six Groups:** (1) *Food & Beverages*, (2) *Pan-Tobacco-Intoxicants*, (3) *Clothing & Footwear*, (4) *Housing*, (5) *Fuel & Light*, and (6) *Miscellaneous*.
- **Weight Structure:** **Food & Beverages** carries the **highest weight** in **CPI-Rural** (54.18%) and **CPI-Combined** (45.86%), while **Miscellaneous** has the highest weight in **CPI-Urban** (29.53%).
- **Frequency:** The index is released **monthly**, with **weekly price collection** for **perishables** and monthly collection for non-perishables and services.
- **Policy Relevance:** **CPI-Combined** is India's official **inflation indicator** for monetary policy under the **Flexible Inflation Targeting** (FIT) framework mandated by the amended RBI Act, 1934.

Current Issues with the Consumer Price Index

- **Outdated Base Year:** The CPI still uses 2012 as its base year, which **no longer reflects** current consumer behaviour or prevailing economic reality.
- **Skewed Weightages:** **Food** holds a **disproportionately high weight** (45.86% in CPI-Combined), even though households now spend more on health, education, and services.
- **Substitution Bias:** The fixed-basket approach **assumes consumers do not shift** to cheaper substitutes when prices rise, which can exaggerate the increase in living costs.
- **Quality Adjustment:** The CPI often **cannot separate genuine inflation** from higher prices caused by improved product quality or newly introduced goods.
- **Data Gaps:** Price information from the vast informal sector remains difficult to collect, which weakens the accuracy and reliability of CPI estimates.

*The **Wholesale Price Index** measures the average change in prices of goods at **wholesale level**. is **published monthly** by the **Office of the Economic Adviser (OEA)**, **Ministry of Commerce & Industry**.*

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India's Farm Export Resilience

- India's Agri-exports **grew 8.8% (Apr–Sep 2025) to $25.9bn** versus 2.9% growth in overall merchandise exports despite high US tariffs ("Trump tariffs") and global price softening.

India's Current Agri Export Scenario (2025)

- **Annual Export Value:** $52Bn in FY 2024–25, growing 6.4% YoY, while total merchandise rose only 0.1%.
- **Billion-Dollar Products:** Marine, non-basmati rice, buffalo meat, coffee, each crossed $1B+ value.
- **Coffee Surge:** Export value increased from $739Mn (2019–20) to $1.8Bn (2024–25).
- **Processed Food Rise:** Processed F&V exports increased from $958M → $1.8Bn (2019–20 to 2024–25).

Drivers of India's Agri Export Growth

- **Policy Relaxation:** Gradual easing of **non-basmati export bans** & duties revived supply, aiming to cross **$6.5Bn**, supported through export promotion under the APEDA.
- **Commodity-Specific Tailwinds:** **17.4% rise** in marine exports (H1 FY25-26) due to global demand and quality compliance enabled by Marine Products Export Development Authority (MPEDA) certification.
- **Price Windfall Effect:** Coffee export value **doubled (2019-20 → 2024-25)** due to 25-year-low global stocks, aided by value-addition initiatives under the **Coffee Board of India**.
- **Domestic Production Support:** Consecutive good monsoons + high FCI stocks ensured exportable surplus with risk protection supported through the **Pradhan Mantri Fasal Bima Yojana (**PMFBY**)**.
- **Private Sector Agility:** Exporters quickly diversified to China, Vietnam, the EU, Japan & Canada to bypass the **58% US seafood tariff**, reducing overdependence on a single market.
- **Trade Infrastructure Upgrades:** Better pack-houses, reefer logistics & Mega Food Parks strengthened perishables export capacity through the **Pradhan Mantri Kisan Sampada Yojana (**PMKSY**)**.
- **Value-Added Processing:** Processed fruits & vegetables exports grew **$958M → $1.8B**, supported by incentives under the **Production Linked Incentive (**PLI**) Scheme** for Food Processing.
- **Digital Market Linkages:** e-NAM integration improved farm-gate aggregation, traceability and market connectivity for export-grade commodities.

Ambaji Marble and Geographical Indication (GI) Tag

Recently, **Ambaji Marble** received the **GI Tag.**

Ambaji Marble:

- **Production:** Banaskantha district, Gujarat.
- **Key Feature: Milky white colour, natural beauty and durability**, used widely in temples, memorials and grand buildings.

GI Tag:

- **Meaning: Certification** given to products that originate from a specific region and have inherent qualities, reputation, and characteristics contributing to their origin.
- **Granted Under:** Geographical Indications of Goods (Registration and Protection) Act, 1999.
- **Validity:** 10 years.
- **Nodal Department: Department for Promotion of Industry and Internal Trade,** Ministry of Commerce and Industry.

The 16th Finance Commission

- The 16th Finance Commission (2026–31), chaired by **Dr Arvind Panagariya**, submitted its report to President Droupadi Murmu on 17 Nov 2025, after receiving a one-month extension.
- The recommendations will apply for **five years starting 1 April 2026**, succeeding the 15th FC (2021–26) headed by **N.K. Singh.**
- **Tax Devolution Formula:** Recommends principles for sharing of the divisible tax pool between the Union and States, and its inter-state distribution.
- **Grants-in-Aid Framework:** Suggests criteria for revenue deficit grants, performance-based grants, and sector-specific support to States.
- **Local Governance Financing**: Proposes mechanisms to augment State resources for Panchayats and Municipalities, in line with Article 280.
- **Disaster Finance Review:** Examines utilisation structure under the Disaster Management Act, 2005.
- **Extensive Consultations:** Conducted state- and UT-level visits to assess fiscal needs, developmental disparities, and regional capacities.

- **Finance Commission -**
- The FC is a constitutional body constituted by the **President** under **Article 280** of the Constitution.
- It is a **Quasi-Judicial body** constituted every 5th year or at such an earlier time as the President deems necessary.
- It consists of a **chairman and four other members** to be appointed by the President. They are **eligible for re-appointment.**

National Gopal Ratna Awards 2025

- The Government of India has announced the National Gopal Ratna Awards 2025, one of the highest honours in the livestock and dairy sector.
- A prestigious national award recognising outstanding contributions in the livestock and dairy sector, especially those promoting indigenous cattle and scientific dairying.
- Established in 2021 under the broader framework of the **Rashtriya Gokul Mission (RGM),** which itself was launched in December 2014.

- Conferred by the **Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD),** Government of India.

- **Aim:**
- To encourage excellence in dairy farming, indigenous cattle conservation, cooperative dairy development, and scientific breeding services.
- To motivate stakeholders to enhance productivity and improve indigenous breeds.

- **Features:**
- Awards given in three categories:
- Best Dairy Farmer (Indigenous breeds)
- Best Artificial Insemination Technician (AIT)
- Best Dairy Cooperative/FPO/MPC

- ***Cash prizes:***
- ₹5 lakh (1st), ₹3 lakh (2nd), ₹2 lakh (3rd).
- Special ₹2 lakh award for NER/Himalayan States.
- AIT category includes certificate & memento only.
- Recognises farmers, cooperatives, and technicians using scientific and ethical dairy practices.

- **Significance:**
- Boosts morale of dairy farmers and enhances India's indigenous cattle productivity.
- Strengthens rural livelihoods and contributes to India's dairy self-reliance.
- Supports national priorities like milk quality improvement, breed conservation, and doubling farmer income.

Green Tug Transition Programme

- **The Chennai Port Authority has initiated the procurement process of its first green tug under the Green Tug Transition Programme**
- The tug will use a **battery-electric propulsion system** and include provisions for future upgrades to other cleaner technologies.
- A tugboat is a compact, powerful vessel designed to manoeuvre larger ships by pushing or pulling.
- An e-tug powered solely by batteries achieves a 100% reduction in nitrogen and carbon emissions, whereas hybrid tugs are expected to **reduce emissions by 25%–35%.**

Green Tug Transition Programme (GTTP)

- It is an initiative by India's Ministry of Ports, Shipping and Waterways (MoPSW) to replace diesel-powered tugs with green tugs operating on non-fossil fuels.
- **Policy Alignment:** It is part of the **Panch Karma Sankalp** and aligns with the Maritime India

Vision (MIV) 2030, Maritime Amrit Kaal Vision 2047, and India's Net-Zero Target by 2070.

- **Nodal Agency:** The National Centre of Excellence in Green Port & Shipping (NCoEGPS).
- **Technology Path:** The transition will begin with battery-electric and hybrid systems, then expands to methanol and green-hydrogen technologies.
- **Targets:** All tugs at major Indian ports must be green by 2040, and all new tugs after 2033 must meet GTTP standards.
- **Implementation:** Phase 1 (2024–2027) requires four major ports to get at least two green tugs each; Phase 2 (2027–2030) aims for at least 50% of tug fleets in pilot ports to switch to green operations.
- **Significance:** The initiative promotes UN SDG 14 and supports India's green shipbuilding efforts.

- The MIV 2030 aims to cut carbon emissions per tonne of cargo by 30% by 2030.
- The Maritime Amrit Kaal Vision 2047 aims for a **70% reduction in carbon emissions per tonne of cargo by 2047.**

Venezuela Seeks Cooperation on Critical Minerals

- Venezuela expressed a strong interest in collaborating with India on critical minerals to expand its economic engagements beyond the oil sector.

Critical Minerals

- Critical minerals are **metallic** or **non-metallic** elements that are vital for a country's **economic growth** and **national security**, but whose supply chains are **susceptible to disruption**.
- **National Lists:** Countries compile their own specific critical mineral lists; India has identified **30 critical minerals**, including nickel, titanium, vanadium, tungsten, and others.
- **Importance:** They support India's clean energy transition by facilitating **EV batteries** and **solar panel** manufacturing, which are crucial for achieving the national **Net-Zero target by 2070**.
- **Policy Framework:** India has implemented the **National Critical Mineral Mission (**NCMM**)** under the **Ministry of Mines** to ensure a secure and sustainable supply of these minerals.

Venezuela

- **Location:** Venezuela is situated on the **northern coast of South America**.
- **Borders:** It borders the **Caribbean Sea** and the **Atlantic Ocean** to the north, **Guyana** to the east, **Brazil** to the south, and **Colombia** to the southwest and west.
- **Geographical Features:** The **Andes**, the expansive grassland plains **(Llanos)**, the **Guiana Highlands**, and the **Caribbean coast**. It hosts the world's **highest waterfall**, **Angel Falls**.
- **Resources**: It has the world's **largest oil reserves** and significant natural gas and mineral deposits.

India has finalised its first-ever structured LPG import deal with the US

- **India has finalised its first-ever structured LPG import deal with the US, sourcing 2.2 MTPA—about 10% of annual LPG imports—for 2026**
- A one-year structured contract under which Indian PSU refiners will import 2 million tonnes per annum (MTPA) of LPG from the **US Gulf Coast in 2026—India's first formal long-term LPG sourcing** contract from the US.

- **Nations Involved-**
- India: IOC, BPCL, HPCL
- United States: US Gulf Coast producers (Chevron, Phillips 66, TotalEnergies Trading)

- **Aim:**
- To diversify LPG sourcing beyond West Asian suppliers.
- To strengthen India–US energy partnership, reduce trade imbalances, and improve energy security.

- **India's LPG Import Profile:**
- India imports around 60% of its LPG demand.
- Around 21 million tonnes imported in 2024.
- 90% of imports traditionally sourced from West Asia (UAE, Qatar, Saudi Arabia, Kuwait).
- India is among the world's fastest-growing LPG markets due to **Ujjwala expansion.**

- **Key Features of the Agreement:**
- Quantity: 2.2 MTPA (≈10% of India's annual LPG imports).
- Benchmark: Based on US Mont Belvieu LPG pricing.

- Suppliers: Awarded jointly to Chevron, Phillips 66, and TotalEnergies Trading.
- Duration: Contract year 2026.

- **Significance:**
- First structured US LPG contract, opening a new energy trade corridor.
- Reduces India's overdependence on West Asian suppliers.
- Strengthens India–US strategic and trade ties, aiding ongoing tariff negotiations.
- Enhances energy security against supply shocks and geopolitical risks.

New Digital System for Public Distribution Systems

- The **Union Minister for Consumer Affairs, Food and Public Distribution**, launched digital systems to enhance **India's food storage, logistics, and Public Distribution Systems (**PDS**)**.
- A modern **steel-based hub silo complex** (integrated system of large cylindrical storages) was also inaugurated in **Malout, Punjab**, to improve scientific grain storage and **reduce post-harvest losses**.

Key Digital Initiatives Launched

- **Bhandaran 360:** A **cloud-based** Enterprise Resource Planning (**ERP**) **system** for the **Central Warehousing Corporation (CWC)** that links external systems like FCI and NAFED, improving digital connectivity.

*An **Enterprise Resource Planning (ERP) system** is software that integrates and manages key functions such as finance, HR, manufacturing, supply chain, and procurement to streamline daily operations.*

- **Anna Darpan:** A **microservices-based cloud platform** for integrated, mobile-first operations to streamline the Food Corporation of India's (FCI) supply chain activities from procurement to sales.
- **Smart EXIM:** An AI- and IoT-enabled automation system that manages **gate control** and **inventory** processes, enhancing efficiency across CWC facilities.
- **ASHA Platform:** A platform that uses **multilingual AI** to facilitate feedback and grievance registration for PDS beneficiaries via automated calls in their **native language**.

Public Distribution System

- It is India's primary **food security system** under the **Ministry of Consumer Affairs, Food and Public Distribution**, to ensure **affordable access** to essential commodities for vulnerable groups.
- It operates through a vast network of **Fair Price Shops (FPSs)**, commonly referred to as ration shops.
- **Objectives:** to provide food and nutritional security, stabilise prices of essential commodities,

alleviate poverty, and manage buffer stocks.

- **Implementation Structure:** The **Centre manages procurement**, storage, transport, and allocation, while **States** oversee **beneficiary identification**, ration cards, and Fair Price Shop supervision.

Codex Alimentarius Commission

- India was re-elected to the **Executive Committee** (**CCEXEC**) for the **Asia region** of Codex Alimentarius Commission (**CAC**), securing a unanimous mandate by the global members.
- The **48th session** of the Codex Alimentarius Commission (**CAC48**) was hosted at the **Food and Agriculture Organization** (FAO) headquarters in **Rome**, Italy.

FAO: A UN **specialised agency** founded in **1945**, with **190+ members including India**; leads global work on food security, agriculture, fisheries & forestry through data, standards & policy support.

Codex Alimentarius Commission

- **Overview:** International intergovernmental body established in **1963** by **World Health Organization** (WHO) & **FAO** under the **Joint FAO/WHO Food Standards Programme**.
- **Membership:** Open to all member nations & associate members of WHO & FAO. As of 2025, it has **189 members** – 188 member countries (including India) & one member organization (European Union).
  - India joined CAC in **1964**, thus **not a founding member**.
- **Standards:** CAC maintains **Codex Alimentarius** (**Food Code**) – a collection of standards, guidelines & codes of practices to promote consumer health & fairness in the food trade.
  - CAC standards are **voluntary** but governments adopt them worldwide & they serve as reference points for **World Trade Organization** (WTO) in dispute settlement.
- **Operations:** CAC meets **annually**, alternating between **Geneva** & **Rome** & works in the six official UN languages to harmonize food safety worldwide.
- **Executive Committee:** **17 members** (Chair, 3 vice-Chairs, 6 regional coordinators, 7 elected members) & members serve a **two-year term** to guide work between annual Commission meetings.

UN Official Languages: *Languages used for official documents & meetings. Include **Arabic**, **Chinese**, **English**, **French**, **Russian** & **Spanish**. French & English are the working languages of UN Secretariat.*

Iran's Crypto Push With BRICS

- Iran is now exploring **cryptocurrencies and blockchain-based trade settlements** with BRICS partners, aiming to minimise reliance on the U.S. dollar-centric financial system.
- In August 2025, EU nations triggered the snapback mechanism, reactivating global sanctions over Iran's alleged uranium enrichment, adding to long-standing U.S. sanctions since 1979.

Snapback Mechanism: *Provision under the **2015 Iran Nuclear Deal (JCPOA)** that allows automatic reinstatement of UN sanctions if Iran is accused of non-compliance, bypassing UNSC veto and enabling quick re-imposition by any participant state.*

Strategic Significance of Iran's Move

- **Sanctions Circumvention:** Cryptos offer **non-SWIFT**, decentralised payment rails for essential imports/exports, reducing exposure to U.S.–EU tracking and freezing.
- **Support for De-Dollarisation:** Aligns with BRICS efforts to diversify global currency dominance by reducing USD dependence in trade and reserves.
- **Trade Continuity:** Helps stabilise foreign trade in energy, metals, machinery & pharma, cushioning the economy against repeated financial blockades.
- **Geopolitical Signalling:** Demonstrates technological and diplomatic defiance, building alternative multipolar financial pathways beyond Western systems.
- **Diplomatic & Economic Implications for India**
- **Neutral–Cautious Stance:** India clarified "de-dollarisation is not part of its financial agenda" (MEA, Aug 2025), keeping distance from crypto-based settlement proposals.
- **Regulatory Constraints:** **RBI-FEMA rules** restrict cross-border crypto settlements; India focuses instead on **CBDC** (Digital Rupee) experimentation for future trade.
- **Energy & Trade Consideration:** While Iran is a traditional oil & urea partner, crypto-based bilateral trade may conflict with India–U.S. strategic alignment.
- **Security Risks:** Unregulated crypto networks could expose India to FATF, AML & sanctions-linked risks.

BRICS

- **Origin:** The Term BRIC was coined in **2001** by economist **Jim O'Neill (Goldman Sachs)** to describe four economies: Brazil, Russia, India, and China. **South Africa** joined the bloc in **2010**.
- **Recent Expansion (2023):** Iran, Egypt, Ethiopia, UAE joined; Saudi Arabia was invited but did not formally accede.
- **Objectives:** Strengthen multipolarity, local-currency trade, development finance, and reduce over-reliance on Western-led institutions & USD system.
- **Economic & Demographic Weight:** Represents **~45% of global population** and **~37.3% of global GDP** (PPP) vs G7 ≈29.3% & EU ≈14.5%.

Natural Farming in India

PM Narendra Modi inaugurated the **South India Natural Farming Summit 2025** in Coimbatore, **Tamil Nadu**.

- The Summit aims to **promote eco-friendly,** natural farming and to **accelerate the transition** towards a climate-smart, regenerative agriculture in India.

Natural Farming

- Natural farming is a **chemical-free**, **sustainable method** that relies on **on-farm biological processes** instead of **synthetic external inputs**.
- It embodies the "**do-nothing farming**" philosophy of Japanese farmer **Masanobu Fukuoka**, emphasising minimal human intervention.
- **Need:** Natural farming promotes **climate resilience** by improving soil health, conserving water, increasing biodiversity, and reducing agriculture's overall carbon footprint.
- **Benefits:** Using locally available inputs lowers production costs and **increases farm profitability** while producing healthier, chemical-free produce.
- **Challenges:** Lower yields, weak certification systems, inadequate farmer training, poor pest-management capabilities, and weak market linkages limit adoption.

__Andhra Pradesh__, __Karnataka__, __Himachal Pradesh__, __Gujarat__, __Uttar Pradesh__, and __Kerala__ lead in the adoption and promotion of natural farming practices in India.

Key Government Initiatives

- **NMNF:** The **National Mission on Natural Farming**, a **Centrally Sponsored Scheme** launched in 2024, is the primary initiative to promote chemical-free agriculture nationwide.
- More than **10 lakh (1 million) farmers** have enrolled under the mission.
- **BPKP:** The **Bhartiya Prakritik Krishi Paddhati**, once a sub-scheme of the **Paramparagat Krishi Vikas Yojana (**PKVY**)**, promoted traditional practices; now it is part of the NMNF.

The PKVY promotes __certified organic farming__ through a __cluster-based approach__, offering farmers financial support for certification and infrastructure.

Namami Gange: The **Namami Gange Programme** promotes natural farming within a **5-km corridor** along both sides of the Ganga River basin to decrease chemical runoff into the river

India and Georgia Strengthen Sericulture Cooperation

- The Indian delegation from the Ministry of Textiles has completed a multi-sectoral engagement in Georgia to enhance cooperation in sericulture, textiles, apparel, and carpet trade.
- The delegation attended the **11th BACSA International Conference, CULTUSERI 2025**.

- **Key Outcomes:** It strengthened India–Georgia sericulture and textile ties, showcased India's 5-in-1 Silk Stole, and expanded diversified trade roles via the BACSA platform.
- **Significance:** The engagement enhanced India's textile diplomacy and reinforced its position in the global sericulture sector.

Sericulture

- Sericulture is an agro-based industry involving silkworm cultivation and silk production. generates sustained employment for rural households, particularly women, across India.
- India is the second-largest silk producer in the world, with Karnataka contributing 32% of th country's total production.
- India is the only country to produce **all five commercial types of silk—mulberry, tropical tasa oak tasar, eri, and muga.**
- The **Central Silk Board (CSB), a statutory body established in 1948** under the Ministry c Textiles, oversees sericulture development and implements schemes like **'Silk Samagra'.**

India Implements Four New Labour Codes

- The four labour codes enacted in 2020 have been implemented nationwide.
- They replace 29 central labour laws to simplify employer compliance, ensure uniform wages, and expand social security coverage for India's workforce.

About the Four Labour Codes

1. **Code on Wages, 2019:**

- **Unified Definition:** Consolidates four laws to establish a single definition of wages, reducing litigation and compliance burdens.
- Wage includes basic pay, dearness allowance, and retaining allowance, which form the basis for benefits and social security contributions.
- **Minimum wage:** Extends statutory minimum wage entitlement to all workers across sectors, replacing the earlier limit to scheduled employment only.
- **Wage Floor:** Introduces a **National Floor Wage** that states must follow to ensure uniform living standards and reduce regional wage gaps.
- **Payment Rules:** Standardises payment deadlines for wages and mandates issuing physical or digital wage slips to improve accountability.
- **Gender Equality:** Prohibits gender-based wage discrimination to promote "equal pay for equal work".

2. **Code on Social Security, 2020:**

- **Legal Recognition:** Amalgamates nine social security laws and, for the first time**, legally defines 'gig workers' and 'platform workers'.**
- **Unified Access:** Mandates social security funds and creates a national portal with Aadhaar-linked identification for unorganised, gig, and platform workers.
- **Expanded Coverage:** Expands EPFO and ESIC coverage to more establishments, regions, and includes compulsory coverage for hazardous jobs.

3. **Industrial Relations Code, 2020:**

- **Worker Definition:** Replaces three previous laws and broadens the definition of worker to include employees earning less than ₹18,000.
- **Layoff Threshold:** Raises prior-approval requirements for layoffs, retrenchments, and closures from 100 to 300 workers to enhance operational flexibility.
- **Fixed-Term Employment:** Introduces fixed-term employment with wage and benefit parity and ensures gratuity after a year of continuous service.
- **Strike Regulation:** Expands strike-notice requirements and widens the definition of strike to include mass casual leave by more than half the workforce.

4. **Occupational Safety, Health and Working Conditions (OSH) Code, 2020:**

- **Safety Expansion:** Consolidates 13 laws to expand safety, health, and welfare regulations to all workplaces with over 10 workers, and to all mines and docks.
- **Health Provision:** Requires free annual health check-ups for workers aged 40 or older and mandates safety committees in large workplaces.
- **Night-Shift:** Permits women to work night shifts with their consent and with safety measures in place.
- **Migrant Redefinition:** Expands the definition of inter-state migrant workers to cover directly

hired and self-migrating workers.

- **Transparency:** Mandates written appointment letters for all employees to ensure clarity on job roles and social security entitlements.

India's Trade Deficit Surge

- India's trade deficit widened sharply by **141% to $21.8 billion** in October 2025, driven by a marginal contraction in merchandise exports, even as services exports remained strong.

Key Highlights of the Trade Report

- **India's trade deficit rose to $21.8 bn, up from $9.05 bn last year, due to rising imports.**
- **Merchandise exports fell 11.8%, while services exports grew 11.9%, cushioning overall performance.**
- Over April–October 2025, total **exports grew 4.8%,** reflecting long-term resilience.
- India recorded its **highest-ever exports in Q1 & Q2**, led by strong IT and global capability centre exports.

Drivers Behind Rising Trade Deficit

- **Tariff Shock**: U.S. 50% tariffs sharply reduced India's merchandise exports. E.g. Exports to the U.S. declined by 20.4% in Sept 2025.
- **Festive Metals:** Gold & silver imports spiked due to festive buying during Dhanteras–Diwali. E.g., Gold spiked by 200% and Silver spiked by 530% in Oct 2025.
- **Merchandise Slump:** Labour-intensive sectors saw severe contraction due to weak global demand. E.g. Gems & jewellery declined by 29.5% and Leather by 15.7%.
- **Services–Goods Gap:** Services remained strong while merchandise remained weak, widening the imbalance. E.g. Services increased to 11.9%, Merchandise decreased to 11.8%.
- **Currency Hedge:** Investors increased gold buying as a hedge against rupee fluctuations. E.g. October's gold demand reversed a 6-month declining trend.

Way Forward

- **Tariff Resolution:** Resolve U.S.–India tariff tensions to restore merchandise export momentum. E.g. BTA negotiations similar to the U.K.–EU early harvest agreements.
- **Market Diversification:** Expand exports to ASEAN, Africa, and Latin America to reduce U.S. dependence. E.g. the **TIES Scheme** supports diversification logistics.
- **Sector Cushion:** Provide targeted support to labour-intensive sectors hit by tariffs. E.g. Enhance RoDTEP rates for leather, textiles, and chemicals.
- **Import Moderation:** Manage festive-period gold/silver surges via calibrated duty/quantity norms. E.g. Turkey's gold-quota model to smooth import spikes.

TIES scheme *supports central and state agencies in developing export-linked infrastructure, such as*

border haats and testing facilities, from 2021–22 to 2025–26.

Bharat NCAP 2.0

- Bharat NCAP 2.0 draft has been released by the Ministry of Road Transport & Highways (MoRTH), expanding India's crash-safety rating system with new test categories and higher safety benchmarks.
- A revised vehicle safety rating programme that evaluates crashworthiness and safety technologies of cars sold in India. It updates the 2023 Bharat NCAP (New Car Safety Assessment program) guidelines and introduces new crash tests and assessment verticals.
- **Launched by the Ministry of Road Transport and Highways (MoRTH).**
- **Testing and certification are handled by the Central Institute of Road Transport (CIRT), Pune.**

Aim:

- To upgrade India's vehicle safety framework to global standards.
- To protect not just occupants but also pedestrians and vulnerable road users.
- To encourage manufacturers to adopt advanced safety technologies.

Key Features of Bharat NCAP 2.0

- **Five Assessment Verticals:** Safe Driving, Accident Avoidance, Crash Protection, Vulnerable Road User Protection (new), Post-Crash Safety (new)
- **Expanded Crash Tests:** Frontal impact, side impact, oblique pole test, full-width frontal test (new), rear impact test (new).
- **Injury Evaluation:** Uses advanced test dummies (ATDs) to measure injury levels in different crash scenarios.
- **Vulnerable Road User Safety:** Includes pedestrian legform tests, adult/child head impact tests; optional checks for autonomous braking in pedestrian and motorcyclist situations.
- **Accident-Avoidance Tech:** Mandatory Electronic Stability Control (ESC); optional Autonomous Emergency Braking (AEBS) earns extra points.
- **Post-Crash Safety:** Checks for fire/electrical safety and ease of occupant escape (doors and seat-belt buckles).
- **Revised Star Ratings:** Higher point thresholds; no 5-star rating if any category scores zero or shows severe injury risk

Significance:

- Brings India closer to global NCAP standards.
- Improves protection for pedestrians, who form over **20%** of road-accident deaths.
- Boosts India's aim of reducing road fatalities by 50% by 2030.

Modernising Cross-Border Payments

- The Reserve Bank of India (RBI) has issued a draft circular proposing reforms **to speed up credit of inward foreign remittances**.

Key Proposals by RBI

- **Same-Day Credit Rule:** Banks must credit inward remittances received during forex market hours on the same day, and after-hours receipts by the next business day.
- **Straight-Through Processing (STP):** RBI mandates end-to-end automated crediting of remittances post-risk checks to eliminate manual delays.
- **Real-Time Reconciliation:** Banks should reconcile their **nostro account** credits every 30 minutes instead of relying on end-of-day statements.
- **Customer Notification:** Beneficiaries must be immediately informed of receipts; those received post-closing should be notified at the start of the next business day.
- **Digital Platforms:** Banks to offer online portals for uploading documents, exchanging information, and tracking FX transaction progress in real time.

A nostro account is the account a bank holds in a foreign bank, called "ours" from the domestic bank's perspective. A vostro account is the account a foreign bank holds with a domestic bank, called "yours" from the domestic bank's viewpoint.

IMF to Alter Classification of India's Forex Framework

- The International Monetary Fund is expected to change the way it classifies India's exchange rate regime, potentially describing it as having **"crawling peg"** like features in its 2025 Article IV report.

What this issue is about?

- The IMF maintains a de facto exchange rate regime classification for all member countries based on how their currencies actually behave in the market, not only on official claims.
- For India, the IMF now likely plans to describe the regime as having crawling peg type features because the **rupee is allowed to adjust gradually while the RBI still intervenes to smooth volatility.**

What governs IMF exchange rate classification?

- The classification is anchored in the **IMF's Articles of Agreement** and its surveillance mandate under **Article IV.**
- IMF staff apply a uniform global methodology that looks at the actual path of the currency, the scale and pattern of intervention, and the degree of policy commitment to any exchange rate path.

Types of exchange rate classifications relevant for India:

1. ***No separate legal tender:***

- Use of another country's currency or membership in a currency union.

- Monetary policy is fully surrendered to the issuing authority of that currency.

2. ***Hard pegs and conventional pegs:***

- Currency board arrangements with a **legally fixed conversion rate** and full foreign asset backing.
- Conventional fixed peg where the domestic currency is kept within a very narrow band around a central rate using active intervention.

3. ***Pegged within horizontal bands:***

- The exchange rate is allowed to move within a somewhat wider announced band around a central rate.

4. ***Crawling pegs:***

- The central rate is adjusted periodically in small steps, often based on inflation differentials with trading partners or preannounced crawl.
- Gives some flexibility but still constrains monetary policy like a peg.

5. ***Crawling bands:***

- A band around a crawling central rate where both the parity and band move over time.
- Flexibility depends on how wide the band is.

6. ***Managed float with no predetermined path:***

- Central bank intervenes to smooth volatility but without any announced or systematic path for the currency.
- Decisions are more judgment based, often linked to reserves, balance of payments and financial stability.

7. ***Independently floating:***

- Exchange rate is mainly market determined.
- Intervention is limited to moderating excessive short-term fluctuations rather than targeting any level.

November 26 - National Milk Day

- November 26 is observed as National Milk Day, commemorating the birth anniversary **of Dr. Verghese Kurien.**
- Dr Kurien, born on 26 November 1921 in Kozhikode, Kerala, led **Operation Flood** and is known as the **"Father of the White Revolution"** in India.
- **White Revolution, or Operation Flood**, launched in 1970, is world's largest dairy development programme, transforming India from a milk-deficient country into the world's largest milk producer.
- **Anand Model:** He pioneered the Anand cooperative model, where farmers managed milk procurement, processing, and marketing, removing middlemen and increasing producer incomes.
- **Institution Building:** He established key institutions, including the **National Dairy Development**

Board (NDDB) in 1965 and the GCMMF, which manages the Amul brand.

- **Awards:** He received the **Ramon Magsaysay Award**, World Food Prize, Padma Shri, Padma Bhushan, and Padma Vibhushan for his contributions.
- **India's LPG consumption has surged to new height.**
- India's LPG consumption has surged to 31.3 MMT in FY25, supported by expanded household access under **Pradhan Mantri Ujjwala Yojana (PMUY)** and rising refill demand.
- **Liquefied Petroleum Gas (LPG):** Fuel mix of **propane and butane** (~40:60 ratio) stored under pressure as liquid; used for cooking, industry & transport.

Trends in India's LPG Sector:

- **Rising Demand:** LPG consumption increased from 21.6 MMT (FY17) to 31.3 MMT (FY25) & is projected to reach 33–34 MMT in FY26.
- **Policy Impact:** Household access expanded under Pradhan Mantri Ujjwala Yojana as refill rates rose from 3.9 to 4.5 cylinders/yr, fuelled by better affordability, delivery networks and increasing reliance on LPG.
- **Commercial Uptake:** Industrial and commercial use grew from ~10% to ~16% of total demand, driven by food services, institutional kitchens and MSME clusters.
- **Supply Gap:** Domestic production rose from 11.2 MMT to 12.8 MMT (FY17–FY25) but imports climbed to ~20.7 MMT, keeping import dependence at 55–60%.
- **Import Diversification:** Middle East supplies ~91–93% of imports; the new India-US LPG agreement (2.2 MTPA) reduces regional reliance and strengthens energy security.

Pradhan Mantri Ujjwala Yojana

- **Overview:** Launched in **2016 as a central sector scheme** under the Ministry of Petroleum & Natural Gas to provide deposit-free LPG connections to women in low-income households.
- It aims to safeguard household health by reducing indoor air pollution by replacing unclean cooking fuels with clean and more efficient LPG.
- **Eligibility:** Adult women from BPL, SC/ST, Antyodaya, SECC-listed households, forest dwellers, migrants and island residents are eligible. Male members and households with no adult females are ineligible.
- **Achievements:** Over 10.33 crore new LPG connections and more than 238 crore cylinder refills availed in 9 years.

Scheme to Promote Manufacturing of Sintered Rare Earth Permanent Magnets (REPM)

- The Union Cabinet has approved a ₹7,280-crore Scheme to Promote Manufacturing of Sintered Rare Earth Permanent Magnets (REPM) to reduce import dependence and build India's first integrated REPM ecosystem.

- A first-of-its-kind national initiative to develop a complete domestic supply chain—from rare-earth oxides to metals, alloys and finished high-performance REPMs.
- **Nodal Ministry: Ministry of Mines** (with oversight from Department of Atomic Energy & NITI Aayog)

- **Targets:**
- Establish 6,000 MTPA of integrated REPM manufacturing capacity
- Select 5 beneficiaries via global competitive bidding (each up to 1,200 MTPA)
- Build India's first complete REPM value chain

Key features:

- **Financial Outlay:**₹7,280 crore
- A total of ₹7,280 crore is allocated to build India's first large-scale, end-to-end Rare Earth Permanent Magnet (REPM) manufacturing ecosystem.
- **₹6,450 crore:Sales-linked incentives (for 5 years)**
- ₹6,450 crore will be disbursed as incentives based on actual magnet sales, encouraging high-quality production and global competitiveness.
- **₹750 crore:Capital subsidy for plant setup**
- ₹750 crore supports the heavy initial investment needed for oxide-to-metal conversion, alloying, and sintering technologies.

Duration: 7 years

- The entire scheme runs for 7 years, ensuring enough time for infrastructure creation, capacity building, and sustained production.

2-year gestation to build facilities

- Manufacturers get two years to construct integrated plants, install metallurgical systems, and stabilise rare-earth processing lines.

5-year incentive period

- For five years after commissioning, companies receive sales-based incentives to scale production and reduce import dependence.

Integrated Manufacturing Covered

- The scheme supports the full rare-earth value chain under one roof, promoting efficiency, cost reduction, and supply-chain security.
- Rare-earth oxides → metals → alloys → sintered REPMs
- It enables India to convert raw rare-earth oxides into metals, process them into alloys, and finally produce high-performance NdFeB sintered magnets.

- **Sintered Rare Earth Permanent Magnets (REPM):**
- REPMs (especially **NdFeB** magnets) are the **strongest commercial magnets** globally, made by

sintering rare-earth-based alloys like **Neodymium-Iron-Boron.**

Rare Earth Permanent Magnets:

- They are a type of permanent magnet made from alloys of rare earth elements.
- Rare Earth Elements are a group of seventeen elements, including the fifteen lanthanides on the periodic table, along with scandium and yttrium.
- **Properties:** exceptional magnetic strength, high energy density, compact size with superior performance compared to other types of magnets.No viable substitutes in high-performance applications
- **Applications:** electric vehicles, renewable energy, electronics, aerospace, and defence sectors

Current Status in India:

- India has 6.9 million tonnes REE reserves (5th largest globally)
- Yet contributes ~1% to global production
- REPM demand is almost fully import-dependent
- China controls ~90% of global REPM supply

Digital Sequence Information

- Digital Sequence Information (DSI) has become a key negotiation topic at the ongoing **11th Governing Body Meeting of the ITPGRFA** in Lima, Peru.

Digital Sequence Information (DSI):

- Digital Sequence Information (DSI) refers to the digital representation of genetic material obtained from biological samples.
- **Data Scope:** It includes nucleic-acid sequences, protein structures, metabolic profiles, epigenetic markers, and other annotated biological information.
- **Data Storage:** DSI is stored in global public repositories such **as GenBank (USA), EMBL-EBI (UK),** and the **DNA Data Bank (Japan)** under the INSDC.

INSDC: The International Nucleotide Sequence Database Collaboration (INSDC) is a global partnership that provides unified, open, and standardised public access to nucleotide-sequence data.

- **Scientific Use:** It enables genetic analysis without physical samples by utilising open-access databases and synthetic biology tools.
- **ABS Gap:** DSI remains outside bilateral **Access and Benefit-Sharing (ABS) systems** under the **Convention on Biological Diversity (CBD) and Nagoya Protocol.**
- **Cali Fund:COP16 (2024) in Colombia** created the Cali Fund to administer fair and equitable benefit-sharing from commercial DSI use.

Advantages of DSI

- **Accelerated Research:** DSI speeds up scientific research by removing the need to collect biological samples for each study physically.
- **Rapid Sharing:** Global access to digital genetic data enables quicker development of diagnostics, vaccines, and targeted treatments.
- **Reduced Barriers:** Open-access database reduces research costs and eliminates the transport and permitting barriers linked to physical genetic material.
- **Targeted Therapies:** Large-scale digital analysis helps identify disease-specific markers for precise therapeutic design.

Challenges with DSI

- **Unfair Access:** Open-access databases allow commercial users to use genetic data without fair benefit-sharing with the source countries
- **Regulatory Uncertainty:** The absence of a legally binding definition and harmonised global rules complicates policy implementation.
- **Traceability Challenge:** Determining the origin and commercial pathway of a specific DSI sequence is expensive, complicated, and often impractical.
- **Capacity Gap:** Many developing countries lack adequate sequencing infrastructure and bioinformatics expertise, restricting their ability to leverage DSI.

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

ITPGRFA is a **legally binding treaty** adopted by the **FAO in 2001** to conserve and share plant genetic resources for food and agriculture (PGRFA).

- **Objective:** The treaty ensures that farmers and breeders can access the genetic material required to create new crop varieties and strengthen global food security.
- **Current Status:** It came into force in 2004 and currently includes 155 contracting parties, comprising 154 countries and the European Union.
- **India's Membership:** India **ratified the treaty in 2002** through the **Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001** and the **Biological Diversity Act 2002.**
- **MLS Mechanism:** The treaty establishes a Multilateral System (MLS) that provides rule-based access to 64 Annex-I food and forage crops for research, breeding, and conservation.
- **SMTA Regulation:** Access under the MLS is regulated by Standard Material Transfer Agreements (SMTA), and users cannot claim intellectual property rights over MLS material.

Tex-RAMPS Scheme

- Government has approved the Textiles Focused Research, Assessment, Monitoring, Planning and Start-up (Tex-RAMPS) Scheme.

'Tex-RAMPS' Scheme

- **Ministry: Ministry of Textiles**
- **Funding:** ₹305 crore from 2025-26 to 2030-31.
- **Aim:** To future-proof India's textiles and apparel (T&A) ecosystem by strengthening Research, Innovation and Competitiveness in Textiles Sector.

Key Components

- **Research & Innovation:** in smart textiles, sustainability etc.
- **Data, Analytics & Diagnostics:** including employment assessments, supply chain mapping, etc.
- **Real-time Integrated Textiles Statistical System (ITSS):** to support structured monitoring and strategic decision-making.
- **Capacity Development & Knowledge Ecosystem:** Strengthening of State-level planning, dissemination of best practices.
- **Start-up & Innovation Support:** Support for incubators, hackathons, and academia-industry collaborations.

IMF Assigns Second-Lowest 'C' Rating to India's National Accounts Statistics (NAS) and Inflation Data

IMF Grading is divided into four grades:

- A: The data provided are adequate for surveillance.
- B: Data have some shortcomings but is broadly adequate for surveillance.
- C: Data have some shortcomings that somewhat hamper surveillance.
- D: Data have serious shortcomings that significantly hamper surveillance.

Key Issues highlighted by IMF

- **Outdated Base Year (2011-12) for GDP calculation:** fails to reflect current production technology and user preferences, which can lead to over or underestimating economic activity.
- **Need to use updated data sources:** E.g. Household consumption and expenditure survey (HCES), Periodic Labour Force Survey (PLFS), etc. to better capture the structural changes in the economy.
- **Lack of Seasonally Adjusted Data:** National accounts are not seasonally adjusted, making it difficult to interpret short-term quarterly movements.
- Outdated statistical techniques in the quarterly national accounts data.
- **Lack of Producer Prices Indices (PPI):** Excessive use of single deflation i.e. Wholesale Price Index (WPI), may introduce cyclical biases.
- **Outdated CPI Components:** The IMF highlights that the current CPI base year, items basket, and weights are outdated (2011/12).

IMF's Recommendation:

- Going forward, regular benchmark revisions of national account, price, and other key statistics should be conducted according to international best practices.

Key Statistical Indicators of Economy

- **Gross Domestic Production (GDP):** It is the total money value of all final goods and services produced within a country's borders in one year.
- **Gross Value Added (GVA):** It is the value of output minus the value of intermediate consumption. The value that producers have added to goods and services.
- **Wholesale Price Index (WPI):** It measures the average change in the prices of goods at the wholesale level. It covers mainly goods, not services.
- **Consumer Price Index (CPI):** It measures the average change in prices of goods and services consumed by households.
- **Producer Price Index (PPI):** It measures the average change in selling prices received by domestic producers. It captures inflation at the producer or factory gate level.

Entrepreneur-in-Residence (EIR) Programme

- India's Entrepreneur-in-Residence Programme (EIR) was highlighted as a key driver of biotechnology innovation at the **BRIC Annual General Meeting** in New Delhi.
- **BRIC:** The Biotechnology Research & Innovation Council, formed in 2023, is apex autonomous society under Ministry of Science & Technology, overseeing India's leading biotechnology research institutions.

EIR Programme

- The EIR Programme is an initiative under the **National Initiative for Developing and Harnessing Innovations (NIDHI)** to support entrepreneurship.
- **Objective:** Encouraging science and engineering graduates and young researchers to pursue entrepreneurship as a career through incubation and financial assistance.
- **Implementing Agency:** The Department of Science and Technology (DST) through a nationwide network of Technology Business Incubators under the Ministry of Science & Technology.
- **Key Feature:** The programme provides a monthly fellowship of up to ₹30,000 per month for 12 months, extendable to 18 months in deserving cases.
- **Significance:** It bridges the gap between academic research and enterprise to enhance India's innovation-led start-up ecosystem.

***NIDHI** is an umbrella programme designed to convert knowledge-based and technology-driven innovations into successful startups, in line with Startup India and Atmanirbhar Bharat.*

50 Years of ICDS Programme

- The Integrated Child Development Services (ICDS) programme, a flagship initiative of the Government of India, marked its 50th anniversary in 2025.

About ICDS:

- Launched in 1975, it is the world's most extensive community-based early childhood development programme. It has now been restructured into **Mission Saksham Anganwadi and Poshan 2.0.**
- It functions as a **Centrally Sponsored Scheme** under the Ministry of Women and Child Development.
- **Objective:** to enhance the nutritional and health status of children aged 0-6, support their overall development, and decrease mortality and malnutrition.
- **Integrated Services:** The ICDS scheme provides six core services—supplementary nutrition, preschool non-formal education, nutrition and health education, and immunisation.
- **Implementation:** It is carried out through a nationwide network of Anganwadi Centres (AWC).

Key Achievements

- **Coverage:** ICDS has over 9 crore beneficiaries nationwide with a network of nearly 1.4 million AWCs.
- **Nutrition Support:** Approximately 95% of children registered under ICDS avail supplementary nutrition.
- **Positive Outcomes:** Studies show improvements in early literacy and numeracy among children.

Key Challenges

- **Funding Strain:** The revised **60:40 Centre–State funding pattern** (from 90:10 earlier) has increased State-level financial pressure, resulting in implementation disparities.
- **Infrastructure Gaps:** Many AWCs lack permanent buildings, functional toilets, and potable water.
- **Worker Shortage:** Anganwadi workers continue to be underpaid, overburdened, and often assigned to non-ICDS duties.
- **Technology Issues: Poshan Tracker and facial recognition systems (FRS) encounter issues**, risking the exclusion of beneficiaries.
- **Nutrition Concerns:** Quality and adequacy issues persist in supplementary nutrition, as evidenced by high rates of stunting (35.5%) and wasting (18.7%).

Karnataka's ICDS Innovations as a Model

- **System Expansion:** Karnataka expanded ICDS from a pilot block to 204 blocks, demonstrating planned administrative scaling.
- **Infrastructure Upgrade:** Over 47,720 AWCs now function from government-owned buildings equipped with kitchens, toilets, drinking water, and electricity.
- **Preschool Reform:** Converting 250 centres into government Montessori units connects ICDS preschool education with structured, bilingual, activity-based foundational learning.
- **Curriculum Standardisation**: The ***Chilipili*** curriculum offers weekly themes and hands-on activities to boost cognitive readiness and ensure consistent learning.
- **Childcare Coverage:** Koosinamane crèches address the 0–3 childcare gap by providing Anganwadi-linked support for working women in rural and semi-urban areas.
- **Nutrition Intervention:** The Chiguru programme integrates growth monitoring with

community-based nutrition counselling, strengthening management in high-burden districts.

- **Worker Welfare:** Enhanced state honorariums and welfare measures improve Anganwadi workers' motivation, retention, and service delivery.

Paradip Port

- Paradip Port Authority (PPA) has achieved the fastest-ever **100 MMT cargo** throughput in its history, and for the 9th consecutive year, crossing the 100 MMT mark—this time 12 days earlier than last fiscal.

Paradip Port

- Paradip Port is one of India's Major Ports, operated by the Paradip Port Authority under the Ministry of Ports, Shipping & Waterways.
- It is a key **deep-water port** on the eastern coast of India, handling large volumes of coal, POL, iron ore, steel, containerised cargo and coastal shipments.
- Location: Located in Jagatsinghpur district, Odisha.
- Situated near the confluence of the **Mahanadi River** and the Bay of Bengal.

History:

- Foundation stone laid by Prime Minister Jawaharlal Nehru on **3 January 1962**.
- Government of India took over management from the Odisha government on 1 June 1965.
- Declared the **8th Major Port of India** on 18 April 1966—the first Major Port on the East Coast to be commissioned after Independence.
- Operates as an autonomous body under the **Major Port Trusts Act, 1963**, governed by a Board of Trustees.

Key Features:

- Handles a diverse cargo profile: coal (45% share), containers, steel, gypsum & flux, POL, and coastal cargo
- Consistent year-on-year cargo growth; achieved 100 MMT for 9 consecutive years
- Advanced mechanised cargo handling systems and improved operational efficiency
- Strong support from Indian Railways and coastal shipping networks

Significance:

- One of India's top-performing Major Ports in cargo handling.
- Acts as a critical gateway for coal-based power plants, steel industries and mineral exports.
- Strengthens India's coastal shipping ecosystem, reducing logistics costs.
- Enhances connectivity to the eastern industrial corridors.

CONSTITUTION, POLITY AND GOVERNANCE

India's quasi-federal structure faces challenges straining Centre-State relations

Institutions like the GST Council and NITI Aayog continue to provide platforms for dialogue, reinforcing the foundational **principle of "self-rule with shared-rule"** that underpins India''s democratic success.

India's Constitutional Framework: A Balance of Powers

Federal Features

1. **Written Constitution:** A foundational document with well-defined procedure for amendment.
2. **Dual Polity:** A system of government at both the Union and State levels.
3. **Bicameralism:** Council of States (Rajya Sabha) representing the interests and aspirations of the states. It also acts as a check on potential majoritarianism in the Lok Sabha.
4. **Division of Powers:** Legislative powers between Union and States through three lists in the under the Schedule VII.

Unitary Features

1. **Strong Centre:** Division of powers is tilted in favor of the central government. E.g., Primacy to Parliamentary legislations on subjects listed under Concurrent List.
2. **Single Constitution and Citizenship:** Uniform laws and rights apply to all citizens across the country.
3. **Parliamentary Authority over States:** Article 3 empowers Parliament to change the territories, areas, and boundaries of states by law, without requiring the states'' consent.
4. **Others:** Integrated Judiciary, All India Services, Emergency powers, Parliament can make laws to meet obligations arising from international treaties, etc.

Contemporary Challenges to the Federal Structure

- **Fiscal Centralisation:** e.g., Implementation of GST impacting financial autonomy of States.
- **Administrative and Political Centralisation:** e.g., use of the **Disaster Management Act** during the COVID-19 pandemic to impose nationwide lockdowns with 'minimal state consultation'.
- **Others:** Reservation of Bill by Governors for Presidential Assent, devolution of taxes and revenues by Finance Commission, etc.

Institutions such as NITI Aayog embodying the 'Team India' spirit, bringing together the Centre and States as equal partners in nation-building, can help address emerging developmental challenges by evolving as a dynamic balance between unity and regional autonomy.

Appointment of University's Vice-Chancellors

Recently, the Supreme Court resolved a long-standing standoff between the West Bengal Governor

and the State government, allowing the appointment of Vice-Chancellors (VCs).

- In Central Universities, Vice-Chancellors are **appointed by the President** on the advice of the Central Government. In contrast, in State Universities, they are **appointed by the Governor** after consulting the State Government.

- The **Governor, as the ex officio Chancellor**, delayed appointments to 36 state-run universities.
- The State government filed a petition citing obstruction of governance and academic autonomy.
- The **Justice U.U. Lalit Committee** was constituted to ensure impartial selection.

UGC Regulations (2018) on the appointment of Vice-Chancellor

- The person to be appointed as a Vice-Chancellor should be a **distinguished academician**, with a
- **a minimum of ten years of experience as a Professor in a University** or
- **Ten years of experience** in reputed research.
- The selection for the post of Vice-Chancellor should be through proper identification by a **Panel of 3-5 persons** by a **Search-cum-Selection-Committee.**
- The Chairman of UGC shall **nominate one member** of the committee.
- **Key Constitutional Provisions Related to Appointment of Vice-Chancellors**
- **Article 154:** The **executive power of the State is vested in the Governor**, but is exercised by him in accordance with the Constitution.
- **Article 163:** The Governor must act on the **aid and advice of the Council of Ministers**; the appointment of VCs is **not a discretionary power** of the Governor.
- **Article 166:** Executive actions, though issued in the Governor's name, are decided by the **State Cabinet**.
- **Article 200:** The Governor **may reserve Bills for the President's assent**, often causing delays in education-related amendments.

National Geospatial Policy, 2022

Survey of India (SoI) is developing a National Geo-Spatial Platform

- Platform will help in implementing the vision of the
- SoI is overarching nodal agency for Geospatial Data.
- **Geospatial data** is time-based data that is related to a specific location on the Earth's surface.

National Geo-Spatial Platform (NGP)

- **Objective:** To serve as a robust and scalable system for standardizing, sharing, and managing foundational geospatial datasets, and
- It will facilitate seamless access to accurate and authoritative spatial data through web services, APIs, and mobile applications
- **Harnessing Geospatial Data for Inclusive and Sustainable Growth**

- **Agriculture:** Enhancing **precision farming**, **soil health mapping** and irrigation management.
- **Logistics & Transportation:** Enables **integrated infrastructure planning.** E.g., PM Gati Shakti National Master Plan
- **Urban Planning and Infrastructure:** Drives advancements in **urban design** by supporting high-resolution topographical surveys (5-10 cm accuracy) and the future development of a **National Digital Twin** for major cities.
- **E.g.**, Geographical Information System (GIS) based Master Plan for Atal Mission for Rejuvenation and Urban Transformation (AMRUT) cities
- **Other**: Environmental conservation (providing high-resolution location data and spatial intelligence), Disaster Management, etc.

National Geospatial Policy, 2022

- It outlines a **strategic roadmap** for the development of geospatial infrastructure, services, and platforms at both **national and sub-national levels**.
- It provided for constituting Geospatial Data Promotion and Development Committee (GDPDC) at the national level.
- **Operation Dronagiri** has been launched under it
- **Operation Dronagiri** is a pilot initiative aiming to demonstrate the real-world applications of geospatial technologies.
- **Other key Initiatives taken to promote Geospatial sector**: National Geospatial Mission, National Geospatial Data Repository, etc.

Govt to Map Highway Black Spots

- The **Ministry of Road Transport and Highways (MoRTH)** will release updated **black spot data** for 2023-2024.
- The data will be based on the **Electronic Detailed Accident Report (e-DAR)** and **Integrated Road Accident Database (iRAD) systems**.
- Earlier, MoRTH's Transport Research Wing (TRW) collected black spot data manually through state submissions and physical verification. The data was available only until 2022, delaying policy response.
- **Black spot list 2023-24**, generated from e-DAR data, will be **India's first real-time** accident mapping.

Black Spots

- A black spot is a **500-metre stretch** on a National Highway (NH) with a high incidence of accidents.
- It is identified if, over **3 years**, there are:
- 5 or more accidents involving deaths or grievous injuries, or 10 or more fatalities.

- Between 2016 and 2022, **13,795 black spots** were identified nationwide, of which 5,036 have already been rectified through long-term engineering measures.

National Road Safety Council (NRSC)

- Constituted under **Section 215** of the **Motor Vehicles Act, 1988** and chaired by the **Union Minister of Road Transport and Highways**.
- State/UT Transport Ministers, senior officers from the Centre and States, and other key road safety stakeholders.

Plenary Power Under Article 142

- In an extraordinary case, the Supreme Court invoked its **plenary powers under Article 142** to quash a conviction under the **Protection of Children from Sexual Offences (POCSO) Act**.

Plenary Powers under Article 142

- **Objective:** Empowers the Supreme Court to pass any order necessary to do **"complete justice"** in a case.
- **Scope:** Enables the Court to override statutory constraints for fairness in unique circumstances.
- **Nature:** Extraordinary, **discretionary**, and case-specific, cannot be invoked as a general rule or precedent.
- **Caution:** Bench clarified this should not be treated as precedent for future POCSO or similar offences.

Protection of Children from Sexual Offences Act, 2012

- **Objective: Safeguards children (<18 years)** from sexual assault, harassment, and exploitation.
- **Nature: Gender-neutral** and **applies strict liability** (consent of minor immaterial).
- **Special Courts:** Each district shall **designate a Sessions Court** to be a **Special Court**. The state government shall establish it in consultation with the Chief Justice of the HC.
- **Penalty:** Stringent punishments up to life imprisonment or death in aggravated cases.
- **Amendment:** The 2019 amendment increased penalties and **criminalised child pornography**.
- **Time-Bound Disposal:** A POCSO case must be disposed of **within one year** from the date the offence is reported to ensure speedy justice for the child victim.
- **Monitoring Authority:** The **National Commission for Protection of Child Rights (NCPCR)** and **State Commissions (SCPCRs)** are empowered to monitor implementation of the Act's provisions.
- **Juvenile Offenders:** If the offender is a child, the case shall be dealt with under the **Juvenile Justice (Care and Protection of Children) Act, 2015**, focusing on rehabilitation rather than punishment.

State Human Rights Commission (SHRC)

- Chandigarh High Court reminds Punjab State Human Rights Commission (SHRC) that it can only recommend, not issue directions like court.

SHRC

- Statutory body formed under the **Protection of Human Rights Act, 1993**.
- Inquires into human rights violations under the **State List** and **Concurrent List**.
- Its **recommendations are advisory**, not legally binding.
- **Composition: A Chairperson** (retired Chief Justice or Judge of a High Court) and two members.
- **Appointment of Chairpersons and Members: Appointed by the Governor** on the recommendation of a committee.
- **Members can be removed** by the **President of India**.

Chhattisgarh Train Accident draws attention towards Rail Safety in India

Though there is a decline in **Consequential Train Accidents** from **135 in 2014-15 to 31 in 2024-25,** yet accidents including derailments, collisions, etc., continue to occur due to **multiple reasons.**

- **Consequential train accidents** are the ones with **serious repercussions**, including injuries, loss of life, disruption of rail traffic and damage to railway property.

Key Reasons for Rail Accidents in India

- **Derailments:** Track defects and poor maintenance (Bikaner–Guwahati Express 2022).
- **Signalling Errors:** E.g., Kanchanjunga Express Train Accident (2024).
- **Operational Mistakes:** Incorrect manual signalling and switching errors (Odisha Coromandel Express Accident, 2023).
- **Other:** Level-crossing incidents, Weather factors, human errors including driver fatigue, fire accidents, etc.

Initiatives taken to Ensure Railway Safety

- **Rashtriya Rail Sanraksha Kosh (RRSK):** Introduced in 2017-18 for **replacement/renewal/ upgradation** of critical safety assets.
- **Commission of Railway Safety:** Under **Ministry of Civil Aviation** dealing with matters on safety of rail travel and train operation with inspectorial, investigatory and advisory functions.
- **Electrical/Electronic Interlocking Systems:** With centralized operation of points and signals to reduce accident due to human failure.
- **KAVACH:** Indigenously developed **Automatic Train Protection (ATP)** system developed by the **Research Design and Standards Organisation (RDSO).**
- **Others:** GPS based Fog Safety Device (FSD); Ultrasonic Flaw Detection (USFD), etc.

- While the railways has moved well in adopting different technologies for its safety, there is a need for **harmonisation amongst them** along with focusing on **human skill development and training** to avoid human errors.

VAIshwik BHArtiya Vaigyanik (VAIBHAV)

- Union Minister recently **interacted with the VAIshwik BHArtiya Vaigyanik (VAIBHAV) Fellows from across the world.**

VAIBHAV

- **Ministry:** Department of Science and Technology, Ministry of Science and Technology.
- **Launched in: 2023**
- It envisages collaboration **between scientists of the Indian Diaspora with Indian Higher Educational Institutions (HEIs), Universities and/ or public funded Scientific Institutions**.
- **VAIBHAV Fellow can choose an** Indian institution to work with and can spend up to **2 months each year there, for up to 3 years.**

India AI Governance Guidelines

- The **Ministry of Electronics and Information Technology (MeitY)** released the **India AI Governance Guidelines** for regulating Artificial Intelligence in India.
- The guidelines promote a **flexible**, **innovation-friendly AI framework** suited to India's socio-economic context. It was unveiled under the IndiaAI Mission.

> *India-AI Mission, launched in **2024** under **MeitY**, is a **strategic initiative** to make India a **global hub** for "**Making AI in India and Making AI Work for India**."*

Key Components of the Guidelines

- **Guiding Principles:** **Seven Sutras** guide it—trust, people-centricity, responsible innovation, fairness & equity, accountability, understandability by design, safety, resilience, & sustainability.
- **Governance Pillars:** **Six pillars for AI development**—Infrastructure, Capacity Building, Policy and Regulation, Risk Mitigation, Accountability, and Institutions.
- **Action Plan:** The **multi-phase plan** details priorities across **short**, **medium**, and **long terms**, including creating new governance institutions and amending current laws as necessary.
- **Practical Framework:** These serve as guidance for **developers**, **industry**, and **regulators** to ensure transparent and accountable **AI deployment**.
- **Institutional Framework:** The guidelines establish **three new AI-specific institutions** while integrating existing regulators, advisory, and standards bodies for coordinated implementation.
- **AIGG:** The **AI Governance Group** will serve as a permanent, high-level **inter-agency**

body dedicated to coordinating policies across ministries.

- **TPEC:** The **Technology and Policy Expert Committee** will function as a multidisciplinary **advisory forum** offering technical and policy guidance.
- **AISI: AI Safety Institute** will act as the main **technical organisation** for testing, evaluation, certification, and setting standards for AI systems.

Road Accidents in India

- The **Ministry of Road Transport and Highways (MoRTH)** has published its **provisional 2024 report** on **road accidents** in India.

Road Accidents in India Report

- **'Road Accidents in India'** is the **annual national report** on road accidents and fatalities published by the **Transport Research Wing (TRW)** of the **Ministry of Road Transport and Highways** (MoRTH).
- **Data Source:** The report analyses accident and fatality data submitted by **Police Departments** of all States and Union Territories.
- **Standardised Format:** It follows data formats developed by the **UN Economic and Social Commission for Asia and the Pacific** (UNESCAP) under the **Asia-Pacific Road Accident Data** (APRAD) project.

Key Findings of the Provisional Report 2024

- **National Overview:** India reported **4.73 lakh road accidents** and **1.70 lakh fatalities** across 35 states and UTs in 2024, excluding West Bengal.
- **States with Decline: Nine states and UTs**, including Gujarat, Haryana, Punjab, Goa, Jharkhand, and Nagaland, recorded **decreases** in **both accident** numbers and **fatalities**.
- **High-Incidence: Tamil Nadu** remained the **most accident-prone** state for the **seventh consecutive year**, followed by Madhya Pradesh, Kerala, and Uttar Pradesh.
- **Highest Fatalities: Uttar Pradesh** reported the **maximum accident deaths** at 24,118 deaths in 2024, and the **highest accident-to-fatality ratio** of 52.37%.
- **Improved Performers: Kerala** recorded the **lowest accident severity**, while **Telangana** achieved the **sharpest drop in** fatality rate from 33.44% to 30.59%.

Road Safety in India

- According to **World Road Statistics** by the **International Road Federation**, India records the **highest number of road accident deaths globally**, followed by China and the United States.
- **Major Causes: Overspeeding** causes more than **68% of road accident deaths** in India; other causes include poor road design, wrong-side driving, and not wearing safety gear.
- **Policy Measures:** Includes adopting a **4E strategy; Education**, **Engineering**, **Enforcement**,

and **Emergency Care;** implementing the Motor Vehicles (Amendment) Act 2019 and the e-DAR project.

India's Rare Disease Community

- The Delhi High Court (2024) ordered the Centre to operationalise the **National Policy for Rare Diseases 2021 (**NPRD**)** and establish a ₹974 crore **National Fund for Rare Diseases (NFRD)**.
- Since 2023, over 50 children have died as **therapies were stopped** once the ₹50 lakh ceiling was reached.

Current Status of Rare Diseases in India

- **Recognised Disorders:** India accounts for **one-third** of the global rare disease incidence, with over **450 rare genetic diseases**, affecting an estimated **70–96 million citizens** (ICMR 2023).
- **Major Rare Diseases:** Spinal Muscular Atrophy, Gaucher's disease, and Whipple's disease.
- **Centres of Excellence:** **12 CoEs**, including AIIMS Delhi, ICH Chennai, have approved treatment protocols.
- **Drug Access:** **95 %** of orphan drugs are imported, raising annual therapy costs to **₹3–5 crore** per patient.
- **Psychological Trauma:** **62 % of caregivers** report depression and burnout (MoHFW review 2024).
- **Financial Catastrophe:** **78 % of rare-disease families** incurred catastrophic health expenditure **(> 25 % of income)**; **41 % sold assets** (NHP 2024).
- **Challenges Faced in Tackling Rare Diseases**
- **Administrative Paralysis:** **0 % fund disbursal** under NFRD since the notification (MoHFW 2024).
- **High Treatment Cost:** Average therapy cost equals **80× India's per-capita income**.
- **Low Public Spending:** India's total health expenditure is **1.3 % of GDP** (NHA 2024).
- **Data Deficiency:** National rare-disease registry covers **only ≈ 1,500 patients** vs millions estimated.
- **Weak Coordination:** **Only 5 States** have operational State Nodal Offices (MoHFW review 2024).
- **Policies and Schemes for Tackling Rare Diseases in India**
- **National Policy for Rare Diseases 2021:** Core framework by **MoHFW** for diagnosis and treatment.
- **National Fund for Rare Diseases:** ₹974 crore fund to finance high-cost therapies.
- **Customs & IGST Exemption (2022):** Full tax exemption on imported orphan drugs and medical devices.
- **Patient Registry (ICMR–NIMS):** National database for tracking patients and improving research.
- **State Rare-Disease Cells:** Formed in Kerala, Karnataka and Delhi for decentralised implementation.

Way Forward

- **Immediate Fund Release:** Operationalise the ₹974 crore NFRD with direct transfer to CoEs.
- **Create a National Mission:** Launch a dedicated **Rare Disease Mission** under MoHFW with a ring-fenced annual budget and measurable treatment outcomes, modelled on **India's National Cancer Grid**.
- **Legislative Backing:** Enact a **Rare Diseases (Prevention and Treatment) Act**, ensuring statutory entitlement and continuity of care.
- **Indigenous Drug Production:** Extend PLI Scheme to orphan-drug and gene-therapy R&D to reduce imports, similar to **South Korea's Orphan Drug Development Programme**.
- **Empower States:** Incentivise **competitive federalism** by ranking states on rare-disease readiness, similar to **NITI Aayog's Health Index approach**.
- **Judicial Monitoring:** The Supreme Court should mandate quarterly progress reporting to prevent policy paralysis, ensuring constitutional compliance under **Article 21**.
- **Integrate Early Screening:** Add newborn genetic testing under **Ayushman Bharat** for early detection and prevention, like **Japan's "Health Japan 21" model**.

Two Mobile Applications for Census 2027

- The Registrar General and Census Commissioner of India has launched two mobile applications, **Digital Layout Map (DLM)** and **Census 2027-Houselist**, for Census 2027.
- A **self-enumeration portal** has also been launched for testing to let citizens submit census details online before physical verification.
- **DLM:** It allows enumerators to geo-tag every building with **latitude-longitude coordinates** and **Houselisting Block (**HLB**)** details on a Geographic Information System (GIS) map.
- **Census 2027-Houselist:** It digitally collects data on **housing conditions** and amenities during the Houselisting and Housing Operations phase, ensuring faster and more accurate data processing.

Census 2027

- Census 2027 will be **India's first fully digital census**, with data collected using mobile applications and uploaded to a **central server**, replacing traditional paper forms.
- **Caste Enumeration:** The Census will **enumerate all castes** beyond the SCs and the STs for comprehensive socio-economic data, marking the **first full caste count since 1931**.
- **Geo-Tagging:** It will **geo-tag all buildings**, replacing the hand-drawn sketches used previously.

Supreme Court Raises Concern over India's Land Registration System in Samiullah v. State of Bihar

Issues Highlighted by the SC

- **Outdated Laws**: Land registration still governed by colonial era laws such as the **Transfer of Property Act 1882, Stamp Act 1899, and Registration Act 190**8.
- **No Conclusive Title:** Registration of a deed (under the Registration Act) only provides presumptive evidence of ownership, **not conclusive title**.
- This means the **state does not certify the authenticity of ownership**, leaving buyers vulnerable to litigation.
- **Litigation Burden:** Fraudulent deeds, encroachments, and weak verification leads to **66% of civil litigation**.
- **Incomplete Digitisation:** Programmes like **DILRMP** (Digital India Land Records Modernization) and **NGDRS** (National Generic Document Registration System) digitise records but **do not correct faulty titles.**

Key Suggestions by the SC

- **Blockchain Integration:** could create an incorruptible, transparent, and easily verifiable registry of property transactions.
- Such systems could **integrate survey data, cadastral maps, and registration details**, preventing multiple sales of the same property.
- **Conclusive Title:** Directed the **Law Commission** to study a shift from presumptive to conclusive titling.
- **Institutional Overhaul:** Called for **legal amendments or alignments** in the Registration Act (1908), Evidence Act (1872), IT Act (2000), etc. and **stronger Centre-State coordination**.

Blockchain Technology

- **Definition:** It is a **DLT (Distributed Ledger Technology)** where encrypted records (blocks) are permanently linked across many computers.
- **Structure:** Data blocks are chronologically linked and cryptographically secured, preventing tampering.
- **Key Features:** Immutability, transparency, traceability, and decentralisation.
- **Benefit:** Enhances trust, reduces fraud, and improves efficiency in public systems.
- **Global relevance:** Countries like Sweden, Georgia, and Ghana have piloted blockchain-based land registries, showing improvements in efficiency and citizen trust.

Contempt of Court in India

- Following alleged derogatory remarks against the Chief Justice of India and the Supreme Court, questions have been raised about what legally amounts to contempt of court.
- **Purpose:** Protect judicial authority, ensure public confidence, and preserve the sanctity of justice delivery.
- **Constitutional Basis: Articles 129** and **Article 215** empower the Supreme Court and High Courts as Courts of Record with inherent authority to punish for contempt. The term ***"contempt of***

court" appears in **Article 19(2)** as a ground to restrict freedom of speech.

- **Statutory Framework: Contempt of Courts Act, 1971** (H.N. Sanyal Committee Recommendation).
- **Civil Contempt (Section 2(b)):** wilful disobedience to any judgment, decree, direction, order, writ or other process of a court or wilful breach of an undertaking given to a court.
- **Criminal Contempt (Section 2(c)):** Publication or act that Scandalises the authority of a court, Prejudices with judicial proceedings, Obstructs the administration of justice in any manner.
- **Contempt of Courts (Amendment) Act, 2006:** It specified that punishment for contempt can be imposed only if the act substantially interferes or is likely to interfere with the administration of justice.
- **Initiation of Proceedings:** Courts may act ***suo motu***, or any person may file a petition with the consent of the Attorney General (SC) or Advocate General (HC).
- **Punishment:** simple imprisonment up to **6 months** or fine **up to ₹2,000**, or **both**, and it is waived if the court accepts a genuine apology.

Landmark Contempt of Court Cases

- **Ashwini Kumar Ghosh v. Arabinda Bose, 1952:** Legitimate criticism of judgments does not equal contempt, unless it crosses the line of fair commentary
- **Anil Ratan Sarkar v. Hirak Ghosh, 2002:** Courts caution against misuse of contempt powers.
- **M.V. Jayarajan v. High Court of Kerala (2015):** Abusive public speech against an HC order will be considered as criminal contempt.
- **PUCL v. Union of India (2003):** Reinforced freedom of expression but limited by contempt restrictions.
- **Vijay Kurle and others (2020):** The Court stated that to comment or criticise the court's judgment, individuals must have the knowledge to challenge a judge's integrity and authority.
- **Shanmugam Lakshminarayanan v. High Court of Madras (2025):** Reaffirmed that contempt power ensures administration of justice, **not judicial immunity**.

Right to Vote and Freedom of Voting

- The Centre told the SC that the **right to vote is only a statutory right** under the RPA 1951, while the freedom of voting is a fundamental right under **Article 19(1)(a)** as a form of expression.
- **Issue**
- **Section 53(2), RPA 1951:** If candidates = seats, Returning Officer declares them **elected without poll**.
- **Petitioners' Claim:** This violates citizens' freedom of expression under **Article 19(1)(a)** by denying them the right to cast **NOTA (None of the Above)** and register dissent.

*India has had only **9 uncontested elections** across 20 General Elections (1951–2024), just 1 case in 34 years since 1991, showing such events are extremely rare.*

Centre's Argument:

- Right to vote is purely statutory under **Section 62** of the **RP Act 1951**, subject to legal limits.
- Freedom of voting is a free speech protected by **Article 19(1)(a)**, realised only when a poll occurs.
- Casting a vote is an expression of opinion, but the legal right arises from statute, not the Constitution. **(PUCL v. Union 2003)**
- In the **Anoop Baranwal case**, the Supreme Court reaffirmed that the right to vote is purely statutory.
- Under **Section 79(b)**, NOTA lacks legal personality to demand a poll; it is only an option or expression.
- **Election Commission's Stand:** Agrees with the Centre; making NOTA a "candidate" requires legislative amendment to the 1951 Act and 1961 Rules.

Right to Vote

- The Constitution of India, under **Article 326**, guarantees universal adult franchise, stating that every citizen aged 18 or above is entitled to vote, provided they are not disqualified under law.
- In the **Anoop Baranwal case (2023)**, the SC reaffirmed that the **right to vote is purely statutory**.
- Being a statutory right means **Parliament can impose reasonable restrictions**, such as disqualifications or procedural changes.

Supreme Court issued directions to remove stray dogs from key public spaces

- SC noted that repeated incidents of dog bites at key public spaces are **not merely a public-health challenge** but a **matter of human safety under Article 21** of the Constitution.

SC Directions

- **A nodal officer must be** appointed for the upkeep and surveillance of each such premise like **educational institutions, hospitals, transport hubs**, etc. by their respective management.
- **District Magistrates** to ensure that such premises are secured by adequate fencing, boundary walls, gates.
- **Local municipal authorities and panchayats** shall carry out **regular inspections,** at least once in every three months.
- All Government and private hospitals shall maintain a **mandatory stock of anti-rabies vaccines and immunoglobulin at all times**.
- **Proper waste-management systems** shall be implemented to eliminate food sources that attract animals.

Issue of Stray dogs in India

- **Population size: 1.5 crore** (2019 livestock census).
- **Dog Bites in India:** Around **37 lakh in 2024** (National Centre for Disease Control data).
- **Rabies: India contributes to 36%** of global rabies deaths.
- **Mortality: Dog bites are responsible for about 96%** of the mortality and morbidity associated with rabies in India.

Provisions and steps taken regarding Stray Dogs in India

- **Constitution:** As per **Articles 243(W),** municipalities are mandated to control the stray dog population.
- **Article 51A (g):** Fundamental Duty "to have compassion for living creatures".
- **Animal Birth Control (ABC) Rules, 2023** under **Prevention of Cruelty to Animals Act, 1960** established the Capture-Sterilize-Vaccinate-Release (CSVR) model to control the stray dog population.
- **National Action Plan for Dog Mediated Rabies Elimination (NAPRE) from India by 2030'** launched by the Ministry of Health & Family Welfare.

Section 33-36 of RPA, 1951

- Recent debates over rejection of nomination papers have renewed calls to reform **India's electoral nomination process** under the Representation of the People Act, 1951 (**RPA, 1951).**

Key provisions (Sections 33-36, RPA 1951):

- **Section 33 - Nomination filing:** Candidates submit nomination papers signed by self and proposers (one for party, ten for independents).
- **Section 33A - Disclosure:** Mandatory declaration of criminal cases, assets, liabilities, and education.
- **Section 33B - Limitation:** Restricts disclosures beyond Section 33A.
- **Section 34 - Security deposit:** ₹25,000 (Lok Sabha) or ₹10,000 (Assembly), forfeited if below one-sixth votes.
- **Section 35 - Notification:** Returning Officer (**RO**) announces nomination, scrutiny, and withdrawal schedule.
- **Section 36 - Scrutiny:** RO examines and may reject **defective papers.**

Humane Justice System for Women Prisoners

- At the **National Human Rights Commission's Foundation Day (Oct 16) conference**, experts stressed the need for a national policy on custodial justice for women.
- With 21,510 women inmates and 1,492 infants in Indian prisons (NCRB, Dec 2023), the call for gender-sensitive reforms has become urgent.

Issues Faced by Women Prisoners

- **Undertrial Majority:** Over **80% of female** inmates are **undertrials**, showing mechanical arrests. It violates **SC's Joginder Kumar Case (1994)** against unnecessary arrests.
- **Infant Detention:** **1,318 women** housed with infants; **1,049** among them undertrials. (NCRB 2023).
- **Gender-Blind Sentencing:** Women are subjected to the same correctional norms as men.
- **Incidental Criminality:** **Over 60%** of women offenders commit crimes under economic or familial stress.
- **Custodial Trauma:** Average confinement **16–18 hours/day** in overcrowded, unhygienic barracks. E.g. **Prison occupancy rate** touches **130%** in many states (MHA Prison Statistics 2023).
- **Mental Depression:** Around **70%** of female inmates are isolated due to family desertion. (NCRB 2023).
- **Bail Oversight:** Less than **15%** of eligible women get bail or probation. (NCRB 2023).
- **Economic Hardship:** Over **75%** of inmates are from poor or unskilled backgrounds. E.g. No inclusion under DBT or PM-Jan Dhan for inmates (NCRB socioeconomic profile 2023).

Way Forward (Schemes / Reforms / Best Practices)

- **Gender Policy:** Frame a **National Policy on Women's Custodial Justice**, ensuring dignity and rehabilitation. E.g. **NHRC 2025 recommendation** for gender-responsive prison standards.
- **Non-Custodial Sentences:** Prioritise community service and probation over imprisonment. E.g. Adopt the **UN Bangkok Rules (2010)** for women offenders.
- **Mandatory Bail:** Introduce automatic bail for undertrial mothers and pregnant women. Follow **Justice Krishna Iyer's (1987)** recommendations.
- **Prison Architecture:** Design female-centric facilities near home districts. E.g. **Women's enclosures** proposed in each district jail under the **MHA Model Manual 2023**.
- **Psychological Care:** Provide counselling, skill training, and peer support. E.g. **Tihar's "Ujjwala Project"**.

CAG's Plan for Two New Cadres

- The Comptroller and Auditor General (CAG) of India has approved the creation of two new specialised cadres — **Central Revenue Audit** (CRA) and **Central Expenditure Audit** (CEA) within its department to enhance centralisation and audit quality from 1st January 2026.
- The CAG plans to restructure its Indian Audit and Accounts Department by creating two new cadres — the **Central Revenue Audit (CRA)** and **Central Expenditure Audit (CEA)** — for improved centralised auditing.

Names of the cadres

- **Central Revenue Audit (CRA) Cadre** – will handle specialised audits of Central Government

receipts and revenues.

- **Central Expenditure Audit (CEA) Cadre** – will focus on expenditure audits of ministries and departments.
- **Aim:** To develop domain expertise, improve audit quality, and ensure professional specialisation in government financial audits, leading to greater fiscal accountability and efficiency.

Need for reform:

- Currently, audits are handled by multiple State Civil Audit offices with dispersed cadre control, causing **fragmentation** and **inefficiency**.
- The new system will **consolidate over 4,000 audit professionals** (out of 42,000 total staff) and enhance manpower flexibility through all-India transfer liability.

Comptroller and Auditor General (CAG) of India

- The **CAG** is a **constitutional authority** (Articles **148–151**) responsible for **auditing the receipts and expenditures** of the Union, States, and other government-funded bodies.
- It acts as the **"Guardian of the Public Purse"** and ensures financial accountability of the executive to the legislature.

Constitutional basis

- **Article 148:** Establishes the CAG of India.
- **Article 149:** Defines CAG's duties and powers.
- **Article 150:** Prescribes the form of government accounts.
- **Article 151:** Deals with audit report submission to the President/Governor.

Appointment and tenure

- Appointed by the **President of India** under his hand and seal.
- Holds office for **6 years or up to age 65**, whichever is earlier.
- Can be removed only through a **special majority resolution** of Parliament (same as a Supreme Court judge).

Key functions (under the 1971 Act)

- Audits **all expenditure** from the **Consolidated Fund**, **Contingency Fund**, and **Public Account** of India and States.
- Audits **Central and State revenues** to ensure proper assessment and collection.
- Audits **government companies and corporations** under respective statutes.
- Provides **audit reports** to the **President/Governor**, which are examined by the **Public Accounts Committee**.
- Acts as a **guide, friend, and philosopher** to legislative committees.

Reports submitted

- **Audit Report on Appropriation Accounts** – checks expenditure vs sanction.
- **Audit Report on Finance Accounts** – annual receipts and disbursements.
- **Audit Report on Public Undertakings** – performance of government companies.

India's Nomination Process Needs Reform

- Under the Representation of the People Act (1951), the **nomination stage has increasingly become a bottleneck**, with candidates screened out even before voting begins.
- Several cases across States show nominations being rejected on **minor technical grounds**, raising concerns about **procedural misuse** and **lack of safeguards**.

Key Issues

- The **Returning Officer (RO)** has broad discretion under **Sections 33-36 of RPA, 1951**, to **accept or reject** nominations.
- Under **Section 36(2)**, nominations can be rejected for **"defects of a substantial character,"** but the law does not define **what is "substantial."**
- Wrongful rejection **cannot be challenged** until **elections end** (Article 329(b)), making the **rejection final and irreversible**.

Way Forward

- **Clarify the Law**: **Clearly define** what constitutes a **"substantial defect",** such as wrong constituency, ineligibility due to age or citizenship, or legal disqualification.
- **Classify Errors:** Distinguish between **minor issues** (not grounds for rejection), issues requiring verification (to allow inquiry), & constitutional disqualification (where rejection must be with written reasoning).
- **Due Process:** Issue a written defect notice mentioning the law violated, evidence, and allow a **minimum 48-hour correction window**.
- **Extend nomination filing hours** to avoid a narrow time window that increases last-minute crowding.
- **Digital-by-Default:** Launch a **unified e-Nomination portal** linked to electoral rolls for **automatic validation** of age, constituency, and voter ID.
- Enable **digital oath** and **affidavit filing (OTP/Digital Signature)**, and allow deposits via UPI/RTGS with a time-stamped audit trail.
- **Institutional Checks:** Create an **appeal or review mechanism** above the Returning Officer (RO) before final rejection.
- Standardise procedures through **mandatory training** and SOPs for ROs; conduct **periodic audits** of scrutiny decisions.
- **Constitutional Rationale:** The **right to contest** is the democratic **counterpart** to the **right to**

vote; arbitrary exclusion undermines voter choice.

Rising Menace of Digital Arrest

- The Supreme Court of India raised alarm over the rising menace of 'digital arrests', noting that victims, mainly elderly citizens, **lost ₹3,000 crore** in India alone.

> ***Modus Operandi of Digital Arrest:*** *Scammers spoof caller IDs to impersonate law enforcement, intimidate victims with false crime accusations and fake documents, isolate them through threats, and demand untraceable payments while stealing personal information for identity theft.*

Scale and Impact of Digital Arrest Scam

- **Elderly Vulnerability:** **Over 60%** of victims were senior citizens (above 60 years), often targeted for low digital literacy and savings. (NCRB Cybercrime Data 2024)
- **Rapid Case Rise:** Cyber-fraud cases involving impersonation **rose by 72% in 2024** compared to 2023.
- **Psychological Impact:** In 1,200 documented cases, **85%** victims reported mental distress, and **40%** developed anxiety disorders post-scam (NIMHANS–CERT-In survey 2024).
- **Low Recovery Rate:** Only **3–4%** of total defrauded money has been recovered so far. (I4C report 2025).
- **Key Challenges in Tackling Digital Arrest Scams**
- **Transnational Operations:** Cyber gangs operate from foreign jurisdictions, limiting India's legal reach. E.g. Scam centres linked to **Myanmar** and **Laos** (MEA, 2025).
- **Use of Deepfakes:** AI tools used to morph officials' faces and voices, enhancing the credibility of scams.
- **Regulatory Gaps:** Limited coordination between CERT-In, MHA Cyber Crime Portal, and state police units.
- **Tech–Law Gap:** IT Act (2000) lacks provisions addressing AI-based impersonation or virtual arrest threats.
- **Money Laundering Nexus:** Funds routed through crypto and mule accounts, complicating recovery. E.g.: FIU-India flagged **₹800 crore** cross-border laundering links.

Way Forward

- **National Cyber Task Force:** Establish a **centralised inter-agency unit** (CBI, CERT-In, RBI) for coordinated investigation. E.g. Similar to **U.S. Cyber Fraud Task Force (CFTF) model**.
- **Deepfake Regulation:** Enact rules under the DPDP Act, 2023 to criminalise AI-based identity fraud. E.g. **EU's AI Act (2025)** mandates watermarking of synthetic media.
- **Elderly Protection Cells:** Integrate cyber vigilance units with **senior citizen helplines (14567)**.
- **Public Awareness Drives:** Launch nationwide CERT-In campaigns on "Digital Arrests" and cyber hygiene in regional languages. E.g.: Similar to Cyber Surakshit Bharat **(MeitY)** outreach model.

- **Stronger Extradition Treaties:** Enhance **India–ASEAN cooperation** to dismantle scam hubs operating from neighbouring countries.

30 Years of Legal Services Authorities Act

- CJI B.R. Gavai at the National Conference on Strengthening Legal Aid Delivery Mechanisms, marking **NALSA's 30th year**, emphasised that **legal aid is not charity but a moral duty**.

*National Legal Services Authority (NALSA) was constituted in **1995** under the provisions of the **Legal Services Authorities Act, 1987**, which came into force on November 9, 1995, and is celebrated annually as Legal Services Day in India.*

Key Highlights from CJI's Message

- **Constitutional Duty:** CJI Gavai highlighted that **legal aid ensures the constitutional promise of justice (Article 39A)** is realised, calling it an administrative and ethical responsibility rather.
- **Institutional Continuity:** Suggested forming **advisory committees** with current and future executive chairpersons of NALSA and State Legal Services Authorities to ensure long-term, vision-based planning.
- **Institutional Strengthening:** Advocated for collaboration between the judiciary, executive, and civil society, and the use of technology with human sensitivity for wider outreach.
- **Respect for Legal Aid Workers:** Called for treating **volunteers**, **paralegal workers**, and legal aid counsels with dignity, recognising their role as the movement's backbone.

Legal Aid Framework in India

- **Constitutional Basis:** **Article 39A** (Directive Principle) directs the State to ensure **equal justice** and free legal aid for citizens unable to afford representation.
- **Statutory Framework:** Governed by the **Legal Services Authorities Act, 1987**, which provides for free and competent legal services to the weaker sections of society.

Three-tier Structure:

1. **NALSA (National Legal Services Authority):** Apex body headed by the **Chief Justice of India**.
2. **SLSAs (State Legal Services Authorities):** Headed by **Chief Justices** of respective High Courts.
3. **DLSAs (District Legal Services Authorities):** Chaired by **District Judges**.

- **Eligibility:** Legal aid is available to women, children, SC/STs, victims of trafficking, persons with disability, and those below the income threshold (as notified by the State).
- **Judicial View:** Legal aid forms part of the broader right to equality and fair trial **(Articles 14 & 21)** as recognised by Supreme Court judgments **(Hussainara Khatoon v. State of Bihar, 1979)**.

Major Initiatives:

- **Tele-Law Programme (2017):** Provides legal advice via Common Service Centres (CSCs).
- **NYAYA Bandhu:** Pro Bono Legal Services, 2018, which connects lawyers with needy citizens.
- **Pan India Awareness and Outreach Campaigns (2021–2025):** Enhance grassroots legal literacy.

Assam's Polygamy Prohibition Bill, 2025

- The Assam Cabinet approved the Assam Prohibition of Polygamy Bill, 2025, which seeks to criminalise polygamy across the State, with possible exemptions for Sixth Schedule tribal areas.

Key Provisions of Assam Prohibition of Polygamy Bill, 2025

- **Punishment:** Conviction for polygamy will attract rigorous imprisonment **up to seven years** & a fine.
- **Compensation Fund:** Establish a **State Victim Relief Fund** to offer financial support to victims.
- **Applicability:** Applicable throughout Assam, **excluding Sixth Schedule** areas managed by autonomous councils.
- **Legal Basis:** Draws strength from **Article 44** (Uniform Civil Code) and **Article 15(3)** empowering the State to make special provisions for women.
- **Implementation:** Offences are **cognizable** & **non-bailable**, to be tried under **Sections 494–495 IPC**.

Legal Provisions of Polygamy Under Various Religions

- **Hindus, Buddhists, Jains, Sikhs:** Prohibited under **Section 5** of the **Hindu Marriage Act, 1955**, a second marriage during the lifetime of a spouse is void **(Section 11)** and punishable under Section 494 IPC.
- **Christians:** Banned under the **Indian Christian Marriage Act, 1872**; offenders can be prosecuted.
- **Parsis: Parsi Marriage and Divorce Act, 1936**, which allows only monogamous marriages.
- **Muslims:** Permitted up to four wives under the **Muslim Personal Law (Shariat) Application Act, 1937**, subject to equal treatment and justice.

Prevalence of Polygamy in India

- **NFHS-5 (2019–21):** National prevalence of polygamy stands at **1.4%**, down from **1.9% in NFHS-4** (2015–16), showing a steady decline across communities.
- **By Religion:** Muslims (1.9%), Hindus (1.3%), Christians (1.0%), Tribal groups (2.4%), indicating cultural and economic factors as key drivers.
- **Regional Trends:** Higher prevalence in **northeastern states** like Meghalaya, Mizoram, and Assam, due to customary tribal laws and matrilineal traditions.

Need for Polygamy Prohibition

- **Gender Equality:** Upholds **Articles 14 and 15**, ensuring non-discrimination against women.
- **Constitutional Morality:** Aligns with **Article 44** and promotes secular legal uniformity in marriage laws.
- **Judicial Precedent:** **Javed v. State of Haryana (2003)** held that polygamy is not an essential religious practice and can be restricted in the public interest.
- **Women's Empowerment:** Protects women from economic insecurity, mental distress, and social marginalisation arising from polygamous unions.
- **Global Practices:** Many Islamic countries like Turkey, Tunisia, and Indonesia have regulated or banned polygamy in line with women's rights frameworks.

Challenges Faced in the Prohibition of Polygamy

- **Customary Laws:** The Sixth Schedule operate under autonomous frameworks, limiting state jurisdiction.
- **Religious Sensitivity:** Risk of political and communal backlash over perceived interference. E.g. protests during debates on the **Uniform Civil Code in Uttarakhand (2024)**.
- **Implementation Gap:** Enforcement of prohibitions and conviction rates under **Section 494 IPC** remain **very low (<10%)** due to weak reporting and social stigma. (NCRB)
- **Socio-Economic Dependence:** Victims often lack financial independence, making withdrawal from relationships difficult. E.g. **over 60% of victims** rely economically on the husband's family. (NCW 2022)

Way Forward

- **Legal Uniformity :** The **Law Commission Report No. 279** (2018) recommended **phased** UCC **reforms** with public consultation for social acceptance.
- **Victim Support Mechanisms:** Operationalise financial, psychological, and legal aid schemes to empower affected women. E.g. **NCW's One Stop Centre Scheme**, ensuring holistic victim assistance.
- **Customary Law Dialogue:** Engage with Sixth Schedule councils to integrate women's rights into tribal legal system. E.g. **Nagaland Women's Reservation initiative** showed balancing tradition with equality.
- **Data and Monitoring:** Establish a state registry of marital status and second marriages. E.g. **Indonesia's marriage registration system**, which curbed polygamy by linking marriage to national ID databases.
- **Judicial and Administrative Coordination:** Strengthen family courts, legal aid centres, and women's commissions for quick redressal and deterrence. E.g. **Fast-Track Special Courts (2019) model**.

CCTV Cameras in Passenger Trains

- Indian Railways has started installing cameras in **locomotive cabs** and **coaches** on passenger trains under the **South East Central Railway zone** (**HQ: Bilaspur, Chhattisgarh**)
- **Nationwide Rollout:** It is part of a larger pan-India plan to install cameras in **74,000 coaches** and **15,000 locomotives** to strengthen security and monitoring.
- **Purpose:** To improve passenger safety, deter crimes, support post-crash investigations, and ensure crew accountability.
- **Locomotive Cameras:** Each locomotive will have **six cameras** for front, rear, and cab views, along with **two microphones** for audio recording.
- **Coach Cameras:** Four **dome cameras** will be installed near coach doors to monitor movements.
- **Technology:** The cameras are **high-resolution**, STQC-certified, and can record in **low light** and high-speed conditions.

Other Government Initiatives for Railway Safety

- **Kavach Train Collision Avoidance System (**TCAS**):** Indigenously developed **Automatic Train Protection** (ATP) system designed to stop trains when a collision risk is detected.
- **Electronic Interlocking: Software-driven signalling system** that replaces older relay-based mechanical methods to minimise human error
- **FogPASS Device:** Portable, GPS-enabled **navigation tool** that helps locomotive pilots operate safely in **low-visibility** or fog conditions.
- **Real-Time Information System (RTIS):** Satellite-based tracking system that **automatically shares** train **location**, **speed**, and **movement** data with control centres
- **Ultrasonic Flaw Detection (USFD):** Non-destructive testing method using **high-frequency sound waves** to find invisible cracks, corrosion, or internal defects in rails.
- **Railway Driver Assistance System (RDAS):** AI-powered technology that **monitors driver alertness** and behaviour to prevent fatigue or inattention during operations.
- **Wheel Impact Load Detectors (WILD):** Unmanned safety systems to identify faulty wheels by **measuring the impact forces** they exert on railway tracks.

SC Affirms Arrest Must Be Communicated in Language Understood by Arrestee

- The SC held that **an arrest is illegal if the written grounds of arrest are not furnished** to the arrestee in a language he/she understands.
- Earlier, the SC mandated **written grounds** of arrest in cases under the **Unlawful Activities (Prevention) Act (**UAPA**)** and the **Prevention of Money Laundering Act (**PMLA**)**.
- This ruling extends that requirement to **all arrests**, including under IPC/Bharatiya Nyaya Sanhita (BNS).

Key Observations of the Supreme Court

- **Article 22(1)** guarantees that a person must be informed of the grounds of arrest "as soon as may

be".

- Simply reading out the grounds or supplying them in a language **not understood** by the accused does **not satisfy constitutional requirements**.
- This violates **Articles 21** (protection of personal liberty) and **22** (right to know the grounds of arrest).

Court's Direction: Grounds of arrest must be **written** in a language the arrestee understands, clear enough to enable the person to **consult a lawyer**, **seek bail**, or challenge custody.

Union Government to launch National One Health Mission

- The mission approved by the **Prime Minister''s Science, Technology, and Innovation Advisory Council (PM-STIAC)**, aims for robust pandemic preparedness and integrated disease control by recognizing the interconnected nature of health risks.

National One Health Mission

- **Vision:** To build an integrated disease control and pandemic preparedness system in India by bringing human, animal and environmental sectors together for better health outcomes, improved productivity and conservation of biodiversity.
- **Implementing Agency:** Indian Council of Medical Research (ICMR).
- **Anchor Institution:** National Institute of One Health, Nagpur.

Critical pillars:

- **Research and Development**: Driving targeted R&D to develop essential tools such as vaccines, diagnostics, and therapeutics.
- **Clinical Readiness**: Enhancing preparedness in terms of clinical care infrastructure and response capabilities.
- **Data Integration**: Streamlining data and information linkages across the human, animal, and environmental sectors for improved access and analytics.
- **Community Engagement**: Ensuring close community participation to maintain a constant state of response readiness.

'One Health'

- It is an **integrated, unifying approach** that aims to sustainably balance and optimize the **health of people, animals, and ecosystems**.
- **'One Health' imperatives in India:** Unique demographics (diverse wildlife, one of the world''s largest livestock populations, and a high density of human population); **Recent Disease Outbreaks** (including the COVID-19 pandemic, outbreaks of Lumpy Skin Disease in cattle, and the persistent threat of Avian Influenza, etc.), among others.

Transplantation of Human Organs and Tissues Rules, 2025

- The Union Health Ministry has amended the Transplantation of Human Organs and Tissues Rules, 2025, removing the mandatory requirement of clinical specular equipment for corneal transplantation centres.

Transplantation of Human Organs and Tissues (Amendment) Rules, 2025:

- The amendment to the Transplantation of Human Organs and Tissues Rules, 2014, issued under the Transplantation of Human Organs and Tissues Act, 1994, seeks to simplify norms for corneal transplantation and strengthen the National Organ Transplant Programme (NOTP).

Aim

- To boost cornea donation and transplantation services, streamline the approval process, and remove infrastructural bottlenecks, ensuring equitable access to eye-care facilities across India.

Key Features:

- **Removal of mandatory clinical specular microscope requirement:** previously used to assess corneal endothelial cell health, easing compliance for smaller eye centres.
- **Promotes equitable access** to transplant services in rural and semi-urban regions by reducing cost and equipment barriers.
- **Strengthens NOTP** by improving coordination among hospitals, tissue banks, and regulatory authorities.
- **Based on expert and stakeholder consultations**, aligning with the government's Vision for Equitable Healthcare Access.
- **Long-term objective:** Strengthen India's **cornea donation ecosystem** and reduce the burden of **corneal blindness** — the **second-leading cause of blindness** among Indians over 50 years of age.

Cornea

- The cornea is the transparent, dome-shaped outer layer at the front of the eye that functions like a window, allowing light to enter and focus on the retina for clear vision.

Characteristics:

- Acts as a **protective barrier** against dust, microbes, and injury.
- **Comprises six layers:** Epithelium, Bowman's Layer, Stroma, Pre-Descemet's (Dua's) Layer, Descemet's Layer, and Endothelium.
- **Highly sensitive:** has **300–600 times more pain receptors** than skin, ensuring quick reflex protection.
- Maintains **eye structure and fluid balance**, essential for vision clarity.
- **Self-healing:** minor injuries repair rapidly, but deeper damage (scarring or clouding) often requires **corneal transplant surgery** to restore vision.

National Water Awards 2024

- The **Ministry of Jal Shakti** has announced the winners of the **6th National Water Awards** for the year **2024**.
- The awards were instituted in **2018** to recognise exceptional efforts in **water conservation** and **management** across the country.
- **Objective:** To raise **public awareness** about the importance of water and promote **community participation** towards a "**Jal Samridh Bharat**" (Water-Prosperous India).
- **Categories:** The 2024 edition featured **10 categories**, recognising **states**, individuals, institutions, **panchayats**, industries, and non-governmental organisations.
- **Key Winners:** A total of **46 winners** were announced.
- **Best State:** **Maharashtra** secured the **first prize**, with **Gujarat** in second place and **Haryana** in third.
- **Best Urban Local Body:** Navi Mumbai Municipal Corporation, Maharashtra.
- **Best Village Panchayat:** Dubbiganipalli (Andhra Pradesh) and Payam (Kerala) won jointly.

CBSE Draft Curriculum for AI and Computational Thinking

- A draft curriculum for **Artificial Intelligence (AI) and Computational Thinking (CT)** has been created by the **Central Board of Secondary Education (CBSE) for Classes III to XII**.

> *Computational Thinking (CT) is a structured approach to **problem-solving** that applies **core computer science concepts** to address challenges across various subjects and real-life contexts.*

- **Objective:** The curriculum aims to develop an **AI-ready mindset** and **skill set** in learners, promoting **critical thinking**, **ethical awareness**, and **career readiness** for a technology-driven future.
- **Teacher Training:** Structured, time-bound **training modules** under NISHTHA will be used to

enhance teacher capacity for effective AI curriculum delivery.

- **Implementation:** By the Department of School Education and Literacy **(DoSE&L)**, **Ministry of Education,** in coordination with **CBSE** and **NCERT**.
- **Timeline:** **Classes 3–6** will adopt the new AI curriculum in **2026–27**, expanding to Classes 9–10 by 2027–28, with senior-secondary electives added later.
- **Significance:** It is **India's first** comprehensive, nationwide **integrated literacy framework** aligned with the **National Education Policy (**NEP**) 2020**.

Key Features

- **Early Integration:** **Computational-thinking** concepts, currently confined to mathematics, will be introduced across all subjects, for **Classes 3–5**.
- **Phased Learning:** AI awareness and foundational CT will be introduced from **Classes 6–8**, progressing to advanced applications in **Classes 9–10**.
- **Elective Option:** **Core AI** and **machine learning modules** will be offered as electives for **Classes 11–12** to deepen conceptual understanding.
- **Experiential Learning:** The framework encourages **practical learning** through games, projects, and activities that teach the AI Project Cycle, data analysis, and model evaluation.

SC Flags Declining Representation of Women in Parliament

- **The** Supreme Court raised concern over the **delay in implementing** the **Women's Reservation Law (Nari Shakti Vandan Adhiniyam / 106th Constitutional Amendment Act, 2023)**.
- A petition was filed seeking **immediate enforcement** of **33% reservation** for women in the Lok Sabha and State Assemblies.

Key Observations by the Supreme Court

- **Justice B.V. Nagarathna** (the **only woman** judge on the SC Bench) highlighted that despite forming **48.44% of India's population**, women remain significantly **under-represented in legislatures**.
- She described women as the **"largest minority"** in the political space and questioned why representation should wait for procedural conditions to be met.
- **Constitutional Basis:** **Article 15(3)** permits the State to take affirmative action and make special provisions for women.
- The Bench underlined that **political justice is as essential as social & economic justice** in a democracy.

Reason for Implementation Delay:

- The law becomes operational only after the **next national census**, and;

- Delimitation (redrawing constituencies based on updated population figures).
- The Union government has **not specified any timeline** for either exercise.

Department of Agriculture and Farmers Welfare released the Draft Seeds Bill, 2025

- Proposed Legislation seeks to replace the **Seeds Act, 1966 and Seeds (Control) Order, 1983** aiming to ensure quality seeds, protect farmers' rights and promote ease of doing business.
- **Key Highlights of the Bill**
- **Mandatory Registration:** No seed, except farmers' variety and the one produced exclusively for export purpose, shall be sold unless registered.
- **Regulation of the sale of seeds:** Seed varieties to conform to **Indian Minimum Seed Certification Standards.**
- **Central Seed Committee:** Constituted by the Central Government with its Headquarters in **New Delhi.**
- It shall offer advice on matters relating **seed programming, planning, seed development, production, storage, processing, export and imports**, etc.
- **State Seed Committees:** To be constituted by State Government consisting of Chairman and not more than 15 members appointed or nominated by State Government.
- **Registration Sub-Committees:** To recommend kind or variety of seeds for registration after scrutinising their claims.
- **National Register on Seed Varieties:** It is a **register of all Kinds or Varieties of seed** kept under the **control and management** of the Registrar.
- **Establishment of Central and State Seed Testing Laboratories:** Equipped with Seed Analysts and Inspectors.
- **Offences and Punishment:** Proposes stringent penal provisions with offences in three categories, namely, trivial, minor and major, with major offences carrying a maximum penalty of Rs. 30 lakh with imprisonment.

Dumpsite Remediation Accelerator Programme

- The **MoHUA** launched **Dumpsite Remediation Accelerator Programme (DRAP)** under **Swachh Bharat Mission–Urban (SBM-U 2.0)** to fast-track the remediation of legacy waste dumpsites.
- The initiative aligns with the government's **'Lakshya Zero Dumpsites' vision** and **Viksit Bharat 2047**, aiming for cleaner and more livable Indian cities.

Current Status of Dumpsite Remediation in India

- **Legacy Waste:** India has **1,428 active dumpsites**, holding nearly 23 crore metric tonnes (MT) of legacy waste. About 80% of this is concentrated in 214 high-impact sites across 202 urban

local bodies (ULBs).

- **Progress Achieved:** So far, 1,048 sites (25 crore MT) have been remediated, processing a total of 14.33 crore MT of waste and reclaiming 7,580 acres (≈50%) of land for reuse.
- **Financial Support:** The Centre provides ₹550 per tonne for legacy waste remediation. ₹4,181 crore **Central Financial Assistance (CFA)** has been sanctioned for projects worth ₹10,228 crore.

Objectives and Features of DRAP

- **Accelerated Remediation:** Fast-tracked approach for scientific capping, biomining, and bio-remediation of waste to meet the **2026 deadline**.
- **Urban Land Reclamation:** Restored land to be repurposed for green zones and utility infrastructure.
- **Pollution Control:** Reduction in landfill methane emissions and leachate contamination of soil.
- **Institutional Strengthening:** Establishment of the **SBM Knowledge Management Unit (KMU)** at the National Institute of Urban Affairs for capacity building and knowledge sharing.
- **Private Investment Platform:** Launch of **Urban Invest Window (UiWIN)** by HUDCO to mobilise PPP-based and multilateral financing for sustainable infrastructure.

Challenges in Dumpsite Remediation

- **Technical Capacity:** Many ULBs lack skilled manpower and advanced biomining technologies, slowing project execution. E.g.**: Only 30% of cities** have functional waste treatment facilities (CPCB 2024).
- **Financial Gaps:** The total cost of remediation **(~₹10,000 crore)** exceeds available CFA allocations, requiring stronger state and PPP participation.
- **Fresh Waste Management:** Inadequate segregation at source **(≈60%)** risks re-accumulation of new dumps (CPCB 2024).
- **Regulatory Compliance:** **Only 68%** of ULBs have notified by-laws under the **Solid Waste Management Rules, 2016**, and **less than 45%** have achieved full segregation of waste at source (CPCB 2024)
- **Data and Monitoring:** **Merely 35%** of ULBs submit timely remediation progress data to state dashboards, causing delays in Central Financial Assistance (CFA) release and technical review (MoHUA 2025).

Way Forward

- **Integrated Waste Governance:** Establish **Urban Waste Management Cells** in each State to coordinate recycling policies. E.g. **Maharashtra's State Swachh Mission model** ensures district-level accountability.
- **Circular Economy Models:** Promote **biomining contracts** and waste-to-energy projects through **UiWIN** to attract private capital. E.g. **Indore's 100% landfill-free model**.

- **Tech Integration:** Develop a **central digital dashboard** tracking dumpsite status and land reuse potential. E.g. **Japan's Smart Waste Portal** supports live data monitoring for landfill reclamation.
- **Scientific Land Reuse:** Convert reclaimed sites into urban forests, solar parks, or logistics hubs, guided by **MoEFCC remediation guidelines (2022)**.
- **Community Involvement:** **Brazil's National Solid Waste Policy (2010)** formally integrates **waste-pickers' cooperatives (catadores)** into municipal waste management, providing social security and training, which helped recycle over 90% of aluminium cans and created **200,000+ green jobs** nationwide.

First Jal Sanchay Jan Bhagidari (JSJB) Awards

- The Hon'ble President of India, will confer the First Jal Sanchay Jan Bhagidari (JSJB) Awards and the 6th National Water Awards 2025 on 18th November 2025 at Vigyan Bhawan.
- A flagship initiative of the Department of Water Resources, River Development & Ganga Rejuvenation (DoWR, RD & GR) under the Ministry of Jal Shakti, instituted in 2018 to recognize outstanding efforts in water conservation and management.
- **Aim:** To promote **community participation**, awareness, and innovation in water resource management, aligning with the vision of *"Jal Samridh Bharat."*

Features:

- Awards across **10 categories**, including Best State, District, Village Panchayat, Industry, NGO, and Institution.
- Evaluation based on **field verification** by **CWC** and **CGWB**.
- **46 winners** selected out of **751 applications** received via the Rashtriya Puraskar Portal.
- **Rankings (Top Performers):**
- **Best State:** Maharashtra (1st), Gujarat (2nd), Haryana (3rd)
- **Best Districts:** Rajnandgaon (Chhattisgarh), Khargone (Madhya Pradesh), Mirzapur (Uttar Pradesh), Tirunelveli (Tamil Nadu), Sepahijala (Tripura)
- **Best Urban Local Body:** Navi Mumbai, Maharashtra
- A community-driven initiative under the Jal Shakti Abhiyan: Catch the Rain (JSA: CTR) campaign, launched on 6th September 2024 at Surat, Gujarat, promoting grassroots water stewardship.
- **Aim:** To encourage Jan Bhagidari (public participation) and CSR involvement in constructing, rejuvenating, and maintaining artificial recharge and storage structures, thereby ensuring long-term water security and resilience.

Features:

- Guided by the **3Cs mantra — Community, CSR, and Cost.**
- Districts encouraged to build **10,000 recharge structures** (3,000 for hilly/North-Eastern districts).

- Collaboration between **Ministry of Jal Shakti** and **Ministry of Housing & Urban Affairs** for urban water recharge.

Rankings and Recognition:

- **100 awardees** selected — including States, 67 Districts, 6 Municipal Corporations, NGOs, industries, and philanthropists.
- **Top-performing districts** receive ₹2 crore (Category 1), ₹1 crore (Category 2), and ₹25 lakh (Category 3).
- **Ranking:** Telangana, Chhattisgarh, and Rajasthan were ranked the top three states in the JSJB Awards 2025.

Explosion at Nowgam Police Station in Srinagar

- A recent explosion caused by seized explosives at **Srinagar's Nowgam police station** raises concerns about failures in following explosive-handling protocols.
- **Accidental Detonation:** The blast resulted from the **accidental ignition** of ammonium nitrate, potassium nitrate, and other explosives seized in Faridabad.
- **Module Link:** The explosives were linked to the **Jaish-e-Mohammed** "white-collar" terror module involved in the Red Fort blast.
- **Claim Rejected:** A claim of responsibility by the People's Anti-Fascist Front (a JeM proxy outfit) was dismissed, and officials classified the incident as an **'accident during evidence handling'**.
- **Standard Protocols for Handling Seized Explosives**
- **Legal Basis:** The handling of seized explosives is governed by the **Explosives Act 1884**, the **Explosives Rules 2008**, and guidelines issued by the **Petroleum and Explosives Safety Organisation** (PESO).
- **Qualified Personnel:** Only authorised **Explosive Ordnance Disposal** (EOD) **experts** trained under the **Explosives Act** are permitted to handle, sample, transport, or destroy seized explosives.
- **Sealed Inventory:** All seized explosives must be recorded in a **sealed inventory** in the presence of police or a **magistrate**.
- They are stored in the police station malkhana (storage room) or **transferred to the court** if the storage is deemed unsafe.
- **Forensic Timeline:** Agencies must send seized explosives for forensic analysis **within twenty-four hours**, and the police retain custody until the sampling is completed.
- **Destruction Approval:** The police require a **court's permission** to **destroy seized explosives**, and destruction is allowed only after approval from the appropriate government authority.

Undertrial Injustice in India

- Justice Vikram Nath of the Supreme Court stressed that many prisoners languish behind bars due to systemic failures like poor legal aid, procedural delays, and inability to furnish bail.

Need for Undertrial Justice in India

- Out of India's **5.6 lakh prisoners**, nearly **4 lakh (70%) are undertrials** (NCRB, 2023).
- Many undertrials spend more time in jail than the maximum sentence for their alleged offences. E.g. In Maharashtra, **11% of undertrials** have been incarcerated beyond the prescribed sentence (NCRB, 2023).
- Around **25% of undertrials** remain in custody for not affording bail bonds (India Justice Report, 2022).
- **Over 60% of prisoners** are unaware of their right to free legal aid (NALSA-UNDP Report, 2023).
- SC/ST and OBC communities form **66% of all undertrials**, showing a socio-economic bias.
- Only **1 legal aid lawyer per 55 prisoners**, leading to poor case follow-up. NALSA audit (2023).
- **Way Forward**
- **Fast-Track Trial:** Prioritise undertrial review committees and special courts for long-pending cases. E.g. The **Delhi High Court's 2023 initiative** disposed of 2,000 petty undertrial cases within six months.
- **Effective Legal Aid Delivery:** Expand NALSA's mandate for quality assurance of legal aid lawyers. E.g., the **UK's Legal Aid Quality Mark System** to rate performance and effectiveness.
- **Bail Reform:** Implement automatic bail for bailable offences and release where detention exceeds half the maximum sentence **(Law Commission of India Report No. 268).**
- **Integration of Technology:** Use AI-based dashboards to track undertrial detention, legal representation, and case status. E.g. **Telangana's e-Prison Project (2024)** reduced detention errors by 25%.
- **Law School Engagement:** Institutionalise legal aid clinics under BCI guidelines for hands-on learning. E.g. **NALSAR models** linking students with district legal services authorities.
- **Targeted Vulnerability Programs:** Provide legal aid, healthcare, and rehabilitation for women, SC/ST inmates, and prisoners with mental illness. E.g. **Kerala's Parivarthanam Prison Outreach**.

Creamy Layer in Scheduled Caste Reservation

- On Nov 2025, CJI B.R. Gavai reiterated that the creamy layer principle should apply to the **Scheduled Caste (SC)** reservation, similar to the **Indra Sawhney (1992) ruling for OBCs**.

Need for Creamy Layer in SC Quota

- **Intra-Group Inequality:** NSS & IHDS data show a clear socio-economic gap within SCs, where the **top 10–15%** households match near-national averages while the bottom remains in low-paid labour.
- **Benefit Concentration:** Research (TISS/ICSSR) indicates a small upwardly mobile SC segment

repeatedly secures top jobs and seats, causing **inter-generational capture** rather than rotating gains to the poorest.

- **Persistent Structural Deprivation:** PLFS 2022–23 shows SC unemployment stays above national levels, with **50%+ workforce** still in low-productivity sectors, proving uneven socio-economic progress.
- **Access & Resource Gap:** AISHE trends show weaker enrolment and completion among rural/low-income SC youth compared to urban/elite SC families, reflecting **internal opportunity disparities**.

Counterarguments Against CJI View

- **Untouchability Effects:** Social discrimination may not disappear for affluent SCs, unlike OBC groups, hence economic filters alone may be insufficient.
- **Constitutional Interpretation:** SC quota is historically based on caste-based discrimination and stigma, not just economic backwardness.
- **Administrative Complexity:** Identifying the creamy layer within SCs & STs is more complex because caste-based exclusion operates universally, not selectively.

Constitutional Basis for SC Reservation

- **Articles 15(4) & 16(4):** Enable special provisions and reservations for socially and educationally backward classes, including SCs, to ensure substantive equality.
- **Article 46:** Directs the State to promote educational and economic interests of SCs/STs and protect them from social injustice and exploitation.
- **Article 14 (Equality Clause):** Allows reasonable classification for affirmative action but discourages over-inclusive benefits that ignore internal disparities.

Key SC Judgments on SC Creamy Layer Classification

- **E.V. Chinnaiah v State of Andhra Pradesh (2004):** Held that SCs form a single homogenous class under **Article 341**, and States **cannot** sub-classify or redistribute quota within SCs.
- **M. Nagaraj vs Union of India (2006):** Upheld promotion reservation for SC/ST, but required quantifiable data on backwardness, inadequate representation and efficiency.
- **Jarnail Singh Case (2018):** Removed the need to re-establish SC/ST backwardness, but allowed creamy layer exclusion for SC/ST in promotions to prevent elite capture.

Higher Education Commission of India (HECI)

- A unified regulator proposed under NEP 2020 to replace UGC, AICTE and NCTE and ensure coherent standards across general, technical, and teacher education.

Four Verticals of HECI

- **National Higher Education Regulatory Council (NHERC):** A single regulator for all higher education (except medical and legal), responsible for setting standards and enforcing compliance.
- **National Accreditation Council (NAC):** An independent accreditation body that evaluates on quality benchmarks like teaching, governance, and infrastructure through a transparent grading system.
- **General Education Council (GEC):** Defines academic standards, learning outcomes, and curricular frameworks to ensure coherence, flexibility, and multidisciplinary learning across institutions.
- **Higher Education Grants Council (HEGC):** Oversees grant-related rules and funding criteria, ensuring transparent and performance-linked financial support.

Key Provisions of the HECI Bill 2025

- **Single Regulator:** Merges UGC, AICTE, and NCTE to reduce overlap and create a unified decision-making system across higher education.
- **Four Verticals:** Independent bodies for regulation, accreditation, learning outcomes, and funding alignment ensure functional separation and avoid conflicts of interest.
- **Expert-Led Bodies:** Each vertical will comprise experts with proven academic/research integrity to improve professionalism and transparency.
- **Autonomy Promotion:** Encourages universities to become self-governing through tiered autonomy, outcome-based accreditation, and academic flexibility.
- **Reduced Red Tape:** Aims to end "heavy-handed regulation" (NEP 2020), by shifting from input-based approvals to performance-based oversight.
- **Funding Clarity:** Funding decisions may remain with the government, but HEGC will guide grant norms to align quality with financial incentives.

Significance of the HECI Bill 2025

- **Regulatory Streamlining:** Eliminates fragmented oversight by three bodies, creating uniform standards across higher education. E.g. India currently has 55+ regulators across education sectors (AISHE).
- **Quality Enhancement:** Accreditation under NAC promotes rigorous benchmarking and outcome-based evaluation. E.g. Only 17% of colleges have NAAC accreditation (NAAC 2023).
- **Autonomy Boost:** HECI's autonomy framework encourages innovation, flexible curricula, and multidisciplinary learning. E.g. **NEP targets 100% GER expansion** through flexible degree pathways.
- **Global Alignment:** Brings India closer to unified regulatory models used in countries like the UK and Australia. E.g. **UK's Office for Students** integrates oversight of all higher-education providers.

Criticism Against the HECI Bill 2025

- **Excess Centralisation:** Fear that HECI may give disproportionate control to the Centre over

appointments & standards. E.g. 2018 HECI draft had all 12 members appointed by Centre.

- **State Marginalisation:** States worry about reduced say, creating conflict between state and national regulatory frameworks. E.g. 70% of India's universities are state universities (AISHE).
- **Representation Gaps:** Concerns about limited inclusion of SC/ST, OBC, women, minorities in regulatory bodies. E.g. CPI(M) highlighted "no representation" for disadvantaged groups in 2018 draft.
- **Funding Concerns:** Fear that grants may shift from **UGC's system to a 60:40 Centre–State pattern**. E.g. Tamil Nadu objected, citing past bias in central fund allocation.
- **Autonomy Paradox:** Institutions fear "**light-but-tight**" may become centralised, compliance-heavy regulation. E.g. India already faces a high regulatory compliance burden (NITI Aayog BRAP report).

Way Forward

- **Balanced Federalism:** Ensure state representation in HECI verticals to protect federal autonomy. E.g. Australia's Tertiary Education Quality Agency includes state nominees.
- **Inclusive Governance:** Mandate representation of women, SC/ST, OBC, minorities, persons with disabilities to ensure inclusive and participative governance.
- **Funding Reform:** Create transparent grant norms under HEGC while maintaining full support for state universities. E.g., RUSA follows performance-linked funding for quality improvement.
- **Capacity Strengthening:** Provide training, digital tools, and compliance simplification for smaller institutions. E.g. NEAT and SWAYAM for academic capacity-building and governance support.
- **Gradual Transition:** Phased rollout to avoid disruptive overlap norms and accreditation cycles. E.g. **EU Bologna reforms** (coherence to education systems across Europe) adopted a multi-phase transition.
- **Rashtriya Uchchatar Shikha Abhiyan (RUSA)** was launched in 2013 as a central sponsor scheme with an aim to provide funding to state higher educational institutions.

53rd Chief Justice of India (CJI)

- **Justice Surya Kant** is set to take oath as the 53rd Chief Justice of India (CJI) on **24 November 2025** following the retirement of CJI B. R. Gavai. His tenure will extend until 9 February 2027, making it one of the longer CJI tenures in recent years.

The Office of the CJI:

- The Chief Justice of India (CJI) is the head of the Indian judiciary and presiding judge of the Supreme Court of India.
- The office flows from **Article 124(1)**, which establishes a Supreme Court consisting of a CJI and other judges.

Constitutional Associated:

- **Article 124(1):** Establishes the Supreme Court of India (CJI + other judges).
- **Article 124(2):** Judges (including CJI) appointed by the President by warrant under his hand and seal, after consultation.
- **Article 126:** Appointment of an Acting CJI when needed.
- **Article 127:** Appointment of ad hoc judges of the Supreme Court.
- **Article 128:** Retired SC judges can sit and act as judges of the Supreme Court.

Procedure for Appointment of the CJI:

- **Seniority Principle:** By convention, the senior-most judge of the Supreme Court (by tenure in SC) is considered for appointment as CJI, if found fit.
- **Initiation by Outgoing CJI:** About one month before retirement, the outgoing CJI recommends the name of the next CJI to the Union Minister of Law & Justice.
- **Executive Processing:** Law Minister → places file before the Prime Minister → PM advises the President.

Presidential Appointment & Oath:

- The President issues the warrant of appointment under Article 124(2).
- The CJI then takes oath of office before the President of India.
- **Memorandum of Procedure (MoP):** The MoP (1999) codifies this practice: "Appointment to the office of the CJI should be of the seniormost Judge of the Supreme Court considered fit to hold the office."

Key Features of the CJI Appointment System:

- **Seniority-based & Convention-driven:** Reduces arbitrariness and strengthens judicial independence by limiting political discretion.
- **Consultative but Executive-formalised:** Though the President/Executive formally appoints, the recommendation flows from the judiciary, especially the outgoing CJI.
- **Linked to Collegium System:** As CJI heads the collegium, his appointment affects the entire higher judiciary appointments ecosystem.

Significance of the CJI's Role:

- **Judicial Head & Master of Roster:** Allocates benches, lists cases, and shapes which issues get priority.
- **Head of Collegium:** Crucial role in appointment and transfer of High Court and Supreme Court judges.
- **Constitutional Sentinel:** Leads benches deciding on federal disputes, fundamental rights, electoral issues, separation of powers.

Constitution (131st Amendment) Bill, 2025

- **The proposed Constitution (131st Amendment) Bill, 2025** sparked a major political row after it sought to bring Chandigarh under **Article 240,** altering its administrative structure.
- A draft amendment proposing to include Chandigarh under Article 240, placing it in the same category as UTs where the President can directly frame regulations.
- **Aim:** To "simplify the Central Government's law-making process for the UT of Chandigarh" and bring uniformity with other UTs lacking legislatures.

Key Features:

- **Brings Chandigarh under Article 240**: Enables the President to make regulations equivalent to Acts of Parliament, similar to A&N Islands, Lakshadweep, DNHDD and Puducherry (when Assembly is dissolved).
- **Allows appointment of an independent Administrator:** Opens the possibility of replacing the current system where Punjab's Governor serves as Chandigarh's Administrator.
- **Reduces Punjab's administrative role:** Would mark a structural shift from the historical arrangement given during the 1966 Punjab Reorganisation, triggering political concerns.

Chandigarh's History

- **Planned vision of Jawaharlal Nehru:** Conceived as a symbol of modern India's aspirations after Partition- **"a new town, unfettered by the traditions of the past."**
- **Designed by Le Corbusier:** The famous French architect developed the master plan, making it one of the world's earliest and finest experiments in modernist urban planning.

Post-Partition Background-

- **Replacement for Lahore:** After 1947, Punjab lost Lahore to Pakistan; Chandigarh was envisioned as the capital of Indian Punjab.
- **Refugee rehabilitation:** The city was partly designed to resettle thousands displaced from West Punjab.

Site Selection and City Construction-

- **Chosen in 1948:** Foothills of the Shivalik's - then part of Ambala district - were selected jointly by the Centre and Punjab Government.
- **Foundation stone laid in 1952:** Marking the beginning of India's foremost modern city project.

Role after the 1966 Punjab Reorganisation-

- **Joint capital of Punjab and Haryana:** After Haryana was carved out, Chandigarh was designated as the shared capital of both states under the Punjab Reorganisation Act, 1966.
- **Declared a Union Territory:** The city came directly under Central Government administration while hosting the secretariats and legislatures of both states.

Existing Governance Structure-

- **Administrator of Chandigarh:** Presently, Governor of Punjab holds additional charge as the Administrator of the UT.
- Earlier (1966–1984), the city had its own independent Chief Commissioner/Chief Secretary, before administration shifted to Punjab's Governor.
- **Administrative Control:** Chandigarh UT functions directly under the Ministry of Home Affairs (MHA).
- The city has no legislative assembly, and governance is carried out through UT administration officials (Adviser to Administrator, Home Secretary, Finance Secretary, etc.).

Delhi Government is planning to adopt a WhatsApp-based e-governance system

- Delhi Government is planning to adopt a WhatsApp-based e-governance system and has proposed a study tour to states like Tamil Nadu, Andhra Pradesh and Karnataka to learn best digital governance practices.

WhatsApp Governance:

- A digital public service platform that allows citizens to apply for services, verify documents, and download certificates directly through WhatsApp.
- It integrates government services with **WhatsApp's API and GenAI** tools to provide an automated, user-friendly interface.

Key Features-

- **Single-window access:** Multiple government services available through one WhatsApp number.
- **AI-enabled assistance:** Chatbot + GenAI for query resolution, document verification, and guided applications.
- **No app required:** Works on a platform most citizens already use.
- **Multi-department integration:** Birth/marriage certificates, licences, caste certificates, and more.
- **24×7 accessibility:** Eliminates physical visits and reduces bureaucratic delays.

Significance-

- **Citizen-centric governance:** Brings government to people's phones, improving convenience and inclusivity.
- **Improves efficiency:** Reduces footfall in offices and speeds up service delivery.
- **Supports Digital India goals:** Aligns with national focus on **DPI, AI-enabled governance,** and service automation.
- **Scalable model:** Can be expanded across departments and replicated by other states.

Constitution Day 2025

- **On 26 November 2025,** India observed Constitution Day with a national function in the historic Central Hall **of Samvidhan Sadan,** marking the **adoption of the Constitution in 1949.**

Event Led by the President:

- The President of India will preside over the national Constitution Day function in the Central Hall, with the Vice-President and Lok Sabha Speaker addressing the gathering before the President's speech.
- The event will include the national reading of the Preamble, led by the President, reaffirming India's commitment to constitutional values.
- The Legislative Department will digitally launch the Constitution of India in nine regional languages: **Malayalam, Marathi, Nepali, Punjabi, Bodo, Kashmiri, Telugu, Odia and Assamese.**
- A commemorative booklet, **"The Art and Calligraphy of India's Constitution",** showcasing calligraphy and artwork from the original Constitution, will also be released.

Constitution Day:-

- Constitution Day (**Samvidhan Diwas**) marks 26 November 1949, the day the Constituent Assembly adopted the Constitution of India.
- The document came into force on 26 January 1950, chosen to commemorate the **Purna Swaraj Declaration of 1930.**
- It was officially designated as Constitution Day in 2015 to honour **Dr B.R. Ambedkar's 125th birth anniversary** year to promote constitutional literacy and civic awareness**.**
- The day honours the work of the Constituent Assembly, chaired by **Dr Rajendra Prasad, with Dr B.R. Ambedkar as Chairman of the Drafting Committee.**

Important Facts About the Indian Constitution

- The Indian Constitution is the longest national constitution, with the original manuscript spanning **251 pages** and containing detailed provisions unmatched globally.
- It took **2 years, 11 months and 18 days** for the Constituent Assembly to finalise the Constitution.
- The original document was not printed; it was handwritten in beautiful calligraphic script by **Prem Behari Narain Raizada**, a renowned master calligrapher.
- Every page carries intricate borders and artwork created by **Nandalal Bose** and his team from Santiniketan, showcasing Indian motifs, historical symbols and cultural themes.
- Two identical handwritten versions were created, one in English and one in Hindi, both preserved in **helium-filled cases** in the Parliament Library.
- The manuscript was inscribed on **special parchment sheets (16 × 22 inches),** designed to last up to a thousand years, and the full document weighs about **3.75 kg.**

Sovereign AI on the rise as nations move to reduce dependence on global superpowers

- As the U.S. and China compete for AI dominance, other countries, including India, are pursuing Sovereign AI to stay secure and competitive.
- Sovereign AI is a nation's capacity to produce artificial intelligence using its own infrastructure, data, and workforce.

Why are countries pursuing sovereign AI?

- **Economic Advantage:** AI is projected to generate trillions of dollars in economic dividends and productivity gains, currently benefitting Global North at the expense of Global South.
- **Strategic Autonomy:** AI is becoming a pillar of economic and military power. Countries don't want to be dependent on the US or China for foundational AI models and computing power.
- **Data Sovereignty:** To ensure critical data (citizens' data, defense, infrastructure, healthcare) stays within national control and is not processed by foreign tech giants. E.g. US based models such as ChatGPT, Grok, etc.
- **Cultural Preservation:** Sovereign foundation models, such **as Large Language models (LLMs),** can be trained on local datasets (e.g. dialects, societal practices) to promote inclusiveness and revitalize indigenous languages.

What are the challenges for India?

- **Foreign dependency:** For technology, components and infrastructure. E.g. silicon chips.
- **Funding**: To setup large AI factories, a huge sum of money is required both from private and public sector at the initial stage.
- **Skilled workforce:** India lacks the high-skilled manpower required for manufacturing advance chips and AI LLM development.

BharatGen: India's Sovereign AI Initiative

- About: It is India's first sovereign, multilingual, and multimodal LLM.
- **Developed by:** Department of Science and Technology (DST) under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) in 2025.
- **Goal:** It aims to create a complete AI stack (integrating text, speech, and document vision) for India in 22 Indian languages, capable of supporting sectors like governance, industry, education, agriculture, healthcare, and digital inclusion.
- ***Key Applications include:***
- **Krishi Sathi:** A voice-enabled WhatsApp advisory tool for farmers.
- **e-VikrAI:** It generates product descriptions from a single image, assisting small sellers in expanding their digital presence.

Sanchar Saathi

- The Department of Telecommunications (DoT) reports that Sanchar Saathi has enabled the **recovery of over 50,000 stolen handsets** nationwide in October for the first time.
- Total device recoveries exceeded 7 lakhs, with monthly recoveries rising by 47% (June–October 2025),
- Karnataka and Telangana emerged as top-performing states, each exceeding 1 lakh recoveries.

Sanchar Saathi:

- Sanchar Saathi is a citizen-centric initiative by DoT to empower mobile subscribers, strengthen their security, and help them **combat telecom-related fraud** and identity theft.
- The Sanchar Saathi portal was launched in 2023, and the Mobile App was introduced in January 2025.
- The **system detects new SIM insertions in blocked devices**, alerting the registered user and the concerned police station for quick recovery.

Key Features:

- **CEIR:** Central Equipment Identity Register enables blocking and tracing of lost or stolen devices across all telecom providers.
- **Know Your Connections:** It allows users to verify the mobile connections registered in their name (e.g., using Aadhaar details) and to report unauthorised or unnecessary ones.
- **Chakshu:** The facility enables citizens to report suspected fraudulent calls, SMS, or WhatsApp communications related to potential cybercrimes or financial fraud.
- **Know Your Mobile:** This service lets users verify a mobile handset's authenticity by entering its IMEI number to check its status (blacklisted, duplicate, or normal) before buying.
- **ASTR:** The AI and Facial Recognition-powered Solution for Telecom SIM Subscriber Verification enables the blocking of any number acquired using fake, forged, or multiple documents.

National Judicial Appointment Commission (NJAC)

- Recently, Supreme Court agreed to consider a PIL questioning the Collegium system for appointment of judges in the top court and the High Courts and seeking revival of the **National Judicial Appointment Commission (NJAC)**.

The NJAC Act, 2014

- **Constitutional Amendment:** Established by the **99th Constitutional Amendment** to replace the Collegium system for higher Judiciary appointments.
- **Composition:** Appointments to be recommended by a **six-member commission**: the CJI, two senior Supreme Court judges, the Union Law Minister, and two eminent persons.
- **Judicial Verdict:** Struck down in the **Fourth Judges Case (2015)**, for violating ''Basic Structure'' (Judicial Independence).

Concerns with the Collegium

- **Opaqueness and Accountability Deficit:** Collegium decisions are not answerable to any external authority—neither Parliament nor the executive.
- **Exclusionary Nature:** Collegium has been criticised for under-representation of women judges, inadequate presence from marginalized communities, etc.
- **Constitutional ambiguity:** Collegium system emerged from judicial interpretation (Three Judges Cases) undermining the principle that Parliament should determine institutional design.
- **Vacancy:** Persistent standoffs between the Collegium and Executive delay appointments.

Existing System of appointments in Higher Judiciary

- Appointments are via the Collegium System formalized by the **Memorandum of Procedure (MoP).**
- The MoP is the rulebook outlining the recommendation, approval, and consultation steps between the Judiciary and the Executive.
- For appointments in Supreme Court: Collegium consists of the **Chief Justice of India and the four senior-most Supreme Court judges.**

For appointments in High Courts:

- Collegium at HC consists of **Chief Justice of High Court and two senior judges of the concerned court**.
- Collegium at SC consists of **CJI and two seniormost Judges of the Supreme Court.**
- Chief Justice of India seeks views of the Judges of the Supreme Court, outside the Collegium, who are conversant with the affairs of the concerned High Court.

Conclusion-

- While the Collegium system safeguards judicial independence, the concerns highlight the need for reform, such as a restructured National Judicial Appointments Commission (NJAC) with safeguards, or a collegium-plus model ensuring transparency, accountability, and diversity.

PM Jan Vikas Karyakram

- The **Ministry of Minority Affairs** held a nationwide review of PM Jan Vikas Karyakram (PMJVK) to improve last-mile outcomes in minority-concentrated areas.

PM Jan Vikas Karyakram

- A **Centrally Sponsored Scheme** implemented by the Ministry of Minority Affairs to bridge development deficits **in Minority Concentration Areas (MCAs)** across India.
- Covers both urban and rural minority clusters across 700+ MCAs and targets MCAS where the minority population exceeds 25% and socio-economic indicators lag behind national averages.
- Funding Pattern is **90:10 for NE/Hill States**, 60:40 for others, 100% for UTs (as per CSS norms).

Objectives of PMJVK

- Reduce regional development deficits through education, health, civic amenities, skill infrastructure.
- Ensure equitable access to public infrastructure for minority communities.
- Strengthen social inclusion, area development, women-focused facilities, and youth-skill infrastructure.

Achievements of PMJVK Implementation

- **Asset Creation:** Over 12,000+ social infrastructure projects sanctioned since inception.
- **Education Boost:** Over 800 facilities, including smart classrooms, have been developed.
- **Health Infrastructure:** 500+ PHCs and maternal-health facilities established or upgraded.
- **Gender Inclusion:** Women's hostels and skill centres constitute 15–20% of total project approvals.
- **Digital Transparency:** 100% fund releases routed through the **PMJVK Portal** and **SNA-SPARSH** in 2025.
- **Community Facilities:** 2,000+ community assets like **Sadbhav Mandaps** and skill centres for public use.
- **Issues in PMJVK Implementation**
- **Utilisation Delays:** Only 62–65% of annual allocations utilised on schedule.
- **Capacity Shortage:** Nearly 40% MCAs have inadequate project-preparation capacity.
- **Land Constraints:** 25–30% PMJVK works are stuck due to land/permission bottlenecks.
- **State Variation:** Huge differences in fund utilisation and asset completion. E.g., Some States show above 90% utilisation, others remain below 50%.

Way Forward

- **Digital Strengthening:** Scale PMJVK Portal with automated alerts and public dashboards for accountable delivery. E.g., Adopt monitoring templates similar to **Geo-MGNREGA** for real-time verification.
- **Community Ownership:** Institutionalise social audits and community consultations to ensure transparency and inclusion. E.g. Follow participatory frameworks of the Aspirational Districts Programme.
- **Quality Assurance:** Enforce third-party audits, digital photo-evidence, and QR-tagging of assets to strengthen accountability and reduce leakages. E.g. QA models seen in the National Health Mission.
- **Convergence Models:** Integrate PMJVK projects with PM-SHRI schools, PM-KVK skill hubs, NHM health facilities, and Smart Cities infrastructure for greater developmental impact

Annual Groundwater Quality Report 2025 released by Central Ground Water Board (CGWB)

- **71.7% of India"s groundwater** meets **BIS standards** but 28.3% of samples exceed limits for one or more parameters,
- **Nitrate Contamination:** Nitrate is most widespread pollutant nationally, with approximately 20% samples exceeding WHO and **BIS limits(45 mg/L)** ,followed by fluoride and salinity
- It is largely attributed to anthropogenic sources, e.g. fertilizer use and sewage and animal waste seeping in groundwater.
- **Uranium contamination**: Samples with uranium levels above the safe limit of **30 ppb** were found at 6.71% during the Pre-Monsoon and 7.91% during post-monsoon.
- Punjab recorded highest contamination, followed by Haryana and Delhi
- **Salinity:** Salinity (Electrical Conductivity,) is a critical issue in arid and semi-arid regions like Rajasthan and Delhi, exceeding limits in 7.23% of samples.,
- **Fluoride** - 8.05% of nationwide samples exceeded limit however it was predominantly geogenic (naturally occurring). Rajasthan showed highest contamination
- **Lead** - Delhi recorded highest contamination. It can impair cognitive development , increases blood pressure, affect kidney and is classified as probable carcinogen
- **Irrigation Suitability:** The groundwater quality is largely suitable for irrigation purposes. The majority of samples, 94.30%, fall into the "excellent category".
- Other Trace Metal and Geogenic Contaminations: **Arsenic (especially in Ganga and Brahamaputra basin), Manganese (e.g., Assam, Karnataka, Odisha, Uttar Pradesh, and West Bengal) etc.**
- **CGWB (Faridabad, Haryana)**
- Origin: Established in **1970** by renaming the **Exploratory Tube wells Organization**
- **Ministry: Under Ministry of Jal Shakti**
- Role: Management, exploration, monitoring, regulation etc of ground water resources of the country
- It is also discharging the functions as **Central Ground Water Authority (CGWA)** established under **Environment Protection Act, 1986.**

INTERNATIONAL RELATIONS AND SECURITY

India's Maritime Vision

- India's maritime sector is undergoing a transformative journey under the **Maritime India Vision 2030** (MIV 2030) and the ambitious Maritime Amrit Kaal Vision 2047.

*With **12 operational major ports** and over 200 non-major ports, the maritime sector handles nearly **95%** of the country's trade **by volume** and **70% by value**.*

Maritime India Vision (MIV) 2030

- Maritime India Vision (MIV) is a comprehensive national strategy to place India among the **top 10 maritime nations** by 2030.
- **Investment Plan:** Launched in **2021**, it includes **over 150 initiatives** across ports, shipping, and inland waterways, requiring **₹3-3.5 lakh crore** investments by 2030.
- **Guiding Principles:** The vision is anchored on **six principles**: (a) challenge analysis, (b) innovation, (c) time-bound action, (d) global benchmarking, (e) human capital, and (f) "Waste to Wealth."
- **Policy Continuity:** MIV 2030 complements the Sagarmala Project and acts as the foundation for Maritime Amrit Kaal Vision 2047.

Institutional and Financial Mechanisms

- **Nodal Ministry:** The Ministry of Ports, Shipping and Waterways (**MoPSW**) leads the implementation.
- **Financial Mechanism:** The **Maritime Development Fund** (MDF) provides long-term financing for port infrastructure, while the **Financial Assistance Scheme** supports domestic shipbuilding capacity.
- **Digital Governance:** The **Sagarmanthan Portal** enables real-time monitoring, and the **National Logistics Portal (Marine)** integrates all logistics services under one digital system.

Key Focus Areas

- **Thematic Pillars: Ten focus areas** include Shipbuilding, Inland Waterways, Cruise Tourism, Port Modernisation, and Maritime Safety.
- **Inland Waterways: Twenty-three National Waterways** are prioritized to expand affordable and sustainable cargo transport.
- **Maritime Heritage:** The **National Maritime Heritage Complex** (NMHC) in **Lothal**, Gujarat, celebrates and preserves India's rich maritime legacy.

Maritime Amrit Kaal Vision 2047

- The Maritime Amrit Kaal Vision 2047 is a national roadmap to position India as a **leading global maritime power by 2047**.
- **Investment Scope:** Launched in 2023 at the Global Maritime India Summit, it outlines over **300 initiatives** with an estimated investment of **₹80 lakh crore**.
- **Nodal Ministry:** The Ministry of Ports, Shipping and Waterways (**MoPSW**) oversees the implementation.
- **Capacity Target:** It seeks to increase India's total port capacity to **10,000** million tonnes per annum (**MTPA**), generate over **1.5 crore jobs**, and place India among the **top five shipbuilding nations**.
- **Core Pillars:** It is built on **four pillars**: (a) Port-led Development, (b) Shipping and Shipbuilding,

(c) Seamless Logistics, and (d) Maritime Skill Development.

- **Thematic Areas:** The plan covers **11 key themes**, including green shipping, modal share enhancement, maritime clusters, and professional maritime services.

Growth Trends in India's Maritime Sector (2014-25)

- **Inland Waterways:** Cargo movement in inland waterways **increased 710%** from 18 million metric tonnes (MMT) in 2014 to **146 MMT** in 2025.
- **Operational Expansion:** The number of operational waterways increased from three to **29**.
- **Cargo Handling:** India's total port capacity **nearly doubled** within a decade, reaching **2,762** million metric tonnes per annum (**MMTPA**) by 2025.
- **Operational Efficiency:** Average **vessel turnaround time** at ports improved significantly, reducing from 93 hours to **48 hours** over the past decade.
- **Financial Performance:** The sector's annual **net surplus grew ninefold**, from ₹1,026 crore to ₹9,352 crore in ten years, while the **operating ratio** improved from 73% to **43%**.
- **Indian Fleet:** The number of **Indian-flagged vessels** expanded from 1,205 to **1,549**.
- **Seafarer Workforce:** India's seafarer strength increased from 1.25 lakh to over **3 lakh**, accounting for **12%** of the global seafaring workforce.

Exercise Trishul

- India launched **Exercise Trishul**, a major **tri-Service drill** along western border with Pakistan across Gujarat and Rajasthan.
- **Objective**: To comprehend **joint operational capability and strategic preparedness** of the **Indian Army, Navy, and the Air Force.**
- The exercise will serve as a **platform to demonstrate how indigenous defense systems** are being **integrated into India's operational framework.**

Trump's move to restart nuclear tests, ending a 33-year halt

- Donald Trump's openness to resuming U.S. nuclear weapons testing has sparked global concern, potentially reigniting an arms race and undermining decades of non-proliferation efforts. He emphasized the need for the U.S. to maintain a credible deterrent against adversaries like China and Russia.

1. Strategic Implications

- **Undermining the CTBT**: The Comprehensive Nuclear-Test-Ban Treaty (CTBT), though not ratified by the U.S., has been a cornerstone of global non-proliferation norms. Trump''s ambiguity threatens to erode its legitimacy, encouraging other powers to reconsider their commitments.
- **Arms Race Revival**: The announcement comes amid heightened U.S.-China tensions. Trump''s

remarks suggest a competitive posture, potentially triggering a new arms race, especially if China accelerates its nuclear modernization.

- **Impact on India**: India, a non-signatory to the CTBT, maintains a voluntary moratorium on testing. Renewed U.S. testing could pressure India to reassess its strategic posture, especially vis-à-vis China and Pakistan.

2. Diplomatic Fallout

- **Global Reaction**: Allies and adversaries alike may view this as destabilizing. NATO members, traditionally aligned with U.S. non-proliferation goals, could face internal dissent over renewed testing.
- **India's Role**: As a responsible nuclear power, India may need to reinforce its commitment to restraint and advocate for renewed global dialogue on disarmament.

3. Ethical and Environmental Dimensions

- **Legacy of Testing**: Underground tests have historically caused long-term environmental damage and health hazards. Reopening this chapter raises ethical concerns about intergenerational justice.
- **Governance and Transparency**: The decision-making process—announced via social media during a diplomatic trip—raises questions about executive accountability in matters of global consequence.

Implications for India

1. Strategic

- **Pressure to Reassess Doctrine**: India maintains a "no first use" nuclear policy and a voluntary moratorium on testing. If the U.S. resumes testing, it could prompt China and Pakistan to follow suit, pressuring India to revisit its own nuclear posture.
- **Deterrence Dynamics**: Renewed testing by major powers may alter the credibility of existing arsenals. India may face questions about the reliability of its aging warheads, especially in comparison to modernized U.S. and Chinese systems.
- **Technological Catch-Up**: India relies on subcritical tests and simulations. A global shift toward active testing could widen the technological gap unless India invests more in advanced validation techniques.

2. Diplomatic and Global Standing

- **CTBT and Non-Proliferation**: India is not a signatory to the CTBT but has respected its spirit. U.S. testing could weaken the treaty's relevance, giving India diplomatic space to argue for a more equitable global nuclear order.
- **UN and Multilateral Forums**: India may need to take a more vocal stance in forums like the UN, advocating for restraint and renewed dialogue on disarmament.
- **Strategic Autonomy**: India's foreign policy emphasizes strategic autonomy. Navigating between

U.S. assertiveness and Chinese expansionism will test India's diplomatic finesse.

3. Ethical and Environmental Considerations

- **Global Norms**: India has long positioned itself as a responsible nuclear power. U.S. testing could dilute this norm, forcing India to choose between restraint and strategic necessity.
- **Environmental Legacy**: India must weigh the long-term environmental costs of testing, especially given its dense population and ecological vulnerabilities.

Poseidon Underwater Drone

- **Russia** has successfully tested its nuclear-powered, nuclear-armed **unmanned underwater vehicle (UUV) Poseidon.**
- **Objective:** It is designed to deliver conventional or **nuclear payloads** and trigger **radioactive tsunamis** near enemy coastlines
- **Nuclear Propulsion:** Poseidon uses a **compact nuclear reactor** that offers nearly **unlimited range** and enables long-duration missions without surfacing.
- **Operational Depth:** The drone can reach **depths exceeding 1,000 meters** and speeds of **up to 100 knots** (~185 km/h).
- **Advantage:** The extreme depth and high speed make it immune to existing sonar systems and anti-submarine weapons.

Baltic Sea

- Poland Intercepts another **Russian Plane over the Baltic Sea.**
- Situated in **Northern Europe.**
- **Bordering countries:** Sweden, Poland, Lithuania, Latvia, Finland, Estonia, Germany, Denmark, and Russia.

- **Kiel Canal** connects the **North Sea to the Baltic Sea.**
- Connected to the **Atlantic Ocean through the Danish Straits.**
- Often cited as the **world's largest brackish inland water body**
- As its **water salinity levels are lower than that of the World Oceans** due to the **inflow of fresh water from the surrounding land** and the sea's shallowness.

Trump–Xi Bonhomie

- The **2025 Busan summit** between U.S. President Donald Trump and China's Xi Jinping revived the idea of a **"G-2" condominium**.
- Their tariff truce and rare-earth cooperation suggest renewed U.S.–China accommodation, a shift that could reshape **India's strategic space** and the Quad's **Indo-Pacific coherence.**

Implications for India

- **Tariff Disadvantage:** India remains at the **highest 50% tariff** slab post-Busan deal. E.g. U.S.-China duties **eased to 47%**, isolating India commercially.
- **Strategic Marginalisation:** G-2 talks risk **sidelining India's balancing role**.
- **Regional Realignment:** G-2 may carve Asia into competing influence zones.
- **Technology Access:** Bilateral U.S.–China easing may limit India's tech inflow. E.g. No relaxation in chip export controls for India.

Implications for Quad

- **Agenda Dilution:** U.S.–China truce may weaken Quad's security focus.
- **Leadership Uncertainty:** U.S. absence reduces collective coherence. E.g. Trump prioritising G-2 over Quad meet signals downgrading.
- **Strategic Vacuum:** India, Japan, and Australia may shoulder extra responsibility.

India – US sign 10 Year framework for Major Defense Partnership

- The framework, signed on the sidelines of the **12th ASEAN Defence Ministers' Meeting - Plus** (ADMM-Plus) in Kuala Lumpur, Malaysia, intends to provide a **unified vision and policy direction** to deepen defence cooperation.
- Previously, similar defense frameworks were signed for 2005-15 and 2015-25 periods.

India-US Defence Cooperation

- **Institutional & Foundational Framework:**
- **Logistics Exchange Memorandum of Agreement** (LEMOA): Signed in 2016, enabling mutual logistics support.

- **Communications Compatibility and Security Agreement** (COMCASA): Signed in 2018, allowing India to acquire secure communication equipment.
- **Industrial Security Agreement** (ISA): Signed in 2019.
- **Basic Exchange and Cooperation Agreement** (BECA): Signed in 2020, facilitating the exchange of geospatial information.
- **Apex Dialogue:** 2+2 Ministerial Dialogue.

Foundational Pacts:

- **Strategic and Policy Pillars**
- **Status:** US designated as a **Major Defence Partnership** (MDP) in 2016.
- **Trade Facilitation:** US granted India **Strategic Trade Authorization** (STA Tier-1) status in 2018.
- **Defence Industry and Technology**
- India''s inventory includes significant US-origin defense items like C-130J, C-17, P-8I aircraft, and Apache, Chinook, and Seahawk helicopters.
- **Trade Volume:** Defence procurement exceeds US$20 billion.
- **Technology Push: Defence Industrial Cooperation Roadmap** (2023) to fast-track technology and co-production.
- **Innovation Ecosystem:** Launched **INDUS X (Defense Acceleration Ecosystem)** to link start-ups and industry.
- **New Initiatives Announced: Autonomous Systems Industry Alliance (ASIA)** to increase industry partnerships and production of autonomous systems in the Indo-Pacific region.
- **Operational Interoperability:**
- **Bilateral Exercises:** Yudh Abhyas (Army), Vajra Prahar (Special Forces), Cope India (Air Force).
- **Multilateral Exercises:** Malabar (navies of India, USA, Japan, Australia).

India–Australia on Counter Terrorism

- The **15th India–Australia JWG on Counter Terrorism** was held in **Canberra** to enhance cooperation against global terrorism.

Key Outcomes of the Meeting

- **Broad Cooperation:** Both sides discussed the domestic, regional, and international terrorism landscape, focusing on law enforcement, judicial coordination, and maritime security.
- **Technology & Radicalisation:** Agreed to counter the misuse of new and emerging technologies by terror outfits and strengthen joint strategies against radicalisation and violent extremism.
- **Information Sharing & Maritime Security:** Reaffirmed the importance of timely intelligence exchange and coordination between maritime security agencies, especially in the Indo-Pacific region.
- **Multilateral Engagement:** Both sides committed to cooperation in the UN, GCTF, FATF, IORA and with QUAD partners for combating terrorism and terror financing.

India–Australia Relations

- **Strategic Partnership:** Elevated to a **Comprehensive Strategic Partnership (CSP) in 2020**, institutionalising annual leaders' summits and **2+2 ministerial dialogues**.
- **Defence & Security:** Cooperation through **AUSINDEX** (naval) exercises, **Malabar drills**, and defence logistics agreements enhances Indo-Pacific security.
- **Economic Engagement:** The **Economic Cooperation and Trade Agreement (ECTA, 2022),** India's first with a developed nation in a decade, reduced tariffs on 85% of goods.
- **Critical Minerals Partnership:** Collaboration to secure lithium, cobalt, and rare earths supply chains supporting India's green energy goals.
- **Education & Migration:** Australia–India **Migration and Mobility Partnership (MMPA, 2023)** facilitate student, research, and professional exchanges.

Meteor Missiles

After the success of Operation Sindoor against Pakistan, India plans to acquire additional Meteor missiles to boost the Indian Air Force's (IAF) aerial dominance.

- **Missile Type:** Meteor is a **Beyond Visual Range air-to-air missile** developed by **MBDA (Europe)**.
- **Propulsion System:** Uses a **ramjet engine** enabling speeds over Mach 4 and dynamic thrust control.
- **Range:** Estimated **150–200 km**, allowing **"first-shot, first-kill"** capability beyond enemy missile range.
- **Guidance:** Equipped with an active radar seeker and data link for mid-course updates.

Ramjet–Scramjet: *Both are air-breathing engines without compressors; the* ***ramjet*** *operates efficiently at* ***Mach 2–4*** *using* ***subsonic combustion*** *(e.g., Meteor missile), while the* ***scramjet*** *sustains* ***supersonic combustion*** *for speeds* ***beyond Mach 5*** *in hypersonic flight.*

India Secures Six-Month US Waiver for Chabahar Port

- The United States granted India a **six-month exemption from sanctions** on **Iran's Chabahar Port**, effective October 29, 2025.
- **Temporary Relief:** The waiver permits India **to continue operational and development work** at Chabahar Port without facing U.S. penalties.

Sanctions

- **Legal Basis:** The sanctions are imposed under **Section 1244** of the **Iran Freedom and Counter-Proliferation Act** (IFCA).

- **Coverage:** Entities & individuals involved in Iran's **energy**, **shipping**, **shipbuilding** and **port** sectors.
- **Penalties:** **Freezing assets**, exclusion from U.S. financial systems, restriction on business, etc.
- **Objective:** To exert **maximum economic pressure** on Iran to halt **nuclear weapon** development, end support for militant groups, and push for a stricter nuclear agreement.
- **2018 Waiver:** The U.S. granted an exemption in 2018, recognising Chabahar's importance in **Afghanistan's reconstruction** and as **India's alternative route** to Central Asia.
- **Revocation:** Following the **Taliban's takeover of Afghanistan** and evolving regional alignments, the U.S. revoked this waiver effective September 29, 2025.

Chabahar Port

- **Geographic Position:** Chabahar is located at the mouth of the **Gulf of Oman** in **Iran's Sistan-Balochistan province**, close to Pakistan's China-operated **Gwadar Port**.
- **Ocean Access:** It is Iran's only **oceanic** and **first deepwater port**, providing direct access to global maritime trade routes.
- **Strategic Link:** The port offers India a secure and direct trade route to Iran, Afghanistan, and Central Asia, **bypassing Pakistan**.
- **INSTC Role:** Chabahar serves as a key node in the INSTC, connecting the Indian Ocean and Persian Gulf to the Caspian Sea and northern Europe via St. Petersburg.
- **Port Terminals:** Chabahar comprises **two main terminals**:
- **Shahid Kalantari:** Developed in the 1980s as a conventional port to diversify Iran's trade routes away from the Strait of Hormuz.
- **Shahid Beheshti:** Developed and operated by **India Ports Global Limited** (IPGL) to facilitate trade with Afghanistan and Central Asian nations, bypassing Pakistan.

Civil War in Sudan

- **El Fasher**, the capital of **North Darfur** in **Sudan**, experienced a massacre after the paramilitary **Rapid Support Forces** (RSF) **took control** from the Sudanese Armed Forces (SAF).

*Sudan, situated in **Northeast Africa**, is the **third-largest country** on the continent, with the Red Sea as its eastern border. It is the leading producer of gum arabic.*

Sudanese Civil War

- The Sudanese Civil War is an ongoing conflict between the **Sudanese Armed Forces** (SAF) and the paramilitary **Rapid Support Forces** (RSF) over control of the country.
- **Territorial Control:** The **RSF** dominates much of **western** and **central** Sudan (Darfur, Kordofan), while the **SAF** controls the **north** and **east**, operating from Port Sudan.
- **Seizure of El Fasher:** In October 2025, the RSF captured El Fasher (North Darfur's capital),

resulting in mass killings, ethnic cleansing, and a **de facto partition** of Sudan.

- **Regional Proxy:** The conflict has evolved into a **regional proxy war**, with the **UAE** reportedly supporting the RSF, while **Egypt** and **Iran** back the SAF.

Factors Behind the Civil War

- **Power Rivalry:** The war stems from a **leadership struggle** between the SAF chief and the RSF commander over control of the state and the integration of forces.
- **Peripheral Neglect:** Decades of political and economic **marginalisation** in Sudan's **peripheral regions** fostered deep resentment toward Khartoum's centralised rule.
- **Resource Conflict:** Competition for land, gold, and grazing rights, compounded by **ethnic divisions**, has made the conflict violently communal.
- **Militia Legacy:** Former dictator Omar al-Bashir's reliance on the **Janjaweed militia** (RSF precursor) eroded the state's monopoly on force and institutionalised parallel power structures.

Consequences of the Civil War

- **Humanitarian Emergency:** Sudan is facing the world's **worst humanitarian disaster**, with over 24 million people suffering from acute food insecurity and famine across Darfur and Kordofan.
- **Mass Displacement:** More than 14 million Sudanese have been displaced internally or fled abroad, making it the **largest displacement crisis**.
- **State Disintegration:** The conflict has split Sudan into rival zones of control, dismantled the central government and halted the post-2019 democratic transition.
- **Regional Instability:** Massive refugee influxes and cross-border arms trafficking have intensified insecurity in neighbouring countries (i.e., **Chad**, **South Sudan**, **Egypt**).

Exercise MILAN 2026

- India will host a historic maritime convergence in February 2026 at Visakhapatnam, featuring the International Fleet Review (IFR), Exercise MILAN 2026, and the IONS Conclave of Chiefs, under the MAHASAGAR vision.
- Exercise MILAN is a biennial multilateral naval exercise hosted by the Indian Navy since 1995, aimed at fostering naval diplomacy, interoperability, and regional maritime cooperation.
- **Nations Involved:** It began with **four navies at Port Blair** and has grown into a premier global event, with participation from **over 40 friendly foreign navies** including those from the **Indo-Pacific, Africa, Europe, and ASEAN regions**.
- **Aim:** The exercise aims to enhance maritime domain awareness, anti-submarine warfare capabilities, air defence coordination, and search-and-rescue preparedness, reinforcing a rules-based maritime order.

Key Features of MILAN 2026

- **Dual-Phase Structure:** The exercise will comprise Harbour and Sea phases, focusing on both operational drills and strategic-level exchanges.
- **Advanced Naval Drills:** Includes anti-submarine warfare, air defence, maritime domain awareness, and search-and-rescue operations, enhancing multi-navy interoperability.
- **International City Parade:** A grand parade at RK Beach, Visakhapatnam, featuring contingents from participating navies, the Indian Army, and Indian Air Force, showcasing maritime diplomacy to the public.
- **Showcase of Indigenous Capability:** India will display INS Vikrant, Visakhapatnam-class destroyers, and Nilgiri-class frigates, reflecting its evolution into a Builder's Navy.

Significance of MILAN 2026

- **Strengthening Maritime Diplomacy:** Positions India as a regional convenor for maritime cooperation, advancing the MAHASAGAR vision of collective security and growth.
- **Enhancing Naval Interoperability:** Builds trust, communication, and tactical synergy among participating navies for coordinated multilateral operations.
- **Supporting the Indo-Pacific Vision:** Reinforces India's role in ensuring a free, open, and inclusive Indo-Pacific, aligned with Act East and IPOI initiatives.

Scam Hubs in Southeast Asia

- The recent rescue of 500 Indian citizens from KK Park, a cybercrime hub in **Myawaddy**, **Myanmar**, exposed the **growing network of transnational scam centres** across Southeast Asia.

Working of Scam Hubs in Southeast Asia

- Located mainly in **Myanmar**, **Cambodia**, and **Laos** inside special economic zones with private security.
- Run by militia-backed warlords like **Myanmar's Saw Chit Thu**, linked to junta forces.
- Traffickers post fake IT jobs online, targeting youth from India, China, and Vietnam with high-salary offers.
- Workers conduct **"pig butchering" scams** (romance + crypto fraud and extortion schemes.
- Scam earnings fund junta operations and armed militias.
- After **China's Operation 1027 (2023)**, scams relocated from northern Myanmar to Cambodian hubs.

Impact of Scam Hubs on India

- **Human Trafficking:** Growing cases of Indians lured by fake job offers into scam hubs. E.g. Over **1,600 Indians** repatriated since July 2022, including **283 from Thailand** and **500 from KK**

Park (MEA Report).

- **Dual Exposure:** India faces risk as both a supplier of trafficked labour and a prime victim base for online scams. E.g. UNODC (2024) flagged India among the **top five target nations** for transnational cyber fraud.
- **Online Fraud:** A Sharp rise in crypto and impersonation scams aimed at Indians through phishing and social media. E.g. CERT-In (2025) recorded a **250% surge in crypto scam** reports post–Operation Sindoor.
- **Consular Challenge:** Increased need for diplomatic coordination and emergency evacuation of victims. E.g. Indian Embassy, Yangon, led multiple repatriation missions under **Operation Safe Return**.

Way Forward

- **Regional Coordination:** Strengthen cooperation with INTERPOL and UNODC for joint extradition.
- **Cyber Regulation:** Enhance data-tracking and **digital forensics** to trace international money trails.
- **Legal Framework:** Enforce stricter cybercrime laws under the **IT (Amendment) Act, 2008**.
- **Diplomatic Engagement:** Push for ASEAN**-led cyber task force** to dismantle scam hubs.

Australia's AI Copyright Policy

- Australia's Attorney-General rejected a think-tank proposal to grant tech firms **unrestricted access to copyrighted material for AI training**.
- Unlike the **U.S. "fair use" model** or **China's data-first approach**, Australia prioritises creator consent.

Australia's AI Copyright Policy

- **Government's Stand:** Technology should not advance "at the expense of creators".
- **CAIRG Formation:** The government established the **Copyright and AI Reference Group (CAIRG)** to develop balanced, rights-based guidelines.
- **Proposed Reform:** Considering a **mandatory paid licensing framework** under the **Copyright Act** to ensure creator consent and compensation.
- **Significance of the Policy**
- Reinforces that AI must respect creator rights, aligning with **UNESCO's AI Ethics (2021) principles**.
- Demonstrates that economic growth and cultural integrity can coexist in AI policy.
- Positions Australia as a leader in **human-centric AI regulation**, shaping discourse in other democracies.

Ayni Air Base in Tajikistan

- India withdrew from the Ayni air base in Tajikistan in 2022 after the lease agreement with Tajikistan was not renewed, reportedly due to pressure from Russia and China.
- The **Ayni air base**, also known as the **Gissar Military Aerodrome (GMA)**, is a **strategically located airbase** in **Tajikistan** that India helped develop and operate jointly with the Tajik government since **2002**. It was India's **first overseas military facility**, giving it a strategic presence in Central Asia.
- **Located in:** The base lies **just west of Dushanbe**, Tajikistan's capital, and around 20 km from Afghanistan's Wakhan Corridor, which borders Pakistan-occupied Kashmir (PoK) and China.

History:

- Originally built during the **Soviet era**, the base fell into disuse after the USSR's collapse.
- India redeveloped it in **2001-2002**, with key roles played by **NSA Ajit Doval**, **Air Chief Marshal B.S. Dhanoa**, and the Border Roads Organisation (BRO).
- Funded by the **Ministry of External Affairs**, India spent about **million** extending the runway to **3,200 metres**, building **hangars, refuelling facilities, and maintenance units**.
- The base was occasionally used by the **Indian Air Force (IAF)** for **humanitarian and evacuation missions**, including during the **Afghanistan crisis in 2021**.

Strategic Importance:

- Provided India a military foothold in Central Asia—a region of high strategic interest.
- Enabled **surveillance and operational reach** over **Pakistan and Afghanistan**.
- Located near the **Wakhan Corridor**, it offered India leverage in regional security and counter-terror operations.
- Strengthened India's role as a security partner in Central Asia amid growing China-Pakistan proximity.

Does India operate other foreign military bases?

- India has **no other fully operational overseas base**. However, India maintains **strategic access** and presence through:
- **Agaléga (Mauritius)**, upgraded airstrip and jetty (supports P-8I maritime aircraft).
- Military Training Team in Bhutan trains the Royal Bhutan Army.
- **By comparison:** China has a formal overseas base in Djibouti and a suspected presence in Tajikistan, and the USA operates over 100 overseas bases globally.
- **Current Status:**
- The **lease expired in 2021**, and Tajikistan declined renewal under Russian and Chinese influence.
- India **completed withdrawal in 2022**, and by early **2023, Russian forces reportedly took over operations** at the base.

- Though the base is no longer Indian-operated, **India continues to maintain diplomatic and security engagement** in Central Asia.

India and Bahrain hold talks on boosting defense and trade ties

Bahrain (Capital: Manama)

- India and Bahrain hold talks on boosting defense and trade ties.
- **Political Features**
- Bahrain is the third-smallest nation in Asia.
- **Location:** Lies in West Asia, in the Persian Gulf.
- **Border:** It is an archipelago of islands and **has no land borders** with other countries.
- **Neighbouring Water Bodies:** Persian Gulf.

Geographical Features

- **Major physical region:** Most of Bahrain is a desert with low-lying rocky and sandy plains.
- **Highest point:** Jabal ad Dukham.
- **Umm er Radhuma- Dammam Aquifer System** extends over Bahrain along with Qatar and Saudi Arabia.

Exercise Poorvi Prachand Prahar

The Indian Armed Forces conducted **Exercise Poorvi Prachand Prahar** in **Mechuka Valley**, **Arunachal Pradesh**.

- **Exercise Nature:** Poorvi Prachand Prahar is a **multi-domain tri-service military drill** involving

coordinated **high-altitude** combat operations.

- **Objective:** It aims to improve operational synergy, interoperability, and combat readiness for potential multi-front conflicts.
- **Assets and Technology:** The drill combines **Special Forces**, **drones**, precision-strike systems, and networked command centres for real-time coordination.
- **Series Linkage:** The exercise continues India's progressive series of joint military drills, following '**Bhala Prahar**' (2023) and '**Poorvi Prahar**' (2024).

India-Israel Joint Working Group Meeting

- Recently, India and Israel held the **17th Joint Working Group (JWG) meeting on defence cooperation.**
- **Key Outcomes:** An **MoU on Defence Cooperation** was signed to provide a unified framework and long-term strategic direction for the partnership.
- Both countries called for a *global* **zero-tolerance approach to terrorism**, stating that both nations face **common security threats**.

India-Israel Relations

- India recognised Israel in **1950**, and **full diplomatic relations** were established in **1992**.
- Bilateral trade has expanded from **USD 200 million** in **1992** to around **USD 10.1 billion in 2022-23.**
- India is now **Israel's third-largest trading partner** in **Asia** and **seventh globally**.
- India and Israel recently signed a **Bilateral Investment Agreement** (BIA) to boost reciprocal investments and strengthen strategic economic ties.

India – United Kingdom Science & Technology Partnership

- The Principal Scientific Adviser (PSA) of India and the National Technology Adviser of the UK jointly launched the pilot **India–UK Science and Technology Partnership (IN-UK-STP) Dashboard**.
- The dashboard is designed to monitor and analyse **bilateral science and technology cooperation**, serving as an evidence-based policy tool.
- **Development:** Jointly developed by the **Office of the PSA** and the **British High Commission** in India.
- **Key Feature:** It **maps projects** since **2018** by funding, institutions, and domains, aligning them with **India–UK Science and Innovation Council (SIC) goals** and the SDGs.
- **Significance:** The dashboard allows both governments to conduct **data-driven evaluation** and planning, facilitating future joint research programs and technology missions.

*The India–UK SIC is a high-level, **ministerial-led forum** that guides **bilateral science, technology, and innovation priorities**.*

India's role amid declining credibility and perceived bias of Western-led Global Institutions

- Of late, major global bodies in the economic, cultural, and political spheres, once seen as impartial, are increasingly aligning with a specific, **interventionist strand of the US foreign policy**, eroding their credibility and creating a "**legitimacy gap**" on the world stage.

Erosion of Western Institutional legitimacy

- **Institutional biases and double standards:** Swift and severe actions taken against Russia following its 2022 invasion of Ukraine with the continued normal engagement with Israel despite the civilian death toll in Gaza.
- **E.g.,** Exclusion of Russia and Belarus from Paris Olympics 2024, disconnection of Russian financial institutions from SWIFT, etc.
- **Dysfunctional institutions:** e.g., WTO Appellate Body remains dysfunctional since 2019 as the US has blocked appointment of new members leaving the body without quorum.
- **Non-representative institutions:** UN Security Council with its P5 members does not represent the contemporary geopolitics and the shifting Balance of Power.
- **Potential Strategic Implications**
- **Increased Global Instability:** Politicized actions by global bodies can exacerbate geopolitical tensions.
- **Reduced International Trade:** The use of financial networks like SWIFT as a foreign policy tool disrupts global commerce.
- **Spurring Energy Prices:** Instability and sanctions regimes can lead to volatility in global energy markets.

Opportunities for India

- **Economic Influence:** Recently, India has surpassed Japan to become the **world's fourth-largest economy**.
- **Strategic Non-Alignment:** Enhances credibility as an impartial leader. E.g., meteoric rise of Indian media as a trusted source for reporting on the Ukraine conflict.
- **Cultural capital:** India''s contribution to humanity's cultural and civilizational story gives it a relatively unique global standing e.g., civilizational ethos of **Vasudhaiva Kutumbakam**, or "One Earth, One Family,
- **Focus on Global South:** e.g., India' hosting of Voice of Global South summit, Induction of African Union into G20 during India's presidency, etc.

US-China 'G2' Revival

- The U.S. President recently **announced the revival of the "G2" concept**, a proposed US-China power partnership to shape global economic governance.

G2 Concept: *Economist* ***Fred Bergsten*** *(2005) claimed that the U.S. and China could act as a* ***"caucus of two"*** *on* ***global economic recovery****.*

Why G2 is Back on the Table?

- After the **2008 global financial crisis**, China emerged as a key economic stabiliser, helping to rescue global markets through massive stimulus.
- A recent shift in **US-China dynamics** saw China resisting US-led trade wars and retaliating effectively, forcing Washington to move from a strategy of **"decoupling" to "derisking."**
- Trump's return signals a **pragmatic acceptance of China's economic weight**, paving the way for renewed cooperation through a G2-style engagement.
- **Implications:** G2 signals that the US and China may resolve tensions bilaterally, reducing space for **third countries**.
- Unlike previous US support for India as a strategic counterweight to China, Washington may now prioritise **economic cooperation** with **Beijing**.

Way Forward for India

- Deepen ties with ASEAN, **Japan, South Korea, Australia, Iran** and **West Asian partners** to strengthen Asia-centred diplomacy and bargaining power.
- Use G20, BRICS+, IPEF & QUAD more actively as **multilateral platforms to balance** a G2-dominated order.
- India must **preserve strategic autonomy**, avoid taking sides between the US and China, and maintain **independent engagements** with **Russia** (energy, defence) and **Europe** (technology, investment).
- **Strengthen India's economic power** to support its diplomacy, **speed up manufacturing**, make exports more competitive, and reduce reliance on imports (especially from China).

India-Romania Bilateral Meeting

- **India** and **Romania** held a bilateral meeting in Bucharest to strengthen trade, investment, and supply-chain partnership within the broader **India-EU economic framework**.
- **India-EU FTA:** Both countries reaffirmed their commitment to conclude a fair and mutually beneficial **India-EU Free Trade Agreement** (FTA) within the year.
- **Supply-Chain:** They agreed to deepen collaboration in standards, testing, and investment facilitation to build resilient and diversified supply chains.

India-Romania Relations

- **Bilateral Relations:** India and Romania elevated their relationship to an '**Extended Partnership**' in 2013 and marked **75 years of diplomatic ties** in **2023**.

- **Trade Relations:** Bilateral trade stood at **USD 2.98 billion** in FY 2023-24, with India's exports exceeding **USD 1.03 billion** in FY 2024-25.
- **Priority Sectors:** Petroleum, engineering goods, pharmaceuticals, ceramics, and glassware.
- **Labour Mobility:** Romania will employ around **30,000 skilled Indian** professionals **annually** to meet labour demands in construction and allied sectors.
- **Defence Agreement:** The **2023 Defence Cooperation Agreement** provides a legal framework for collaboration in R&D, cyber defence, and co-production.

Romania

Location: Romania lies at the crossroads of **Central**, **Eastern**, & **Southeastern Europe**. It shares borders with **Ukraine**, **Hungary**, **Serbia**, **Bulgaria**, & **Moldova**, and has a coastline along the Black Sea.

Memberships: It is a member of the **European Union**, NATO, and the Schengen Zone, among others.

Major River: The **Danube River** forms much of Romania's southern border and flows into the **Black Sea** through the **Danube Delta** (UNESCO World Heritage Site).

Topography: The **Carpathian Mountains** form an arc across central Romania, and surround the **Transylvania** region (known for its medieval towns and castles).

India–UAE Cultural Cooperation

- At the 2nd Joint Steering Committee Meeting of the **India–UAE Cultural Council**, both nations agreed to deepen cultural, educational, and youth cooperation.

India–UAE Cultural Cooperation Highlights

- **Cultural Landmark:** India House to be built in Abu Dhabi as a hub for art, yoga training, and heritage exhibitions, symbolising the creative bond between the two nations.
- **Yoga Recognition:** To formalise Yoga as a competitive sport, first in the Gulf via UAE Yoga Committee.
- **Archival Linkages:** Plans for cooperation between National Archives of India and UAE's archival institutions to document shared maritime and cultural history.
- **Youth, Education, Tourism:** Roadmap for student mobility and co-branded tourism events.

Yoga

- **Philosophical Foundation:** Rooted in the six orthodox schools (Darshanas) of Hindu philosophy, especially **Patanjali's Yoga Sutras** (2nd century BCE), which codified **Ashtanga Yoga** (Eightfold Path).
- **Global Recognition:** United Nations declared **June 21** as **International Day of Yoga (IDY)** in 2014.
- **Cultural Heritage Status:** Recognised by UNESCO (2016) as part of Intangible Cultural

Heritage of Humanity, acknowledging yoga's universal value.

INS Savitri

- Indian Naval Ship **INS Savitri** recently arrived at **Port Louis, Mauritius,** during a **Long-Range Operational Deployment** to the **South-West** Indian Ocean Region.
- **INS Savitri (P53)** is an **indigenously** built **Sukanya-class offshore patrol vessel** of the Indian Navy, commissioned on **7 June 1990**.
- The ship serves under the **Eastern Naval Command**, based in **Visakhapatnam**.
- The INS Savitri undertakes multiple **offshore patrol roles**, including maritime surveillance, coastal security, search and rescue, and exclusive economic zone (EEZ) monitoring.
- It has participated in several **long-range operational deployments**, including patrols off the **Maldives**, **Seychelles**, and **Mauritius**, strengthening maritime cooperation.

Water Convention

- Bangladesh became the first country in South Asia to join the U.N.'s Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention).
- **Adopted in Helsinki in 1992** and **entered into force** in 1996.
- **Legally binding convention** for sustainable management of shared water resources.
- Requires parties to **prevent, control, and reduce** transboundary impacts.
- Ensures reasonable, equitable, and sustainable use of shared waters.
- Mandates cooperation through agreements and joint bodies among riparian states.

India-New Zealand Bilateral Engagement

- India and New Zealand have intensified economic engagement, with the Union Commerce and Industry Minister leading a large business delegation to New Zealand.
- The visit is aligned with the **4th round of negotiations** for the **India-New Zealand Free Trade Agreement (**FTA**)** being held in Auckland.

India-New Zealand Relations

- India & New Zealand formalised diplomatic ties in **1952**, shortly after both nations gained independence.
- The **Indian-origin population** forms **~6% of New Zealand's population**, a key bridge in partnership.
- The partnership witnessed renewed momentum in **2024-25**, marked by frequent high-level visits,

including the New Zealand PM's visit to India (March 2025).

- New Zealand joined two major **India-led platforms**, the **Indo-Pacific Oceans' Initiative (IPOI)** and the **Coalition for Disaster Resilient Infrastructure (**CDRI**)**.
- Bilateral merchandise trade reached **USD 1.3 billion** in 2024-25, up **49% year on year**, reflecting expanding commercial confidence.

President's State Visit to Angola and Botswana

- The President to undertake a six-day state visit to **Angola** and **Botswana**, marking the **first-ever visit by an Indian head of state** to both countries.
- She will attend **Angola's 50th Independence Day celebration** and address the Angolan Parliament, a **rare diplomatic gesture**.

African Union

- African Union (AU) is a **continental body** comprising the **55 member states** of the African Continent.
- It was officially launched in **2002** as a successor to the **Organisation of African Unity**.
- The AU is the most recent recipient of **'full member status'** to the Group of 20 (G20).
- **Agenda 2063:** The AU's strategic framework for socio-economic transformation and integration of Africa over the decades ahead, emphasising inclusive growth and African-led initiatives.

Global Nuclear Testing Consensus

- With major powers like the U.S., Russia, and China reconsidering or resuming nuclear test readiness, the long-standing post–Cold War moratorium is weakening.
- In this shifting landscape, India's voluntary moratorium since 1998, which once projected maturity, now requires strategic re-evaluation to balance deterrence credibility with diplomatic prudence.

Global Nuclear Context

- **Testing Revival:** U.S. signalled possible testing resumption under President Trump.
- **Arms Control Erosion:** Russia's withdrawal from New START and the U.S. non-ratification of the CTBT weakened global disarmament norms.
- **China's Expansion:** Rapid arsenal growth and new silos at **Lop Nur** heighten regional imbalance. E.g. SIPRI 2024 estimates China has **500+ nuclear warheads**.

India's Nuclear Posture

- **Voluntary Moratorium:** Since the 1998 Pokhran-II tests, India pledged no further testing.

- **Credible Minimum Deterrence:** Doctrine aims for sufficient deterrence, not arms race parity.
- **Data Reliability:** Lacks empirical yield validation post-1998 tests.
- **Strategic Autonomy:** India's restraint was self-imposed, not treaty-bound, hence reversible.
- **Rationale for Re-Evaluation of India's Nuclear Posture**
- **Eroding Deterrence:** Evolving tech and adversarial build-ups may outpace India's tested designs. E.g. Pakistan expanding tactical and sea-based deterrence (SIPRI 2024).
- **Security Environment:** China's modernisation and U.S.–China tensions raise new strategic risks. E.g. increasing Indo-Pacific militarisation post-AUKUS and QUAD engagements.
- **Technological Validation:** Modern MIRV systems require renewed yield assurance.
- **Moral–Strategic Balance:** India must retain ethical credibility while ensuring technological confidence.

First BIMSTEC-India Marine Research Network (BIMReN) Conference

- Kochi hosted the First **BIMSTEC-India Marine Research Network (BIMReN)** Conference from **November 4–6, 2025**, marking a major milestone in advancing regional blue economy cooperation and marine research collaboration among Bay of Bengal nations.
- A **biennial** regional platform under the BIMSTEC framework that promotes joint marine research, sustainable fisheries, and blue economy initiatives through collaboration between India and other BIMSTEC member countries.
- The BIMReN initiative was first announced by Prime Minister of India during the Colombo BIMSTEC Summit in 2022.
- Officially launched in 2024 by the Ministry of External Affairs (MEA), Government of India.
- **Host (2025):** The first biennial conference was hosted by India in Kochi from November 4–6, 2025, bringing together scientists, policymakers, and research institutions from all seven BIMSTEC nations.

Aim:

- To strengthen scientific cooperation in marine research, promote sustainable management of the Bay of Bengal's resources, and enhance regional capacity for blue economy governance aligned with India's Neighbourhood First, Act East, Indo-Pacific, and MAHASAGAR strategies.

Key Features:

- **Institutional Collaboration:** Links 25 research institutions and 50+ scientists across BIMSTEC through twinning grants and split-site PhD fellowships.
- **Focus Areas:** Marine ecosystem health, sustainable fisheries, ocean observation, and technology-driven marine innovation.
- **Knowledge Exchange:** Biennial conferences and joint research programs to harmonize policy and scientific understanding.
- **Youth Engagement:** Encourages young researchers to contribute to marine sustainability and

policy development.

- **Regional Integration:** Builds a cooperative framework for data sharing, capacity building, and maritime governance.

Significance:

- Reinforces India's leadership in regional marine science diplomacy and sustainable ocean governance.
- Advances India's vision of MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions), integrating economy, environment, and diplomacy.

World Artificial Intelligence Cooperation Organization (WAICO)

- Recently at **APEC (Asia Pacific Economic Cooperation)** meet in South Korea, China pushed for a global body, WAICO, to govern Artificial Intelligence (AI) norms.

WAICO

- **Aim:** Shaping global standards for world cooperation.
- It incorporates principles from **China"s 2023 Global AI Governance Initiative,** emphasizing human-centric design, data sovereignty and algorithmic transparency.
- Announced during 2025 **World Artificial Intelligence Conference** in **Shanghai.**
- **Key Purpose**: Reimagining the international architecture of AI governance, position China as an alternative to USA, exert China's soft Power, etc.

India Deepens Trade Ties with Latin America

- India has concluded the **9th Round of India–Peru Trade Agreement** in **Lima** and the **3rd Round of India–Chile CEPA** negotiations in **Santiago**, aiming to enhance market access.

India's Trade Engagement with Latin America

- **Trade Growth:** Bilateral trade reached **USD 50 billion in FY 2024**, led by India's exports of pharma, textiles, and machinery and imports of minerals and oil.
- **India–Peru Trade Pact:** The 9th round (Nov 2025, Lima) advanced talks on goods, services, and critical minerals; the next round will be held in New Delhi (Jan 2026).
- **India–Chile CEPA:** The 3rd round (Oct 2025, Santiago) focused on investment, IPR, and supply-chain resilience, strengthening economic integration.
- **Investment Expansion:** Indian companies have expanded into mining, energy, automobiles, and agro-industries, while Latin firms explore India's pharma and IT markets.
- **Policy Direction:** India seeks to finalise **CEPA and FTA frameworks by 2026** to achieve tariff parity with major economies and deepen South–South economic cooperation.

Significance of India–Latin America Relations

- **Defence Cooperation:** India and **Brazil** have strengthened defence ties through Joint Defence Committee meetings and a **2+2 Political–Military Dialogue** for greater strategic coordination.
- **Critical Minerals Security:** India's **KABIL–CAMYEN pact** in **Argentina** marks its first lithium mining venture; the **Lithium Triangle** (Chile, Argentina, Bolivia) holds over **75% of global reserves**.
- **Food & Energy Security:** Latin America supplies India with edible oils, pulses, and crude oil, with Argentina a major soybean oil source and **Brazil**, **Mexico**, and **Venezuela** key energy partners.
- **Trade & Investment:** Bilateral trade hit USD **35.7 billion (2023–24)**, and Indian firms invested **USD 12 billion** across IT, energy, and manufacturing; India also maintains a PTA with **MERCOSUR**.
- **Climate & Renewable Partnership:** India extended a USD **140 million LoC to** CARICOM for green projects and collaborates with Brazil on biofuels under the **Biofuture Platform**.

Mitra Shakti Exercise

- **11th edition** of **India–Sri Lanka joint military exercise** *Mitra Shakti 2025* began at **Belagavi, Karnataka**
- **Objective:** To improve **coordination** and strengthen **joint sub-conventional operations** under the United Nations mandate.
- **Representation:** The exercise involves Indian troops from the **RAJPUT Regiment** and Sri Lankan troops from the **GAJABA Regiment**, along with **Air Force personnel** from both countries.
- **Focus Areas:** Includes **counter-terrorism operations**, heliborne raids, drone deployment, counter-unmanned aerial systems (C-UAS) operations, **Army Martial Arts Routine (AMAR)**, and yoga.
- **Significance:** The exercise enhances India–Sri Lanka **defence cooperation**, deepens **bilateral relations**, and promotes **regional peace** and stability. **India-Canada 7th Ministerial Dialogue**
- **India and Canada** recently held the **7th Ministerial Dialogue on Trade and Investment (MDTI)** in New Delhi.
- **Key Highlights of the Dialogue**
- The meeting aimed to **reinvigorate trade** and **investment ties** and advance cooperation under the **Joint Statement on Renewing Momentum** towards a Stronger Partnership **(October 2025)**.
- Both sides **reaffirmed their relationship** based on shared **democratic values**, **cultural diversity**, and economic complementarities.
- The **Indian diaspora (2.9 million)** and over **4.27 lakh Indian students** in Canada were recognised as vital links strengthening bilateral relations.

  Trade Figures: Bilateral trade in goods and services reached **USD 18.38 billion** in **2023**, reflecting steady growth

India-Bhutan Bilateral Relations

- Prime Minister of India is in Thimphu to join the seventieth birthday celebrations of former King Jigme Singye Wangchuck, widely called K Four, and to underline the strategic depth of India Bhutan ties.
- **Historic Foundation:** The **1949 Treaty of Friendship** institutionalised India-Bhutan relations; the **2007 revision** removed guidance clauses, marking a mature, sovereign partnership.
- **Shared Values:** Rooted in **trust, cultural affinity, and Buddhism**, both nations see their relationship as moral and civilisational, not merely strategic.
- **Geostrategic Relevance:** Bhutan acts as a **critical Himalayan buffer** between India and China, ensuring India's northern frontier stability.
- **Economic Integration:** India is Bhutan's **largest trade and investment partner**, absorbing over **90% of Bhutan's exports**, mainly hydropower.
- **Diplomatic Consistency:** Bhutan remains India's most reliable partner in South Asia, exemplifying the **"Neighbourhood First"** policy in practice.

Key Areas of Cooperation:

- **Hydropower Diplomacy:** Projects like **Chukha, Tala, and Mangdechhu** (totaling over 2,100 MW) power Bhutan's economy while exporting clean energy to India.
- **Security Partnership:** Bhutan's **Operation All Clear (2003)** removed Indian insurgents, showcasing unwavering strategic trust.
- **Connectivity Projects:** Ongoing work on **Kokrajhar–Gelephu and Banarhat–Samtse rail links** enhances border and trade integration.
- **Digital Collaboration:** **RuPay cards, BHIM UPI, and QR interoperability** link the nations' fintech ecosystems for cashless cross-border transactions.
- **Space and Technology:** Launch of the **India-Bhutan Satellite (2022)** and shared ground stations mark a leap in scientific cooperation.

Major Initiatives Taken So Far:

- **₹10,000 crore support** committed for Bhutan's **13th Five-Year Plan**, ensuring continuity of developmental aid and community projects.
- **Punatsangchhu-II Hydroelectric Project (1,020 MW)** inaugurated in 2025, symbolising energy self-reliance and regional green power trade.
- **Gyalsung National Service Program:** India extended ₹200 crore grant and ₹1,500 crore concessional loan to skill Bhutanese youth for nation-building.
- **India-Bhutan Renewable Energy Roundtable 2024** advanced cooperation in solar, hydrogen, and private hydropower investment.
- **Cultural diplomacy:** The Piprahwa Buddha relic exhibition and Zhabdrung statue restoration

deepen spiritual and heritage ties.

Differences Between India and Bhutan:

- **Economic Scale:** India's trillion-dollar economy contrasts Bhutan's **billion GDP**, creating asymmetry but also interdependence through trade.
- **Energy Dependence:** Bhutan relies on **hydropower for 30% of revenues**, whereas India seeks diversification into renewables.
- **Demographic Contrast:** India's population exceeds **1.4 billion**; Bhutan's is **less than a million**, influencing governance and resource priorities.
- **Geopolitical Exposure:** India engages global powers, while Bhutan navigates a **triangular balance** between India, China, and global institutions.
- **Climate Position:** Bhutan remains **carbon-negative**, while India is a major emitter balancing growth with sustainability commitments.

Way Ahead:

- **Diversify Economic Base:** Encourage tech, tourism, organic agriculture, and education partnerships to reduce hydropower dependence.
- **Green Corridor Expansion:** Develop joint solar and hydrogen projects, integrating Bhutan into India's carbon market ecosystem.
- **Strategic Infrastructure:** Fast-track cross-border rail, digital fibre, and power-grid interconnections for deeper physical and virtual integration.
- **Youth and Skill Integration:** Create dual degree programmes, start-up incubation hubs, and AI research linkages to empower Bhutanese youth.
- **Regional Stability:** Maintain joint vigilance on the China frontier, ensuring the Doklam sector remains secure for both nations.
- India-Bhutan friendship represents trust without tutelage, cooperation without coercion, and proximity with parity. As both embrace a green and digital future, the relationship must evolve from hydropower to knowledge power—anchored in shared values, mutual respect, and regional harmony.

15th India-Vietnam Defence Policy Dialogue

- The **15th edition** of the India-Vietnam **Defence Policy Dialogue (DPD)** was held in **Hanoi** recently.
- Both countries **reviewed progress** under the India-Vietnam **Joint Vision Statement 2030**, which positions **defence cooperation** as a core pillar of their **Comprehensive Strategic Partnership**.
- Both countries signed an MoU to provide mutual support in submarine search-and-rescue operations, enabling coordinated response during emergencies in the Indo-Pacific.

- A Letter of Intent on **defence industrial cooperation** was also **signed**, focusing on joint research and production, and transfer of technology.

India-Vietnam Relations

- India and Vietnam have a long-standing partnership, elevated to a **Comprehensive Strategic Partnership in 2016**, with cooperation expanding in defence, trade and technology.
- In **June 2025**, both sides held the **13th Political Consultation** and **10th Strategic Dialogue** in New Delhi and reviewed progress under the **Plan of Action 2024-2028**.
- Vietnam hosted the **Holy Relics** of **Lord Buddha exposition** in **May 2025**.
- A landmark **$700 million** BrahMos supersonic missile deal (2025) is set to mark **India's largest defence export**, supporting Vietnam's maritime defence against China in the South China Sea

India–Angola Relations

President Droupadi Murmu addressed the **Angolan Parliament** during her state visit, marking **40 years** of **India–Angola diplomatic relations**.

Key Areas of Cooperation

- **Energy:** Angola is India's **second-largest** supplier of crude oil, after China. Petroleum exports account for nearly **90%** of the total bilateral trade.
- **Trade:** India consistently remains one of Angola's **top three trading partners**. Currently, it is the **second-largest** after China, accounting for about **10%** of its global trade.
- **Defence:** India provided a **$200 million Line of Credit** to modernise **Angola's armed forces**, including equipment upgrades, personnel training, and maintenance facilities.
- **Agriculture:** A MoU signed in May 2025 expanded **agricultural cooperation** to support Angola's **economic diversification** and improve its food security.
- **Global Alliances:** Angola has joined India-led global initiatives like the **International Solar Alliance (**ISA**)**, the **Global Biofuels Alliance (**GBA**)**, and the **International Big Cat Alliance (**IBCA**)**.

Angola

- Angola is located in **southwestern Africa** and is the **continent's seventh-largest country**. It is known for its extensive **oil**, **diamond**, and **mineral reserves**.
- **Boundaries:** It borders the **Republic of the Congo** (north), **Democratic Republic of the Congo** (northeast), **Zambia** (southeast), **Namibia** (south), and the **Atlantic Ocean** (west).
- **Capital:** **Luanda** serves as Angola's capital and main seaport.
- **Physical Features:** The country has a **narrow coastal plain** that rises to a central plateau, with **Mount Moco** being its highest peak. Major rivers include the **Cuanza** and **Cunene**.

Exercise Malabar 2025

- Exercise Malabar **2025** is taking place in **Guam,** in the **Northern Pacific,** among the member states of the **Quadrilateral Security Dialogue (**Quad**)**.
- **Exercise Phases:** The **Harbour Phase** involves planning, coordination, communication drills, and sports exchanges; the **Sea Phase** includes fleet manoeuvres, anti-submarine, and anti-air warfare drills.
- **Naval Asset:** The indigenously designed **guided-missile stealth frigate**, INS Sahyadri, is participating.

Exercise Malabar

- It is an **annual multilateral naval exercise** involving **India**, the **United States**, **Japan**, and **Australia**.
- **Objective:** To improve **military interoperability**, coordination, and communication among **Quad members** to support a free, open, and rules-based Indo-Pacific region.
- **Evolution:** The exercise began in **1992** as a **bilateral drill** between **India** and the **US**. It expanded to a trilateral format with **Japan in 2015** and became a **quadrilateral** exercise with **Australia in 2020**.

> *The Quad is an informal strategic forum of **India**, **the U.S.**, **Japan,** and **Australia** to promote stability and security in the Indo-Pacific, founded in **2007** and revived in **2017**.*

VINBAX

- 6th India-Vietnam Army Exercise VINBAX starts off in Hanoi.
- It is a **bilateral army exercise between India and Vietnam** aimed at enhancing interoperability and sharing best practices in UN peace-keeping operations.

India-Canada 7th Ministerial Dialogue

- **India and Canada** recently held the **7th Ministerial Dialogue on Trade and Investment (MDTI)** in New Delhi.

Key Highlights of the Dialogue

- The meeting aimed to **reinvigorate trade** and **investment ties** and advance cooperation under the **Joint Statement on Renewing Momentum** towards a Stronger Partnership **(October 2025)**.
- Both sides **reaffirmed their relationship** based on shared **democratic values**, **cultural diversity**, and economic complementarities.
- The **Indian diaspora (2.9 million)** and over **4.27 lakh Indian students** in Canada were recognised as vital links strengthening bilateral relations.
- **Trade Figures:** Bilateral trade in goods and services reached **USD 18.38 billion** in **2023**, reflecting steady growth.

India-Nepal Connectivity Pact

- **India** and **Nepal** signed a **Letter of Exchange (LoE)** amending the **Treaty of Transit** to expand **rail-based connectivity** and enhance **trade**.
    - *The **Treaty of Transit** is a significant India-Nepal agreement that guarantees **landlocke Nepal** access to **Indian territory and ports** for **international trade**.*
- **Rail Connectivity:** The LoE facilitates the movement of containerised and bulk cargo between **Jogbani (India)** and **Biratnagar (Nepal)**.
- **Trade Corridors:** It liberalises movement along the **Kolkata–Jogbani**, **Kolkata–Nautanwa (Sunauli)**, and **Visakhapatnam–Nautanwa (Sunauli)** corridors, facilitating Nepal's **third-country trade**.
- **Significance:** The amendment strengthens **regional connectivity**, supports India's Neighbourhood First policy, and promotes **economic integration** in South Asia.

India–Nepal Relations

- **Trade:** India is Nepal's **largest trading partner** and **leading source of FDI**, making up almost **two-thirds** of Nepal's merchandise trade.
- **Connectivity:** Key initiatives include the **Motihari–Amlekhgunj petroleum pipeline**, Integrated Check Posts (ICPs) at border crossings, and various cross-border railway links.
- **Defence:** Both nations coordinate on border management, **counter-terrorism** and hold the annual **military exercise**, **Surya Kiran**.
- **Energy:** India has committed to importing **10,000 MW of electricity** from Nepal over the next decade, with recent agreements prioritising cross-border transmission lines.
- **Cultural:** **Sister-city agreements** ("**twinning arrangements**") link **Kathmandu–Varanasi**, **Lumbini–Bodhgaya**, and **Janakpur–Ayodhya** to enhance people-to-people relations.

India's Development Cooperation

- India has evolved from being a **major aid recipient** to a proactive development partner, championing **South–South Cooperation (SSC)** through inclusive capacity-building models.

Current Status of India's Development Cooperation

- **India–UN Development Partnership Fund:** Established in **2017** under UNOSSC, with India committing **US$150 million over 10 years**; has supported **85+ projects** across **65 countries**.
- **Geographical Priority:** Targets Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS).

- **India–UN Global Capacity-Building Initiative (2025):** Enhances training, knowledge exchange, and institutional learning to complement project-based funding.
- **Focus Sectors:** Renewable energy, digital infrastructure, climate-resilient agriculture, women-led enterprises, and ecosystem restoration.
- **Demand-Driven Model:** Projects proposed by partner governments, ensuring national ownership.
- **Implementation Approach:** Collaboration with UN agencies ensures transparency and scalability.

United Nations Office for South-South Cooperation (UNOSSC) *was established to promote, coordinate and support South-South and triangular cooperation globally and within the United Nations system.*

Significance of India's Distinct Model of South–South Cooperation

- **Blended Financing:** Combines grants and technical expertise, ensuring sustainability.
- **Knowledge Transfer:** Draws on India's domestic successes, Digital Public Infrastructure (DPI), renewable energy missions, and Agri-innovation ecosystems.
- **Global Credibility:** The Fund has become a flagship model of equitable, evidence-based cooperation, endorsed during India's G20 Presidency (2023).
- **Principled Partnership:** Focuses on solidarity, not leverage, guided by **Vasudhaiva Kutumbakam** ("The world is one family").

Challenges in India's Development Cooperation Framework

- **Fragmented Coordination:** Absence of a centralised monitoring authority across. E.g. NITI Aayog's 2024 review found overlap among **30+ ongoing** capacity-building initiatives.
- **Impact Measurement Deficit:** No real-time results dashboard linking projects to SDGs or social impact outcomes. E.g. **40% of funded projects** lack consolidated evaluation reports (MEA 2025).
- **Resource Constraints:** India's **Official Development Assistance (ODA)** outflows **(~$2.6 billion in 2024)** remain modest compared to China or Japan, constraining scale.
- **Regional Complexity:** Political sensitivities in South Asia and Africa occasionally slow implementation or create duplication with other donor programs.
- **Limited Private Sector Integration:** Only **12–15%** of India's development cooperation projects involve private-sector participation, compared to **40–45%** in OECD countries (OECD Development Report, 2024)
- **Low Documentation:** India allocates **less than 0.5%** of its total development assistance budget to public communication and evaluation, whereas OECD donors allocate around **3–5%** (NITI Aayog Review, 2024)

Way Forward

- **Institutionalise Coordination:** Establish a **National Development Cooperation Authority**

(NDCA) to unify capacity-building initiatives. E.g. **Japan's JICA** for coherent strategy and impact alignment.

- **Real-Time Impact Dashboard:** Consolidate project data, SDG linkages, and outcome mapping for transparency similar to **UNDP's Data Futures Platform**, enabling open-access accountability.
- **Regional Scaling:** Replicate successful pilots across geographies like **Pacific renewable projects in Africa**, and **East African climate-smart agriculture in South Asia**.
- **Evaluation and Communication:** Commission independent reviews and build an **India Development Cooperation Portal** showcasing global good practices.
- **Deepen Multilateral Linkages:** Collaborate with BIMSTEC, African Union **(Agenda 2063)**, and Pacific Islands Forum to institutionalise cross-regional cooperation.

India–Cuba Sign Memorandum of Understanding

- India and Cuba signed a MoU that includes a **Treaty on Mutual Legal Assistance in Criminal Matters** and a **Protocol on Cultural Exchange and Cooperation**.
- The Mutual Legal Assistance Treaty facilitates the sharing of **legal information** and support between the **judicial systems** of both countries.
- The Cultural Exchange Protocol promotes partnerships in **arts**, **heritage**, **sports**, and **education**, strengthening **people-to-people ties**.

India–Cuba Relations

- **Diplomatic Recognition:** India was one of the first countries to recognise the new Cuban government after the **1959 Revolution**.
- **Strategic Solidarity:** As **founding members** of the **Non-Aligned Movement (**NAM**)**, both nations consistently promote collaboration among Global South countries in international forums.
- **Bilateral Assistance:** India has provided **over $243 million** in Lines of Credit to Cuba for projects in key sectors like **agriculture** and **renewable energy**. It also consistently provides **humanitarian aid**.
- **Focus Areas:** Cuba's membership in the International Solar Alliance (ISA) strengthens **bilateral energy ties**; other areas include **biotechnology** and **traditional medicine**.

U.S. Government Shutdown Ended

- US President **Donald Trump** signed a **government funding bill** on 12 November 2025, formally ending a **record 43-day** government shutdown.
- **Record Length:** The shutdown, beginning on 1 October 2025, became the **longest in US history** by lasting **43 days**.
- **Past Record:** The longest shutdown lasted **35 days** during **Donald Trump's first presidency** between December 2018 and January 2019.

Government Shutdown in the U.S.

- **Definition:** A shutdown occurs when **Congress** and the **President fail to pass appropriation**

bills or a 'continuing resolution' required to continue federal operations.

- **Statutory Basis:** The **Antideficiency Act of 1884** prohibits federal agencies from spending money without explicit congressional authorisation.
- **Fiscal Deadline:** Federal funding must be approved before the **fiscal year begins on 1 October**; missing this deadline creates a funding gap that **shuts down non-essential services**.

Mudh-Nyoma Airbase

- India has operationalised Mudh-Nyoma airbase in Ladakh, enhancing its defence preparedness along the **Line of Actual Control** with China.
- **Location: Eastern Ladakh.**
- **Situated at a** height of nearly 13,000 feet **and very close to the Line of Actual Control (LAC).**
- **Importance:** Directly overlooks critical approaches including **Depsang Plains, Pangong Tso sector, and Chushul Valley.**
- **Built by:** Border Roads Organisation (BRO).
- **Fourth major airbase in Ladakh:** Complementing Leh, Kargil and Thoise.

G7 Foreign Ministers' Meeting Outreach Session

- External Affairs Minister S. Jaishankar participated in the **Group of Seven (G7) Foreign Ministers' Meeting (FMM)** Outreach Session held in **Niagara, Canada**.
- **Objective:** The G7 FMM is an **annual platform** where G7 foreign ministers discuss coordinated approaches to foreign policy, security, and economic issues.

- **2025 Presidency: Canada**, as the **G7 President for 2025**, hosted and chaired the meeting.
- **Outreach Sessions:** These are **thematic extensions of the G7 FMM** where selected partner countries are invited to contribute wider and diverse perspectives.
- Dr Jaishankar joined the outreach session on **energy security** and **critical minerals**.

Group of Seven (G7)

- The G7 is **an informal forum** of advanced economies: **Canada**, **France**, **Germany**, **Italy**, **Japan**, **UK**, and **US**, with the **European Union** (EU) participating as a '**non-enumerated**' member.
- Members collectively represent **~10% of the population** and **~45% of global nominal GDP**.
- **Origin:** The G7 was created in **1975** to coordinate responses to global economic challenges, such as the **oil crisis** and the **recession** of the **1970s**.
- **Operating Structure:** It operates **without a formal treaty**, **constitution**, or **permanent secretariat,** and the presidency rotates annually among member countries.

Colombo Security Conclave

- NSA has invited Bangladesh to the Colombo Security Conclave (CSC) meeting in New Delhi.
- It is regional security grouping established in 2020.
- **Objective:** To promote regional security by addressing transnational threats and challenges of common concern to the Member States.
- **Members:** India, Sri Lanka, Mauritius, Maldives and recently joined by Bangladesh.
- Seychelles is an observer nation.
- **Five pillars of cooperation:** Maritime Security; Countering Terrorism; Combating Transnational Organised Crime; Cyber Security; and Humanitarian Assistance.

Exercise Garuda-2025

- **Exercise Garuda 25** has commenced at **Mont-de-Marsan, France**, between the **Indian Air Force (IAF)** and the **French Air and Space Force (FASF)**,
- This is the **eighth edition** of the **bilateral air exercise** between **India and France**.
- **Objective:** To improve interoperability and tactical refinement and strengthen defence cooperation between the two air forces.
- **Aircrafts Involved:** India deployed **Su-30MKI fighters**, C-17 transport aircraft, and IL-78 tankers to operate alongside **French multirole fighters**.
- **Key Focus:** Includes air-to-air combat, integrated air defence missions, and joint strike operations in realistic operational conditions.
- **Significance:** It highlights India's commitment to **structured air force cooperation** and strengthens **bilateral defence ties** with France.

Strait of Hormuz

- Iranian forces intercept, move tanker with high-sulphur gasoil towards Iran in Strait of Hormuz.
- The Strait of Hormuz is a narrow waterway between **Iran and Musandam Peninsula (Oman).**

- Musandam Peninsula is a northeastern extension of the Arabian Peninsula.
- It connects the **Persian Gulf** to the **Gulf of Oman**.
- **Strategic Importance:** About 25% of the world''s oil passes through the Strait of Hormuz.

DRDO Develops New Generation Man-Portable Autonomous Underwater Vehicles

- DRDO has successfully developed a new generation of Man-portable Autonomous Underwater Vehicles (MP-AUVs) for naval mine countermeasure missions.
- A compact, lightweight **autonomous underwater vehicle system** that can be carried by personnel and deployed quickly for detecting, classifying, and analysing underwater mines in real time.
- **Developed by:** Naval Science & Technological Laboratory (NSTL), Visakhapatnam - a premier naval systems lab of Defence Research and Development Organisation **(DRDO).**

Aim:

- To strengthen India's **indigenous mine countermeasure (MCM) capability**,
- Reduce risk to naval divers and manned vessels,
- Enable fast, autonomous, and networked underwater mine detection.

Key Features:

- **Multi-AUV System:** Uses multiple portable AUVs working collaboratively during missions.
- **Side Scan Sonar + Underwater Cameras:** Enables high-resolution imaging and real-time detection of mine-like objects.
- **AI-Driven Target Recognition:** Deep-learning algorithms autonomously classify threats, reducing operator load and speeding up missions.
- **Underwater Acoustic Communication:** Allows AUVs to exchange data underwater, enhancing situational awareness and coordination.
- **Man-Portable & Rapid Deployment:** Lightweight design suitable for quick launch from ships or shore.
- **Validated Through Field Trials:** Successfully tested in NSTL harbour trials for accuracy, coordination, and mission reliability.

Significance:

- **Enhances Naval Mine Warfare Capability:** Provides an intelligent, networked, and safer system for mine detection and neutralisation.
- **Reduces Risk to Personnel:** Minimises the need for divers or manned vessels in high-risk minefields.
- **Boosts Indigenous Defence Tech:** Strengthens India's self-reliance under Aatmanirbhar Bharat in critical underwater warfare systems.

Operation Southern Spear

- The United States has launched Operation Southern Spear, a major new military and surveillance campaign targeting Latin American drug-trafficking cartels.
- A large-scale U.S. military and intelligence operation deploying unmanned air and sea systems to detect, monitor, and disrupt drug-trafficking networks across the Caribbean and eastern Pacific.
- **Nation Involved:** Led by the United States, under the Department of Defence.
- **Aim:**
- To neutralize narco-terrorist networks operating in the Western Hemisphere.
- To secure U.S. borders against drug smuggling routes.
- To test and operationalize a hybrid fleet of robotic and manned naval forces as part of Navy modernization.

Key Features of Operation Southern Spear:

- **Robotic & Autonomous Systems (RAS):** Long-endurance robotic surface vessels, interceptor boats, and VTOL robotic aircraft for round-the-clock surveillance.
- **Hybrid Fleet Integration:** Combines unmanned systems with traditional warships under the U.S. Navy's Project 33 for accelerated robotic fleet deployment.
- **Expanded Naval Presence:** Over a dozen U.S. vessels in the region, including **USS Gerald R. Ford**, amphibious ships, and a nuclear submarine.
- **High-Speed Interdiction:** Robotic boats capable of rapid interception of narco-vessels in high-traffic maritime chokepoints.

Significance:

- **Major Military Escalation:** Largest U.S. naval buildup in the Caribbean in decades, heightening geopolitical tensions.
- **Counter-Narcotics Capability Boost:** Enhances the U.S.'s ability to monitor and intercept drug shipments across vast oceanic routes.
- **Regional Impact:** Raises concerns among Latin American nations—especially Venezuela—about potential U.S. interventionism.

Eurasian Economic Union (EAEU)

- The progress of the India–Eurasian Economic Union (EAEU) Free Trade Agreement negotiations has been reviewed.

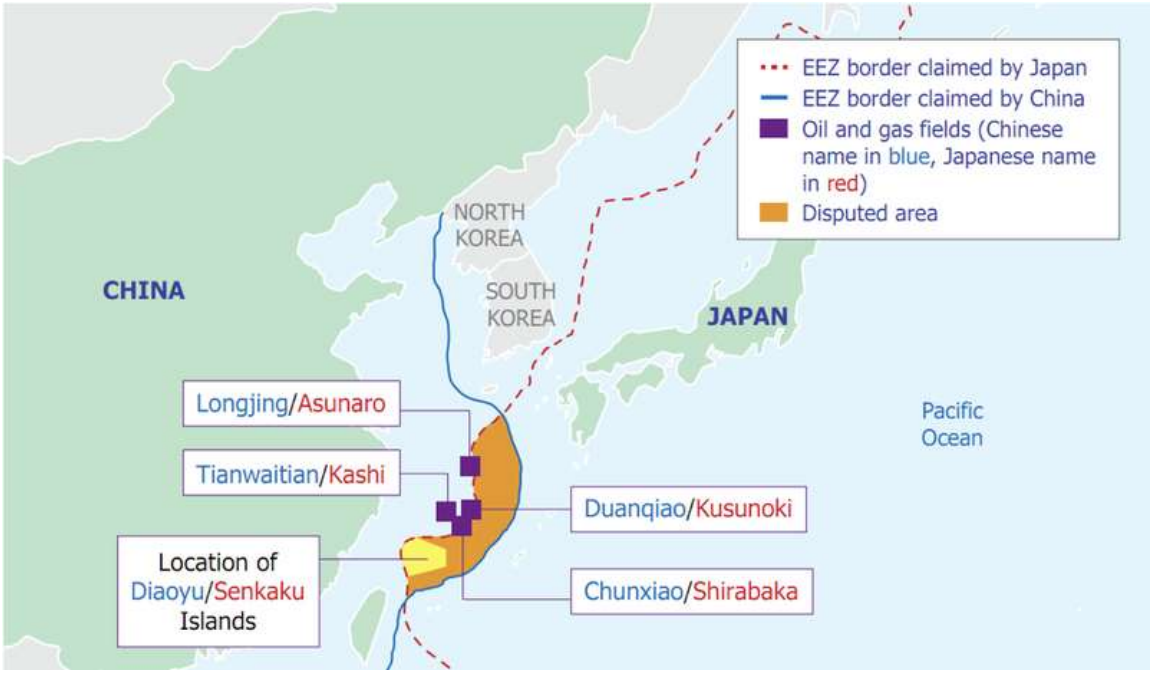
EAEU:-

- **Overview:** It is an **international organization** for regional economic integration.
- **Genesis:** Established by the **Treaty on the Eurasian Economic Union** (signed in 2014).
- **Members:** Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia.
- **Feature:** Enables free movement of goods, services, capital and labour, supported by coordinated,

harmonised and unified policies.

Senkaku Island

- Recently, a formation of China Coast Guard ships passed through the waters around the Japan-administered Senkaku Islands.
- **Japan** and **China** have long-running disputes over these islands.
- Located in the **East China Sea**
- They are part of **Okinawa Prefecture.**
- Also **known as Diaoyu** in Chinese.



Ten Years of last India-Africa Forum Summit (IAFS)

- Absence of IAFS for a long period warrant reflecting on the Opportunities and Challenges in India-Africa relations.Three IAFS have been held previously in **2008, 2011 and 2015, with a focus on broader development cooperation.**

Opportunities in India-Africa Relations:

- **Trade: African Continental Free Trade Area (AfCFTA)** creates a single market, offering Indian investors immense scale and access.
- **India is Africa's third-largest trading partner** (after EU and China) with trade surpassing **$100 billion.**

- **African-led development:** Africa has been one of the world's fastest-growing regions over past decade and this growth translates into an expanding consumer base, growing young workforce and presenting vast market opportunities.
- **Soft Diplomacy:** Human resource development through education and healthcare cooperation.
- **E.g. IITs campuses, Indian Technical and Economic Cooperation (ITEC), Pan-African e-Network.**
- **Representation in Global Institutions:** India supports African representation in global institutions which boosts India's leadership in global South-South Cooperation.
- **E.g. India's push for membership for African Union in the G-20.**
- **Technological cooperation:** India can aid Africa in leapfrogging digital infrastructure deficits through initiatives like **Digital Public Infrastructure (DPI).**

Challenges:

- **Competition and Debt: I**ndia faces competition from China's investments that could potentially push African countries in the debt-trap.
- **Delays:** India's projects face issues of scale and bureaucratic drag, hindering actualization of potential.
- **Geopolitical challenges:** Political Instability (rise of military coups) and maritime insecurity (piracy and maritime terrorism in the **Indian Ocean Region (IOR)**) hinder investment and long-term project viability.

Way Ahead:

- **Revive IAFS-IV:** Institutionalise IAFS as a regular summit, create a permanent Secretariat and renew political momentum for a unified India–Africa engagement roadmap.
- **Build an India–Africa Digital Corridor:** Jointly develop **DPI architecture—UPI–Afripay linkages**, DigiLocker-style document systems and tele-health networks to serve the wider Global South.
- **Co-Invest in Strategic Future Sectors:** Partner with Namibia/Morocco on green hydrogen, **DRC/Zambia on EV battery minerals**, and Kenya–Nigeria hubs on digital startups and AI innovation.
- **Accelerate LoC Delivery:** Establish a single-window LoC monitoring dashboard, fix deadlines, and empower local project execution teams to reduce long-standing implementation delays.
- **Strengthen Maritime Security Architecture:** Make **AI-KEYME** annual, enhance Western Indian Ocean coordination, and sign logistics support agreements with Kenya, Mauritius and Tanzania.
- **Deepen People-to-People Connect:** Double ITEC and ICCR scholarships, expand India-linked institutions like **IIT-M Zanzibar**, and support African students and entrepreneurs in Indian ecosystems.

Conclusion:

- India–Africa ties stand at a pivotal moment, driven by shared demographics, development priorities and a shifting global order. A decade after IAFS-III, the partnership now needs stronger institutions and co-created growth rather than transactional exchanges. If India can connect, build and revive key frameworks, this relationship will anchor the Global South's rise in the 21st century.

Rudra - all arms integrated brigade

- India successfully tested its newly-raised **integrated all-arms brigade 'Rudra'** during the **tri-Service** Exercise Trishul on the western front with Pakistan.
- Southern Army Command chief Lt-General Dhiraj Seth hinted at a doctrinal shift from the traditional "Cold Start" to a quicker & robust "Cold Strike", in this context.
- A Rudra Brigade is a newly conceptualised all-arms, **permanently integrated combat formation** combining infantry, mechanised units, armour, artillery, air defence, engineers, signals, drones, logistics and support elements under a single operational framework.

Aim:

- To create self-contained, rapidly deployable integrated battle formations that can execute swift, multi-axis offensive strikes.
- To operationalise India's move from **Cold Start to Cold Strike**, enabling faster mobilisation and decisive limited-war operations under a nuclear overhang.

Operated By:

- Operated by the Indian Army, under different regional Corps (e.g., Konark Corps on western front).
- Two Rudra brigades already deployed on the northern borders (Eastern Ladakh & Sikkim).

Key Features of Rudra Brigades-

- **Fully Integrated All-Arms Formation:** Combines infantry, mechanised infantry, armour, artillery, AD, engineers, signals, UAV units and logistics into one cohesive brigade during peace and war.
- **Tailor-Made for Terrain:** Composition changes depending on the operational theatre—deserts, plains, mountains, or LoC.
- **Faster Mobilisation & Higher Readiness:** Permanent integration reduces mobilisation time drastically, enabling immediate offensive action.
- **Capable of Multi-Domain Operations:** Equipped for operations involving land, air support, drones, sensors, precision weapons and electronic warfare.
- **Built-In Force Multipliers:** Includes drones, ISR systems, area-saturation artillery, attack helicopter support and rapid logistics nodes.
- **Modular & Flexible Structure:** Units can be added or detached based on mission requirements, enabling high adaptability.

Significance:

- **Enables "Cold Strike" Doctrine:** Moves beyond Cold Start by combining speed + technology + integrated logistics for deep, rapid offensives.
- **Strengthens Western & Northern Borders:** Enhances India's ability to respond swiftly to Pakistan-based provocations and Chinese mobilisation.
- **Reduces Response Time in Crisis:** Permanent integration ensures forces are pre-aligned, trained together, and mission-ready.

Rudra Brigade

- **Overview:** Indian Army is converting a few of its 250 single-arm brigades (each brigade has over **3000 troops**) into Rudra all-arm brigades with **multi-component integration**.
- Each Rudra brigade would be tailor-made for its assigned area of operation & the mission.
- **Components:** Infantry, mechanized infantry, **tanks**, **artillery**, **air-defence systems**, engineers, signals, **drone** detachments, **logistics** & **combat-support** teams.
- **Objective:** Bring together all fighting arms & support units into a **self-contained group** to ensure **faster mobilization**, **better cohesion** & **increased efficacy**.
- **Current Status:** Two Rudra brigades already operational along the northern borders with China – in **Ladakh** & **Sikkim**.

- ***Cold Start Doctrine:*** *India's* ***pro-active*** *conventional war strategy, developed after its troop formations took almost a month to mobilise under Operation Parakram, following the* ***2001 Parliament attack****.*
- ***Operation Parakram:*** *Deployment of nearly 500,000 Indian troops along* ***Indo-Pak border*** *following the 2001 Parliament attack. Slow pace of deployment gave time for Pakistan to fortify its defences.*
- ***Cold Strike:*** *An upgrade from the traditional 'Cold Start' doctrine. Emphasizes quicker mobilization, deeper thrusts & seamless multi-domain operations – enhancing India's war strategy.*

28-point draft peace proposal for ending the Russia–Ukraine war

- **The United States has privately shared a 28-point draft peace proposal for ending the Russia–Ukraine war** with President Volodymyr Zelenskyy, reportedly prepared under former U.S. President Donald Trump's team.
- A US-drafted, 28-point roadmap aimed at ending the Russia–Ukraine war through a negotiated settlement involving security guarantees, constitutional changes, economic arrangements, and territorial compromises.
- Proposed by: Prepared under the strategic framework associated with US President Donald Trump's 2024 foreign-policy team.

Aim:

- To freeze the conflict and prevent further territorial expansion by either side.
- To restructure European security by limiting NATO expansion.
- To rebuild Ukraine's economy with U.S.–EU investment mechanisms.

Key Features of the 28-Point Plan

- **Security Architecture Reset:** Ukraine must abandon NATO membership, enshrine neutrality in its Constitution, and accept permanent restrictions on military size (600,000 troops). NATO must formally guarantee Ukraine will never be admitted and must avoid stationing troops on Ukrainian soil.
- **Territorial & Political Concessions:** Ukraine expected to make unspecified territorial concessions to Russia.
- Dialogue between Russia–Ukraine–Europe to settle all "ambiguities" of the last 30 years.
- **Western Economic Reconstruction Package:** Creation of a Ukraine Development Fund for tech, energy, AI, urban rebuilding, and resource extraction.

Reintegration of Russia into the Global Economy:

- Gradual lifting of sanctions.
- Russia invited to rejoin the G8.
- U.S.–Russia long-term cooperation in energy, rare earths, AI, Arctic projects, etc.

Frozen Asset Utilisation:

- $100 billion in frozen Russian assets used for Ukraine's reconstruction under U.S. management.
- U.S. receives 50% of profits; EU adds another $100 billion.

Significance of the Plan:

- Represents the most detailed U.S.-brokered proposal since the war began.
- Could reshape the NATO–Russia–Ukraine security balance for decades.
- Criticised for being Russia-leaning and undermining Ukrainian sovereignty.

ASMPA-R Missile

- France test-fired the **Air-Sol Moyenne Portee-Renove (ASMPA-R) air-to-surface cruise missile** from **Rafale-M** fighter jet & formally inducted it into service.

- ***Rafale-M:*** *Carrier-borne variant of Rafale fighter jet designed for naval operations; it has been selected by India for deployment on* ***INS Vikrant*** *to replace the aging MiG 29K fleet.*

- ***Cruise missile:*** *Guided missile that flies within the atmosphere using jet or ramjet propulsion, designed for low-altitude, high-precision strikes.*
- ***Ramjet Propulsion:*** *Air-breathing engine that compresses incoming air using forward speed instead of compressors, enabling sustained high-supersonic flight in missiles*

ASMPA-R Missile

- **Latest Upgrade:** Second upgraded variant of France's ASMPA series; inducted into its **Strategic Air Forces** in 2023 & into its **Nuclear Aeronaval Force** (**FANU**) in 2025.
- **Range & Speed:** Medium-range nuclear-capable air-to-surface cruise missile with **~600 km range** & **Mach 3** supersonic speed.
- **Propulsion:** **Liquid-fuel**, **ramjet-powered** system with a **solid-fuel booster** for initial acceleration.
- **Warhead:** Speculated to carry an improved **nuclear warhead**; earlier ASMPA-A variant housed a nuclear warhead (100–300 kiloton yield).
- **Design Changes:** Features **larger rear fins** and **smaller front fins**, reversing the ASMPA-A layout, while retaining central ramjet air intake.
- **Future:** France is working on a future variant of ASMPA-R, the **Air-Sol Nucléaire de 4th Generation** (**ASN4G**); it will arm the next Rafale variant, **Rafale F5** fighter & its naval variant.

BvS10 Sindhu Armoured Vehicle

- Indian Infrastructure giant **Larsen & Toubro (L&T)** and British defence contractor BAE Systems secured a contract from the Indian army for supply of **BvS10 Sindhu armoured vehicles**.
- L&T will **indigenously produce** the vehicle in India, with design support from BAE Systems.

BvS10 Sindhu

- **Overview:** Indian variant of Bandvagn Skyddad 10 (BvS10) Viking **all-terrain** armoured vehicle to be manufactured by L&T in **Hazira**, Gujarat, with at least **60% indigenous content**.
- **Role:** Designed for **high-mobility operations** in extreme terrain like snow, mountains, swamps, deserts; especially suitable for **Ladakh and Eastern Command** environments.
- **Configuration:** **Twin-cabin design** with protected front and rear modules; **amphibious** capability with **45° climbing** and **60% gradient** performance.
- **Capacity:** Carries **10–12 troops** with a payload of ~**5 tonnes**, maintaining mobility even in deep snow and soft ground where wheeled vehicles fail.

The G20 Summit 2025 in Johannesburg

- It was the first ever G20 Summit held on African soil, with the theme Solidarity, Equality, Sustainability. The G20 declaration was adopted by world leaders despite the US boycott.

Key Highlights of Declaration

- **Disaster Resilience & Debt Sustainability:** People-centred disaster response, support for debt-burdened countries, and emphasis on sustainable industrialisation and jobs.
- **Climate & Energy Transition:** Push to expand renewables, endorsed the **G 20 Critical Minerals Framework (voluntary)**, and reaffirmed the Paris 1.5°C and global biodiversity goals.
- **Institutional Reform:** Call for UNSC reform and stronger multilateral cooperation rooted in the spirit of **Ubuntu** (Emphasizing interconnectedness and shared humanity).
- Reaffirmed commitment on empowerment of women and girls and condemned terrorism in all its forms and manifestations.

Major Ideas Proposed by India at Summit

- **Global Traditional Knowledge Repository:** To harness collective human wisdom.
- **Africa Skills Multiplier:** Aimed to create 1 million certified trainers fostering youth skills in Africa.
- **Global Healthcare Response Team:** G20 healthcare experts to respond to global health crises.
- **Open Satellite Data Partnership:** Sharing satellite data for agriculture, fisheries, disaster management.
- **Critical Minerals Circularity Initiative:** To promote recycling, innovation, and supply chain security.
- **Countering Drug Terror Nexus:** Initiative to combat drug trafficking and terrorism.
- On sidelines of G20 summit, India and Italy both adopted a joint initiative to counter financing of terrorism.

G20

- **Founded in:** 1999 after the Asian financial crisis of 1997 – 1998.
- **Members:** Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom, United States, the European Union, and the African Union.
- **Purpose:** Plays an important role in shaping and strengthening global architecture and governance on all major international economic issues.
- **Annual summit:** G20 Summit is held annually, under the leadership of a rotating Presidency. The Presidency is supported by the Troika (Previous, current and incoming Presidency).
- During South Africa's Presidency, the members of the ***G20 troika are Brazil, South Africa and the United States.***

The LCA Tejas crashed during an aerial display at the Dubai Air Show

- **The LCA Tejas** crashed during an aerial display at the Dubai Air Show, leading to the death of IAF pilot Wing Commander Namansh Syal.

- **LCA Tejas is India's indigenous 4.5-generation**, all-weather, multi-role light combat aircraft, forming a key element of the IAF's fighter fleet modernisation.
- **Developed by: Designed by Aeronautical Development Agency (ADA) and produced by Hindustan Aeronautics Limited (HAL) under the Light Combat Aircraft (LCA) programme.**

Evolution:

- **Conceived in the** 1980s as a replacement for the **MiG-21 fleet, the LCA Tejas** made its first flight in 2001 and was formally inducted into the **Indian Air Force in 2016.**
- Over time, it has evolved into improved variants such as **Tejas Mk-1 and Mk-1A, with the more advanced Tejas Mk-2** currently under development.

Key Features:

- **Lightest & smallest in its class:** Composite airframe for high maneuverability and reduced weight**.**
- **4.5-gen avionics: AESA radar, advanced EW suite,** digital flight controls, SMFDs, and open architecture mission computer.
- **Quadruplex fly-by-wire:** Ensures high agility with enhanced pilot control and safety.
- **Multi-role capability:** Air-to-air, air-to-ground, BVR missiles, precision bombs, and maritime strike roles.
- **IFR capability:** In-flight refuelling for extended range.
- **Variants:** Single-seat fighter (IAF/Navy), twin-seat trainer, and advanced Mk-1A with superior sensors and survivability features.
- **Significance:**
- **Strengthens Atmanirbhar Defence:** A major milestone in India's indigenous aerospace capabilities.
- **MiG-21 replacement:** Provides a modern, agile and cost-effective fighter for IAF.
- **Export potential:** Several countries, including in Asia–Africa, have expressed interest.

HAMMER precision-guided air-to-ground weapon system

- Bharat Electronics Limited (BEL) and France's Safran Electronics & Defence have signed a Joint Venture Cooperation Agreement to manufacture the **HAMMER precision-guided air-to-ground weapon system** in India.
- The **HAMMER (Highly Agile Modular Munition Extended Range**) is a smart, precision-guided, air-to-ground weapon designed to strike hardened targets with high accuracy from stand-off ranges.
- **Developed by:** Originally developed by Safran (Sagem), France, and now set for joint manufacturing with BEL in India.
- **Aim:** To provide the IAF and Navy with a combat-proven, modular, precision weapon suitable for

mountainous warfare, quick deployment, and integration with aircraft like Rafale and Tejas.

Key Features of HAMMER:

- **Modular Architecture:** Features a guidance kit + range-extension kit that can be fitted onto multiple types of general-purpose bombs, enhancing flexibility across missions.
- **High Accuracy Precision Strike:** Uses GPS/INS, infrared, and laser-guided options, enabling accurate strikes on bunkers, hardened shelters, airstrips, and enemy infrastructure.
- **Extended Stand-Off Range:** Can hit targets up to 70 km, enabling aircraft to strike without entering high-risk airspace—crucial for operations in contested zones.
- **High Agility & Manoeuvrability:** Optimised for mountain warfare (e.g., Ladakh), allowing precision strikes even in complex topography and high-altitude environments.
- **Platform Compatibility:** Integrated with Rafale, and to be integrated with LCA Tejas, providing flexibility across Air Force and Navy combat platforms.
- **Joint Manufacturing & Indigenous Capability:** The BEL–Safran JV will achieve 60% localisation, with BEL leading final assembly, testing, and quality assurance, reducing foreign dependence.

Significance:

- **Boost to 'Make in India' Defence Manufacturing:** Local production strengthens India's self-reliance in advanced, high-precision weapon systems and supports export potential.
- **Enhances Air Force Strike Capability:** Provides India with a versatile, precision strike weapon capable of neutralising hardened targets — essential for operational readiness against adversaries.
- **Faster, Cost-Effective Availability:** Indigenous manufacturing avoids delays associated with emergency imports and reduces long-term procurement costs.

Excercise AUSINDEX 2025

- **AUSINDEX 2025, a bilateral, biennial maritime exercise between the Indian Navy and the Royal Australian Navy, took place in the Northern Pacific Ocean.**
- **Objective:** To improve naval interoperability & deepen India–Australia strategic maritime coordination.
- **Participants:** The indigenously built stealth frigate **INS Sahyadri** represented the Indian Navy, and frigate **HMAS Ballarat** represented the Royal Australian Navy.
- **Focus Areas:** Included anti-submarine warfare, gunnery drills, and advanced flying operations.
- **Significance:** The exercise reinforces a shared commitment to a free, open, and inclusive maritime order in the Indo-Pacific.

The AUSTRAHIND 2025, the fourth edition of the annual joint military exercise between the Indian Army and the Australian Army, was also recently conducted in Perth, Australia.

Asian and Pacific Centre for Development of Disaster Information Management

- The 10th Session of the **Asian and Pacific Centre for Development of Disaster Information Management (APDIM)** Governing Council took place in New Delhi**.**
- The discussions focused on enhancing inclusive disaster risk data governance in the Asia-Pacific.
- India hosted the meeting, reaffirming regional cooperation under the **Prime Minister's 10-Point Agenda for Disaster Risk Reduction.**
- **Participation:** Member states, including **Bangladesh, Iran, Kazakhstan, the Maldives, Mongolia, Turkey,** and representatives from **UN ESCAP and APDIM Secretariat** attended.
- **Significance:** The session advanced **APDIM's 2026–2030 Strategic Action Plan** in alignment with the **Sendai Framework** and the **2030 Agenda.**
- **UN ESCAP:** The United Nations Economic and Social Commission for Asia and the Pacific is the UN's regional development arm for the Asia-Pacific**. Founded in 1947, it is based in Bangkok, Thailand.**

APDIM:-

- It is a regional institution of the **UN ESCAP,** headquartered in **Tehran, Iran.**
- **Objective:** To minimise disaster losses through effective **disaster risk reduction (DRR) policies and improved information management.**
- **Establishment:** UN ESCAP resolutions in 2011 and 2015 approved its creation and statute, leading to its formal establishment in 2018.
- **Key Functions**: It serves as a regional disaster data hub, promotes knowledge sharing, and enhances cooperation on transboundary hazards like sand and dust storms.
- **Governance Structure:** APDIM's Governing Council has eight elected ESCAP members plus Iran; it meets annually to review progress and plan future work.
- **India Role: India is a founding member and serves as an elected Council member for 2022–2025.**

Safran Aircraft Engine Services India Facility

- PM Modi inaugurated the **Safran Aircraft Engine Services India (SAESI)** facility in Hyderabad to provide world-class engine maintenance and repair services.
- He also laid the foundation stone for an adjacent Maintenance, Repair, and Overhaul (MRO) facility for the **M88 engines** that power Rafale fighter jets.
- **SAESI Facility:**It is designed to service LEAP (Leading Edge Aviation Propulsion) engines, which power commercial aircraft like the Airbus A320neo and Boeing 737 MAX.
- **Capacity:** The state-of-the-art facility aims to service up to 300 LEAP engines annually after reaching full operational capacity by 2035.
- **Significance:** It is a major step towards realising Aatmanirbharta (self-reliance) in the aviation sector and establishing India as a global aviation hub.

- The LEAP engine offers fuel-efficient, reliable propulsion for commercial aircraft, reducing CO_2 emissions, lowering operating costs, and minimising environmental impact.

India–UAE Third CEPA Joint Committee Meeting

- India and the UAE successfully convened the third meeting of the Joint Committee under the **Comprehensive Economic Partnership Agreement (CEPA)** in New Delhi.
- The CEPA was signed in 2022 to liberalise and integrate the economies of both nations. The India-UAE Joint Commission acts as the main body to assess progress and coordinate CEPA-related actions.

Key Highlights

- **Trade Target:** Recognising the rise in bilateral trade, both countries reaffirmed their commitment to achieve **USD 100 billion in non-oil, non-precious metal trade by 2030**.
- **Gold TRQ:** India informed the UAE about a competitive online bidding system for gold **Tariff Rate Quota** allocations under CEPA.
- **Regulatory Talks:** Discussions covered pharmaceutical trade facilitation, early signing of the Food Safety MoU, and anti-dumping measures to promote smooth trade.

A TRQ is a two-tiered trade policy mechanism that allows a specific quantity of a product to be imported at a lower (or zero) tariff rate.

India–UAE Relations

- **Trade:** UAE is India's **third-largest trading partner** and **second-largest export destination**. Bilateral trade exceeded USD 100 billion in FY 2024–25, rising 19.6% year-on-year.
- **Investment:** UAE sovereign funds committed USD 75 billion to Indian infrastructure, supported by the Bilateral Investment Treaty (BIT) signed in 2024.
- **Energy Security:** UAE remains **India's fourth-largest crude oil supplier** and the only **country storing oil in India's Strategic Petroleum Reserves.**
- **Defence Ties:** Cooperation involves high-level dialogues, exercises such as **Desert Cyclone** and **Zayed Talwar,** and maritime security coordination.
- **Climate Partnership:** India and the UAE jointly launched the **Global Green Credit Initiative (GGCI**) to promote sustainable practices globally.
- **Diaspora:** The 3.5 million Indian diaspora in the UAE strengthens cultural ties. The **BAPS Hindu temple in Abu Dhabi** symbolises mutual respect and cultural diplomacy.

Improvised Explosive Device (IED) Used in Red Fort Car Blast

- Investigators suspect that the recent car blast near the Red Fort in New Delhi may have been caused by an improvised explosive device (IED).

Improvised Explosive Device (IED)

- An Improvised Explosive Device (IED) is a homemade or non-standard explosive weapon assembled from commercial or military components to cause damage.
- **Wide Range:** IEDs can be built using pressure cookers, metal pipes, chemical fertilisers, cell phones, vehicle parts and other readily available items.
- **Size Variation**: Their size ranges from small improvised devices to large vehicle-concealed bombs known as Vehicle-Borne IEDs (VBIEDs).
- **Core Components:** A typical IED contains five elements: Switch (Trigger), Initiator (Detonator), Main Charge (Explosive Material), Power Source (Battery), and Container (Casing).
- **Lethal Enhancements:** Many IEDs include nails, ball bearings, or hazardous chemicals to maximise casualties during detonation.
- **Trigger Methods:** Common triggering systems include command-operated remote methods, timer-based systems, and victim-operated mechanisms (i.e., pressure plates).

Why IEDs Are Often Preferred Weapons of Choice?

- **Cheap Components:** The materials used for IEDs (e.g., fertiliser, hydrogen peroxide, and gunpowder) are inexpensive, dual-use and commercially available.
- **Easy Fabrication:** IEDs can be assembled with minimal training and permit wide variation in size, form, and concealment techniques.
- **Low Detectability:** Their improvised design and use of non-military components make them difficult for conventional screening technologies to identify.
- **Remote Detonation:** Many IEDs can be triggered remotely, allowing perpetrators to maintain distance and evade immediate capture.

Factors Contributing to the Decline of IED Use in India

- **Ammonium Nitrate Rules:** Designating **ammonium nitrate** as a deemed explosive has imposed tighter licensing controls and curtailed pilferage from mining sites.
- **Border Controls:** Enhanced border surveillance and interdiction measures have disrupted smuggling routes carrying military-grade explosives from Pakistan.
- **Rule Amendments:** Recent amendments to the Explosives Rules tightened transport tracking and closed logistics loopholes used to siphon legally sourced materials.
- **Fertiliser Safeguards:** Mandatory neem-coating and added chemical inhibitors in fertilisers have made separating ammonium compounds for explosive use technically unviable.

Way Forward for a Holistic National Counter-IED Policy

- **Nodal Agency:** Empower the **National Bomb Data Centre (NBDC)** as the central authority to integrate intelligence and remove information silos across state police and central security forces.
- **Uniform RSP:** Mandate a standard national **Render Safe Procedure** (RSP) to prevent casualties caused by inconsistent IED handling and disposal practices.
- **Signature Bank:** Create a digital National Bomb Signature Bank to link forensic signatures across incidents and identify recurring bomb-maker networks.
- **Component Law:** Enact specific legal provisions criminalising the possession of unauthorised IED sub-components such as detonator circuits and triggering switches.

S-500 Air Defence System

- PM of India and President of Russia are set to meet during the India–Russia Summit, where both defence ministers are expected to discuss India's potential interest in Russia's next-generation S-500 air defence system.

S-500 Air Defence System:

- **The S-500 Prometey** is Russia's most advanced **long-range surface-to-air** and **anti-space defence system**, capable of intercepting aircraft, ballistic missiles, hypersonic weapons, and even low-orbit satellites.
- **Developed By:** Developed by Almaz-Antey, Russia's premier air-defence manufacturer.

Key Features-

- **Ultra-long range:** Can intercept targets up to 600 km away.
- **Near-space interception:** Works at altitudes up to 200 km, including low-Earth-orbit objects.
- **Hypersonic interceptors:** Missiles like 77N6-N / 77N6-N1 fly at Mach 5–7, using "hit-to-kill" accuracy.
- **Multi-target engagement:** Tracks and destroys stealth jets, ballistic missiles, hypersonic glide vehicles, and drones.
- **Advanced radar suite:** 91N6A(M) & 96L6-TsP radars can detect threats up to 800 km away, including stealth aircraft.
- **Rapid response:** Reaction time of 3–4 seconds, nearly twice as fast as S-400.
- **Highly mobile:** Mounted on all-terrain transporters for quick deployment.

Advancements Over S-400:

Feature	S-400	S-500
Max Range	380 km	600 km
Target Altitude	~30–40 km	Up to 200 km (near-space)

Hypersonic Interception	Limited	Full capability (Mach 5–7)
Satellite Kill Capability	No	Yes – Low Earth Orbit
Response Time	9–10 sec	3–4 sec
Stealth Tracking	High	Superior multi-band radar

Significance:

- Massive strategic upgrade to India's layered air-defence shield.
- Enhances India's capability against China's hypersonic missiles and Pakistan's ballistic arsenal.
- Gives India anti-space defence—a rare capability globally.

India re-elected to the International Maritime Organization (IMO)

- **India re-elected to the International Maritime Organization** (IMO) Council for 2026–27 with highest votes. India has been re-elected in Category B, comprising countries with the largest interest in international seaborne trade.
- IMO Council consists of 40 elected members across **three categories (A,B and C)** and functions as the executive body of the IMO.
- **International Maritime Organization** (HQ: London, UK)
- **Genesis: 1948** as Inter-Governmental Maritime Consultative Organization (IMCO), but the name was changed in **1982 to IMO**.
- **Role:** United Nations specialized agency with responsibility for the safety and security of shipping.
- Create a regulatory framework for the shipping industry that is fair and effective, universally adopted and universally implemented.

Role of IMO in Maritime Safety

- ***IMO Conventions and Strategies:***
- International Convention for the Prevention of Pollution from Ships **(MARPOL)** prevents and minimizes pollution (oil, garbage, air) from ships.
- **Ballast Water Management Convention** aims to prevent the spread of invasive aquatic species.
- International Convention for the Safety of Life at **Sea (SOLAS)** establishes minimum safety standards for ships, including requirements for fire protection and navigation.
- International Convention on Standards for Training Certification and Watchkeeping for Seafarers Convention sets qualifications for seafarer training and certification.
- 2023 IMO Strategy on Reduction of GHG Emissions from Ships seeks to achieve net-zero GHG emissions by 2050.

SOCIETY AND SOCIAL JUSTICE

Stampede Results in Loss of Lives in Andhra Pradesh's Venkateswara Swamy Temple

A stampede or crushing occurs when a **sudden crowd surge arises due to real or perceived danger** or loss of space.

- The **National Disaster Management Authority (NDMA)** categorizes stampedes as **man-made disasters**.
- In recent past **India is witnessing a rapid surge in stampedes**, such as: **Bengaluru (**RCB's IPL win celebrations), **New Delhi railway station (**rush for Kumbh Mela), **Prayagraj (**Kumbh Mela stampede), etc.

Why is India so susceptible to Stampedes?

- **Lack of Accountability and Enforcement**: Event venues often **exceed safe capacity limits**, **inadequate infrastructure (e.g. barricades)**, reflecting weak administrative oversight and poor enforcement of safety norms.
- **Poor Planning and Coordination**: Absence of integrated planning **between local administration, police, and event organizers** leads to confusion.
- **Limited Use of Technology**: Minimal deployment of **real-time surveillance systems, crowd-density analytics,** etc.
- **Other factors**: Rising pilgrimage culture due to rise in prosperity, congested urban spaces clubbed with high population density, panic triggering, poorly trained personnel, delays in rescue, etc.

Way Forward

- **Use real-time monitoring** with **CCTV, Drones and digital tools** to track crowd flow and alert authorities quickly as recommended by NDMA.
- **Limit entry through registration** and **online passes** to manage crowd size at major gatherings.
- **Ensuring accountability of both organisers and administration** for not following safety norms and managing crowds responsibly.
- **Improve infrastructure** with wider pathways, clear exits, and better safety facilities.

NDMA Guidelines on Managing Crowd

- **Traffic Regulation:** Control vehicular movement around pandals and festive grounds to prevent congestion.
- **Clear Signage:** Display route maps for entry and emergency exits at prominent locations.
- **Crowd Control:** Use barricades to maintain orderly, queue-based movement of people.
- **Surveillance:** Install CCTV cameras and ensure adequate police presence for monitoring and

safety.

- **Space Management:** Remove unauthorized parking and makeshift stalls encroaching on pedestrian areas.
- **Other:** Medical Preparedness; Public Awareness; Fire Prevention, etc.

Doha declaration

- Doha declaration adopted at the **Second World Summit for Social Development**.
- The 1st summit took place in **Copenhagen, Denmark** in 1995.
- Summit was convened by the **United Nations General Assembly**.
- It renews and updates the 1995 **Copenhagen commitments**, calls for:
- Treating **poverty eradication**, **decent work** and **social inclusion** as interconnected priorities.
- Expanding universal, gender-responsive social protection, and equitable access to health and education, etc.

Workplace stress and rising diabetes risk among India's working-age adults

- India has **10.1 crore diabetics** (ICMR–INDIAB, 2023), with rising incidence among **younger, urban, working-age adults**.
- **Relation between Workplace stress and diabetes risk:**
- **Chronic Stress:** It keeps the body in a state of heightened alert, leading to **elevated levels of cortisol and adrenaline**.
- These high hormone levels **disrupt normal glucose metabolism** & body is encouraged to favor fat accumulation, particularly around the **abdomen (central weight gain).**
- **Long commute hours:** Reduces time for exercise and rest.
- **Irregular meal timing and sedentary work environments:** Directly affects digestive processes and calorie utilization.
- **Shift Work (especially night shifts)**: Disrupts circadian rhythms, which govern metabolism. When sleep and meal timing are irregular, insulin sensitivity drops, leading to unstable blood sugar profiles.

Diabetes

- **Chronic non communicable disease** that occurs either when the **pancreas** does not produce enough **insulin** or when the body cannot effectively use the insulin it produces.
- Insulin is a hormone that regulates **blood glucose.**

Major Types of Diabetes

- **Type 1 Diabetes:** Autoimmune destruction of insulin-producing beta cells in the pancreas.

- **Type 2 Diabetes:** Body's cells become **insulin resistant**; pancreas cannot produce enough insulin to compensate.
- **Gestational Diabetes:** Due to High blood glucose during pregnancy.

Government initiatives to control diabetes

- **The Eat Right India movement by FSSAI** promotes healthy eating.
- **Fit India Movement:** Launched in 2019 aims to promote a physically active lifestyle and make fitness an integral part of daily life in India.
- **The National Programme for Prevention and Control of Cancer, Diabetes, Cardio-vascular diseases and Stroke (NPCDCS) was launched in 2010** to combat NCDs.
- **Ayushman Bharat–Pradhan Mantri Jan Arogya Yojana (PM-JAY):** Provide financial protection for secondary and tertiary care.

Induction of Women Soldiers in the Territorial Army

- Women will soon be inducted into the **'other ranks' category** of the **Territorial Army (TA)**, allowing them to **serve as soldiers for the first time**.
- Women were **first permitted to join the TA as officers** and in limited roles within specific units in **2019**.

Territorial Army (TA)

- The TA is a **part-time volunteer military force** that supports the Army during emergencies**,** natural **disasters**, and internal security threats.
- It is based on the "**citizen soldier"** principle, where employed **civilians volunteer** their spare time for national defence tasks.
- **Origin:** The **Indian Territorial Force (1920)**, established by the British for volunteer service, developed into the TA under the **Territorial Army Act of 1948**. It was officially inaugurated in **1949**.
- **Eligibility:** Indian citizens **aged 18–42** with **civilian occupations** and **medical fitness** are eligible; they undergo **annual training camps** of about **two months**.
- **Deployment:** TA units were mobilised during the **1962 Sino-Indian War**, **1965 and 1971 Indo-Pakistani Wars**, and **1999 Kargil War** to support logistics, protect infrastructure, and secure rear areas.

Hidden Hunger in India

- Millions of children and adults in India endure severe undernutrition and hidden hunger, highlighting a persistent and deeply rooted national crisis.
- **Hidden hunger**, or **micronutrient deficiency**, is a form of **undernutrition** in which a person does not receive enough essential vitamins and minerals **despite adequate calorie intake**.

India's Hidden Hunger Landscape

- **National Burden:** India hosts **one quarter** of the world's **hungry population**, with over **190 million undernourished** and nearly half of the global burden of wasting.
- **Child Undernutrition:** About **35.5%** of children **under five** are **stunted** (low height for age), and **18.7%** are **wasted** (low weight for height).
- **Adolescent Deficits:** Around **24%** of Indian adolescents remain **thin** (below healthy body mass), and nearly **80%** face multiple **micronutrient deficiencies**.
- **Gender Impact:** Women and children are disproportionately impacted. According to **NFHS-5**, **57%** of **women** and **67%** of children aged 6-59 months are anaemic.
- **State Hotspot:** **Gujarat**, **Jharkhand**, and **Bihar** record significantly higher malnutrition levels than the national average.

*In the **Global Hunger Index** (GHI) **2025**, India ranked **102nd out of 123 countries** and received a score of **25.8**, placing it in the **"serious"** hunger category.*

Consequences of Hidden Hunger

- **Intergenerational Cycle:** Maternal malnutrition raises the risk of **low-birth-weight babies** and initiates a cycle of nutritional deficiencies across generations.
- **Early Damage:** Micronutrient deficiencies in the **first 1,000 days** cause permanent losses in physical growth and permanently limit cognitive development.
- **Productivity Loss:** Weakness, fatigue, and frequent illnesses can reduce an adult's work capacity. India loses about **4% of its GDP** due to micronutrient malnutrition.
- **Dividend Threat:** Hidden hunger weakens the health, learning, and skills of youth, and **lowers the productive potential** of India's demographic dividend.
- **Health Burden:** Weakened immunity increases infection risks and leads to higher hospitalisations, which in turn raise household and public healthcare costs.

Government Initiatives Addressing Hidden Hunger

- **Mission** POSHAN 2.0**: Saksham Anganwadi** and **POSHAN 2.0** improve **nutrition** for **children** and **mothers** through upgraded Anganwadi services and real-time monitoring.
- **Pradhan Mantri Poshan Shakti Nirman (**PM Poshan**):** Provides hot **cooked meals** and fortified rice **to schoolchildren** and supports better attendance and daily nutrition.
- **Food Fortification:** Mandatory fortification of rice, edible oil, and salt adds **iron**, **folic acid**, and **essential vitamins** to widely consumed staples.
- **Anaemia Mukt Bharat (**AMB**):** Supplies **iron-folic acid tablets** and conducts regular **deworming** and strengthens awareness to reduce anaemia prevalence.
- **Pradhan Mantri Matru Vandana Yojana (**PMMVY**):** Offers **conditional cash transfers** to pregnant and lactating women to support nutrition and compensate for partial wage loss.

- Eat Right India: Promotes safe food practices and encourages balanced diets through nationwide **FSSAI-led outreach**.

Prime Minister urges 10-Year national pledge to shed Colonial Mindset rooted in Macaulay's Legacy

- Prime Minister highlighted that colonial mindset started taking root when in **1835**, **British MP Thomas Babington Macaulay** launched a major campaign to uproot India from its cultural foundations.
- **Macaulay's Minute on Education in 1835** promoted English education in India at the expense of education in Oriental languages like Sanskrit, Hindi, Arabic etc.
- To promotion of British Education system, Mahatma Gandhi noted that **India's ancient education system** was a beautiful tree that was uprooted and destroyed.

Colonial Mindset in India: Core Elements

- **Language:** Use of English in courts and universities is seen as aspirational, sometimes hindering access for non-English speakers.
- **Culture:** Colonial rule imposed Western cultural elements including western dress, food, art forms, manners, and values, often projecting Indian knowledge systems as inferior.
- **Laws & Institutions:** Many colonial laws, such as the IPC (Indian Penal Code), Forest Laws, Sedition etc. and criminal procedures, are rooted in establishing control rather than service.
- **Economic System:** Imported economic models and emphasis on private capital led to impoverishment of a large section of population.
- **Knowledge Systems:** Indigenous knowledge systems forgotten due to large emphasis on imported models of research and innovation.

Cognitive Decolonisation: The Way Forward

- **Policy Measures:** Promoting Indian languages in the National Education Policy, reviving indigenous knowledge systems and reform of colonial era laws.
- Renaming **Rajpath**, a symbol of colonial rulership, to **Kartavya Path**, emphasising duty over entitlement.
- **Cultural Revival:** Revitalization of indigenous festivals and crafts nurture pride. Eg: **International Yoga Day.**
- For instance, the **Sengol in the New Parliament Building** symbolises India's democratic and historical legacy.
- **Behavioural Shift:** Focus on Atmanirbhar Bharat emphasizing self-reliance in innovation, local governance, and embracing Indian thought in public life. Eg: **Mission LIFE.**

Gap in India's Rank between QS Asia and QS World University Rankings

- **Indian Higher Education Institutions (HEIs)** declined in QS Asia University Rankings despite achieving better positions in QS World University Rankings **2026**.

Key Reasons

- **Regional Competition:** Indian HEIs improved their performance scores, but **East and Southeast Asian universities improved faster**, thereby lowering India's relative standing.
- **Metric Differences:** QS Asia emphasises citations per paper, **PhD-qualified staff**, and exchange-mobility, where India lags; QS Global focuses on **research volume**, where India performs better.
- **Internationalisation Gaps:** Indian HEIs have **low international students and faculty**, while China's Double First-Class plan focused on QS-relevant metrics like international faculty and joint research.
- **Faculty Shortages:** High student enrolment coupled with limited hiring capacity lowers **faculty–student ratio scores** across prominent Indian institutes.
- **Structural Bias:** Survey-based reputation metrics favour institutions with stronger **global networks** or **branding initiatives**, resulting in structural disadvantages.

Australia to become first country to ban social media for children under 16 years

- From December 10, 2025, social media companies such as Facebook, Instagram, YouTube, etc. can be fined up to AUD 50 million for failing to remove such accounts from their platforms.

What are the concerns regarding social media usage in children?

- **Mental Health:** Children addicted to social media often show increased rates of anxiety, depression, and low self-esteem.
- **Physical Health:** Exposure to certain content promotes sedentary behavior, eating disorders and unattainable beauty ideals leading to issues like disrupted sleep patterns, obesity etc.
- **Social development:** Constant use of the virtual platforms reduces face-to-face interactions leading to social isolation, strained family relations and inability in emotional regulation.
- **Online safety concerns:** Social media makes children susceptible to cyberbullying, harmful content, and online sexual predators.

Potential negative effects of the ban -

- **Limit development of digital skills:** Limits positive impacts of using social media such as creative expression, collaborative learning via educational content, interest-based networking, etc.
- May push children to unsafe places on the Internet E.g. **Dark Web**
- Alternative approaches to tackle social media addiction in children
- **Restricted usage:** E.g. allowing access to educational and creative learning streams.
- **Children-focused platforms:** E.g. Instagram Teen accounts with built-in protections.

- **Adopting Best Practices:** E.g. Digital De-Addiction (D-DAD) centres of Kerala police provide free counselling to kids with digital addiction.

Policy Framework on Relocation of Forest-Dwellers from Tiger Reserves

Ministry of Tribal Affairs (MoTA) sent a policy brief titled "**Reconciling Conservation and Community Rights**" to the Ministry of Environment, Forest, and Climate Change (**MoEFCC**).

- It proposed a policy framework for the **relocation** and **coexistence** of forest-dwelling communities within India's tiger reserves.

Key Recommendations from the Policy Framework

National Governance and Oversight

- **National Framework:** **MoTA** and **MoEFCC** will standardise procedures, timelines, and accountability measures through a **National Framework for Community-Centred Conservation and Relocation**.
- **Public Database:** A **National Database on Conservation-Community Interface** will transparently document relocation cases, compensation paid, and post-relocation results.
- **Independent Audits:** Annual audits by accredited, independent agencies will **verify compliance** with FRA 2006, WLPA 1972, and human rights norms.
- **Relocations as an Exceptional Measure**
- **Voluntary Basis:** Relocation from tiger reserves must be a **last resort**, **voluntary**, and grounded in verifiable ecological and social evidence.
- **Right Completion:** All Individual and Community Forest Rights under the FRA 2006 must be **verified at** the **Gram Sabha** level before initiating relocation.
- **Consent Safeguard:** Free, prior, and informed consent (**FPIC**) must be obtained transparently and monitored by accredited civil society organisations.

Co-existence as the Preferred Option

- **Right to Remain:** Communities must be **permitted to stay** within traditional forest habitats while exercising rights recognised by the FRA 2006.
- **In-Situ Development:** Authorities must offer on-site facilities (e.g., **healthcare**, **education**, **water**, **housing**) to ensure that staying remains a feasible option.
- **Shared Governance:** Gram Sabha representatives shall participate in Tiger Conservation Foundations and **Eco-Development Committees** for inclusive management.

Legal Safeguards and Grievance Redressal

- **Compliance Officer:** Each tiger reserve must appoint a **compliance officer** to ensure adherence to the FRA and WLPA during relocations.

- **Grievance System:** A **three-tier system** (district, state, national) will enable communities to report violations or compensation disputes.
- **Legal Recourse:** The SC/ST (Prevention of Atrocities) Act, 1989, shall apply to cases involving coercion, unlawful eviction, or rights denial.

Challenges Related to Relocating Forest Dwellers

- **Livelihood Collapse:** Relocation severs communities from forest-based economies and pushes them into **unfamiliar cash markets** without the assets or skills needed.
- A 2019 study on **Sahariya** Adivasis displaced from **Kuno NP (MP)** showed over 90% trapped in debt after losing income from non-timber forest products (NTFPs).
- **Compensation Deficit:** The **one-time ₹15 lakh** compensation under NTCA guidelines bypasses the Land Acquisition (LARR) Act, 2013, and denies fair compensation and social impact assessments.
- The LARR Act mandates payments **up to four times** the market value.
- **FRA Coercion:** Authorities often circumvent the Forest Rights Act (FRA), 2006, by **withholding Community Forest Rights** (CFR).
- In the **Achanakmar TR** (**Chhattisgarh**), the **Baigas** were relocated without being granted CFR.
- **Health Decline:** The shift from diverse forest-based diets to limited PDS rations reduces nutrition levels and weakens health resilience.
- Studies on **Baiga** families relocated from **Kanha TR (MP)** reveal **rising malnutrition** and the disappearance of 150 traditional food sources.
- **Conflict Shifting:** Relocating villages from core to buffer zones merely transfers human-wildlife conflict to already populated, ecologically fragile areas.
- In **Tadoba-Andhari TR** (**Maharashtra**), over 40% of conflict incidents occur in buffer zones where people are resettled.

Stubble Burning in Punjab

- With the paddy harvesting season underway in Punjab, incidents of **stubble burning** have again surfaced as a major environmental concern.
- Although the number of farm fire incidents has declined sharply due to government interventions, the total area burnt remains largely unchanged.

Why Farmers are Compelled to Practice Stubble Burning?

- **Short Window:** Only **20–25 days** between **paddy harvest** (late Oct) and **wheat sowing** (mid-Nov) pushes farmers to clear fields rapidly. (Punjab Agricultural University, 2024)
- **Labour Shortage:** **Rural mechanisation** and **migration** have led to a **~45% drop** in agricultural labour availability over the last decade. (NITI Aayog, 2023)
- **Machine Cost:** Machines like the **Happy Seeder** cost **₹1.5–2 lakh**, even with 50–80% subsidy,

making ownership unviable for smallholders.

- **Fragmented Landholdings:** With average holdings of **1.9 hectares in Punjab** and **1.4 hectares in Haryana**, residue management at a small scale becomes uneconomical. (Agricultural Census, 2021)
- **Weak Enforcement:** Though fines exist under the **Air (Prevention and Control of Pollution) Act, 1981**, local administrations rarely impose penalties due to socio-political sensitivities.

Way Forward

- **In-situ Management:** Promote crop residue incorporation using **Happy Seeder** and **Super Straw Management Systems** through **Custom Hiring Centres**. E.g. **ICAR's Crop Residue Management Scheme**.
- **Ex-situ Utilisation:** Channel **paddy straw to biogas**, paper, and biomass power plants for energy generation. E.g. **India's SATAT Scheme** planning **5000 Compressed Biogas plants**.
- **Direct Incentives:** Provide **per-acre financial assistance** (₹2000–₹3000) to farmers who avoid burning residue. E.g. Punjab's pilot incentive in **Sangrur** and **Patiala** led to a **60% drop in fires**.
- **Behavioural Change:** Conduct sustained **campaigns** linking stubble burning to health and soil degradation awareness. E.g. **Punjab's "No Burn November" campaigns**.
- **Digital Monitoring:** Integrate **thermal (MODIS/VIIRS)** and **optical (Sentinel-2) satellite** data with ground verification for accurate fire mapping. (PGIMER Chandigarh study, 2025).

GEOGRAPHY, ENVIRONMENT, BIODIVERSITY AND DISASTER MANAGEMENT

Iberian Lynx

World's first-ever white Iberian Lynx was spotted in Spain.

- **IUCN status:** Vulnerable
- **IUCN Green Status of Species:** Largely Depleted.
- **CITES**: Appendix I
- **Habitat:** Mosaic of **dense scrub for shelter and open pasture for hunting.**
- **Rabbit abundance** is the essential component of Iberian lynx habitat.
- **Behaviour**: Mainly crepuscular (generally sleep during day) and **nocturnal but can also be active at daytime.**
- **Major Threats:** Rabbit population collapses, habitat loss and fragmentation, disease transmission, low genetic diversity, poaching etc.

- Iberian lynx is considered as world's most threatened cat species.
- **Geographical range:** It is endemic to the southern Iberian Peninsula, where it occurs in Spain, Portugal and Southern France.
- **Habitat:** It prefers open grassland mixed with dense shrubs such as strawberry tree, mastic, and juniper, and trees such as holm oak and cork oak.
- **Appearance :** It has its sharp eyes, dark ear tufts, heavily spotted tawny coat, long legs and a very short tail with a black tip and a "beard" of fur around its face, and prominent black ear tufts.

The Rowmari-Donduwa Wetland Complex

- Experts, researchers, and forest officials have joined forces to seek Ramsar site status for the Rowmari–Donduwa wetland complex in Assam's Laokhowa Wildlife Sanctuary, after it recorded higher bird diversity than existing Ramsar sites in Northeast India.
- The Rowmari–Donduwa wetland complex is an interconnected floodplain–marsh ecosystem located within the Laokhowa Wildlife Sanctuary (70.13 sq. km), which forms part of the Kaziranga Tiger Reserve in Nagaon district, central Assam.
- It serves as a crucial ecological and migratory corridor between the Kaziranga and Orang National Parks.
- **Location:** Situated in the heart of Assam, the wetlands are embedded within the **Kaziranga–Orang landscape**, bordered by the **Laokhowa and Burhachapori Wildlife Sanctuaries**, both functioning as **buffer zones** of the Kaziranga Tiger Reserve.

Key Features:

- **Area:** Covers around **2.5–3 sq. km** of interconnected floodplain–marsh terrain.
- **Biodiversity Hotspot:** Hosts over **120 species of resident and migratory birds**, surpassing counts at Deepor Beel and Loktak Lake.
- **Bird Census 2025:** Recorded **47,000+ birds**, including 20,653 at Rowmari Beel and 26,480 at Donduwa Beel.
- **Ramsar Criteria:** Meets **8 of the 9 Ramsar criteria**, making it eligible for international wetland recognition.
- **Ecological Role:** Acts as a **habitat, breeding, and feeding ground** for migratory and threatened avian species.
- **Flora:**
- Dominated by **floodplain vegetation**, **aquatic grasses**, and **marshland reeds**, providing cover and nesting sites.
- Presence of **hydrophytes and sedges**, essential for wetland nutrient cycling and maintaining water quality.
- **Fauna:**
- **Avian Diversity:** Includes globally threatened species such as the **Knob-billed Duck, Black-necked Stork, and Ferruginous Pochard**.
- **Other Wildlife:** Supports **fish, amphibians, otters, reptiles**, and serves as a feeding zone for animals migrating from Kaziranga and Orang.
- **Migratory Birds:** Hosts winter visitors from Central Asia and Siberia, forming part of the Central Asian Flyway.

Significance:

- **Biodiversity Conservation:** A critical site for waterbird and wetland ecosystem preservation in Assam's Brahmaputra floodplains.
- **Ecological Connectivity:** Strengthens wildlife corridors within the Kaziranga-Orang landscape.
- **Climate Resilience:** Acts as a natural flood buffer and carbon sink, supporting hydrological balance.

Nauradehi Sanctuary to Become 3rd Home for Cheetahs

- Madhya Pradesh Chief Minister announced that Nauradehi Wildlife Sanctuary will become the third home for cheetahs in the state after Kuno National Park and Gandhi Sagar Sanctuary.
- Nauradehi Wildlife Sanctuary is one of India's largest sanctuaries, spread over 1,197 sq. km, and serves as a crucial wildlife corridor in the upper Vindhyan range of Madhya Pradesh.

Located in:

- The sanctuary lies across Sagar, Damoh, and Narsinghpur districts of Madhya Pradesh, situated between the **Yamuna and Narmada River basins**.
- Major rivers like **Bamner, Kopra, and Bearma** flow through it.

History and Ecology:

- Declared a sanctuary to conserve central Indian fauna, Nauradehi has **mixed deciduous forests**, **Vindhyan sandstone formations**, and **diverse soil types** (red, black, and alluvial).
- It supports over 250 animal species, including tiger, leopard, sloth bear, wild dog, chinkara, sambhar, and blackbuck, along with 170+ bird species such as storks, vultures, and pheasants.

Features:

- **Altitude:** 400–600 metres above sea level.
- **Rainfall:** Around 1,200 mm annually.
- Rich in **grasses, herbs, shrubs, and bamboo**, making it ideal for herbivores and potential cheetah prey base.

Nauradehi Wildlife Sanctuary

- Nauradehi is the **largest wildlife sanctuary** in **Madhya Pradesh**, spanning **1,197 sq km** across Sagar, Damoh, and Narsinghpur districts.
- **Topography:** The sanctuary lies on a plateau in the upper Vindhyan range, with elevation ranging between **400** and **600 metres**.
- **Forest Type:** It is classified as **Southern Tropical Dry Deciduous Forest**, dominated by **teak** along with Amla, Tendu, Mahua, and Sal.
- **Dual Basins:** About **one-fourth** drains into the **Narmada basin**, while the remaining **three-fourths** flow into the **Yamuna basin** via the **Kopra**, **Bamner**, and **Bearma** rivers.

- **Key Fauna:** The **Indian wolf** is the **keystone species**; Others include Bengal tiger, leopard, dhole, hyena, sloth bear, and the rare bird **Spotted Grey Creeper**.
- **Ecological Connectivity:** It forms a critical wildlife corridor between Panna and Satpura TRs and indirectly connects Bandhavgarh TR via the Rani Durgavati WLS.

Cheetah Conservation in India:

- The **Asiatic cheetah** became extinct in India in **1952** due to hunting and habitat loss.
- The Government of India launched **Project Cheetah**, reintroducing **African cheetahs from Namibia** at **Kuno National Park (2022)** and later at **Gandhi Sagar Sanctuary (2024)**.
- **Nauradehi** will now serve as the third site, ensuring species expansion, genetic diversification, and ecosystem restoration in central India.

Rare Defence Traits in Indian Frogs

- A team from the University of Delhi's Systematics Lab, has documented for the first time rare anti-predator defence behaviours in two Indian frog species, published in Herpetological Notes.
- The study uncovers **unique behavioural adaptations** in frogs, including **biting, shrieking, and body-raising**, to deter predators.
- These are among the **first such recorded instances** in Indian amphibians, expanding knowledge of their survival strategies.
- Of the 7,800+ known frog species worldwide, only around **650 exhibit such defence responses**, making the Indian cases scientifically valuable.

Species and Their Behavioural Features:

- **Apatani Horned Toad (Xenophrys apatani) – Arunachal Pradesh:**
- A nocturnal frog with **cryptic, leaf-litter camouflage** that hides it during the day.
- When threatened, it **inflates its body**, emits a **sharp distress call**, and may **bite predators** — a first-time observation in India.
- **Bicoloured Frog (Clinotarsus curtipes) – Western Ghats, Kerala:**
- A diurnal forest species that **arches its body by stretching limbs vertically**, appearing larger and more menacing.
- This **body-raising posture** is believed to intimidate predators and was experimentally verified in the wild.

Implications:

- **New Behavioural Records:** Adds previously unknown defensive behaviours to the global amphibian database.

- **Evolutionary Insight:** Suggests adaptive responses evolved to suit diverse Indian ecological niches.
- **Biodiversity Awareness:** Reinforces how much remains undocumented in India's rich amphibian fauna.

Vaigai Dam

- The **timely northeast monsoon** and release of water from the **Vaigai Dam** have revived optimism among **Madurai farmers**, boosting **paddy cultivation** across double-crop regions.
- It was constructed in **1959** across **the Vaigai River** and stands 111 feet high.
- It serves as the primary irrigation source for vast agricultural lands in **Madurai** and **Dindigul** districts and supplies drinking water to Madurai and Andipatti.
- The dam houses a **6 MW hydroelectric power station**, contributing to local energy generation.

Vaigai River

- It is one of **Tamil Nadu's most revered** and ancient rivers, and is celebrated in Tamil literature and mythology, including Silappatikaram and Thiruvilayadal Puranam.
- **Origin:** Emerges from the **Varusanadu and Megamalai hills** in the **Western Ghats**.
- **Course:** Flows southeast through the Pandya Nadu region and empties into the **Palk Strait** near the Pamban Bridge in Ramanathapuram district.
- **Major Tributaries:** Include Suruliyar, Mullaiyar, Varaganadhi, Manjalar, Kottagudi, Kridhumaal, & Upparu.
- The river receives a vital inflow from **Periyar Dam (Kerala)** through a diversion tunnel cutting across the Western Ghats.

India Backs Afghanistan's Kunar Dam Plan

- India backed **Afghanistan's plan to build a dam** on the **Kunar River**, reaffirming its readiness to assist in sustainable water management and hydroelectric development.
- The move comes amid rising **Afghanistan-Pakistan tensions**, underscoring India's sovereignty and regional cooperation stance.

Kunar River

- The Kunar River (known as the **Chitral River** in Pakistan) is a significant transboundary river that flows through **northern Pakistan** and **eastern Afghanistan**.
- It originates from the **Chiantar glacier** in the **Hindu Kush mountains** at the border of Gilgit-Baltistan and Chitral, Pakistan.
- It flows as the **Yarkhun, Mastuj**, and **Chitral River** before entering Afghanistan, where it is called the Kunar River.
- **Major Tributaries:** include the Lutkho, Landai Sin, Shishi (left bank), and Pech (right bank)

rivers.

Typhoon Kalmaegi

- Typhoon Kalmaegi made landfall in the central Philippines.
- Typhoons are **essentially tropical cyclones** that originate over Western Pacific Ocean.
- A tropical cyclone is a **rapidly rotating storm** that begins over tropical oceans, and they can vary in speed, size, and intensity.
- **Favourable conditions** for tropical cyclones include warm ocean waters, atmosphere cooling fast with height, relatively moist air, pre-existing near-surface disturbance etc.
- **Other names** for Tropical Cyclones include:
- **Hurricane** in Atlantic Ocean and Northeast and South Pacific Ocean.
- **Cyclones** in the Indian Ocean,
- **Willy-willies** in the Western Australia.

Mussels

- Mussels reveal growing microplastic pollution in Greece's seas.
- Mussels are **bivalve mollusks** characterized by a blue–black shell that lives attached to surfaces in marine environments.
- The molluscs include many familiar animals, including clams, snails, slugs, squid, tusk shells and chitons.
- These are **filter-feeding organisms** that absorb a range of contaminants into their tissue, including invisible microplastics.
- They are known for their **efficient feeding, higher protein content** compared to oysters.
- They have been used globally for decades as a **barometer of marine pollution.**

Water Lettuce (Pistia stratiotes)

- Invasive aquatic species **Water Lettuce *(Pistia stratiotes)*** has overrun **Lake Suchitlán** in **El Salvador**, threatening local fisheries and livelihoods.

*Lake Suchitlán is the **largest artificial lake** (135 sq. km) in **El Salvador**, created by the Cerrón Grande Hydroelectric Dam on the **Lempa River**. It is designated as a Ramsar site.*

Water Lettuce (*Pistia stratiotes*)

- Water lettuce, also called **water** or **Nile cabbage**, is a **free-floating freshwater plant** with leaves that resemble a head of lettuce.
- It is a popular **ornamental plant** but is also considered an **invasive weed**.
- **Habitat Preference:** It thrives in **still or slow-moving freshwater environments** (i.e., ponds,

lakes, and reservoirs), mainly in **tropical** and **subtropical** regions.

- **Physical Traits:** The plant has soft green leaves with fine white hairs that trap air bubbles, and **unbranched roots** with a hair-like appearance.
- **Invasive Nature:** Its **fast growth** and **mat formation block sunlight**, deplete oxygen, and disrupt local aquatic biodiversity.
- **Ecological Role:** Despite being invasive, it provides temporary refuge for fish and helps **suppress algal blooms** by absorbing excess nutrients.
- **Human Use:** It is unsafe for human consumption due to high concentrations of **calcium oxalate crystals** that irritate mucous membranes.
- **Phytoremediation:** Its **hyperaccumulation** ability makes it useful for phytoremediation, **wastewater treatment**, and **oil-spill cleanup**.
- **Conservation Status:** **IUCN:** Least Concerned

Hurricane Melissa

- **Hurricane Melissa** recently caused devastating damage and multiple deaths across the **Caribbean**, especially in **Jamaica**, Haiti, and **Cuba**.
- It formed over the **Caribbean Sea** as a tropical cyclone and strengthened into a **Category 5 hurricane**.
- The hurricane sustained **maximum winds of 185 mph (298 km/h)** and had a **minimum central pressure** of **892 millibars**—one of the lowest ever recorded in the Atlantic basin.
- Melissa became the **strongest hurricane** to make landfall in **Jamaica**, surpassing the destructive **Hurricane Gilbert** of **1988**.
- The name "**Melissa**" was proposed by the **United States** and approved by the **World Meteorological Organisation (**WMO**)** hurricane naming panel.

- *A **Category 5 cyclone** is the **highest classification** on the **Saffir–Simpson Hurricane Wind Scale (SSHWS)**, with sustained winds of **157 mph (252 km/h) or more** that can cause severe damage.*
- *The **SSHWS** is a **five-tier scale** (Categories 1 to 5) used to **classify hurricanes** based on **maximum sustained wind speed**. It helps to understand potential property damage and the severity of the impact.*

UNEP Emission Gap Report 2025: Off Target

- Recently "**Emission Gap Report 2025: Off Target**" was released by **UN Environment Program (UNEP)**.
- **Key Highlights of the Report**
- Even the **updated Nationally Determined Contribution pledges under the Paris Agreement**, could lead to global temperature rise by 2.3-2.5 ^{0}C by this century.

Emissions Gap Report *is* ***UNEP's flagship annual report*** *that assesses the gap between current* ***Nationally Determined Contributions*** *(NDCs) and the emission* ***reductions required*** *to achieve the Paris Agreement targets.*

Key Findings of the Report

Overall Progress

1. **Limited Progress:** Climate pledges have achieved **minimal real progress** in keeping warming below 2°C and reaching the 1.5°C target.
2. **Projected Warming:** Even with full NDC implementation, global temperatures may still **rise by 2.3-2.5°C** this century, slightly lower than 2024's 2.6-2.8°C projection.
3. **Accounting Changes:** Nearly one-third of this 0.3°C improvement arises from changes in calculation methods rather than genuine emission reductions.

Political and Institutional Factors

1. **U.S. Withdrawal:** The planned U.S withdrawal from the **Paris Agreement in 2026** could **negate about 0.1°C** of this limited temperature progress.
2. **NDC Submissions:** As of September 2025, **only 60 countries**, representing 63% of global emissions, had submitted or announced updated climate targets for 2035.
3. **G20 Shortfall:** The G20, responsible for **77% of global emissions**, remains off track, with total emissions still **increasing by 0.7%** in 2024.

Emission Trends and Gaps

1. **Emission Growth:** Global GHG emissions **rose by 2.3%** in 2024 to reach **57.7 gigatonnes CO_2 equivalent**. This rate is about **four times faster** than the average annual growth rate of the **2010s**.
2. **Major Emitters:** **India** recorded the **largest absolute rise** in emissions in 2024, followed by China, Russia, Indonesia, and the United States.
3. **Emission Gap:** Current pledges would **cut 2035 emissions** by **only 15%** from 2019 levels, far below the **55% reduction required** for the 1.5°C target.
4. **1.5°C Overshoot:** The report concludes that **surpassing** the **1.5°C limit is now inevitable** within the **next decade**, urging all nations to keep the overshoot as short and limited as possible.

India-Specific Findings

- **Emissions Growth:** India's GHG emissions **increased by 3.6%** in 2024, ranking as the **second-highest** among major economies after Indonesia.
- **Per Capita Emissions:** Despite rising totals, India's **per capita emissions** (~3 tCO_2e) remain **well below the global average** of 6.4 tonnes of CO_2 equivalent.
- **NDC Submission:** India missed the September 30, 2025, deadline to submit its updated **2035 Nationally Determined Contribution** (NDC) under the Paris Agreement.

- **2030 Goals:** India is on track to meet its 2030 commitments, including a 45% reduction in emissions intensity from 2005 levels.
- **Transparency Concerns:** UNEP raised concerns over **unclear carbon removal plans** and the lack of regular **annual progress reports**.

Umngot River

- Meghalaya's Umngot river (also known as Dawki River), known for its greenish blue crystal-clear water **is turning murky.**
- **Origin:** Originates from the **Eastern part of Shillong Peak.**
- **Flow:** Southwards through **Dawki,** a small town in **East Jaintia Hills district, Meghalaya** (near the Indo-Bangladesh border) and **finally enters Bangladesh.**
- Acts as the gateway to Bangladesh.
- **Key Features:** Forms Natural boundary between **Ri Pnar (Jaintia Hills)** and **Hima Khyrim (Khasi Hills).**

Avalanche in Nepal

- An avalanche struck **Mount Yalung Ri** base camp in **Nepal**, killing several climbers.

Mount Yalung Ri

- It is a **5,630-meter-high peak** in the Himalayan range, located in the remote **Rolwaling Valley** of northeastern Nepal.
- The Valley contains the large **Tsho Rolpa glacial lake**, which poses a high risk of a **glacial lake outburst flood (GLOF)**.
- Mount Yalung Ri is situated in the **Gaurishankar Conservation Area** near the **Nepal–Tibet border**.

Avalanches

- An avalanche is a **quick**, **sudden slide of snow**, **ice**, and **debris** down a mountain slope.
- It usually occurs on **slopes steeper than 30 degrees** when the **weight of accumulated snow** exceeds the **snowpack's capacity** to support it.
- **Triggers:** Avalanches can be caused by **natural factors** like heavy snowfall, rapid warming, earthquakes, and rain-on-snow events, or by **human activities** like skiing, snowboarding, and construction.

CITES Verification Mission Report on India

- A recent CITES report warned against **misclassification of wild-caught animals** and recommended that **India suspend imports of endangered species** until stronger verification is in place.

CITES Report

- **Report Overview:** The report was published by the **CITES Secretariat** after an **official verification mission** conducted in India in 2025.
- **Investigation Reason:** The investigation began following **global concerns** over **large-scale imports** of CITES-listed species by two Jamnagar-based facilities:
- **Green Zoological Rescue and Rehabilitation Centre** (GZRRC) and
- **Radha Krishna Temple Elephant Welfare Trust** (RKTEWT).
- **Mission Focus:** The mission examined whether India's **wildlife import approvals complied** with CITES rules and upheld their **non-commercial character**.

Key Findings of the Report

- **Facility Standards:** The Jamnagar facilities maintained **high animal welfare standards**, proper documentation, and **valid CITES permits** for their imported species.
- **Verification Gaps:** Indian authorities accepted import permits **without verifying** the animal origins or cross-checking with source countries.
- **Permit Irregularities:** The report identified **contradictory records**, **misuse of CITES purpose codes**, and cases of forged permits.
- **Recommendations for India**
- **Import Suspension:** India should **stop importing** Appendix-I species until stronger verification and control systems are implemented.
- **Stronger Checks:** Authorities must **verify animal origins** and captive-bred claims through a transparent, risk-based system before granting import approval.
- **Past Review:** India should **review previous imports** from source countries (e.g., Germany, Iraq, Guyana) and take corrective action if violations are found.

Heavy Metals in Cauvery Fish

- A recent study found high levels of heavy metals in fish from the Cauvery River, warning of serious human health risks from prolonged consumption.
- **Study Scope:** Researchers tested **sediments from 18 sites** and **fish from 10 sites** for key heavy metals: **chromium**, **cadmium**, **copper**, **lead**, and **zinc**.
- **Method:** The **Geoaccumulation Index** and **Ecological Risk indices** with multivariate statistical analysis identified both natural and human sources of pollution.
- **Key Findings of the Study**
- **Contaminant Risk:** **Cadmium** and **lead** were the major pollutants; their high concentrations

made fish unsafe for regular human consumption.

- **Tissue Variation:** **Liver** and **gill tissues** accumulated **more metals than muscles**, though muscle tissues also showed values above safe limits.
- **Pollution Sources:** Industrial effluents, agricultural runoff, and untreated sewage were the primary human sources of heavy metal pollution.
- **Natural Input:** Mineral-rich zones in the **upper Cauvery basin** contributed small metal traces, **primarily iron**.
- **Recommendations:** The study calls for limited fish intake, strict effluent control, continuous monitoring, and greater public awareness.

Cauvery River

- The Cauvery (Kaveri) is **South India's third-largest river**, often revered as the ***"Dakshina Ganga"***.
- **Source Point:** It rises at Talakaveri in the **Brahmagiri Hills** of the **Western Ghats**, **Karnataka**, at an elevation of about **1,341 metres**.
- **River Length:** The river flows roughly **800 kilometres** before joining the **Bay of Bengal** south of **Cuddalore** in Tamil Nadu.
- **Drainage Basin:** The Cauvery basin spans **81,155 square kilometres** across **Karnataka**, **Tamil Nadu**, **Kerala**, and **Puducherry**.
- **River Course:** Flowing southeast across the Deccan Plateau, it cascades through the Eastern Ghats and forms the **fertile delta** plains of Tamil Nadu.
- **Major Tributaries:**
- **Left Bank:** *Harangi*, *Hemavati*, *Shimsha*, *Arkavati*.
- **Right Bank:** *Lakshmantirtha*, *Kabini*, *Suvarnavati*, *Bhavani*, *Noyyal*, *Amaravati*.
- **Major Dams:** **Krishnarajasagar** (KRS) Dam in Karnataka, **Mettur** Dam (Stanley Reservoir) and **Bhavani Sagar** Dam in Tamil Nadu, and **Kabini** Dam on the Karnataka–Kerala border.
- **Water Dispute:** The river remains the subject of **inter-state water disputes** between Karnataka, Tamil Nadu, Kerala, and Puducherry over equitable water sharing.

High Seas Treaty

- The High Seas Treaty (Biodiversity Beyond National Jurisdiction: BBNJ) has been **ratified by over 60 countries** and will be **effective in January 2026**.

High Seas Treaty

- It is **formally Agreement** on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Treaty), and is often called the **"Paris Agreement for the Ocean."**
- Adopted in **2023**, it aims to head off a biodiversity crisis in the **open ocean**.
- The treaty is the **first legally binding international** pact focused on **protecting marine**

life in the high seas (areas beyond national jurisdiction).

- **India signed the agreement** in **September 2024**.

Key Provisions of the Treaty

- **Marine Genetic Resources (MGRs):** Recognise them as the **common heritage** of humankind, intended to ensure equitable benefit sharing.
- **Area-Based Management Tools (ABMTs):** These tools enable the creation of Marine Protected Areas (MPAs) to conserve ecologically sensitive zones.
- **Environmental Impact Assessments (EIAs):** Mandatory prior assessment for any activity that may cause transboundary or cumulative ecological damage.

Significant Challenges of the High Seas Treaty

- **Principle Ambiguity:** Unclear balance between common heritage and freedom of the high seas, creating confusion in implementation.
- **Benefit Sharing:** No defined mechanism for **sharing profits** from **Marine Genetic Resources**, raising biopiracy concerns.
- **Power Participation:** Major ocean powers (the U.S., China, and Russia) **have not ratified** the treaty, weakening global enforcement.
- **Institutional Overlap:** Coordination issues are likely with bodies like the United Nations Convention on Law of the Sea (UNCLOS) & International Seabed Authority (ISA), risking **fragmented ocean governance**.

Gogabeel Lake Designated as Ramsar Site

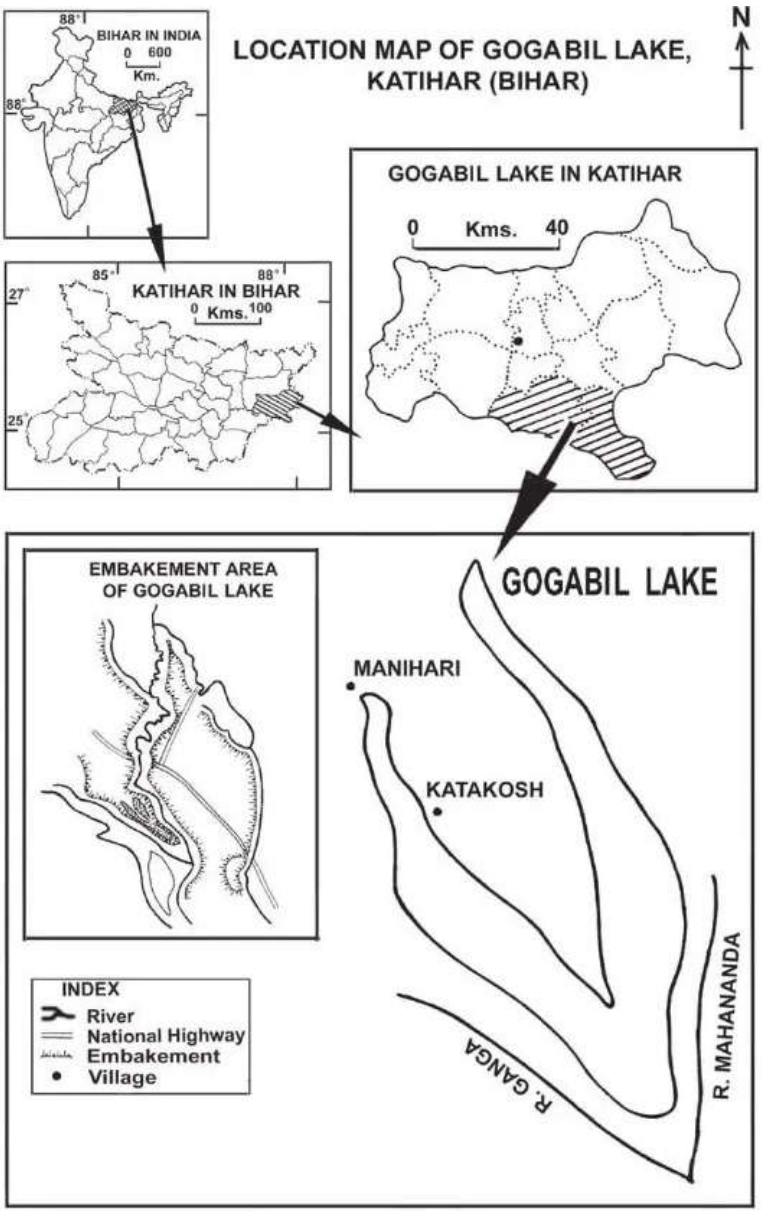
- **Gogabeel Lake** in **Katihar district**, Bihar, has been declared as India's latest Ramsar site. It is **India's 94th** and **Bihar's 6th** Ramsar site.

Gogabeel Lake

- Gogabeel Lake is an **86.63-hectare** permanent **oxbow lake**, formed by the old channels of the **Kankhar** and **Mahananda** rivers.
- **Hydrology:** It is fed by floodwaters from the **Mahananda**, **Ganga**, and **Khankhar** rivers.
- **Community Reserve:** Gogabeel was declared **Bihar's first** Community Reserve in **2019** and is recognised as an **Important Bird and Biodiversity Area** (IBA) by **BirdLife International**.
- **Avian Habitat:** The lake is home to migratory and resident birds such as the **Lesser Adjutant Stork**, **Pallas's Fish Eagle**, and **Black-necked Stork**.

Ramsar Sites in India

- **Top States:** Currently, **Tamil Nadu** has the most Ramsar sites (**20**), followed by **Uttar Pradesh** (**10**) and **Bihar** (6).
- **First Designations: Chilika Lake** in **Odisha** and **Keoladeo National Park** in **Rajasthan** were **India's first Ramsar sites**, designated in **1981**.
- **Largest and Smallest: Sundarbans Wetland** in **West Bengal** is the **largest** Ramsar site, while **Renuka Wetland** in **Himachal Pradesh** is the **smallest**.



Baku to Belém Roadmap to 1.3T report

- The **Baku to Belém Roadmap to 1.3T report** released ahead of COP-30 underscores the need for

enhanced and predictable financial commitments from developed countries.

- Report identifies five action fronts on finance - **Replenishing**, **Rebalancing**, **Rechanneling**, **Revamping**, and **Reshaping** (5R) to deliver the 1.3 T by 2035 with USD 300 billion being a part of the overall goal.

5R Mechanism

- **Replenishment**: Developed countries need to increase delivery of grants and concessional climate finance.
- **Rebalancing**: Creditor countries, the International Monetary Fund and multilateral development banks shall work together to alleviate **onerous debt burdens** faced by developing.
- **Rechanneling**: Multilateral development banks, development finance institutions, public development banks and multilateral climate funds need to significantly scale the availability and quality of **catalytic financial** and **risk mitigation instruments** such as foreign exchange hedging, etc.
- **Revamping**: Governments should mainstream climate, nature and just transition objectives into planning, budgeting and investment frameworks, etc.
- **Reshape financial structures**: for enhanced capital flows.

1st Pan-India Assessment and Monitoring of Endangered Species of Vultures

Wildlife Institute of India (WII) releases its **1st Pan-India Assessment and Monitoring of Endangered Species (Vultures)**

- This first nationwide assessment estimated breeding adult populations focusing on **four Critically Endangered species** i.e., **the White-rumped, Indian, Slender-billed, and Red-headed vultures.**

Major Findings

- **Geographic Scope:** The survey documented vulture presence at 216 sites across 17 states.
- **Contraction of Range:** It revealed **absence of nesting in nearly 70% of historical sites** previously known across the country.
- **Dependence on Protected Areas (PAs):** PAs hold **54% of all documented nests**.

Species specific findings

1. **Indian Vulture (Gyps indicus):** Found mainly in Madhya Pradesh & Rajasthan (largest at Mukundra Hills); reliant on secure cliff sites
2. **White-rumped Vulture (Gyps bengalensis):** Concentrated in Kangra Valley, Himachal Pradesh
3. **Slender-billed Vulture (Gyps tenuirostris):** Breeding mostly in Upper Assam
4. **Red-headed Vulture (Sarcogyps calvus):** Found in Madhya Pradesh; depends on dense, undisturbed forests; population extremely low and fragmented.

Vultures

- Large carrion-eating birds, mainly found in tropics and subtropics; 9 species in India.
- **Significance:** Clean environment by consuming carcasses, controlling wildlife diseases.
- **Conservation Status:** Protected under **Schedule I, Wildlife Protection Act, 1972.**
- **Threats:** Habitat loss, food scarcity, diclofenac poisoning, electrocution.
- **Conservation Initiatives:** Ban on **diclofenac, ketoprofen, aceclofenac**; **Action Plan for Vulture Conservation (2020–25)**

Transforming Food System crucial for solving Climate, Health, Biodiversity and Justice Crises

- Recent EAT-Lancet Commission report highlights that even if global energy transition away from fossil fuels occurs, food systems would cause the **breach of Paris target** of **limiting global temperatures to 1·5°C.**
- ''Food systems'' refers to **all activities** involved in food production, processing, distribution, consumption, and disposal, with their economic, health, social, and environmental impacts.

Key Highlights of the Report

- **Food drives Five Planetary Boundary transgressions:** It includes land system change, biosphere integrity, freshwater change, biogeochemical flows, and Green House Emissions (GHGs).
- Agricultural and food systems **release about 30% of total GHGs.**
- **Inequalities in Food systems**: Richest 30% of global population contribute to **more than 70% of environmental pressures** from food systems.
- **Case of India:** Despite the decline in its economic contribution, agriculture would remain a large source of GDP and employment by 2050 and hence restructuring food systems could be more challenging due to large labour force.

Key Recommendations to Transform Food Systems

- **Planetary Health Diet (PHD)**: It would reduce environmental impacts and nutritional deficiencies of most current diets.
- PHD is a **diet rich in plants** including whole grains, fruits, vegetables, nuts, and legumes with **only moderate or small amounts of fish, dairy, and meat.**
- **Conservation Agriculture:** It is the complementarity of sustainable and ecological intensification practices, with **reduced soil disturbance, continuous soil cover, and crop diversification** forming its basis.
- **Integration of Food Systems across Key Policy Goals:** Including Paris Agreement, Kunming–Montreal Global Biodiversity Framework, and nation- specific food-based dietary guidelines, etc. **Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980**
- The **Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980,** earlier called the **Forest (Conservation) Act, 1980**, was enacted to regulate the diversion of forest land for non-forestry purposes.
- It mandates **prior approval of the Central Government** before any forest land is used for mining, industry, agriculture, or infrastructure.
- The Act provided that any aggrieved person may file an appeal to the National Green Tribunal against the decision of the State Government or any authority.
- The Act empowered the Central Government to constitute the **Forest Advisory Committee (FAC)** to advise the Government regarding forest conservation.
- After the **2023 amendment**, it introduced new provisions for land-use rationalisation, penal Net Present Value (NPV), and **Van Adhiniyam Rules, 2023**, aligning forest conservation with

developmental needs.

Solar Waste Management in India

- A study by the **Council on Energy, Environment and Water (CEEW)** estimates that India could generate **~11 million tonnes** of solar waste by **2047**, mainly from crystalline-silicon solar modules.

Key Findings of the Report

- To handle projected waste, **nearly 300 specialised** recycling plants would be required nationwide.
- **Material recovery** (silicon, copper, aluminium, and silver) could create a **circular-economy** opportunity worth ₹ 3,700 crore by 2047.
- If **recycling** becomes **efficient**, recovered materials could supply **38% of raw material** requirements for solar manufacturing and **avoid 37 million** tonnes of **carbon emissions**.
- **Concerns Highlighted in the Report**
- **India's solar recycling ecosystem** is still in its **nascent stage**; only a few recyclers operate commercially.
- Recycling is economically **unviable** today, as recyclers incur losses of **₹10,000-₹12,000 per tonne**, while **buying back** waste modules accounts for **two-thirds** of recycler costs.
- Without policy support, most panels may **end up in landfills**, creating environmental hazards.

Policy Recommendations by CEEW

- Introduce **Extended Producer Responsibility** (EPR) under the **E-Waste Management Rules, 2022** and **panel manufacturers** should **collect** and recycle end-of-life modules.
- Support recyclers through **EPR certificate trading**, **tax incentives**, and R&D to improve the recovery of silicon and silver.
- Create a **centralised solar inventory** to track waste hotspots and improve transparency in material data.
- Form a **Circular Solar Taskforce** under the **Ministry of New and Renewable Energy** (MNRE) to coordinate policy, finance, and industry efforts.

India's Cheetah Reintroduction Program

- **Project Cheetah** is a Central Government initiative to **restore cheetah populations** in India, where they were **declared extinct** in **1952**.
- Launched in **2022**, it is the world's first intercontinental large wild carnivore translocation

project.

- **Primary Site: Kuno** National Park in Madhya Pradesh was the first site to receive **eight cheetahs** from **Namibia** in 2022 and **twelve** from **South Africa** in 2023.
- **Expansion Site: Gandhi Sagar WLS** was later developed to **expand habitat availability**, with two male and one female cheetah relocated here from Kuno in 2025.

Volcanic Lightning

- Recently, volcanic lighting was mentioned in the news.
- It is a **powerful electrical discharge** caused by a volcanic eruption rather than from an ordinary thunderstorm.
- **Cause:** The primary mechanism is the **collision** and **rubbing** of **ash particles (near ground) or ice particles (higher up)** within the **volcanic plume**, generating **static electricity** and building up electric charges.
- **Significance:** The lightning acts as a natural **early warning system** of oncoming eruptions.

Rhesus Macaque

- The Standing committee of the **National Board for Wildlife** has recommended **reinstating Rhesus Macaque under Schedule II** of the **Wildlife (Protection) Act, 1972.**
- It will restore its **statutory protection** against illegal capture & cruelty.
- **Scientific Name**: macaca mulatta
- **Native:** to **mainland Asia**.
- These are **nonhuman primates** that **share approximately 93% genetic sequence** identity with **humans**.
- **Diet**: omnivores
- **Characteristics**: They are **both arboreal and terrestrial**.
- **Conservation status**:
- **Least Concern** (IUCN).

India Joins Tropical Forest Forever Facility (TFFF) as Observer

- India announced its decision to join the **Tropical Forest Forever Facility (TFFF)** as an '**Observer**' at **COP30** in **Belém**, **Brazil**.

- **Tropical Forest Forever Facility (TFFF)**
- The TFFF is a **global finance mechanism** launched by **Brazil** at COP30 to ensure predictable, long-term funding for tropical forest conservation.

- **Objective:** It provides **performance-based** financial support to **Tropical Forest Countries** (TFCs) for conserving and restoring tropical and subtropical moist broadleaf forest (**TSMBF**).
- **Member Countries:** Founding members include **Brazil**, **Colombia**, **Ghana**, the Democratic Republic of **Congo**, **Indonesia**, and **Malaysia**.
- **Potential Scope:** The TFFF covers about **1.2 billion hectares** of eligible forests across more than **70** developing countries.
- **Alignment:** The TFFF complements the objectives of the UNFCCC, CBD, and UNCCD but **operates independently** of their financial frameworks.
- **Fundraising:** The facility aims to mobilise **$25 billion** from member countries and attract up to **$100 billion** from private investors.
- **Mechanism:** Money is pooled into the **Tropical Forest Investment Fund** (TFIF) and invested in clean, fixed-income assets. The investment returns are used to finance annual conservation payments.
- **Structure:** The TFFF operates as an umbrella facility with **two complementary parts** coordinated by a Secretariat:
- **Tropical Forest Investment Fund (TFIF):** Mobilises and manages resources for forest finance.
- **Tropical Forest Forever Facility:** Oversees reward rules, eligibility, monitoring, and disbursement
- **Institutional Host:** The **World Bank** (WB) acts as the **interim trustee** and host of the TFFF Secretariat.
- **Payment Structure:** Countries receive **$4 per hectare** annually for maintaining forest cover. Deductions are made for deforestation and forest fires.
- **Indigenous Support:** At least **20%** of total funds are earmarked for **Indigenous Peoples and Local Communities** (IPLCs) engaged in forest protection.
- **Verification:** A satellite-based monitoring system tracks canopy cover, deforestation and degradation.

Importance of Forest Conservation

- **Climate Regulation:** Collectively, Forests **absorb about 7.6 billion tonnes of CO_2 annually** (as per Global Forest Watch), helping **slow global warming**.
- **Biodiversity Hotspots**: Tropical forests cover only **7% of Earth's surface**, but h**old 50% of global biodiversity** (WWF).
- **Soil Conservation**: Forests reduce soil erosion and prevent flood intensity by stabilizing slopes.
- **Other: Economic Value** (trade in timber, rubber, etc.); **Livelihood and Cultural** Support; **Medicinal Resource** Base; **Rainfall and Hydrological Cycle**, etc.

Other Global Initiatives for Forest Conservation

- **Convention on Biological Diversity (1992):** Encourages conservation of ecosystems,

sustainable use, and equitable sharing of benefits.

- **UN REDD+ (2008):** Provides financial incentives to developing countries for reducing deforestation and enhancing carbon stocks.
- **Bonn Challenge (2011):** Aims to restore 350 million hectares of degraded forests by 2030.
- **Paris Agreement (2015):** Recognizes forests as key climate mitigation tools.

Pilia malenadu Spider Species

- Researchers have discovered a new jumping spider species, ***Pilia malenadu***, in the **Western Ghats** of Chikkamagaluru district, **Karnataka**.

Pilia malenadu

- *Pilia malenadu* is a newly identified **jumping spider species** belonging to the **genus *Pilia***.
- **Etymology:** The name *Malenadu* originates from **Kannada**, meaning '**land of the rain**'.
- **Historical Record:** This marks the **first discovery** of a *Pilia* species in **123 years**, following the last record from Kerala in 1902.
- **Gender Documentation:** The study is the **first to document** both male and **female specimens** of the *Pilia* genus.
- **Habitat:** The species was found exclusively on ***Memecylon umbellatum*** (**Anjan/Ironwood**) and ***Memecylon malabaricum*** plants.
- **Appearance:** The spider is **under 5 mm**, **brown** in colour, with **white markings**, and distinct **V-shaped patterns** on its abdomen.

EAT-Lancet Commission Report 2025

- The 2025 EAT-Lancet Commission on Healthy, Sustainable and Just Food Systems has warned that **global food systems are the largest contributors to breaching planetary boundaries**.

Planetary Boundaries Concept: *Defines* ***nine limits that regulate Earth's stability****. They are climate change, ocean acidification, ozone depletion, nitrogen and phosphorus cycles, freshwater use, land use, biosphere integrity, chemical pollution, and aerosol loading.*

Key Findings of 2025 Report

- Food systems are responsible for **5 of 7 breached boundaries**, including nitrogen and phosphorus overuse, biodiversity loss, land-system change, and freshwater overuse.
- Agricultural and food systems generate **30%** of global greenhouse gases; transforming them could cut emissions by **50%**.
- India is performing poorly due to excess use of nitrogen fertilisers and pesticides, and has lost much of its natural land cover, which should ideally remain **50–60% intact**.
- **Less than 1%** of the global population currently lives within ecological and social safety limits.

- The **wealthiest 30%** of people cause **70%** of food-related environmental damage.

Key Recommendations to Transform Food Systems

- **Promote Planetary Diet:** More plant-based foods (fruits, vegetables, whole grains, pulses, millets) and less red meat, sugar, and processed food to cut emissions and improve health.
- **Expand Climate-Smart/Regenerative Farming:** Use no-till, mulching, crop rotation, and reduced chemical inputs to restore soil and save water. E.g., AP Natural Farming & Direct Seeded Rice (Punjab).
- **Align Food Systems with Climate & Biodiversity Goals:** Link food policies with Paris Agreement, KM-GBF, and national dietary guidelines for sustainable & healthy food systems. E.g., Eat Right India initiative.

Lessons for India from China's Air Pollution Control

- **China offered** to share its **expertise** with India in **achieving cleaner air**, highlighting the common challenges both countries face with air pollution.

India's Current Air Pollution Landscape

- **Global Ranking:** India was the **fifth most polluted country** in the world in 2024, a slight improvement from third place in 2023. (*IQAir Air Quality Report 2024*)
- **National Average:** The national average PM2.5 level reached **50.6 µg/m³ in** 2024, almost **ten times** the WHO's recommended safe limit. (*IQAir Report 2024*)
- **Urban Hotspots:** **New Delhi** remained the world's **most polluted capital** at 91.6 µg/m³, while **Byrnihat** in **Meghalaya** was the **most polluted city** in 2024. (*IQAir Report 2024*)
- **Mortality Burden:** Air pollution caused over **2 million deaths** in India in 2023, mainly from long-term particulate exposure. (*State of Global Air 2025 report*)

Steps Taken by China to Combat Air Pollution

- Integrated **air-quality targets into officials' performance reviews**, linking promotions to pollution-control outcomes to ensure strict accountability.
- Launched the **'2+26' regional coordination mechanism**, enabling simultaneous industrial curbs and traffic restrictions across key polluted cities during smog episodes.
- **Expanded green finance** through green credit, emission-control loans and blended funds to attract private investment for clean-air initiatives.
- Imposed **Ultra-Low Emission (ULE) norms** for steel, cement and thermal plants, mandating advanced desulphurisation and catalytic equipment.
- Shut down or relocated **~150 million tonnes of outdated steel capacity (2016–21)** away from dense urban clusters to reduce industrial emissions.
- Implemented a **coal-to-gas/electric heating transition** in northern China, replacing household

coal-burning stoves to reduce winter pollution.

- Rolled out **China-VI vehicle emission standards** and accelerated EV adoption through subsidies and licence incentives, making China the world's largest EV market with e-public transport mandates.
- Established a **real-time air monitoring network** with 2,000+ stations and CEMS-linked oversight, alongside the **Three-North Shelterbelt Project** which increased forest cover and reduced dust storms.

What India Can Learn from China's Clean Air Strategy?

- **Performance-Linked Funding:** Enforce accountability by **linking** the release of **central funds** and **bureaucratic promotions** to meeting NCAP air-quality targets.
- **Regional Airshed Authority:** Extend the CAQM model to the entire **Indo-Gangetic Plain** and other multi-state airsheds to coordinate emission control and implement Low Emission Zones.
- **Time-Bound Upgrades:** Set a strict 24-month deadline for heavy industries to install **Ultra-Low Emission (ULE)** technologies like FGD, and halt new clearances in non-compliant regions.
- **Grid-Based Accountability:** Divide municipal wards into **smaller grids** and make one **local officer legally responsible** for all non-point pollution sources in their area.
- **Clean Fuel Transition:** Phase out high-sulfur fuels like petcoke and furnace oil, while offering MSMEs **subsidised green loans** to switch to PNG or electricity.
- **National Green Finance Facility:** Establish a **central green finance platform** using public funds to de-risk projects and attract private investment in pollution-control technologies.

Khangchendzonga National Park Rated "Good" by IUCN

- The International Union for Conservation of Nature (IUCN) has rated Khangchendzonga National Park as "Good" in its 2025 global review of natural World Heritage Sites — making it India's only site with a positive conservation status.
- A global **IUCN World Heritage Outlook 2025 assessment** that evaluates the conservation effectiveness of all natural World Heritage Sites based on biodiversity health, management quality, and climate resilience.

Initiative by IUCN:

- Conducted under the **World Heritage Outlook programme** to track the condition of 252 natural sites globally.
- Sites are ranked as **"Good," "Good with Some Concerns," "Significant Concern," or "Critical."**
- Khangchendzonga National Park emerged as **the only Indian site rated "Good,"** indicating effective ecological management and cultural conservation.
- A **UNESCO World Heritage Site (2016)** and India's **first "mixed" heritage site**, recognized for both its **natural beauty and cultural significance.**

Location:

- Situated in **North and West Sikkim**, covering **1,784 sq km**—nearly **40% of Sikkim's total area**—along the India–Nepal border.

History:

- Declared a **National Park in 1977** and later incorporated into the **Khangchendzonga Biosphere Reserve.**
- Named after **Mount Khangchendzonga (8,586 m)**, the world's **third-highest peak** and India's highest.
- Inscribed as a **UNESCO site in 2016** for its integration of **Lepcha spiritual traditions** and Himalayan biodiversity.

Geographical Features:

- Encompasses **280 glaciers** and **70+ glacial lakes**, including **Zemu Glacier** and **Tso Lhamo Lake.**
- Spans diverse biomes — from **subtropical forests (1,300 m)** to **permanent snowfields (8,598 m).**
- Habitats include **Himalayan moist forests, alpine meadows, and temperate broadleaf forests.**
- **Uniqueness:**
- Houses rare species like snow leopard, red panda, clouded leopard, blue sheep, Himalayan tahr, and over 550 bird species including Impeyan pheasant and Satyr tragopan.
- Represents a sacred landscape — the Lepcha's Mayel Lyang and Tibetan beyul (hidden paradise).
- Known for its intact ecological gradients, pristine biodiversity, and fusion of spiritual ecology with scientific conservation.

Dumpsite Remediation Accelerator Programme (DRAP) Launched

- It is a **year-long,** targeted initiative under **Swachh Bharat Mission-Urban 2.0** to achieve the goals of **Lakshya Zero Dumpsites** by **September 2026.**
- **Swachh Bharat Mission (SBM-U) 2.0** was launched in 2021 to achieve Garbage Free Status for all cities. It also aims at remediation of all **legacy dumpsites** and converting them into **green zones.**

DAMP:-

- **Objective:** Prioritize high-impact locations, covering **approximately 8.8 crore MT of legacy waste**.
- Legacy Waste refers **to aged municipal solid waste** in landfills or dumpsites, it is a mix of partially or completely decomposed biodegradable waste, plastic waste, etc.
- About **80% of the legacy waste** is concentrated in **214 sites across 202 Urban Local Bodies.**

- **Ministry:** Ministry of Housing and Urban Affairs (MoHUA).
- **Eligibility:** All States/UTs with ongoing legacy waste projects with **priority to** sites containing over **45,000 MT of legacy wastes.**
- No minimum threshold for eligibility for UTs and North Eastern States.
- **Dumpsites and its Management in India**
- **Status:** Currently, **1,428 sites** are undergoing remediation (1,048 have been fully remediated).
- **Major emissions of primary concern:**
- **Leachate**: Polluted water that emerges at the base of dumpsite waste.
- **Landfill Gas**: Mixture of **carbon dioxide and methane** formed because of anaerobic conditions created in dumpsites during waste decomposition.

Greater Flamingo Sanctuary (GFS)

- A 50-MW wind farm proposed by the National Institute of Wind Energy (NIWE) can affect Greater Flamingo Sanctuary.
- The Greater Flamingo''s range spans **Africa, western Asia, and southern Europe.**
- it is usually found in shallow, saline, alkaline wetlands during the breeding season
- **GFS**
- **Establishment**: By Tamil Nadu Government at Dhanushkodi.
- **Aim:** To protect vital migratory bird habitats along the Central Asian Flyway (A major migratory bird route connecting Eurasia with the Indian subcontinent).
- **Location**: Within the ecologically sensitive **Gulf of Mannar Biosphere Reserve**.

Agendas for the COP30 Summit

- The **30th United Nations Climate Change Conference** (COP30) is taking place in **Belém, Brazil,** under **Brazil's presidency**. It marks the first COP to be hosted in the Amazon region.
- **Theme:** Known as the '**COP of Truth**' or the '**Implementation COP**,' it seeks to move beyond

symbolic commitments towards real, measurable climate action across **six thematic areas** ("Axes").

- **Six Axes:** (1) Energy, industry, and transport transitions; (2) Stewardship of forests, oceans, and biodiversity; (3) Transformation of food systems; (4) Resilience in cities, infrastructure, and water; (5) Human and social development; and (6) Cross-cutting issues/Enablers.

Key Agendas of the COP30 Summit

1. Implementation and Commitments

- **'Implementation COP':** Aims to transform past climate pledges into **concrete**, **time-bound** national plans with defined targets and transparent monitoring.
- **NDCs 3.0:** Finalize updated **Nationally Determined Contributions** (NDCs) **for 2035** with clear emission goals and stronger reporting mechanisms.
- **Finance Framework:** Adopt the **New Collective Quantified Goal** (NCQG) to replace the $100 billion pledge with a **$300 billion annual** climate finance framework.

2. Adaptation and Resilience

- **Global Adaptation:** Implement the **UAE Framework for Global Climate Resilience** within the **Global Goal on Adaptation** (GGA) to expand adaptation efforts and reduce vulnerability.
- **Finance Roadmap:** Advance the joint '**Baku-to-Belém Finance Roadmap**' to mobilize **$1.3 trillion** every year for mitigation and adaptation initiatives.
- **Forest Facility:** Expand the **Tropical Forest Forever Facility** (TFFF) to support tropical forest conservation and long-term carbon storage using **blended finance**.

3. Equity and Cooperation

- **Pollutant Reduction:** Accelerate the **Super Pollutant Country Action Accelerator** to reduce methane, HFCs, and black carbon in 30 developing countries **by 2030**.
- **Trade Fairness:** Reform **Carbon Border Adjustment Mechanisms** (CBAMs) to prevent '**carbon leakage**' and ensure fair trade terms for developing nations.
- **Just Transition:** Advance the **Belem Action Mechanism for a Global Just Transition** (BAM) to promote an equitable, rights-based energy transition under the UNFCCC.
- **Global Partnership:** Strengthen cooperation on technology transfer, climate innovation, and capacity building between the Global North and the Global South for effective climate action.
- **Ethical Stocktake:** Institutionalise the **Global Ethical Stocktake** (GES) to integrate moral, ethical, and cultural perspectives into global climate policy
- Data will help **design better irrigation schedules**, support climate-resilient cropping decisions.

CAQM invokes Stage-III of Graded Response Action Plan (GRAP) in NCR amid severe Air Pollution

- The Delhi government has implemented Stage III of the Graded Response Action Plan (GRAP-III)

as the city's Air Quality Index (AQI) breached 400, entering the 'severe' category for the first time this season.

- The Graded Response Action Plan (GRAP) is a dynamic pollution control framework designed to combat deteriorating air quality in the National Capital Region (NCR) through stage-wise preventive and corrective actions based on AQI levels.
- **Organisation Involved:** Implemented by the **Commission for Air Quality Management (CAQM)** in coordination with the Central Pollution Control Board (CPCB), Delhi Government, and state pollution control boards of NCR states.
- **Established in:** **2017**, following the directions of the **Supreme Court of India**, based on recommendations by the Environment Pollution (Prevention and Control) Authority (EPCA).

- It will include a **9-point action plan** comprising a **ban on construction, mining, and polluting vehicles**, along with **hybrid schooling** and **staggered office timings** to reduce emissions and congestion.
- Commission for Air Quality Management in NCR and adjoining Areas (CAQM) is a statutory body established under **the Commission for Air Quality Management in National Capital Region (NCR) and Adjoining Areas, Act 2021.**

Graded Response Action Plan

- It is an **emergency response mechanism** for the entire NCR, triggered by Delhi''s Average AQI, to coordinate multiple stakeholders against deteriorating air quality in Delhi-NCR.

Aim:

- To reduce air pollution in Delhi-NCR through timely, coordinated, and graded interventions, thereby safeguarding public health and ensuring compliance with the National Clean Air Programme (NCAP) objectives.

Key Features:

- **Four-stage response system** linked to air quality levels:
- **Stage I:** Poor (201–300)
- **Stage II:** Very Poor (301–400)
- **Stage III:** Severe (401–450)
- **Stage IV:** Severe+ (>450)

Reasons for NCR Air pollution:

- **Topographical Factors:** It includes **basin effect** of indo gangetic plain**, Natural barriers** (Himalayas and Aravalis), **etc.**
- **Meteorological Factors:** It includes **temperature inversion, low wind speeds etc.**
  Pollution: It includes pollution from **Stubble burning, Vehicular and Industrial emissions etc**
- **Progressive and cumulative restrictions** — each stage includes measures from previous stages.
- **Actions include:** bans on **construction, demolition, and BS-III petrol/BS-IV diesel vehicles**,

closure of **schools (up to Class 5)**, and promotion of work-from-home.

- **Essential services** like metro, railways, sanitation, defence, and healthcare are exempt but must adhere to dust and emission control norms.
- **Real-time monitoring** via CPCB and IMD/ IITM forecasts helps invoke stages in advance.

How it Works?

- The **CAQM Sub-Committee** reviews **daily AQI data and forecasts** to decide when to activate or relax stages.
- When higher AQI levels are expected to persist for **three or more days**, the next GRAP stage is invoked **proactively**.
- Enforcement is carried out jointly by **Delhi Pollution Control Committee (DPCC)**, **NCR state boards**, and **district administrations**, ensuring inter-agency coordination and public compliance.

Case Study: How Beijing reduced its Air Pollution?

- **Improved Air Quality:** Beijing's average AQI fell from **144 (2015)** to **92 (2024)**.
- **Phased, Long-Term Strategy:** Implemented a **three-phase anti-pollution plan (1998–2017)** combining local governance, public participation, and steady regulation.
- **Targeted Source Control:** Aimed to cut emissions from coal power, transport, and industry/construction via clean energy, vehicle upgrades, and stricter industrial rules.
- **Regional Cooperation & Investment:** Coordinated regional cooperation with five surrounding provinces and significant public investment led to sharp pollutant reductions.

Watershed Mahotsav

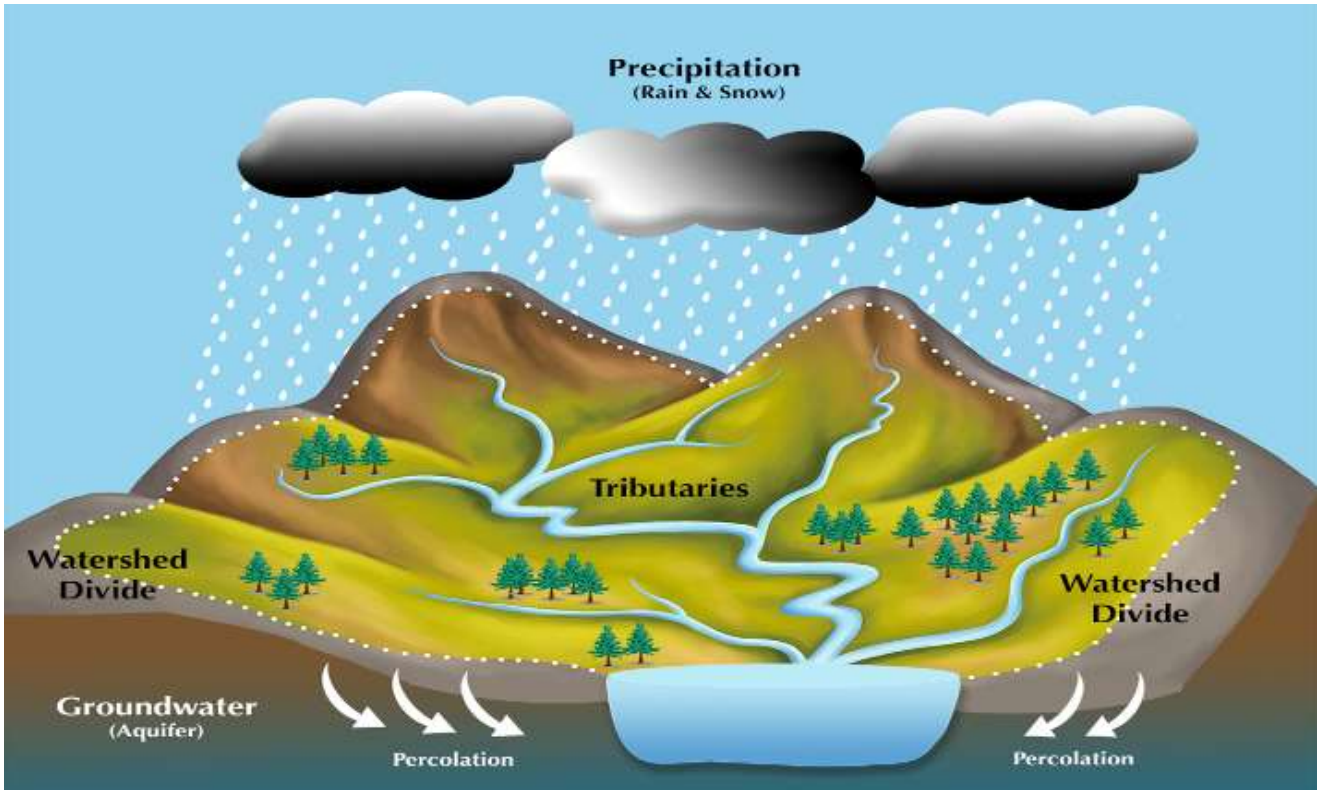
- Union Minister of Agriculture will inaugurate the Watershed Mahotsav in Guntur, Andhra Pradesh, on November 11, 2025.
- The Watershed Mahotsav is a national festival celebrating community participation in sustainable watershed management. It focuses on integrating citizens, policymakers, and local bodies to promote holistic soil and water conservation in rural India.
- It is part of the **National Watershed Conference 2025**, organised by the **Department of Land Resources (DoLR)** under the **Ministry of Rural Development**.
- **Aim:** To foster **Jan Bhagidari (public participation)** in watershed development, restore degraded ecosystems, and strengthen rural livelihoods through efficient water management and soil conservation.

Key Features:

- Promotes **Mission Watershed Revitalisation** for repairing and maintaining old watershed structures.
- Integrates **MGNREGA** for funding and on-ground implementation of soil and water conservation work.
- Includes **community initiatives** like shramdaan, tree plantation drives, and recognition through

the Watershed Jan Bhagidari Cup 2025.

- Focuses on **rainfed area development**, water harvesting, afforestation, and spring-shed rejuvenation.



Soil Organic Carbon

- A recent ICAR study revealed that climate change and unbalanced fertiliser use are **speeding up the decline of soil organic carbon** (SOC) in India's farmland.
- **Agri-Ecological Mapping:** It created **an agri-ecological base map** to analyse cropping systems and the impacts of fertiliser on soil carbon.

Key Findings of the Study

- **Geographic Pattern:** SOC levels **increase with elevation** and **decrease with temperature**, causing hill regions to accumulate more carbon than plains and arid zones.
- **Nutrient Link:** **Low SOC** leads to **micronutrient deficiencies** in crops, while high carbon supports balanced nutrient retention and soil fertility.
- **Regional Decline:** **Haryana**, **Punjab**, and **western Uttar Pradesh** exhibit high soil carbon loss due to prolonged use of urea and phosphorus-rich fertilisers.

Soil Organic Carbon (SOC)

- Soil organic carbon (SOC) is the **carbon part of soil organic matter (SOM)**, expressed as a percentage of total soil weight.

- **Composition:** About **50-60%** of soil organic matter is carbon, and healthy soils typically contain between **1%** and **6% SOC**.
- **Forms:** SOC exists in various forms, including **fresh residues**, **humus**, and **living microorganisms**.
- **Determinants of Soil Organic Carbon**
- **Temperature: Cooler climates** maintain **higher SOC** as low microbial activity slows decomposition, while tropical regions lose carbon quickly due to rapid decay.
- **Rainfall: Moderate rainfall** promotes vegetation growth and residue return, leading to increased SOC. Arid or flooded soils retain far less carbon.
- **Soil Texture: Clay soils** preserve more SOC because fine particles **chemically bind** organic matter, whereas sandy soils lose carbon through leaching and poor aggregation.
- **Vegetation Type: Grasslands** build greater SOC through **deep-root carbon** storage. Forests lose carbon faster as surface litter decomposes quickly.
- **Topography: Low and flat regions** collect SOC **from runoff** and cooler microclimates, whereas steep slopes face erosion that strips away carbon-rich topsoil.
- **Soil Depth: Topsoil** contains the **most SOC** from roots and microbial activity, with carbon levels steadily decreasing with depth.

Benefits of Soil Organic Carbon

- **Soil Structure:** SOC **binds soil particles** into stable aggregates, enhances **water infiltration**, and boosts resistance to erosion.
- **Microbial Life:** It **fuels beneficial microorganisms** that manage nutrient recycling, suppress soil-borne diseases, and decompose organic matter.
- **Soil Fertility:** Higher SOC improves **cation exchange capacity** and **nutrient availability**, ensuring balanced and healthy plant growth.
- **Water Retention:** Carbon-rich soils retain more moisture, improve **irrigation efficiency**, and support crop stability during prolonged dry periods.
- **Nutrient Supply:** It acts as a **slow-release source** of nitrogen, phosphorus, and sulfur, reducing farmers' reliance on chemical fertilisers.
- **Climate Regulation:** SOC **captures atmospheric carbon dioxide** and strengthens the soil's capacity as a stable natural carbon sink.

Factors Affecting Soil Organic Carbon

- **Tillage:** Repeated ploughing **exposes buried organic matter** to air, breaks carbon bonds and lowers the soil's organic carbon content.
- **Fertiliser Use:** Excess **nitrogen fertiliser** increases microbial decomposition, which accelerates carbon loss and gradually raises soil acidity.
- **Residue Management:** Burning or **removing crop residues** depletes the primary source of new organic carbon, weakening the soil's ability to replenish its fertility.

- **Land Conversion:** Converting forests or grasslands into agricultural land **disrupts natural soil processes** and leads to a decline in carbon storage.
- **Temperature Rise:** Warmer conditions **stimulate microbial respiration**, release more carbon dioxide and reduce the soil's long-term carbon reserves.
- **Erosion:** Runoff and wind erosion strip away carbon-rich topsoil, decreasing both fertility and carbon-holding capacity of the soil.

Integrity Matters Checklist

- The Global Reporting Initiative (GRI) has launched the UN-endorsed "Integrity Matters Checklist", a new tool designed to help companies align their climate disclosures with UN standards for credible net-zero commitment.

Integrity Matters Checklist

- An UN-endorsed climate disclosure framework that helps companies and investors transparently report on net-zero targets, transition plans, and greenhouse gas reduction efforts.
- **Developed by:** GRI in partnership with the United Nations, aligning with recommendations of the UN High-Level Expert Group (HLEG) on Net Zero Commitments.
- **Aim:** To operationalise the Integrity Matters report of the HLEG by ensuring corporate climate action is credible, science-based, and transparent, supporting both the Paris Agreement and 2030 Agenda goals.

Key Features:

- **Alignment with UN guidance** on verifiable net-zero targets and just transition principles.
- **Integrated with GRI 102: Climate Change 2025 Standard**, enabling consistent and comparable sustainability reporting.
- Encourages companies to **phase out fossil fuel investments** and adopt **science-based transition pathways**.
- Provides a **checklist-based reporting tool** to track progress from **pledges to delivery**, enhancing investor and policymaker trust.
- Endorsed by UN officials as a bridge between **corporate ambition and climate accountability**.

Global Reporting Initiative (GRI):

- An international independent standards organisation that provides the world's most widely used sustainability reporting framework for businesses, governments, and NGOs.
- **Launched in:** 1997, by Ceres and the Tellus Institute, with support from the UN Environment Programme (UNEP).
- **Aim:** To promote transparency and accountability by helping organisations measure and communicate their environmental, social, and governance (ESG) impacts in a standardized and comparable way.

International Cryosphere Climate Initiative released the State of the Cryosphere Report 2025

- The report highlights the status and impact of changes in **five key components of cryosphere – Ice Sheets, Mountain Glaciers and Snow, Polar Oceans, Sea Ice, and Permafrost.**

Key Highlights of Report

- **Ice Sheets:** Losses from the Greenland and Antarctic ice sheets have quadrupled since the 1990s.
- **Impact:** Sea-level rise results in widespread loss of infrastructure, agricultural land, homes, and livelihoods in coastal regions.
- **Polar Oceans:** Rising greenhouse gases are impacting their role as heat/carbon absorbers and drivers of global circulation.
- **Impact:** Two major ocean current systems, Antarctic Overturning Circulation (AOC) and Atlantic Meridional Overturning Circulation (AMOC), have slowed substantially due to freshwater melt.
- **Mountain Glaciers and Snow:** Glacier ice loss is increasing exponentially worldwide, with 273 gigatons lost per year between 2000 and 2023.
- **Impact:** Threatens water, food, economic, and political security for billions of people.
- **Sea Ice:** Sea ice extent and thickness have **declined 40-60% at both poles** since 1979.
- **Impact:** Loss of sea ice drives Arctic amplification, threatens ice-dependent species, disrupts weather and ocean currents and increases sea-level rise risks.
- **Permafrost:** Over 210,000 km^2 of permafrost has thawed per decade since current warming began.
- **Impact:** Thawing permafrost **decreases the global carbon budget** and releases vast amounts of ancient organic carbon (three times more than currently in the atmosphere).

Lake Turkana

- A recent study found that changes in Lake Turkana's water levels affected fault movement and magma generation, showing a direct link between climate change and tectonic processes.
- Lake Turkana is the world's **largest permanent desert lake** and the **largest alkaline lake**, mainly situated in **Kenya's Great Rift Valley**. Its northern end extends into **Ethiopia**.

- **World Heritage Site:** Known as the "**Jade Sea**" for its turquoise colour, its basin was declared a UNESCO World Heritage Site in 1997
- **Hominin Site:** The Turkana Basin is a significant **paleoanthropological site**, often referred to as the "**Cradle of Humankind**" due to numerous hominin fossil discoveries.
- **River Flow:** Three rivers, **Omo**, **Turkwel**, and **Kerio**, feed the lake, with the Omo River contributing nearly 90% of the total inflow.
- **Nile Crocodile:** It has the **world's largest breeding colony** of Nile crocodiles, concentrated on its Central and South Islands.

Key Findings of the Study

- **Climate-Rift Link:** Climate change–driven **shifts in Lake Turkana's water levels** directly influenced crustal pressure and earthquake activity in the East African Rift Valley.
- **Dry-Phase Unloading:** During dry periods, falling lake levels **reduce water pressure**, letting faults move faster and causing more earthquakes.
- **Magma Uplift:** Reduced surface pressure lets **magma melt** and **rise faster**, triggering more earthquakes and eruptions.
- **Wet-Phase Stability:** In wetter periods, added water weight **presses the crust down**, slowing fault slips and reducing earthquake frequency.
- **Geological Evidence:** Geological records show faster fault slips and stronger earthquakes after 5,000 years ago, when the region became drier.

'Global Cooling Watch 2025' Report calls for urgent shift to Sustainable Cooling

- Report published by the **UN Environment Programme's (UNEP) Cool Coalition,** details a **Sustainable Cooling Pathway** aimed at dramatically reducing projected GHG emissions from cooling by 2050.
- The Global Cooling Watch 2025 is UNEP's second global assessment on the environmental, economic, and equity dimensions of cooling, providing the scientific foundation for the Global Cooling Pledge.
- **Published by:** United Nations Environment Programme (UNEP) at COP30 (2025).
- **Aim:** To analyse global cooling trends, project future emissions, and propose a "Sustainable Cooling Pathway" to achieve near-zero emissions while ensuring equitable access to cooling worldwide

Key Trends Identified:

- **Rising Cooling Demand:** Global cooling capacity is projected to rise **2.6 times (22 TW → 58 TW) by 2050**, driven by rapid urbanization, income growth, and intensifying heatwaves, particularly in developing nations.
- **Emission Surge:** Without strong policy intervention, **cooling-related GHG emissions may reach 10.5 billion tons of CO_2e by 2050**, nearly double 2022 levels, threatening to offset gains from other climate actions.
- **Developing Country Growth:** Cooling demand in **Article 5 countries** (developing nations) is set to increase **fourfold**, highlighting a widening divide in energy use and infrastructure readiness between rich and poor economies.
- **Energy Consumption:** Global electricity use for cooling may rise from **5,000 TWh (2022) to 18,000 TWh (2050)**, straining power grids and escalating peak load demands, especially in

tropical regions.

- **Heat Inequality:** Over **2 billion people** in low-income households remain vulnerable to extreme heat exposure due to lack of access to affordable, efficient cooling technologies.
- **Passive Cooling Potential:** Integrating **passive cooling design**—like reflective roofing and urban greening—can lower indoor temperatures by up to **8°C** and cut energy use by **15–55%**, offering scalable climate adaptation.
- **HFC Transition:** Phasing down **high-global-warming refrigerants (HFCs)** and adopting **low-GWP alternatives** could eliminate up to **0.4°C of projected global warming** this century.
- **Global Cooling Pledge Progress:** So far, **72 nations and 80 organizations** have joined the **Global Cooling Pledge**, collectively aiming for a **68% emission reduction in the cooling sector by 2050**.

Succeses:

- Strengthened **global collaboration** through the Global Cooling Pledge, harmonizing standards and accelerating knowledge sharing among nations.
- Mainstreaming of **passive cooling measures** in building codes and urban policies, especially in Asia and Africa.
- Rapid **technological progress** in hybrid and low-energy cooling systems, improving energy efficiency by up to 50%.
- Enhanced **private sector participation** in manufacturing and financing sustainable cooling technologies.
- Emerging **Tiered Access Frameworks** are improving cooling equity and resilience for low-income and heat-vulnerable populations.

Limitations:

- Persistent **inequality in cooling access**, with millions in tropical developing regions still unprotected from lethal heat exposure.
- **Insufficient adaptation finance**, as current funding meets less than 20% of global cooling resilience needs.
- **Policy fragmentation** across sectors—energy, housing, and environment—hampers unified cooling governance.
- **Delayed HFC phase-down** and poor refrigerant disposal continue to drive high direct emissions.
- Dependence on **fossil-based electricity** undermines gains from efficiency and refrigerant transition efforts.

UNEP Recommendations:

- Adopt a **Sustainable Cooling Pathway** combining passive design, efficient appliances, and rapid clean energy integration.
- **Accelerate refrigerant phase-down** through Kigali Amendment implementation and enforce full

lifecycle refrigerant recovery.

- **Mobilize green finance** via concessional lending, PPPs, and climate bonds to expand access to sustainable cooling.
- Mandate **passive cooling standards** in national building and urban planning regulations.
- Ensure **equitable access** by subsidizing efficient cooling for vulnerable communities and heat-stressed regions.
- The Global Cooling Watch 2025 underscores that unchecked cooling demand could derail global climate goals. A coordinated shift toward **efficient, equitable, and low-emission cooling** is essential. If implemented urgently, UNEP's pathway could **cut 97% of future emissions** and secure a climate-safe, heat-resilient future.

Beat the Heat Global Initiative

- Joint effort by **UNEP's Cool Coalition and Brazil** (COP30 Presidency) to turn Global Cooling Watch findings into real-world climate action.
- **Objective**: Promotes multi-level governance involving governments, cities, industries, and financial institutions for equitable cooling access.
- **Focus areas:**
- Passive and nature-based cooling design integration.
- Public procurement of efficient, low-GWP (Global Warming Potential) technologies.
- Urban heat planning and inclusive cooling for vulnerable communities.

Citizen Protest Over Toxic Air as Delhi's AQI Turns 'Severe'

- A peaceful citizen protest was held at India Gate, New Delhi, against the worsening air pollution levels as the city's overall Air Quality Index (AQI) deteriorated to the *'Severe'* category.
- The alarming situation prompted the **Commission for Air Quality Management (CAQM)** to invoke **Stage-III of the Graded Response Action Plan (GRAP)** across the National Capital Region (NCR).

Key Issues Highlighted by Protesters

- Air quality in Delhi has reached **hazardous levels**, making **breathing a survival act**, particularly for children, the elderly, and asthma patients.
- Citizens expressed that the **right to clean air** is a basic right, not a privilege.
- Despite being peaceful and non-political, **protesters were detained** and prevented from moving by barricades, indicating a shrinking democratic space for environmental activism.

Graded Response Action Plan (GRAP)

- GRAP is a region-specific emergency action framework to control air pollution in Delhi-NCR, prescribing graded measures based on the severity of air quality.
- It classifies actions under **four stages**: Poor (AQI 201–300), Very Poor (301–400), Severe (401–450), and Severe Plus (above 450), with escalating restrictions at each level.
- The plan includes coordinated steps such as vehicular restrictions, dust control, curbing industrial emissions, and promoting public transport.

Key Measures Under GRAP Stage-III

1. **Ban on construction** and **demolition activities** across Delhi-NCR to curb **dust pollution**.
2. **Prohibition on BS-III petrol** and **BS-IV diesel four-wheelers** in Delhi, Gurugram, Faridabad, Ghaziabad, and Gautam Buddha Nagar.
3. Shift to **hybrid learning mode** for students up to Class V in Delhi and the above NCR districts.
4. Continuation of restrictions under **Stage-I (Poor) and Stage-II (Very Poor)** categories already in force.

National Biodiversity Authority Releases ABS Funds

- The **National Biodiversity Authority (**NBA**)** released ₹43.22 lakh in patent-linked **Access and Benefit Sharing (**ABS**) funds** to reward biodiversity contributors.
- These funds were generated from **Intellectual Property Rights (**IPR**)** applications that used **Indian biological resources** for commercial or research purposes.
- The funds will be distributed to local communities, with **Andhra Pradesh** getting the **largest share**.

> ***IPR:*** *They are* ***legal rights*** *granting creators* ***exclusive control*** *over the use, reproduction, and commercialisation of their* ***intellectual works*** *for a specified period.*

Access and Benefit Sharing (ABS)

- ABS refers to the framework that governs how **genetic resources** are **accessed** and how the **benefits** from their use are **equitably shared** between users and providers.
- It is a core principle of the **Nagoya Protocol (2010)**, an international agreement under the **Convention on Biological Diversity (**CBD**)**.
- **Implementation:** Through a **three-tier** mechanism under the Biological Diversity Act, 2002, involving the **NBA**, **State Biodiversity Boards (SBBs)**, and local **Biodiversity Management Committees (BMCs)**.

National Biodiversity Authority (NBA)

- NBA is a **statutory autonomous** body created in **2003** under the **Biological Diversity Act, 2002**.
- Based in **Chennai**, it functions under the Ministry of Environment, Forest and Climate Change

(MoEFCC).

- It regulates **access to biological resources**, monitors benefit-sharing compliance, and provides policy advice to the Central Government. It holds the power of a **civil court**

COP32 in Ethiopia

- **Ethiopia** will host the **32nd Conference of the Parties** (COP32) to the UNFCCC in **2027**. The COP presidency & venue rotate among **five** UN-recognised **regional groups**: Africa, Asia, Latin America an d the Caribbean, Central and Eastern Europe, and Western Europe & Others.

Humboldt Penguin (*Spheniscus humboldti*)

- Chile's Ministry of the Environment has **reclassified the Humboldt penguin** as **'endangered'** within the country, due to a decline of over 50% in its population since the late 1990s.

Humboldt Penguin (*Spheniscus humboldti*)

- The Humboldt penguin is a **medium-sized seabird** native to the **Pacific coasts** of **Chile** and **Peru**. It is named after the cold Humboldt Current.
- **Habitat Preference:** They inhabit **rocky coastal areas** and **offshore islands**, and nest in burrows, caves, or rock crevices.
- **Distribution:** Their range follows the cold, nutrient-rich **Humboldt Current**, with nearly **80%** of the global population found along **Chile's Pacific coast**.
- **Behavioural Traits:** Humboldt penguins are **highly social** and **monogamous**, with both parents sharing responsibilities for egg incubation and offspring care.
- **Physical Features:** They have **black heads**, **white facial stripes**, and **pink skin patches near the bill**.
- **Unique Adaptation:** **Spines on their tongues** help grip slippery fish underwater, while **patches of bare skin** dissipate excess heat.
- **Ecological Role:** As **mid-level predators**, they help maintain marine ecosystem balance by regulating the small schooling fish population.
- **Major Threats:** Fishing net entanglement, guano extraction, food competition, avian influenza, etc.
- **Conservation Status:** **IUCN:** Vulnerable; **CITES:** Appendix I

ARISE Programme

- At the **UNFCCC COP30 Climate Summit**, **Germany** and **Spain** pledged **$100 million** to support a new climate change adaptation programme under the Climate Investment Funds (CIF).
- **Accelerating Resilience Investments and Innovations for Sustainable Economies** (ARISE).

- **Objective:** To help developing countries integrate resilience into economic planning, strengthen adaptive capacity, and mobilise climate finance.
- **Implementing Body:** Climate Investment Funds (CIF), a **$13 billion multilateral financing mechanism** housed within the World Bank.

COP30 UNFCCC Summit

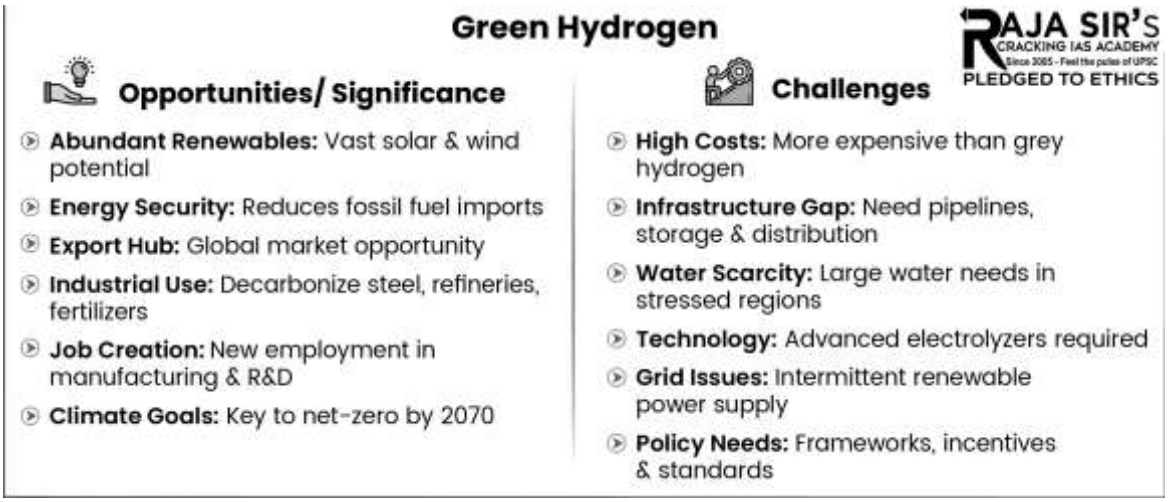
- COP 30, hosted in **Belém, Brazil**, the gateway to the **Amazon rainforest**, was themed around Climate Justice and Global Adaptation Finance.
- It marked the **first-ever COP held in the Amazon region**, symbolising the need to link biodiversity conservation with equitable climate action.
- The summit focused on enhancing global adaptation capacity, protecting forests and ecosystems, and ensuring fair financial flows for developing nations most affected by climate impacts.

Hydrogen Valley Innovation Clusters (HVICs)

- Union Minister of Science and Technology announced that 4 HVICs are being developed across the country to demonstrate complete green hydrogen value chain.

HVICs

- **Aim**: To demonstrate **full hydrogen value chain** (production, storage, transport and utilization) and India's **first large-scale hydrogen demonstration projects**.
- Originally conceptualized by the **Department of Science and Technology**, they are now integrated under the **National Green Hydrogen Mission (NGHM).**
- **NGHM is an Umbrella** programme launched in **2023** to create a Green Hydrogen ecosystem. It **target**s to produce **5 MMT of Green Hydrogen annually by 2030**.



Green Hydrogen

- Hydrogen produced using renewable energy, such as solar or wind power, instead of fossil fuels.

- **Process**: By **electrolysis** (splitting water into oxygen and hydrogen) or **gasification of biomass.**
- **Criteria**: Emissions from the process should not be more than **2 kg of CO_2 equivalent for every 1 kg of Hydrogen produced.**
- **India's First 3 Green Hydrogen Hubs**: Deendayal Port (Gujarat), V.O. Chidambaranar Port (Tamil Nadu), and Paradip Port (Odisha).

Gynandromorphism

- Scientists in Thailand discovered a rare spider that is **half-female and half-male** (**gynandromorphism**) named Damarchus inazuma.
- It is an **abnormal reproductive condition** in which **both female and male characteristics are displayed** in the same individual.
- It is most frequently recognized in organisms that have **strong sexual dimorphism** such as **certain butterflies, spiders and birds**.
- **Cause**: It is typically **an event in mitosis during early development**.
- **One of the dividing cells does not split** its sex chromosomes, producing mixed male/female cell lines.

Global Climate Risk Index 2025

- At the COP 30 Summit in Belém, **Germanwatch** has published the **Climate Risk Index (CRI) 2025**, showcasing the effects of climate-related disasters (1995–2024).
- **Key Findings of the Report**
- India ranked **9th globally** among nations worst hit by climate disasters (1995–2024)
- Over **80,000 deaths** in India due to extreme weather events, which is about **9.6% of global deaths**.
- Around **430 extreme events** were recorded in India, including floods, droughts, cyclones, and heatwaves.
- Economic Losses for India are estimated at **USD 170 billion over 30 years** due to climate disasters.
- Improved Annual Rank from **10th (2023)** to **15th (2024)**, indicating gradual progress in resilience.
- The most affected countries include **Pakistan**, **Philippines**, **Bangladesh**, **Haiti**, and **Myanmar**.
- The 1999 Odisha cyclone, 2013 Uttarakhand floods, Cyclone Hudhud (2014), Cyclone Amphan (2020), and the 2015 heatwave were major events.
- **Between 1995 and 2024**, 9,700 extreme weather events caused over **8 lakh deaths and $ 4.5 trillion in damages.**
- **India** ranked **15th in CRI Rank 2024 and 9th in CRI Rank 1995-2024.**

- **India** faced nearly **430 extreme weather events** in three decades, causing **$ 170 billion losses** and **1.3 billion affected.**

Germanwatch

- **Type:** Independent, non-profit environmental and development organisation.
- **Established: 1991**, headquartered in **Bonn, Germany**.
- **Flagship Reports:**
- **Global Climate Risk Index:** Assesses nations' vulnerability to extreme weather events.
- **Climate Change Performance Index:** Evaluates climate action performance of over 60 countries based on emission trends, renewable energy, and policy efforts.

Atlantic Meridional Overturning Circulation (AMOC)

- Iceland has declared the potential collapse of AMOC as a national security threat.
- In November 2025, **Iceland** formally classified a potential AMOC collapse as a national security and existential threat, the **first climate phenomenon** to receive such status.

AMOC

- AMOC is a **system of ocean currents** that circulates water within the Atlantic Ocean, bringing warm water north and cold water south.
- It is powered by the **differences in water temperature and salinity** and **distributes heat and nutrients** throughout the world's ocean basins.
- **Its weakening and collapse** can lead to:
- Cool Europe and change precipitation patterns in parts of Europe, South America, and Africa.
- Affect the timing of the Indian monsoon.
- Tropical rain belt to shift southward, resulting in droughts over the African Sahel.

Atlantic Meridional Overturning Circulation (AMOC)

- AMOC carries warm, salty water northward at the surface and returns cold, dense water southward at depth, forming a key component of **global thermohaline circulation**.
- It is driven by differences in **water density**, which determines its temperature.
- It acts as a **conveyor belt**, redistributing heat throughout the Earth's climate system by bringing it from the tropics in the **Southern Hemisphere to Greenland** and carrying cold water back south.
- It is a potential **climate tipping point**; its collapse could trigger rapid & irreversible climate changes.
- A 2021 study found that the AMOC is already at its **weakest in over 1,600 years**.

Importance of AMOC

- **Climate Regulator:** Distributes heat from the tropics to the North Atlantic, stabilising European winters and global temperature patterns.

- **Rainfall & Monsoon Influence:** Shapes tropical rainfall belts and monsoon systems, affecting agriculture and water security across continents.
- **Ocean Health & Carbon Cycle:** Drives deep-ocean circulation that supports **nutrient cycling**, marine ecosystems, and **long-term carbon storage**, moderating global climate change.

Impact of Weakening of AMOC

- **Severe Winter in Europe:** North-Western Europe could experience more intense winter extremes.
- **Sea Ice Expansion:** Cooling from the reduced heat transfer from ocean currents would be amplified by "extensive" sea ice expansion to the coasts of northwest Europe.
- **Weakening of Monsoon:** A shutdown of the AMOC could shift the Intertropical Convergence Zone southward, weakening monsoon systems across India, West Africa, and the Amazon.
- **Ice Melt:** Greenland and Arctic ice melt may accelerate, increasing freshwater input into the ocean and further amplifying weakening of the AMOC.
- **Droughts:** The **Sahel region** in Africa is at risk of severe droughts, which could disrupt livelihoods.
- **Ocean & Weather Instability:** Reduced heat distribution can intensify marine heatwaves, **Atlantic hurricanes**, sea-level rise patterns, and destabilise global climate systems

India Launches Biomass-Based Hydrogen Pilot Initiative

- At the **3rd International Conference on Green Hydrogen (ICGH 2025)**, the **Ministry for New & Renewable Energy** announced a new **₹100 crore initiative** under the National Green Hydrogen Mission (NGHM).

Key Highlights of the Announcement

- The **National Green Hydrogen Mission (NGHM),** launched in **2023** with an outlay of ₹19,744 crore, aims to **decarbonise** hard-to-abate sectors.
- A new **₹100 crore Call** for **Proposals** will fund pilot projects that use **biomass** and **waste materials** to produce green hydrogen.
- The scheme will be implemented through BIRAC (Biotechnology Industry Research Assistance Council).
- **Another ₹100 crore** has already been allocated for **startups under NGHM**.
- The Ministry also announced that **43 hydrogen-related** skill qualifications have been **approved**.
- Frameworks such as the **Green Hydrogen Standard (2023)** and the **Certification Scheme (2025)** are **now operational**.

Progress under NGHM.

- Incentives under the **Strategic Interventions for Green Hydrogen Transition (SIGHT) programme** have been awarded for:

- **3,000 MW per annum** of **domestic electrolyser manufacturing** and;
- **8.62 lakh metric tonnes** per annum of **green hydrogen production**.
- India now records the **world's lowest green ammonia** price at ₹49.75/kg for a production capacity of 7.24 lakh MTPA.

Climate and Health Funders Coalition (CHFC)

- **The CHFC** has committed an initial **$300 million for integrated action** to tackle **climate change and its consequences on health.**
- It brings together **institutional and individual funders operating at international, national and regional levels to improve health and save lives.**
- **The committed funders currently include:** Bloomberg Philanthropies, Gates Foundation, etc.
- **Immediate focus**: Extreme heat, Air pollution, Climate sensitive infectious diseases, Critical climate and health data for decision makers.

Global Carbon Budget 2025 report

- In 2025, India''s emissions grew slower to 1.4%, due to monsoon cooling, and a growth in renewable energy, as per **Global Carbon Budget 2025 report**.
- The report is published by **Global Carbon Project.**

Key Highlights of Report

- **India is the third largest emitter** of carbon at 3.2 billion tonnes annually (2024), led by the U. S. (4.9 billion tonnes) and China (12 billion tonnes).
- **In per person terms,** it is 2.2 tonnes of carbon dioxide per year, the second lowest of 20 of the largest economies globally.
- **Coal is the major** fuel type contributing to India's emissions.

India highlighted that climate finance is a key barrier to climate ambitions

- India issued statements on behalf of the BASIC (Brazil, South Africa, India and China) and the Like-Minded Developing Countries (LMDC) group at the UNFCCC CoP30, in Belém, Brazil and highlighted the importance of climate finance.

Key Highlights of India's Stand

India called for:

- **Definition:** A clear and universally agreed **definition of climate finance**;
- **Adaptation Finance:** Strengthened and **scaled-up public finance flows for adaptation**;
- **Adaptation Financing** needs to exceed nearly fifteen times current flows.
- Strong outcome on **Global Goal on Adaptation (GGA),** introduced by Article 7 of 2015 Paris Agreement for enhancing adaptive capacity, strengthening resilience and reducing climate vulnerability.

- **Article 9.1:** Implementation of Article 9.1 of the Paris Agreement, reaffirming the **legal obligation of developed countries** to provide financial resources to assist developing countries in both mitigation and adaptation.
- **Climate Technology:** Strong outcome on the **Technology Implementation Programme** (outcome of first global stocktake of Paris Agreement), emphasizing that intellectual property and market barriers must not hinder technology transfer to developing nations.
- **Narrowing Development Gap between Global North and South: UNFCCC Just Transitions Work Programme** must result in action-oriented institutional arrangements, ensuring that equitable and inclusive climate transitions across economies.

Internationally Agreed Climate Finance Targets

- **Baku to Belem Roadmap to 1.3T: At COP29,** Parties agreed to the **New Collective Quantified Goal (NCQG),** including a goal to mobilise at least $300 billion per year by 2035 for developing countries.
- **A broader goal** was also set to reach at least **$1.3 trillion in total** external finance per year by 2035.
- **Glassgow Climate Pact:** Commits developed nations to providing $40bn in adaptation funding for developing nations by 2025.

Saranda Forest

- Supreme Court directed the Jharkhand government to **notify Saranda Forest as wildlife sanctuary and conservation reserve.**
- It also prohibited any mining activity within a one-km radius of its boundary.
- Saranda, known as the "**land of seven hundred hills," is a lush Sal forest in Jharkhand.**
- It is a **part of Chhotanagpur bio-geographic zone** and the landscape **merges with forests of Odisha and Chhattisgarh.**
- **Tribes: Ho, Munda, Uraon, Santhal** etc.
- **Chief rivers** draining the area include Karo, Koina, Lailor etc.
- Important for **movement of Central Indian elephant population** and is home to **unique orchids.**
- **Ligarda swamp** hosts rare vegetation, palms, wild bananas, ferns, and Piper species.

Declaration on Information Integrity on Climate Change

- **Global Initiative for Information Integrity on Climate Change** launched the Declaration on Information Integrity on Climate Change at COP30.
- Announced at G20 Leaders Summit in 2024, the initiative is a dedicated **multilateral collaboration** among States and international organizations to **fund research and action promoting information integrity** on climate issues.

- It has also launched a Global Fund for Information Integrity on Climate Change.
- **The Declaration** recognises that Climate misinformation has become a climate crisis.
- **Climate misinformation** refers to false, misleading, or deceptive content about climate change, its causes, impacts, or solutions.

It **commits governments to protect climate science** and ensure transparent public communication.

Himalayan Black Bears

- Climate change-induced **changing weather patterns** are disturbing the **hibernation patterns** of **Himalayan Black Bears**, making them unusually aggressive.
- This shift in behaviour has led to more **attacks on humans and livestock**, intensifying human–animal conflict in Himalayan regions.

Himalayan Black Bear (*Ursus thibetanus laniger*)

- The Himalayan black bear is a **subspecies** of the Asiatic black bear native to the **Himalayan region**. They are called "**moon bear**" because of a **white crescent** or **V-shaped mark** on their **chest**.
- **Habitat Distribution:** They inhabit **India**, **Nepal**, **Bhutan**, **China**, and **Pakistan** across elevational zones of **1,500–3,700** meters.
- **Physical Features:** It has a glossy **black coat**, a **pale chest patch**, rounded ears, and an elongated snout.
- **Unique Features:** Longer, **thicker fur** than other Asiatic black bears; they **hibernate** for 5-7 months during peak winter.
- **Diet:** Himalayan black bears are **omnivores**, consuming nuts, fruits, honey, roots, and insects.
- **Behavioural Patterns:** They are **skilled climbers**, **nocturnal**, **solitary**, and spend much time in trees.
- **Ecological Role:** They are **keystone species** and serve as a **primary seed disperser**, which helps sustain the stability and regeneration of the forest ecosystem.
- **Major Threats:** Habitat fragmentation, human encroachment, and **poaching for gall bladders** (used in traditional Asian medicine).

Asiatic Black Bear (*Ursus thibetanus*)

- The Asiatic black bear is a **medium-sized bear species** native to **Asia**, with a distinctive white chest mark and arboreal adaptability.
- **Conservation Status: IUCN:** Vulnerable; **CITES:** Appendix I; **WPA: Schedule I**

The Land Gap Report 2025

The Land Gap Report 2025 highlights reliance of governments' climate pledges on **Land-Based Carbon**

Removal (LBCR)

Present government climate pledges propose using approximately 1.01 billion ha of land for Land Based Carbon Removal.

- **Land Based Carbon Removal (LBCR)**
- LBCR refers to strategies that use terrestrial ecosystems primarily forests, soils, wetlands, and agricultural landscapes to absorb and store carbon dioxide from the atmosphere.

Methods of LBCR

- **Reforestation and Afforestation**: According to the IPCC, reforestation and afforestation can **mitigate 0.5–10.1 gigatonnes of CO_2** per year.
- **Soil Carbon Sequestration:** It refers to the process of capturing atmospheric CO_2 and storing it in soils in the form of soil organic carbon (SOC).
- **Bioenergy with Carbon Capture and Storage (BECCS)**: In BECCS, energy crops like silvergrass are grown, which are burned as fuel for bioenergy, and the resulting CO_2 emissions are captured and stored underground.
- **Geologic Carbon Sequestration**: Captured CO_2 either from direct air capture or biogenic sources is injected deep underground into porous rock formations for long-term storage.
- **Biochar**: Burning biomass in an oxygen-limited environment producing more stable form of carbon, which can then be applied to soils – adding nutrients and increasing soil's carbon stocks.
- **Enhanced Weathering**: Accelerating the natural reaction between carbon dioxide and reactive sources, such as certain types of rocks, to increase carbon uptake.

Other Key Highlights of Land Gap Report

- **Land Gap**: Climate pledges rely excessively on LBCR requiring 1 billion ha of land.
- Land conversion at this scale would displace food production, threaten biodiversity, and disrupt livelihoods, leading to severe social and ecological trade-offs.
- **Forest Gap**: Difference between commitments to halt and reverse deforestation and forest degradation by 2030 – amounting to loss or degradation of around 20 million ha forest each year by 2030.

Belem Action Plan for Health and Climate Adaptation

- Belem Action Plan for Health and Climate Adaptation launched at **COP30 in Belem, Brazil**. It is the first international climate adaptation document focused specifically on health.
- **Key Highlights**
- **Aim: strengthening global health systems** to cope better with impacts of climate change.
- It is structured around two cross cutting principles and concepts - **health equity** and '**climate justice**' and leadership and governance on climate and health with social participation.
- **It outlines three lines of action for climate-resilient health systems:**

- **Surveillance & Monitoring:** Climate-informed early warning systems and integrated data platforms.
- **Evidence-based Policy & Capacity Building:** Workforce upskilling, gender-responsive and equity-driven health policies, integration of mental health and psychosocial support etc.
- **Innovation & Production:** Resilient infrastructure, **just transitions**, sustainable supply chains, and return-on-investment frameworks.
- **Funding:** About 35 philanthropies, under the banner of **Climate and Health Funders Coalition**, announced an initial commitment of **US $300 million** for implementation.
- **Need for Climate Health Adaptation Plan**
- Climate change is already driving a global health emergency, with over 540 000 people dying from extreme heat each year & **1 in 12 hospitals worldwide at risk of climate-related shutdowns**.
- **3.3 to 3.6 billion people already live in areas highly vulnerable to climate change**, and hospitals are facing 41% higher risk of damage from extreme weather.

India's Slowing CO_2 Emission Growth

- The Global Carbon Project (GCP) 2025 reports India's fossil-fuel CO_2 emissions to grow by just **1.4% in 2025, down from 4% in 2024**.

Drivers Behind the CO2 Emission Slowdown

- **Early & Strong Monsoon:** Reduced cooling and irrigation demand lowered peak power load. E.g. First half of 2025 **power-sector** CO_2 emissions showed a **decline for the first time** (CREA analysis).
- **Renewables Uptick:** Solar and wind additions met incremental demand without increasing coal use; E.g. India added **>20 GW RE capacity in 2024–25**, easing coal generation growth.
- **Demand-Side Efficiency:** Efficiency gains reduced fossil dependence; E.g., UJALA**-led LED adoption** cut lighting load by **~48 TWh annually**.
- **Policy Push:** Green hydrogen, storage, and domestic solar manufacturing boosted low-carbon options; E.g. National Green Hydrogen Mission and PM-KUSUM Scheme.
- **Global Economic Conditions:** Slower industrial output moderated fossil-fuel use; E.g. global emissions rose **only 1.1% in 2025** despite record energy demand (GCP).
- **Significance of the CO2 Emission Slowdown**
- **Energy Transition Signal:** Slower CO_2 growth reflects reduced coal dependence as renewables expand rapidly; supports India's **500 GW RE target by 2030**.
- **Lower Carbon Intensity:** Decadal growth fell from **6.4% (2005–14) → 3.6% (2015–24)**, showing structural improvements in energy efficiency.
- **Global Standing:** India's **growth (1.4%) is lower than the US (1.9%)**, strengthening India's narrative as a responsible emitter despite rising development needs.
- **Policy Credibility:** Supports India's NDC goals, **45% emissions intensity reduction by**

2030 and validates schemes like PAT, UJALA, and FAME-II.

- **Climate Diplomacy:** Positions India as a bridge between developing and developed nations, bolstering calls for climate finance & energy equity.

India–Botswana Cheetah Translocation Pact

- **India** and **Botswana** formally announced a pact for the **translocation of eight cheetahs** during Indian President Droupadi Murmu's state visit to the country.
- This initiative is part of India's ongoing effort to **restore cheetah populations**, under "Project Cheetah."
- The cheetahs to be translocated will be kept in a **quarantine facility** at **Mokolodi Nature Reserve**, **Botswana**, before they arrive in India.

> *Project Cheetah, launched in **2022**, is a **Central Government initiative** to reintroduce cheetahs in India, where they were **declared extinct in 1952**. It is the **world's first intercontinental large carnivore translocation project**.*

Botswana

- **Location:** Botswana is a **landlocked country in Southern Africa**, with **Gaborone** as its **capital**.
- **Borders:** It shares borders with **Namibia** (west and north), **Zambia** and **Zimbabwe** (northeast), and **South Africa** (southeast and south).
- **Geographical Features:** More than **70% of its land area** is covered by the **Kalahari Desert**.
- **Biodiversity:** The **Okavango Delta**, a UNESCO World Heritage site, is located here; it is also home to the world's **largest population** of African elephants.

Crassicaulis middletonii

- The **Botanical Survey of India** discovered a new **flowering plant**, ***Crassicaulis middletonii***, in the evergreen forests of **Arunachal Pradesh**'s **West Siang** district.
- **Significance:** The discovery represents both a **new species** and a **new genus** record for India.
- **Genus Record:** It is India's first record of the **genus *Crassicaulis***, extending its known range nearly 12,000 km westward from its **only known species** in **China**.
- **Habitat Preference:** The plant thrives along **stream banks** and near **small waterfalls** in **evergreen forests** at about 800 metres elevation.
- **Appearance:** It grows up to **30 cm tall**, with slender stems and **white flowers** tinged with **pink**.
- **Threats:** Pollution, landslides, and flash floods pose risks to its fragile habitat.
- **'Biogeographical Bridge':** The discovery highlights the **Eastern Himalaya**'s role as a **biodiversity corridor** linking Indian and Southeast Asian floral lineages.

Global Warming and Food Insecurity

- The **World Food Programme (WFP)** released a 2025 analysis linking temperature rise directly to food insecurity using data across 45 countries (2017–2025).

Key Findings from the WFP Study

- A **+1°C rise** in temperature results in 70 million more people becoming food insecure globally.
- Under a **0°C anomaly**, around 252 million people face food insecurity.
- Under a **+1°C anomaly**, this jumps to 322 million (a 28% increase).
- Eastern Africa shows more than double the temperature sensitivity of **Western Africa**. **Haiti** and **Yemen** have the highest vulnerability, with an 8% increase in food-insecure populations per +1°C rise.

Broader Implications of Temperature Rise

- **Food System Fragility:** With the global population projected to reach **9.7 billion by 2050**, agricultural systems in low-income nations face compounded climate and resource stress.
- **Economic Loss:** Climate-linked food shocks cause **$80–100 billion** annual GDP losses globally (FAO).
- **Inequality Amplifier:** Smallholder farmers and regions dependent on rain-fed agriculture are exposed. E.g. In India, over 55% of net sown area is rain-fed; yield losses during drought years can exceed 25–30%.

World Food Programme

- WFP is an international organisation within the UN that provides food assistance worldwide. Founded in **1961**, WFP is headquartered in **Rome**.
- It is the **world's largest** humanitarian organisation. It is a significant provider of cash assistance, medical supplies, and passenger services for humanitarian workers.
- WFP aims to fulfil the 17 SDGs, prioritising achieving **SDG 2 for "zero hunger" by 2030**.
- The World Food Programme was awarded the **Nobel Peace Prize in 2020** for its efforts to provide food assistance in areas of conflict and to prevent the use of food as a weapon of war and conflict.

Smooth-Coated Otter Spotted in Indravati Tiger Reserve

- Researchers captured **photographic evidence** of the **elusive smooth-coated otter** inside **Indravati Tiger Reserve** for the first time in 25 years.
- **Smooth-Coated Otter (*Lutrogale perspicillata*)**
- The smooth-coated otter is a highly social, **semi-aquatic mammal** native to South and Southeast Asia.
- **Physical Traits:** It is one of the **largest otter species** and has a short, glossy reddish-brown coat.
- **Habitat Preference:** Inhabits **freshwater wetlands**, rivers, and lakes, but can also tolerate

estuarine conditions while needing **fresh water for drinking**.

- **Dens:** They build dens under tree roots, among boulders, or within dense vegetation along the banks.
- **Diet:** Carnivorous and **piscivorous**; groups often form a **coordinated V-formation** to herd fish.
- **Social Behaviour:** It is a **diurnal** species and lives in **cohesive family groups** of up to 11 individuals.
- **Distribution:** Widely distributed across **South** and **Southeast Asia**, with an isolated population found in the **marshlands** of **Iraq**.
- **Ecological Role:** As **apex predators**, smooth-coated otters regulate fish populations and act as **indicator species** of freshwater ecosystem health.
- **Key Threats:** Habitat degradation, Water pollution, Pesticides exposure, Poaching, Illegal trade, etc.
- **Conservation Status:** **IUCN:** Vulnerable; **CITES: Appendix I**; **WPA: Schedule I**.

Indravati Tiger Reserve

- Indravati Tiger Reserve is a **tropical moist and mixed deciduous** forest located in the **Bijapur district** of **Chhattisgarh**.
- **Flagship Species:** It has one of the **last surviving populations** of the endangered **Wild Asian Buffalo** (the **state animal** of **Chhattisgarh**).
- **Other Fauna:** Tigers, leopards, Indian gaur, Nilgai, Blackbuck, Sloth bears, Dholes, etc.
- **Key Flora:** Prominent species include Teak, Sal, Bamboo, Mahua, and Tendu.
- **River System:** The perennial **Indravati River** flows east to west, forming the **northern boundary** of the reserve and the **interstate border** with **Maharashtra**.

Right to Clean Air

- As Delhi's air quality again dipped to "very poor" levels (AQI > 350), citizens, parents, and children gathered spontaneously at India Gate, demanding government accountability.
- **Impact of Air Pollution in India**
- **Public Health Emergency:** Air pollution contributes to **~1.6 million deaths** annually in India (Lancet Planetary Health, 2024), with children and the elderly most affected.
- **Invisible Pandemic:** 99% of Indians breathe air exceeding safe PM2.5 levels (WHO 2023).
- **Delhi's Air Quality:** AQI crosses **450** during winter, equivalent to smoking **20–25 cigarettes** per day.
- **Economic Cost:** The World Bank estimates **~1.4% of India's GDP** is lost annually to air pollution.
- **The Right to Clean Air**
- **Constitutional Basis:** Clean air is part of the **Right to Life** under **Article 21** of the Constitution, which guarantees every citizen the right to live with dignity, health, and environmental safety.
- **Directives and Duties:** **Articles 47, 48A, and 51A(g)** collectively direct the State and citizens to protect and improve the environment, including air quality.

- **Judicial Recognition:**
- **Subhash Kumar vs State of Bihar (1991):** The Supreme Court held that the **right to pollution-free water and air** is part of the Right to Life under **Article 21**.
- **M.C. Mehta vs Union of India (1987):** Recognised the right to a **clean environment**; led to measures controlling air pollution from industries and vehicles.
- **Vellore Citizens Welfare Forum vs Union of India (1996):** Introduced the **"Precautionary" and "Polluter Pays" principles**, now part of Indian environmental jurisprudence.
- **Legislative Framework:**
- **Air (Prevention and Control of Pollution) Act, 1981:** Establishes legal mechanisms for regulating and reducing air pollution through **CPCB** and **SPCBs**.
- **Environment (Protection) Act, 1986:** Umbrella legislation empowering the government to set and enforce air quality standards.
- **National Green Tribunal (NGT) Act, 2010:** Provides a specialised judicial forum for environmental disputes, including air pollution cases.
- **International Obligations:** India is a signatory to the Paris Agreement (2015) and the UN Sustainable Development Goal **3.9**, which aims to reduce deaths from air pollution by **2030**.

Global Phase-Out of Mercury-Based Dental Amalgams

- Signatory nations to the **Minamata Convention on Mercury** have agreed to phase out mercury-**based dental amalgams** by **2034**.

Mercury

- **Mercury (Hg)** is a **naturally occurring** heavy metal found in air, water, and soil, but human activities have raised mercury levels in the environment.
- **Health Hazard:** Mercury **destroys body cells**, damages vital organs, and prolonged inhalation of vapours leads to chronic **neurological**, **oral**, and **skin disorders**.
- **Global Hazard:** The **World Health Organisation (**WHO**)** ranks mercury among the **top 10 chemicals** posing major health risks.
- **Primary Sources:** **Artisanal and Small-Scale Gold Mining** (about **38%**) is the **largest human-made source**; others include coal combustion, metal and cement industries, and waste incineration.
- Minamata Disease: It is a severe **neurological disorder** caused by mercury poisoning, first identified in **1950s Japan** due to eating fish from **Minamata Bay** contaminated with **methylmercury**.

Minamata Convention

- The Minamata Convention on Mercury is an **international, legally binding treaty** to safeguard human health and the environment from mercury and its compounds.

- **Adoption:** It was signed and adopted by representatives from **92 countries** in **2013**; **India** ratified the Convention in **2018**.
- **Implementing Agency:** It is an initiative by the **United Nations Environment Programme (**UNEP**)** that coordinates the global efforts for its implementation.

Systematic Observation Impact Bond

- **Systematic Observation Impact Bond,** World's first impact bond on weather and climate data recently opened for contributions.
- To be announced as part of **COP30 (UNFCCC) Action Agenda**.
- **Aim:** Finance instrument to **strengthen resilience and early warnings worldwide**
- Seeks initial capitalization of **USD 200 million by end of 2026.**
- **Pioneered by: Systematic Observations Financing Facility (SOFF),** a United Nations fund created by UN Environment Programme (UNEP), World Meteorological Organization, and UN Development Programme (UNDP).
- **Significance:** Help 30 Least Developed Countries (LDCs) and Small Island Developing States (SIDS) meet **Global Basic Observing Network (GBON) standards.**

Anegada Passage

- Fighter jets and guided-missile destroyers, transited the **Anegada Passage** as a part of USA's **Operation Southern Spear** against Narco Terrorism in the Caribbean.

Anegada Passage

- **Location:** Channel in the **West Indies, connecting the Atlantic Ocean** with the **Caribbean Sea.**
- It is **65 km wide** and **separates the British Virgin Islands (west)** from the **Leeward Islands (southeast).**
- It is one of the two passages through which subsurface water enters the **Caribbean** (other being the Windward Passage).

India announced a plan to develop a national platform for climate and nature finance

- India, along with 13 other developing countries and regions, announced plans to establish country- or region-specific platforms during a ministerial event at COP30 in Belém, Brazil.
- The initiative includes regional bodies such as the African Islands States Climate Commission (AISCC) and participating countries like Cambodia, Colombia, and others.

The Platform

- Supported through the **Green Climate Fund's (GCF)** Readiness and Preparatory Support Programme.

- **Readiness Programme** supports country-driven initiatives to strengthen their institutional capacities, governance mechanisms, and planning towards a transformational long-term climate action agenda.
- **Purpose:** Strategic, country-driven mechanisms that translate climate priorities into programmatic investment approaches.
- It will replace a fragmented project approach based climate finance mobilisation.
- And, provides platform for better coordination between the different public and private, international and local stakeholders.

Green Climate Fund

- It is the **world's largest climate fund.**
- **Genesis:** COP 16, UNFCCC Cancun, 2010.
- It serves the **Paris Agreement in accordance with Article 9.**
- **Mandate:** To support developing countries in raising and realizing their Nationally Determined Contributions ambitions towards low-emissions, climate-resilient pathways.
- **Governance:** Fund is governed by the GCF Board and it is accountable to and functions under the guidance of the COP, UNFCCC.
- **HQ:** Songdo, Incheon City, Republic of Korea

Integrated Forum on Climate Change and Trade (IFCCT)

- **Integrated Forum on Climate Change and Trade (IFCCT)** launched at COP30
- **Aim:** To create a permanent, politically supported space where countries can address the increasingly contentious intersection between trade policies and climate action.
- It will be institutionally independent of both the WTO and the UNFCCC
- The Forum will be co-chaired by Brazil and a developed country partner, and is open to all parties to the UNFCCC.
- **Forum will not** Negotiate binding outcomes or interpret existing agreements or adjudicate disputes or evaluate specific national measures.

Ethiopia's Hayli Gubbi volcano

- **A massive volcanic ash cloud from Ethiopia's Hayli Gubbi volcano—**which erupted after nearly 10,000 years—has drifted toward India, raising concerns over air quality and aviation.
- Hayli Gubbi is a shield volcano in **Ethiopia's Afar Region**, known for broad, gently sloping volcanic structures formed by low-viscosity basaltic lava typical of the East African Rift system.
- **Located In:** It lies in the Afar Depression of Ethiopia, at the southern end of the Erta Ale volcanic range, one of the most active tectonic and volcanic zones in the world.

History Background:

- No confirmed eruptions for ~10,000–12,000 years (Holocene).
- On 23 November 2025, a sudden sub-plinian eruption produced an ash plume reaching 45,000 ft (FL450).
- The plume drifted across Red Sea, Yemen, Oman, and then moved east toward western India.

Key Features:

- Shield volcano type—broad, low-gradient, large lava fields.
- Part of the **divergent plate boundary** where the African Plate is rifting.
- Eruption produced **volcanic ash, SO_2, glass shards**, and rock particles transported at high altitudes (15,000–45,000 ft).
- Classified as sub-plinian due to vertical column height and ash dispersal scale.

Other Major Volcanoes in Africa:

1. Mount Nyiragongo (DR Congo) – One of the world's fastest lava flows.
2. Mount Silali (Kenya) – Extinct caldera volcano.
3. Dabbahu Volcano (Ethiopia) – Rift-related fissure eruptions.
4. Mount Alayta (Ethiopia) – Part of Afar Rift.
5. Ardoukoba (Djibouti) – Erupted in 1978.
6. Mallahle (Ethiopia) – Stratovolcano.
7. Asavyo (Ethiopia) – Volcanic field within Afar rift.

Impact on India:

- **Air Quality:** Ash is at high altitudes, limiting ground-level mixing; Delhi is unlikely to see major AQI deterioration.
- Skies may appear hazy/darker but pollutants will remain mostly aloft.
- **Health & Climate:** SO_2 can contribute to acid rain regionally, but concentrations over India appear limited.
- Volcanic particles may briefly affect solar radiation and visibility.

Road Dust Management

- Road dust has become a major contributor to PM_{10} levels across Indian cities, prompting renewed scrutiny under the NCAP's 40% PM_{10} reduction target for 2025–26.

Consequences of Road Dust

- **Health Bur**den: Continuous inhalation of coarse and fine particles increases respiratory illnesses and eye irritation in exposed populations. E.g., ICMR notes higher OPD visits during PM spikes.
- Ambient Pollution: Road dust contributes 20–52% of PM_{10} and 8–25% of $PM_{2.5}$, worsening overall AQI levels and amplifying winter smog across large urban clusters.
- Heat Intensification: Bare road verges and open surfaces increase local temperatures and turbulence, aiding dust circulation. E.g., IPCC AR6 shows greening reduces heat by 2–4°C.
- Economic Costs: Pollution-linked morbidity lowers labour productivity (WB estimate: 1.4% GDP loss).

Significance of Reducing Road Dust

- **Major Share:** Road dust forms the largest PM_{10} fraction (20–52% contribution across 17 cities) , making mitigation crucial for meeting NCAP goals and reducing premature mortality risks.
- **Regional Priority:** Northern India's higher silt loads make dust control essential for stabilising urban air quality. E.g. Delhi averages 14.47 g/m^2 silt load.
- **Policy Prioritisation:** Nearly 64% of NCAP spending has already been directed towards dust reduction.
- **Urban Mobility:** CAQM notes improved road performance post-sweeping, reducing accident risk.

Challenges Faced in Controlling Road Dust

- **Fragmented Jurisdiction:** Multiple agencies handle roads without clear accountability, slowing coordinated dust control efforts. E.g. Delhi has 12 agencies sharing responsibilities.
- **Machine Shortage:** Cities lack adequate mechanised sweepers needed for the daily cleaning of mapped stretches. E.g. Delhi requires 200 machines but operates only 85.
- **Poor Road Condition:** Damaged surfaces and potholes trap silt that quickly resuspends with traffic movement. E.g. the CAQM pilot found 24% roads in poor shape.
- **Weak SOPs:** No national-level standards exist for dust disposal, sweeping methods or

suppressant use, reducing consistency. E.g. Construction and Demolition Waste Rules 2025 omit dust pathways.

Way Forward

- **Unified Agency:** Establish a single nodal body in each city to coordinate all road dust management responsibilities. E.g. NCR's CAQM model of central oversight.
- **Verge Greening:** Expand roadside greening and paving to reduce loose dust and stabilise open edges effectively. E.g. Bengaluru's verge-greening experiments.
- **Machine Deployment:** Procure context-specific sweepers suited to varying road widths, traffic and debris characteristics. E.g. EU practice of calibrated cleaning machinery.
- **Dust Suppressants:** Evaluate chemical agents through controlled Indian studies before adoption at scale. E.g. CSIR-CRRI pilot trials on natural polymers.

Fujiwhara Effect

- **Two potential cyclonic storms are forming in the Bay of Bengal, with global forecast models indicating a possible Fujiwhara interaction between them.**
- A rare meteorological phenomenon where two nearby cyclonic systems begin to rotate around a common centre due to interaction of their wind circulations.
- Identified by **Sakuhei Fujiwhara (1921)**, it occurs mostly in the tropical cyclone belt when storms are within ~1,400 km of each other.

Factors Aiding Its Occurrence:

- Proximity of two cyclones within a threshold distance (typically **<1400 km** in the Indian Ocean).
- Similar rotational direction (counter-clockwise in the Northern Hemisphere).
- Favourable sea surface temperatures >26°C supporting sustained convection.
- Low vertical wind shear allowing stable cyclone structure.

How it forms?

- **Close Formation:** Two cyclones forming within ~1400 km begin influencing each other's wind fields and natural movement patterns due to proximity.
- **Wind Interaction:** Their outer rainbands and upper-level winds overlap, creating deformation zones that gradually pull the systems toward each other.
- **Coupled Circulation:** The interacting winds generate a shared pivot point, forcing both cyclones to rotate in curved, mutually influenced paths.
- **Orbiting:** If one storm is stronger, the weaker one revolves around it and may eventually be absorbed due to energy imbalance.
- **Merger:** When centres move very close, the vortices fuse into a single, larger cyclone with enhanced convection and stronger winds.
- **Weakening:** Competition for heat and moisture can deprive the weaker cyclone of inflow,

triggering rapid weakening or dissipation.

- **Deflection:** If interaction is weak, storms may push each other onto diverging paths, adding significant uncertainty to forecasts.

Key features -

- **Mutual Rotation:** Both cyclones circle a common centre anti-clockwise, altering their original trajectories and movement speed.
- **Energy Transfer:** The stronger system can steal momentum or moisture from the weaker one, reshaping their relative strengths.
- **Track Uncertainty:** Steering winds get disrupted, making prediction of landfall, intensity, and movement highly challenging for meteorological agencies.
- **Possible Fusion:** Close approach may cause the cyclones to merge into a more intense system with higher rainfall and damaging winds.
- **Stalling:** Storms may slow down or stall during interaction, prolonging rainfall events and increasing flood risks.

Implications:

- **Forecast Challenges:** High uncertainty delays accurate warnings for landfall and complicates planning for evacuation and relief operations.
- **Heavy Rainfall:** Prolonged interaction increases rainfall over TN, Andhra, Odisha, Bengal, Sri Lanka, and Myanmar, worsening flood potential.
- **Intensification Risk:** Energy transfer or merger can rapidly strengthen one system, raising threats of severe winds, storm surge, and coastal damage.

"100-metre definition" of Aravalli Hills

- A Forest Survey of India (FSI) assessment has revealed that the government's new 100-metre height definition for Aravalli Hills - accepted by the Supreme Court—removes over 90% of the Aravalli landscape from protection.

Aravalli Hills:

- The Aravalli Hills are one of the **oldest fold mountain ranges** in the world, forming a major ecological barrier, wildlife corridor, and mineral-rich region of northern and western India.
- **Located In:** Extends from near Delhi through southern Haryana and Rajasthan to Gujarat, running roughly 670 km.
- **Formation:**
- Formed during the **Proterozoic era** through ancient tectonic collisions, part of the **Aravalli–Delhi orogenic belt.**
- Once very high mountains, they have been heavily eroded over millions of years.

- **Geological & Physical Features:**
- Typically, 300–900 m high, with the highest peak Guru Shikhar (1,722 m) in Mount Abu.
- Composed of **quartzite, marble, granite, copper and zinc**-bearing rocks.
- Generate rivers such as **Banas, Luni, Sabarmati, and Sahibi**.
- Act as a major barrier preventing sand, dust, and desertification from advancing eastward.

The "100-metre definition" of Aravalli Hills issue:

- The Supreme Court has accepted a recommendation from the Environment Ministry that only those landforms that rise 100 metres or more above their immediate surroundings (local ground level) will be counted as "Aravalli Hills."
- If a hill is less than 100 m tall (from base to peak), it is not considered Aravalli under the new rule.
- Only tall hill sections remain protected and smaller hills lose protection.

Issues Highlighted by FSI Survey:

- New 100-metre definition **excludes 90% of hills**, leaving them unprotected.
- Earlier scientific criteria (slope + 30m height) would have covered around 40%, far more than the new definition.
- Lower hills (10–30 m) are critical windbreaks that stop sand and dust from the Thar desert.

NGT directs CPCB to trace hundreds of missing Endosulfan barrels

- The NGT has directed the CPCB, Kerala SPCB and Plantation Corporation of Kerala to trace hundreds of missing barrels of banned pesticide **Endosulfan.**

National Green Tribunal (NGT):

- A specialised judicial body for speedy disposal of environmental disputes, functioning with expertise in environmental science and law.
- **Established in:** Set up on 18 October 2010 under the National Green Tribunal Act, 2010 to provide dedicated and time-bound environmental justice.
- **Aim:** To ensure effective environmental protection, conservation of natural resources, and provide relief and compensation for environmental damage.
- *Jurisdiction:*
- Handles civil cases involving substantial environmental questions linked to laws listed **in Schedule I (e.g., Water Act, Air Act, EPA, Forest Conservation Act, Biodiversity Act).**
- *The following important Acts are NOT within NGT's jurisdiction:*
- **Wildlife Protection Act, 1972:** Wildlife crimes, poaching, sanctuary matters fall outside NGT's powers and go to regular courts.
- **Indian Forest Act, 1927:** Issues of forest offences, transit rules, and forest land rights are not heard by the NGT.

- **Forest Rights Act, 2006 (FRA):** Claims, titles, individual/community forest rights are outside NGT jurisdiction.
- Has appellate jurisdiction over decisions relating to environmental clearances, pollution control orders, and biodiversity benefit-sharing disputes.

Governance Structure

- **Chairperson:** Head of the Tribunal – must be a retired Supreme Court Judge or Chief Justice of a High Court and appointed by the Central Government in consultation with the CJI.
- **Judicial Members:** Retired Judges of SC/HC and handle adjudication of environmental disputes based on legal principles.
- **Expert Members:** Specialists in environmental science, forestry, pollution control, or related fields; ensure interdisciplinary decision-making.

Powers & Functions

- Can provide relief, compensation, and restitution for victims of pollution, environmental damage, and hazardous substance accidents.
- Applies the polluter pays, precautionary, and no-fault liability principles while awarding compensation.
- Not bound by the Civil Procedure Code; guided instead by principles of natural justice for faster adjudication.
- Aims to decide cases within six months, reducing burden on High Courts and the Supreme Court.
- Can enforce environmental rights, impose penalties, direct restoration work, and monitor compliance with its orders.

New Fruit Fly Species Euphranta undulata

- A new fruit fly species, Euphranta undulata, was recently discovered in the Ri-Bhoi district of Meghalaya.
- **Etymology:** The name, undulata, derives from the Latin word for "wavy," referring to the wavy margin of the female **aculeus tip** (the pointed part of the egg-laying ovipositor).
- **Physical Traits**: It is a slender-bodied insect with a brown or grey abdomen and patterned hyaline (transparent) wings.
- **Ecological Niche**: Native to the bamboo ecosystem of Northeast India, it is frugivorous (fruit-eating) and monophagous (feeding on a single type of food).

Centre Gets CEC Push for Tiger Reserve in Goa

- A Supreme Court-appointed Central Empowered Committee (CEC) recommended notifying a tiger reserve in Goa through a two-phase implementation plan.
- **First Phase:** Around 300 sq km of **Cotigao and Netravali Wildlife Sanctuaries** (WLS), adjoining **Karnataka's Kali Tiger Reserve**, will be notified as the core area.
- **Second Phase:** The inhabited parts of **Mhadei WLS** and the southern part of **Bhagwan Mahavir WLS** will subsequently be notified as buffer zones.
- **Legal Requirement:** The state must issue the notification **within three months** and prepare a Tiger Conservation Plan under **Section 38V of the Wildlife (Protection) Act, 1972.**
- **State Objection:** Goa argued that (a) nearly 1,00,000 residents oppose relocation and (b) the state currently has no resident tigers.

Tiger Landscape in Goa

- **Reserve Status:** Goa has no formally notified tiger reserve, yet its Western Ghat belt remains a crucial tiger landscape.
- **Tiger Corridor:** Mhadei and Bhagwan Mahavir Wildlife Sanctuaries (WLS) create a continuous tiger corridor linking Karnataka's **Bhimgad WLS** and Kali Tiger Reserve.
- **Recognised Habitat:** The Western Ghats stretch from **Sattari to Netravali** was officially recorded as tiger habitat in the 2018 National Tiger Census.
- **Mortality Concern**: NTCA recommended a tiger reserve after four tigers were deliberately poisoned in Mhadei WLS in 2020.
- **Legal Mandate:** A 2023 Bombay High Court order directed Goa to notify Mhadei and adjoining areas as a Tiger Reserve under the Wildlife (Protection) Act, 1972.

India Revised Earthquake Design Code, 2025

- India has released a radically updated seismic zonation map under the revised Earthquake Design Code (2025), placing the entire Himalayan arc in a newly created highest-risk **Zone VI** for the first time.

Revised Earthquake Design Code, 2025:

Seismic Zonation Map:

- A seismic zonation map classifies different regions of India based on their earthquake hazard potential, helping determine how strong structures must be to withstand earthquakes.

- The updated map is issued by the **Bureau of Indian Standards (BIS) as** part of the revised Earthquake Design Code, 2025 (IS 1893).
- It uses internationally accepted **Probabilistic Seismic Hazard Assessment (PSHA)**

Key Features of the Revised Zonation Map

1. Introduction of Highest-Risk Zone VI:

- Entire Himalayan arc (J&K–Ladakh to Arunachal) placed in Zone VI, the most hazardous zone, for the first time.
- Recognises consistent, extreme tectonic stress along the Indian–Eurasian plate boundary.

2. 61% of India Now in Moderate to High Hazard Zones:

- A major jump from older estimates relying mainly on past epicentres.
- Reflects scientific modelling of fault segments, **locked sections**, and rupture potential.

3. Boundary Towns Auto-Upgraded to Higher-Risk Zone:

- If a city lies on the border of two zones, it defaults to the higher-risk one.
- Moves away from administrative lines to geological realities.

4. Inclusion of Rupture Propagation Southward:

- Acknowledges that Himalayan Frontal Thrust ruptures may extend south to populated foothill regions like Dehradun (near Mohand).

5. Mandatory Structural & Non-Structural Safety:

- New norms for anchoring parapets, ceilings, tanks, façades, HVAC units, etc., if their weight exceeds 1% of total load.
- Buildings near active faults must withstand pulse-like ground motions typical of near-fault quakes.

6. New Soil & Ground-Response Requirements:

- Detailed provisions for liquefaction, soil flexibility, site-specific shaking spectra.
- Encourages geotechnical investigations before major construction.

7. Exposure Mapping (PEMA Method):

- Incorporates population density, infrastructure concentration and socioeconomic vulnerability.
- Integrates impact-based assessment with geological hazard.

Significance

- **Improved Earthquake Preparedness:** Accurate hazard modelling ensures stronger building codes for at-risk regions, especially the Himalayas.
- **Retrofitting Imperative:** Old structures, especially in Himalayan towns, must be retrofitted, including schools, hospitals, and bridges.
- **Uniformity Across the Himalayan Arc**: Fixes decades of underestimation due to inconsistent older maps (Zones IV & V), despite identical tectonics.

Hawfinch Bird Sighted at Jim Corbett National Park

- A Hawfinch was recently sighted at Jim Corbett National Park, Uttarakhand, marking the first confirmed record of the species in India.

Hawfinch (Coccothraustes coccothraustes)

- The hawfinch is the **largest finch species** in Europe and Asia, known for its massive, conical beak.
- Appearance: It has a large round head, a thick neck, and a distinctive black patch on the throat. The bill changes colour with the seasons.
- **Habitat Preference**: It prefers mature deciduous and mixed forests with cherry, hornbeam, maple, and other hard-seed trees.
- **Partial Migrants**: European populations are mostly resident, while the Asian hawfinches migrate south during winter.
- **Distribution:** It is widely found across the **Palearctic realm**, including Europe, North Africa, and temperate Asia.

- **Diet:** The species is primarily **granivorous** (seed-eater). Strong bill and jaw muscles crack hard seeds and fruit pits, such as cherry, olive, and plum.
- **Ecological Engineer**: Its selective preference for particular tree species influences seed dynamics and forest regeneration.
- **Conservation Status: IUCN- Least Concerned.**

Methane Hotspot Warning for India

- A UNEP report released at **COP30 (Belem, Brazil)** identifies India as a global methane hotspot, especially from stubble burning and waste burning.
- India emitted **≈9% of global emissions**, making it the **world's 3rd-largest emitter**, yet methane

was absent from India's COP30 national statement.

Key Findings of the UNEP Report

- India emitted about **31 Mt of methane in 2020**, accounting for 9% of global methane emissions.
- Methane emissions from waste burning in India rose 64% (1995–2020), significantly higher than the global rise of 43%.
- Agricultural methane from India accounts for **12% of global agricultural methane**.
- Methane from rice cultivation in India is projected to increase by **8%** between 2020 and 2030.
- India generated **20 Mt methane from agriculture and 4.5 Mt from the energy sector** in 2020.
- The G20, including India, contributes 65% of global methane emissions as per UNEP's assessment.

India's Methane Emission Profile

- **Livestock Emissions:** Enteric fermentation produces ~20 Mt methane (India's largest emission source).
- **Rice Cultivation:** Methane release in paddy fields projected to rise 8% by 2030.
- **Waste Burning:** Methane from waste burning surged 64% (1995–2020), reaching 7.4 Mt.
- **Energy Sector:** Coal mining, biomass burning, and oil & gas leakages emit ~4.5 Mt methane annually.

Why Methane Was Omitted from India's COP30 Statement?

- **Agriculture Sensitivity:** Over 54% of India's workforce depends on agriculture, and livestock, rice, the top methane sources, are politically and socio-economically sensitive sectors.
- **Food Security Concerns:** Rice systems emit 12% of global agricultural methane, and India fears aggressive methane mitigation may risk food security for 1.4 billion people.
- **No Commitment in NDC:** UNEP notes India's NDC "does not identify actions" to cut agricultural methane; mitigation pledges focus instead on renewables, efficiency, hydrogen and forests.
- **Past Refusal:** India earlier declined the **Global Methane Pledge (2021),** arguing its priority is adaptation, not mitigation, in agriculture, hence no policy shift at COP30.

Way Forward

- **Farm Diversification:** Shift from water-intensive paddy to millets/pulses to reduce methane from rice cultivation. E.g. **MSP-backed Shri Anna Mission** for climate-resilient cropping.
- **Straw Management:** Expand access to Happy Seeders, balers, and bio-decomposer sprays to eliminate burning. E.g. Delhi–Punjab PUSA Bio-Decomposer pilot.
- **Methane Capture:** Promote CBG plants for landfill methane capture. E.g. **SATAT Scheme**
- **Waste Reform:** Strict enforcement of waste segregation, landfill capping, and biomethanation. E.g. Indore's biogas-from-waste model.
- **Methane Monitoring:** Use satellite-based monitoring for real-time methane hotspots. E.g. EU's Copernicus Methane Tracker model for India's ISRO systems.

- **Policy Integration:** Include methane mitigation explicitly in NDC updates and state climate action plans. E.g. New Zealand's agriculture methane roadmap.

Taningia silasii (Indian Octopus Squid)

- A new deep-sea squid species, named Taningia silasii or the Indian octopus squid, has been discovered in the Arabian Sea (at about 390 m depth).
- Researchers from the **Central Marine Fisheries Research Institute (CMFRI)** made the discovery.
- The CMFRI is India's leading marine fisheries research organisation based in Kochi, Kerala. It operates under the Indian Council of Agricultural Research (ICAR) within the Ministry of Agriculture and Farmers' Welfare.

About Taningia silasii

- It is the second recognised species in the rare genus **Taningia, after Taningia danae**, which was discovered in the Atlantic Ocean.
- The specimen belongs to the family Octopoteuthidae, whose adults lack the two long feeding tentacles found in most other squid species.
- It is nicknamed the **"octopus squid"** because it has only eight arms instead of ten.
- Key Distinction: It differs from T. danae by having fewer gill lamellae and featuring an oval funnel–mantle locking cartilage.
- Genetic Evidence: DNA barcoding showed an 11% divergence from the Atlantic member, confirming it as a separate species.

Oman has been elected as a member of the UNESCO Man and the Biosphere (MAB) Council

- Oman has been elected as a member of the UNESCO Man and the Biosphere (MAB) Council for the 2025–2029 term during the 43rd UNESCO General Conference in Samarkand.
- Oman is a monarchy located on the southeastern coast of the Arabian Peninsula, known for its balance of traditional culture and rapid modernization under Sultan Haitham bin Tariq Al Said.
- **Capital:** Muscat
- **Neighbouring Countries:** Bordered by United Arab Emirates (northwest), Saudi Arabia (west), and Yemen (southwest).
- Maritime boundaries with the Arabian Sea and Gulf of Oman.
- **Geographical Features:**
- The **Al-Hajar Mountains** dominate the north, with **Mount Shams (2,980 m)** as the highest peak.
- The vast **Rubʿ al-Khali (Empty Quarter)** desert covers much of its interior, while fertile coastal plains like **Al-Batinah** and **Dhofar** support agriculture.
- Oman's coastlines, monsoon-fed Dhofar region, and ancient **falaj (irrigation)** systems sustain its

oasis-based settlements.

- The Man and the Biosphere (MAB) Programme is UNESCO's intergovernmental scientific initiative launched in **1971** to improve the relationship between humans and their environment.
- **Aim:** To promote biodiversity conservation, sustainable ecosystem management, and human–nature harmony through research, innovation, and education.

Features:

- Governed by the **International Coordinating Council (MAB-ICC)** composed of **34 Member States** elected by UNESCO's General Conference.
- Encourages scientific research, youth empowerment, and policy innovation to address climate change and sustainability challenges.
- Guided by the MAB Roadmap (2015–2025), with a new 2025–2035 roadmap to be adopted at the **5th World Congress of Biosphere Reserves in Hangzhou, China (2025).**

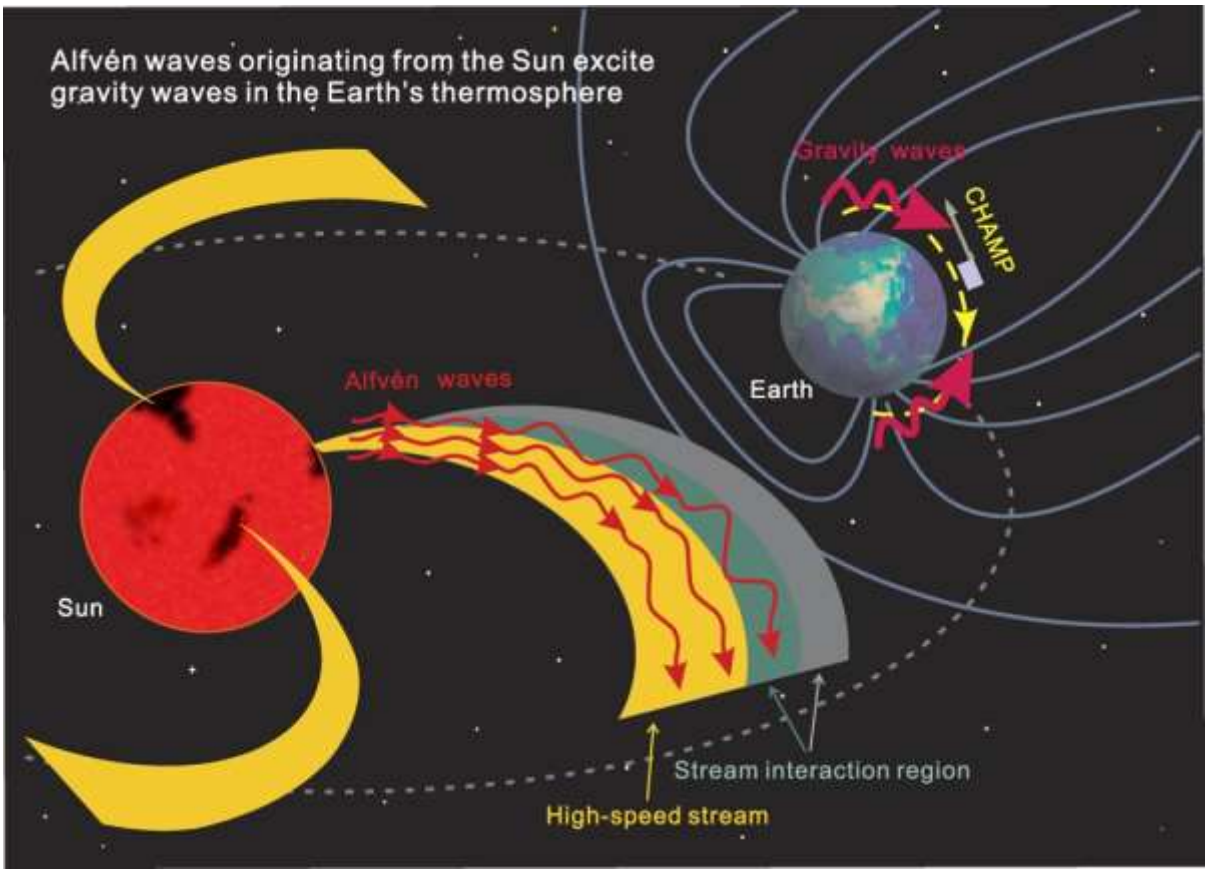
SCIENCE AND TECHNOLOGY

Alfven Waves

- A recent study revealing distinct **Red and Blue Doppler shifts** confirms the presence of the **Alfven waves in the Sun's Corona**. They are **magnetic waves that travel along the Sun's magnetic field lines,** causing the **plasma to oscillate sideways.**
- It occurs in a **plasma state (or conducting fluid), resulting from the interaction of the magnetic fields** and electric currents within it.
- They are believed **to carry energy from the Sun's surface into the corona,** contributing to its **extremely high temperatures.**
- **Significance:** Coronal heating, Solar Wind Acceleration, Improved Space Weather Forecasting etc.

Alfvén Waves

- Alfvén waves are **low-frequency**, **transverse electromagnetic waves** that occur **only in electrically conducting fluids** like plasma, liquid metals, and electrolytes.
- These waves move along the **Sun's magnetic field lines** and speed up the solar wind, which can disrupt satellites, GPS systems, and power grids on Earth.
- These waves were first proposed by Nobel Prize-winning **Swedish physicist Hannes Alfvén** in **1942**.



Monoclonal Antibodies (mAbs)

- The **Indian Council of Medical Research (ICMR)** seeks partners to develop monoclonal antibodies (mAbs) against Nipah viral disease.
- Nipah virus is a zoonotic pathogen causing severe respiratory and neurological illness, transmitted from bats or infected animals to humans.

Monoclonal Antibodies (mAbs)

- **Definition**: Monoclonal antibodies are laboratory-produced proteins, engineered to bind specific antigens, mimicking natural immune responses.
- **Origin**: Derived from identical immune cells cloned from a single parent B-cell.
- **Function**: Used to diagnose, prevent, and treat diseases including cancers, autoimmune disorders, and viral infections.

How Are They Made?

- The production of mAbs involves a process called **hybridoma technology**, developed by Georges Köhler and César Milstein in 1975:
  Immunization: A mouse is injected with an antigen to stimulate B cell production.
  Cell Fusion: B cells from the mouse''s spleen are fused with immortal myeloma cells to

create *hybridomas*.

Selection: Hybridomas are screened to find those producing the desired antibody.

Cloning: Selected hybridomas are cloned to produce large quantities of identical antibodies.

Negative Effects of Antibiotic Combination Therapy

- A recent study highlighted how combining antibiotics, rather than enhancing treatment, can sometimes **reduce effectiveness** and **accelerate antimicrobial resistance (**AMR**)**.

Key Findings of the Study

- While combining antibiotics may seem like a way to fight resistant bacteria, such combinations can sometimes result in **"antagonism,"** where drugs interfere with each other's effects.

Different Mechanisms:

- **Bacteriostatic antibiotics** (like tetracycline) stop bacterial growth.
- **Bactericidal antibiotics** (like ciprofloxacin) kill actively dividing bacteria.
- When used together, the bacteriostatic drug **halts bacterial division**, preventing the **bactericidal** one from working effectively.
- **Study Findings:** Researchers found that **tetracycline** slowed bacterial metabolism in E. coli, reducing **ciprofloxacin's** ability to destroy bacterial cells, leading to **higher bacterial survival**.
- **Resistance Risk:** Using **unnecessary or poorly designed combinations** can accelerate the emergence of **"superbugs,"** which are bacteria resistant to multiple antibiotics.

Transient Lunar Phenomena

- Moon's surface, recently regaining attention as NASA and ESA's lunar monitoring programmes track unexplained luminous events known as **Transient Lunar Phenomena**.
- Transient Lunar Phenomena (TLPs) are brief, **unexplained luminous or colour changes observed on the Moon's surface**, appearing as flashes, glows, or mists lasting from a few seconds to several hours.
- Reports of TLPs date back over **1,000 years**, including from **Apollo 11 astronauts** (1969).
- Frequently observed near **Aristarchus**, **Plato**, and other geologically active craters.

Theories of Origin

- **Gas Outgassing:** Sudden release of **radon** or **argon** from beneath the lunar crust.
- **Meteoroid Impacts:** High-velocity collisions cause visible flashes.
- **Electrostatic Dust Activity:** Charged lunar dust rising and reflecting sunlight.
- **Atmospheric Distortion:** Earth's atmosphere causes optical illusions mistaken for lunar flashes.

ISRO Launched India's Heaviest Communication Satellite for Indian Navy

- **GSAT-7R (CMS-03)** was successfully launched aboard the **LVM3 (Launch Vehicle Mark-3)** from the Satish Dhawan Space Centre, Sriharikota.
- LVM3 is **India's heaviest operational rocket** for launching heavy communication satellites and deep-space missions. It is a **three-stage vehicle**, comprising
- **Solid Stage**: Two solid strap-on boosters at first stage (use of solid propellant)
- **Liquid State**: One liquid core stage (liquid propellant)
- **Cryogenic Stage**: One cryogenic upper stage (powered by the indigenous high-thrust CE-20 cryogenic engine, loaded with cryogenic propellant)

Key Features of GSAT-7R Satellite

- It is a part of **India's advanced defence communication satellite series GSAT-7.**
- **Weight:** ~4,400 kg
- **Orbit:** Launched into the **Geosynchronous Transfer Orbit (GTO),** it will eventually settle into **Geostationary Orbit (**35,786 kilometers above Earth**).**
- **Coverage:** Provides **multi-band telecommunication** services across the **Indian Ocean Region** and **Indian landmass**.
- **Purpose:** Strengthens **space-based communication**, **maritime domain awareness**, and **secure links** among Navy ships, submarines, aircraft, and Maritime Operations Centres.
- **Significance**
- Indigenous development marks India's growing **self-reliance (Aatmanirbharta)** in **defence-space communication.**
- Enhances **Navy's strategic capabilities** and **blue-water communication reach**.
- **Precision Warfare:** Navigation satellites vital for **missile accuracy** and **precision strikes**.

Other Military Satellites in the GSAT-7 Series

For Navy:

- **GSAT-7 (Rukmini)**: Operational **since 2013**; provides maritime communication and surveillance.

For Air Force:

- **GSAT-7A (Angry Bird)**: Launched in 2018; strengthens **network-centric operations and data link connectivity.**
- **GSAT-7C**: To be developed and includes ground hubs for **real-time, secure communication.**

For Army:

- **GSAT-7B**: To be developed to enhance **surveillance and communication in border areas**.

Sulfadiazine

- **Taiwan** has seized shipments of Chinese mitten crabs after discovering **sulfadiazine**, a **prohibited veterinary drug** under Taiwan's food safety laws.

*Chinese mitten crabs are **medium-sized burrowing crabs** native to **East Asia** and are listed among the "**100 worst invasive species**" by the **International Union for Conservation of Nature (**IUCN**)**.*

- Sulfadiazine is a **sulfonamide antibiotic**, a class of **synthetic** antimicrobial agents used to treat **bacterial infections** in humans and animals.
- It blocks the production of folic acid in **bacteria**, which is vital for their growth and reproduction.
- **Key Concern:** Excessive use of sulfonamides like sulfadiazine leads to **antimicrobial resistance (**AMR**)**.
- **Regulation in India:** It is a **prescription medication** in India for **human use**, but its application in **food-producing animals** and **aquaculture** is **regulated**.

*The WHO defines antimicrobial resistance as a **microorganism's capacity** to survive an **antimicrobial drug** that was once effective against infections caused by that microorganism.*

Global Virus Network

- **The Global Virus Network (GVN)** has expanded its international coalition by including three new **Centres of Excellence** across the Americas to enhance virology research capacity**.**
- The GVN is a voluntary alliance of leading medical virology laboratories and scientists working together to combat viral threats worldwide.
- **Global Reach:** It currently comprises 63 Centres of Excellence and Affiliates across 35 countries.
- **Objective:** It aims to minimise the global impact of pandemics through international cooperation and joint research on vaccines and antiviral therapies**.**
- **India's Role:** India is a key partner contributing through the official **GVN Centre of Excellence, the Manipal Institute of Virology (MIV) in Karnataka,** and various other affiliate centres.

China successfully achieved the first-ever thorium to uranium fuel conversion in a Thorium Molten Salt Reactor (TMSR)

- China's TMSR is currently the only operational molten-salt reactor in the world.
- The achievement of thorium-uranium conversion marks a milestone in TMSR development.

Thorium Molten Salt Reactor (TMSR)

- It is **fourth-generation** advanced nuclear energy system that uses **high-temperature molten salt** as a **coolant**.
- **Key Features**: Cool without water, **run** at **atmospheric pressure**, deliver a **high-temperature output**, etc.

Key Advantages:

1. **Passive Safety Features**: If an MSR is too hot, a salt plug melts, stopping the reaction.
2. **Small High-Level Nuclear Waste Footprint**: Thorium generates fewer long-lived minor actinides

(radioactive metallic elements) than plutonium fuels.

3. **Other**: Extract more energy from fuel, etc.

Thorium Fuel

- Thorium has to be converted to **Uranium-233** in a reactor before it can be used as fuel.
- Thorium-232 is the only naturally occurring isotope of thorium.
- It is three times more abundant in nature than uranium.
- Despite its widespread availability, the metal's utilisation is restricted by its high extraction cost.
- The **third stage of India's nuclear power program** envisages large scale power production from thorium.
- **Advanced Heavy Water Reactor**, currently under development with **Bhabha Atomic Research Centre (BARC)**, would serve as a technology demonstrator for thorium fuel cycle.
- Also, India is developing an **Indian Molten Salt Breeder Reactor (IMSBR)**.

Thorium reserves in India

- India has the world's largest reserves of thorium.
- Kerala and Odisha have rich reserves of **monazite**, which contains about 8 – 10% thorium.
- It is also found in Andhra Pradesh, Tamil Nadu, West Bengal and Jharkhand.

Launch of Communication Satellite-03

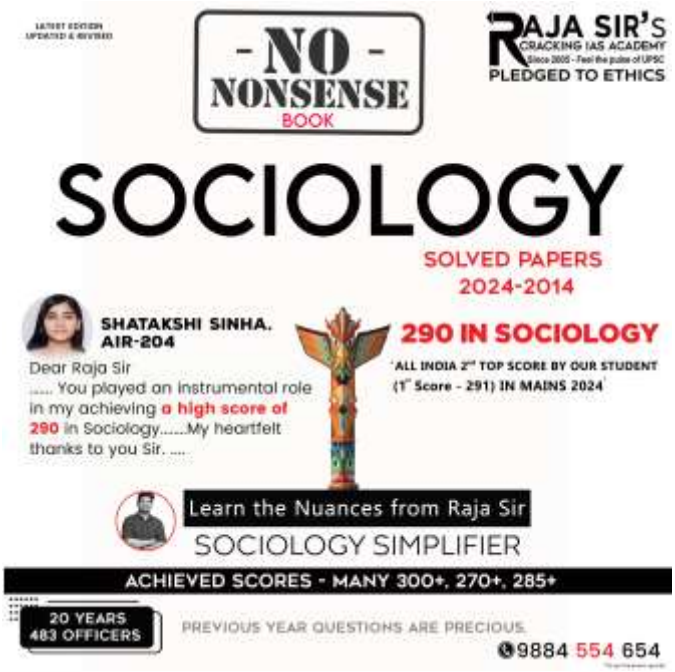
- ISRO successfully launched the CMS-03 communication satellite using the LVM3-M5 rocket from **Satish Dhawan Space Centre** in **Sriharikota**.
- **Strategic Role:** CMS-03, also known as **GSAT-7R**, is a **multi-band military satellite** providing secure, high-bandwidth communication for the Indian Navy across the Indian Ocean Region.
- **Upgrade:** It replaces the ageing **GSAT-7 (Rukmini)** launched in **2013**.
- **Launch Vehicle:** The Launch Vehicle Mark 3 (LVM3-M5), nicknamed **"Bahubali,"** is **ISRO's most powerful operational rocket** with a **100% success rate** in heavy-lift missions.
- **Propulsion System:** The rocket employs a **three-stage propulsion system** combining a solid booster, a liquid core, and a cryogenic upper stage.

Comet 3I/ATLAS

- Comet 3I/ATLAS has been found to contain water, marking a significant discovery in understanding cometary evolution.
- Comet 3I/ATLAS is the **third known object** from outside our solar system to be discovered passing through our celestial neighborhood.
- Other two are **1I/'Oumuamua** seen in 2017 and **2I/Borisov** seen in 2019.
- Astronomers have categorized this object as **interstellar** because of the hyperbolic shape of its

orbital path. (It does not follow a closed orbital path about the Sun.)

- It was first spotted by NASA-funded **Asteroid Terrestrial-impact Last Alert System (ATLAS) telescope** in Río Hurtado, Chile.



Vikram-3201 Microprocessor and India's Semiconductor Ecosystem

- Debates have emerged over the selection of **Assam** and **Gujarat** for **new semiconductor fabrication facilities** following the launch of the Vikram 3201 microprocessor.

Vikram 3201:-

- Vikram 3201 is India's **first fully indigenous 32-bit**, space-grade microprocessor built to operate in extreme environmental conditions.
- **Development:** It is designed by **ISRO's Vikram Sarabhai Space Centre (VSSC)** and fabricated at the Semiconductor Laboratory (**SCL**), **Chandigarh**.
- **Purpose:** Primarily used in **avionics**, **navigation**, and control systems of **launch vehicles** and **satellites**.
- **Architecture:** It features a general-purpose 32-bit architecture with **152 custom instructions** and supports **64-bit floating-point** operations. It operates at a **frequency of 100 MHz**.
- **Advancement:** Vikram 3201 represents an advancement over the **16-bit Vikram 1601 microprocessor**, which has been deployed in ISRO's launch vehicles since 2009.
- **Durability:** The processor can withstand extreme temperatures ranging **from −55°C to +125°C**, is **radiation-hardened**, and remains resilient under **intense vibration** and **mechanical stress**.

Semiconductor Landscape in India

- **Market Size:** India's semiconductor market was valued at **$52 billion** in 2024-25 and is projected to exceed **$100 billion by 2030**.
- **Project Status:** **Ten semiconductor projects** worth ₹1.6 lakh crore have been approved under the India Semiconductor Mission (ISM) **across six states**.
- **Import Dependence:** India **imports nearly 90-95%** of its semiconductor chips, primarily from **China**, **Taiwan**, South Korea, and the United States.
- **Global Dominance:** **Taiwan**'s TSMC produces **over 90%** of advanced chips, and East Asia accounts for about three-fourths of global manufacturing capacity.
- **Japan** and the **Netherlands** remain leaders in semiconductor **equipment production**.
- **Design Strength:** **Around 20%** of semiconductor design talent is based in **India**, supported by major chip design and R&D centres of leading global firms.
- **Strategic Focus:** India prioritises manufacturing **mature-node chips** (**28 nm+**) used in automobiles, equipment, and power devices, instead of advanced-node chips (3–5 nm) for high-end computing.

Government Initiatives

- **Semiconductor Integrated Circuits Layout-Design Act, 2000:** Protects **intellectual property rights** for semiconductor circuit layouts and promotes innovation in chip design.
- **Semicon India Programme (SIP):** Allocates ₹76,000 crore with up to **50% fiscal support** to attract investment in semiconductor and display manufacturing.
- **India Semiconductor Mission (ISM):** Serves as the **nodal agency under MeitY** to implement semiconductor schemes, assess proposals, and coordinate with industry stakeholders.
- **Modified Scheme for Semiconductor Fabs:** Offers 50% fiscal support for establishing **silicon-based fabrication units** targeting technologies of **28 nm or below**.
- **Modified Scheme for Compound Semiconductors:** Provides 50% capital support for setting up facilities for **compound semiconductors**, **silicon photonics**, **sensors**, and **ATMP/OSAT units**.
- **Design Linked Incentive (DLI) Scheme:** Grants **up to ₹15 crore per applicant** and access to advanced design infrastructure for domestic semiconductor startups.
- **SPECS Scheme (2020):** Provides a 25% incentive on capital expenditure for producing electronic **components** and **sub-assemblies**.
- **Chips to Startup (C2S) Programme:** Aims to train **85,000 engineers** in Very Large-Scale Integration (**VLSI**) and embedded design to strengthen India's semiconductor workforce.

Typhoid Conjugate Vaccine

- Bangladesh became the eighth country in the world to introduce the Typhoid Conjugate Vaccine (TCV).

- It is a **single-dose, injectable vaccine** that protects against typhoid fever by triggering the body to produce antibodies against the Salmonella Typhi bacterium.
- Eg- Typbar TCV (manufactured by Bharat Biotech).
- **Typhoid**
- **Caused by:** Bacterium Salmonella Typhi.
- **Spread through:** Contaminated food or water.
- **Symptoms include:** prolonged high fever, fatigue, headache, nausea, abdominal pain, and constipation or diarrhoea.

Magnetic Waves Explaining the Sun's Super-hot Atmosphere

- A new study offers insights into the **cause of the large temperature gap** between the **Sun's outer atmosphere (**corona**)** and its **surface**.

*The **Sun's surface (photosphere)** is about **10,000°F (5,500°C)**, while its **corona** reaches **2 million°F (1.1 million°C)**.*

- Scientists examined **magnetic waves** in the Sun's corona using the **Daniel K. Inouye Solar Telescope (DKIST)** in **Hawaii**, the world's **most powerful ground-based solar telescope**.
- **Wave Discovery:** They observed **Alfvén waves** forming **twisting patterns** in the **coronal magnetic field**, confirming their widespread presence in the Sun's outer atmosphere.
- **Energy Transfer:** The researchers also detected tiny, **periodic** Doppler shifts indicating that these waves carry **substantial energy**, which **heats the corona** to extremely high temperatures.
- **Significance:** The discovery provides **direct evidence** that magnetic waves heat the corona and strengthen models used for **predicting space weather**.

Quantum Gravity

- A Study has proposed that **black hole 'morsels'** could offer insights into quantum gravity.
- Black hole morsels are **hypothetical micro-black holes**, far smaller than their parent black holes, **comparable in mass to asteroids and therefore much hotter.**
- **Field of theoretical physics** that seeks to describe gravity according to the **principles of quantum mechanics.**
- Hence, it seeks to **reconcile two theories of physics — quantum mechanics** (dealing with particles on small scales) — **and gravity** (for large scales, based on Einstein's General Theory of Relativity).
    - **Significance:** Understand the physics within black holes, quantum entanglement, condensed matter physics, etc.

Advanced Driver Assistance System (ADAS)

Union Government is considering mandating **Advanced Driver Assistance System (ADAS) in all new models of trucks and buses**, including school buses.

- **ADAS**
- It is a **built-in suite of coordinated technologies** that help drivers operate their vehicles more safely and **avoid human errors**.
- In ADAS, sensors such as **Lidar, Radar, and cameras** work together to inform features such as pedestrian detection, and lane departure warning.
- It includes a range of features including Adaptive Cruise Control, Automatic Emergency Braking, Blind Spot Detection, Cross-Traffic Alert, Parking Assistance, Traffic Sign Recognition, among others.

ICMR Invites EoI for Nipah Antibody Development

- The **Indian Council of Medical Research (ICMR)** has invited **Expressions of Interest (EoI)** from Indian manufacturers to develop **monoclonal antibodies** against the Nipah virus.

Monoclonal Antibodies

- Monoclonal antibodies (mAbs) are **laboratory-produced proteins** that mimic natural human antibodies to recognize and **neutralize specific** antigens on diseased cells.
- They are utilized in **disease diagnosis**, **cancer treatment**, autoimmune disorder management, and infectious disease therapy.

ICMR

- ICMR is India's **apex autonomous body** for the formulation, coordination, and promotion of **biomedical research**. It functions under the Department of Health Research, **Ministry of Health and Family Welfare**.
- **Origin:** Established in **1911** as the Indian Research Fund Association, it was renamed ICMR in **1949.**
- **Mandate:** To address **national health priorities** and **translate research into actions** for improved public health outcomes.
- **Governance:** The **Union Minister for Health and Family Welfare** chairs the **ICMR's Governing Body**, while the **Scientific Advisory Board** oversees scientific and technical matters.

Nipah Virus

- **Nipah virus (NiV)** is a **single-stranded** RNA virus that causes serious **respiratory** and **neurological diseases** in humans.
- It is a **zoonotic pathogen** transmitted from **animals to humans** and sometimes between humans.
- **Hosts:** **Fruit bats**, also known as **flying foxes**, are the main natural hosts of the virus.
- **Transmission Routes:** Through **direct contact** with infected animals, consumption of **contaminated food**, or contact with **bodily fluids** of infected individuals.

Quantum Leap: India Successfully Demonstrates Robust QKD Infrastructure

- Startup QNu Labs, supported under the **National Quantum Mission (NQM),** successfully demonstrated **India''s first extensive QKD network**, spanning over 500 kilometers.
- It involved a network deployed over existing **optical fiber** infrastructure, marking a significant milestone in **quantum-secure communication**.
- This demonstration was made under a project funded through the **I-Hub Quantum Technology Foundation,** under the **National Mission on Interdisciplinary Cyber-Physical Systems (NMICPS).**

What is Quantum Key Distribution (QKD)?

- QKD leverages the principles of **quantum mechanics** to ensure secure distribution of the **encryption keys**, used for data communication.
- **Quantum mechanics** is the field of physics that explains how **extremely small objects** simultaneously have the characteristics of **both particles** (tiny pieces of matter) and **waves** (a disturbance or variation that transfers energy).
- QKD is an example of **quantum cryptography** (also known as **quantum encryption**).
- QKD can be deployed through different mediums: optical fiber**,** free space, and through satellites

Benefits:

- Capable of **detecting** and **mitigatingeavesdropping attacks** (sniffing or snooping attack)
- Suitable for **Critical Infrastructure** (defence, government communications, healthcare, financial services, data centres, and telecommunication networks), etc.

- The Prime Minister presented two path breaking Quantum innovations to the nation.

QSIP (Quantum Random Number Generator System in Package)

- It is India's quantum security chip.
- QSIP provides **quantum-certified randomness** (random numbers from a quantum computer) that is used in cryptographic algorithms.
- It ensures defence against cyber threats and future quantum attacks.

25-qubit QPU

- It is India's first quantum computing chip, developed by Startup QpiAI
- Earlier, QpiAI also launched QpiAI-Indus, which is the country's **first full-stack quantum computer** integrating all layers of technology, with 25 superconducting qubits.

NASA-ISRO Synthetic Aperture Radar (NISAR) Satellite

ISRO Chairman V. Narayanan announced that the **NASA-ISRO Synthetic Aperture Radar (**NISAR**) satellite** will soon be fully operational.

NISAR Satellite

- NISAR is the **first Earth-observation satellite** jointly developed by **NASA (U.S.)** and **ISRO (India)**.
- It was launched aboard **ISRO's** GSLV**-F16** from the **Satish Dhawan Space Centre** at **Sriharikota**.
- **Key Feature:** It is the world's first such satellite to utilise a **dual-frequency Synthetic Aperture Radar (**SAR**)** system (**L-band** and **S-band**) from a single platform.
- **L-Band (NASA):** Operates at a **lower frequency** that can **penetrate forest canopies** and measure soil moisture, forest biomass, and the motion of land and ice surfaces.
- **S-Band Radar (ISRO):** Operates at a **higher frequency**, increasing its sensitivity to **smaller vegetation structures**, soil moisture changes, crop conditions, and snow cover variations.

*A **SAR system** is a type of radar that produces **detailed**, **high-resolution images** of objects and landscapes on Earth's surface, even in **dark or cloudy conditions**.*

- **Specifications:** The satellite weighs **approximately 2,400 kg** and has a minimum mission life of **3 years**.
- **Orbit and Coverage:** It will orbit the Earth at an altitude of **747 km** in a Sun-synchronous orbit, mapping its land and ice surfaces **twice every 12 days**.

Other Scheduled ISRO Missions

- Gaganyaan: India's **first uncrewed human spaceflight** test is scheduled for **January 2026**, with **crewed missions** expected by **2027**.
- Bhartiya Antariksh Station: India's **first space station module** is scheduled to launch by **2028**, with the **full five-module lab** operational by **2035**.
- The **Indian space station** will be a **52-tonne facility** hosting 3-4 crew members for long stays and up to 6 for short missions.

Neurotoxin Found in Cycad Plants

- Scientists and medical experts at a recent **AIIMS Bhubaneswar** workshop cautioned against **serious health risks from ancient Cycad plants**.
- **Neurotoxin:** Researchers identified **BMAA (β–N–methylamino–L–alanine)**, a potent neurotoxin,

in several Cycad species native to **Odisha**.

Cycad Plants

- Cycads are **ancient dioecious** (either male or female) **gymnosperm plants** that resemble palms or ferns but form a distinct evolutionary group.
- **Morphology:** They have stout, **unbranched trunks with crowns** of large, stiff, evergreen leaves.
- **Longevity:** Cycads **exhibit slow growth** &remarkable longevity, often surviving for thousands of years.
- **Symbiosis:** Their **coralloid roots** host **nitrogen-fixing cyanobacteria** that supply essential nutrients.
- **Habitat Range:** They thrive in diverse habitats, including rainforests, savannas, and semi-arid regions with well-drained soils.
- **Global Spread:** Cycads occur in tropical and subtropical regions across all continents, **except Europe** and **Antarctica**.
- **Indian Range:** They are found in **Odisha**, **Assam**, **Meghalaya**, **Tamil Nadu**, **Karnataka**, and the **Andaman and Nicobar Islands**.
- **Toxic Compounds:** All parts of the cycad plant contain toxins like **Cycasin**, **BMAA**, and **MAM** to protect against herbivores.
- **Health Risk:** BMAA exposure is associated with **neurodegenerative** diseases like **Parkinsonism**, **motor neuron disease**, and **dementia**.
- **Human-Use:** Cycads are grown as **ornamental plants** and valued for their **starch-rich seeds**, **medicinal extracts**, and fibrous materials used in traditional **handicrafts**.
- **Cycad gum** is traditionally used as **an antidote** for **snake bites** and to **treat malignant ulcers**.

Satellite-based internet

- Elon Musk-owned Starlink has signed an agreement with Maharashtra government to deliver satellite-based connectivity to remote and underserved regions.
- **Definition**: Satellite internet is **wireless broadband delivered via communication satellites** orbiting the Earth.
- **Difference:** Unlike fibre, cable, or DSL, it **does not depend on physical ground-based wiring**.
- **How does it work?** Data is transmitted from a user's dish to a satellite and then to ground stations connected to the global internet.
- Low Earth Orbit (LEO) satellites, like Starlink, offer faster speeds and lower latency than traditional geostationary ones.
- **Significance:** Helps bridge the digital divide by connecting remote and underserved regions.

Project Suncatcher

- Google launches **Project Suncatcher** to test AI data centres in space.

Project

- **Objective:** Explore **AI computing in space** using solar-powered satellites in low-Earth orbit.
- The initiative envisions a c**onstellation of compact satellites**, each carrying Google's custom-built **Tensor Processing Unit (TPU) chips—**processors designed specifically for machine learning and AI applications.
- **Two prototype satellites will launch by 2027** to test power generation, chip performance, and data transmission.

NexCAR19 revolutionizes cancer treatment with affordable innovation & enhanced patient safety

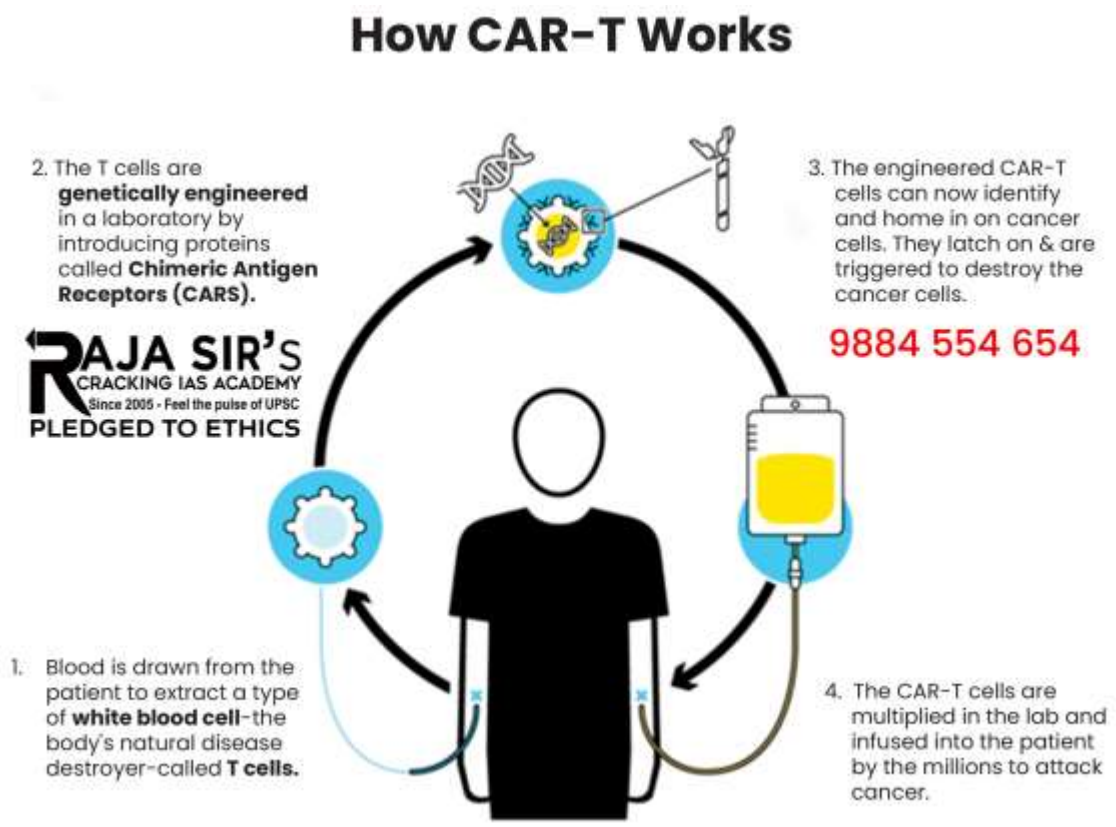
- NexCAR19 therapy was **developed for B-cell blood cancers by ImmunoACT** (a company incubated under IIT Bombay, and Tata Memorial Hospital), supported by DBT and BIRAC.
- **NexCAR19, India's 1st indigenous CAR T-Cell therapy,** was granted market authorization by the Central Drugs Standard Control Organisation **(CDSCO) in 2023.**

CAR (Chimeric Antigen Receptor) T-Cell Therapy

- It **modifies immune cells**, specifically T-cells, by turning them into potent cancer fighters known as CAR-T cells.
- T-cells are **special cells (types of white blood cells)** whose primary function is cytotoxic, meaning killing other cells.
- This treatment is **designed for specific types of blood cancer** and is given to patients whose cancer has either relapsed or not responded to first-line treatment.

Benefits of CAR T-Cell therapy

- **Short treatment duration:** Unlike aggressive chemotherapy or stem cell transplants, it allows for a faster recovery.
- **Sustained Benefits:** CAR T-cells persist in the body, offering long-term protection against cancer relapse.
- **Accessibility:** Nexcar19 cost is lower compared to imported CAR-T therapies.
- **Challenges:** Therapy for one cancer won''t work for another type of cancer, can have negative effects on the nervous system, Cytokine Release Syndrome (Over activation of immune cells), risk of infection, etc.



Tidal Disruption Event (TDE)

- Astronauts have observed the biggest and most distant Flare from black hole which originated due to **tidal disruption event (TDE)**.
- **Meaning:** Tidal disruption events occur when a star approaches a supermassive black hole and gets violently ripped apart, causing outflows of radiation.
- **Significance:** TDEs help researchers understand how black holes change their surroundings.

Brightest and Most Distant Black Hole Flare

- Astronomers recently detected the **most distant and brightest black hole flare** ever observed in the universe.
- **Observation:** The flare was first seen in **2018** at the **Palomar Observatory** in **California**, and later confirmed in **2023** at the **Keck Observatory** in **Hawaii**.
- **Luminosity:** It emitted light equivalent to **10 trillion suns** and originated from **Active Galactic Nucleus** (AGN) **J2245+3743**, located about **10 billion light-years** away.
- **Event Type:** The flare resulted from a **Tidal Disruption Event** (TDE) where a massive star (around 30 times the Sun's mass) was torn apart by the gravity of a supermassive black hole.
- **Time Dilation:** As the universe expands, the flare's **light waves stretch** during travel, making the entire event **appear slower** when observed from Earth.

- **Significance:** The discovery helps scientists in understanding how supermassive black holes formed and influenced the early galaxies.

Encephalomyocarditis Virus (EMCV)

- The only male African elephant at Delhi Zoo died due to the rare **rodent-borne encephalomyocarditis virus (EMCV)**.
- Encephalomyocarditis virus is a **positive-sense**, non-enveloped, **single-stranded** RNA virus.
- It is a **zoonotic virus** that causes **myocarditis** and **encephalitis** (inflammation of the heart and brain) in **mammals**; it sometimes causes **mild flu-like illness** in **humans**.
- **Host:** **Rodents**, such as rats and mice, are natural hosts that carry the virus without showing symptoms.
- **Transmission:** Through the **faecal-oral route** via consuming **food or water** contaminated with **infected rodent excreta** or by ingesting **infected rodent carcasses**.
- **Susceptible Species:** **Domestic pigs** (especially piglets), **African elephants**, and **non-human primates**.
- **Treatment:** There is **no specific treatment** or commercial vaccine; management relies on **rodent control**, hygiene, and strict zoo-level biosecurity practices.

GPS Spoofing

- Airlines have reported a surge in GPS spoofing over Delhi, triggering government investigations into the unusual navigation disruptions.
- It is a type of **cyberattack** that transmits false GPS (Global Positioning System) signals to **mislead navigation systems.**
- **Function:** It **exploits the weak signals of GPS satellites** by overpowering them with fake signals, making receivers show false locations.
- **Threats:** It can disrupt aviation, logistics, telecom, energy, and defense sectors.

Advancing Breast Cancer Care

- Recently, oncologists have noted a shift in cancer treatment, moving from intravenous (IV) infusions to subcutaneous (under-the-skin) injections for **HER2-positive breast cancer patients.**

Treatment Shift

- Traditional treatment for HER2-positive breast cancer involves IV administration of drugs like **trastuzumab** and **pertuzumab** through a chemoport.
- The process can take **several hours** and requires **extended hospital stays**.
- The new **subcutaneous (SC) formulation** allows the same drugs to be injected under the skin **in 2-5 minutes**, offering equal efficacy and safety.

Scientific Basis of the Treatment

- Subcutaneous trastuzumab uses **recombinant human hyaluronidase (rHuPH20)**, an enzyme that helps absorb large molecules through the skin.
- Key clinical trials, **HannaH, FeDeriCa, and ADEPT**, confirmed that SC formulations **match IV infusions** in terms of **safety**, drug absorption, and therapeutic outcomes.

Breast Cancer Cases in India

- Breast cancer is the **most common cancer** in India, accounting for **28.2% of all female cancers**.
- The age-standardised incidence rate (ASR) is reported as **25-32 per 100,000 women**, higher in urban metros due to lifestyle and reproductive factors.
- The **mortality-to-incidence ratio** remains high, with up to a poor **5-year survival rate of up to 52%** for Indian women, much lower than in high-income countries.
- **Government Initiatives for Breast Cancer**
- Under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), **women aged 30+** are screened for breast, cervical, and oral cancers.
- Swasth Nari Sashakt Parivar Abhiyaan (2025), a nationwide campaign, boosted women's health awareness and breast cancer screening.
- PM-JAY: Provides **an annual cover of ₹5 lakh** per family for over **200 cancer treatment packages**, including breast cancer surgery, chemotherapy, and radiation.

BRAIN Initiative Cell Atlas Network (BICAN)

- Researchers have completed a **first draft of atlases** of the developing human brain .
- **The research** is part of the **U.S. National Institutes of Health's BRAIN Initiative Cell Atlas Network** (BICAN).
- **Key-findings of Research**
- **Scientists** chart how the **many types of brain cells emerge** and mature from the **earliest embryonic and foetal stages** until **adulthood.**
- **Findings** could help in tackling certain brain-related conditions **like autism and schizophrenia.**
- **BICAN is a collaborative** effort between **neuroscientists, computational biologists and software engineers** to create a open-access comprehensive atlas of the human brain.

Scrub Typhus

- A 52-year-old man was diagnosed with scrub typhus after returning to Kerala from Dubai, marking the first documented case from the Gulf region.
- It highlights the emergence of scrub typhus beyond its endemic zone in **South** and **Southeast Asia**.

Scrub Typhus

- Caused by the **bacterium Orientia tsutsugamushi**, transmitted through the bite of infected **larval**

mites (chiggers), now widely seen in southern and northeastern India

- Symptoms like High-grade fever, chills, myalgia, headache, dry cough, chest pain, and eschars (black scab-like lesions) in moist body folds like armpits or groin appear **after 6–20 days of infection**.
- Diagnosis confirmed through **IgM ELISA antibody test** for scrub typhus.
- Responds effectively to **doxycycline** if detected early; untreated cases have a **50% mortality rate**.
- Prevention through the use of insect repellents, protective clothing, and avoidance of mite-infested areas.

Transfer of PSLV Development to Industry Consortium

- ISRO plans to **partially transfer the development** of the **Polar Satellite Launch Vehicle (**PSLV**)** to an Indian industry consortium.

*The **PSLV** is a **four-stage**, **medium-lift** launch vehicle developed by **ISRO**. It is India's **third-generation** launch vehicle and the **first** Indian launch vehicle equipped with **liquid stages**.*
*The **private industry** currently supplies about **80–85%** of the systems used in ISRO missions.*

- **Objective:** The initiative **aims to enhance private sector participation** in India's space program and increase **India's annual satellite launch capacity**.
- **Industry Consortium:** It is a group of private Indian companies led by **Hindustan Aeronautics Limited (HAL)** and **Larsen & Toubro (L&T).**
- The **first PSLV** built entirely by the consortium is expected to be launched by **February 2026**.
- **Transfer Framework:** ISRO will allocate **50% of PSLV development** to industry partners after two successful launches.

Other Key Initiatives for Private Sector Participation

- IN-SPACe (2020): The Indian National Space Promotion and Authorisation Centre serves as a **single-window agency** authorising and promoting private participation across India's space activities.
- Indian Space Policy 2023: Enables **non-government entities** to carry out complete space missions, including satellite design, manufacturing, and launch.
- NSIL Reform: **NewSpace India Limited** now functions on a **demand-driven basis**, transferring ISRO technologies for large-scale industrial production.

Juvenile Huntington's Disease Brain Donation

In a first for India, the family of a **Juvenile Huntington's Disease (JHD)** patient donated his brain to NIMHANS, Bengaluru.

Huntington's Disease (HD)

- It is a **rare**, **progressive genetic disorder** that causes progressive breakdown of the brain's nerve cells.
- It is **caused by a mutation** in the **HTT gene**, which is involved in the production of a protein called **huntingtin**, which provides instructions for making the protein.
- Mutated genes provide faulty instructions leading to the **production of abnormal huntingtin proteins** and the **formation of clumps**.
- These clumps disrupt the normal functioning of the brain cells, which eventually leads to the death of neurons in the brain, resulting in Huntington's disease.
- While **adult HD manifests** between 30–50 years, **Juvenile HD (JHD)** appears before 20 years, with faster progression, and severe symptoms like Motor impairment, cognitive decline, and speech difficulty.
- Autosomal dominant, a child of an affected parent has a **50% chance** of inheriting the mutation.
- Globally affects about **3–7 per 100,000 people**; JHD forms ~6% of all HD cases.
- **Significance of JHD Brain Donation**
- The NIMHANS Brain Bank, with over 450 specimens, will **study neurodegeneration for drug discovery**.
- Highlights growing acceptance of **post-mortem brain donation** for neurological research.
- Facilitates linkages with **international HD research networks** for genetic mapping.

Black Hole Morsels

- A new theoretical study suggests that tiny remnants of black hole mergers, called "black hole morsels," could emit **detectable gamma-ray bursts**.
- Black hole "morsels" are **hypothetical micro–black holes**, far smaller than their parent black holes, formed during extreme cosmic collisions like black hole mergers.
- They are comparable in mass to asteroids, but immensely dense and hot, radiating strongly through **Hawking radiation**, far more intense than large black holes.
- Their lifetime ranges from **milliseconds to years**, depending on mass.
- These emissions may provide the first observable evidence of **quantum gravity**, bridging the gap between **Einstein's relativity** and quantum mechanics.

- ***Hawking Radiation:*** *Proposed by* ***Stephen Hawking (1974)****, it explains that* ***black holes emit faint thermal radiation*** *due to quantum effects near the event horizon, gradually losing mass over time, linking quantum mechanics, thermodynamics, and general relativity.*

- ***Einstein's Relativity:*** *Proposed by* ***Albert Einstein*** *in the early 20th century, it unifies space and time into spacetime, showing that gravity is the curvature of spacetime caused by mass and energy, revolutionising our understanding of motion, gravity, and the universe's structure.*

Rise in Chest Infections

- A recent study has reported a significant increase in **pertussis-like infections** caused by **Bordetella holmesii** (a lesser-known bacterium that mimics whooping cough) in **northern India**.

Pertussis and Bordetella holmesii

- **Pertussis (Whooping Cough):** A highly **contagious respiratory** illness.
- It is caused mainly by **Bordetella pertussis**, which leads to severe coughing fits, breathing difficulty, and potential complications in **infants**.
- **Bordetella holmesii:** A closely related bacterium that produces similar clinical symptoms, often leading to misdiagnosis.
- Unlike B. pertussis, it may **not be targeted** effectively by the existing pertussis vaccines, complicating disease management.

Key Findings of the Study

- Out of 935 suspected pertussis (whooping cough) cases analysed, **37%** were caused by **Bordetella holmesii**, surpassing infections from Bordetella pertussis, traditionally the primary pathogen.
- This marks a notable **epidemiological shift** in **India's causative agents** of respiratory infections.
- The findings point to **B. holmesii** as an emerging cause of chronic respiratory infections in children.
- The trend suggests an evolving aetiology of pertussis-like illnesses, demanding **updated diagnostic** and **vaccination strategies**.

GW250114 Discovery

- Scientists have detected GW250114, the clearest gravitational wave signal ever recorded, from a black hole merger about 1.3 billion light-years away.
- GW250114 is a gravitational wave event produced by the merger of two black holes roughly 30 times the mass of the Sun each, orbiting in near-circular paths before coalescing into a single, rotating black hole.
- **Found by:** Detected jointly by the **LIGO (U.S.)**, **Virgo (Italy)**, and **KAGRA (Japan)** observatories using laser interferometry — the same technology that confirmed gravitational waves in 2015.
- **Features:**
- **Most precise signal yet:** Clearer and stronger than earlier detections, thanks to improved detector sensitivity (reduced laser noise, better mirrors).
- **Observed 1.3 billion light-years away**, providing an exceptionally clean waveform for analysis.
- **Verified Hawking's area theorem:** Researchers measured the event horizon areas before and

after the merger, confirming that the total surface area increased, as predicted.

- **Stephen Hawking's Black Hole Area Theorem:**
- **Proposed in:** 1971 by **Stephen Hawking**, as part of black hole thermodynamics.
- **Core Idea:** The total surface area of all black holes (event horizons) in an isolated system can never decrease over time — it can only increase or remain constant.
- **Physical Meaning:**
- The event horizon area represents a black hole's entropy (disorder).
- Hence, the theorem mirrors the Second Law of Thermodynamics, where total entropy never decreases.
- During a black hole merger, the combined event horizon area after merger is greater than the sum of the individual black holes' areas.
- **Significance of GW250114 Discovery:**
- Marks a milestone in gravitational-wave astronomy, ten years after LIGO's first detection.
- Offers direct empirical evidence for fundamental laws of black-hole physics.
- Enhances understanding of black hole formation, spin, and merger dynamics.
- Strengthens global collaboration among LIGO–Virgo–KAGRA networks, setting the stage for next-generation detectors and deeper cosmic exploration.

Neodymium

- India to scale up its **Neodymium production** to **500 tonnes** by the end of FY27, to boost self-reliance in rare earth elements.

Neodymium

- **Category**: Lanthanide Metal.
- It is a **key component in the global rare-earth magnet industry**, vital for electric vehicles, clean energy technologies, and defence systems.
- **Appearance**: Lustrous, silvery-yellow metal that tarnishes quickly in air.
- **Key Applications**: Makes **Very strong permanent magnets** in an alloy with iron and boron, make lasers, use in eye and cosmetic surgery, treatment of skin cancers, etc.
- **Source:** Monazite and Bastnaesite (like most Lanthanide elements).

Scintillometer

- A scintillometer has been installed at the Tamil Nadu Rice Research Institute in **Aduthurai**.
- TRRI is a part of a **Critical Zone Observatory (CZO) network**, with **only three** in India, and this is the **only one** in Tamil Nadu.
- It is an **optical device** that measures the **movement of heat** and **moisture** between the land

surface and the **atmosphere**.

- The instrument works by **sending a light beam** between two fixed points; turbulence in the air causes tiny fluctuations (scintillations) in the beam.
- These fluctuations are **analysed** to calculate **heat transfer** and **evapotranspiration**, providing reliable microclimate and irrigation-related data.

> ***Evapotranspiration*** *is the process by which water transfers from land and plant surfaces into the atmosphere as vapour. It is a combination of both evaporation and transpiration.*

- **Tamil Nadu Rice Research Institute**
- TRRI was established under the **Tamil Nadu Agricultural University (TNAU)** with support from the **National Centre for Earth Science Studies (NCESS)** and has been fully operational since **2022**.
- It generates continuous datasets on **weather**, **soil moisture**, **canopy conditions**, and hydrology, crucial for the Cauvery **Delta**, a climate-sensitive agricultural region.

Rift Valley Fever (RVF)

- Recently, the World Health Organization (WHO) confirmed an outbreak of RVF affecting Mauritania and Senegal in Western Africa.

RVF:-

- **Origin:** Derives name from **Kenya's Rift Valley,** where the disease was first recognised in the early **1930s**
- **Caused By: Phlebovirus** belonging to the Phenuiviridae family.
- **Spread:** It **primarily affects animals** eg. cattle,etc.
- **Humans** get infected through close contact with infected animals or by the bite of infected mosquitoes.
- It has **not** been shown to **spread from person to person.**
- **Treatment:** Currently, there is **no specific antiviral treatment.** However, animals vaccine do exist.

Altermagnetism

- Physicists have confirmed altermagnetism as a new class of magnetic order, distinct from ferromagnetism and antiferromagnetism, following recent experimental validations in 2024–25.
- Altermagnetism is a third form of magnetism that combines features of ferromagnetism and antiferromagnetism.
- In altermagnetic materials, atomic spins alternate in direction, but are related by rotations or mirror reflections within the crystal structure instead of simple shifts.
- This leads to no overall magnetic field while retaining a unique internal spin polarization, giving rise to a new magnetic phase.

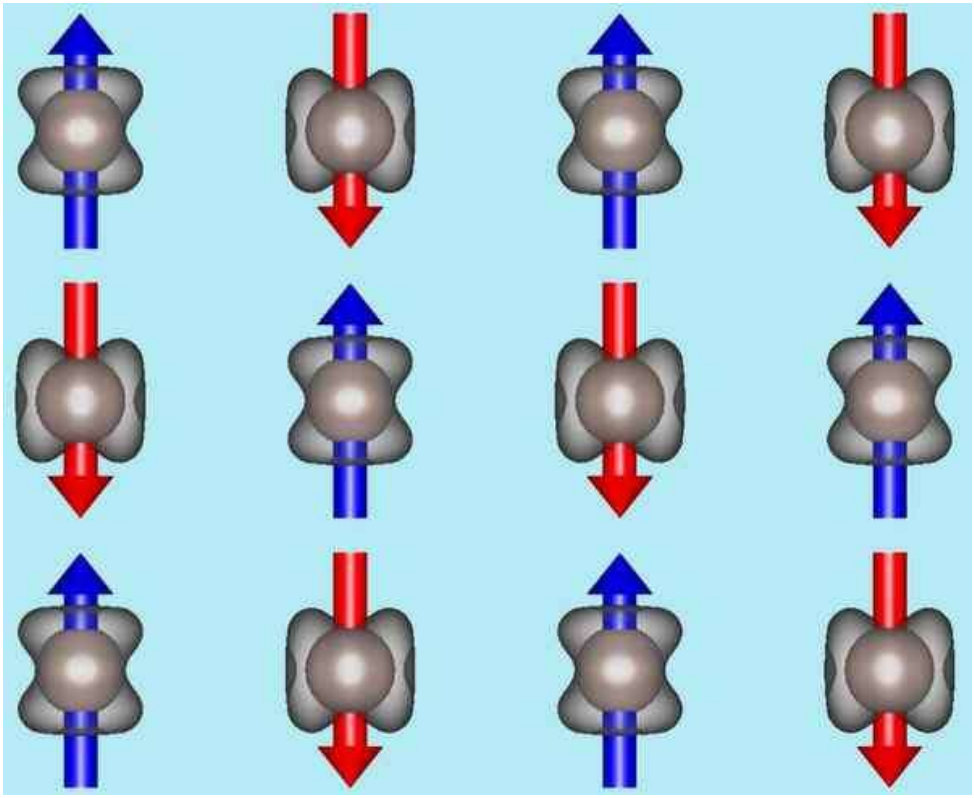
Properties of Altermagnets:

1. Physical Properties

- **Zero net magnetisation:** Although spins alternate, their arrangement cancels external magnetic fields, similar to antiferromagnets.
- **Spin-split electronic bands:** Inside the material, electrons with opposite spins occupy slightly different energy states, a feature typical of ferromagnets.
- **Symmetry-based spin arrangement:** The opposite spins are related by mirror or rotational symmetry, not by simple spatial translation.
- **High-speed spin dynamics:** Spin switching occurs on picosecond or sub-picosecond timescales, allowing operation in the terahertz range.

2. Chemical and Material Properties

- Found in compounds like **manganese telluride (MnTe)** and **ruthenium dioxide (RuO_2)**.
- Exhibits strong **crystalline symmetry** that defines spin alternation and electronic structure.
- Can exist in **metals, semiconductors, and insulators**, making it broadly applicable for material engineering.



3. Applications:

- **Spintronics:** Enables next-generation spin-based electronics that are faster, smaller, and more

energy-efficient.

- **Quantum computing:** Reduces magnetic noise, enhancing qubit stability and coherence.
- **Data storage:** Facilitates high-density storage with minimal signal interference.
- **Ultrafast electronics:** Allows terahertz-level magnetic switching for advanced processors and logic gates.
- **Sensors and detectors:** The anomalous Hall effect in altermagnets enables precise electrical detection of magnetic states.

4. Limitations:

- **Complex synthesis:** Producing single-domain, defect-free altermagnetic crystals is still difficult.
- **Detection difficulty:** Conventional magnetometers cannot detect them due to the absence of external fields.
- **Scalability concerns:** Controlling spin domains and maintaining uniformity across large samples remains a challenge.

India's largest and first MWh-Scale Vanadium Redox Flow Battery (VRFB) inaugurated

India's largest and first MWh-Scale Vanadium Redox Flow Battery (VRFB) inaugurated at NTPC NETRA

- **Flow Batteries**, along with **solid state batteries**, are one of the next generation battery technologies and are emerging as an **alternative to lithium-ion** for grid-scale applications, offering **flexibility, longevity, and safety.**

Next Generation Battery Technologies

- **Flow Batteries:** Flow batteries are powered by **reduction-oxidation (redox) reactions** and involve **two different liquid electrolytes** that pass ions or protons back and forth through a porous membrane.
- These batteries can **store larger amounts of energy**—as much as the size of the electrolyte cells can contain—and don't use flammable or polluting materials.
- **Types of Flow Batteries:** Vanadium Redox, Zinc–Bromine, Iron–Salt/Organic systems.
- **Solid-State Batteries:** These use **solid electrolyte solutions**, which don't need a different separator.
- It **makes them safer** because they are less prone to leakage from damage or swelling in hot temperatures.
- **Significance of Next Generation Battery Technologies**
- Suitable for **grid-scale energy storage** due to **independent scaling of power and energy capacity**.
- Provides an **alternative to lithium-ion** batteries, as it diversifies material dependency and

enhances supply chain security.

- **Used** in power management, pumps, grid energy storage, etc.
- Provides **Long-Duration Energy Storage (LDES) solutions**, enhancing renewable energy integration and grid resilience.

Aditya L1 Observes Coronal Mass Ejection

- The **VELC** onboard Aditya-L1 has enabled the **first spectroscopic observation** of a **coronal mass ejection (**CME**)** in the **visible wavelength range**.
- Scientists from the **Indian Institute of Astrophysics (**IIA**)** and **NASA** have collaborated to estimate the **key parameters** of the observed CME.

- **VELC:** The **Visible Emission Line Coronagraph** is the primary and largest **payload** on board Aditya-L1, developed by IIA and ISRO.
- **Aditya-L1 Mission:** It is India's **first dedicated solar mission** aimed at studying the Sun's outer atmosphere and emissions. It is positioned in a halo orbit around the Sun-Earth **Lagrange Point 1 (**L1**).**
- **Lagrange Point:** It is a position where the **gravitational forces of two large bodies**, like the Sun and the Earth, **balance** the **centrifugal force** on a **smaller object**, allowing it to **stay stable**.

Coronal Mass Ejections

- A coronal mass ejection (CME) is a **massive release** of hot, **magnetised gas** and **charged particles** from the Sun's outer layer, the **corona**.
- **Cause:** It occurs when **magnetic field lines** on the Sun abruptly break and reconnect, releasing a significant amount of energy that sends material into space.
- **Effect on Earth:** CMEs directed toward Earth can cause geomagnetic storms, disrupting **satellites**, power grids, and **communications**; they can also create auroras.

Key Findings and Parameters

- **Electron Density:** The CME contained about **370 million electrons** per cubic centimetre—much higher than the 10–100 million in the normal corona.
- **Energy:** Its energy was estimated at **9.4 × 10^21 joules**, which significantly exceeds the energy of WWII atomic bombs.
- **Mass and Speed:** The CME had a mass of about **270 million tonnes** and an initial velocity of **264 km/sec**, with plasma **temperatures** reaching nearly **1.8 million Kelvin**.

TB Vaccine Development

- WHO report calls for bold financing and equitable access strategies to ensure **novel tuberculosis (TB) vaccines** reach adolescents and adults in high-burden countries.
- Despite TB's devasting global impact, **no new vaccines have been licensed** in over a century.

- Presently available **Bacille Calmette-Guérin (BCG) vaccine** offers protection against the consequences of TB for infants and young children but it offers only **limited and variable protection against pulmonary TB** in adolescence and adulthood.
- WHO established the **TB vaccine accelerator Council in 2023** to facilitate the development, testing, authorization, and use of new TB vaccines.

DNA Pioneer James Watson

- Nobel laureate **James Watson**, who co-discovered the **double-helix structure of** DNA, has recently died.
- He received the 1962 Nobel Prize with **Francis Crick** and **Maurice Wilkins** for discovering **DNA's structure** and **self-duplication mechanism**.

DNA

- **Deoxyribonucleic acid (DNA)** is a molecule that contains **genetic instructions** essential for growth, reproduction, and biological functions in all living organisms.
- It is the **hereditary material** passed from parents to offspring, forming life's **unique genetic blueprint**.
- **Structure:** DNA has a double-helix shape like a twisted ladder. Its sides have **sugar** and **phosphate molecules**, and the rungs are made of **four nitrogen bases**—adenine, thymine, guanine, and cytosine.
- **Location:** In eukaryotes, DNA is found in the **nucleus** and **mitochondria**, whereas in prokaryotes, it exists as circular chromosomal DNA in the **cytoplasm**..
- **Function:** Specific DNA segments known as **genes** guide the production of proteins that **regulate traits** and **body functions**.
- **Key Applications:** DNA fingerprinting aids forensic and **paternity tests**; sequencing helps diagnose genetic disorders, supports **evolutionary studies**, and improves precision medicine.

UNESCO's Neurotechnology Ethics Framework

- **UNESCO** released the **world's first global framework on the ethics of neurotechnology**, set to enter into force on November 12, 2025, to regulate brain-related innovations.

Neurotechnology

- **Definition:** Devices and procedures that access, assess, or act on the human neural system to restore or enhance brain function.
- **Applications:** Includes brain-computer interfaces, neuroimaging, and AI-based brain data analysis used in healthcare, rehabilitation, and human enhancement.

Key Recommendations of the UNESCO Framework

- **Ethical Governance:** Ensure beneficence, autonomy, privacy, and accountability in neurotech R&D.
- **Ban on Misuse:** Prohibits using brain data for political manipulation or employment screening.
- **Human Rights:** Recognises freedom of thought and mental privacy as emerging "**neurorights**".
- **Open Science Promotion:** Advocates the sharing of research data under open-access models.
- **Responsible Research & Innovation (RRI):** Encourages researchers to evaluate long-term impacts.
- **Vulnerable Groups:** Calls for safeguards for children, the elderly, and the mentally ill in neurotech testing.
- **Self-Regulation:** Urges companies to adopt ethics-by-design and independent ethics boards.
- **Global Precedents of Neurotechnology Frameworks**
- **Chile (2021):** First country to enshrine "**mental integrity**" in its Constitution.
- **California (2024):** Passed a law protecting brain data privacy from corporate misuse.
- **OECD (2019):** Developed the first guidelines for responsible innovation in neurotechnology enterprises.

Aurora

Auroras were witnessed in Northern America, Australia etc. **due to a cannibal solar storm.**

- A **cannibal solar storm** happens when a **faster solar storm catches up with an earlier storm**, resulting in a stronger storm, affecting GPS and power systems.
- An aurora is a **natural light display in the night sky**, usually only appearing in **lower Polar Regions**.
- They occur when **high-energy charged particles from the Sun** collide with **atoms in the upper atmosphere**.
    - E.g. **Oxygen** (green and red light), **Nitrogen** (blue and purple).
- Near the North Pole, it is called an **aurora borealis or northern lights** and near the South Pole, it is called **aurora australis or the southern lights**.

Ricin and Ammonium Nitrate

- Recently terror attacks were averted related to Ricin poison and Ammonium Nitrate.

Ricin

- It is a **protein** found naturally in **castor beans** and can be made from waste residue of castor beans.
- **Lethal poison**: Even 1 mg mixed in food can kill an adult. There is **no antidote or specific treatment** for ricin poisoning.
- It works by getting inside the cells of a person''s body and **preventing the cells from making the proteins they need.**

Ammonium Nitrate

- Pure **ammonium nitrate (NH4NO3)** is a **white, water-soluble, crystalline substance** with a **melting point of 170°C.**
- It is **not explosive by itself**. However, it is **one of the ingredients used for the manufacture of explosives**.

DNA Identification

- DNA **Identification**/profiling used to identify suspects or victims at Red fort blast site.
- It is a technique used to identify individuals by analyzing unique patterns in their DNA.

Key Methods

- **Short Tandem Repeat (STR):** Examines short repeating DNA sequences in the nucleus.
- **Mitochondrial DNA (mtDNA):** Used if nuclear DNA is degraded. mtDNA is abundant and maternally inherited, allowing matches with maternal relatives.
- **Y Chromosome:** Focuses on STRs on the Y chromosome, inherited father to son. Identifies male victims by matching paternal male relatives.
- **Single Nucleotide Polymorphisms (SNPs):** Used for highly degraded DNA.
- SNPs are single-base differences unique to individuals, matched with personal items like toothbrushes.

Quantum Diamond Microscope

- **IIT Bombay** develops **India's first** Quantum Diamond Microscope under the National Quantum Mission.
- **Technology:** Uses **nitrogen-vacancy (NV) centres** in diamond to image magnetic fields at **nanoscale resolution at room temperature**.
- **Applications:** Enables advanced research in neuroscience, materials science and non-destructive semiconductor testing.
- **Significance:** Secures India's first patent in quantum sensing and strengthens national capabilities in frontier instrumentation.

Parachute System Test for Gaganyaan Mission

- **ISRO** recently conducted an **Integrated Main Parachute Airdrop Test (IMAT)** as part of qualification trials for the Gaganyaan mission's **parachute system**.
- A test article simulating the mass of the **Gaganyaan Crew Module** was dropped from an **Indian Air Force (IAF) IL-76 aircraft**.
- The test confirmed that the crew module is **capable of a stable descent** even if one of the four

main parachutes fails or opens late.

Gaganyaan Mission

- The Gaganyaan Mission is **India's first human spaceflight program** by the Indian Space Research Organisation (ISRO).
- **Objective:** It aims to send a crew of **three astronauts** into **Low Earth Orbit (**LEO**)**, about **400 km** above Earth, for a **three-day mission** and to ensure their safe return.
- **Launch Vehicle:** The mission will use the human-rated **LVM3 (Launch Vehicle Mark-3)**, India's **heaviest** and most **powerful** operational rocket, earlier known as GSLV Mk-III.
- **Launch Timeline:** The **first uncrewed** test flight is scheduled for **late 2025**, with the first **crewed mission** planned for **2027**.

Fourier Transform Infrared Spectroscopy

- Recent reports highlight the use of **FTIR spectroscopy** as a rapid and effective tool for detecting **material evidence** in post-blast forensic investigations.
- It is a technique used to **analyze materials** by measuring how they **absorb infrared light**.
- It uses a special device called an **interferometer** to record data, which is then processed by a computer to make a graph (called a spectrum).
- **Significance**: non-destructive (preserve sample); require minimal material, **provides both qualitative & quantitative data etc**.
- **Applications:** Commonly used across fields such as pharmaceuticals, materials science, environmental analysis, and forensics.

Study offers a promising new method to repair spinal fractures using Stem Cells

- As per the Study, stem cells extracted from **adipose tissue** (known as body fat) can help heal osteoporosis-related fractures seen in humans.
- **Osteoporosis** is a disease which makes bones weak and fragile.

Stem Cells

- **Meaning:** They are **unspecialized cells** that can **self-renew indefinitely** and can also **differentiate into more mature cells** with **specialized functions.**
- In humans, they have been identified in **inner cell mass of the early embryo**; in some tissues of **foetus, umbilical cord, placenta**; and in **several adult organs.**

What is a stem cell?

It is a special cell capable of **becoming many different types of cells** in the body, playing a key role in growth and tissue repair.

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Stem cell uses

It is a cell that can develop into many different types of cells in the body.

Stem cell types

Stem cells are classified according to their **origin** and their ability to **develop** into other cell types.

Embryonic stem cells: From early-stage embryos; can become any cell type.

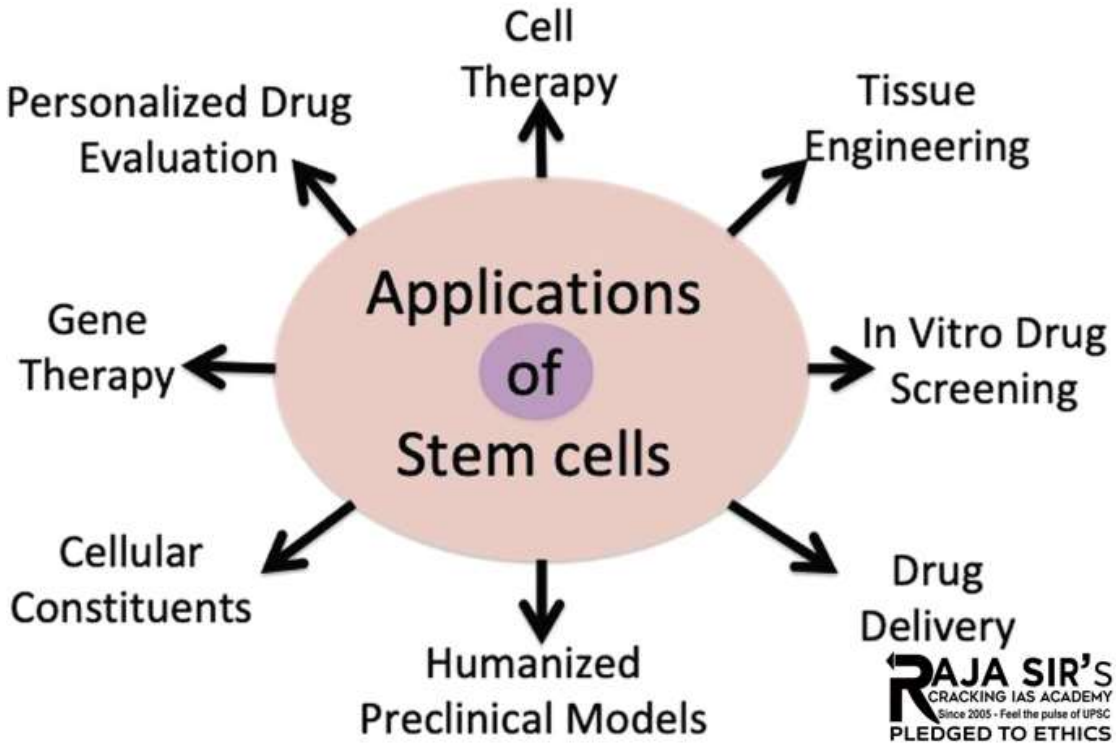
Adult stem cells: Found in tissues like bone marrow; limited to related cell types.

Cord blood stem cells: Taken after birth; useful with low rejection risk.

iPS cells: Reprogrammed body cells; similar to embryonic, used for research.

- **Key Types: Pluripotent stem cells** (embryonic stem cells and induced pluripotent stem cells) and **Nonembryonic/Somatic/Adult stem cells.**
- **Embryonic Stem Cells (ESCs):** Found in the embryo (3- 5 days post fertilization and prior to implantation) containing an inner cell mass capable of generating to all the specialized tissues of human body.
- **Induced Pluripotent Stem Cells (iPSCs):** Created through the introduction of embryonic genes into a **somatic cell** (For E.g. Skin Cell) causing it to revert back to a "stem cell like" state.
- **Pluripotent stem cells**: Ability to differentiate into all cells of the adult body.
- **Adult Stem Cells (ASCs): Undifferentiated** cells found in tissue or organ and can differentiate to **yield the specialized cell types of that tissue or organ**. Key Types Include: Neural Stem Cells;

Skin Stem Cells, etc.



World Health Organisation (WHO) releases the Global Tuberculosis (TB) Report 2025

- The report highlights TB to among top 10 causes of death worldwide and leading cause of death from a **single infectious agent.**

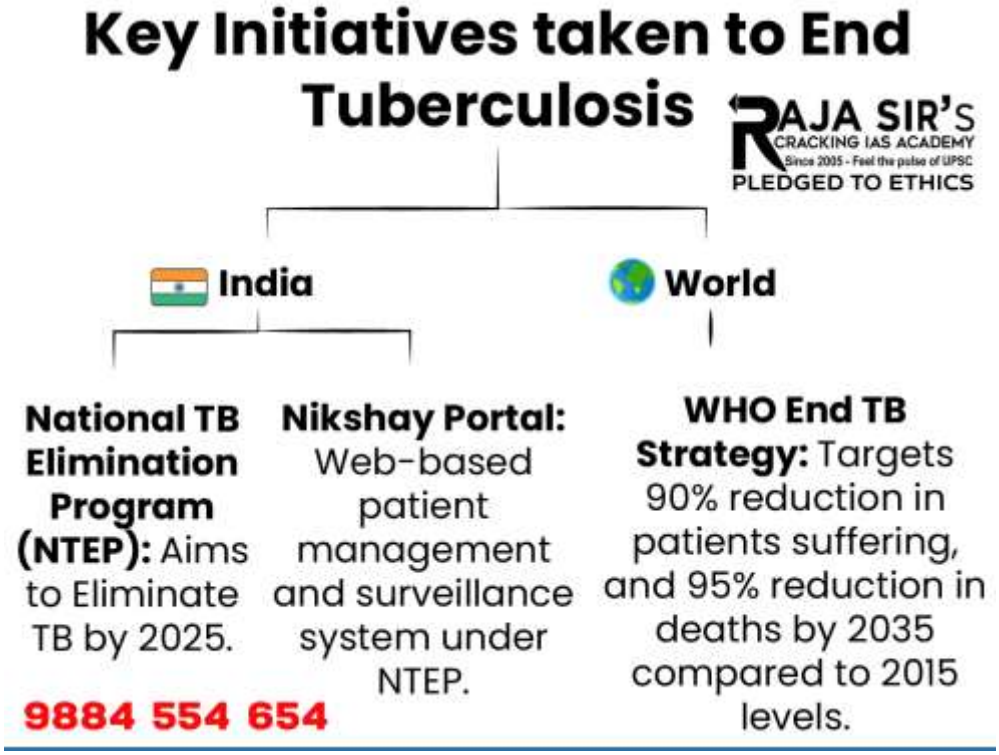
Other Key Findings

- **TB Burden:** In 2024, 87% of world's TB patients were concentrated in 30 countries, with the highest rates found in **India (25%).**
- **Global TB Incidence Rate:** Net **reduction of 12%** from 2015-2024.
- **Global TB Deaths:** Net **reduction of 29%** from 2015-2024.
- **Multidrug-resistant TB (MDR-TB):** Remained a public health crisis and a health security threat.

Tuberculosis (TB)

- It is a **contagious airborne disease** caused by a **bacterium called Mycobacterium tuberculosis.** It is **preventable and curable.**
- **Two Types:**
- **Pulmonary TB:** Most common form **affecting the lungs,** and is contagious spreading through **airborne droplets** through coughing or sneezing.
- **Extrapulmonary TB:** Occurs **outside the lungs**, affecting organs like lymph nodes, bones, brain, kidneys, or the pleura, less contagious and spreads within the body from lungs.

- **Treatment:** Treated with special antibiotics, most common being **rifampicin; isoniazid; pyrazinamide; and ethambutol.**
- **MDR-TB:** Form of TB that do not respond to rifampicin and isoniazid, the two most effective first-line TB drugs.



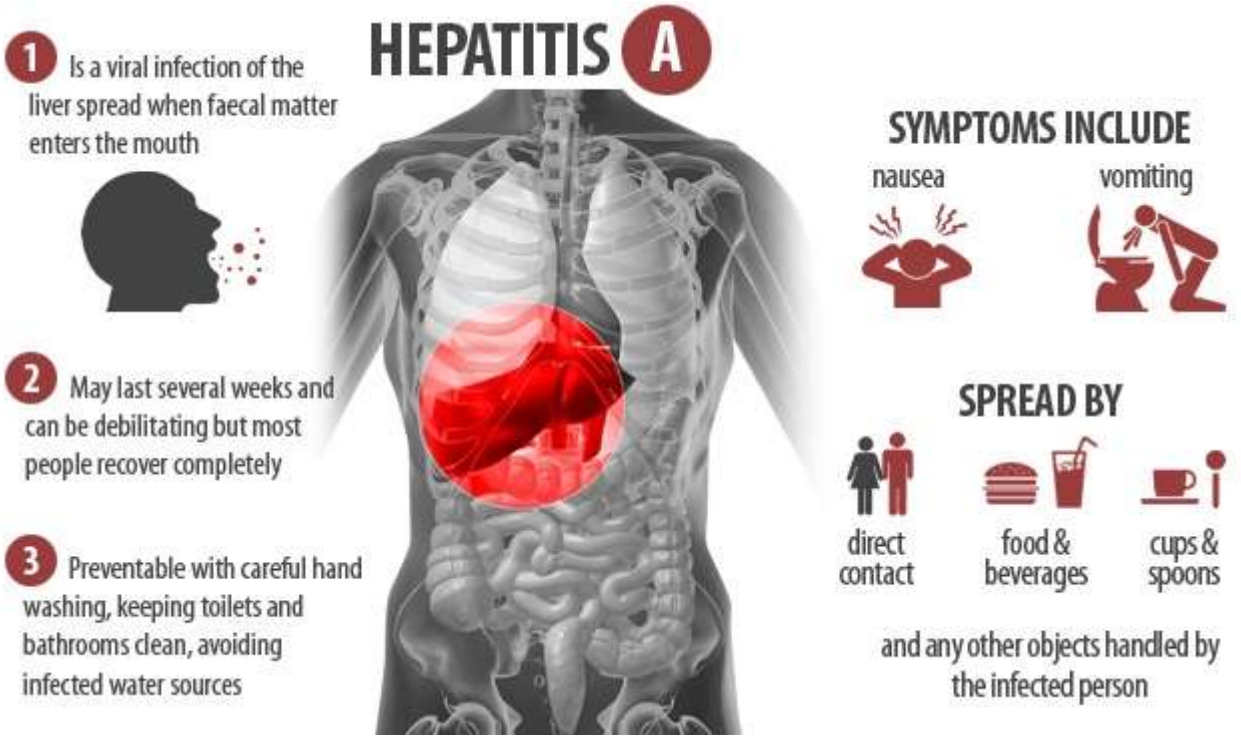
Hepatitis A Vaccine Needs to be Included in UIP

- Public health experts recommend **adding Hepatitis A vaccination** to India's **Universal Immunisation Programme (**UIP**)** due to increasing outbreaks and declining natural immunity.

Hepatitis A

- It is an **acute liver infection** caused by the **Hepatitis A virus (**HAV**)**, a non-enveloped RNA virus.
- The infection is usually **short-term** and clears completely **without** causing **permanent liver damage**, unlike **Hepatitis B or C**.
- **Transmission:** Primarily through the **faecal-oral route** from contaminated food, water, or close contact.
- **Symptoms:** Adults commonly exhibit **fever**, nausea, abdominal pain, dark urine, pale stools, and **jaundice**, while young children may remain **asymptomatic**.
- **Treatment & Prevention:** There is **no antiviral cure**, and management relies on rest, good nutrition, and adequate hydration. It can be prevented through **vaccination**.
- **Hepatitis A** has been a **growing cause of acute liver failure in India.**
- It is an **inflammation of the liver** that can cause mild to severe illness.

- **Transmitted through**: Ingestion of **contaminated food and water or through direct sexual contact** with an infectious person.
- **Recovery:** Almost everyone recovers **fully from hepatitis A with a lifelong immunity.**
  - However, a very **small proportion of people infected with hepatitis A** could die from fulminant hepatitis.
- Unlike hepatitis B and C, **hepatitis A does not cause chronic liver disease**.
- **Vaccine is available for Hepatitis A and B** but is not available for hepatitis C.



Key Reasons for Inclusion

- **Disease Burden:** Hepatitis A causes **10–30%** of **acute viral** hepatitis cases and **5–15% of acute liver failure** incidents in India.
- **Epidemiological Shift:** Improved hygiene **reduced exposure** in **children**, but now **adolescents** are more **vulnerable**; recent **outbreaks** in Kerala, Maharashtra, Uttar Pradesh, and Delhi highlight this shift.
- **Declining Immunity:** Natural immunity has decreased from **over 90%** to around **50–60%** in urban areas.
- **Vaccine Advantage:** A single-dose live vaccine offers **90–95% protection** with **15–20 years of immunity**; India's **Biovac-A** is a safe, affordable, and effective option.

Universal Immunisation Programme (UIP)

- UIP, launched in **1985**, provides **free vaccines** to **children** and **pregnant women** across the country.

- It is one of the largest **immunisation programs** worldwide, covering **12 preventable diseases**.
- **Digital Systems:** **eVIN** enables real-time cold-chain monitoring, while **U-WIN** tracks vaccination of pregnant women and newborns.

Lab-Grown Milk

- Israel-based startup Remilk has announced the commercial launch of its lab-grown "cow-free" milk from January 2026, marking one of the world's first large-scale rollouts of animal-free dairy.
- Lab-grown milk, or **animal-free dairy**, is real milk made **without cows** using biotechnological methods.
- Unlike plant-based milks (soy, almond, oat), it contains **actual dairy proteins—casein and whey—identical to cow's milk**, making it suitable for traditional dairy uses like cheese, curd, and yogurt.
- **Developed by:**
- Pioneered by Israeli food-tech firms such as Remilk, Imagindairy, and Wilk.
- **Process:**
- **Precision Fermentation:** Milk-producing genes are inserted into microbes like yeast.
- These microbes are grown in **bioreactors**, where they secrete milk proteins when fed sugar.
- Proteins are then blended with fats, minerals, and carbohydrates to replicate cow's milk—**lactose-free, cholesterol-free, and hormone-free**.

Features:

- **Nutritionally identical** to traditional milk—contains all **nine essential amino acids**, calcium, and similar fat/protein content.
- **Customizable:** Fat or lactose content can be altered; suitable for **lactose-intolerant consumers**.
- **Ethical and sustainable:** No animal use, antibiotics, or methane emissions.
- **Allergen label required** since proteins are identical to cow's milk.

Significance:

- Offers a climate-friendly alternative to conventional dairy—reducing land, water, and emissions.
- Addresses animal welfare and ethical concerns.
- For India, it opens new avenues for biotech innovation but faces cultural, cost, and regulatory challenges under FSSAI.

India Unveils First Indigenous High-Precision Diode Laser

- India launched its first indigenous high-precision diode laser engineered for quantum communication and computing. It marks a major step in India's capability to build quantum-grade hardware.

- A **compact, high-precision diode laser system** engineered for quantum technologies, scientific research, higher-education laboratories, and cutting-edge industrial applications.
- It provides ultra-stable, tunable and long-duration laser output required for quantum experiments and secure communication systems.
- **Developed by:** Prenishq Pvt. Ltd., a deep-tech startup and spin-off from IIT Delhi
- Supported by the National Quantum Mission (NQM)
- **Aim:**
- To create an indigenous quantum-grade diode laser for secure communication, quantum computing, and high-precision scientific research.
- To strengthen India's quantum ecosystem and enable quantum-safe digital infrastructure.

Key Features:

- **Ultra-Narrow Linewidth & High Beam Quality:** Ensures sharp, stable beams ideal for high-resolution quantum sensing and communication tasks.
- **Long-Term Frequency & Power Stability:** Maintains precise performance over long durations, reducing recalibration needs in labs and field setups.
- **Wide Wavelength Range (UV to Near-IR):** Supports multiple quantum systems and scientific instruments requiring different operational wavelengths.
- **Rugged & Temperature-Controlled:** Designed to operate reliably in Indian climatic conditions, ensuring stable quantum output.
- **Compact, Lightweight & Low-Power:** Portable, energy-efficient architecture makes deployment easy in both labs and mobile platforms.
- **Plug-and-Play Integration:** Simple setup with minimal configuration enables fast adoption by researchers and educational institutions.
- **Free-Space & Fiber-Coupled Output:** Flexible delivery options allow use in both optical table experiments and long-distance communication links.

Applications:

1. Quantum Communication

- **QKD Backbone:** Provides stable, coherent light required for generating quantum keys used in ultra-secure communication.
- **Quantum-Safe Transactions:** Enables banks, defence and telecom systems to protect data against attacks from future quantum computers.

2. Photonic Quantum Computing

- **Photon Qubit Control:** Generates precise laser pulses to encode, manipulate, and read photonic qubits in quantum processors.
- **Error-Resilient Operations:** Low noise and stable frequency improve gate fidelity, reducing errors in optical quantum computation.

3. Scientific & Industrial Research:

- **Precision Spectroscopy:** Offers narrow, stable beams for analysing atomic and molecular structures at extremely high resolution.
- **Atomic Clocks & Metrology:** Supports next-gen optical clocks and ultra-precise timekeeping, improving navigation and communication systems.

Ammonium Nitrate

- A massive explosion at the Nowgam police station in Srinagar occurred when seized explosives—primarily ammonium nitrate recovered from a terror-linked doctor in Faridabad—accidentally detonated, killing nine people.
- Ammonium nitrate is a **white crystalline chemical compound** widely used as a fertilizer and a key ingredient in industrial and improvised explosives.
- It is highly oxidising and becomes explosive when mixed with fuel or other sensitizing agents.
- **Chemical Formula:** NH_4NO_3 – Ammonium Nitrate

Key Features:

- **Strong Oxidiser:** Does not burn alone but greatly accelerates combustion of other materials.
- **Highly Soluble & Hygroscopic:** Absorbs moisture easily, dissolves readily in water.
- **Thermally Unstable:** Can undergo decomposition at high temperatures (melting point 170°C), leading to violent explosions under confinement.
- **White Crystalline Solid:** Appears similar to common salts, making large quantities difficult to visually identify.

Regulations in India:

- Classified as an **explosive** under the **Explosives Act, 1884** (as per 2011 Gazette notification).
- Governed by the **Ammonium Nitrate Rules, 2012**, covering manufacture, conversion, bagging, transport, storage, import, and export.
- Any mixture containing **over 45% ammonium nitrate** is treated as an explosive.
- Requires licences under:
- **IDR Act, 1951** (for industrial manufacture)
- **Ammonium Nitrate Rules, 2012** (for handling, storage, transport, sale, or use)

Applications:

Agriculture:

- Used as a **high-nitrogen fertilizer** (NPK: 34-0-0).
- Preferred for its stability and efficient nitrogen release compared to urea.

Industrial Explosives:

- Major ingredient in commercial explosives like **ANFO (Ammonium Nitrate Fuel Oil)**, which accounts for ~80% of explosives used in mining and quarrying.
- Also used in mixtures like **Amatol, Ammonal, Minol, Nitrolite**, etc.
- **Terrorism:** Widely misused in **Improvised Explosive Devices (IEDs)** due to easy availability and high explosive potential when combined with fuel.

Niche Uses:

- **Instant cold packs:** Dissolution in water absorbs heat (endothermic).
- Experimental use in **off-grid cooling systems** and as a refrigerant.
- Previously used in some **airbag inflators** (now discontinued due to safety concerns).

Cohort Connect 2025

- The Union Minister of State for Science & Technology launched the Phenome National Conclave on Longitudinal Cohort Studies: Cohort Connect 2025 at CSIR–IMMT, Bhubaneswar.
- A nationwide scientific platform under the **Phenome India programme**, bringing together India's major longitudinal cohort studies to generate large-scale, India-specific health data for precision medicine, disease prediction, and public health planning.
- **Launched In:** 2025, by the Ministry of Science & Technology at CSIR–IMMT, Bhubaneswar.
- **Aim:**
- To examine how genes, lifestyle, behaviour, nutrition, pollution, and environment influence disease patterns in Indian populations.
- To create a massive longitudinal dataset for chronic and emerging diseases like diabetes, cancer, neurological disorders, and infectious disease interactions (e.g., diabetes–TB link).

Key Features:

- Integrates multiple Indian cohort studies under one national framework ("Cohort Connect").
- Focuses on rising **non-communicable diseases (NCDs)** including diabetes, metabolic disorders, cardiovascular diseases, and renal complications.
- Uses advanced tools such as **genome sequencing**, biomarkers, digital health monitoring, and lifestyle mapping.
- Builds upon India's existing genomic progress—**10,000 human genomes sequenced**, moving toward **one million genomes**.
- Encourages collaboration between **CSIR labs, DBT institutions, clinicians, epidemiologists, and industry partners**.
- Generates long-term datasets involving **diverse Indian populations**, addressing India's unique genetic and cultural diversity.

Significance:

- Provides **"Indian data for Indian solutions"**, reducing dependence on Western health models.
- Enables early detection, personalised treatment, and prevention strategies tailored to India's population.
- Strengthens India's preparedness against future health challenges, including emerging infections and lifestyle diseases.

The Rare Earth Hypothesis

- Recent data from NASA's Kepler and James Webb Space Telescopes (JWST) suggest that while Earth-sized planets in habitable zones are common, the specific conditions required for complex life remain extremely rare, reviving interest in the Rare Earth Hypothesis.
- The Rare Earth Hypothesis posits that while microbial life might be widespread across the universe, complex, multicellular life is exceptionally uncommon due to the need for a unique and finely tuned set of planetary, stellar, and cosmic conditions.

Propounded by:

- Proposed by **Peter Ward (palaeontologist)** and **Donald Brownlee (astronomer)** in their 2000 book "Rare Earth: Why Complex Life is Uncommon in the Universe."
- **Aim:**
- To explain why Earth-like complex ecosystems may be an extraordinary rarity in the cosmos despite the abundance of stars and planets.
- **Key Features:**
- **Multiple Conditions Required:** Complex life depends on a rare combination of factors — stable climate, plate tectonics, magnetic field, atmospheric regulation, and a protective gas giant (like Jupiter).
- **Habitable Zone Constraint:** Not enough to be in a "habitable zone"; the planet's composition, orbit, and atmosphere must also remain stable over billions of years.
- **Planetary System Architecture:** Giant planets can either shield inner planets from impacts or destabilize them depending on mass and orbit.
- **Climate Stability:** Long-term carbon-silicate cycling and plate tectonics are vital to maintain a life-supporting atmosphere.
- **Atmospheric Retention:** Only few planets, particularly around Sun-like stars, can sustain thick atmospheres against stellar radiation.
- **Significance:**
- Challenges the Copernican Principle (that Earth is not special) by suggesting Earth's conditions are uniquely fine-tuned for complex life.
- Guides astrobiology and exoplanet research, focusing on planetary systems with Earth-like stability.

Moon's Sphere of Influence (MSI)

- ISRO confirmed that the Chandrayaan-3 Propulsion Module (PM) re-entered the Moon's Sphere of Influence (MSI) during its high-altitude Earth-bound orbit, undergoing two lunar flybys.
- The Moon's Sphere of Influence (MSI) is the region around the Moon where its gravitational influence dominates over Earth's for orbital calculations.
- Inside this region, it is mathematically more accurate to treat a spacecraft as orbiting the Moon, with Earth acting as a perturbing body.

Located in:

- The MSI is an **imaginary, approximately spherical (or oblate spheroid) region** surrounding the Moon.
- For the Earth–Moon system, the MSI radius is roughly **~66,000 km** from the Moon's center (approximate, varies with models).

How to Calculate It (SOI Radius)?

- Using the classical patched-conic approximation:

$$R_{SOI} = a_{planet}\left(\frac{m_{planet}}{m_{Sun}}\right)^{\frac{2}{5}}$$

Where:

R_{SOI} = radius of a planet's SOI in km

a_{planet} = semimajor axis of the planet's orbit around the Sun (km)

m_{planet} = planet's mass (kg)

m_{sun} = Sun's mass = 1.989×10^{30} kg

a_{Moon} = 3.844×10^5 km and $\left(\frac{mass_{Moon}}{mass_{Earth}}\right) = \frac{1}{81.3}$

- (**Note:** For precise mission design, ISRO uses numerical N-body simulations, not this crude formula.)

Features of the Sphere of Influence:

- **Dominant gravitational region**: Moon's gravity governs trajectory integration more strongly than Earth's.
- **Not a physical boundary**: It is a mathematical convenience, not a sharp gravitational cutoff.
- **Both Earth & Moon still influence motion**: Earth still perturbs the orbit inside MSI; Moon still perturbs outside it.
- **Useful for "patched conic" method**: Helps switch from one two-body solution (Earth–craft) to another (Moon–craft).
- **Shape is not perfectly spherical**: It is closer to an **oblate spheroid**, influenced by orbital eccentricity and the Sun.

Significance:

- **Trajectory Planning**: Determines when spacecraft navigation should shift from Earth-centric to

Moon-centric calculations.

- **Critical for Lunar Flybys & Insertions**: Ensures optimal timing for orbit circularisation, braking, or slingshot manoeuvres.
- **Avoids Orbital Uncertainty**: Helps predict perturbations from Earth, Sun, and other lunar orbiters.

ESCAPADE Mission to Mars

- **NASA's twin-spacecraft Mars mission ESCAPADE** was launched aboard **Blue Origin's New Glenn rocket** from Cape Canaveral Space Force Station in **Florida**.

ESCAPADE Mission:

- ESCAPADE (**Escape and Plasma Acceleration and Dynamics Explorers**) is a **twin-spacecraft Mars mission** by **NASA** to study how the solar wind strips away the Martian atmosphere.
- It is part of **NASA's SIMPLEx programme** for independent planetary science missions using small, low-cost spacecraft.
- **Core Objective:** It aims to examine Mars' **hybrid magnetosphere** and explain how solar-wind interaction drives long-term atmospheric loss into space.
- **Twin Spacecraft:** The mission deploys two identical small satellites, **Blue** and **Gold**, launched aboard Blue Origin's **New Glenn rocket**.
- **'Launch and Loiter':** The spacecrafts were placed early into a fuel-efficient **holding orbit** around the Earth-Sun Lagrange point 2 (L2) to wait for the **correct Earth-Mars alignment**.
- **Gravity Assist:** Once Earth and Mars align correctly, they will use an Earth gravity-assist manoeuvre ("**slingshot**") to propel toward Mars with **minimal fuel use**.
- **Science Timeline:** The main science mission will begin in mid-2028 and will last for about eleven months. It is divided into **two phases**:
- **String of Pearls:**Both satellites will fly in **nearly identical orbits** to capture **short-timescale variations** in Mars' environment.
- **Complementary Phase:**Each spacecraft will shift to **different orbits** to study **distinct regions** of Mars' magnetosphere simultaneously.
- **Key Instruments:** Each spacecraft is equipped with the **EMAG** magnetometer, **EESA** electrostatic analyser, and **ELP suite** to measure plasma density and temperature.

ISRO's Production Expansion and Upcoming Missions

- ISRO aims to **triple its annual spacecraft production** within **three years** and boost India's share in the **global space economy from 2% to 8% by 2030**.

Upcoming Missions of ISRO

- **Industry PSLV:** The **first** PSLV fully assembled by an industry consortium led by **Hindustan**

Aeronautics Limited (HAL) and **Larsen & Toubro (L&T)** is scheduled for launch by **February 2026**.

- **Gaganyaan:** The **crewed mission** under Gaganyaan, **India's first human spaceflight programme**, is planned for launch in the first quarter of **2027**.
- **Chandrayaan-4:** India's **first lunar sample-return mission** is planned for **2028** under Chandrayaan-4.
- **LUPEX:** India's joint **lunar polar exploration** with **JAXA (Japan Aerospace Exploration Agency**) to investigate **water ice in** the moon's shadowed regions is scheduled for launch in **2028**.
- **Indian Space Station:** The **first module** of the **Bharatiya Antariksh Station** is scheduled to launch in **2028**, with **full operation** expected by **2035**.
- The endeavour would make **India the third major nation** to operate an independent space station.

India Needs to Include Typhoid Conjugate Vaccine (TCV) in the UIP

- **Bangladesh** recently introduced the **Typhoid Conjugate Vaccine (TCV)**, while India, a major supplier of the vaccine, has **not included** it in the **Universal Immunisation Programme (**UIP**)**.

> *Typhoid Conjugate Vaccines provide **single-dose**, **long-lasting immunity** and are **WHO-approved** for **children aged six months and above**.*

Typhoid

- Typhoid is a **water-borne disease** caused by the bacterium **Salmonella Typhi**. It mainly spreads in areas with **poor water**, **sanitation**, and hygiene **infrastructure**.
- **Disease Burden:** WHO estimates show **9–12 million global infections** and over **100,000 deaths** annually, with India, Pakistan, and Bangladesh as hotspots; **Children** are significantly impacted.
- **Transmission:** Mainly through the **faecal-oral route** via ingestion of contaminated food or water; it also spreads through the **faeces or urine** of an infected person or an asymptomatic carrier.
- **Symptoms:** Prolonged **high fever** with headache and **non-specific symptoms**, which make early diagnosis difficult.

Key Reasons for TCV Inclusion in UIP

- **High Burden:** **SEFI modelling** (2017–2020) estimates **4.5 million annual Indian cases** with nearly **9,000 deaths**. The incidence is highest in densely populated, low-income settlements lacking sanitation.
- **AMR Threat:** Salmonella Typhi shows **growing resistance** to **common antibiotics** like ciprofloxacin, azithromycin, and ceftriaxone, limiting treatment options.
- **Vaccine Advantage:** TCV significantly decreases typhoid cases, decreases antibiotic use, and prevents the development of **new drug-resistant strains**.

- **Health Equity:** High private-sector pricing (~₹2,000/dose) **limits TCV access** for vulnerable populations.
- **National Guidance:** National Technical Advisory Group on Immunisation (NTAGI) officially recommended the inclusion of TCV in UIP in 2022.
- **Sanitation Gaps:** Only **6% of urban households** have a guaranteed safe water supply, despite initiatives like the Swachh Bharat Mission.
- **Regional Alignment:** India's neighbours, including **Pakistan**, **Nepal**, and **Bangladesh**, have already adopted TCVs in accordance with **WHO guidance**.

Scientists from Banaras Hindu University (BHU) developed 23 novel mutant varieties of Adam Chini rice using Mutagenesis.

- **Mutagenesis:** A plant-breeding technique to create beneficial genetic changes using physical or chemical agents, achieving improved crop traits without altering core characteristics.

Adam Chini -

- **Overview:** Traditional **aromatic black rice** from eastern Uttar Pradesh; known for **sugar crystal-like grains**, strong fragrance rivalling Basmati rice and premium cooking quality.
- **GI Status: Adam Chini Chawal was awarded a Geographical Indication tag in 2023 (NABARD), the second rice variety from Uttar Pradesh to be granted this distinction, after Kalanamak rice.**
- **Challenges:** Prone to lodging due to its 165 cm height, long 155-day maturity period & low yields of 20-23 quintals/hectare, hindering large-scale cultivation despite high market demand.
- **Breakthrough:** New mutant varieties have reduced height (105 cm for mutant-14), earlier maturity (120 days for mutant-19) and higher yields (30-35 quintals/hectare for mutant-14, 15, 19 & 20).
- New varieties enable mass production of Adam Chini, coveted especially in Australia & New Zealand.

Sentinel-6B satellite

- **Sentinel-6B satellite** was launched from **Vandenberg Space Force Base (USA)** to strengthen global ocean-climate observation and sea-level monitoring accuracy.

Sentinel-6B

- **Primary Objective:** High-precision tracking of sea-level rise, ocean temperature and circulation to support climate science, disaster prediction & marine safety.
- **Mission Partners:** Jointly developed by **NASA, NOAA & ESA under the EU Copernicus Programme.**
- **Twin-Satellite Model:** Operates with **Sentinel-6 Michael Freilich (2020)** to ensure a continuous recording.

- **Orbit Details: LEO mission moving at ~7.2 km/s, completing one orbit in ~112 minutes.**
- **Heritage Lineage:** Continues satellite record of **TOPEX/Poseidon → Jason-1/2/3 → Sentinel-6** series.

Significance:

- **Climate Science Backbone:** Critical for measuring long-term climate change indicators.
- **Disaster Preparedness:** Enhances storm, cyclone, flood & coastal inundation forecasting accuracy.
- **Blue-Economy Support:** Helps **secure subsea cables,** pipelines, ports & shipping routes.

European Union Copernicus Programme

- Launched in **1998** and previously known as the **Global Monitoring for Environment and Security Programme (GMES)**, Copernicus is the Earth observation component of the EU space programme.
- The programme is named after **Nicolaus Copernicus**, the 15th-century Polish scientist who first proposed a **heliocentric** universe model.

India's Superbug Surge

- A 2025 Lancet study found India recording the **world's highest prevalence** of **multidrug-resistant organisms (MDROs)** among patients undergoing a standard endoscopic procedure.

Key Findings of the Lancet Study

- India recorded the highest global prevalence of MDROs, with **83.1% of patients** carrying at least one superbug (compared to **31.5% in Italy**, **20.1% in the US**, and **10.8% in the Netherlands**).
- **Extended-Spectrum Beta-Lactamase (ESBL)** producing bacteria were found in **70.2% of Indian patients**, making several commonly used antibiotics ineffective.
- **Carbapenem-Resistant Organisms (CROs)** were detected **in 23.5% of patients**, and Carbapenem-Producing Enterobacterales (CPE) were virtually absent in the Netherlands.

Extended-Spectrum Beta-Lactamase (ESBL) & Carbapenem Resistance

- **ESBL-producing bacteria** can render many **common antibiotics**, such as **penicillins** and **cephalosporins**, ineffective, making routine treatments less effective.
- **Carbapenem-resistant organisms** go a step further and resist carbapenems, which are last-resort antibiotics used in critical infections.

Drivers Behind India's High MDRO Burden

- **OTC Antibiotic Misuse:** **Over 50%** of antibiotic sales in India occur without prescription (CDDEP, 2023), leading to self-medication and incomplete dosing that accelerates resistance.
- **Weak Stewardship:** Only **~15–20%** of Indian tertiary hospitals have functional Antimicrobial Stewardship Programmes (AMSP), despite ICMR's guidelines for mandatory adoption.

- **Poor Infection Control:** Nearly **70–80% of hospitals/clinics** lack advanced effluent treatment systems (CSE audits), enabling resistant organisms to spread through wastewater.
- **Agriculture & Livestock Use:** India is among the **top 5 global consumers** of antibiotics in animals; poultry studies show up to **60–70% samples** containing antibiotic residues or resistant strains.
- **Diagnostic Gaps:** **<30% of infections** in Indian hospitals undergo **culture testing** (ICMR), pushing doctors toward empirical and often unnecessary broad-spectrum antibiotic use.

'BIRSA 101' Gene Therapy

- India launched its **first indigenous 'CRISPR' based gene therapy** called **'BIRSA 101'** for **Sickle Cell Disease** (**SCD**), which particularly affects India's tribal population.
- 'BIRSA 101' is named after Bhagwan Birsa Munda, the great tribal freedom fighter, coinciding with his **150th birth anniversary**.

- ***Gene Therapy:*** *Technique that treats or prevents diseases by adding, removing, or altering genes inside a patient's cells to correct faulty genetic functions.*
- ***CRISPR:*** *Stands for* **Clustered Regularly Interspaced Short Palindromic Repeats***; a genome-editing system that uses guide RNA and the* ***CAS enzyme*** *to cut and modify DNA with high precision.*

'BIRSA 101'

- **Indigenous Platform:** India's first **CRISPR-based gene therapy**, developed at Council of Scientific & Industrial Research-Institute of Genomics & Integrative Biology (**CSIR-IGIB**).
- It is a significant step towards creating a **Sickle Cell–Free India** by **2047** and supporting the goal of Atmanirbhar Bharat in frontline healthcare technologies.
- **Cost Advantage:** Designed to replace expensive overseas gene therapies (often costing ₹20–25 crore), enabling low-cost domestic treatment through **Serum Institute of India** manufacturing.
- **Target Population:** Prioritises India's high-burden **tribal regions of Central & Eastern India**, where SCD prevalence can exceed **10–40%** in some groups.

Sickle Cell Disease (SCD)

- A group of genetic disorders caused by an **abnormality in HBB gene** which codes for **Haemoglobin**. When both parents carry the sickle cell trait, their child has a significant chance of being born with it.
- Normally Red Blood Cells (RBCs) are flexible disc-shaped cells that move easily through blood vessels. In SCD, RBCs become crescent or sickle-shaped, can't move easily & thus can block the blood flow.
- India bears the **world's second-largest burden of SCD** disproportionately affecting its **tribal population** due to high genetic prevalence in these communities & marrying within the tribes.

Indigenous Gene-Editing Tool Based on TnpB Protein

- Indian scientists at ICAR-CRRI have developed a patented **gene-editing tool** using **TnpB proteins**, providing an indigenous alternative to the globally patented CRISPR-Cas systems.

New Indigenous Gene-Editing System (TnpB)

- **Molecular Scissors:** Uses Transposon-associated TnpB proteins, functioning like Cas9/Cas12a to **precisely cut DNA** at targeted gene sites.
- **Hyper-compact Size:** TnpB proteins have **~400–500** amino acids, far smaller than Cas9 (1,000–1,400 aa).
- **Better Delivery:** Due to compactness, TnpB can be delivered via viral vectors directly into cells, avoiding tissue-culture-based delivery and reducing cost and complexity.
- **Source:** Uses **TnpB (408 aa)** derived from the extremophile bacterium ***Deinococcus radiodurans***.
- **India's Need for an Indigenous Gene-Editing System**
- **High Costs:** Heavy reliance on imported biotech tools raises development costs and slows Agri-innovation. E.g. CRISPR licensing can add **10–20% extra cost** to GE crop commercialisation.
- **Strategic Autonomy:** Indigenous TnpB enables **Atmanirbhar Bharat** by eliminating foreign IP barriers and empowering public-sector-led gene-editing programmes.
- **Foreign Control:** Foreign CRISPR platforms require **commercial licensing fees**, delaying India's GE crop release. E.g. ICAR's CRISPR-edited stress-tolerant rice cannot be planted until licensing terms are settled.

Gene Editing

- Gene editing **modifies** the plant's existing native genes by making precise cuts at **targeted DNA sites** using a **protein (scissors)** and a **guide RNA (navigator)**.
- It does not introduce foreign DNA; instead, it creates **mutations** similar to natural variations, making the technology more precise, faster, and easier to regulate.
- **Key Differences with Genetically Modified Organisms (GMOs)**
- **Native DNA:** GMOs introduce **foreign genes** from other species; gene editing modifies **only the plant's own genes** without adding external DNA.
- **Regulatory Burden:** GMOs face stringent, **expensive regulation**; gene-edited crops often pass through simpler**, faster approval** pathways.
- **Technology Approach:** GMOs rely on **transgenic insertion**; gene editing uses **CRISPR/TnpB** to achieve precise site-specific edits.
- **Commercial Landscape:** GMO deployment dominated by large corporations; gene editing enables public-sector and small research institutions to create new varieties.

WHO Declares Indonesia Polio-Free

- World Health Organization (WHO) declared the end of **Indonesia's poliovirus type-2 outbreak** after it met the **Global Polio Eradication Initiative (GPEI)** criteria.
- GPEI Criteria: A country must show zero indigenous wild poliovirus cases for 36 months, maintain high population immunity (≥90% coverage) & implement stringent monitoring before regional certification.

Polio :-

- **Disease Profile: Poliomyelitis** (polio) is a highly infectious enteroviral disease spread via the faecal–oral route, causing irreversible paralysis in ~1 out of 200 infections.
- **Types:** Three serotypes exist – **Poliovirus 1, 2 and 3**; wild poliovirus type-2 was globally eradicated in 2015, though vaccine-derived strains can still cause outbreaks.
- **Vaccines:** Oral Polio Vaccine (OPV) and Inactivated Polio Vaccine (IPV).
- **Global Status:** As of 2024, wild poliovirus remains endemic only in Pakistan and Afghanistan, per WHO surveillance reports.
- **India's Status:** Certified polio–free in 2014 following nationwide Pulse Polio campaigns. India continues sewage surveillance in high-risk cities and uses **bivalent OPV (bOPV)** plus IPV in routine immunisation.

- **Enterovirus Disease:** Illnesses caused by enteroviruses – RNA viruses that spread mainly via the faecal-oral route and commonly infect the gut; causes mild fever to severe conditions like paralysis.
- **OPV:** oral, live-weakened virus providing strong mucosal immunity and transmission blocking; low cost; carries rare risk of **Vaccine-Associated Paralytic Poliomyelitis (VAPP).**
- **IPV:** injectable, dead virus providing strong systemic immunity, prevents paralysis by eliminating VAPP risk; costlier and requires trained personnel.

Auramine O

- Auramine O, a low-cost industrial yellow dye classified as a possible human carcinogen, continues to appear in Indian food products despite being legally prohibited.

Auramine O:

- **Chemical Identity:** A synthetic dye derived from ***dimethylaniline-formaldehyde*** condensation that appears as yellow crystalline flakes soluble in organic solvents.
- **Regulatory Status:** Classified as non-permitted for food use under FSSAI; similarly restricted by EU, US Food and Drug Administration (FDA), and East Asian regulators due to toxicity risks.
- **Industrial Applications:** Used in textiles, leather, paper, printing inks, & fluorescent microbiological staining; no authorised role in foods or edible commodities.
- **Health Hazards:** Linked to **hepatic-renal toxicity**, splenomegaly, mutagenicity, & labelled Group 2B (possible carcinogen) by the International Agency for Research on Cancer based on animal evidence.
- **Adulteration Pattern:** Commonly detected in sweets, turmeric, and street snacks to enhance colour; persists due to informal supply chains, weak market surveillance, and low-cost availability.

***Metanil yellow**, **Rhodamine B**, Sudan dyes & chemical adulterants such as **Argemone oil,** calcium carbide, & urea are some other banned substances commonly detected in Indian adulteration cases*

India's First Private Orbital Rocket Vikram-I

- PM Narendra Modi unveiled Vikram-I, India's first private orbital rocket developed by Hyderabad-based Skyroot Aerospace.
- **Vehicle Design:** Vikram-I is a **four-stage, 20-metre-tall launch vehicle** designed to serve the small-satellite market.
- The rocket can carry 350 kg to low **Earth orbit (LEO)** or 260 kg to **sun-synchronous orbit (SSO).**
- **Structural Build:** It uses an all-carbon fibre body and 3D-printed engines to reduce overall weight and enhance strength.
- **Stage Propulsion:** The first three stages use **'Kalam' solid-fuel motors**, while the upper stage operates on **'Raman' hypergolic engines.**
- **Rapid Turnaround:** The system supports complete assembly and launch within 24 hours from any designated launch site.
- **Launch Legacy:** Vikram-I follows Skyroot's 2022 launch of India's first-ever private (sub-orbital) rocket, Vikram-S.
- **Orbital Rocket:** An orbital rocket lifts a payload **from Earth into a stable orbit.** It must reach a horizontal velocity of about 28,000 km/h (17,500 mph) to remain in orbit.
- **Suborbital Rocket**: **It follows a ballistic parabolic path and returns to Earth.** It cannot achieve orbit because its speed and trajectory are insufficient for sustained orbital motion.

H5N5 Bird Flu

- For the first time, a human has died due to the H5N5 avian influenza virus in the USA.
- **H5N5 Avian Influenza**
- **Type:** Influenza A virus subtype found primarily in wild waterfowl and poultry.

Genetic Makeup

1. **H5: Haemagglutinin subtype** (surface protein enabling cell entry)
2. **N5: Neuraminidase subtype** (surface protein enabling viral release)

- **Difference from H5N1:** Genome sequencing indicates H5N5 is genetically distinct from currently circulating H5N1 strains. Same H5 subtype but different N subtype (N5 vs N1). WHO data show that H5N1 human cases have exceeded 860 since 2003, while H5N5 has only had one confirmed case (in 2025).
- **Transmission to Humans:** Extremely rare; this is the first confirmed human infection. It occurs mainly through direct contact with infected birds. No evidence of human-to-human transmission so far.

- **Symptoms:** High fever, Severe respiratory illness, neurological symptoms and rapid deterioration.
- **Treatment:** Treatment relies on early use of neuraminidase inhibitors such as oseltamivir to reduce severity, supported by hospital-based care for respiratory distress.

Amyotrophic Lateral Sclerosis

- Amyotrophic Lateral Sclerosis (ALS) is in focus due to rising global burden (projected +69% cases by 2040) and its inclusion under India's National Policy for Rare Diseases (NPRD), 2021.

Amyotrophic Lateral Sclerosis:

- **Nature:** A progressive motor neuron disease (also called **Lou Gehrig's disease**) causing degeneration of brain and spinal motor neurons, leading to muscle atrophy, paralysis and respiratory failure.
- Over 90% cases are sporadic, with onset typically from 55-75 years, and higher prevalence in males. Average life expectancy after diagnosis is 3-5 years.
- **Symptoms:** Early signs include fasciculations, limb weakness, dysarthria and dysphagia; advanced stages cause breathing difficulty, immobility, and may co-occur with **frontotemporal dementia (FTD-ALS).**
- **Causes:** Etiology unclear; linked to genetic mutations (e.g., C9ORF72), smoking, hypertension, and possible glial cell dysfunction.
- **Treatment:** Confirmed via Electromyography, nerve conduction, MRI, biopsies; no cure developed yet. Management includes multidisciplinary therapy, assistive devices, and palliative respiratory support.

Fasciculation is involuntary twitching of muscles, Dysarthria is slurred speech due to impaired motor control and Dysphagia is difficulty swallowing caused by weakened throat muscles.

IAU Approves New Names for Martian Landforms

- **A 3.5-billion-year-old crater** on Mars has been officially named after **Indian geologist M.S. Krishnan,** following approval by the **International Astronomical Union (IAU).**
- The IAU has also approved five Kerala-based names- **Valiamala, Thumba, Bekal, Varkala and Periyar—for nearby craters and a Martian valley.**

Key Features of the Naming Decision:

- The crater is 3.5 billion years old and lies in **Xanthe Terra,** a region where researchers identified evidence of **ancient glacial** and river activity.

Names follow IAU rules:

- **Large craters -** named after deceased scientists with major contributions.
- **Small craters -** named after towns/villages with cultural or historical relevance.
- The proposal was submitted by Kerala-based scientists from IIST and Government College

Kasaragod.

Significance:

- This is the first time Kerala place-names have been adopted for features on Mars.
- Highlights India's growing role in planetary science and space research.
- **Immortalises M.S. Krishnan, the first Indian Director of the Geological Society of India.**

ICMR Report Warns of Rising Antibiotic Resistance in India

- ICMR's AMRSN Report 2024 warns that common infections in India—**UTIs, pneumonia, sepsis, diarrhoea** are becoming harder to treat as routine antibiotics fail.
- Superbugs like *coli, Klebsiella, Acinetobacter and Pseudomonas* now show high resistance to **fluoroquinolones, cephalosporins** and even last-line **carbapenems**.

Superbugs

- A superbug is a bacteria or fungus that becomes resistant to multiple antibiotics or antifungals, making routine infections extremely difficult to treat.
- How Superbugs Form?
- They evolve resistance due to misuse/overuse of antibiotics, incomplete dosing, hospital overexposure to high-end drugs, and gene transfer between microbes.

Types of Common Superbugs:

- **Bacterial:** coli, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, MRSA, CRE.
- **Fungal:** Candida auris, Aspergillus fumigatus with rising antifungal resistance.

Symptoms of Superbug Infections:

- Symptoms vary by organ but include persistent fever, chills, septic shock, painful skin lesions, breathing difficulty, extreme fatigue, rapid heart rate or low blood pressure.
- **Implications:**
- **Treatment Failure:** Even strong antibiotics stop working, forcing toxic or expensive drug combinations.
- **Higher Mortality:** ICU infections like ventilator-associated pneumonia become life-threatening.
- **Longer Hospital Stays:** Patients require prolonged isolation, raising healthcare burden.
- **Economic Loss:** Increased cost of treatment, lost productivity, and higher burden on public hospitals.
- **Threat of Untreatable Infections:** Everyday illnesses could become fatal like in the pre-antibiotic era.

Significance

- Highlights urgent need for India-wide antibiotic stewardship and infection-control protocols.
- Signals rising global AMR threat, jeopardising SDG targets on health and well-being.
- Calls for surveillance strengthening, new drug discovery, and regulated antibiotic sales.

HISTORY, HERITAGE AND CULTURE

Arya Samaj @ 150

- **Founded:** In 1875 by **Swami Dayanand Saraswati** in **Bombay**.
- **Religious Reforms**: Denounced **idolatry and ritualistic worship**, preached respect and reverence for other human beings.
- Believed in **infallible authority of Vedas** and Swami Dayanand Saraswati gave **slogan of 'Back to Vedas'.**
- **Social Reforms**: Opposed **caste as hereditary, untouchability** and advocated **Vedic education for all castes;** against **child marriage**, **forced widowhood** and **campaigned for women's education.**
- **Educational Reforms: E.g. Dayanand Anglo Vedic (DAV) Trust and Management** in 1886 to **impart scientific and modern education**.
- **Freedom Movement:** Prominent members included freedom fighters such as **Lala Lajpat Rai, Bhagat Singh, Ram Prasad Bismil, Madan Lal Dhingra, Swami Shraddhanand**, **Sachindra Nath Sanyal**, etc.

Core Principles and Practices

Rejection of Later Accretions

- Arya Samaj rejects practices like idol worship, animal sacrifices, rituals for ancestors, and caste-based discrimination by birth.
- It opposes social evils like child marriage, untouchability, and priestly dominance.
- It encourages merit-based caste systems, aligning with the varna principles described in the Vedas.

Social Reform Efforts

- Actively promotes female education and inter-caste marriages.
- Establishes institutions such as schools, colleges, orphanages, and widow homes.
- Engages in famine relief, medical work, and other humanitarian initiatives.

Doctrinal Beliefs

- Upholds karma (moral causation) and samsara (cycle of rebirth).
- Believes in the sanctity of the cow and efficacy of Vedic rituals like oblations to the fire.
- Emphasizes the samskaras — rituals marking life's significant stages.
- Legacy: Arya Samaj has contributed significantly to education, cultural revival, and social progress both in India and among Indian diaspora communities globally.
- Institutions established under its banner have been instrumental in spreading rational Vedic teachings, fostering equality, and improving social welfare.

Contemporary Relevance of Arya Samaj Principles

- **Social Equality**: Its opposition to casteism and untouchability echoes **India's constitutional values** of equality and justice.
- **Gender Empowerment**: Advocacy of women's education and rights aligns with schemes like **Beti Bachao Beti Padhao** and **Nari Shakti Vandan Adhiniyam**.
- **Education & Rationalism**: DAV institutions continue its legacy of **scientific and moral education**; supports **scientific temper under Article 51A (h).**
- **Other**: **Ethical living over rituals**, aiding **interfaith harmony**; living in **harmony with nature**, etc.

Lucknow as the Creative City of Gastronomy

The 43rd session of **UNESCO**'s General Conference named **Lucknow as the Creative City of Gastronomy** as part of its **UNESCO Creative Cities Network (UCCN).**

- **Second** Indian city in this category **after Hyderabad.**
- **Other Indian cities include:** Gwalior (Music), Jaipur (Crafts & Folk Art), Chennai (Music), etc.

UCCN

- **Origin**: Created in **2004** to **strengthen cooperation with and among cities** that have recognized **creativity as a strategic factor** of **sustainable development**.
- **Covers 7 creative fields**: Crafts & Folk Art, Design, Film, Gastronomy, Literature, Music and Media Arts.

Narayan Singh

- PM inaugurated **Shaheed Veer Narayan Singh Memorial and Tribal Freedom Fighters Museum** in Chhattisgarh.

Shaheed Veer Narayan Singh (1795 – 1857)

- He was a **tribal leader and freedom fighter** from **Sonakhan, Chhattisgarh**, born in **1795** to

Zamindar Ramasai of the **Binjwar tribe.**

- His father had earlier rebelled against the **British and the Bhosales** (1818–19).

Key Contributions

- Regarded as the **first freedom fighter of Chhattisgarh** and a **symbol of tribal resistance**.
- **Fought valiantly against the British during the 1857 Revolt**, but was captured and **executed on December 10, 1857**.
- During the **famine of 1856**, he **seized food grains** hoarded by a trader to feed the starving poor.

Values

- Leader, benevolent and just ruler, respected for his fairness and service to his people.

Baliyatra Festival

- President Extends Greetings On Baliyatra Festival.
- Baliyatra festival is generally celebrated in coastal **Odisha** on the **day of "Kartika Purnima".**
- It commemorates the **past association of the people of Odisha with Bali** and the glorious maritime tradition of transoceanic voyages they undertook to South East Asian Countries.
- It is also associated with legend **'Taapoi' and rituals like 'Bhalukuni Osha' or 'Khudurukuni Osha' and 'Bada Osha'**. **Baliyatra Festival**
- President Droupadi Murmu has extended her greetings to the nation, especially to the people of **Odisha**, on the occasion of the historic Baliyatra festival.
- The "**Baliyatra**" festival, meaning "**Voyage to Bali**," is an **annual event** in **Cuttack, Odisha**. It takes place every year on **Kartika Purnima**.
- It celebrates the **2,000-year-old maritime history** and **trade** with **Southeast Asian countries**.
- The festival honours the **Sadhabas (Odia mariners)** who sailed from ancient ports such as **Tamralipti**, Manikpatna, Palur, and Pithunda to trade spices and jewels.
- **Boita Bandana:** It is the **central ritual** that involves floating **miniature boats (boitas)** made from **paper**, **cork**, or **banana bark**, symbolising the farewell to sailors embarking on their voyages.
- **Key Feature:** Baliyatra hosts one of Asia's largest **open-air fairs**, featuring thousands of stalls selling handicrafts, textiles, traditional artefacts, and Odia cuisine.
- **Significance:** The festival highlights **Odisha's maritime heritage** and supports **India's Act East Policy**, fostering regional cultural diplomacy.

Red Fort

A blast occurred near Delhi's Red Fort, resulting in several injuries and reported deaths. Union Home Minister informed that a comprehensive investigation is underway by the Delhi Police, NIA, NSG, and FSL to determine the exact cause of the explosion.

- The Red Fort is a historic Mughal fort and palace complex located in Old Delhi, serving as the main residence of Mughal emperors for nearly 200 years.
- It represents the zenith of Mughal architecture, blending Persian, Timurid, and Indian styles.
- Commissioned by **Emperor Shah Jahan** in **1639** and completed in **1648**, following his decision to shift the capital from Agra to **Shahjahanabad (Delhi)**.
- The fort's design was prepared by **Ustad Ahmad Lahori**, the architect of the **Taj Mahal**.
- The Red Fort was plundered during **Nadir Shah's invasion (1739)** and later used as a **British military garrison** after the **1857 Revolt**.
- It witnessed the decline of Mughal power, British colonial rule, and later became a symbol of India's freedom.

Characteristics of the Fort:

- Constructed mainly from **red sandstone**, symbolizing power and grandeur.
- Enclosed by **2.5 km-long massive defensive walls** along the Yamuna River.
- Features architectural marvels like **Diwan-i-Aam (Hall of Public Audience)**, **Diwan-i-Khas (Hall of Private Audience)**, **Moti Masjid**, and the **Nahr-i-Behisht (Stream of Paradise)** water channel connecting royal pavilions.
- The layout reflects Islamic Garden aesthetics (Charbagh concept) infused with **Hindu design motifs**.

Important Events in History at Red Fort:

- **1739:** Plundered by **Nadir Shah**, who looted the **Peacock Throne** and other treasures.
- **1857:** Became a key site during the **First War of Independence**; **Bahadur Shah Zafar** was captured and tried here.
- **1945–46:** Venue for the Indian National Army (INA) trials, symbolizing the final phase of India's freedom struggle.
- **15 August 1947:** **Jawaharlal Nehru** hoisted the national flag at the **Lahori Gate**, marking India's independence.
- **2007:** Declared a **UNESCO World Heritage Site** for its cultural and architectural significance.

Ningol Chakouba Festival

- **Manipur** celebrates **Ningol Chakouba**, a traditional festival celebrating the bond between married women and their brothers.

Key Highlights of the Festival

- The festival is **observed every year** on the **second day of Hiyangei** in the **Meitei lunar calendar**.
- The term 'Ningol Chakouba' is derived from the Manipuri words, **'Ningol'** meaning **married**

women and 'Chakouba' meaning a **grand feast**.

- Every year, the **Department of Fisheries**, Manipur, organises this fair cum competition on the **day before the festival** to provide fish to the public at a minimum price.

Raulane Festival

Himachal Pradesh's **Raulane Festival** preserves its ancient faith and tradition.

- **Overview: Ancient 5,000-year-old festival of Kinnaur, HP** that honours **mystical celestial fairies** known **as Saunis.**
- **Key Ritual:** Two men act as a symbolic groom and bride **(Raula and Raulane)**, fully covered in Kinnauri woollens, representing a link to the divine.
- **Procession:** The pair walks to the **Nagin Narayan Temple** and performs a slow devotional dance.

Kartar Singh Sarabha

- Eminent freedom fighter Kartar Singh Sarabha was remembered on his death anniversary.
- **Karatar Singh Sarabha (1896 - 1915)**
- He was an **Indian revolutionary** born in Punjab.

Key Contributions

- He became a **member of Ghadar Party at a young age.**
- He played key role in publishing **Punjabi issue** of the **Ghadar newspaper**.
- In 1913, **Ghadar Party** was formed by the Indians in Oregon (US) with the aim to oust the British from India
- On returning to India, he **focused on mobilising Indian soldiers to revolt** and set up a **small scale arms manufacturing unit** in Ludhiana.
- He was **charged with sedition** in **Lahore Conspiracy Case** and was executed in 1915**.**

Values

- Bravery, Courage, Commitment, etc.

Abujhmadiya Tribe

- Members of the Abujhmadiya Tribe took part in the **Bastar Olympics,** reflecting broader integration of remote tribal communities.
- **About Abujhmadiya Tribe-**
- **Status:** Recognised as one of the seven **Particularly Vulnerable Tribal Groups (PVTG) in Chhattisgarh, under the Ministry of Tribal Affairs.** As per the 2011 census, the tribe has about 40,000 members**.**
- **Location:** A subgroup of the **Gond tribe,** primarily concentrated in the **Abujhmad area of Chhattisgarh (Narayanpur & parts of Bijapur)** which is historically unmapped and remote.
- Abujhmad area became an unofficial headquarters of the **Maoists** due to its remoteness and lack of

development.

- **Language:** Speak Abujhmaria, considered a variant of the Gondi (Dravidian) language family, with largely oral transmission.
- **Economy:** Subsistence base includes shifting cultivation, forest produce collection, minor agriculture, and livestock, with low integration into formal markets.
- **Development:** Characterised by low literacy, high geographic isolation, fragile health indicators, and minimal access to public services.

> ***Bastar Olympics*** *is a ₹5-crore, government-backed multi-sport initiative across seven districts of* ***Chhattisgarh,*** *engaging 3.91 lakh participants—including* ***women, PVTGs and former cadres*** *to promote sports and rebuild trust in a* ***post-insurgency region.***

350th Shaheedi Diwas of Guru Tegh Bahadur

- India observed the 350th Shaheedi Diwas of Guru **Tegh Bahadur**, during which the Prime Minister unveiled a special coin and a commemorative stamp.

Guru Tegh Bahadur:

- Guru Tegh Bahadur was the **ninth Sikh Guru**. He was born in **Amritsar in 1621** and became the leader of the Sikhs from 1665 until he died in 1675.
- Born as **Tyag Mal** in Amritsar, he was the youngest son of **Guru Hargobind Sahib, the sixth Guru.**

Early Life:

- Born on 1 April 1621 at Amritsar; trained in martial skills, scriptures, archery, horsemanship, and classical texts like the Vedas/Upanishads.
- Displayed exceptional bravery in the Battle of Kartarpur (1634); earned the title **"Tegh Bahadur" (Brave of the Sword).**
- Married Mata Gujri (1632); lived at Bakala for over 20 years, meditating in seclusion.

Major Works & Contributions:

Extensive Preaching Journeys:

- Travelled across Punjab, UP, Bengal, Bihar, Assam, and Dhaka, spreading Guru Nanak's message.
- Established centres of Sikh teaching; dug wells, started langars, and supported poor communities.

Founding of Anandpur Sahib:

- Purchased land from Rani Champa of Bilaspur; founded **Chakk Nanaki (later Anandpur Sahib)** in 1665–72, which became a major Sikh centre.

Social-Reformist Role:

- Condemned casteism, fanaticism, ritualism, and tyranny.
- Strengthened Sikh identity through a philosophy rooted in fearlessness (nirbhau) and freedom

from enmity (nirvair).

Spiritual & Literary Contributions:

- Composed 59 Shabads and 57 Shaloks across 15 Raagas.
- His hymns form an integral part of Guru Granth Sahib, added by Guru Gobind Singh.

Conflict with Aurangzeb & Execution:

- He was publicly beheaded in Delhi on **24th November 1675 (Shaheedi Divas),** by order of **Aurangzeb,** for refusing forced conversion to Islam and resisting state-backed religious persecution.
- **Gurudwara Sis Ganj Sahib and Gurudwara Rakab Ganj Sahib** in Delhi mark the places of Guru Tegh Bahadur's execution and cremation.
- Guru Tegh Bahadur is honoured as the **'Protector of Humanity' (Srisht-di-Chadar),** and he championed **Ik Onkar, meaning "There is only one God".**
- He stood up for the Kashmiri Pandits, who sought his help against Aurangzeb's religious oppression.
- Inspired by Guru Tegh Bahadur, his son, **Guru Gobind Singh Ji,** went on to formalise the Sikh community into the distinguished and symbolic society known as the **Khalsa.**

Prime Minister paid tributes to Ahom general Lachit Borphukan on his birth anniversary

About Lachit Borphukan (1622-1672):

- **Birth:** 24 November 1622 at Charaideo, Assam.
- Held several positions in the Ahom Kingdom including the Commander-in-Chief.
- Founded by the **Sukapha, Ahom dynasty** ruled over much of Assam and the North East from **1228 to 1826 AD.**
- **Chosen as one of five Borphukans of Ahom kingdom** and given administrative, judicial, and military responsibilities.
- **Battle of Saraighat (1671): Defeated the Mughal forces, led by Raja Ramsingh-I.**
- **Recognition:** National Defence Academy (NDA) gives Lachit Barphukan Gold Medal to best cadet since 1999; Lachit Divas on November 24; 125 feet Bronze statue.
- **Values: Courage, Patriotism, Leadership.**

G.V. Mavalankar (1888 - 1956)

- Lok Sabha Speaker paid floral tributes to Shri Ganesh Vasudev Mavalankar, the first Speaker of Lok Sabha.
- Popularly known as Dadasaheb, he was conferred the title **'Father of the Lok Sabha'** by Jawaharlal Nehru.

Key Contributions:

- He was active in Gujarat Education Society, Gujarat Sabha, and joined Swaraj Party.
- He played active role in Non-Cooperation movement and **'Khaira No-Rent'** campaign.
- Remained Speaker of Bombay Legislative Assembly (1937-1946), elected to preside over Central Legislative Assembly (1946) and became speaker of Provisional Parliament in 1949.
- He was the founder Chairman of the National Rifle Association as also of the Institute for Afro-Asian Relations.
- **Books:** Manavatana Jharna, Sansmarano, A great Experiment.
- **Values:** Nonpartisanship, leadership, integrity, patriotism etc.

The Taj Mahal

- The upcoming Hindi film "**The Taj Story**", starring Paresh Rawal, has triggered nationwide controversy for reviving the discredited "Tejo Mahalaya" theory, which claims the Taj Mahal was originally a Shiva temple.
- The Taj Mahal is a 17th-century white marble mausoleum on the right bank of the Yamuna River in Agra, Uttar Pradesh. It is one of the Seven Wonders of the World and a UNESCO World Heritage Site (1983), celebrated as the pinnacle of Indo-Islamic architecture.

Built during:

- Commissioned in **1632 CE** by **Mughal Emperor Shah Jahan** in memory of his wife **Mumtaz Mahal**, it was completed in **1648 CE**, with additional structures and landscaping finished by **1653 CE** under the supervision of architect **Ustad Ahmad Lahori**.

History:

- Constructed by artisans, calligraphers, inlayers, and masons from across India, Central Asia, and Persia, the Taj represents the zenith of **Mughal craftsmanship**.
- Inscriptions in Arabic, Persian, and Quranic verses document its chronology and spiritual symbolism.

Key Features:

- The **central white marble tomb** stands on a raised square platform with **four minarets** at each corner, symbolizing symmetry and spatial balance.
- The **double-dome chamber** houses the cenotaphs of **Mumtaz Mahal (center)** and **Shah Jahan (west)**; the real graves lie in the **lower crypt**.
- The **pietra dura (inlay)** work, with precious stones depicting intricate floral motifs, exemplifies Persian and Indian artistic fusion.
- The **Charbagh garden** follows the **Timurid-Persian quadripartite design**, divided by water channels symbolizing the rivers of paradise.

- The **main gateway (Darwaza-i-Rauza)** and flanking **mosque and guest house** of red sandstone contrast with the central marble mausoleum, emphasizing visual harmony.

Significance:

- Represents the culmination of Mughal architecture, uniting Persian, Ottoman, and Indian aesthetics into a symbol of eternal love and divine harmony.
- Serves as a testament to 17th-century engineering and design, blending artistic precision with spiritual allegory—reflecting paradise and resurrection.
- Continues to be a global icon of India's cultural heritage, drawing over 6 million visitors annually and inspiring art, literature, and architecture worldwide.

Gold coins from the Vijayanagara-era unearthed

- Over 100 gold coins from the Vijayanagara era were unearthed inside an earthen pot during restoration works at a Later Chola-period Shiva temple in Kovilur, Tiruvannamalai district, Tamil Nadu.
- A total of **103 punch-marked gold coins** of varying sizes and shapes were discovered during excavation near the sanctum sanctorum of the **Kovilur Shiva temple** atop the Jawadhu Hills.

Discovery:

- Officials from the Tamil Nadu State Archaeology Department (TNSAD) and Revenue Department secured the site and transferred the coins to the district treasury under the provisions of the **Indian Treasure Trove Act, 1878**.
- The coins carry the **boar emblem**, a symbol of **Vijayanagara royal authority**, and are believed to be **devotional offerings** minted during the reigns of rulers such as **Harihara II or Krishnadevaraya** (14th–16th centuries CE).
- Archaeologists estimate the coins to be approximately 5 mm in size, made of pure gold, and possibly issued as temple endowments or donations.
- The Vijayanagara Empire (1336–1646 CE) was founded by Harihara I and Bukka I, inspired by the sage Vidyaranya, to defend Hindu kingdoms in South India.
- Its capital at Hampi became a major political, economic, and religious hub. The empire issued one of the most sophisticated monetary systems in medieval India.

Key Features of Vijayanagara Coinage:

- **Metal Composition:** Predominantly **gold pagodas (gadyanas)**, half and quarter pagodas, along with **silver taras** and **copper jitals**. Gold was reserved for religious offerings and royal use.
- **Eg:** Krishnadevaraya's gold Balakrishna pagoda (3.3 gm) with Devanagari legend "Sri Pratapa Krishna Raya."
- **Artistic Imagery:** Coins bore images of **Hindu deities**—Siva-Parvati (Uma-Maheshwara), Vishnu-

Lakshmi, Balakrishna, or Gandaberunda (double-headed eagle)—reflecting royal devotion and temple culture.

- **Legends and Language:** Inscribed in **Devanagari, Kannada, or Tamil**, often featuring the ruler's name and honorifics such as "Sri Pratapa" (valiant).
- **Symbolism:** The **boar emblem (Varaha)**—an avatar of Vishnu—was used as the state symbol on royal coins and seals, representing divine sanction to rule.
- **Economic Role:** Vijayanagara coinage served both as **temple wealth and trade currency**, circulating widely across South India, Sri Lanka, and the Indian Ocean trade routes.

Global Peace Prayer Festival

- The **Global Peace Prayer Festival** is being held in **Thimphu, Bhutan**, to promote global peace and harmony.
- **Host Country:** It is organised by the **Royal Government of Bhutan** to mark the **70th birth anniversary** of **King Jigme Singye Wangchuk**.
- **Objective:** The festival gathers Buddhist leaders, monks, and scholars **from different traditions** to pray for world peace and humanity's healing amid global conflicts.
- **India's Contribution:** Sacred **relics of Lord Buddha** from India were brought to Bhutan for public display and worship. **Ram Temple Flag Hoisting Ceremony**
- PM Narendra Modi hoisted the saffron flag — the **Dharma Dhwaj**, atop the Ram Mandir in Ayodhya, marking the completion of the temple's construction.

PM pays tributes to Birsa Munda on 150th birth anniversary

Janjatiya Gaurav Divas is also being celebrated, marking the **birth anniversary of Bhagwan Birsa Munda.**

- Government declared **15th November as Janjatiya Gaurav Divas** in 2021.

Birsa Munda

Early Life:

- Born in Ulihatu Khunti district, Jharkhand in 1875 with birth name Daud Munda.
- Belonged to the Munda tribe of the Chhotanagpur plateau area, present day Jharkhand.

His Teachings and Beliefs:

- **Monotheism:** Founded a new sect known as the Birsait, Birsa preached belief in one God.
- **Revival of Tribal Faith:** He rejected the influence of Christian missionaries and sought to reform traditional Munda religious practices.
- **Moral Discipline:** He emphasized Cleanliness, Hard work, Avoiding alcohol & Purity in personal and social life.

Contribution to Colonial Resistance:

- Provided leadership to Munda rebellion also known as the **"Ulgulan (Great Tumult) movement".**

- He is remembered as **Bhagwan (God)** and was given the title of **Dharti Aaba (Father of Earth).**

Death & Legacy

- Died in Ranchi Jail due to an illness on June 9, 1900.
- His movement contributed to **repealing of begar system** and led to Tenancy Act (1903) which **recognised the khuntkhatti system.**

  Chotanagpur Tenancy Act (1908) later banned passage of tribal land to non-tribal folks.

Munda Rebellion

- Birsa Munda mobilized tribes belonging to Chhotanagpur, Bengal and Odisha **against the Dikus (outsiders) and Europeans** from 1895 onwards to establish an **independent Munda Raj.**
- **Major Reasons for the revolt**
- **Introduction of Zamindari system:** Traditional systems like the **Mundari Khuntkatti (community land ownership)** were replaced.
- Change in policies led to **Beth begari (forced labour)** and **bonded labour**
- **Exploitation by the Dikus(Outsiders e.g. moneylenders, traders, missionaries etc.)**
- **Missionaries criticising their traditional culture**

Ram Mandir

- It is a three-story temple built in the traditional ***Nagara style*** of architecture, prevalent in North India.
- **Mandap Layout:** The complex contains five main halls — **Nritya, Rang, Sabha, Prarthana, and Kirtan.**
- **Spatial Features:** The Singh Dwar on the eastern side is the main entrance; **Garbhagriha** (sanctum sanctorum) houses the infant Ram idol; and the first floor has a **Shri Ram Darbar**.
- **Construction Material:** It mainly uses **pink Bansi Paharpur sandstone**; granite is used in plinths, while **White Makrana marble** and coloured marble are used in inlay work.
- **Iron-Free Structure:** The construction does not use iron or steel to prevent corrosion, thereby lowering the overall carbon footprint.

Sirpur Archaeological Site

- The Chhattisgarh government is preparing the **5th-century Sirpur** archaeological site in Mahasamund district for a **UNESCO World Heritage nomination,** introducing digital exhibits, and battery-operated transport.

Sirpur Archaeological Site:

- **Sirpur is a 5th–12th century** multi-religious archaeological city known for its extraordinary concentration of **Hindu temples, Buddhist viharas and Jain monuments,** revealing the cultural and political vibrancy of **Dakshina Kosala.**

Location:

- Situated on the banks of the **Mahanadi River,** about 2 hours from Raipur, in Mahasamund district, Chhattisgarh.

History of the Site:

- First identified in **1882 by Alexander Cunningham;** major excavations resumed in the **1950s, expanded in the 1990s and 2003 onwards.**
- **Served as the capital of Dakshina Kosala under the Panduvanshi and later Somavamshi kings (6th–8th century).**

- **Excavations have revealed:**

1. 22 Shiva temples
2. 5 Vishnu temples
3. 10 Buddhist viharas
4. 3 Jain viharas

- Archaeological evidence shows Sirpur was both a religious centre and a flourishing commercial-urban hub with palaces, markets, residential quarters, stupas and public infrastructure.
- Architecture of Sirpur: Sirpur displays a rare blend of Shaiva, Vaishnava, Buddhist and Jain architectural traditions, reflecting deep social harmony and artistic excellence.

Key Architectural Highlights:

Lakshmana Temple (7th century):

- One of India's finest brick temples, built on a stone jagati.
- Sculpted brick shikhara, intricate door jamb carvings, Vishnu depictions and Maithuna panels.

Surang Tila Complex (7th century):

- Dramatic **panchayatana temple** set on a high 9-metre terrace accessed by 37 steps.
- Four Shiva shrines with differently coloured lingams and one Ganesha shrine.
- 32-pillared mandapa and signs of ancient seismic damage.

Teevardev Buddha Vihara (8th century):

- A large monastery with a monolithic **Avalokiteshvara statue,** inscriptions and ornate door jamb.
- Shows rare blending of Buddhist and Hindu iconography.

Baleshwar Temple (8th century):

- Carved pillars, lintels, elegant female figures and a marble Shiva lingam.

Gandheshwar Temple (18th century):

- A living temple enriched with reused sculptures from Sirpur's ruins—Buddha images beside Shiva lingams—symbolising cultural continuity.

Urban Planning Features:

- Palace complexes, marketplaces, monasteries, stupas, meditation cells, water systems and a 6th-century market complex.

Madhvacharya

- Prime Minister Narendra Modi unveiled a 77-feet bronze statue of Lord Rama at the **Shree Samsthan Gokarn Partagali Jeevottam Math in Goa.**
- He also visited Udupi evoked the legacy of **Jagadguru Madhvacharya**, linking Udupi's spiritual heritage to India's cultural unity.

Madhvacharya

- Madhvacharya (13th century CE) was a renowned Indian philosopher, theologian and founder of the Dvaita (dualism) school of Vedanta. He is revered as a major **Vaishnava acharya** and is traditionally regarded as an incarnation of Vayu, the Wind God.

Birth and Early Life:

- Born as Vāsudeva in Pajaka village near Udupi, Karnataka (1199–1278 CE or 1238–1317 CE, dates debated).
- Exceptional physical strength and intellect—nicknamed Bhima.
- Took Sannyasa as a teenager, initiated by **Achyutapreksha**, receiving the names Purna Prajna and later Ananda Tirtha.

His Philosophy (Dvaita Vedanta):

- Madhvacharya's school, **Tattvavāda**, is based on realist dualism.
- Key principles-

Pancha-Bheda (Five Eternal Distinctions)

1. God – Soul
2. God – Matter
3. Soul – Matter
4. Soul – Soul
5. Matter – Matter

- These differences are natural, eternal and real, rejecting monism.
- **God:**
- Vishnu/Narayana is the supreme independent reality (Svatantra Tattva).

- All souls and matter are dependent realities.
- Liberation (moksha) is possible only through Vishnu's grace.
- Pramānas (Sources of Knowledge)

Accepted three:

1. Pratyaksha (perception)
2. Anumāna (inference)
3. Śabda (scriptural testimony)

Bhakti over Jnana

- Liberation comes through devotion (bhakti), not mere intellectual knowledge.

Contribution to Bhakti Movement:

- Reinforced personal devotion to Vishnu and daily remembrance of God (Smarana).
- Rejected Advaita's non-dualism; debated Shankara and Ramanuja traditions.
- Authored 37 Sanskrit works, including commentaries on:
- Bhagavad Gita
- Brahma Sutras (Madhva-bhashya & Anuvyakhyana)
- Principal Upanishads
- Bhagavata Purana (Tatparya-nirnaya)
- Founded the Udupi Krishna Mutt, establishing the famous Ashta Mathas tradition.
- Inspired later Dvaita scholars: Jayatirtha, Vyasatirtha, Raghavendra Tirtha.

FACTS FOR PRELIMS

Asian Youth Games 2025

- The Asian Youth Games (AYG) is a continental multi-sport event organised by the Olympic Council of Asia (OCA) for athletes aged between 14–17 years, aimed at nurturing young sporting talent across Asia.
- First held in **Singapore in 2009**, the Games were designed as a feeder event for the **Asian Games**, helping young athletes gain international exposure early in their careers.
- **1st Edition (2009):** Singapore
- **2nd Edition (2013):** Nanjing, China
- The 2017 and 2021 editions were cancelled due to logistical and pandemic-related issues, marking **Bahrain 2025** as the **third edition** of the Games after a 12-year gap.
- **2025 Event (Bahrain):**
- Held in **Manama, Bahrain**, from **22–31 October 2025**.
- Featured participants from across Asia in multiple disciplines.

- India delivered a **record-breaking performance**, winning **48 medals** — its **highest-ever tally**, surpassing previous bests from **2009 and 2013** editions.
- 13 gold, 18 silver, 17 bronze which is total of 48 medals.
- The achievement reflected India's growing youth sports infrastructure and training programs under initiatives like **Khelo India**.
- **Next Event:** The **4th Asian Youth Games** will be held in **Tashkent, Uzbekistan, in 2029**, which was originally planned for 2025 but postponed due to construction delays.

Significance:

- Reinforces India's rise as a youth sports powerhouse in Asia.
- Strengthens the nation's Olympic talent pipeline for future global competitions.
- Encourages investment in grassroots sports development and youth training programs.

ICC Women's Cricket World Cup 2025

- India created history by winning its maiden ICC Women's Cricket World Cup 2025, defeating South Africa by 52 runs in the final held at Dr. DY Patil Stadium, Navi Mumbai.
- The ICC Women's Cricket World Cup is the premier One Day International (ODI) championship for women, organized by the International Cricket Council (ICC) every four years. Each team plays 50 overs, and qualification is determined through the ICC Women's Championship and World Cup Qualifier tournaments.

Origin and History:

- **First held:** 1973 in England — two years before the first men's World Cup.
- **Initially organized by:** International Women's Cricket Council (till 2005).
- **Format:** Round-robin and knockout stages, featuring top women's cricketing nations.
- **Dominant teams:** Australia (7 titles), England (4), New Zealand (1), India (1 – 2025).
- **India's hosting years:** 1978, 1997, 2013, and 2025(along with Sri Lanka).

ICC Women's Cricket World Cup 2025 Highlights:

Category	Details
Host Nation	India and Sri Lanka
Venue (Final)	Dr. DY Patil Stadium, Navi Mumbai
Winner	India (First-ever title)
Runner-up	South Africa
Margin of Victory	India won by 52 runs

• **Player of the Match**	• **Shafali Verma**
• **Player of the Series**	• **Deepti Sharma**
• **Captain (India)**	• Harmanpreet Kaur
• **Captain (South Africa)**	• Laura Wolvaardt

Significance:

- **Historic Achievement:** India lifted its **first-ever Women's World Cup**, cementing its place among top global cricketing nations.
- **Women's Cricket Empowerment:** A major milestone for women's sports in India, inspiring greater participation and investment.
- **Sporting Diplomacy:** Enhanced India's image as a leading global host of major sports events.

QS Asia University Rankings 2026

- The **QS Asia University Rankings 2026** have been published, featuring **over 1,500 institutions**, making it the **largest edition** to date.
- The **University of Hong Kong** ranked **first**, with institutions from Hong Kong, China, and Singapore leading the rankings.

Key Highlights for India

- **Representation:** India is Asia's **2nd most represented** higher education system after Mainland **China**.
- **Top Performers:** **Seven Indian universities** ranked among the **top 100** — IIT Delhi, IISc Bangalore, IIT Madras, IIT Bombay, IIT Kanpur, IIT Kharagpur, and the University of Delhi.
- **Leading Institution:** **IIT Delhi** is **India's highest-ranked institution**, positioned **59th in Asia**. It has held the top national position for **five consecutive years**.
- **Performance Indicators:** Indian institutions excelled in **Papers per Faculty** and **Staff with PhD metrics** but lagged in **faculty–student ratio** and **international student participation**.

1. *The **QS Asia University Rankings** is an **annual list** published by the global higher education analytics firm **Quacquarelli Symonds (QS)** that ranks the **top universities** in **Asia**.*

2. *QS is a **UK-based company** that also publishes the influential QS World University Rankings.*

Zohran Mamdani

- **Zohran Mamdani** of the **Democratic Party** has been elected as **New York City's mayor**, becoming the city's **first Muslim** and **first South Asian-origin mayor**.

Sports – 100 Years of Hockey

- India is celebrating the **centenary of Indian Hockey** on **November 7**, **2025**, to commemorate the founding of the **Indian Hockey Federation** in **Gwalior** in **1925**.

Artificial intelligence data centre on Australia's Christmas Island

- Google plans to build a large artificial intelligence data centre on **Australia's Christmas Island.**
- **Location**: In **Indian Ocean**, 1500 km North West of Australian mainland.
- Nicknamed the "**Galapagos of the Indian Ocean**".
- It is a **135 sq. Km island** famous for its **annual migration** of millions of **red crabs, sea birds, whale sharks and spectacular coral reefs.**
- Christmas Island is well positioned to **monitor Sunda Strait, Lombok Strait, Malacca Straits.**

David Szalay Wins the Booker Prize 2025

- **Hungarian-British author David Szalay** has won the Booker Prize in **2025** for the novel **'Flesh'**.
- Szalay is recognised for **his minimalist writing** and **keen insights into modern life**; he was previously shortlisted for the Booker Prize in 2016.

Booker Prize

- The Booker Prize is a renowned **global literary award** honouring the best **English-language fiction** novel **published in the UK or Ireland**.
- Originally limited to Commonwealth citizens (1969–2013), it now includes **writers of any nationality** who write in the English language.
- It was formerly called the "**Man Booker Prize**" until **2019**, when it was renamed "**The Booker Prize**."
- **Prize Money:** The winner receives a **£50,000 cash prize** and gains recognition worldwide.
- **Notable Winners:** **1st Indian-origin** winner – **VS Naipaul**; **1st Indian citizen** winner – **Arundhati Roy**. Others include Salman Rushdie, Margaret Atwood, and **Samantha Harvey (2024)**.

Commonwealth Games 2030 in India

- India has been formally ratified as the host of the 2030 Commonwealth Games, with Ahmedabad (Amdavad), Gujarat as venue.

- This will be the centenary edition of the Games, marking 100 years since the first British Empire Games were held in Hamilton, Canada, in 1930.

Commonwealth Games 2030:

- The Commonwealth Games are a quadrennial multi-sport event featuring athletes from member nations of the Commonwealth of Nations, blending Olympic-core sports with Games-specific disciplines like netball, lawn bowls and squash.

Brief History:

- **Origin:** Proposed in the late 19th–early 20th century as a "Pan-Britannic" sporting contest and first realised as the Inter-Empire Championships (1911).
- **Formal start:** The first British Empire Games were held in Hamilton, Canada, in 1930, with 11 countries and 400 athletes.
- **Name evolution:**

1. British Empire Games (up to 1950)
2. British Empire and Commonwealth Games (1954–1966)
3. British Commonwealth Games (1970–1974)

- Commonwealth Games (from 1978 onwards), reflecting decolonisation and equality among members.

2030 Host: Ahmedabad (Amdavad)

- The Commonwealth Sport General Assembly in Glasgow (Nov 2025) ratified Amdavad/Ahmedabad, Gujarat as host of the 2030 Centenary Commonwealth Games, after a vote of 74 member nations and territories.
- Ahmedabad's bid builds around the Sardar Vallabhbhai Patel Sports Enclave and Narendra Modi Stadium sports infrastructure, aligning also with India's long-term ambition to bid for the 2036 Olympics.
- India has been a regular participant since 1934, and first hosted the Games in Delhi 2010, which remain India's best-ever multi-sport performance, finishing second on the medals tally.

About The Commonwealth:

- The Commonwealth of Nations is a voluntary association of independent and equal countries, many of which were formerly part of the British Empire, cooperating on the basis of shared values rather than formal political control.

Historical Evolution:

Early Commonwealth

- At the 1926 Imperial Conference, Britain and the Dominions agreed they were equal in status, forming what was then called the British Commonwealth of Nations—linked by allegiance to the British monarch but not ruled by the UK.

Birth of the Modern Commonwealth

- After World War II, many territories became fully independent.
- India's independence in 1947 created a new situation: India wanted to be a republic, yet remain in the association.
- The London Declaration (1949) allowed republics and countries not owing allegiance to the British Crown to remain members, effectively creating the modern Commonwealth of Nations.
- Membership later expanded to countries with no direct colonial link to Britain

Indian Institute of Technology (IIT) in Nigeria

- Nigeria is set to host the first Indian Institute of Technology (IIT) campus in West Africa.
- The first batch is expected to begin in 2026, focusing on engineering, technology, and research.
- This initiative marks a major step in India''s global education outreach and is part of the National Education Policy (NEP) 2020, which encourages Indian universities to expand internationally.
- The new campus will follow the **IIT Madras–Zanzibar model.**
- The IIT Madras-Zanzibar campus started in 2023 with students from across Africa.
- The IIT Delhi- Abu Dhabi campus, which opened in 2024, offers courses that match local industry needs.