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GEOGRAPHY, ENVIRONMENT & DISASTER MANAGEMENT

Topics for Mains

Re-defining the Aravallis: Supreme Court's Environmental Intervention

Syllabus Mapping: GS-I - Geography, GS-III-Environment

Context

The Supreme Court (November 2025) has settled a uniform, scientific definition of the Aravalli Hills and Ranges, paused fresh mining leases and renewals, and directed preparation of a Management Plan for Sustainable Mining (MPSM) across Delhi, Haryana, Rajasthan and Gujarat.

About Aravalli Range

- **Formation:** The Aravalli Mountains are of one of the world's oldest ranges→The formation of the Aravalli basin began approximately 2,000 million years ago during the Precambrian era as part of the Aravalli-Delhi orogeny
- **Extent**
  - The Aravalli Mountain Range stretches over 800 kilometres from Gujarat to Delhi.
  - Starting from Delhi Aravallis run across the states of Haryana, Rajasthan, and reach plains of Gujrat near Palanpur.
- **Highest point**: Guru Shikhar (1722 meters), a peak in the Arbuda Mountains of Sirohi district in Rajasthan
- **Rivers:** The rivers of Aravallis are ephemeral and flow mainly during the rainy season.
  - The main rivers are Sabi, Indori, Luni, Kantli, Banganga, Sukri, Mansi,Vakal, Jakham, Banas, Sabarmati, and Arjuni.
  - Aravallis is one of the main Indian watersheds separating the drainage of Bay of Bengal through Chambal from that of Arabian Sea through Mahi, Sabarmati, Luni, and other rivers.
- **Important minerals** found in the Aravalli's are Zinc, Lead, Silver, Cadmium, Marble, Precious and semi-precious stones, Tungsten, Gypsum, Soapstone, Rock-phosphate, Asbestos, Clay, Calcite and building stone.
- **Wildlife**: The Aravalli range is home to total 22 wildlife sanctuaries in the four states of Delhi, Gujarat, Haryana and Rajasthan

Significance of the Aravallis

- **Climate Divide & Desertification Check**
  - Acts as a **barrier against the Thar Desert's eastward expansion** by stabilizing sand dunes.
  - Prevents **desertification** in semi-arid regions of Rajasthan, Haryana, and Delhi.
  - Moderates the **monsoon flow** and influences rainfall patterns in northwest India.
- **Ecological Significance**
  - Houses **dry deciduous and thorn forest ecosystems** rich in biodiversity.
  - Home to **wildlife like leopards, nilgai, jackals**, and endemic plant species.
  - It serves as a **wildlife corridor** linking Ranthambore, Sariska, and Kumbhalgarh sanctuaries.
- **Groundwater Recharge**
  - Functions as a **natural watershed**, with its quartzite rocks aiding in groundwater percolation.
  - Supports aquifers in **Gurugram, Alwar, and Delhi NCR**—crucial for drinking and irrigation.
- **Urban & Cultural Relevance**
  - It encircles major urban areas like **Delhi, Gurugram, and Jaipur**, influencing microclimates.
  - Contains archaeological and historical sites (e.g., **Chittogarh, Kumbhalgarh Forts**), adding cultural value.
- **Carbon Sink & Air Purifier:** Forested tracts help **sequester carbon**, mitigating urban air pollution.

Challenges to the Aravalli Ecosystem

- **Illegal Mining:** Despite Supreme Court bans, rampant **quartzite and stone mining** continues (e.g., in Faridabad, Alwar).
- This has led to widespread deforestation**, habitat destruction, and dust pollution**.
- **Deforestation and Encroachment**

  - Urban expansion in Delhi NCR and Rajasthan has caused **land-use change and forest fragmentation**.
  - **Over 31 hills** in Rajasthan have vanished due to indiscriminate cutting.
- **Poor Legal Protection**
  - **Large parts of the Aravallis are not notified as forests**, especially in Haryana, limiting protection under Forest Conservation Act.
  - Lack of **uniform environmental governance** across states further exacerbates the problem.
- **Climate Change Stress**
  - Alters rainfall patterns and increases **forest fire susceptibility** has emerged as a major challenge.
  - This has reduced the range's capacity to **regulate microclimates and recharge aquifers**.
- **Lack of Community Participation:** Limited local involvement in conservation leads to **unsustainable resource use** and **weak enforcement**.

Measures taken to Protect Aravallis

- **Aravalli Green Wall Project**: This initiative aims to develop a 5-kilometre-wide green buffer zone along the Aravalli hill range, spanning across four states, to combat desertification and enhance ecological security.
- **State-Level Intervention**: In 2016, the Haryana government issued a notification designating the Mangar Bani region, part of the Aravalli hills, as a "no-construction zone" to preserve its ecological integrity.
- **Detailed Action Plan for Aravalli Landscape Restoration:** It outlines a science-based, community-led, and policy-supported roadmap to restore the ecological integrity of the Aravallis. It exhorts all stakeholders to adopt a 'Whole of Government' and 'Whole of Society' approach in the restoration of the Aravallis.
- **Judicial Action (MC Mehta v. Union of India)**: Through a series of rulings, the Supreme Court had imposed a complete ban on mining operations in the Aravalli region to prevent environmental degradation and safeguard the fragile ecosystem.

Concerns over Supreme Court's Directions

- **Ecologically Inadequate Height-Based Definition:** The 100-metre criterion overlooks the eroded and fragmented nature of the Aravalli system, excluding ecologically vital low-lying hillocks, ridges and recharge zones.
- **Shrinking of the Protected Aravalli Landscape:** The new definition risks excluding large areas earlier treated as Aravallis, enabling land-use change, mining and construction through legal reclassification.
- **Fragmentation of Wildlife Habitats and Corridors:** Reduced protection of low-elevation zones may disrupt wildlife corridors, increasing habitat fragmentation and human–wildlife conflict in NCR and adjoining regions.
- **Dilution of the Precautionary Environmental Principle:** Continuation of existing mining before completion of comprehensive scientific mapping may weaken the precautionary approach central to India's environmental jurisprudence.
- **Challenges in Implementing the MPSM:** Effective execution of the Management Plan for Sustainable Mining requires strong inter-state coordination, scientific capacity and enforcement, which remain uneven.
- **Normalisation of Mining in a Fragile Ecosystem:** Identification of regulated mining zones risks legitimising extraction in an already degraded mountain system critical for desertification control.

Supreme Court Recent Directions Related to the Aravallis

- **Uniform definition adopted:** Only **hills above 100 metres** will be classified as part of the Aravalli Hills and Ranges.
- **Pause on new mining: Fresh mining leases and renewals prohibited** until scientific mapping and impact assessments are completed.
- **Management Plan for Sustainable Mining (MPSM):**
  - Demarcation of **no-mining zones**.
  - Identification of **limited, tightly regulated mining areas**.
  - Mapping of **ecologically sensitive zones**, wildlife corridors and aquifers.
  - Assessment of **cumulative environmental impacts and carrying capacity**.
  - Clear **restoration and rehabilitation measures**.
- **Scientific mapping mandated:** Comprehensive mapping of the Aravalli range across all states.
- **Strict regulation of stone-crushing units** to curb air pollution and ecological damage.
- **Continuation of existing legal mining:** Allowed under **stringent regulation** to prevent the rise of illegal mining mafias.

Way Forward

- **Strengthen Legal Protection and Unified Governance:** Rajasthan's notification of certain Aravalli belts as eco-sensitive zones can be replicated in Haryana and Delhi.
- **Promote Community-Based Conservation Models:** The Joint Forest Management (JFM) in Madhya Pradesh shows how community engagement can protect forest landscapes effectively.
- **Implement Landscape-Level Ecological Restoration:** It is important to adopt large-scale, science-based afforestation to restore degraded areas.
- **Integrate Aravalli Conservation into Urban Planning:** Hyderabad's Haritha Haram initiative has integrated afforestation with urban development, which can be a model for NCR.
- **Comprehensive Mapping and Monitoring:** Strategic integration of Aravalli conservation into India's blue and green economy agendas requires updated GIS-based mapping of forest cover, encroachments, aquifers, and biodiversity corridors.
- **Strengthen institutional and community participation mechanisms**, involving state governments, local communities and a dedicated Aravalli conservation authority for coordinated governance.

Note: Supreme Court has stayed 100-metre Aravalli definition, to form new expert panel to resolve critical ambiguities

Why Bioremediation Matters for India's Pollution Challenge

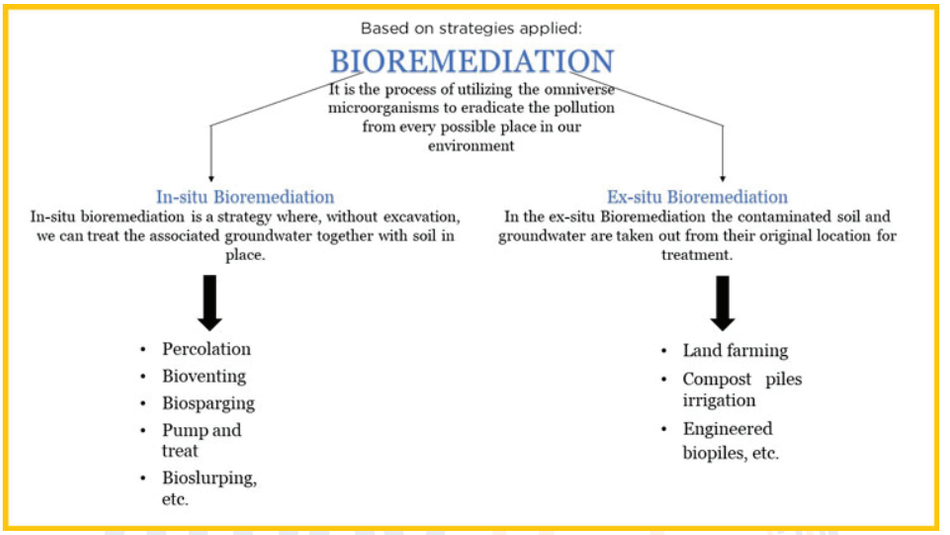
Syllabus Mapping: GS-III-Environment

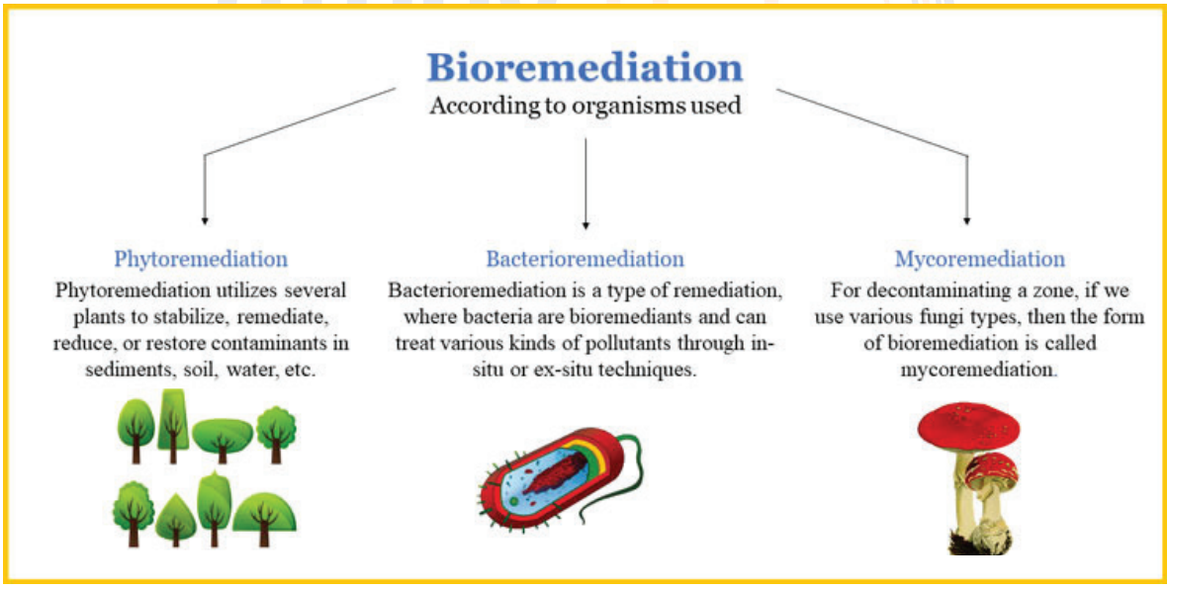
Context

India is reassessing bioremediation solutions as pollution from sewage, industrial effluents, pesticides, plastics, and oil spills continues to overload the country's soil, water, and air systems.

What is Bioremediation?

- Bioremediation refers to the use of living organisms, primarily bacteria, fungi, algae and plants to degrade, detoxify or immobilise harmful pollutants present in soil, water and sediments.
  - The microorganisms used for the degradation of pollutants are called **bioremediates.**
- These organisms metabolise contaminants such as hydrocarbons, pesticides, plastics and heavy metals, transforming them into relatively non-toxic substances like water, carbon dioxide or simpler organic compounds.
- Unlike chemical or mechanical remediation, bioremediation works in harmony with natural ecological processes, making it environmentally sustainable and economically viable, particularly for large-scale and long-term pollution challenges.





Recent Advancements in Bioremediation

- **Metagenomic tools** now identify pollutant-degrading microbes directly from contaminated sites, as seen in studies of polluted stretches of the Ganga.
- **Genetically engineered microorganisms** such as modified Ideonella sakaiensis can break down PET plastics, while engineered oil-eating bacteria aid marine spill cleanup.
- **Synthetic biology** has enabled biosensing microbes that fluoresce in the presence of arsenic and heavy metals.
- **Enzyme-based remediation** reduces organic load in sewage treatment plants without releasing live organisms.
- **Nanocomposites** developed by IITs enhance oil spill and heavy-metal remediation, while **phytoremediation** using metal-accumulating plants restores mining-affected soils in Odisha and Jharkhand.

Need for Bioremediation in India

- **Environmental burden of rapid industrialisation:** Despite gradual improvements, major rivers like the Ganga and Yamuna continue to receive significant loads of untreated sewage and industrial effluents.
- **Persistent contamination:** Oil spills, pesticide residues, and heavy-metal deposits are degrading ecosystems and endangering public health.
- **Limitations of conventional cleanup methods:** Mechanical and chemical remediation technologies are costly, energy-intensive, and often generate secondary waste.
- **Suitability for Indian conditions:** Bioremediation offers a low-cost, scalable, and environmentally benign option, particularly useful given the large extent of polluted sites and limited remediation budgets.
- **Rich biodiversity advantage:** India's indigenous microbes, already adapted to varied local conditions such as high temperatures, salinity, or acidity, often perform better than imported strains in breaking down pollutants.

International Practices

- **China**: Has made bioremediation a priority under its soil pollution control framework, using genetically improved bacteria to restore industrial wastelands.
- **Japan**: Integrates microbial and plant-based cleanup systems into its urban waste strategy.
- **European Union**: Funds cross-country bioremediation projects to clean oil spills and rehabilitate mining-affected areas.
- **Status in India:** Adoption is growing but still limited to pilot-scale applications in most regions. The Department of Biotechnology (DBT) promotes projects under its Clean Technology Programme.

Opportunities of Bioremediation for India

- **Ecological Restoration of Degraded Water Bodies**: Bioremediation offers a sustainable pathway for restoring polluted rivers, lakes, wetlands and groundwater systems by reducing organic load, toxic contaminants and nutrient imbalance.
- **Reclamation and Productive Reuse of Contaminated Land:** Through gradual detoxification of soils affected by industrial effluents, mining and waste dumping, bioremediation enables the recovery of degraded land for agriculture, forestry, infrastructure and urban redevelopment.
- **Cost-Effective and Scalable Pollution Management:** Bioremediation provides a low-cost, decentralised and energy-efficient alternative to conventional clean-up methods, making it particularly suitable for India's large number of polluted sites and limited municipal and state-level remediation budgets.
- **Alignment with National Environmental Missions:** Bioremediation complements flagship initiatives such as the Swachh Bharat Mission, Namami Gange Programme and the National Clean Air Programme by supporting long-term ecological rehabilitation rather than short-term pollution control.
- **Leveraging India's Indigenous Biodiversity Advantage:** India's rich microbial and plant biodiversity, adapted to diverse climatic and ecological conditions, offers locally resilient bioremediation solutions that are often more effective and safer than imported technologies.
- **Strengthening Climate and Sustainability Commitments:** By restoring ecosystems and reducing land and water degradation, bioremediation contributes to India's commitments under the Sustainable Development Goals, land degradation neutrality targets and climate adaptation strategies.
- **Employment Generation and Green Skill Development: T**he expansion of bioremediation can create employment across biotechnology research, environmental services, wastewater treatment, monitoring and waste management.

Risks and Concerns associated with Bioremediation

- **Ecological Risks from Genetically Modified Microorganisms:** The release of genetically modified microorganisms without stringent monitoring and control may disrupt native microbial communities, alter ecological balances and produce unintended long-term environmental consequences.
- **Inadequate Field Testing and Containment Mechanisms:** Insufficient pilot testing, weak containment strategies or premature large-scale deployment can lead to ineffective remediation or even worsen contamination by spreading partially degraded toxic by-products.
- **Biosafety and Biosecurity Challenges:** The absence of robust biosafety frameworks and standard operating procedures increases the risk of accidental exposure, misuse or uncontrolled proliferation of remediation organisms, particularly in open ecosystems.
- **Weak Regulatory Oversight and Institutional Fragmentation:** Limited coordination between regulatory bodies such as pollution control boards, biotechnology authorities and local governments results in inconsistent standards, poor enforcement and accountability gaps.
- **Lack of Standardisation and Certification Systems:** The absence of nationally accepted certification mechanisms for microbial formulations, enzymes and remediation protocols reduces reliability, quality control and stakeholder confidence.
- **Uncertain Long-Term Effectiveness:** Bioremediation outcomes may vary due to environmental factors such as temperature, pH and nutrient availability, raising concerns about predictability and sustained performance.
- **Risk of Technological Over-Reliance:** Overdependence on bioremediation without addressing root causes of pollution, such as untreated sewage and industrial discharge, may result in cosmetic clean-ups rather than lasting environmental solutions.
- **Public Perception, Awareness and Acceptance Issues:** Low public understanding of microbial technologies can generate resistance, misinformation and fear, particularly regarding genetically modified organisms, affecting community participation and project sustainability.

Strategies to Scale Bioremediation in India

- **Development of National Protocols and Standards:** India must formulate comprehensive national protocols for bioremediation, biomining and microbial applications, jointly

developed by the Department of Biotechnology, the Central Pollution Control Board and State Pollution Control Boards, to ensure scientific uniformity, safety and regulatory clarity.

- **Creation of Regional Bioremediation Hubs:** Establishing regional hubs that link universities, research institutions, industries, startups and local governments can facilitate field testing, technology transfer and region-specific solutions for diverse pollution challenges.
- **Strengthening Innovation, Startups and Community Participation:** Enhanced funding, incubation and scale-up support through DBT–BIRAC and allied mechanisms can promote indigenous innovation, while empowering community-level initiatives and local bodies to adopt decentralised bioremediation solutions.
- **Robust Biosafety, Certification and Capacity Building Frameworks:** Strengthening biosafety regulations for genetically modified organisms, creating certification systems for microbial products and remediation protocols, and training on-ground personnel are essential for safe and effective implementation.
- **Digital Monitoring and Real-Time Oversight:** Deployment of biosensors, remote sensing tools and digital dashboards can enable real-time monitoring of remediation performance, compliance and ecological impacts, improving transparency and accountability.
- **Public Outreach and Awareness Building:** Expanding public communication and outreach programmes can build trust, counter misinformation and encourage responsible adoption of bioremediation, ensuring societal acceptance and long-term sustainability.

Fiscal Fault Lines in India's Disaster Response

Syllabus Mapping: GS-III-Disaster Management

Context

The 2024 Wayanad landslides exposed increasing centralisation and growing tensions within India's fiscal federal architecture for disaster response amid rising climate shocks.

Disaster Management Act, 2005– Three Tier Structure

Institutional framework at the National Level	• **Ministry of Home Affairs (MHA):** It coordinates with disaster affected states, line ministries, National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF), National Institute of Disaster Management (NIDM), Home Guards and Civil Defence, and Armed Forces etc. • **National Disaster Management Authority (NDMA):** It is the **apex body** for disaster management, constituted under the DM Act, 2005 and **headed by the Prime Minister of India.** • **National Platform for Disaster Risk Reduction (NPDRR):** It is a multi-stakeholder and multi- decision making body on disaster management. – It is **chaired by the Union Home Minister** with other ministers as its members. • **National Executive Committee: Chaired by the Union Home Secretary** it acts as the coordinating and monitoring body for disaster management in India. • **The Cabinet Committee on Security (CCS):** It is involved in decision making if the disaster has serious security implications. • **National Institute of Disaster Management (NIDM):** It is the nodal agency responsible for **human resource development, capacity building, training, research, documentation and policy advocacy** in the field of disaster management. • **National Disaster Response Force (NDRF):** The NDRF is a specialist response force that can be deployed in a threatening disaster situation or disaster.
Institutional Framework at State Level	• **State Disaster Management Authority:** Chief Minister as the ex-officio Chairperson. – It is responsible for laying down the State Disaster Management Policy and approving the State DM Plans in accordance with the guidelines laid down by the Union. • **State Executive Committee:** It is responsible for coordinating and monitoring DM related activities in the state. – The Chief Secretary of the state is its ex-officio chairperson. – It lays down the guidelines for preparation and implementation of national and state DM plans.
Institutional Framework at the District Level	• At the district level, the **District Disaster Management Authority (DDMA), headed by the District Collector/District Magistrate**, is responsible for overall coordination of the disaster management efforts and planning.

Fund Disbursal System for Disaster Response in India

India follows a **two-tier disaster-financing structure** under the Disaster Management Act, 2005, **supported by periodic Finance Commission grants.**

- **State Disaster Response Fund (SDRF):** Primary source of funds for immediate post-disaster relief.
  - **Funding Pattern:**
    - » **75:25 ratio** (Union:State) for most States.
    - » **90:10 ratio** for North-Eastern and Himalayan States.
    - » Allocated based on Finance Commission recommendations.
- **National Disaster Response Fund (NDRF):** Used for "calamities of severe nature" requiring additional central assistance.
  - **Funding Pattern:** Entirely **Union-funded** through budgetary support and National Calamity Contingency Duty.

- **Finance Commission Grants: 15th Finance Commission (2021–26):** Allocated **₹1.6 lakh crore** for disaster risk management across India.
  - Divided it into **Response funds (SDRF/NDRF) and Mitigation funds** (newly institutionalised).

Advantages of India's Multi-Tier Disaster Response Structure

- **Clear Division of Responsibilities:** A well-defined allocation of roles among national, state and district authorities improves coordination and reduces confusion during disasters, with the Centre framing policy, States planning implementation, and Districts executing response measures.
- **Rapid On-Ground Response:** Empowered District Disaster Management Authorities headed by District Collectors enable immediate evacuation, relief and emergency actions without delays caused by awaiting higher-level approvals.
- **Specialised National Support:** National-level institutions such as the NDRF provide professional search-and-rescue and technical expertise, complementing state and district efforts in relief, rehabilitation and shelter management.
- **Uniform yet Flexible Planning Framework:** Disaster Management Plans at national, state and district levels ensure standardisation in approach while allowing flexibility to address region-specific hazards and vulnerabilities.
- **Scalable Resource Mobilisation:** Disaster response follows a tiered model, using local resources first, followed by State Disaster Response Funds, and escalating to national assistance during severe calamities.
- **Enhanced Accountability and Preparedness:** Statutorily defined roles for each tier strengthen accountability, improve compliance, and support sustained capacity-building and preparedness efforts.

Current Challenges in Disaster Response

- **Rising gap between assessed losses and actual financial assistance undermines State capacity.**
  - **E.g.,** Kerala's Wayanad landslides (2024) incurred ₹2,200 crore in losses but received only ₹260 crore from the Centre, reflecting widening fiscal asymmetry.
- **Outdated relief norms do not match present reconstruction and livelihood-restoration needs.**
  - **E.g,** Compensation ceilings like ₹4 lakh for death and ₹1.2 lakh for fully damaged houses have not been revised for nearly a decade despite rising inflation and construction costs.
- **Slow, discretionary fund release mechanisms delay timely response.**
  - **E.g.,** NDRF assistance requires multi-layer clearances (IMCT → NEC → HLC), causing significant delays in events such as **Cyclone Gaja (2018) and Karnataka floods (2019).**
- **Weak risk mapping and hazard-based planning increases exposure to disasters.**
  - **E.g.,** Despite 12.6% of India being landslide-prone and rapid expansion of floodplains, urban planning and Finance Commission allocations remain poorly aligned to actual hazard vulnerability.
- **Urban flooding and climate extremes outpace the preparedness of local bodies.**
  - **E.g.,** Cities like Bengaluru and Chennai face recurring floods due to encroached drains, loss of wetlands, and obsolete drainage systems despite rising extreme rainfall events.
- **Fragmented institutional coordination across agencies hampers integrated response.**
  - Overlapping mandates among NDMA, SDMAs, DDMAs, municipal bodies, and sectoral agencies often lead to delays in evacuation, debris clearance, and relief delivery.
- **Limited community participation and weak local-level resilience planning.**
  - **E.g.,** Panchayats and municipalities often lack trained personnel, resources, and early warning integration, weakening last-mile disaster response.
- **Insufficient focus on long-term mitigation and climate adaptation.**
  - **E.g.,** Most spending still goes to relief and compensation rather than structural mitigation like slope stabilisation, flood-retention systems, and resilient housing.
- **Inadequate early warning dissemination and technological reach in remote areas.**
  - **E.g.,** Events such as the 2023 Sikkim GLOF revealed gaps in sensor networks and communication channels that provided only minutes of warning to communities.
- **Underutilisation of preparedness and mitigation budgets at the State level.**
  - **E.g.,** CAG reports show many States utilize only 50–70% of available disaster-mitigation funds due to administrative delays and project-level constraints.

Recent Government Initiatives for Disaster Resilience

- **Amendment to Disaster Management (Amendment) Act, 2025:** It assigns planning responsibility directly to national and state authorities (National Disaster Management Authority (NDMA) and state equivalents), replacing earlier dependence on executive committees.
- **New Technological & Data-driven Tools**: The government launched **ICR-ER (Integrated Control Room for Emergency Response)** and **NDEM Lite 2.0 mobile app**, and rolled out the **Assam Flood Hazard Zonation Atlas** — aimed at enhancing real-time monitoring, early warning, and disaster preparedness across India.
- **Seismic observatories increased from 80 in 2014 to 168 by February 2025.**
- **The BhooKamp app was launched for real-time earthquake updates.**
- **NDMA's Earthquake Risk Indexing (EDRI) project** assesses earthquake risks in 50 cities, with plans to cover 16 more cities.

Way Forward for Disaster Governance in India

- **Objective, Data-Driven Triggers for Fund Release:** Adopting automatic, data-based thresholds for disaster assistance, similar to FEMA's per-capita damage triggers in the United States, can make fund release predictable and non-discretionary, reducing delays and political negotiation.

- **Parametric, Satellite-Based Disaster Insurance:** Introducing parametric insurance for high-risk States, on the lines of African Risk Capacity and the Caribbean CCRIF, can ensure rapid payouts within days after cyclones, floods or droughts.
- **Automatic Disaster Classification Mechanisms:** Pre-defined triggers based on rainfall intensity, wind speed, seismic activity and loss-to-GSDP ratios, as used under Mexico's FONDEN, can enable swift and objective disaster categorisation.
- **Strengthened Local Early-Response Financing:** Creating pre-positioned quick-response funds for district administrations, inspired by the Philippines' Quick Response Funds, can facilitate immediate relief and response within 24–48 hours.
- **Linking Central Assistance to State Preparedness:** Tying central disaster support to State investments in mitigation, resilient housing and land-use planning, similar to Australia's shared-responsibility model, can incentivise risk reduction.
- **Modernisation and Indexation of Relief Norms:** Regularly revising and indexing compensation norms to inflation can ensure realistic and predictable reconstruction support aligned with actual costs.
- **Unified National Disaster-Risk Database:** Building an integrated national database using hazard maps, climate projections and satellite indices on the lines of systems in the US, Japan and the EU can guide evidence-based disaster finance allocation.

Fire Safety in India: From Recurrent Tragedies to Systemic Reform

Syllabus Mapping: GS-III-Disaster Management

Context

A devastating fire at a Goa nightclub that killed 25 people once again exposed deep regulatory failures, illegal operations and weak enforcement of fire safety norms in India.

Fire Hazard Status in India

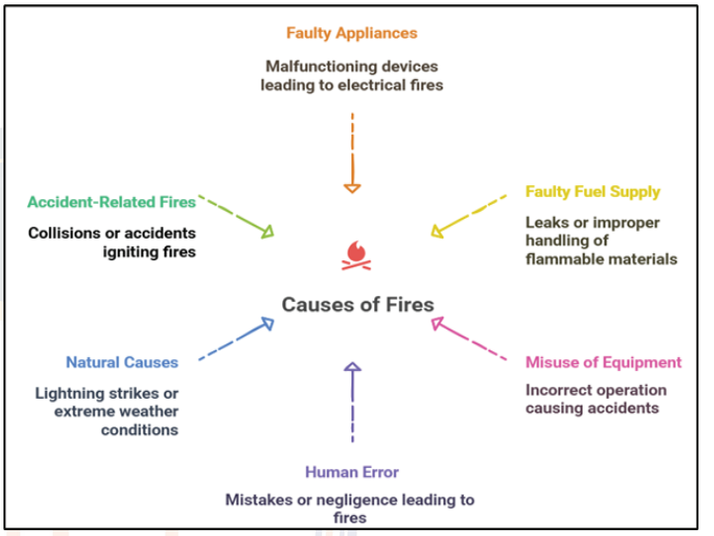
- A fire hazard refers to uncontrolled burning in a residence or building caused by natural, human or technical factors, leading to loss of life, property and environmental damage.
- According to the NCRB report 2022, 7,435 people were killed in over 7,500 fire accidents in India in 2022.
- 1,85,383 people had lost their lives due to fire accidents between 2010 and 2019 — an average of 65 deaths a day. (NCRB)
- India Risk Survey (IRS) in 2018 (a joint effort of FICCI and Pinkerton) has declared fire outbreak as the third largest threat to business continuity

Recent Examples

- Kolkata Hotel fire accident, April, 2025- 14 killed
- Hyderabad Gulzar Houz fire accident, May 2025- 17 killed
- Rajkot Gaming Zone Fire accident, May 2025- 3 killed
- New Delhi Neonatal clinic fire accident, Nov. 2024-7 killed
- Fire at Takshashila Arcade, Surat, 2019: 22 people killed

Fire Safety Measures in India

- **National Building Code (NBC),** published by the BIS in 1970 and updated in 2016-provide comprehensive guidelines for construction, maintenance, and fire safety protocols in buildings.
- **Role of State Governments:** Fire services in India fall under state jurisdiction and are delineated as a municipal function, with state governments tasked with enforcing fire prevention measures through legislation such as the State Fire Services Act and building bylaws.
- **Model Building Bye Laws 2016**- issued by the Ministry of Housing and Urban Affairs, offers guidance to states and Union Territories (UTs) in formulating building bylaws to address fire protection and safety requirements.



- **Scheme for Expansion and Modernization of Fire Services**: Launched from earmarked allocation of Preparedness and Capacity Building Funding Window under the NDRF for strengthening fire services in the States for the period up to 2025-26.
- **Model Bill for Fire and Emergency Services, 2019**: Offers a standard framework that states can adopt to establish and manage fire and emergency services.
- **Fire and Life Safety Guidelines (2020):** Issued by the Ministry of Health, these guidelines recommend measures such as third-party fire safety accreditation and the development of a Fire Response Plan (FRP).
- **Other Laws**: The Factories Act of 1948's Section 37 establishes regulations to guard against fire and explosion hazards.

Challenges in Fire Safety Management in India

- **Regulatory Challenges**
  - Fire safety regulation in India suffers from a lack of standardisation and uniform safety legislation across states, leading to wide variations in enforcement and compliance.
  - Most states have not yet updated their fire safety laws in line with the Model Fire and Emergency Services Act, 2019, resulting in outdated legal frameworks.
  - Although the National Building Code prescribes detailed provisions on fire and life safety, its guidelines remain

largely advisory and are not enforced uniformly across the country.
  - Local authorities frequently fail to conduct regular fire safety audits, allowing violations to persist unchecked.
  - In industrial and factory settings, fire safety is often neglected due to poor machinery maintenance, unserviced HVAC systems, unsafe storage of flammable materials and inadequate monitoring, particularly in the unorganised sector.
- **Infrastructural Constraints**
  - Fire departments across the country operate with barely around ten percent of their sanctioned manpower, with only about 54,239 personnel available nationwide, as highlighted in a Rajya Sabha reply in 2019.
  - In addition, there is an acute shortage of fire stations and firefighting equipment, with deficiencies estimated at nearly 98 percent for fire stations and over 80 percent for firefighting and rescue vehicles, according to the National Disaster Management Authority.
- **Challenges Arising from Rapid Urbanisation**
  - Informal settlements characterised by substandard housing lack basic fire safety measures and safe construction practices.
  - The rapid growth of high-rise buildings has outpaced the expansion of high-reach firefighting infrastructure, making it difficult to access upper floors during emergencies.
  - Congested urban layouts, narrow lanes and chronic traffic congestion further delay emergency response and evacuation.
- **Emerging Climate Change Risks:** A study published in Nature projects that under a high greenhouse gas emission scenario, vehicle fires could increase by 11.6 percent and outdoor fires by 22.2 percent globally by 2100, placing additional strain on already overstretched fire services, even as building fires may marginally decline.

Suggested Measures to strengthen Fire Safety Management

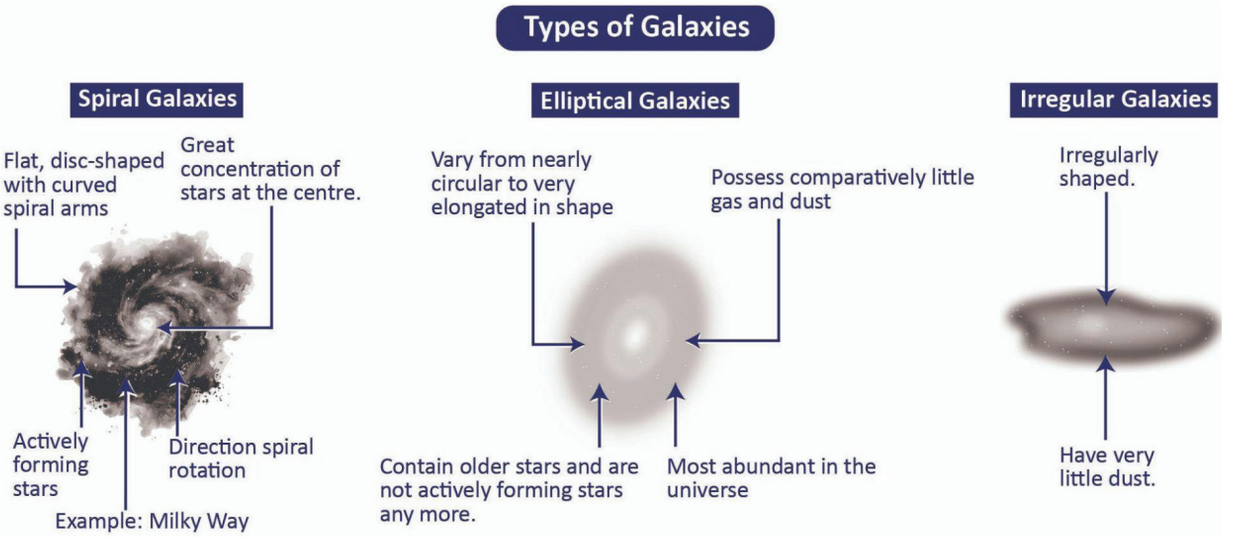
- Investment in **modern firefighting equipment, technology, and vehicles** equipped with advanced tools and communication systems
- **Mandatory annual fire safety audits** by third-party agencies for buildings with high footfall.
- Conduct **Hazard Identification and Risk Assessment (HIRA)** to proactively detect and mitigate potential fire risks.
- Enforce the **13th Finance Commission's recommendations** by ensuring that municipal corporations with over one million residents prepare fire hazard mitigation plans and upgrade fire services in coordination with State Fire Services Departments.
- **Enforce fire safety regulations strictly, with stringent penalties** for violations.
- Promote public awareness through routine fire safety drills in residential areas, schools, and institutions.
- **Strengthen local bodies** by increasing financial allocations for fire departments, ensuring proper training for fire personnel, and improving infrastructure.
- **Blue Green Infrastructure**-Green spaces as firebreaks, water recycling systems for firefighting reserves.
- Fully **implement NDMA guidelines** regarding the scaling, standardization of equipment, and fire service training protocols.

Topics for Prelims (Geography)

Alakananda Galaxy

Context

Researchers from the National Centre for Radio Astrophysics–Tata Institute of Fundamental Research (NCRA–TIFR), Pune, have identified a well-defined spiral galaxy named Alaknanda, dating back to nearly 1.5 billion years after the Big Bang, using observations from NASA's James Webb Space Telescope (JWST).



About Alakananda Galaxy

- It is located at a distance of about 12 billion light-years from Earth.
- It formed when the universe was roughly 10% of its present age (around 1.5 billion years old).
- The galaxy exhibits a classic spiral morphology with two prominent spiral arms and a bright central bulge.
- Its overall structure is strikingly similar to that of the Milky Way.
- The galaxy is named after the Alaknanda River of the Himalayas, considered the sister river of the Mandakini, a Hindi name often associated with the Milky Way.
- **Significance:**
  - The discovery provides evidence that complex and stable galactic structures formed much earlier than previously thought.
  - It strengthens the view that the early universe was more evolved in terms of galaxy formation than standard models predict.

Southern Ocean Carbon Anomaly

Context

Recent observations show that the Southern Ocean has continued to strengthen as a carbon sink, contrary to long-standing climate model projections.

About Southern Ocean or Antarctic Ocean

- Surrounds Antarctica and connects the Atlantic, Pacific and Indian Oceans.
- Plays a critical role in global heat and carbon regulation.
- Characterised by strong westerly winds and deep-water upwelling.
- The Southern Ocean absorbs nearly 40% of global oceanic CO_2 uptake, despite covering only 25–30% of the global ocean area.

About Southern Ocean Carbon Anomaly

- Climate models predicted that stronger winds would increase upwelling and release CO_2 into the atmosphere, weakening the ocean's carbon sink.
- Observations since the early 2000s show increased carbon absorption instead of release.
- Deep, carbon-rich waters rose by about 40 metres, and subsurface CO_2 pressure increased by around 10 microatmospheres, but surface CO_2 emissions did not rise.
- This divergence between model predictions and observations is termed the Southern Ocean Carbon Anomaly.
- **Reasons Behind the Anomaly**
  - Increased Antarctic ice melt and rainfall freshened surface waters.
  - Formation of a low-density freshwater layer strengthened ocean stratification.
  - Strong stratification trapped carbon-rich waters at depths of 100–200 metres, preventing atmospheric release.
  - Climate models inadequately capture small-scale processes such as ocean eddies and ice–ocean interactions.
- **Significance**: Southern Ocean's temporary buffering of atmospheric CO_2 may weaken as stratification declines, potentially releasing stored carbon and accelerating global warming.

Emission of light and very low-frequency perturbations

Context

A rare atmospheric phenomenon known as **ELVEs** (Emission of Light and Very Low Frequency perturbations due to Electromagnetic Pulse Sources) created a striking **red halo of light** that was seen hovering above a small town in Italy.

About ELVEs

- It is a phenomenon involving a brief, expanding ring of light in the Earth's upper atmosphere.
- It is a type of **Transient Luminous Event (TLE)**—a category of electrical discharges that occur high above thunderstorms, separate from the lightning we see on the ground.
- **Working:**
  - A powerful lightning strike releases a spherical electromagnetic pulse (EMP).
  - The EMP travels upward at the speed of light and strikes the lower ionosphere at an altitude of about 80–100 km.
  - The pulse energises free electrons present in the ionosphere.
  - These electrons collide with nitrogen molecules, causing them to emit a faint reddish glow.
  - Due to the spherical wave interacting with a flat atmospheric layer, the light appears as a rapidly expanding circular ring.
- **Discovered by:** Franz Boeck through space-based observations.
- **Key Features**
  - ELVEs are extremely short-lived, lasting less than one millisecond.

- The luminous ring can expand to a diameter of 300–500 kilometres.
- They occur at the base of the ionosphere, around 90 km above Earth's surface.
- ELVEs are observed more frequently over oceans, where lightning tends to be more powerful.

Comparison of Transient Luminous Events (TLEs)

Feature	Sprites	ELVEs	Blue Jets
Basic Nature	Vertical, jellyfish-like flashes of light	Rapidly expanding circular rings of light	Narrow, cone-shaped upward jets
Trigger Mechanism	Positive cloud-to-ground lightning	Electromagnetic pulse from intense lightning	Strong electric fields within thunderstorms
Shape	Columnar or carrot-shaped structures	Expanding ring or halo	Conical beam
Duration	Few milliseconds	Less than 1 millisecond	Hundreds of milliseconds
Altitude Range	50–90 km (mesosphere)	80–100 km (lower ionosphere)	20–50 km (stratosphere)
Colour	Reddish-orange	Faint red	Blue
Associated Atmospheric Layer	Mesosphere	Ionosphere	Stratosphere
Visibility	Best observed from space or aircraft	Detected mainly by satellites	Occasionally visible from aircraft
Common Location	Over large thunderstorms	More frequent over oceans	Above powerful thunderclouds

Super Kilonova

Context

An international team of astronomers, including researchers from IIT Bombay and the Indian Institute of Astrophysics (IIA), Bengaluru, has reported evidence of a rare cosmic explosion called a superkilonova.

About Super Kilonova

- A **superkilonova** is a **rare and extremely energetic cosmic explosion** that occurs when a **kilonova is powered by an additional energy source**, making it **brighter, bluer, and longer-lasting** than a normal kilonova.
- **How it forms:**
  - **Baseline event – Kilonova:** When **two neutron stars merge**, they eject neutron-rich matter that forms **heavy radioactive elements** (such as gold and platinum).
    - The radioactive decay of these elements produces a short-lived optical–infrared glow called a **kilonova**.
  - **Extra energy → Superkilonova:** A superkilonova occurs when **extra heat or energy** boosts this glow beyond normal levels. Two main mechanisms are proposed:
    - **Fallback heating:** Some ejected matter falls back onto the merged object, heats up, and re-energises the ejecta.
    - **Supernova + merger sequence:** A massive star explodes as a **supernova**, forming two neutron stars that **quickly merge**, combining supernova energy with a kilonova.

Comparison: Nova, Supernova, Hypernova, Kilonova

Feature	Nova	Supernova	Hypernova	Kilonova
Basic Meaning	Sudden brightening of a star	Explosive death of a star	Extremely energetic supernova	Explosion from neutron star merger
Cause	Thermonuclear explosion on surface of a white dwarf in a binary system	Core collapse of a massive star or white dwarf explosion	Collapse of a very massive, rapidly rotating star	Collision of two neutron stars or neutron star–black hole
Energy Released	Low	Very high	Extremely high (more than supernova)	Moderate but intense
Brightness	Increases by thousands of times	Can outshine an entire galaxy	Among the brightest explosions known	Short-lived but very bright
Elements Produced	No heavy element synthesis	Elements up to iron; some heavy elements	Large amounts of heavy elements	Major source of gold, platinum, rare heavy elements
Frequency	Relatively common	Rare	Very rare	Extremely rare
Astronomical Importance	Studies stellar accretion	Stellar evolution, element formation	Gamma-ray bursts, black hole formation	Origin of heavy elements, gravitational waves
Associated Phenomena	Binary star systems	Neutron star or black hole formation	Long-duration gamma-ray bursts	Gravitational waves

Antarctic Ozone Hole

Context

The Antarctic ozone hole closed unusually early in 2025, marking one of the strongest signs yet of sustained recovery of the stratospheric ozone layer.

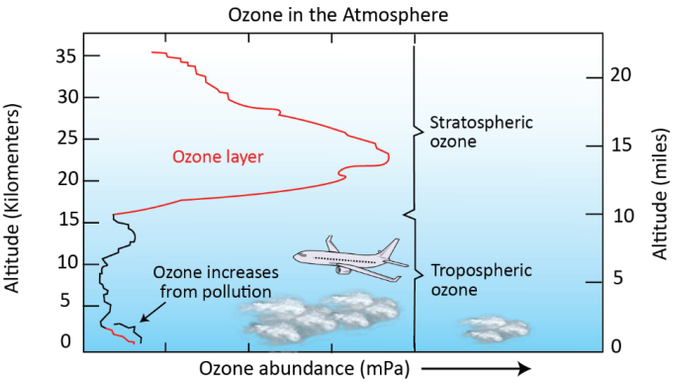
About Antarctic Ozone Hole

- The Antarctic ozone hole refers to a **seasonal and pronounced depletion** of stratospheric ozone over Antarctica, typically occurring from **August to November** during the Southern Hemisphere spring.
- In **2025**, the ozone hole reached a **maximum size of just over 21 million sq km**, significantly smaller than the **record 29 million sq km observed in 2006**.

Causes of Ozone Hole in Antarctica

As compared to the rest of the world, the South Antarctic region is more prone to ozone depletion, because of several reasons, such as:

- **Extreme Cold and Polar Stratospheric Clouds (PSCs):** Antarctica's very low winter temperatures form PSCs that convert inactive chlorine/bromine into highly reactive forms, accelerating ozone destruction.
- **Return of Sunlight in Southern Hemisphere Spring:** When sunlight returns in August–September, it triggers photochemical reactions that release active chlorine radicals, causing rapid ozone depletion.
- **Polar Vortex Isolation:** The strong Antarctic polar vortex traps cold air and prevents mixing with ozone-rich air from lower latitudes, intensifying the seasonal ozone hole.



Ozone Layer

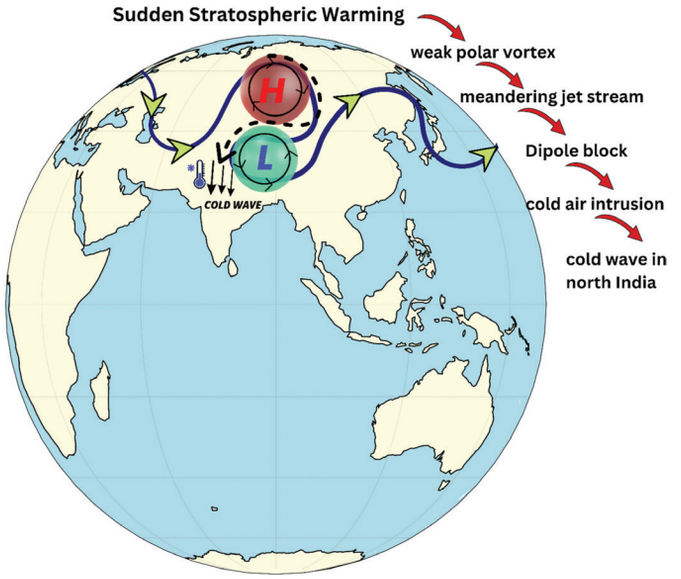
- A region of relatively high ozone (O_3) concentration located in the stratosphere, between **10–40 km above in the stratosphere.**
- Formed through **natural photochemical reactions** when UV radiation splits oxygen molecules (O_2) into atoms that recombine to form ozone.
- Functions as a **protective shield**, absorbing most of the Sun's **harmful ultraviolet-B (UV-B) and UV-C radiation.**

Good Ozone	Bad Ozone
It is the stratospheric ozone.	It is the tropospheric ozone. Also known as ground-level/ surface-level ozone
It acts as a shield to protect Earth's surface from the sun's harmful ultraviolet radiation. The stratospheric ozone is often termed **"Earth's sunscreen."**	It is harmful and one of the chief air pollutants. It is the main component of smog.
	It is not emitted directly into the air. It is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC).

Sudden Stratospheric Warming (SSW) event

Context

Meteorologists have warned that another Sudden Stratospheric Warming (SSW) event may occur in December 2025.



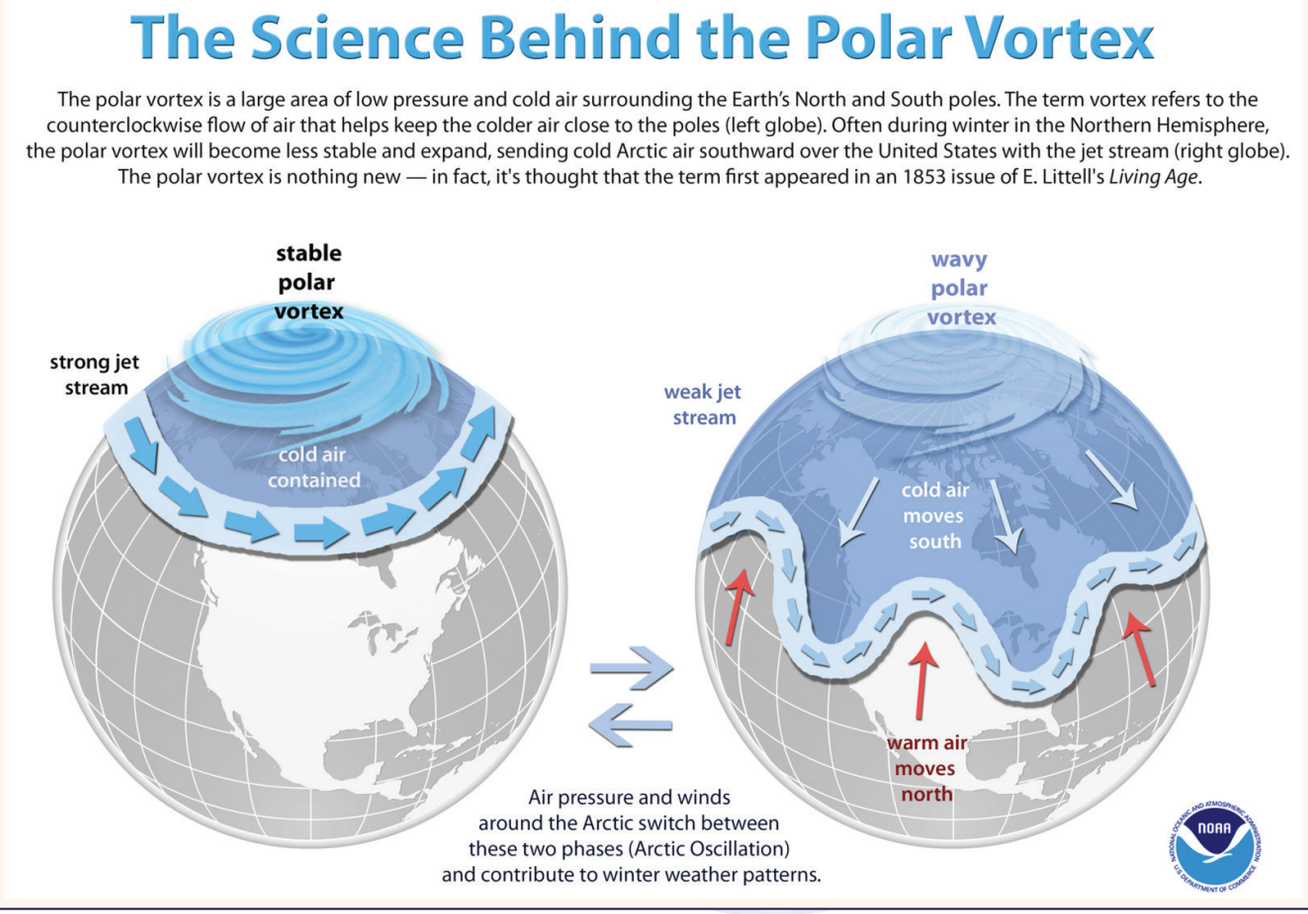
About Sudden Stratospheric Warming (SSW) event

- It is a major atmospheric event in which **temperatures in the polar stratosphere rise abruptly–by 40-50°C within a few days**.
- It occurs **10–50 km above the Earth's surface** (in the **stratosphere**), typically over the **Arctic region** during winter.
- **Why Does it Occurs:**
  - **Generation of Planetary Waves:** Large-scale atmospheric disturbances, called Rossby waves (or planetary waves), are generated in the lower atmosphere (troposphere) by geographical features like mountains and land-sea temperature contrasts.
  - **Upward Propagation and Breaking:** These powerful waves propagate high into the stratosphere where they "break." This transfers massive energy and momentum from the waves to the stratospheric airflow.
  - **Destruction of the Polar Vortex:** The transferred energy dramatically slows the strong westerly winds of the Polar Night Jet, disrupting the stratospheric polar vortex. This disruption causes air to sink rapidly over the pole, leading to intense **adiabatic compression and warming** (the SSW).

- **Types of SSW:**
  - **Major SSW:** Polar vortex **reverses its direction** (from westerly to easterly). Leads to strong surface weather impacts.
  - **Minor SSW:** Temperature increases occur but the polar **vortex does not fully reverse**.

Polar Vortex

- The polar vortex is a large, persistent low-pressure system of cold air that forms over the Earth's polar regions in the stratosphere and upper troposphere during winter.
- It consists of strong westerly winds that circulate around the poles, effectively trapping cold air and isolating polar atmospheric conditions from lower latitudes.



Micrometeoroids and Orbital Debris (MMOD)

Context

A piece of **space debris** recently struck the Chinese crewed spacecraft **Shenzhou-20**, has renewed global concern over **Micrometeoroids and Orbital Debris (MMOD).**

About Micrometeoroids and Orbital Debris (MMOD)

- **Micrometeoroids:**
  - Naturally occurring, extremely small particles in space, typically **micrometres to 2 mm** in size.
  - Mostly originate from **asteroid collisions** in the asteroid belt; a smaller share comes from **comets**.
  - Travel at **very high velocities (11–72 km/s)**, making even tiny particles highly destructive.
  - **Micrometeoroids** exist throughout space but are slightly denser near Earth due to gravitational attraction.
- **Orbital Debris (Space Junk):**
  - Human-made objects in Earth's orbit that no longer serve any purpose.
  - Includes defunct satellites, spent rocket stages, fragments from collisions and **anti-satellite (ASAT) tests**.
  - **Orbital debris** is concentrated mainly in **Low Earth Orbit (200–2,000 km)**.

Risks posed by MMOD

- **Catastrophic damage risk:** Even millimetre-sized particles can disable satellites due to extreme kinetic energy.
- **Threat to astronauts:** Penetration of crew modules or life-support systems can be fatal.
- **Mission disruption:** Damage to sensors, solar panels, and communication systems reduces mission life.
- **Kessler Syndrome:** A runaway collision cascade where debris generates more debris, potentially making orbits unusable.

- **Economic & strategic risk:** Loss of satellites affects navigation, communication, weather forecasting, and defence.

Tsunami ready villages in Indian Ocean

Context

India is set to have **over 100 "Tsunami Ready" villages**, the **highest number in the Indian Ocean region**, becoming the **first country** to achieve this scale.

About Indian National Centre for Ocean Information Services (INCOIS)

- It is an autonomous body under the **Ministry of Earth Sciences**.
- It operates the **Indian Tsunami Early Warning Centre (ITEWC)**, which:
  - Monitors **global earthquakes** in real time.
  - Issues **tsunami advisories and warnings** for the **Indian Ocean region**.
- INCOIS is the **nodal coordinating agency** for implementing the **UNESCO-IOC "Tsunami Ready" initiative in India**.
  - **UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)** is a **voluntary, international, community-based initiative** aimed at strengthening disaster risk prevention and mitigation in coastal regions..

About Tsunami Ready Villages

- They are coastal communities **certified by the Intergovernmental Oceanographic Commission of UNESCO** for meeting defined tsunami preparedness standards.
- **Key criteria include:**
  - High **community awareness** about tsunami risks.
  - **Hazard mapping** and **public display of evacuation routes/ maps**.
  - Access to **24×7 tsunami warning systems**.
  - **Regular mock drills** and community participation.
  - Strong coordination with **local disaster management authorities**.

Chillai kalan

Context

Kashmir Valley has received its first snowfall of the season with the onset of Chillai Kalan.

About Chillai kalan

- Chillai Kalan refers to the **most severe winter period** in the Kashmir Valley.
- It lasts for **40 days**, from **21 December to 30 January**.
- During this period, temperatures frequently fall **below 0°C**, particularly at night.
- The valley experiences the **heaviest snowfall of the winter season** during Chillai Kalan.
- **Significance of Chillai Kalan**
  - Heavy snowfall during this phase is crucial for **glacier accumulation** and long-term water security.
  - Snowmelt from Chillai Kalan sustains **rivers, springs and groundwater recharge**.
  - It supports **agriculture and horticulture**, especially for crops dependent on winter chill.
  - The snow cover contributes to **hydropower generation** in the region.
- **Subsequent Winter Phases**
  - Chillai Kalan is followed by **Chillai Khurd**, a relatively milder winter phase lasting **20 days**.
  - This is succeeded by **Chillai Bache**, the final and mildest phase of winter, lasting **10 days**.

Topics for Prelims (Environment)

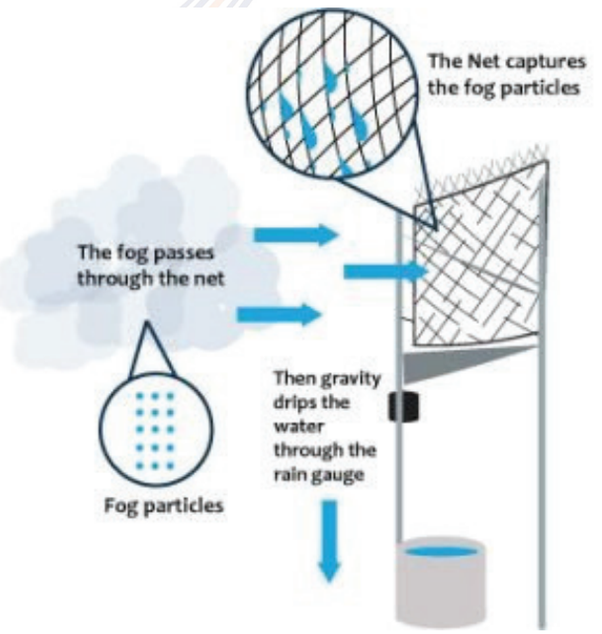
Fog Harvesting

Context

Fog harvesting is emerging as a low-cost, climate-resilient water solution for India's fog-prone and water-stressed regions.

About fog harvesting

- Fog harvesting (also called fog collection or fog catching) is a **passive water collection technique** that uses fine mesh nets installed in fog corridors to capture microscopic water droplets from fog.
- As fog droplets strike the mesh, they **coalesce into larger drops** that flow by gravity into gutters and storage tanks.
- The system requires **no external energy**, minimal infrastructure, and with basic filtration and disinfection, the collected water can be used for **drinking, domestic needs, or agriculture**.
- Under favourable conditions, a single fog net can yield **up to 400 litres of water per day**, and clustered systems can supply **entire villages**.



Suitability of fog harvesting for India's climate

- India has **several fog-prone microclimates**, especially in Himalayan and hill regions, coastal belts, and select rain-shadow areas.
- Potentially suitable regions include **Himachal Pradesh, Uttarakhand, Sikkim, Darjeeling hills of West Bengal, Meghalaya, parts of the Northeast, and certain coastal or windward slopes**.
- The technology aligns well with India's needs because it is **low-cost, decentralised, climate-resilient, and community-manageable**, making it suitable for remote and high-altitude habitations.
- Fog harvesting can **complement existing sources** such as springs, rainwater harvesting, and groundwater recharge, reducing seasonal water insecurity.
- Limitations include **high site-specificity, seasonal dependence, land requirements, and the need for regular maintenance**, as well as caution in polluted or industrial zones.

Why pollution affects North Indian cities more than south & west

Context

A recent analysis 'Air Quality Assessment of Major Indian Cities (2015–2025)' described why pollution affects northern cities more than southern and western cities in India.

Reasons for more pollution in North Indian Cities

- **Geographic Trapping of Pollutants in the Indo-Gangetic Plain:** Northern cities like Delhi, Lucknow, and Varanasi lie in a **landlocked basin surrounded by the Himalayas**, which act as a barrier that prevents polluted air from dispersing, causing pollutants to accumulate for longer periods.
- **Low Wind Speeds and Poor Dispersion Conditions:** The **flat topography and dense urban structures of northern cities** reduce wind flow, slowing horizontal dispersion of pollutants compared to coastal or open-terrain cities in the south and west.
- **Winter Temperature Inversion Intensifies Pollution Build-Up:** During winters, the **planetary boundary layer becomes thinner, trapping cold, dense air under a warmer air layer above;** this "winter inversion" prevents vertical mixing, causing pollutants to remain close to the ground.
- **Lack of Coastal Advantages Available to Southern and Western Cities:** Cities like Chennai, Mumbai, and Visakhapatnam benefit from **stronger sea breezes, higher humidity, and better natural ventilation,** which dilute pollutants faster.
- **Higher Emission Load Across the Northern Region:** The Indo-Gangetic Plain records concentrated sources of pollution—**stubble burning, vehicular emissions, industrial clusters, brick kilns, thermal plants, and biomass use**—making baseline pollution levels much higher than in south and west India.
- **Seasonal Meteorological Patterns Aggravate Winter Pollution in the North:** While monsoon winds and rainfall help disperse pollutants, the **dry winters** of northern India **provide no cleansing mechanism,** allowing pollution levels to spike sharply each year, unlike the relatively consistent air-flow patterns in southern and western regions.

Chemical Dust Suppressants

Context

A CPCB-commissioned pilot study found that **chemical dust suppressants reduce particulate matter more effectively**, showing **50–60% higher efficiency** compared to water (25–30%).

About Chemical Dust Suppressants

- They are **compounds applied to soil, road surfaces, or construction sites** to bind loose particles and prevent them from becoming airborne.
- They form a **thin, adhesive layer** that keeps dust down for several hours.
- **Common Types Used:**
  - **Chloride-based salts:** *Calcium chloride ($CaCl_2$), Magnesium chloride ($MgCl_2$)*
    - » These are hygroscopic—pull moisture from the air, keeping the surface damp.
  - **Lignin sulfonate:** A by-product of the paper industry; works as a natural binder for soil particles.
  - **Asphalt emulsions:** Provide a semi-permanent crust on unpaved or construction surfaces.
  - **Bio-additives:** Typically plant-based polymers that help bind dust.
- **How They Work**:
  - Increase surface moisture retention.
  - Form a stabilizing crust over dust-prone surfaces.
  - Reduce the frequency of re-suspension of PM10 and PM2.5.

Environmental and Health Concerns

- **Soil Quality Degradation:** Chloride salts alter soil structure, increasing salinity.
  - Can reduce soil fertility and disturb microbial balance.
- **Groundwater Contamination:** Salts and chemical additives can leach into groundwater.
  - Long-term accumulation poses risks to drinking water sources.
- **Vegetation Damage:** High chloride levels cause leaf burn, stunted growth, or plant death.
  - Particularly harmful near roadside green belts or agricultural fields.
- **Run-off during Rainfall:** Leads to contamination of stormwater drains and wetlands.
  - Asphalt emulsions may introduce hydrocarbons into the environment.
- **Disruption of Local Ecologies:** Alters soil chemistry and impacts small organisms (worms, insects).
- **Health Concerns**
- Respiratory Irritation
- Skin and Eye Irritation
- Exposure from Residue Breakdown
- Toxicity from Misuse

Corporate Social Responsibility

Context

The Supreme Court of India has ruled that Corporate Social Responsibility (CSR inherently includes environmental responsibility) and is not a voluntary act of charity, but a constitutional obligation.

Recent SC Guidelines on CSR

- **Article 51A(g) applies to corporations:** Companies, as legal persons, have a **fundamental duty to protect the environment**.
- **Polluter Pays principle enforced:** Firms harming wildlife habitats must **bear restoration costs**.
- **Mandatory conservation focus:** CSR funds to support **in-situ and ex-situ biodiversity conservation**.
- **Climate change lens:** Long-term studies on **climate impacts on endangered species** mandated.

About Corporate Social Responsibility (CSR)

- It refers to a company's responsibility to contribute to **social, environmental, and sustainable development** beyond profit-making.
- **Legal basis in India:** CSR is mandated under **Section 135 of the Companies Act, 2013**, making India one of the first countries to have **statutory CSR**.
- **Eligibility:** CSR provisions apply to companies having:
  - **Net worth ≥ ₹500 crore**, or
  - **Turnover ≥ ₹1,000 crore**, or
  - **Net profit ≥ ₹5 crore** in the preceding financial year.
- **Key Features:**
  - **CSR spending norm:** Eligible companies must spend **at least 2% of the average net profits of the previous three financial years** on CSR activities.
  - **Permissible activities:** CSR spending can be made on areas such as **education, health, poverty alleviation, environment protection, rural development, gender equality, and disaster relief**.
  - **Compliance mechanism:** Unspent CSR funds must be transferred to a **specified government fund** or a **designated CSR account**, depending on the nature of the project.
    - » Penalties apply for non-compliance.
  - **CSR registration:** Entities implementing CSR projects must **register with the Registrar of Companies (ROC)** to ensure transparency and monitoring.

Inhalable Microplastics

Context

A new multi-city study has identified inhalable microplastics (iMPs) as a new emerging air pollutant in Indian metropolitan markets.

About Inhalable Microplastics (iMPs)

- **Plastic particles smaller than 10 micrometres (µm)** that can enter the human respiratory system through inhalation.
- Much smaller than regular microplastics (less than 5 mm), thus capable of **reaching deep lung tissues, alveoli, and even entering the bloodstream**.
- They originate from **synthetic clothing fibres (polyester), tyre wear, footwear erosion, packaging materials, and urban waste**.
- Due to their low density and aerodynamic properties, they **remain suspended in air for long periods**, increasing exposure risk.

Impacts of Inhalable Microplastics

- **Health Impacts:**
  - **Respiratory diseases:** Irritation, chronic inflammation, reduced lung function, increased asthma and COPD-like symptoms.
  - **Deep lung penetration:** Particles <2.5 µm interact with macrophages and reach alveoli; <1 µm particles cross into the bloodstream.
  - **Carriers of pathogens:** Found carrying fungi and bacteria like *Aspergillus fumigatus*, *Candida*, and antibiotic-resistant *Bacillus* species.
  - **Toxic chemicals exposure:** DEP (linked to hormonal imbalance, fertility issues), phthalates, and lead (damaging to brain, nerves, kidneys).
  - **Cancer risk:** Some identified polymers (PET, polyethylene, synthetic rubber) are associated with carcinogenic pathways.
  - **Systemic impacts:** Oxidative stress, immune suppression, reproductive and endocrine disruption.
- **Environmental Impacts:**
  - **Persistent pollutant:** Long atmospheric life; can travel across cities and deposit into rivers, soil, and oceans.
  - **Food chain contamination:** Airborne microplastics eventually enter water bodies and marine life, returning to humans via food and salt.
- **Urban Air Quality Impacts:**
  - **Constitute up to 5% of PM2.5 and PM10 load**, complicating traditional air pollution control strategies.
  - **Peak during winter inversion and crowded market hours**, increasing human exposure.

CAFE Norms

Context

The US-based International Council on Clean Transportation (ICCT) and the Geneva-based International Road Federation (IRF) have separately urged India to reconsider further concessions under India's upcoming Corporate Average Fuel-Efficiency (CAFE) norms.

About CAFE Norms

- The term "Corporate Average" refers to the sales-volume-weighted average for each automaker.
- CAFE norms were introduced by the Government of India in 2017 under the Energy Conservation Act, 2001.
- **Phase I** was initiated in 2017–18 with a CO_2 limit of 130 g/km, applicable until 2022.
- **Phase II** began in 2022–23, setting a stricter CO_2 limit of 113 g/km.

- The Ministry of Road Transport and Highways is the nodal agency responsible for monitoring and reporting a summary of annual fuel consumption by automobile manufacturers at the end of each fiscal year.
- **Aim of CAFE norms**: To enhance vehicle fuel efficiency, reduce CO_2 emissions, minimize oil dependency, and improve pollution control.
- **Coverage:** Passenger vehicles (petrol, diesel, LPG, CNG, hybrid, and electric) with a gross weight below 3,500 kg.
- **Difference Between CAFE and BS VI**:
  - **CAFE Norms**: Focus specifically on limiting CO_2 emissions to improve fuel efficiency.
  - **BS VI Standards**: Broader in scope, addressing all major pollutants, including NOx (Nitrogen Oxides) and SOx (Sulphur Oxides).

50th Anniversary of CITES

Context

The 20th meeting of the Conference of the Parties (CoP20) to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) has concluded in Samarkand, Uzbekistan, marking the 50th anniversary of the Convention

About CITES

- **Aim**: To ensure that international trade in wild animals and plants does not threaten their survival.
- **Establishment**: Adopted in 1973 and entered into force in 1975.
- **Member:** 185 member parties **(Turkmenistan (recent): 2024, India: 1976).**
- **Secretariat**: Administered by the **United Nations Environment Programme (UNEP)** and is located in Geneva, Switzerland.
- **Representatives Meet**: Every two to three years at a Conference of the Parties (COP) to review progress and adjust the lists of protected species.
- **CITES is legally binding on the Parties, BUT** it **does not replace national laws**; instead, Parties are required to implement the Convention.

CITES Listing

Appendix-I	• It lists species which are most endangered • They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial, for instance for scientific research
Appendix-II	• It lists the species that are not threatened with extinction but may become so if trade is not controlled. • It also includes so-called "look-alike species", i.e., species whose specimens in trade look like those of species listed for conservation reason
Appendix-III	• It is a list of species that are included at request of Parties which already regulate trade in those species & that needs cooperation of other countries to prevent illegal exploitation. • International trade in specimens of species listed in this Appendix is allowed only on presentation of the appropriate permits or certificates.

United Nations Environment Assembly (UNEA)

Context

India's resolution on 'Strengthening the Global Management of Wildfires' was adopted at the 7th Session of the United Nations Environment Assembly (UNEA-7) in Nairobi, Kenya.

About UNEA

- It is the **world's highest-level decision-making body on environmental matters.**
- **Established: 2012** following the **UN Conference on Sustainable Development (Rio+20).**
- **Governing body of: United Nations Environment Programme (UNEP).**
- **Headquarters: Nairobi, Kenya** — the only UN headquarters located in Africa.
- **Membership:** 193 UN member states
- **Frequency of meetings:** Convenes **biennially** (every two years); special sessions may be held when required.
- **Mandate and functions:**
  - Sets **global environmental priorities**
  - Provides **policy guidance** to UNEP
  - Reviews the **state of the global environment**
  - Strengthens **international environmental governance**

UNEA-7

- **Theme**: "Advancing sustainable solutions for a resilient planet."
- **Major Resolutions:**
  - Global wildfire management (India-led): Emphasis was placed on the **Integrated Fire Management approach with support from platforms like the Global Fire Management Hub.**
  - Coral reef protection.
  - Sound management of chemicals and waste.
  - Sustainable use and governance of digital/AI systems.
  - Environmental dimensions of antimicrobial resistance.
  - Protection of glaciers and addressing sargassum seaweed blooms.

Related Information: UNEP's report *"Spreading Like Wildfire"*, noting projections that wildfire events could increase by **14% by 2030, 30% by 2050, and 50% by 2100** without action.

Global Environment Outlook 2025: Key highlights

- Greenhouse gas emissions have risen by about 1.5% annually since 1990, driving record warming of around 1.55°C in 2024 and intensifying climate impacts.
- Nearly one million of the world's eight million species face extinction, while land degradation affects 20–40% of global land and over three billion people.
- Climate-related disasters cost roughly USD 143 billion each year, and pollution causes nine million deaths annually, with air pollution alone costing USD 8.1 trillion in 2019.
- Plastic pollution has crossed 8 billion tonnes, imposing health-related losses of about USD 1.5 trillion annually.
- Strategic environmental investments could yield USD 20 trillion annually by 2070, while inaction risks severe ecological and economic damage.

Sponges in Tackling Metal pollution

Context

A recent study published in Microbiology Spectrum reports that freshwater sponges from the Sundarban delta can act as bioindicators and bioremediators of toxic metal pollution

About Sponges

- Sponges are simple aquatic animals belonging to the **phylum Porifera**.
- They are among the **oldest multicellular organisms**, with fossils dating back over **600 million years**.
- Most sponge species are marine, though some occur in **freshwater environments**, including Indian riverine and deltaic systems.
- **Key Characteristics of Sponges**
  - Sponges lack true tissues and organs, including nervous, muscular and digestive systems.
  - They feed through a **filter-feeding mechanism**, drawing water in through microscopic pores called **ostia**.
  - Specialized cells known as **choanocytes** trap bacteria, plankton and organic particles from the water.
  - Filtered water exits through larger openings called the oscula.
  - Their skeleton consists of **mineral spicules** (silica or calcium carbonate) and/or the protein **spongin**.
  - Sponges host diverse **symbiotic microbial communities**, which contribute to nutrition, chemical defence and pollutant detoxification.

Role of Sponges in Mitigating Heavy Metal Pollution

- Freshwater sponges function as natural biofilters, continuously pumping and processing large volumes of water.
- They remove heavy metals such as arsenic, lead and cadmium through adsorption, where metal ions bind to sponge surfaces or become trapped in their porous structures.
- Sponge-associated microbes assist in handling metal stress by binding, transforming or immobilising toxic ions.
- This symbiotic system allows sponges to survive in contaminated environments while reducing metal bioavailability.

About Heavy Metals

- Heavy metals are elements with high atomic weight and density, typically greater than 5 g/cm^3.
- Common heavy metals of environmental concern include lead (Pb), arsenic (As), cadmium (Cd), mercury (Hg) and chromium (Cr).
- **Key Characteristics of Heavy Metals**
  - Heavy metals are toxic even at low concentrations.
  - They are persistent, meaning they do not degrade easily in the environment.
  - They tend to bioaccumulate in living organisms and can enter food chains.
  - Long-term exposure causes serious health and ecological impacts.

Heavy Metal Pollution in India

Affected Areas	Major Heavy Metals	Key Health / Environmental Impacts
West Bengal & Bihar (Nadia district, Kolkata)	Arsenic, Cadmium	Arsenicosis, neurological disorders
Punjab (Malwa, Ludhiana)	Selenium, Uranium, Barium	Organ damage, cancer risks
Uttar Pradesh (Kanpur)	Hexavalent Chromium, Arsenic, Lead	Gastrointestinal and skin disorders
Madhya Pradesh (Singrauli mining belt)	Mercury	Neurological symptoms
Odisha (Keonjhar, Talcher)	Iron, industrial heavy metals	Respiratory health issues
Delhi NCR (Yamuna River basin)	Lead, Aluminium	High blood lead levels in children
Karnataka (Bengaluru)	Cadmium, Silver	Kidney dysfunction

Species in News

Hornbill

News: The Hornbill festival started in Nagaland.

About Hornbill

- Hornbills are called **"gardeners or farmers of the forest"** for playing a key role in dispersing seeds of tropical trees.
- They are one of the biggest **frugivores (fruit-eating birds) in the Asian rainforest.**
- Great Hornbill is the **state bird of Kerala and Arunachal Pradesh. (Not of Nagaland)**
- **Diversity:**
  - There are about **62 hornbill species world-over.**
  - **India is home to 9** of them including the Great Hornbill, the Malabar Pied, Hornbill and the Rufous-necked Hornbill.
- **Range:**
  - It is found in the **Indian subcontinent and Southeast Asia.**
  - **Major Habitat in India:** Namdapha National Park (highest density of hornbills across Asia) & Western Ghats.
- **Threats:** Illegal logging, forest clearance, hunting for meat & medicinal value of body parts.

- **Conservation Status:**
  - **IUCN:** Vulnerable
  - **WPA :** Schedule I
  - **CITES:** Appendix-I.

Short Neck Clam

News: The short-neck clam population in Ashtamudi Lake is showing early signs of recovery.

About Short Neck Clam

- **Distribution:** It is bivalve mollusc **native to the Indo-Pacific region**.
  - The range spans from the Gulf of Oman to Japan, including India, China, Sumatra, and the Philippines.
- **Key Features:**
  - **Appearance**: It has a triangular-to-oval glossy outer shell with a variable yellowish-brown colour often marked by darker radial bands.
  - **Habitat**: It inhabits shallow marine and estuarine sandy–mud flats at depths reaching four metres.
  - Act as a **bioindicator of heavy-metal and petroleum–hydrocarbon pollution** due to high accumulation and low detoxification.
  - It is harvested for **food** and to **manufacture cement**, **calcium carbide**, and **sand-lime bricks**.
- **Major threats:** Pollution, invasive Charru mussels, over-exploitation, and shifts in salinity or temperature.

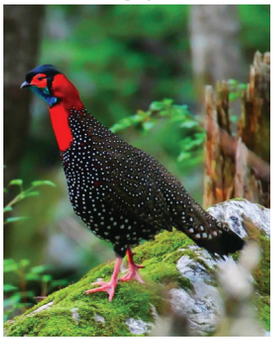
Finn Weaver

News: Finn's Weaver's population is rapidly declining in the Terai region.

About Finn Weaver

- **Distribution:** Native to the Ganges and Brahmaputra valleys in India and Nepal, especially the Terai grasslands.
- **Characteristics:**
  - **Diet:** primarily Granivorous.
  - It is a **grassland-wetland indicator species.**
  - First described in 1869 by the British ornithologist Allan Octavian Hume (father of Indian ornithology).
  - It builds **large, globular nests** — unlike other Indian weavers that build hanging tubular nests.
- **Conservation Status:**
  - **Wildlife Protection Act, 1972:** Schedule IV.
  - **IUCN:** Endangered.
- **Threats:** Expansion of agriculture, grass cutting, construction and water management decisions, along with floods, crow attacks and breeding failures, threaten this species.

Western Tragopan



News: Studies showed that Western Tragopan survived in small fragmented pockets.

About Western Tragopan

- **Distribution:** Undisturbed montane forests with dense undergrowth in the Western Himalayas.
  - Found in Jammu & Kashmir, Himachal Pradesh, Uttarakhand.
- **Characteristics:**
  - **Medium-sized pheasant species**.
  - Locally as **Jujurana** ("king of birds").
  - **Appearance**:
    - **Male**: Dark plumage with white spots, bright orange breast, red hindneck, and blue throat.
    - **Female**: Brownish-grey with white streaks and paler underparts.
  - State Bird of Himachal Pradesh.
- **Threats:** Highly vulnerable to **human disturbance**, **climate change**, **forest loss**, **fragmentation**, and **habitat degradation**.
- **Conservation Status:**
  - **IUCN:** Vulnerable
  - **CITES:** Appendix-I

Tapanuli Orangutan

News: Scientists warn Cyclone Senyar may have pushed Tapanuli orangutan closer to extinction.

About Tapannuli Orangutan

- **Distribution: Endemic to Indonesia**, found only in the **Batang Toru ecosystem** of **North Sumatra**.
- **Characteristics:**
  - Genetically and morphologically distinct from **Sumatran** and **Bornean orangutans**.
  - Males have **smaller heads and flatter cheek pads**, with a **distinct vocal call**.
  - Highly **arboreal** and largely **solitary** in behaviour.
  - It was **scientifically described in 2017**, making it the **newest identified great ape species**.
- **Conservation Status:**
  - **IUCN:** Critically Endangered
  - CITES: Appendix-I.

Great Indian Bustard

News: The Supreme Court strengthened safeguards for the protection of the Great Indian Bustard (GIB) by revising and refining conservation areas in the context of Green Energy Corridor (GEC) projects in Rajasthan and Gujarat.

About Great Indian Bustard

- **Distribution:** It is endemic to the Indian subcontinent, confined mostly to **Rajasthan and Gujarat**. Small population found in Maharashtra, Karnataka and Andhra Pradesh.
  - Desert National Park in Jaisalmer (Rajasthan) is known for the population of the Great Indian Bustard.
- **Features:**
  - **Habitat:** open grasslands, arid plains and scrub forests
  - Males have a distinctive black crown, a long neck, and a buff-coloured body with white underparts.
  - Females are generally smaller and lack the prominent black crown.
  - One of the heaviest flying birds, weighing between 10 to 15 kg.
  - It is primarily omnivorous. It feeds on insects like grasshoppers, beetles and sometimes even small rodents and reptiles. It also feeds on grass seeds.
  - Only less than 150 GIBs are left in the wild and almost exclusively restricted to India.
- **Conservation Status**
  - **IUCN status:** Critically Endangered
  - **Wildlife Protection Act, 1972:** Schedule I
  - **CITES:** Appendix 1
  - Covered under species recovery program.
- **Threats:**
  - Power lines (disturbs visibility)
  - Free-ranging dogs
  - Pesticides in farmlands
  - Loss of grassland and nesting sites
- **Steps taken to conserve GIB:**
  - **Species Recovery Programme:** It is kept in the species recovery programme under the Integrated Development of Wildlife Habitats of the Ministry of Environment, Forests and Climate Change (MoEFCC).
  - **Firefly Bird Diverters:** Firefly bird diverters are flaps installed on power lines.They work as reflectors for bird species like the GIB. Birds can spot them from a distance of about 50 metres and change their path of flight to avoid collision with power lines
  - **Artificial Hatching:** Collecting eggs from the wild and artificially hatching them.
  - Supreme Court Judgements: In **2021**, the Supreme Court directed:
    - » **Undergrounding of power transmission lines** in **priority GIB habitats**.
    - » Mandatory installation of **bird diverters** where undergrounding is not feasible.

Topics for Prelims (Disaster Management)

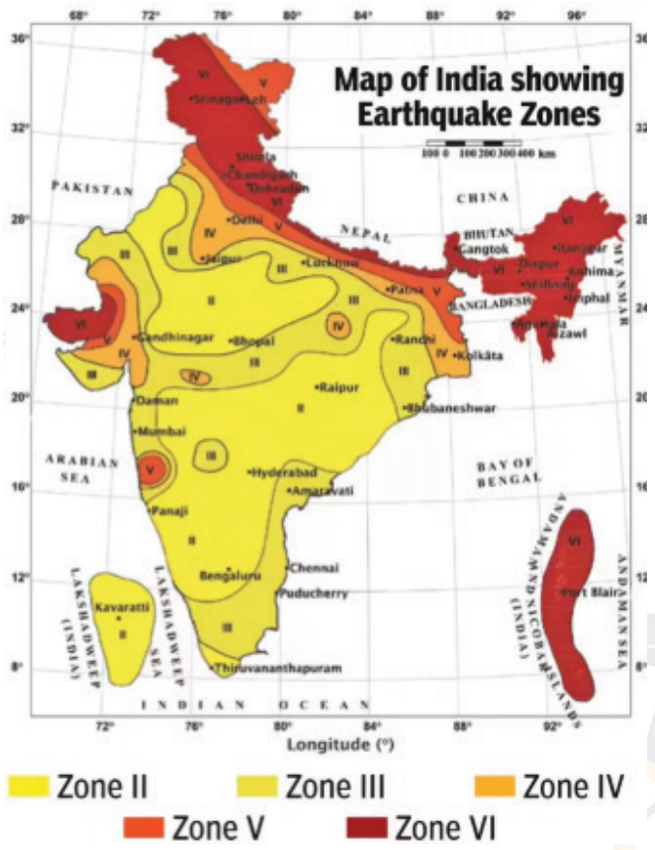
India's Updated Seismic Zonation Map (2025)

Context

India's Earthquake Design Code (IS 1893 Part 1: 2025) has been comprehensively revised by the Bureau of Indian Standards (BIS).

Old Vs. New Seismic Zonation Map

Feature	Old Map (IS 1893:2002/2016)	Updated Map (IS 1893:2025)
Highest Risk Zone	Zone V	Zone VI (newly introduced)
Himalayan Classification	Mixed Zones IV & V	Entire Himalayan arc in Zone VI
Percent of Land in Moderate-High Risk	59%	61%
Basis of Zonation	Historical epicentres, geology, soil data	PSHA (scientific, probabilistic)
Boundary Rule	Administrative boundaries	Towns on zone boundaries auto-upgraded
Non-Structural Safety	Limited	Mandatory attention to parapets, ceilings, overhead tanks, panels
Near Fault Provisions	Basic	Pulse-like ground motions included
Site-Specific Requirements	Limited	Liquefaction & soil response spectra



Causes of Earthquake Risk and Vulnerability in India

- **Himalayas and North-eastern region:** The entire Himalayan belt is particularly prone to major earthquakes surpassing a magnitude of 8.0.
  - The Himalayas were formed from the collision of the Indian and Eurasian plates, and the process of mountain building continues.
  - The Indian plate moves approximately one centimeter per year towards the north and northeast, but its movement is obstructed by the Eurasian plate, causing the plates to become locked.
  - As a result, energy accumulates over time at various points, eventually being released as earthquakes.
- **Andaman and Nicobar Islands:** According to data from the United States Geological Survey (USGS), 442 earthquakes occurred with a magnitude of 4.0 to 6.6 between 2010 and 2022.
  - The islands are situated in the Himalayan collision zone. In the northern part of the region, the north-south running Andaman-Nicobar subduction system meets the onshore continuation of the Indo-Burmese arc.
  - Further, the region has heavily folded topography characterized by several longitudinal thrusts and faults.

National Project for Strengthening Disaster Risk Reduction (NPSDRR)

Context

The Union Ministry of Panchayati Raj and the National Disaster Management Authority approved the National Project for strengthening Community-Based Disaster Risk Reduction Initiatives in Panchayati Raj Institutions.

About NPSDRR

- **Implementation:** Jointly implemented by the Ministry of Panchayati Raj and the National Disaster Management Authority.
- **Financial outlay:** Total allocation of ₹507.37 crore.
- **Coverage:** Implemented across 20 States and 81 disaster-prone districts, covering 20 Gram Panchayats in each district.
- **Cluster-based approach:** Gram Panchayats and Model Gram Panchayats are selected within geographically contiguous clusters.
- **Integrated planning:** Focuses on preparing Panchayat- and village-level Disaster Management Plans and integrating them with Gram Panchayat Development Plans (GPDPs).
- **Model Gram Panchayat concept:** One Model Gram Panchayat in each of the 20 States, mapped to six different hazard types.
- **Demonstration role:** Model Gram Panchayats act as replicable templates for embedding disaster resilience into local planning, infrastructure, and community preparedness.

News in Short

Topic	Details
World Summit on Disaster Management	**Context:** World Summit on Disaster Management was held in Dehradun from 28th to 30th November 2025. **About World Summit on Disaster Management (WSDM)** • **Objective:** To strengthen international cooperation, deepen multi-stakeholder partnerships, and develop innovative, scalable solutions for reducing disaster risks and building resilient communities. • Jointly organised by the **Government of Uttarakhand**, **Uttarakhand Council for Science & Technology (UCOST)**, and the **Himalayan Academy of Science & Technology (HAST)**. • **Theme for 2025:** "Strengthening International Cooperation for Building Resilient Communities" – The summit commemorates the **Silkyara Tunnel rescue anniversary.**
Tamil Nadu's Community-based MRV (CbMRV) Initiative	**Context:** Tamil Nadu has emerged as a **national and global example of community-led climate governance** through its **Community-based Monitoring, Reporting and Verification (CbMRV) initiative.** **About CbMRV Initiative** • CbMRV (Community-based Monitoring, Reporting and Verification) is a **village-led system** that enables communities to **generate, manage, and use science-ready environmental and climate data**. • **Launched:** Initiated in **2023** under the **UK PACT programme** in Tamil Nadu.

Topic	Details
	• **Pilot landscapes:** – **Aracode (Nilgiris):** Mountain forests and tribal livelihoods – **Vellode (Erode):** Agriculture and wetlands – **Killai (Cuddalore):** Mangroves and coastal fisheries • **Data covered:** Rainfall, temperature, soil and water health, biodiversity, fish catch, cropping patterns, livelihoods, carbon stocks and emissions. • **Digital integration:** Community data is fed into a **digital dashboard** used at village, district, and State levels.
Weakly Interacting Massive Particles	**Context:** A recent study claims detection of a gamma-ray excess from the Milky Way's centre, which may be consistent with annihilation of Weakly Interacting Massive Particles (WIMPs), a leading dark matter candidate. **About WIMPs** • **WIMPs** are **hypothetical subatomic particles** proposed as a leading candidate for **dark matter**. • They are **massive** compared to ordinary particles and **interact extremely weakly** with normal matter and electromagnetic radiation. • Because they **do not emit, absorb, or reflect light**, WIMPs cannot be detected directly and are inferred only through **gravitational effects or high-energy by-products**. • When two WIMPs collide, they are theorised to **annihilate and produce high-energy gamma rays**, which astronomers attempt to detect as indirect evidence of dark matter. • WIMPs fit naturally within the **Lambda–Cold Dark Matter (ΛCDM) model**, which explains the large-scale structure and evolution of the universe.
Parana Valles	**Context:** Scientists have mapped large river drainage systems on Mars, including Paraná Valles. **About Parana Valles** • It is a large network of ancient valleys located in the **Margaritifer Sinus quadrangle** of southern Mars. • It stretches for about **329 km**, and is part of a highly integrated drainage network. • These valleys were carved by **running liquid water**, based on their dendritic (tree-like) river and erosion patterns.
Galaxy Filaments	**Context:** Researchers from the **University of Oxford** have identified a **50-million-light-year-long cosmic filament** traced by at least 14 galaxies. **About Galaxy Filaments** • Galaxy or cosmic filaments are enormous "threads" within the **cosmic web**, spanning **hundreds of millions of light-years**, made of gas, dark matter, and galaxies. • **Formation:** Formed by **gravity** pulling matter into long, thin strands that connect massive clusters of galaxies. They arise from **early-universe ripples** and evolve under gravity. • **Role in Cosmic Evolution:** – Act as **highways** along which galaxies and gas flow into bigger clusters. – Influence **where galaxies form**, how fast they grow, and how much gas they receive over billions of years. • **Associated Structures:** Filaments surround large **voids**, forming an interconnected network of filaments, walls, and empty regions that shape the large-scale structure of the universe.
Dulhasti Hydroelectric Project	**Context:** Union Environment Ministry's expert panel has cleared the 260-MW Dulhasti Stage-II Hydroelectric Project on the Chenab river. **About Dulhasti Hydroelectric Project** • **Type:** Run-of-the-river hydroelectric power project. • **Location:** Kishtwar district, Union Territory of Jammu & Kashmir, India. • **River:** Chenab River. • **Installed Capacity: Stage I- 390 MW** (3 × 130 MW units), commissioned in **2007.** – **Dulhasti-II HEP: 260 MW (2 × 130 MW)** » Utilises the existing Dulhasti-I dam and diverts surplus water from the Marusudar River via the Pakal Dul reservoir.

Topic	Details
Subansiri Lower Hydroelectricity Project (SLHP)	**Context:** India's largest hydropower project, the Subansiri Lower Hydroelectric Project is now operational. **About SLHP** • Located in: Gerukamukh, on the Assam–Arunachal Pradesh border • Built on: Subansiri River • Type: Concrete Gravity Dam. • Installed Capacity: 2,000 MW.

Places in News

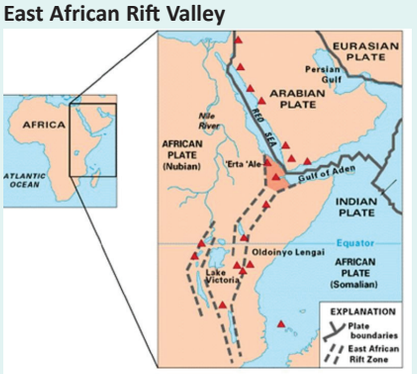
Guinea-Bissau

News: Military rule was implemented in Guinea-Bissau.

About Guinea-Bissau

- **Location**: Situated in Western Africa.
- **Land Boundaries:** Shares borders with Senegal to the north and Guinea to the east and south.
  - **Islands:** Includes the Bijagós (Bissagos) archipelago along with several other offshore islands.
  - **Maritime Boundary:** Bordered by the Atlantic Ocean on its western side.
- **Key Geographical Features:**
  - **Fouta Djallon plateau**, **Boé Hills, Corubal basin and the Gabú Plain**
  - **Major Rivers: Geba, Corubal, Cacheu, and others.**

East African Rift Valley



News: Africa's East African Rift Valley is slowly tearing apart the continent, with new magnetic data confirming that the region is gradually splitting and may form a new ocean within 5–10 million years.

About East African Rift Valley

- It is a major **continental rift system** where the African Plate is slowly splitting into two new tectonic plates— the **Nubian Plate** and the **Somali Plate**.
- It stretches over **3,000 km** from the **Afar Triple Junction** in Ethiopia (where the Red Sea and Gulf of Aden meet) down through **Kenya, Uganda, Rwanda, Burundi, Tanzania**, and into **Mozambique**.
- Formed by **divergent plate boundaries**.
- The region hosts numerous **active volcanoes** such as **Mount Kilimanjaro, Mount Kenya, Ol Doinyo Lengai, and Nyiragongo**, and experiences **frequent earthquakes** linked to crustal stretching.
- Contains some of the world's deepest and largest lakes—**Lake Tanganyika, Lake Malawi, Lake Turkana**

Bitra Island

News: The Indian Navy will ramp up its presence in Bitra island.

About Bitra Island

- **Location**: Smallest Inhabited island of Lakshadweep.
  - Part of the Amindivi Subgroup of islands.
- **Type:** Coral Atoll
- A small shrine of Malik Mulla was located there.

Thailand

News: Thailand seeks BRICS membership with India's support.

About Thailand

- **Located in: Southeast Asia**, forming part of the Indochinese Peninsula.
- **Capital:** Bangkok
- **Geography:**
  - Borders: **Myanmar** (West & Northwest), **Laos** (North & Northeast), **Cambodia** (Southeast), **Malaysia** (South)
  - Coastlines along the **Gulf of Thailand** (East) and **Andaman Sea** (West).
  - **Physiographic regions include:** Northern mountains, Central Plains (rice bowl of Thailand), Northeastern Korat Plateau, and Southern peninsula.
  - **Major rivers: Chao Phraya**, **Mekong** (forms part of boundary), **Mae Klong**.

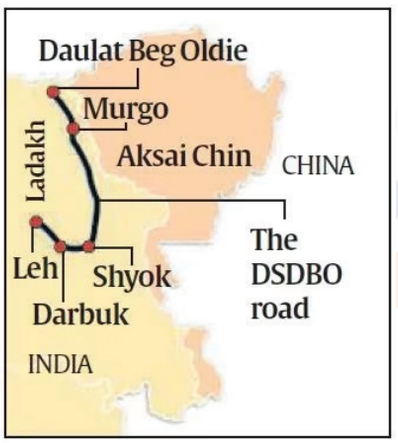
Oman

News: 14th round of India-Oman Strategic Consultative Group meeting conducted in Muscat, Oman.

About Oman

- **Location: West Asia** on the **southeastern coast of the Arabian Peninsula.**
- **Capital: Muscat**
- **Border:** Yemen (South-west), United Arab Emirates (North-west), Saudi Arabia (West), Arabian Sea (South and East) and Gulf of Oman (North).
- **Geographical Features:**
  - **Al Hajar Mountains**
  - **Rub' al Khali Desert (Empty Quarter)**
  - **Gulf of Oman Coastline**
  - **Natural Resources**: Petroleum, Copper, Asbestos, Limestone, Natural Gas

Shyok Tunnel



News: The defence minister of India inaugurated 125 border infrastructure projects including Shyok Tunnel in Ladakh.

About Shyok Tunnel

- **Location:** Durbuk–Shyok–Daulat Beg Oldie (DS-DBO) Road in eastern Ladakh.
  - It connects Leh to the high-altitude Daulat Beg Oldie (DBO) military outpost near LAC.
- **Built by**: Border Roads Organisation (BRO).
- **Significance:** Provides all-weather connectivity in a region prone to heavy snowfall, avalanches, and extreme temperatures.

Benin

News: Cotonou(Benin) recently witnessed a **failed coup attempt** by soldiers belonging to the **Military Committee for Refoundation**.

About Benin

- **Capital:** Porto-Novo (constitutional capital)
- **Seat of Government / Largest City: Cotonou**
- **Borders:**
  - **Land Boundaries:** Niger (north-east), Burkina Faso (north-west), Togo (west), Nigeria (east)
  - **Maritime Boundary:** Coastline along the Bight of Benin, part of the Gulf of Guinea, Atlantic Ocean
- **Geographical Features:**
  - **Landscape:** Narrow sandy coast → marshy lagoons → **La Terre de Barre Plateau** → savannah in the north.
  - **Mountains: Atakora Mountains** (northwest).
  - **Highest Point: Mount Sokbaro** (approx. 658 m).
  - **Major Rivers: Niger River** (forms part of its northern boundary) & **Ouémé River** (largest entirely within Benin)

Czech Republic

News: PM Modi congratulated Excellency Andrej Babiš on appointment as Prime Minister of Czech Republic.

About Czech Republic

- **Capital:** Prague
- **Location:** Central Europe; landlocked.
- **Borders:** Germany (W), Poland (N), Slovakia (E), Austria (S).
- **Geography:**
  - Historically composed of **Bohemia, Moravia, and part of Silesia**.
  - **Terrain**: Mostly **hills and plateaus**, surrounded by mountain ranges such as the Sudetes and Carpathians.
  - **Major river**: **Vltava** (flows through Prague).
  - **Climate**: Temperate continental.
- **Membership:**
  - **EU**: since 2004

Venezuela

News: The United States is facing scrutiny over a September boat strike by the US military in the Caribbean, in which a Venezuelan vessel accused of drug trafficking was attacked.

About Venezuela

- **Location**: Northern coast of **South America**
- **Capital**: **Caracas**
- **Geographical Boundaries**
  - **North**: Caribbean Sea & Atlantic Ocean
  - **East**: Guyana
  - **South**: Brazil
  - **West/Southwest**: Colombia
- **Physical Features**
  - **Andes Mountains** in the north
  - **Orinoco River Basin** with vast **Llanos (plains)**
  - **Lake Maracaibo** – Largest lake in South America
  - **Angel Falls** – World's **highest waterfall**
- **Major Rivers**
  - **Rio Negro** (2,250 km) – Tributary of Amazon; shared with Colombia & Brazil
  - **Orinoco River** (2,101 km) – 3rd longest river in South America
- **Islands and Archipelagos (Caribbean):** Margarita Island, La Blanquilla, La Tortuga, Los Roques, Los Monjes
- **Natural Resources:** Holds the world's largest oil reserves

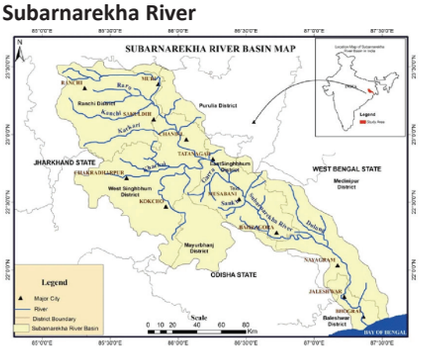
Yellow Line

News: Israel's military chief Lt Gen Eyal Zamir has referred to the "Yellow Line" inside Gaza as a "new border.

About Yellow Line

- It is a "forward defensive line for Israeli communities".
- It divides the Israeli-held part of Gaza from the rest.
- It challenges the second phase of US President Donald Trump's 20-point ceasefire plan.

Subarnarekha River



News? Subarnarekha river features prominently as the symbolic setting of Ritwik Ghatak's film *Subarnarekha*, marking its 60th anniversary this year nationwide.

About Subarnarekha River

- **River System:** An **east-flowing inter-State river** of eastern India.
- **Origin:** Rises near **Nagri village, Ranchi district (Jharkhand)**, on the **Chota Nagpur Plateau**.
- **Course:** Flows through **Jharkhand → West Bengal → Odisha** before entering the sea.
- **Length:** Approximately **395 km**.
- **Major Tributaries: Kharkai** (largest and most important), **Kanchi**, **Raru**, **Karkari.**
- **Other Features:**
  - **Hundru Falls (Jharkhand)**
  - **Chandil Dam (Jharkhand)**

Siliserh Lake and Kopra Jalashay

News: Siliserh Lake in Rajasthan and Kopra Jalashay in Chhattisgarh have recently been designated as Ramsar Sites.

About Siliserh Lake, Rajasthan

- **Located in:** Alwar district, Rajasthan.
- **Key Features:**
  - It is a **man-made lake and wetland** constructed in 1**845 by Maharaja Vinay Singh of Alwar.**
  - Falls within the **buffer zone of the Sariska Tiger Reserve.**
  - It is in a **semi-arid zone.**
  - Supports **149 bird species** and **17 mammal species**.
  - **Notable fauna include:** Vulnerable River Tern (Sterna aurantia), Black Stork (Ciconia nigra) with over 1% of its biogeographic population.

About Kopra Jalashay, Chhattisgarh

- **Location:** Bilaspur, Chhattisgarh.
- **Key Features:**
  - Characterised by a **large open water spread** with **shallow, nutrient-rich backwaters**.
  - It is **Chhattisgarh's First Ramsar Site.**
  - Supports **over 60 migratory bird species** used for nesting, feeding and stop-over.
  - **Notable species include:** Vulnerable Greater Spotted Eagle (Aquila clanga), Endangered Egyptian Vulture (Neophron percnopterus).

Bondi Beach

News 12 people have been killed in a terror attack on Australia's Bondi beach.

About Bondi Beach

- It is an urban beach.
- Located in the eastern part of Australia.
- Known for crescent-shaped shoreline and strong surf conditions.

Cho La & Dok La Passes

News Chola and Dok La passes are opened for battlefield tourism under the **Bharat Rannbhoomi Darshan initiative.**

About Cho La Pass

- **Location:** Eastern Himalayas, on the **India–China (Tibet) border** in Sikkim.
- **Connectivity:** Links **Sikkim (India)** with the **Chumbi Valley (Tibet Autonomous Region of China)**.
- Site of the **1967 Cho La clashes** between Indian and Chinese forces, where India successfully repelled Chinese advances.

About Dok La Pass

- **Location:** At the **trijunction of India, Bhutan, and China**, near the **Doklam Plateau**.
- **Connectivity:** Acts as a route between **Bhutan** and **Chumbi Valley**.
- Gained prominence due to the **2017 Doklam standoff** between Indian and Chinese troops after Chinese road construction in Bhutanese territory.

What is Bharat Ranbhoomi Darshan?

- It is a **national initiative** launched to promote **battlefield tourism** across India by opening historically significant battlefields and frontier sites to citizens and visitors.
- It is developed jointly by the **Ministry of Defence**, **Ministry of Tourism**, and the **Indian Army**.
- **Inaugurated on 15 January 2025**, coinciding with the **77th Army Day.**

Mindanao Island

News The victim of Bondi island shooting had visited southern part of Mindanao island weeks before incident.

About Mindanao Island

- **Location:** Southernmost major island of the **Philippines**,
- Bordered by: **Sulu Sea**, **Celebes Sea**, and **Philippine Sea**.
- **Size: Second-largest** island of the Philippines (after Luzon).
- **Strategic Waters:** Near key maritime routes connecting the **South China Sea** and **Pacific Ocean**.

Gulf of Oman

News? Iran has seized an oil tanker in the Gulf of Oman.

About Gulf of Oman

- It is the North western arm of the Arabian Sea.
- **Bordering Countries**: It is bordered by **Iran in the north, by the United Arab Emirates in the west, and by Oman in the south**.
- It connects the **Arabian Sea with the Strait of Hormuz**.

Syria

News: The United States carried out large-scale airstrikes targeting dozens of Islamic State positions in Syria.

About Syria

- **Located: West Asia**, along the **eastern Mediterranean coast**, in the **Levant region**.
- **Bordered by: Turkey (north)**, **Iraq (east)**, **Jordan (south)**, and **Israel and Lebanon (west)**.
  - **Golan Heights** was seized by Israel from Syria during the **1967 Six-Day War**.
- **Geographical Features:**
  - **Major physical regions: Syrian Desert**, **Euphrates River Valley**, and **Anti-Lebanon Mountains** (forming the border with Lebanon).
  - **Major rivers: Orontes** and **Tigris**.

Kavachi volcano

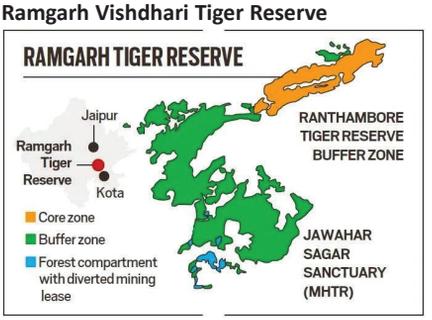
News: Scientists have confirmed that sharks and other large marine animals were found living inside the crater of Kavachi Volcano.

About Kavachi Volcano

- **Type:** Highly active **submarine (underwater) volcano**
- **Location:** Near the **Solomon Islands**, southwest Pacific Ocean
- **Tectonic setting:** Situated in a **subduction zone** where the Pacific Plate interacts with the Indo-Australian Plate
- Hosts **hammerhead sharks, silky sharks, and stingrays** inside its crater during non-eruptive phases.

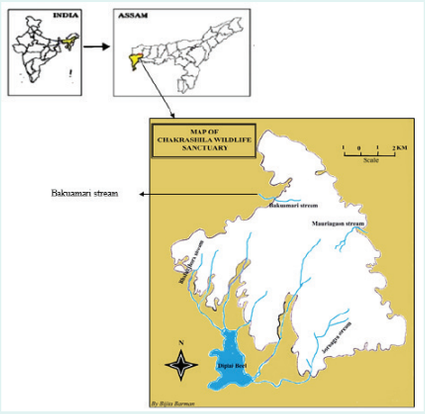
Protected Areas in News

Ramgarh Vishdhari Tiger Reserve



- **Location:** Bundi district, Rajasthan in the buffer area of Ranthambore tiger reserve and Mukundara Hills tiger reserve.
- **River: Mej** (tributary of the Chambal River) passes through it.
- **Flora:** It consists of Dhok, Khair, Salar, Khirni trees with some Mango and Ber trees.
- **Fauna:** The sanctuary currently has leopards, sambhars, chitals, wildboars, smaller cats, caracals, chinkaras and nilgai.

Chakrashila Wildlife Sanctuary



- **Location:** Kokrajhar and Dhubri districts of Assam.
- **Landscape:** Dominated by forested hillocks (Chakrashila Hill), surrounded by plains and wetlands.
- **Flora:** Sal, teak, bamboo, cane, and diverse medicinal plants.
- **Fauna:** Rhesus macaque, capped langur, leopard, civets, deer, porcupine, Golden Langur (India's only sanctuary specifically notified for its protection).

Ratanmahal Wildlife Sanctuary/ Ratanmahal Sloth Bear Sanctuary

- **Location**: Dahod district of Gujarat, adjoining the Jhabua and Kathiwada regions of Madhya Pradesh,
- **Flora:** The sanctuary is characterised by dry teak forests in the foothills and mixed deciduous vegetation with dry bamboo thickets along the periphery, with abundant Mahua and Jamun trees, which form vital food resources.
- **Fauna**: It is a key stronghold for the Sloth Bear, supporting the largest population of the species in Gujarat**,** and also sustains a significant leopard population.
- Gujarat has regained its **'Tiger State' status** after 33 years, following confirmation of a tiger's presence in Ratanmahal Wildlife Sanctuary.

INTERNATIONAL RELATIONS & INTERNAL SECURITY

Topics for Mains (International Relations)

India- Russia Relations

Syllabus Mapping: GS-2- Bilateral Relation

Context

Recently the President of Russia Vladimir Putin visited India.

Outcome of the Visit

- **Political and Strategic Understanding:** The summit reaffirmed the **Special and Privileged Strategic Partnership** between India and Russia. Both sides emphasized strategic autonomy, support for a **multipolar world order**, and continuity in bilateral ties despite global uncertainties.
- **Defence and Security Cooperation:** Defence cooperation remained central, with focus on **joint production under Make in India**, especially the **BrahMos missile programme**, timely supply of spares, and collaboration on air defence and maritime security.
- **Energy and Nuclear Cooperation:** Russia reaffirmed cooperation across **oil, gas, LNG, nuclear energy, coal gasification, petrochemicals**, and upstream technologies.
  - Both sides agreed to deepen **civil nuclear cooperation**, particularly additional units at the **Kudankulam Nuclear Power Plant** and cooperation in the nuclear fuel cycle.
- **Trade, Connectivity and Economic Engagement:** The leaders reiterated the target of **USD 100 billion trade by 2030**.
  - Emphasis on **International North-South Transport Corridor (INSTC)**, **Chennai–Vladivostok Maritime Corridor**, and **Northern Sea Route**.
  - Enhanced cooperation in the **Russian Far East and Arctic**, with India playing an active observer role in Arctic governance.
- **People-to-People and Multilateral Cooperation:** Both countries agreed to enhance **people-to-people exchanges**, tourism and academic links, and continue close coordination in **BRICS, SCO and G20**, with India playing a balancing role in global governance.
- Cooperation within BRICS and G20 on **Global South priorities** and sustainable development.
- Russia welcomed joining the **International Big Cat Alliance (IBCA)**; India encouraged Russia to join **ISA and CDRI**.

India Russia Relations Background

Timeline of India – Russia Relationship

- **Foundational Partnership (Since 1947):** Russia has been a key ally to India since its independence, investing in crucial sectors like heavy machinery, energy, and steel.
- **Treaty of Peace and Friendship (1971):** Solidified India-Russia relations, emphasizing their commitment to global peace and security.
- **Post-Soviet Union Relations (1990s):** Continued collaboration with the Treaty of Friendship and Cooperation (1993) and Military-Technical Cooperation agreement (1994).
- **Strategic Partnership Declaration (2000):** During President Putin's visit, this declaration marked a new cooperation era in diverse sectors.
- **Dialogue Mechanisms Establishment:** Institutionalized regular interactions and cooperative through multiple dialogue levels.
- **Elevation to Special Partnership (2010):** Upgraded to a "Special and Privileged Strategic Partnership" during the Russian President's visit to India.
- **BRICS Presidency (2015):** Russia's BRICS Presidency further strengthened the partnership with various events and meetings.
- **Military Technical Cooperation (2021–2031):** A decade-long agreement finalized during the first India-Russia 2+2 Dialogue
- **25th Anniversary (2025):** Marked the 25th anniversary of the Declaration on Strategic Partnership (2000).

Importance of India-Russia Relations

- **Strategic High-Tech Collaboration:** Russia remains India's **most reliable partner** for advanced technological supplies, particularly in **defense and strategic systems**.
  - While Western nations like **France and the United States** are gradually easing restrictions on dual-use technology (which can have both civilian and military applications), they still impose limitations on certain critical technologies.
  - The **West's restrictions** mean India cannot fully rely on Western countries for its **undersea warfare** and **long-range weapon systems**.
  - Russia plays a crucial role by providing the necessary technology without such limitations.

Example: **BrahMos missile**, a supersonic cruise missile co-developed by India and Russia, exemplifies this collaboration.

- **Energy Trade and Price Stability**: India's trade with Russia in fossil fuels (oil and gas) helps ensure **global energy price stability**.
  - Even though sanctions are in place to curb Russia's profits due to its actions in Ukraine, India ensures that its trade with Russia complies with these sanctions.
- **Geopolitical Balancing: Russia-China Dynamics:** India helps prevent Russia from becoming overly dependent on China. A Russia that is forced into a subordinate role to China would destabilize the **global power balance** and be harmful to Western interests.

Importance of India-Russia in Maintaining Global Order

- **Bridge between Russia and the West**: India acts as a bridge between Russia and an otherwise alienated Western ecosystem.
  - Through its multilateral commitment, India anchors Russia to the global system and fosters connectivity across geopolitical divides.
- **Global supply-chain security in the Arctic**: The Arctic is emerging as a crucial region for **natural resources, shipping routes**, and strategic interests.
  - Without India's involvement, a strong **Russia-China alliance** could dominate this region.
  - India's growing presence in the Arctic, supported by partnerships with **European and Nordic countries**, helps balance this potential dominance.
  - **Example**: The proposed **Chennai-Vladivostok corridor** is a maritime trade route connecting India and Russia.
- **Moderation in Multilateral Groupings:** India plays a crucial role in **multilateral organizations** like **BRICS (Brazil, Russia, India, China, South Africa)** and the **Shanghai Cooperation Organisation (SCO)**.
  - India ensures these platforms are **not used against the West**.

India's approach, as articulated by External Affairs Minister **S. Jaishankar**, is **non-Western** but **not anti-Western**. They are complementary to Western-led systems rather than antagonistic.

Areas of Cooperation

- **Political and Strategic Engagement:** Political ties remain robust with **regular leadership-level engagement**. The **23rd Annual India–Russia Summit (Dec 2025)** marks continuity after the 22nd Summit in Moscow (July 2024).
  - Russia continues to support **India's UNSC permanent membership**.
- **Frequent Political interactions:** PM Modi and President Putin have maintained frequent meetings and telephonic contacts, coordinating on regional and global issues including Ukraine, terrorism, and multipolar global order.**Economic and Trade Relations:** Bilateral trade touched a **record USD 68.7 billion in FY 2024–25**, driven largely by energy imports. Both sides aim to reach **USD 100 billion trade by 2030** and **USD 50 billion mutual investments**. Focus areas include:
  - **India–EAEU Free Trade Agreement**
  - Smooth payment mechanisms
  - Connectivity via **INSTC** and **Chennai–Vladivostok corridor** Energy, fertilizers, coal, and pharmaceuticals dominate trade baskets.
- **Defence and Security Cooperation:** Defence remains the **core pillar** of ties. Cooperation has shifted from buyer–seller to **joint R&D and co-production**, guided by the **2021–2031 Military-Technical Cooperation Agreement**. Defence cooperation in:
  - Joint platforms: **BrahMos**, **Su-30MKI**, **T-90 tanks**, **AK-203 rifles**
  - Procurement of **S-400 air defence system**
  - Regular exercises: **INDRA-2025 (army & naval)**, **Zapad-2025**
  - Commissioning of **INS Tushil** and **INS Tamal** Russia remains critical for spares, engines, and legacy platforms.
- **Science, Space and Nuclear Cooperation:** India and Russia cooperate in **space (Gaganyaan)**, advanced sciences, and nuclear energy. The **Kudankulam Nuclear Power Plant** remains India's most productive nuclear facility built with foreign assistance. A new **STI Roadmap** focuses on innovation, commercialization, and emerging technologies.
- **Parliamentary, Cultural and People-to-People Ties:** Parliamentary exchanges, cultural festivals, yoga diplomacy, cinema, and education underpin societal ties. Around **20,000 Indian students** study in Russia.
  - E.g. Cultural diplomacy expanded in 2025 through **Bharat Utsav**, film festivals, and International Yoga Day celebrations across Russia.
- **Multilateral Cooperation:** India and Russia coordinate closely in **UN, BRICS, SCO and G20**. India will chair **BRICS in 2026**, aiming to strengthen institutional cooperation. Connectivity initiatives and Arctic cooperation also feature prominently.
  - Russia has backed India joining the Nuclear Suppliers Group (NSG) and Asia Pacific Economic Cooperation (APEC)
  - Russia supports India's position on the Kashmir issue.

India–Russia relations remain **resilient, pragmatic and multi-dimensional**, anchored in strategic autonomy and a shared vision of a **multipolar world**. While defence, energy and nuclear cooperation remain strong, both sides are working to **diversify trade, enhance connectivity, and rebalance economic ties** for long-term sustainability.

Challenges in Indo - Russia relationship

- **Economic Imbalance:** India's trade deficit with Russia is growing.
  - The strengthened Russian Ruble and increased oil purchases in 2022 further widen this deficit.
- **Defence Diversification:** India aims to reduce reliance on Russian defence supplies for modernization and to avoid US sanctions under **CAATSA** (Countering America's Adversaries Through Sanctions Act).
- **Russia-China Proximity:** Russia's deepening ties with China, including selling advanced weapons, create security concerns for India and affect the Indo-China military balance.
- **India-US Dynamics:** India's stance on Russia's Ukraine conflict is critical, given its strategic role in the **US-led Indo-Pacific strategy** against China's rise. Aligning with Russia could impact India's position in the Indo-Pacific.
- **Russia-Pakistan-China Axis:** Sanctions against Russia have led to its increasing collaboration with China and Pakistan,

especially in defence and intelligence. This axis poses strategic challenges to India's Eurasian outreach and security.

- **India and QUAD:** India's silence in the Quad (US, Australia, Japan) consensus against Russia puts its diplomatic relations in a delicate balance, needing careful navigation.
- **Energy Dependence:** Sanctions on Russia's energy sector raise concerns for India, whose oil demand is projected to reach 10 million barrels per day by 2030.
- **Trade Challenges:** Indian investments in Russian energy face risks from Western sanctions. Bilateral trade is hampered by unresolved issues like connectivity, tariff barriers, and excessive regulation.
- **Shifting India-US Relations:** The rapid growth of India-US defence cooperation since 2008, including the India-US nuclear deal and foundational agreements (LEMOA, COMCASA, BECA), has caused Russia to pivot towards China, evidenced by its arms sales to China.
- **Russia's Tilt Towards China:** The Russia-India-China forum hasn't seen major success due to India's unresolved issues with China. Russia's participation in China's Belt and Road Initiative indicates their aligned interests against the US.
- **Differing Views on Indo-Pacific:** Russia opposes the Indo-Pacific concept, seeing it as a US-led initiative to contain China and Russia, preferring the Asia Pacific framework.

Way Forward

- **Rupee-Rouble Trade Mechanism:** Amid Western sanctions, the Rupee-Rouble trade mechanism emerges as a viable solution for sustaining India-Russia bilateral trade, bypassing conventional currency restrictions.
- **Strategic Collaboration Against China-Pakistan-Russia Triangle:** To counterbalance the emerging China-Pakistan-Russia alliance, India needs to strengthen ties with Moscow.
  - This includes cooperation in projects like the International North-South Transport Corridor (INSTC), offering a shorter, cost-effective route parallel to China's Belt and Road Initiative.
- **Defence Modernization and Joint Production:** India and Russia can focus on the joint development and production of advanced weapons systems, aligning with India's 'Make in India' initiative. This includes joint manufacturing of spare parts and reciprocal logistics support.
- **Joint Ventures in Third Countries**: Collaborative projects in third countries, like the Rooppur nuclear plant in Bangladesh, exemplify how India and Russia can leverage their strengths in international ventures.
- **Scientific and Technological Collaboration:** India should capitalize on Russia's scientific and technological prowess to address its developmental challenges.

Pax Silica Initiative

Syllabus Mapping: GS-2- Impact of Policies of Developed countries

Context

A new US-led strategic initiative, Pax Silica, does not include India.

About Pax Silica Initiative

- **Pax Silica** is a **US-led strategic initiative** aimed at building a **secure, resilient and innovation-driven global silicon and semiconductor supply chain**.
- **Meaning of the Name**
  - **"Pax"** (Latin): peace, stability, long-term prosperity.
  - **"Silica"**: refined into silicon, the foundation of **computer chips and AI hardware**.
- **Key Areas of Cooperation (Deliverables)**
- Joint projects in:
  - **Critical minerals** (refining and processing)
  - **Semiconductor design, fabrication, and packaging**
  - **Compute, data centres, ICT systems, and fiber-optic networks**
  - **Energy grids and power generation**
  - **Logistics and transportation**
- **Joint ventures and strategic co-investments**.
- **Protection of sensitive technologies** from countries of concern.
- Building **trusted technology ecosystems**, including AI models and applications.
- **Participating Countries:** Japan, South Korea, Singapore, Netherlands, United Kingdom, Israel, United Arab Emirates, Australia.
- **Objectives:**
  - **Reduce coercive dependencies** in critical technologies and semiconductor supply chains.
  - **Protect strategic materials and capabilities** essential for artificial intelligence and advanced computing.
  - Enable **trusted and aligned nations** to **develop, scale and deploy transformative technologies**.
  - Strengthen **economic security** in the era of AI and digital geopolitics.

Why India Was Not Included in Pax Silica

India's exclusion from **Pax Silica** is driven less by geopolitics as well as **technology capability, ecosystem maturity, and risk calculus** of the U.S.-led coalition.

- **Absence of Advanced Semiconductor Manufacturing Capability**
  - Pax Silica prioritises countries with **existing dominance** in Advanced-node fabrication, Chip-making equipment and High-end packaging and AI hardware
  - India currently **lacks an operational semiconductor fab**, especially at advanced nodes (<10 nm).
  - India's strengths lie in **chip design, IT services, and assembly**, which are **necessary but not sufficient** for Pax Silica's core goals.
- **Economic and Investment Risk Dimension:** Semiconductor and AI infrastructure demand **high-capital, long-gestation, and low-risk environments**. Research assessments point to concerns over India's **execution track record, regulatory fragmentation, and infrastructure reliability** (power, water, logistics).
- **AI Ecosystem and Industrial Depth Dimension:** Pax Silica is not limited to chips; it aims to secure the **entire AI stack**—from compute and data centres to foundational models and applications. The participating countries host **globally dominant AI firms, cloud infrastructure providers, and**

advanced research ecosystems. India's AI ecosystem, while large in talent, has yet to demonstrate **global-scale industrial leadership** in AI hardware and infrastructure.

- **Strategic Trust and Export Control Dimension:** The initiative operates within a tightly aligned **export-control and technology-security regime**. India's policy of **strategic autonomy**, including diversified partnerships and reluctance to fully align with restrictive technology blocs, makes it a **less predictable partner.**

Implications of India's Exclusion

- **Strategic Implications:** India's absence from Pax Silica may limit its influence in **setting global rules and standards** for semiconductors and artificial intelligence.
- As these norms increasingly shape economic and military power, India risks being positioned as a **rule-taker rather than a rule-maker** in the emerging technology order.
- **Economic and Industrial Implications:** Continued exclusion implies sustained **dependence on imported advanced semiconductors**, affecting India's ambitions in defence manufacturing, AI deployment, and high-end industrial growth. It also constrains access to **co-investment and technology spillovers** central to the AI-driven economy.
- **Geoeconomic and China+1 Implications:** The episode underlines the limits of the **China+1 strategy** for India. While manufacturing diversification is occurring, **high-technology relocation follows capital, capability, and credibility**, not geopolitics alone. India must compete not just with China's factories but with **entrenched technology ecosystems**.
- **Policy and Strategic Signal for India:** Rather than a diplomatic setback, the exclusion serves as a **strategic signal**. It highlights the urgency for India to move from **policy intent to demonstrate capacity**—by delivering credible semiconductor fabs, integrating energy and logistics with tech policy, and building trusted industrial ecosystems.

Though India is included in iCET/Quad tech workstreams, so exclusion is not "overall isolation".

Way Forward for India

- **Build Credible Semiconductor Manufacturing Capacity:** India must move beyond announcements and ensure **time-bound commissioning of at least one commercially viable semiconductor fab**, even at mature nodes (28–65 nm). Establishing a **track record of execution** is essential to gain credibility in future technology coalitions.
- **Integrate Energy, Water, and Logistics with Tech Policy:** Semiconductor and AI infrastructure are **energy- and resource-intensive**. India should develop **dedicated semiconductor and AI industrial corridors** with assured power, water recycling, and multimodal logistics to reduce investor risk and execution uncertainty.
  - Deepen the AI Hardware–Software Ecosystem: India should leverage its software and design strengths to build an integrated **AI ecosystem**, including:
  - Advanced chip design (fabless model)
  - Compute infrastructure and data centres
  - Applied AI solutions in defence, health, and governance This will shift India from a services hub to a **full-stack AI participant**.
- **Strengthen Policy Predictability and Single-Window Governance:** A **stable, long-term regulatory framework** with single-window clearances, uniform state-level policies, and assured incentives is critical. Technology investors prioritise **predictability over subsidies**.
- **Position India as a Trusted "Second-Tier Anchor":** Even outside Pax Silica, India can emerge as a **trusted manufacturing and assembly hub** for advanced economies by focusing on:
  - Chip packaging and testing (OSAT/ATMP)
  - Electronics manufacturing services
  - Secure supply chains for non-frontier technologies
- **Use Existing Strategic Platforms Effectively:** India should deepen engagement through:
  - **iCET (India–US Initiative on Critical and Emerging Technologies)**
  - **QUAD technology and supply-chain working groups**
  - Bilateral tech partnerships with Japan, Korea, and the EU These platforms can serve as **stepping stones** to future inclusion.
- **Shape Global Norms Through Multilateral Forum:** India should actively push for **inclusive, rules-based technology governance** at the G20, BRICS, and WTO, ensuring that global AI and semiconductor norms do not become **exclusive technology cartels**.

Unlocking potential of India-Africa Economic Ties

Syllabus Mapping: GS-2 India and Developing world

Context

Prime Minister Narendra Modi's July 2025 visits to Namibia and Ghana, and December 2025 visit to Ethiopia, renewed focus on India–Africa economic relations amid global economic uncertainty.

Significance of Africa for India

- **Strategic Trade Diversification:** India–Africa bilateral trade stands at **~$100 billion**, making Africa India's **4th largest trading partner**.
  - Africa absorbs **$38.17 billion of Indian exports (FY24)**, led by **Nigeria, South Africa, and Tanzania**.
  - Africa offers **high-growth demand** compared to stagnating Western markets.
- **Manufacturing & Industrial Opportunity:** Africa's **preferential access to U.S. markets** allows Indian firms manufacturing in Africa to benefit from **favourable tariff regimes**.
  - Engagement with the African **Continental Free Trade Area** enables access to a **single market of 1.4 billion people**.
- **MSME Expansion Potential:** African markets are **less entry-restricted** for Indian **MSMEs** compared to the U.S. and EU.
  - Sectors like **pharmaceuticals, textiles, light engineering, food processing** suit India's MSME strengths.

- **Resource & Energy Security:** Africa is rich in **critical minerals, hydrocarbons, and rare earths**, essential for India's **energy transition and manufacturing ambitions**.
  - Mining and mineral exploration offer long-term strategic depth.
- **Services & Soft Power Advantage:** India's strengths in **IT, healthcare, education, and skill development** can boost **services exports**, which are currently underutilised in Africa.
- **Opportunities for Digital Cooperation:** Africa's Digital Transformation Strategy (2020–2030) aligns closely with India's experience in building low-cost, scalable Digital Public Infrastructure (DPI). This convergence creates a strong basis for a new India–Africa Digital Compact rooted in co-development, South–South cooperation, and digital public goods.

Digital Cooperation between India and Africa

Opportunities for India	Opportunities for Africa
• **Soft Power Leadership**: India's open, inclusive DPI model provides a credible alternative to proprietary and surveillance-led digital systems. • **Technology Diplomacy**: Affordable, interoperable Indian solutions align well with AU digital priorities, positioning India as a preferred partner. • **Strategic Leverage**: Digital cooperation strengthens India's South–South leadership and balances China's digital influence in Africa. • **Market Access**: Africa's young population offers expansion opportunities for Indian fintech, edtech, healthtech, and govtech firms. • **Human Capital Linkages**: IIT–IIIT collaborations and skilling initiatives can build long-term India–Africa knowledge partnerships.	• **Continental Coordination**: Scope for an AU-led, unified framework for digital governance and policy coherence. • **Governance Efficiency**: Digital capacity building can improve effectiveness of legislatures, regulators, and service delivery. • **Regional Integration**: Cross-border digital payments, identity, and trade systems can advance the Digital Single Market. • **Financial Inclusion**: Digital platforms can transform the financial sector, lowering costs and formalising economies. • **Inclusive Growth**: Connecting the unconnected can boost GDP, productivity, employment, and gender equity. • **Reducing Digital Divide**: Expansion of secure, open digital infrastructure can ensure more equitable access across Africa.

Emerging Challenges in India–Africa Relations

- **Rising Chinese Dominance: China** is Africa's **largest trading partner**, with trade exceeding **$200 billion**.
  - **21% of Africa's imports (2024)** come from China, compared to **~6% from India**.
  - **33% of Chinese exports** to Africa fall under **HSN 84 & 85 (machinery, electrical goods, semiconductors)**, exposing India's **industrial lag**.
- **Narrow Export Basket:** India's exports remain concentrated in **petroleum products, rice, pharmaceuticals, and textiles**, limiting value addition.
- **Low Manufacturing Footprint:** Indian firms underutilise **African manufacturing incentives**, missing opportunities in **local value chains**.
- **Trade Finance & Risk Constraints:** Limited **Lines of Credit**, high perceived political risk, and weak **trade insurance mechanisms** deter Indian MSMEs.
- **Investment Barriers:** India's Africa FDI is **skewed towards Mauritius**, often for **tax arbitrage**, rather than productive investment.
  - **Political instability (e.g., Sahel Region), bureaucratic hurdles, and high financing costs** affect Indian investors.

Way Forward (Strategic Roadmap)

- **Trade Architecture Reforms:** Negotiate **Preferential Trade Agreements (PTAs)** and **Comprehensive Economic Partnership Agreements (CEPAs)** with African regional blocs.
  - Deepen integration with **AfCFTA** to scale Indian exports.
- **Manufacturing-Led Engagement:** Shift from **commodity exports** to **joint manufacturing and value-added production** in Africa.
  - Focus on **engineering goods, electronics, agro-processing, and pharmaceuticals**.
- **MSME-Centric Trade Finance:** Expand **Lines of Credit** and ease access for MSMEs.
  - Promote **local-currency trade** and create **India–Africa joint insurance pools** to reduce political and commercial risk.
- **Logistics & Connectivity Push:** Invest in **port modernisation, hinterland connectivity**, and **India–Africa maritime corridors** to lower freight costs.
- **Services & People-to-People Expansion:** Boost services trade in **IT, healthcare, education, and professional services**.
  - Align skill development partnerships with African industrial needs.
- **Public Sector Leadership:** Indian **PSUs** should lead investments in **mining, renewable energy, infrastructure, and critical technologies**, crowding in private capital.

India- Ethiopia Relations

Indian Prime Minister Narendra Modi recently conferred with 'Great Honor Nishan of Ethiopia' country's highest honour during Addis Ababa visit.

Key Outcomes of the Recent Visit

- Bilateral relations were elevated to a **Strategic Partnership**, marking a new phase of long-term cooperation.
- An **MoU on Debt Restructuring** for Ethiopia was signed under the **G20 Common Framework**, reflecting India's support for global debt relief efforts.
- An agreement on **Cooperation and Mutual Administrative Assistance in Customs Matters** was concluded to enhance trade facilitation and compliance.
- An **MoU for establishing a Data Centre** at Ethiopia's Ministry of Foreign Affairs was signed to strengthen digital governance and data management.

- An **Implementing Arrangement for cooperation in UN Peacekeeping Operations training** was agreed upon, deepening defence and security collaboration.
- **Indian Council for Cultural Relations (ICCR) scholarships for Ethiopian students were doubled**, expanding educational and cultural exchanges.
- **Specialised short-term courses in Artificial Intelligence** were offered to Ethiopian students and professionals under the **ITEC programme**, supporting capacity building.
- India committed to **augmenting the capacity of Mahatma Gandhi Hospital in Addis Ababa**, particularly in maternal healthcare and neonatal care.

Key Opportunities for India

- **Strategic & Geopolitical:** Ethiopia's role as the **Horn of Africa's anchor state** and host of the **African Union** enhances India's diplomatic footprint in Africa.
  - Ethiopia's **BRICS membership** opens new avenues for coordination in South–South and multilateral platforms.
- **Economic & Investment:** Large **domestic market (109 million+)** and manufacturing base position Ethiopia as a gateway to East Africa and AfCFTA (African Continental Free Trade Area) markets.
  - Significant scope in **mining (gold, critical minerals, rare earths)** vital for India's renewable energy, battery and semiconductor sectors.
  - Strong potential in **pharmaceuticals, agro-processing, textiles, light manufacturing**, and export-oriented industries.
- **Education & Capacity Building:** Deep goodwill from India's historical role in Ethiopian education.
  - High Ethiopian student inflow to India, including Africa's **largest cohort of PhD scholars**.
  - Scope to expand **digital education, skilling, vocational training, AI and STEM cooperation**.
- **Defence & Security:** Long-standing defence cooperation, including training and institutional linkages.
  - Opportunity for India to supply **cost-effective, battle-tested defence platforms** and expand training under new defence MoUs.
- **Energy & Infrastructure:** Ethiopia's vast **hydropower and renewable energy potential** offers scope for Indian technology, financing, and EPC participation.

India and New Zealand FTA

Syllabus Mapping: GS-2- Bilateral Relation

Context

India and New Zealand have concluded a comprehensive Free Trade Agreement.

Salient Features of the FTA

- **Zero-duty market access:** Customs duties eliminated on **100% of Indian exports**, boosting export competitiveness.
- **Healthcare cooperation:** Inclusion of New Zealand's **first-ever annex on Health and Traditional Medicine Services**.
- **Agricultural integration:** Launch of an **Agricultural Productivity Partnership** to enhance farm productivity and link Indian farmers to global value chains.

Benefits of India and New Zealand FTA

Area	Key Benefits for India
Market Access (Goods)	Zero-duty access on **100% of New Zealand tariff lines (8,284)** from entry into force; elimination of ~10% tariffs on ~450 Indian export lines; average applied tariff of **2.2% reduced to zero**
Services Trade	New Zealand's **best-ever offer**: commitments in **118 services sectors**; **MFN treatment in 139 sectors**
Health & AYUSH	First-ever **Health & Traditional Medicine Annex**; global promotion of **AYUSH** (Ayurveda, Yoga & Naturopathy, Unani, Siddha, Sowa-Rigpa, Homeopathy); boost to medical value travel and wellness services
Education & Student Mobility	Students allowed **20 hrs/week work** during study; protected against future policy changes; **extended post-study work visas** (STEM Bachelor: 3 yrs; Master's: up to 3 yrs; Doctorate: up to 4 yrs)
Professional Mobility	**5,000 skilled visas (up to 3 years)** for Indians in AYUSH, Yoga, Indian cuisine, music, IT, engineering, healthcare, education, construction

Area	Key Benefits for India
Working Holiday Scheme	**1,000 Indian youth annually** eligible for multiple-entry stays up to **12 months**
Investment	**USD 20 billion FDI commitment** from New Zealand over **15 years**
Regulatory Facilitation	Faster approvals for **pharmaceuticals & medical devices**; recognition of inspections from **US, EU, UK, Canada** regulators
Intellectual Property	Binding commitment to amend laws within **18 months** for **EU-level GI protection** for Indian products
Customs & Trade Facilitation	**Advance rulings, e-documentation**, clearance within **48 hours** (**24 hours for perishables**)

We will discuss the brief overview of the India-New-Zealand Relations

Areas of Cooperation

Historical Relation

- **Early Indian Migration**: Indians began arriving in New Zealand in the **late 18th century** on British East India Company ships.
  - Early migrants were primarily from **Gujarat** and later from **Punjab**.
  - Formation of the **Auckland Indian Association** in **1920** (centenary celebrated in 2020).
- **Diplomatic Relations**: Both countries became independent in **1947**.
  - India established diplomatic representation in **1950** with a **Trade Commission**, later upgraded to a **High Commission**.
- **Shared Similarities**:
  - Commonwealth membership.
  - Common law practices.
  - Democratic governance focused on diverse communities.

Political, Defence, and Security Cooperation

- **Parliamentary Engagement**: Regular parliamentary delegation visits.
- **Defence Collaboration**: Increased participation in **military exercises** and **staff college exchanges**.
  - Regular **port calls** by naval ships (e.g., Tarini at Lyttelton and HMNZS Te Kaha at Mumbai).
  - Signing of **India-New Zealand MoU for Defence Cooperation** to establish regular bilateral defence engagement.
- **Maritime Security**: NZ sees India as a safe bet to counter China's assertive rise in the Indo-Pacific region.
  - India's participation in **Combined Maritime Forces** and cooperation under **Command Task Force 150**.

Combined Task Force (CTF) 150 is a multinational naval task force working under **Combined Maritime Forces** and is based in Bahrain. Indian Navy has committed a contribution of 5 staff members to the CTF150 battle staff during the period RNZ Navy is leading the CTF150 from January 2025.

New Zealand's interest in joining the **Indo-Pacific Oceans Initiative (IPOI)**. PM Modi welcomed New Zealand into this partnership with like-minded countries.

  - Discussions on maritime cooperation at the **National Maritime Heritage Complex (NMHC)** at Lothal.
- **Capacity Building**: Regular officer training exchanges at Defence Colleges.

Trade, Investment, and Financial Cooperation

- **India and New Zealand merchandise bilateral trade: It** increased from **USD 855 Million in 2015-2016 to USD 1298 Million in 2024-2025**. The exports increased by 130% whereas imports only increased by 7.21% in 10 years. In 2024-25, the exports from India to New Zealand was higher than imports from New Zealand, maintaining positive trade balance with the country.
- **Digital Payments**: Discussions on early cooperation in the digital payments sector.
- **Customs Cooperation**:
  - **Authorized Economic Operators Mutual Recognition Arrangement (AEO-MRA)**: It facilitates smoother trade by easing movement of goods between trusted traders.
  - **Customs Cooperative Arrangement:** In August 2024, New Zealand and India signed it to enhance trade ties and intensifying collaboration against transnational organized crime
- **Sectoral Cooperation in Horticulture and Forestry: Memorandum of Cooperation on Horticulture** to promote knowledge sharing and research exchanges.
  - Development of **post-harvest and marketing infrastructure**.
  - **Letter of Intent on Forestry Cooperation** for policy dialogues and technical exchanges.
- **Tourism and Air Connectivity:** Recognition of tourism's role in enhancing economic ties and mutual understanding.
  - Update to the **India-New Zealand Air Services Agreement** to support direct flights.
  - Encouragement for airlines to commence **non-stop flights** between India and New Zealand.

Science, Technology, and Disaster Management

- **Technology Partnerships**: Strengthening collaboration in **research, innovation, and commercialization** of technologies.
- **Climate Change Cooperation**:
  - New Zealand's membership in the **International Solar Alliance (ISA)** (since 2024).
  - New Zealand's membership in the **Coalition for Disaster Resilient Infrastructure (CDRI)**.
- **Earthquake Mitigation**: Work towards a **MoU on Earthquake Mitigation** to enhance preparedness and response capacity.

Education, Mobility, and People-to-People Ties

- **Education**: India is the 2nd largest source of international students in NZ.

  - Signing of a **refreshed Education Cooperation Arrangement**.
  - Expansion of Indian student access to New Zealand education institutions.
- **Skilled Migration**: Agreement to negotiate skilled worker mobility under trade agreement.
  - Addressing irregular migration issues.
- **Sports**: MoU on Sports Cooperation in cricket, hockey, and Olympic sports.
  - **Sporting Unity events** in 2026 to celebrate 100 years of sporting ties.
- **Traditional Medicine**: Expert discussions on knowledge exchange and collaboration.
- **Cultural Ties**: Growing New Zealand interest in **yoga**, Indian **music**, **dance**, and **festivals**.
  - Promotion of bilateral cultural exchange.

Issues in the Relationship:

- **China's Growing Influence:** China's strategic agreements in the Pacific (e.g., with the **Cook Islands**) create pressure on New Zealand.
  - New Zealand's economic reliance on China complicates its foreign policy balancing act.
- **Geopolitical Differences:** Historical differences over India's **nuclear policies** have strained ties in the past (e.g., New Zealand's opposition to India's nuclear tests (1998)).
  - New Zealand's traditionally cautious approach to security alliances creates hesitation in deeper strategic engagement.
- **Political Sensitivities:** Concerns over India's domestic political and human rights issues could limit diplomatic engagement.
  - Differences in political systems and governance styles create friction in policy alignment.
- **Regulatory and Logistical Barriers:** Differences in **regulatory standards** and **customs procedures** hinder smooth trade.
  - Complex visa processes and work permits limit mobility for professionals and students.
- **Economic Asymmetry:** India's large and diverse economy contrasts with New Zealand's smaller, export-dependent market.
  - Finding mutually beneficial trade terms is challenging due to this economic imbalance.

Way Forward

- **Enhance Strategic Cooperation in the Indo-Pacific:** Develop joint maritime security initiatives to counter China's assertiveness.
  - Align with regional frameworks like the Quad and the Pacific Island Forum for greater security cooperation.
- **Expand Economic and Trade Ties:** Diversify trade beyond agriculture and dairy, focusing on technology, pharmaceuticals, and renewable energy.
  - Encourage business-to-business partnerships and investment forums.
- **Boost Educational and Cultural Exchange:** Establish joint research programs in climate change, clean energy, and the blue economy.
  - Simplify visa procedures to enhance student and professional mobility.
- **Strengthen Collaboration on Climate Change and Sustainability:** Partner on clean energy initiatives and sustainable development projects in the Pacific.
  - Support climate resilience and disaster management efforts in small island nations.
- **Leverage Diaspora and Soft Power:** Engage the Indian diaspora in New Zealand as a bridge for stronger economic and cultural ties.
  - Promote Indian cultural festivals and New Zealand's indigenous Maori heritage for mutual understanding.

Topics for Mains (Internal Security)

Security Cooperation in the Indian Ocean

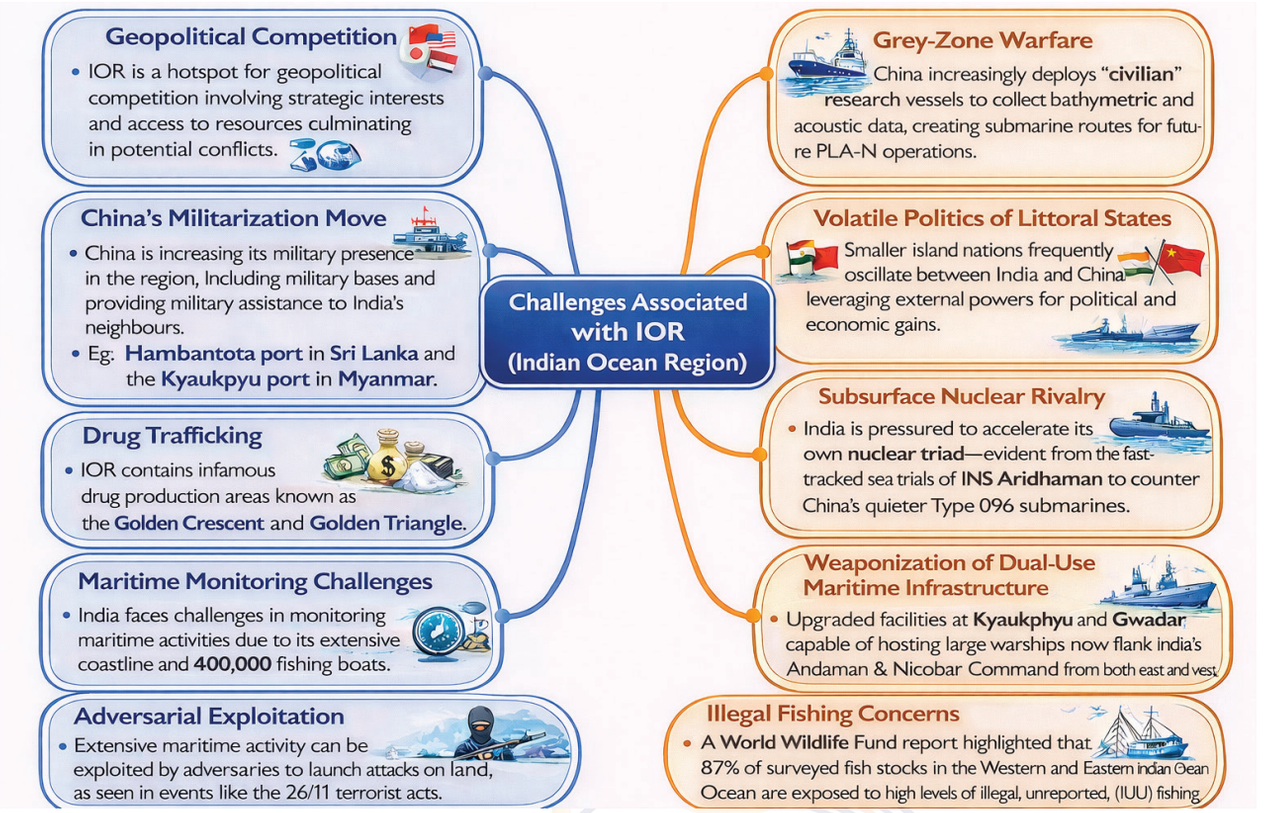
Syllabus Mapping: GS-3: Security Challenges in Indian Ocean

Context

The 7th NSA-level Colombo Security Conclave (CSC) summit in 2025 renewed the bid to shape Indian Ocean security through a broadened platform on maritime threats and cyber risks. Inclusion of new member Seychelles as the sixth full member shows growing regional cooperation, though differing priorities keep the architecture fluid, underscoring India's strategic centrality.

India's Core Strategic Priorities in the Indian Ocean

- **Neighbourhood First Strategy:** The Indian Ocean underpins India's 'Neighbourhood First' strategy, enabling it to counter extra-regional powers and shape regional norms.
- **Role as Net Security Provider and First Responder:** The region is central to India's humanitarian diplomacy, where rapid disaster relief enhances trust and soft power.
  - **E.g.,** "Operation Sagar Bandhu" in Sri Lanka.
- **Strategic Connectivity and Access to Central Asia:** Given limited land access, the ocean provides India's only viable link to Central Asia and Afghanistan, offering a counter to China's Belt and Road Initiative (BRI) corridors.
  - **E.g.,** International North–South Transport Corridor (INSTC).
- **Resource Security:** Deep-sea minerals like PMNs (Polymetallic Nodules) and sulphides are vital for clean-energy technologies, reducing reliance on Chinese critical mineral supply chains.
  - **E.g.,**India's 15-year ISA contract (2025) for the Carlsberg Ridge.
- **Technological Advancement:** Deep-ocean missions elevate India's scientific standing and provide **dual-use benefits** for submarine operations and undersea surveillance.
  - **E.g.,** Matsya 6000.
- **Energy Security and SLOC Protection:** Critical SLOCs in the Indian Ocean carry the majority of India's crude and LNG imports, making them essential for economic stability.



Safeguarding India's Strategic Interests in the IOR

- **Strengthen SAGAR and Development-Led Security:** Expand assistance to IOR nations through patrol vessels, radar networks, and disaster-relief assets.
  - Extend Lines of Credit for port development, renewable energy, and fisheries, reducing littoral states' dependence on external powers and reinforcing India's role as a trusted partner.

India's MAHASAGAR vision—"Mutual and Holistic Advancement for Security and Growth Across Regions"

It was formally announced by **Prime Minister Narendra Modi** during his visit to **Mauritius** in **March 2025.** It builds on the SAGAR policy announced during his visit to Mauritius in 2015 that has guided India's engagement with the IOR for one decade.

Components of MAHASAGAR initiative:

- **Partnership for shared future:** MAHASAGAR would emphasize trade for development, capacity building for sustainable growth, and mutual security for a shared future.
- **Broader geographic region:** While SAGAR initiative was South Asia-centric concept, MAHASAGAR expands to encompass the broader Indian Ocean and, significantly, Africa's eastern littoral states
- **Economic Development:** Cooperation will be ensured through technology sharing, concessional loans and grants
- **Voice of Global South:** The objective is also to bring the voice of the Global South to the global high table.
- **Multilateralism:** Greater cooperation with IOR groupings like IORA, Colombo Security Conclave, and QUAD.

- **Institutionalize Minilateral Security Frameworks:** Formalize the Colombo Security Conclave (CSC) into a treaty-based organization with a permanent secretariat and budget.
  - Enable real-time intelligence sharing, coordinated patrols, and interoperable maritime operations among like-minded IOR states.
- **Build a Pan-Regional Underwater Domain Awareness Network:** Deploy a seabed-based Sound Surveillance System (SOSUS) in collaboration with friendly littorals to detect hostile submarine activity.
  - Shift from surface surveillance to a "transparent ocean" model for real-time tracking and deterrence of underwater threats.
- **Secure the Digital Ocean and Undersea Cable Infrastructure:** Launch a dedicated "Submarine Cable Security Protocol" to treat undersea data routes as sovereign critical assets.
  - Use AUVs for cable monitoring and offer cable-security guarantees to island partners to prevent hybrid sabotage and data coercion.
- **Integrate Deep-Sea Resources into Regional Blue Economy Partnerships:** Operationalize India's deep-sea mining licenses to build an "IOR Rare Earths Supply Chain."
  - Provide technology-sharing that enables sustainable extraction of minerals like cobalt and nickel, offering an alternative to China's extractive BRI model.

Significance of a Strong Defence Industrial Base

Syllabus Mapping: GS-3: Defence Production

Context

India's defence manufacturing ecosystem is undergoing a structural transformation, marked by greater private-sector participation, higher domestic production, and rapidly expanding defence

exports, positioning the country to strengthen self-reliance and emerge as a credible global defence supplier.

Current Status Of Defence Production in India

- **Highest-ever defence production:** ₹1.54 lakh crore in FY 2024–25.
- **Indigenous defence production:** ₹1,27,434 crore in FY 2023–24 (up 174% from 2014–15).
- **Defence exports:** Record ₹23,622 crore in FY 2024–25, to 80+ countries / over 100 nations.
- **Ecosystem depth:** 16,000 MSMEs, 788 industrial licences to 462 companies.
- **Private sector role rising:** About 23% share in total production (FY 2024–25).

Significance of a strong defence industrial base

- **Strategic autonomy:** Reduces dependence on imports and insulates national security from global supply-chain disruptions.
- **Operational readiness:** Ensures timely availability of equipment during conflicts and crises.
- **Economic gains:** Generates high-skilled employment, boosts manufacturing value chains, and supports innovation.
- **Export capability:** Enhances India's role in global defence markets amid rising international demand for cost-effective platforms.
- **Geopolitical leverage:** Signals technological maturity and reliability, strengthening diplomatic and strategic partnerships.
- **Resilience:** Nations with robust domestic defence industries demonstrate greater stability in volatile security environments.

Key issues and challenges

- **Regulatory complexity:** Lengthy procedures for export licensing, joint ventures, and technology transfer, particularly affecting MSMEs and startups.
- **Policy uncertainty:** Limited long-term demand visibility dampens private investment confidence.
- **Institutional fragmentation:** Overlapping roles across ministries hinder coordination and export facilitation.
- **DRDO transition needs:** Insufficient separation between frontier research and downstream production/commercialisation.
- **Financing constraints:** Limited access to competitive credit and specialised export financing instruments.
- **Testing and certification bottlenecks:** Stringent domestic standards, inadequate integrated testing facilities, and delayed trials. **E.g.,** Naval systems or aerospace components undergo repeated trials, extending timelines by years.
- **Ecosystem gaps:** Need for a dedicated export facilitation agency and international certification alignment to compete with established global players.

Way Forward

- **Simplify regulatory processes** through single-window digital clearances, time-bound approvals, and fast-track mechanisms for MSMEs and startups.
- **Provide long-term demand visibility** by publishing multi-decade defence acquisition and indigenisation roadmaps with assured order commitments.
- **Strengthen public–private partnerships** by clearly delineating roles, with DRDO focusing on frontier research and industry leading production and commercialisation.
- **Expand defence financing mechanisms**, including export credit, guarantees, and lines of credit for foreign buyers of Indian defence equipment.
- **Upgrade testing, trials, and certification systems** by expanding integrated facilities, adopting international standards, and enforcing strict timelines.
- **Focus on critical technology development** via co-development partnerships, IPR sharing, and sustained R&D funding in engines, electronics, and sensors.
- **Ensure policy stability and continuity** to build investor confidence and support India's defence export target of ₹50,000 crore by 2029.

Topics for Prelims (International Relations)

Biological Weapons Convention

Context

India hosted the international conference "50 Years of BWC: Strengthening Biosecurity for the Global South" in New Delhi.

About Biological Weapons Convention

- **Formal Name:** The Convention is officially titled "The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction."
- **Definition of Biological Weapons:** These weapons involve the deliberate spread of disease-causing agents—such as bacteria, viruses, fungi, prions, or rickettsiae—or toxins derived from living organisms to harm or kill humans, animals, or plants.
- **Established in:** 1975.
- **Membership:** The BWC has near-universal adherence with 188 States Parties (India joined in 1974) and 4 Signatory States — Egypt, Haiti, Somalia, and Syria.

  - **Non-Party States:** Five countries—Israel, Chad, Djibouti, Eritrea and Kiribati—have neither signed nor acceded to the Convention.
- **Review Mechanism:** States Parties convene roughly every five years to assess the functioning of the Convention and adapt it to evolving scientific, technological, and security environments.

- **Key Features:**
  - It is the first multilateral disarmament treaty to outlaw an entire class of weapons of mass destruction (WMD).
  - The BWC bans the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons.
  - It builds upon and strengthens the 1925 Geneva Protocol, which had prohibited only the use—but not the possession—of biological weapons.
  - Implementation Support Unit (ISU) assists in administrative coordination, supports implementation efforts, and promotes universalization as mandated by Review Conferences.

Challenges faced by BWC

- **Lack of Verification Mechanism:**
  - Unlike other disarmament treaties (e.g., **Chemical Weapons Convention - CWC**), BWC **has no formal inspection system**.
- **Emerging Biotechnological Threats**:
  - Advances in **synthetic biology, genetic engineering and biotechnology** create new risks.

India and the Biological Weapons Convention (BWC)

- **Early Commitment:** India is an original supporter of the BWC and **ratified it in 1974**, even before its entry into force in 1975.
- **Normative Position:** India consistently advocates **complete prohibition of biological and toxin weapons** and supports disarmament through **multilateral, non-discriminatory frameworks**
- **Implementation:** India has put in place **national export controls, biosafety and biosecurity regulations**, and criminal provisions to prevent misuse of biological agents.
- **Verification Stand:** India supports strengthening the BWC through **legally binding verification and compliance mechanisms**, especially to address advances in biotechnology.

Iran Ratifies Law to Join UN Convention Against Terror Financing

Context

Iran has ratified a law to join the **United Nations Convention for the Suppression of the Financing of Terrorism (1999)**. This move comes amid debates on whether such steps could eventually lead to Iran's removal from the **Financial Action Task Force (FATF) grey/black list**, though the **immediate economic impact remains uncertain**.

About the UN Convention Against Terror Financing (CFT)

- Adopted in **1999** under the United Nations.
- Aims to **criminalise the financing of terrorist acts and organisations**.
- Requires States Parties to:
  - Identify, freeze, and seize funds linked to terrorism.
  - Strengthen domestic laws and international cooperation.
- Forms one of the **core international legal instruments** underpinning the global anti-terror financing regime.

Why is Iran's Ratification Significant?

- **Alignment with Global AML/CFT Norms**
  - Ratification signals Iran's intent to align with **international anti-money laundering (AML) and counter-terror financing (CFT)** standards.
  - Addresses one of the key concerns raised by FATF regarding **terror financing risks**.
- **FATF Context**
  - FATF places countries on **grey list** or **black list** for deficiencies in AML/CFT frameworks.
  - Iran has been on FATF's **high-risk list** due to:
    - » Non-ratification or incomplete implementation of key conventions.
    - » Concerns over enforcement and political will.
    - » Ratifying the CFT convention is a **necessary but not sufficient condition** for removal from FATF scrutiny.
- **Limited Immediate Economic Impact**
  - **Economic gains may not be immediate**, as:
    - » FATF delisting depends on **effective implementation**, not just legal adoption.
    - » Iran continues to face **U.S. and Western sanctions**, which independently restrict trade and financial flows.
  - Thus, ratification alone may not restore banking access or foreign investment quickly.

Australia–Canada–India Technology and Innovation (ACITI) Partnership

Context

The **Australia–Canada–India Technology and Innovation (ACITI) Partnership** was launched to strengthen **trilateral cooperation in critical and emerging technologies** on the sidelines of the G20 Summit in Johannesburg

Strategic Objectives

- Promote **secure and trusted technology cooperation** among like-minded democracies.
- Support **diversification of global supply chains**, especially in strategic sectors.
- Build a **resilient technological order** aligned with sustainability and economic security.
- Complement multilateral efforts under the **G20 framework**.

Strategic Significance

For India

- Enhances India's role in **global technology partnerships** beyond traditional groupings.
- Strengthens access to **critical minerals, clean tech, and advanced innovation ecosystems**.
- Aligns with initiatives like **Atmanirbhar Bharat**, **India Semiconductor Mission**, and **technology diplomacy**.

For Global Governance

- Reflects the rise of **plurilateral technology coalitions**.
- Signals a shift from open globalisation to **trusted, resilient supply-chain frameworks**.
- Integrates **technology, sustainability, and economic security** objectives.

Chasing China Report

Context

A new global lending report by AidData, a U.S.-based research institute, reveals that China lent **over $2 trillion** to 179 countries between **2000 and 2023**, with a major shift from development-oriented loans to **commercial lending**, especially to high-income countries like the United States, Russia, and EU member states.

Key Highlights of Report

- **China's Massive Global Lending Footprint:** In 2023 alone, China was the **world's largest creditor**, lending **$140 billion**.
- **The United States is the Largest Beneficiary:** U.S. companies received about **$200 billion** through nearly 2,500 projects.
  - More than **95%** of this lending came from Chinese state-owned banks, firms, and the People's Bank of China.
- **Lending Shift Toward High-Income Countries:** High-income countries received **$943 billion**—over **20%** of all loans.
  - China is increasingly prioritizing **commercial lending** over aid; in the U.S., **75%** of loans were commercial and only **7%** developmental.
  - After the U.S., the biggest beneficiaries were: **Russia: $172 billion, Australia: $130 billion, EU (27 countries): $161 billion**
- **Decline of BRI finance:** BRI share fell from 75% to 25% of China's total lending.
- **Strategic Financial Channels & Approval Success:** China reportedly used offshore shell companies and bank syndicates to secure an **80% success rate** in global mergers and acquisitions approvals.
- **India's Exposure:** Indian entities borrowed or received **$11.1 billion**, mainly for **energy**, **banking**, and **financial services**.
  - Loans had a mix of **commercial** and **developmental** intent.

Implication of the findings:

- **On China+1 strategy:** Despite supply-chain diversification, China remains deeply embedded in global finance and manufacturing. The report shows that firms and states are adding alternatives, not abandoning China
- **Large-scale lending** to the **U.S., EU, and Australia** indicates deep **financial entanglement**, making clean economic "decoupling" from China unrealistic.
- **Rising Risks to Global Financial Stability:** High exposure through **commercial loans, offshore structures, and opaque financing** raises risks of **debt stress and regulatory arbitrage**.
- **Geoeconomic Competition Intensifies:** Lending is increasingly used as a tool of **geopolitical leverage**, complementing trade, technology, and investment controls.

Implication for India

- **Limited but Strategic Financial Exposure:** India's exposure ($11.1 bn) is modest compared to major economies, reducing systemic vulnerability. However, concentration in energy and finance sectors requires regulatory vigilance.
- **Need for Financial De-Risking, Not Decoupling:** India must pursue selective de-risking—screening investments, improving due diligence, and strengthening oversight of offshore-linked financing.

Reciprocal Exchange of Logistic Support (RELOS) Agreement

Context

Russia's State Duma, the lower house of parliament, ratified a RELOS pact with India.

About RELOS Agreement

- It is a **bilateral logistics pact** that allows Indian and Russian military platforms to access each other's ports, airbases, and infrastructure for refuelling, repairs, and maintenance.
- **Benefits:**
  - **It streamlines joint operations**, enabling smoother exercises, training missions, humanitarian assistance, and disaster relief with reduced procedural delays.
  - **India gains strategic access** to Russian naval ports, including those along the Northern Sea Route, expanding its operational footprint in the Arctic and polar regions.
  - **Russia receives reciprocal access** to Indian naval facilities in the Indian Ocean Region.
  - **The agreement enhances interoperability**, operational readiness, and deepens long-term defence cooperation.

Note: RELOS **does not allow permanent military bases** or automatic access during conflict.

Comparison with Similar Indian Agreements

India has signed similar logistics agreements with:

- **United States:** LEMOA (Logistics Exchange Memorandum of Agreement)
- **France:** Logistics Support Agreement
- **Japan:** Acquisition and Cross-Servicing Agreement (ACSA)
- **Australia:** Mutual Logistics Support Agreement
- **South Korea, Singapore, UAE** (variants of logistics support pacts)

Organisation for Security and Cooperation in Europe (OSCE)

Context

Ukraine wants "real peace, not appeasement" with Russia, its foreign minister said at the Organization for Security and Cooperation in Europe.

About OSCE

- **Origin:** Evolved from the **Conference on Security and Co-operation in Europe (CSCE)**, established by the **Helsinki Final Act (1975)** during the Cold War.
- **Post–Cold War Continuity**
  - After the Soviet Union collapsed, the CSCE was institutionalised as the OSCE (1995).
  - Russia remained a member as the legal successor state, while the U.S. stayed engaged to maintain European stability.
- **Headquarter: Vienna**
- **Member nations: 57 participating States** spanning **North America, Europe, and Asia**. (Note: **India is not a member**.)
- **Core purpose:** Its core purpose was to create a **common security framework** that included:

- **NATO bloc** (U.S., Western Europe)
- **Warsaw Pact bloc** (Soviet Union → today's Russia and others)
- Thus it Includes **Russia and the U.S.** in the same security forum.
- **Decision Making:** Organisation operates on the **basis of consensus-based decision-making.**
- **Governance Framework Includes:**
  - **Summits** as the highest decision-making authority
  - **Forum for Security Co-operation**, which handles the **politico-military aspects** of security
  - Additional bodies focused on human rights, economic cooperation, and conflict prevention.
- **Core Concept: Comprehensive Security**
  - OSCE follows a **comprehensive security approach**, meaning security is not limited to military issues but includes political, economic, environmental, and human dimensions.

OSCE and the Russia–Ukraine Conflict

- OSCE played a major role after **2014 Crimea crisis** through monitoring and mediation.
- The **Special Monitoring Mission (SMM)** in Ukraine observed ceasefire violations until it was discontinued in 2022.
- Ukraine's statement on "real peace, not appeasement" reflects frustration with **Russia's use of consensus rules** to block strong OSCE action.

Washington accord for Peace and Prosperity

Context

The Democratic Republic of the Congo and Rwanda recently signed the Washington Accords for Peace and Prosperity.

About Washington Accord for Peace and Prosperity

- Also known as Democratic Republic of the Congo–Rwanda Peace Agreement.
- Signed on **December 4, 2025**, in **Washington, D.C.**
- **Purpose of the Accords:**
  - Reinforces commitments to end **decades of conflict** between DRC and Rwanda.
  - Seeks to promote **peace, cooperation, and long-term stability**.
  - Aligns with the **Regional Economic Integration Framework (REIF)** to accelerate regional peace, security, and economic growth.

Background to the Conflict

- **Eastern DRC** has witnessed **decades of instability**, involving armed groups, ethnic militias, and cross-border interventions.
- Rwanda has been accused by the DRC and UN reports of backing rebel groups (notably **M23**), while Rwanda cites security threats from anti-Rwanda militias operating from Congolese territory.
- The conflict zone is rich in **critical minerals** (cobalt, coltan, lithium), linking security issues with global supply chains.

About M-23 Rebels

- M23 and also known as the C**ongolese Revolutionary Army** is a **Congolese Tutsi-led rebel paramilitary group**.
- The name "March 23" refers to the **23 March 2009 peace agreement** between the Congolese government and the National Congress for the Defense of the People (CNDP), a rebel group that later evolved into M23.
- It operates in the eastern regions of the **Democratic Republic of Congo (DRC)**, specifically in **North Kivu province**.
- M23 is primarily composed of ethnic **Tutsis** and is fighting to protect Tutsi interests, particularly against **Hutu militias such as the Democratic Forces for the Liberation of Rwanda (FDLR).**

International Atomic Energy Agency (IAEA)

Context

The International Atomic Energy Agency (IAEA) has said that the protective shield around the Chernobyl nuclear disaster site in Ukraine has stopped working after being damaged in drone strikes.

About International Atomic Energy Agency (IAEA)

- **About:** Intergovernmental and autonomous international organisation
- **Created In:** 1957 for response to the deep fears and expectations generated by the discoveries and diverse uses of nuclear technology.
  - IAEA was initially set up as the world's "**Atoms for Peace**" organization within the United Nations family.
- **Aim:** It works for the **safe, secure and peaceful uses of nuclear science** and technology, contributing to international peace and security and the United Nations' Sustainable Development Goals.
  Function of IAEA:
  - Promote safe, secure and peaceful use of nuclear energy
  - Assists its Member States and promotes the exchange of scientific and technical information between them
  - Setting framework for cooperative efforts to build and strengthen an international nuclear safety and security regime.
  - Verify States' fulfilment of their non-proliferation undertakings under the NPT.
- **Reports to:** The IAEA, although it submits reports to the Economic and Social Council (ECOSOC), **reports** primarily to the **General Assembly directly**, and may also report to the UN **Security Council whenever necessary.**
- **Governance**: The policy making bodies include the **General Conference of all Member States** and the 35-member **Board of Governors.**
- **Total Membership:** 178 countries including India (has been a member since its inception)
- **Headquarters:** Vienna, Austria
- Awarded the **Nobel Peace Prize (2005)**.

Interpol Notices

Context

The CBI has issued a Blue-Corner Notice through Interpol against owners of the Goa nightclub Birch by Romeo Lane, where 25 people died in a recent fire.

INTERPOL (International Criminal Police Organization)

- **HQ:** Lyon, France
- **Members:** 196 countries (India is a member)
- **Purpose:** It is an inter-governmental law enforcement organisation, helps coordinate cooperation among law enforcement agencies across its member countries.

Types of Interpol Notices

Notice	Purpose
Red Notice 🔴	To locate and provisionally arrest a wanted person pending extradition. (Most well-known)
Blue Notice 🔵	To locate or identify a person of interest, or to collect information.
Green Notice 🟢	To warn about a person's criminal activities when they pose a threat to public safety.
Yellow Notice 🟡	To locate missing persons, especially minors, or help identify persons unable to identify themselves.
Black Notice ⚫	To identify unidentified bodies.
Orange Notice 🟠	To warn of an event, person, object, or process representing a serious and imminent threat.
Purple Notice 🟣	To provide information on modi operandi, objects, devices, or concealment methods used by criminals.
Silver Notice ⚪	• To track assets of wanted criminals globally. (Launched Jan 2024 in pilot phase). • First Silver Notice from India: Issued against Shokeen Shubham (visa fraud), followed by Amit Lakhanpal (crypto fraud).
Interpol–UN Special Notice	For individuals or entities subject to UN sanctions.

BRICS

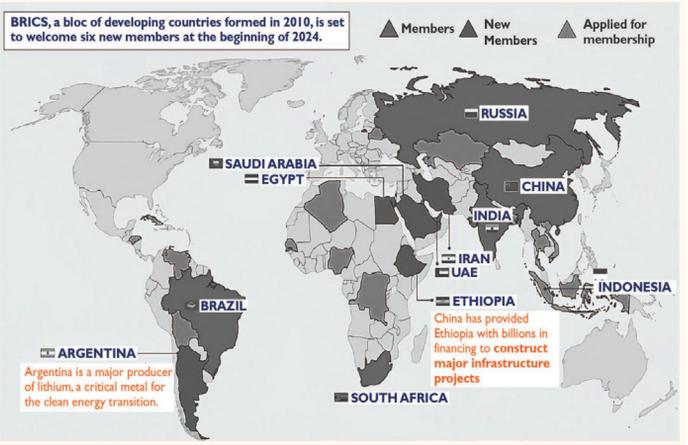
Context

Brazil officially transferred the BRICS presidency to India on December 12, 2025, during the concluding session of the 4th BRICS Sherpas Meeting.

- **Most Recent summits**:
  - **17th BRICS Summit:** It was convened under Brazil's presidency in Rio de Janeiro on July 6–7, 2025 with the theme as **'Strengthening Global South Cooperation for more Inclusive and Sustainable Governance'** At the end of this summit, the **"Rio de Janeiro Declaration"** was adopted.
  - **16th Summit 2024:** Kazan, Russia. **Theme**: Strengthening Multilateralism for Just Global Development and Security
  - **15th Summit (2023):** Johannesburg, South Africa. **Theme**: BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development, and Inclusive Multilateralism
- **Chairship:** Rotates annually among Brazil, Russia, India, China, And South Africa.
  - **2025**: **Brazil**
  - **2026: India**

BRICS GROUPING

- It is an intergovernmental organisation established in 2009.
- BRICS is an acronym that stands for **Brazil, Russia, India, China, and South Africa.**
- The acronym "BRICS" was formulated by economist **Jim O'Neill, of Goldman Sachs**. He believed that the BRICS countries will be the drivers of global economic growth in the coming century.
- **First Summit** of BRICS grouping took place at **Yekaterinburg, Russia in 2009.**
- **Membership of BRICS**:
  - Originally it was just BRIC i.e. Brazil, Russia, India, China.
  - South Africa joined the group in 2010.
  - Additional members joined in 2023, including Egypt, Iran, the United Arab Emirates (UAE), Saudi Arabia, and Ethiopia, Indonesia. (Indonesia is the latest country to join BRICS).
  - Argentina was also invited to join the bloc but it rejected to join it.
  - In January 2025, Indonesia joined the BRICS as a full member.



Reason for recent increase in the membership:

- Greater representation of the global south countries in the grouping.
- Strengthening the multipolar world order.
- Strengthening the Global south cooperation in the developing countries.

Bodies created by BRICS

New Development Bank (NDB)

- During the **6th BRICS Summit in Fortaleza (2014)** the leaders signed the Agreement establishing the **New Development Bank (NDB).**
- **Members of NDB**: Besides five founding members of NDB(Brazil, Russia, India, China, and South Africa), New members admitted are **Bangladesh, United Arab Emirates (UAE), Egypt.**
- **Shareholding:** The five founding members (Brazil, Russia, India, China and South Africa) have equal shareholding of 18.98% each. The new members varying shareholding in NDB:
  - Bangladesh: 1.79%
  - Egypt: 2.27%
  - UAE: 1.06%
- **Permanent HQ:** Shanghai.

Contingent Reserve Arrangement (CRA)

- **Aim:** Provide short-term liquidity support to the members through currency swaps to help mitigate the BOP crisis situation.
- **Enforced:** entered into force at the 7th BRICS summit in July 2015.
- Capital of $100 billion is distributed among the Five founding members.

Rapid Financing Instrument (RFI) - IMF

Context

The International Monetary Fund (IMF) has approved $ 206 million for Sri Lanka under the Rapid Financing Instrument (RFI) following the devastation caused by Cyclone Ditwah.

About Rapid Financing Instrument (RFI)

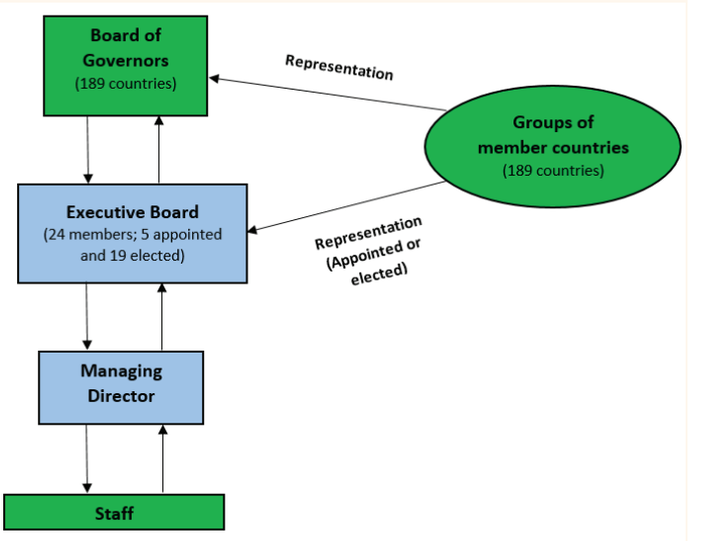
- It is an **emergency lending facility** of the **International Monetary Fund (IMF)**.
- **Purpose of RFI:** To support countries affected by **Natural disasters, Pandemics and health emergencies, Commodity price shocks, and Conflict, war, or sudden economic crises**.
- **Key Features:**
  - **Rapid disbursement:** Funds are released **quickly**, often in a single tranche.
  - **Limited conditionality:** No requirement for a full-fledged economic reform programme.
    - » Only basic policy commitments and safeguards.
  - **Flexible use:** Can be used for **budget support**, health spending, imports, or stabilising the economy.
  - **Applicable to all IMF members**, regardless of income level.

Other instruments of IMF:

- **Extended Fund Facility (EFF): It** aims to support countries facing **medium- to long-term balance of payments problems** arising from **structural weaknesses**. It is open to **all IMF member countries** with external financing needs and requires **structural reforms** to ensure macroeconomic stability.
- **Resilience and Sustainability Facility (RSF):** It seeks to help **low-income and vulnerable middle-income countries** manage **long-term risks to balance of payments stability**, especially from structural challenges. Access is limited to countries undertaking **credible, macro-critical policy reforms**.

About International Monetary Fund (IMF)

- It is a **specialised agency** of the United Nations (UN), founded at the Bretton Woods Conference in 1944. **(HQ- Washington DC)**
- **Membership:** 190 countries.
- It grants loans **only to its member countries.**
- **Reports released by IMF:**
  - **World Economic Outlook (WEO):** A biannual report analysing global economic trends and forecasts.
  - **Global Financial Stability Report (GFSR):** Focuses on global financial markets and assesses risks to financial stability.
- **Lending facilities of IMF:** Extended Fund Facility, Rapid Financing Instrument, Rapid Credit facility.



Source: Own illustration

Structure of the IMF

- **Board of Governors:** Highest decision-making body of the IMF. Each member country is represented by its Finance Minister or Central Bank Governor. They meet annually to review key policies and global economic challenges.
- **Executive Board:** Composed of 24 Executive Directors, this board is responsible for the day-to-day operations of the IMF.
  - Each director serves a two-year term, and voting power is based on the financial contributions (quotas) of the countries within each constituency.
- **Managing Director:** The Managing Director is the head of the IMF and its staff.

Quota System

- The IMF operates on a quota system, which reflects each member's relative position in the global economy. A member's quota is determined by its GDP, trade openness and other factors.
- Quotas determine the financial contribution of each member country, voting power, and access to IMF resources. Quotas are denominated in Special Drawing Rights (SDRs), the IMF's unit of account.
- A country's voting power is directly related to its quota; the higher the quota, the more voting power the country has. The U.S. has the largest quota and voting share, followed by Japan, China and Germany.
- India has **2.75% of the total quota,** making it the **8th largest** quota-holding country.

United Nations Convention on Negotiable Cargo Documents (Accra Convention), 2025

Context

The United Nations General Assembly has adopted a resolution endorsing the United Nations Convention on Negotiable Cargo Documents, also known as the Accra Convention, 2025.

About Accra Convention, 2025

- **Objective:** Creates a uniform legal framework for negotiable cargo documents and extends their use beyond maritime transport to multimodal transport involving rail, road, air, and sea.

- **Operational Flexibility:** Permits cargo to be sold, diverted, or pledged as collateral for financing while it is still in transit.
- **Legal Effect:** Treats negotiable cargo documents as legally equivalent to the physical delivery of goods.
- **Significance:** Enhances trade finance, promotes digitalisation of global trade, and improves efficiency in cross-border logistics.

Negotiable Cargo Documents (NCDs):

- Documents, in both paper and electronic form, that represent goods in transit.
- Grant transferable rights over the goods to the holder.

India - Oman Relations

Context

Prime Minister Narendra Modi's visit to Oman has reaffirmed Oman's role as a key partner in India's **Indian Ocean and West Asia strategy**.

Outcomes Of Recent Visit

- India and Oman moved towards the **formal signing of the Comprehensive Economic Partnership Agreement (CEPA)**, marking a major milestone in bilateral economic relations.
  - CEPA is expected to **boost bilateral trade, ease customs duties, liberalise services, and attract investments** across multiple sectors.
- The **India–Oman Business Summit in Muscat** provided strategic direction to deepen trade and investment collaboration between businesses of both countries.
- India invited **Omani companies and startups** to partner in India's growth journey amid rapid economic expansion and policy reforms.

Glimpse Of India- Oman Ties

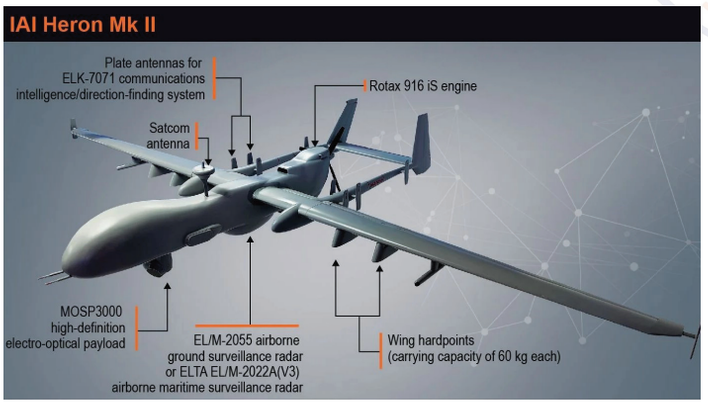
- **Diplomatic Relations:** India and Oman established formal diplomatic ties in **1955**, which were elevated to a **Strategic Partnership in 2008**.
- **Trade Relations:** Oman was India's **28th largest trading partner in FY 2023–24**, with bilateral trade expanding from **USD 6.70 billion (2017–18)** to **USD 10.61 billion (2024–25)**.
- **Trade Diversification:** India is **Oman's fourth-largest source of non-oil imports** and **third-largest destination for non-oil exports**, reflecting diversification beyond hydrocarbons.
- **Investment Ties:** Over **6,000 India–Oman joint ventures** operate in Oman, accounting for around **USD 7.5 billion** in cumulative capital.
- **FDI Flows:** Oman's cumulative **FDI equity inflows into India** between **2000 and 2025** stood at **USD 605.57 million**.
- **Fintech Cooperation:** RuPay launched in Oman in the year 2022.
- **Defence Cooperation:** The two countries hold **biennial tri-service military exercises** across the Army (**Al Najah**), Air Force (**Eastern Bridge**), and Navy (**Naseem Al Bahr**).
- **Maritime Significance:** Oman's strategic location near the **Strait of Hormuz**, through which India imports nearly **one-fifth of its crude oil**, underscores its importance for India's energy security.
- **Port Access:** In **2018**, India signed an agreement to access **Duqm Port**, strategically located on Oman's southeastern coast overlooking the **Arabian Sea and the Indian Ocean**, and close to **Iran's Chabahar Port**.

Topic for Prelims (Defence and Security)

Heron MkII UAVs

Context

India has placed fresh emergency procurement orders for additional satellite-linked Heron Mk II Unmanned Aerial Vehicles (UAVs).



About Heron MkII UAVs

- **Manufacturer:** Developed by Israel Aerospace Industries (IAI).
- **Category:** A Medium Altitude Long Endurance (MALE) UAV designed primarily for intelligence, surveillance, and reconnaissance (ISR) missions.
- **Endurance:** Capable of flying up to 35,000 feet, cruising at around 150 knots, and sustaining continuous operations for nearly 45 hours.
- **Capabilities:** Features state-of-the-art sensors, communication-intelligence payloads, and satellite communication (SATCOM) connectivity, allowing long-range and beyond-line-of-sight operations.

Su-57 Fifth-Generation Stealth Fighter

Context

Russia recently proposed expanding defence cooperation with India, including offers related to the **Su-57 fifth-generation fighter aircraft**, **long-range drones**, and **submarines**. India's response has been described as **cautious and non-committal**, reflecting a shift in India's defence procurement and strategic calculus..

About Su-57 Fifth-Generation Stealth Fighter

- **Developed by:** Russia's Sukhoi Design Bureau under the PAK-FA (Prospective Airborne Complex of Frontline Aviation) program.
- **Features:**
  - **Stealth:** Low radar cross-section (RCS) through stealth shaping, radar-absorbent materials, and internal weapons bays.
  - **Multirole Capability:** Designed for aerial combat as well as precision strikes against land and sea targets.
  - **Twin Engines:** Uses **two AL-41F1 turbofan engines** with thrust-vectoring nozzles..
  - **Supermaneuverability:** Thrust vectoring and advanced aerodynamics enhance close-range combat performance.

- **Top Speed:** Mach 2.0 (about 2,400 km/h) at high altitude.
  - » Around Mach 1.09 (1,350 km/h) at low altitude
- **Avionics and Sensors:** Integrated avionics with advanced sensor fusion and situational awareness.

Was India's Response Tepid?

- **Lessons from Past Experience (FGFA–Su-57):** India had earlier exited the **FGFA project** linked to the Su-57 due to Concerns over **engine performance and stealth capability,** Limited **technology transfer and** High costs with unclear operational advantage
  - This history makes India wary of re-entering a similar arrangement.
- **Shift in India's Defence Procurement Philosophy:** India is increasingly prioritising:
  - **Indigenisation** (Tejas Mk-2, AMCA, indigenous drones, submarines)
  - **Diverse sourcing** (US, France, Israel, domestic industry)
  - Large Russian platforms risk **crowding out indigenous programmes**.
- **Technology and Future-Readiness Concerns: I**ndia seeks **cutting-edge, future-proof technologies**, especially in Fifth-generation fighters, AI-enabled drones and Underwater warfare
  - There are doubts about Russia's ability to Deliver **state-of-the-art technology and** Sustain long-term upgrades under sanctions
- **Strategic and Geopolitical Considerations:** Deep defence cooperation with Russia carries risks of **Secondary sanctions (CAATSA-related concerns)** complicating ties with the **US and Indo-Pacific partners**
- **Operational and Maintenance Issues:** The Ukraine conflict has highlighted **Supply chain disruptions and** Difficulty in spares, maintenance, and upgrades of Russian systems

Ekam AI & SAMBHAV

Context

The Indian Army showcased Ekam AI and SAMBHAV as part of the Vijay Diwas.

About Ekam AI

- It is a **fully indigenous and secure artificial intelligence platform** developed for use in sensitive defence and operational environments.
- It is designed to be **reliable, secure, and independent of foreign software or external cloud systems**.
- **Purpose:** The platform enables users (including defence personnel) to **analyse information, manage documents, and support decision-making** effectively even in high-security contexts.

Project SAMBHAV

- It is a **portable satellite-based communication system** designed to provide reliable mobile connectivity in areas with limited or no network coverage.
- **Purpose:** To **establish communication rapidly** in **remote border areas**, **disaster-affected regions**, and other connectivity-challenged locations.

Highlighted technologies included:

- **AI-based satellite imagery analysis** for real-time ground awareness.
- **Portable AI systems** for remote operations with limited connectivity.
- **Drone analysis tools** developed in India for threat assessment.

Other indigenous innovations showcased were:

- **Rapid-deploy bridges** for fast connectivity in challenging terrain.
- **All-terrain vehicles** tailored for rugged, mountainous environments.
- **Eco-friendly trackways** made from recycled plastic for improved mobility.
- **Silent electric tactical vehicles** for reduced noise and heat signatures.
- **Night-vision components** developed domestically, reducing dependency on imports.
- **Unmanned firefighting robots** for high-risk zones.
- **Quick-build protective shelters** and **green energy/sustainable infrastructure solutions**.

Exercise Desert Cyclone-2025

Context

The 2nd edition, Desert Cyclone-II, was held in Abu Dhabi, UAE, from 18 to 30 December 2025.

About Exercise Desert Cyclone

- It is a **bilateral joint military exercise**
- **Between India and the United Arab Emirates (UAE)** involving the Indian Army and the UAE Land Forces.

- It is designed to **enhance military cooperation, interoperability, and training** between the two countries.
- Troops will practice fighting in built-up areas, heliborne operations, mission planning and integration of UAS and Counter-UAS capabilities.
- **Initiated in:** 2024.

Important India–West Asia Military Exercises

Exercise	Partner Country	Service	Primary Focus	Strategic Importance
Zayed Talwar	UAE	Navy	Maritime security, naval operations	Secures Sea Lines of Communication (SLOCs) critical for India's energy imports
Naseem Al Bahr	Oman	Navy	Maritime security, anti-piracy, HADR	Strategic due to Oman's proximity to the Strait of Hormuz; long-standing naval cooperation
Al Najah	Oman	Army	Counter-terrorism, urban warfare	Complements India's access to Duqm Port; boosts land-force cooperation
Blue Flag	Israel (Multilateral)	Air Force	Advanced air combat, network-centric warfare	Provides exposure to high-end air combat tactics and interoperability with advanced air forces

Apache Helicopters

Context

The **Indian Army has received the final batch of AH-64E Apache attack helicopters from the United States**.

About Apache Helicopter

- The **AH-64E Apache** is a **fully integrated attack helicopter weapon system**, designed for **precision strikes, high situational awareness, and network-centric operations**.
- It is equipped with **advanced sensors and targeting systems**, **unmanned aircraft control capability**, and **robust digital connectivity**.
- The platform features a **proven and upgraded airframe**, offering **enhanced power, endurance, and manoeuvrability**, suited for **high-intensity and demanding operational environments**

Background of the Deal

- India decided to induct the **AH-64E Apache attack helicopters** as part of its effort to modernise **Army Aviation** and enhance **offensive strike capabilities**.
- The helicopters were acquired from the **United States** under the **Foreign Military Sales (FMS)** programme, which involves government-to-government transactions.
- **Why the U.S. Approved the Sale:** India is designated a **Major Defence Partner** of the United States.

Param Vir Chakra

Context

Portraits of all 21 Param Vir Chakra awardees (gallantry award) are now on display at Rashtrapati Bhavan.

About Wartime Gallantry Award

Establishment and Background

- **Instituted: 26 January 1950**, with retrospective effect from **15 August 1947**.
- Created after India became a Republic to replace British-era honours.
- Named **"Param Vir Chakra"**, meaning Wheel of the Ultimate Brave.

Category	Award Name	Level	Awarded For
Wartime 	**Param Vir Chakra**	Highest	**Most conspicuous bravery** or **supreme sacrifice** in the presence of the enemy.
	Maha Vir Chakra	Second-highest	For acts of **conspicuous gallantry in the presence of the enemy**.
	Vir Chakra	Third-highest	Acts of **gallantry on battlefield**

INS Taragiri

Context

INS 'Taragiri', has been delivered to the Indian Navy as part of Project 17A.

More in News

- Earlier INS Nilgiri, INS Udaygiri and INS Himgiri were received by the Indian Navy under Project 17A.

About INS Taragiri

- Built under Project 17A by Mazagon Dock Shipbuilders Limited (MDL) and Garden Reach Shipbuilders and Engineers (GRSE).
- Named after the erstwhile INS Taragiri (Leander-class), which served 1980–2013.
- **Key Features:**
  - The ships carry Long Range Surface to Air Missiles (LRSAM), BrahMos missiles, Barak-8, lightweight Anti-Submarine Torpedo, Indigenous Rocket Launcher (IRL).

» They carry advanced sensors such as multi-mission radar, the Shakti Electronic Warfare Suite, airborne early-warning radar, surface-surveillance radar, and Humsa-NG sonar.

Key Features of Project 17A Frigates

- Hull design is **4.54% larger** than the Shivalik-class (P-17).
- Enhanced **stealth and sleekness**, with advanced weapon and sensor suites.
- Uses **Combined Diesel or Gas (CODOG)** propulsion, including:
  - Diesel engine + Gas turbine.
  - Controllable Pitch Propeller (CPP).
  - **Integrated Platform Management System (IPMS)** for automation and efficiency.

Dark Eagle Hypersonic Missile system

Context

Recently the US Army and Navy completed integrated testing of the Dark Eagle Long-Range Hypersonic Weapon (LRHW).

About Dark Eagle Hypersonic Missile System

- It is a **U.S. intermediate-range, boost-glide hypersonic weapon** jointly developed for the **U.S. Army (LRHW)** and **U.S. Navy (CPS)**.
- **Mechanism:** Rocket booster accelerates → C-HGB separates → glides at hypersonic speeds while maneuvering unpredictably toward target.
- **Speed: Exceeds Mach 5**; likely **near Mach 10 in cruise** to meet
- **Launch platforms:**
  - **Army:** Mobile, land-based launcher
  - **Navy:** Surface ships and submarines (Conventional Prompt Strike)

Strategic Significance

- **Deterrence Against Peer Competitors:** Designed to counter advanced capabilities of China (DF-17) and Russia (Avangard, Zircon). It strengthens U.S. ability to penetrate advanced air and missile defence systems.
- **Shift in Warfare Doctrine:** Hypersonic weapons compress the **decision-making window**, increasing risks of miscalculation.

Anjadip Anti-Submarine Water Craft

Context

The Indian Navy has inducted Anjadip, the third of eight Anti-Submarine Warfare Shallow Water Crafts (ASW SWC).

About Anjadip

- **Named after: Anjadip Island**, off the coast of Karnataka.
- **Designed and Built Indigenously:** By **Garden Reach Shipbuilders and Engineers (GRSE)** under a **PPP model** with **L&T Shipyard**.
  - Over 80% indigenous content
- **Length:** ~77 metres.
- **Propulsion: Waterjets** (largest Indian naval warship to use waterjet propulsion).
- **Role:**
  - Anti-submarine warfare in shallow coastal waters
  - Coastal surveillance
  - Mine-laying operations
- **Legacy:** Continues the heritage of the earlier **INS Anjadip**, a **Petya-class corvette** decommissioned in 2003.

About Anti-Submarine Warfare Shallow Water Crafts (ASW SWC)

ASW SWC is a **specialised class of Indian naval warships** designed for **littoral and shallow-water operations**.

Primary purpose: Detect, track, and neutralise **enemy submarines** close to the coast.

- Developed under **Make in India** for the **Indian Navy**
- Built by **Garden Reach Shipbuilders & Engineers (GRSE)**
- Intended to replace ageing Soviet-era shallow-water ASW platforms

Important Military Exercises in News

Exercise	Participating Countries / Forces	Type & Domain	Key Aim / Focus	Other Important Facts
EKUVERIN	Indian Army & Maldives National Defence Force	Bilateral – Army	Counter-insurgency, counter-terrorism, HADR; training in semi-urban, jungle & coastal environments	Annual exercise; started in **2009**; "Ekuverin" means **Friends** in Dhivehi; **14th edition** held at **Thiruvananthapuram (Kerala)**
GARUDA SHAKTI	Indian Air Force & French Air and Space Force	Bilateral – Air Force	Enhance air combat interoperability and operational cooperation	First held in **2003** at **Gwalior**; conducted **every 2–3 years**; held alternately in India and France; **10th edition**
HARIMAU SHAKTI	Indian Army & Malaysian Army	Bilateral – Army	Jungle warfare and counter-insurgency operations	Started in **2012**; **5th edition (2025)** held in **Rajasthan**; Other India–Malaysia exercises: **Samudra Laksamana (Navy)**, **Udara Shakti (Air Force)**
EKATHA	Indian Navy & Maldives National Defence Force (MNDF)	Bilateral – Navy (Maritime)	Amphibious operations, coastal security, HADR, interoperability	Annual exercise; started in **2017**; **2025 edition** conducted in **Maldives**

Topic for Mains

Declining Parliamentary Health in India

Syllabus Mapping: GS2: Legislature, Executive

Context

The foundation of India's parliamentary democracy, the Westminster model of executive accountability to the legislature, has been fundamentally undermined and replaced by executive dominance.

Trends in declining quality of parliamentary democracy in India

Criminalisation of Politics

- **ADR–National Election Watch:** 46% of MPs have criminal cases; 31% face serious charges (murder, rape, kidnapping, crimes against women).
- Highest proportion recorded since 2004; upward trend from 34% (2014) → 43% (2019) → 46% (2024)

Decline in Legislative Scrutiny (Committee System)

- PRS Legislative Research: Only ~16% of Bills in the 17th Lok Sabha (2019–24) were referred to parliamentary committees.
- Sharp fall compared to earlier Lok Sabhas:
  - **14th LS: ~60%**
  - **15th LS: ~71%**
  - **16th LS: ~25%**

Parliamentary Disruptions & Productivity

- PRS (2024–25 sessions): Lok Sabha and Rajya Sabha functioned for well below two-thirds of scheduled time in several sessions.
- A large share of time lost to adjournments, protests and walkouts.
- Question Hour and private members business most affected, reducing executive accountability.

Mechanisms through which legislature ensures accountability

- **Question Hour**: Ministers answer queries on policies, actions, and administrative lapses.
- **Zero Hour**: MPs raise urgent matters requiring immediate government response.
- **Parliamentary Committees**: Standing Committees, PAC, Estimates Committee, and others scrutinise bills, budgets, and administrative performance.
- **Motions**: Censure motions, no-confidence motions, adjournment motions, and calling-attention motions compel the government to justify its actions.
- **Budgetary Control**: Legislature approves expenditure; cut motions and examination of demands for grants enforce financial accountability.
- **Debates and Discussions**: Policy debates during bills, budget sessions, and special discussions place government decisions under scrutiny.
- **Delegated Legislation Oversight**: Committee on Subordinate Legislation reviews rules and regulations made by the executive.
- **Audits and Reports**: CAG findings reviewed by PAC to examine misuse or inefficiency in public spending.

EXECUTIVE	LEGISLATURE
• **Composition:** President (nominal), PM & Council of Ministers (real power)	• **Composition:** Lok Sabha, Rajya Sabha, and President
• **Functions:** Policy-making, public services, national security, foreign affairs	• **Functions:** Law-making, budget approval, executive scrutiny
• **Powers:** Ordinances, key appointments, armed forces command, budget preparation	• **Powers:** Constitutional amendments, impeachments, emergency laws, treaties
• **Accountability:** To Lok Sabha (via collective responsibility)	• **Articles:** 79–123 govern its functioning

Reasons for declining effectiveness of Parliament

- **Criminalisation of Politics**: The rising proportion of MPs and MLAs facing criminal charges has adversely affected the quality of parliamentary functioning. Legislators with serious criminal cases often undermine ethical standards, weaken public trust, and reduce the quality of deliberations.
- **Executive-Led Legislature:**
  - **Marginalisation of Private Members' Bills**: Although Private Members' Bills are meant to reflect non-executive legislative initiative, they are rarely discussed or passed. The last such Bill to become law was in 1970, indicating the near-monopoly of the executive over the legislative agenda.
  - **Overuse of the Ordinance Route**: Frequent promulgation and re-promulgation of ordinances bypass parliamentary scrutiny, reducing Parliament to a post-facto ratifying authority rather than a deliberative law-making body. This weakens legislative accountability and federal consultation.
  - **Anti-Defection Law (10th Schedule):** While intended to curb political instability, the law restricts MPs and MLAs from voting or speaking against the party line. Fear of disqualification discourages dissent, independent thinking, and constituency-based representation, thereby limiting meaningful debate.
- **Partisan and Ineffective Role of Presiding Officers**
  - **Certification of Money Bills**: The increasing tendency to certify controversial legislation as Money Bills dilutes the constitutional role of the Rajya Sabha, undermining bicameralism and federal checks and balances.
  - **Poor Management of Disruptions:** Presiding Officers are often perceived as partisan and reluctant to act decisively against disorderly conduct, leading to frequent adjournments and loss of productive time.
  - **Delay in Decision-Making:** Failure to promptly decide on issues such as disqualification petitions under the Anti-Defection Law erodes public trust in parliamentary neutrality and institutional fairness.

- **Lowering Standards of Parliamentary Scrutiny**
  - **Absenteeism and Reduced Sittings**: High absenteeism of members and a decline in the number of parliamentary sitting days limit detailed discussions, questions, and accountability mechanisms.
  - **Dilution of Committee System:** A declining proportion of Bills being referred to Standing or Select Committees weakens expert scrutiny, stakeholder consultation, and evidence-based law-making.
  - **Use of Voice Votes:** Passing significant legislation through voice votes reduces transparency and avoids recording individual accountability of MPs.
  - **Guillotining of Demands for Grants**: Large numbers of Demands for Grants are guillotined without discussion, undermining Parliament's power of the purse and effective financial oversight of the executive.
- **Decline of Representative Democracy**
  - **Low Representation of Women:** Women constitute only about 14.3% of Members of Parliament, reflecting persistent gender imbalance and inadequate inclusiveness in political representation.
  - **First-Past-the-Post (FPTP) System**: The electoral system often leads to disproportionate seat-to-vote ratios, enabling parties to secure large majorities with limited popular vote share, weakening representativeness.
  - **Inadequate Research Support to MPs:** Most MPs lack access to robust research staff and institutional policy support, unlike advanced democracies. This constrains informed participation, especially during complex legislative debates.
- **Parliamentary Disruptions and Political Incentives**
  - **Ineffectiveness of Speaker/Chairman:** Disciplinary powers such as naming or suspension of members are rarely used consistently, encouraging a culture of impunity
  - **Government Reluctance to Debate Contentious Issues:** Avoidance of structured debates on sensitive matters fuels opposition protests, leading to disruptions rather than dialogue.
  - **Media Incentivisation of Disorder:** Televised disruptions provide instant visibility, creating perverse incentives for members to resort to protest politics instead of parliamentary engagement.

Impacts of Improper Functioning of Parliament

- **Constitutional Right Infringement**: Parliament's core functions such as law-making, representation, and oversight are essential parts of India's constitutional scheme.
  - While Article 75 of the Constitution does not explicitly create a freestanding right to ask questions, it frames the collective responsibility of the Council of Ministers to Parliament. Question Hour, Zero Hour, and debates operationalise representative accountability.
- **Impact**:
  - When disruptions truncate Question Hour, MPs are denied the effective opportunity to question the executive.
  - This inhibits informed discussions on policy implementation, public spending, and administration.
- **Hindrance to Representative Democracy:** Representative democracy depends on elected members expressing constituents concerns directly in Parliament. Improper functioning limits this channel of communication.
- **Impact**:
  - MPs unable to raise matters of public importance due to disruptions.
  - Constituents' voices go unheard, reducing accountability of the executive to the legislature.
- **Eg**: In the Budget Session 2025, several MPs reported that matters concerning farmers' distress and regional infrastructure projects could not be raised due to repeated disruptions and premature adjournments of the House.
- **Oversight Limitation:** Parliament's oversight function including questions, motions, and substantive debates is constrained by improper functioning.
- **Impact**:
  - Inability to hold the executive accountable for policy outcomes.
  - Policy errors and administrative lapses go unchecked.
- **Eg**: According to PRS Legislative Research (2025), less than two-thirds of scheduled time is often utilised productively in recent sessions.
  - Several reports note that 0 minutes of Unstarred/Starred Questions remain unanswered due to lack of time or quorum issues.
- **Lack of Order and Inadequate Discussion Time:** Frequent adjournments and disorderly conduct shorten scheduled debates, interrupting the legislative process.
- **Impact**:
  - Bills are often passed without proper debate or clause-wise examination.

• Reduced scrutiny increases risks of poorly drafted laws, contradictory provisions, and unintended policy consequences.

- **Anti-Defection Law**: The Tenth Schedule (Anti-Defection Law) was instituted to prevent political instability due to floor-crossing. However, its impact on parliamentary functioning is mixed.
- **Impact**:
  - MPs become reluctant to voice dissent even on legitimate issues for fear of losing membership.
  - Restricts intra-party debate and discourages independent thinking.
- **Eg**: In assemblies such as Karnataka (2019) and Madhya Pradesh (2020), legislators faced disqualification proceedings for publicly dissenting from party lines on key policy matters.
- **Disruptions:** Wastage of Public Resources and Stunted Governance. Parliamentary disruptions result in real economic and governance costs.
- **Impact**:
  - **Wastage of taxpayers money:** Parliament and state legislatures are funded by public exchequer; unused sitting days represent a direct loss of public resources.

- **Delayed decision-making**: Slows passage of key legislation, affecting economic reforms, welfare schemes, and crisis responses.

Case Study: UK/Canada Parliamentary Model

- **Planned Days**: UK Parliament meets over 100 days a year with opposition deciding the agenda for 20 days.
- **Effective Questioning of PM**: UK PM responds directly to MPs' questions.

Way Forward

- **Increase Sitting Days:** Adopt the Venkatachaliah Committee 2002 and Rajya Sabha Committee (2008) recommendation of a minimum 100 sittings annually with a pre-declared calendar.
- **Limit the Anti-Defection Law:** Limit the 10th Schedule to **confidence and money bills** (**Law Commission's 170th Report**.)
- **Mandatory Committees Scrutiny:** Make committee scrutiny compulsory for **all non-emergency bills and provide them with research support.**
  - **Example:** The **UK Select Committees** and **US Congressional Committees.**
- **Establish an Independent Parliamentary Budget Office (PBO):** On the lines of the **U.S. Congressional Budget Office (CBO)** to give MPs **independent analyses** of **fiscal proposals, budget assumptions, and long-term expenditure commitments.**

Parliamentary control over Executive

Introduction

In a Parliamentary system, oversight of the Executive by the Parliament is designed to ensure that the Executive remains accountable for its actions and policies, preventing it from wielding unchecked power or acting arbitrarily. To fulfill this role, Parliament employs various mechanisms such as deliberations and debates, including the Question Hour and Zero Hour, legislative approval or rejection, financial scrutiny through committees like the Estimates Committee, Public Accounts Committee, and Departmentally Related Standing Committees (DRSCs), as well as procedural tools such as the No Confidence Motion and Adjournment Motion.

Effectiveness of Parliamentary oversight in ensuring a responsive and accountable Executive

- **Legislative tools for scrutiny:** Question hour and Zero hour allow members to raise urgent matters and question ministers directly.
  - **Eg: Questions on the Rafale deal and Pegasus spyware** brought significant public and media attention to issues of national security and privacy.
- **Parliamentary Committees**: Department-Related Standing Committees (DRSCs) conduct detailed scrutiny of bills and policies away from political pressures.
  - **Eg**: The Public Accounts Committee (PAC) led to the exposure of the **2G spectrum scam and Commonwealth Games irregularities**.
- **Budgetary Oversight:** The scrutiny of the Union Budget, demands for grants, and reports of the Comptroller and Auditor General (CAG) enable Parliament to review the use of public funds.
  - **Eg**: Parliamentary debates have questioned allocations to health and education sectors, influencing policy priorities.
- **Motions and Debates:** Tools such as no-confidence motions, adjournment motions, and discussions under **Rule 193 or Rule 184** serve to hold the government accountable.
  - **Eg**: The 2018 no-confidence motion against the NDA government, although unsuccessful, compelled the Prime Minister to address critical issues in Parliament.

Ineffectiveness of Parliamentary oversight in ensuring a responsive and accountable Executive

- **Majority party dominance**: Since the Executive is formed by the party or coalition with a majority in Parliament, it often overrides opposition voices, even when substantial concerns are raised about proposed legislation.
- **Decline in deliberation and discussion:** Parliamentary sessions are increasingly marked by disruptions rather than meaningful debate.
  - **Eg:** According to **PRS Legislative Research,** the **16th Lok Sabha (2014–19) lost 16%** of its scheduled time to disruptions.
- **Inadequate legislative scrutiny:** A significant number of bills are passed without being referred to Parliamentary Committees, reducing opportunities for detailed examination.
  - **Eg**: In the 16th Lok Sabha, only 25% of bills were referred to committees, compared to 71% and 60% in the 15th and 14th Lok Sabha, respectively.
- **Frequent use of the guillotine:** Budget proposals are often passed using the guillotine procedure, where remaining demands for grants are put to vote without discussion, thereby weakening financial oversight of the Executive.
- **Rise of delegated legislation:** The increasing use of delegated legislation has shifted law-making powers from the Parliament to the bureaucracy, reducing legislative involvement in drafting detailed regulations.

Measures to strengthen Parliamentary control over the Executive

- **Enhanced role for the Opposition:** Allowing the Opposition greater influence in setting the agenda—similar to practices in the UK and Canada—can improve government accountability.
- **Reinforced floor accountability**: Amend procedural rules to require the Prime Minister to respond to questions covering multiple ministries, and ensure that Committee reports are debated in both Houses.
- **Parliament's power to self-convene:** At present, Parliament meets at the President's summons, based on the Executive's advice. A constitutional amendment allowing Parliament to convene at the request of a specified number of MPs could improve responsiveness to urgent issues.
- **Strengthening the Committee system:** Make ministerial appearances before committees mandatory, enhance transparency through video-recorded meetings, and encourage greater public engagement in committee proceedings.

Conclusion

CJI BR Gavai recently quoted that the "Constitution is supreme and not us" while urging for harmony between judiciary, executive and the Parliament. Therefore, a more robust Parliamentary oversight framework would not only hold the Executive accountable but also ensure more efficient policy-making and better governance outcomes for citizens.

National Judicial Policy: Rethinking Judicial Governance in India

Syllabus Mapping: GS2: Judiciary

Context

Chief Justice of India Surya Kant has urged the development of a comprehensive national judicial policy aimed at strengthening consistency and predictability in the functioning and decision-making of the judiciary.

About National Judicial Policy:

A National Judicial Policy would serve as a shared guiding framework for courts across India, promoting uniform standards in judicial functioning while respecting constitutional independence. Its objective is to ensure consistency in interpretation and application of law across the Supreme Court and all 25 High Courts. By aligning judicial approaches on major constitutional and legal questions, it enables courts to function in a coherent and harmonious manner, without compromising decisional autonomy.

Current Judicial System Gaps

- India's judge-to-population ratio is only **21 judges per million people**, far below the **120th Law Commission's recommended 50 per million**,
- India has over **5 crore pending cases**, including 4.6 crore in district courts, 63+ lakh in High Courts, and nearly 90,000 in the Supreme Court.
  - The government (Union + States) accounts for **nearly 50% of all cases**, making it the single biggest contributor to pendency.
- As of 2025, there are 334 vacant judge-posts in various High Courts (out of a sanctioned strength of 1,122 judges).
- District courts **lack 4,000+ courtrooms and thousands of staff positions**.

Need for a Consistent National Judicial Policy

- **Divergent Judicial Interpretations:** Different High Courts frequently deliver conflicting judgments on similar legal issues, creating uncertainty for citizens, governments, and businesses.
- **Inconsistency Across Supreme Court Benches:** Contradictory or varying orders by different Benches of the Supreme Court weaken legal certainty and complicate policy implementation nationwide.
- **Mounting Pendency of Cases:** With over 5.4 crore cases pending across Indian courts, the absence of standardised case-flow management practices hampers timely justice delivery.
- **Access Barriers to Justice:** High litigation costs, language barriers, long travel distances, and procedural delays disproportionately exclude marginalised communities from effective judicial remedies.
- **Uneven Judicial Infrastructure:** Court infrastructure, staffing levels, and technological capacity vary widely across states, undermining the principle of equal access to justice.
- **Need for Judicial Harmony:** A common framework would promote adherence to shared constitutional values while allowing courts to function independently within their jurisdictional space.

Initiatives Taken in This Direction

- **Promotion of Mediation**: Courts are increasingly encouraging structured mediation and capacity-building programmes to reduce adversarial litigation and speed up dispute resolution.
- **Digital Justice Reforms:** Introduction of e-filing, virtual hearings, digital transcripts, and multilingual platforms aims to improve efficiency and accessibility of courts.
- **Strengthening Arbitration:** India has upgraded arbitration infrastructure and aligned procedures with international best practices to ease judicial burden.
- **International Judicial Engagement:** Judicial exchanges and cooperation initiatives enable Indian courts to learn from global experiences and enhance cross-border legal coordination.
- **Infrastructure Development:** Focus has increased on modern court complexes, improved staffing, and technological upgrades to reduce systemic delays.

Challenges Associated with a National Judicial Policy

- **Federal Structure Constraints:** India's diversity of state laws, languages, and local practices makes uniform implementation complex.
  - Eg: In 2024, the Madras High Court rejected Tamil Nadu's proposal to conduct proceedings in Tamil, reaffirming English as the sole court language.
- **Concerns Over Judicial Independence**: A national policy must not dilute High Courts' constitutional autonomy under Articles 225 and 226, or enable executive interference.
  - Eg: The Supreme Court struck down parts of the Tribunal Reforms Act, 2021, citing threats to judicial independence in appointments and tenure.
- **Infrastructure Deficits**: Poor connectivity, staff shortages, and inadequate facilities obstruct uniform procedural and digital standards
  - **Eg: In 2025, courts in Satgawan (Jharkhand)** reported frequent internet failures; nationally, 26% of courts lack women's toilets, and many lack power backup.
- **Shortage of Judges:** Large vacancies and excessive caseloads undermine uniform timelines and speedy justice.
  - **Eg: The Allahabad High Court (2025)** operated with nearly 50% vacancies, forcing judges to hear 80–100 cases daily.
- **Resistance to Reform:** Lawyers and court staff often resist sudden procedural or technological changes without adequate training.
  - **Eg: Lawyers in Thoothukudi and Puducherry (2023)** boycotted courts over mandatory e-filing due to infrastructure and training gaps.

- **Digital Divide:** Tech-centric reforms risk excluding rural and marginalised populations lacking devices or digital literacy
  - Eg: Virtual hearings were delayed in the Delhi High Court due to platform glitches, while SC/ST communities in Kurnool lacked access to basic digital tools.

Global Models of National Judicial Policy and Justice Sector Reform

Jurisdiction	Reform Framework / Strategic Plan
Portugal	Over the past decade, Portugal has instituted a comprehensive justice-sector reform under strategic programmes such as **Justiça + Próxima**, **Justiça +**, and the broader GovTech framework — aiming to modernise the entire judicial system, improve access to justice, digitise services, and make justice "people-centred."
Sweden (and several other EU countries)	Through judicial councils (e.g., through institutions analogous to a "Council for the Judiciary"), courts in Sweden and some EU countries manage strategic planning — covering staffing, budget allocation, training, infrastructure, automation, case management, and long-term administrative policy.
Denmark	Denmark established an independent "Council for the Judiciary" (late 1990s) with explicit powers to draw up strategic policy plans for judicial procedures, court administration, resource allocation, training, and automation — in effect functioning like a national judicial policy authority.
Vietnam	The government has launched a draft strategic roadmap aiming at comprehensive judicial reform — including institutional restructuring, improved judicial support services, legal aid, and justice-system modernisation through 2030 (with a vision to 2045).

Way Forward

- Jointly draft a National Judicial Policy involving the Supreme Court, High Courts, and the Law Ministry.
- Harmonise court procedures on listings, timelines, precedents, and documentation.
- Strengthen the lower judiciary through recruitment, training, and infrastructure investment.
- Ensure digital platforms are inclusive, secure, multilingual, and accessible in remote regions.
- Expand ADR mechanisms, especially mandatory pre-litigation mediation.
- Institutionalise regular judicial conferences and structured inter-court coordination.

Conclusion

A well-designed National Judicial Policy can enhance clarity, predictability, and fairness in India's justice delivery system. By harmonising judicial practices while safeguarding independence, it deepens public trust and reinforces the rule of law. As observed by the Chief Justice of India, constitutional rights acquire real meaning only when justice is timely, consistent, and accessible to all.

Digital Constitutionalism: A New Frontier of Rights

Syllabus Mapping: GS2: Salient features, Rights

Context

The Centre withdrew its directive requiring all mobile manufacturers to pre-install the Sanchar Saathi app from 2026 after strong concerns over privacy, consent, and surveillance. The rollback, triggered partly by industry resistance including Apple, revived the broader debate on state power, data misuse, and the need for digital constitutionalism.

Introduction

Digital constitutionalism denotes the projection of constitutional values into the digital realm. It seeks to apply principles such as liberty, dignity, equality, privacy, due process, proportionality, and the rule of law to digital technologies, online platforms, and data-driven governance. At its core, it ensures that technological power operates within constitutional limits, rather than above them.

Evolution of the Concept

- The idea gained global traction as digital technologies began reshaping political participation, governance, and individual freedoms. Concerns emerged around unchecked surveillance, algorithm-based decision-making, and the concentration of power in digital platforms.
- In India, digital constitutionalism received a decisive boost after **Justice K.S. Puttaswamy judgment (2017)**, which recognised privacy as a fundamental right in the digital age. Internationally, the EU's General Data Protection Regulation (2018) reinforced notions of data sovereignty, informed consent, and accountability.
- Academic discourse traces the concept to early warnings about algorithmic governance, mass data collection, and erosion of civil liberties.

Core Features of Digital Constitutionalism

- **Rights-Centric Digital Governance:** Digital systems must be designed to uphold privacy, dignity, autonomy, and equality, ensuring that technology serves constitutional values rather than undermines them.
- **Constraints on Surveillance Powers**: Both state and corporate surveillance must satisfy tests of legality, necessity, proportionality, and procedural safeguards, supported by independent oversight.
- **Transparency in Algorithms:** Decision-making systems using AI or automated processes should be auditable, explainable, and subject to disclosure requirements to prevent arbitrary or opaque governance.
- **Genuine Consent Frameworks**: Consent must be informed, voluntary, specific, and revocable, enabling individuals to exercise meaningful control over their personal data.

- **Safeguards Against Digital Discrimination:** AI systems must be evaluated for bias to prevent reinforcement of caste, gender, ethnic, or socio-economic inequalities through automated tools.

Legal Framework Governing Digital Rights in India

- **Article 21 and the Right to Privacy:** The Supreme Court in Puttaswamy (2017) mandated that any digital intrusion must meet standards of legality, necessity, and proportionality.
- **Digital Personal Data Protection Act, 2023:** Regulates data collection, processing, and consent obligations of data fiduciaries. However, wide exemptions granted to the State dilute individual protections.
- **Information Technology Act, 2000 and IT Rules (2021/2023):** Provide the regulatory architecture for intermediaries, cybersecurity, and online content governance, with a stronger focus on control than rights protection.
- **Aadhaar Act, 2016:** Regulates biometric identity use, with Supreme Court-mandated limitations on purpose expansion to prevent misuse and surveillance overreach.
- **Absence of a Dedicated Surveillance Law**
- Digital interception continues under colonial-era and early-internet statutes like the Telegraph Act, 1885 and IT Act, 2000, which lack modern safeguards and judicial supervision.

Challenges to Digital Constitutionalism

- **Unregulated Surveillance Practices:** Technologies such as facial recognition, metadata analysis, and biometric monitoring operate with minimal transparency and weak judicial oversight.
- **Erosion of Meaningful Consent:** Click-wrap and blanket consent mechanisms undermine user autonomy and enable excessive data harvesting.
- **State Exemptions from Data Protection Norms:** Broad governmental exemptions under the DPDP Act reduce accountability and permit disproportionate data access.
- **Algorithmic Opacity and Bias**
- Black-box AI systems can produce discriminatory outcomes, disproportionately impacting women, minorities, and economically vulnerable groups.
- **Institutional Vacuum**
- India lacks a specialised, independent body to audit algorithms, supervise surveillance, and enforce digital constitutional rights.

Way Forward

- Enact a comprehensive surveillance law mandating judicial warrants, proportionality review, and independent oversight.
- Establish an autonomous Digital Rights Commission to regulate algorithms, supervise data practices, and redress violations.
- Strengthen the DPDP framework by narrowing state exemptions, enhancing remedies, and enforcing strict data retention limits.
- Mandate algorithmic impact assessments, bias audits, and explainability norms for high-risk AI used in governance.
- Promote digital literacy to empower citizens to understand, assert, and defend their data rights.

Conclusion

As governance increasingly relies on data and algorithms, constitutional values must remain the moral and legal compass of digital transformation. Without robust safeguards, surveillance and opaque technologies risk hollowing out liberty, equality, and democratic accountability. Digital constitutionalism ensures that technology strengthens citizenship and freedom, rather than becoming an invisible mechanism of control.

Right to Disconnect and the Future of Work

Syllabus Mapping: GS2: Fundamental rights, Bills

Context

NCP (SP) MP Supriya Sule and Congress MP Shashi Tharoor have introduced Private Members' Bills in the Lok Sabha to legally establish the right to disconnect amid growing concerns over work–life balance and mental-health stress in an increasingly hyper-connected work environment.

About Right to Disconnect

- It is a labour right that **allows employees to disengage from work-related communication outside official working hours** without fear of penalty or adverse employment action.
- The concept of disconnecting from work finds its roots in A**rticle 24 of the Universal Declaration of Human Rights (UDHR**) which states that **'Everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay.'**
- In India, the Right to Disconnect can be interpreted within **Article 21,** which guarantees the Right to Life and Personal Liberty.
- **Judicial Expansion of Article 21 to Include Health:**
  - **State of Punjab v. M.S. Chawla (1997):** The Supreme Court held that the **right to health and medical care** is an integral part of Article 21.
  - **CESC Ltd. v. Subash Chandra Bose (1992):** The Court defined health as complete **physical, mental, and social well-being**, not just the absence of disease. This makes overwork, burnout, and "telepressure" constitutional concerns.

Definitional Gaps in Understanding 'Work'

- A key weakness of the Right to Disconnect Bill lies in its failure to define what constitutes "work" in a digitally mediated economy.
  - Indian labour law has historically been structured around physical attendance, fixed schedules, and clearly demarcated working hours.
- Although the Bill permits employees to ignore work-related communications outside prescribed hours, it does not clarify whether responding to emails, messages, or calls after hours amounts to "work" in legal terms.
  - This ambiguity becomes particularly important when read alongside the Occupational Safety, Health and Working Conditions Code, 2020, which continues to regulate working time and overtime without explicitly addressing digital engagement beyond formal schedules.

- By addressing communication without incorporating it into the legal framework governing working hours, the Bill introduces a conceptual disconnect.
  - As a result, the right risks operating more as a behavioural guideline than as an enforceable labour standard, thereby weakening its practical impact.

Constitutional Dimensions of the Right to Disconnect

- The Bill also raises unresolved constitutional questions. The freedom to disengage from work is closely connected to Article 21 of the Constitution, which guarantees the right to life and personal liberty. The ability to disconnect directly affects personal autonomy, dignity, mental health, and well-being, all of which have been judicially recognised as elements of Article 21.
- Yet, the Bill does not articulate this constitutional basis or clarify how such guarantees are to be operationalised within employment relationships. Consequently, it remains ambiguous whether the right to disconnect is merely a statutory labour entitlement or reflects a broader constitutional commitment to autonomy and human dignity in the workplace.

Core Elements Proposed in the Right to Disconnect Bill, 2025

The Bill seeks to recalibrate employer–employee relations in the digital age by formally recognising limits to after-hours work. Its key provisions include:

- **Post-work communication limits:** Employers may initiate communication beyond official working hours, but employees are under no legal obligation to respond once their workday ends.
- **Protection against retaliation:** Employees cannot be subjected to disciplinary action, adverse appraisal, or workplace discrimination for declining after-hours emails, calls, or messages.
- **Institutional oversight mechanism:** The Bill proposes the establishment of an Employees' Welfare Authority, tasked with framing sector-specific standards, monitoring compliance, and addressing grievances related to digital overreach.
- **Collective negotiation of after-hours norms:** Enterprises employing more than ten workers must negotiate and formally define after-hours work expectations. Any work performed beyond regular hours must be compensated as overtime at standard rates.
- **Mental health safeguards:** Employers are required to provide counselling services and facilitate access to digital detox centres, acknowledging the psychological toll of constant connectivity.
- **Deterrent penalties:** Non-compliance attracts a financial penalty equivalent to 1% of total employee remuneration, introducing enforceability rather than mere advisory guidance.

Significance of the Bill

- **Protection of Employee Well-being:**
  - The Bill directly addresses the health consequences of an "always-on" work culture, including stress, anxiety, burnout, and sleep deprivation. It responds to the growing phenomenon of telepressure, the perceived compulsion to respond instantly to digital communication.
  - **Eg: A 2023 McKinsey Health Institute survey** found that 59% of Indian respondents reported symptoms of burnout, far exceeding the global average of 20%, underscoring the urgency of regulatory intervention.
- **Restoration of Work–Life Balance:** By legally demarcating working time and personal time, the Bill reinforces the classical labour principle of balanced daily life: eight hours of work, eight hours of rest, and eight hours of leisure. This formal boundary is especially relevant in remote and hybrid work environments where spatial separation between office and home has eroded.
- **Assurance of Fair Compensation:** The Bill mandates overtime pay for employees who voluntarily engage in work beyond prescribed hours. This ensures that digital availability is not extracted as unpaid labour, correcting a common imbalance in modern service-sector employment.
- **Employer Accountability:** The proposed penalty clause transforms the right to disconnect from a moral expectation into a compliance-based obligation. The financial cost of violations incentivises firms to redesign internal communication norms and workload planning.
- **Recognition of a Legal Right:** By codifying rest as a legally enforceable entitlement, the Bill aligns India with jurisdictions such as France and Portugal, where the right to disconnect is embedded within labour law rather than left to corporate policy.

Arguments Supporting Long Working Hours

- **Economic Growth Imperative:** Proponents argue that longer working hours increase aggregate output and productivity, supporting India's aspiration to become a $5 trillion economy. Institutions such as the World Bank and ILO note that developing economies often rely on extended labour input during high-growth phases.
- **Global Competitiveness:** Extended work schedules are seen as necessary for competing with high-intensity economies like China and South Korea, where demanding work cultures, such as China's "996" model, are prevalent.
- **Sector-Specific Demands:** Industries like IT, finance, manufacturing, and startups operate across time zones and fast innovation cycles, often requiring longer hours to meet global delivery timelines. High-profile endorsements of long workweeks, such as Elon Musk's advocacy of 80-hour schedules, reinforce this view.
- **Perceived Employment Security:** Employees may voluntarily work extended hours to signal dedication, improve performance evaluations, and enhance career prospects, especially in competitive corporate environments.
- **Optimal Use of Capital:** In capital-intensive sectors, longer work cycles ensure better utilisation of infrastructure and machinery, maximising returns on investment and supporting industrial expansion.

Arguments Opposing Long Working Hours

- **Productivity Decline**: Empirical evidence suggests diminishing returns beyond a threshold of working hours. An OECD (2023) study confirms that prolonged work reduces output per hour and increases error rates.
- **Health and Safety Risks:** The ILO–WHO Joint Report (2021) links long working hours to heightened risks of cardiovascular disease, depression, and anxiety, imposing long-term social and economic costs.
- **Work–Life Imbalance**: Excessive work erodes personal relationships, leisure, and overall life satisfaction. Countries like France, which introduced shorter workweeks, did so partly to counter these adverse social effects.
- **Reduced Job Satisfaction and Higher Attrition:** Sustained overload lowers morale and accelerates burnout, contributing to higher employee turnover. The Gallup Global Workplace Report (2022) identifies overwork as a key driver of disengagement.
- **Loss of Creativity and Innovation:** Cognitive fatigue undermines analytical thinking and creativity. Notably, Microsoft Japan's four-day workweek experiment recorded improvements in productivity and innovation, challenging assumptions that longer hours equal better outcomes.
- **Gendered Impact:** Extended working hours disproportionately burden women, especially working mothers, who shoulder a larger share of unpaid care work. UN Women (2023) highlights how such patterns widen gender gaps in employment and leadership.

Global Examples

- **France (2017):** Mandatory email blackout periods.
- **Italy (2017):** Right to disconnect for remote workers.
- **Spain (2018):** Data protection and digital rights law.
- **Australia (2023)**: Fair Work Amendment Bill establishes a statutory right to disconnect.

Way Forward

- **Sector-Specific Regulations:** Different industries (IT, BPO, gig, manufacturing, startups) require different levels of flexibility.
  - **E.g.,** France applies broad rules but allows sectoral agreements for industries that need extended availability.
- **Mandatory Corporate Policies on Digital Disconnection:** Firms should be required to create internal policies: email blackout hours, delayed-send features, and escalation protocols.
  - **E.g.,** Germany's Volkswagen stops email servers after office hours for certain employee categories.
- **Strengthening Enforcement Through Digital Tools:** Instead of physical inspections, digital logs (email timestamps, messaging patterns) can be used for compliance checks.
  - **E.g.,** Ireland's Code of Practice relies on organisation-level monitoring rather than state enforcement.
- **Defined Rest Windows:** Platform companies should provide algorithm-defined rest periods and restrict task pings after certain hours.
- **Promote Culture Change:** Government and industry bodies should run awareness campaigns highlighting burnout, productivity loss, and mental-health effects.
  - **E.g.,** Australia's Fair Work Commission couples legislation with workplace mental-wellbeing programs to shift culture.

Lok Adalat

Syllabus Mapping: GS2: Judiciary

"Peace is a sine qua non for development"

Context

Lok Adalats embody a people-centric justice delivery system that combines legal finality with conciliation, making justice accessible, affordable, and humane while significantly reducing the burden on courts.

Introduction to Lok Adalats

- Lok Adalat means **"People's Court"** and is **based on Gandhian principles**.
- Lok Adalats are given statutory status under the **Legal Services Authorities Act, 1987**.
- **Section 19(5):** Lok Adalats have jurisdiction to arrive at a compromise or settlement.
- **Section 22:** They have the same powers as vested in Civil Courts under CPC, 1908 for certain matters.
- It is an **Indian innovation** in the judicial system.
- Lok Adalats are being organized by NALSA and State LSAs for amicable settlement of disputes. Though Lok Adalats are designed to expedite case resolution, they encounter challenges due to their limited powers compared to regular courts

Data

- National Lok Adalats achieved a **110% increase** in total case disposals in 2023 compared to the previous year.
- **State Lok Adalats** improved from **8,51,309 cases (FY 2022-23)** to **9,97,494 cases (FY 2023-24)**

Function/Role/Power of Lok Adalats

- **Utilization of Existing Infrastructure**: Lok Adalats are typically held on non-working days of the courts. This allows for the optimal use of existing court infrastructure for periodic Lok Adalats without requiring dedicated space.
- **Judicial Training**: Referral judges and deputed judges for Lok Adalats are:
  - Regularly trained at State Judicial Academies
  - Training is aligned with State-specific judicial training schedules
- **Pre-Lok Adalat Meetings**: NALSA encourages SLSAs to conduct these meetings to ensure parties are informed and motivated to attend.
  - Result: These efforts have led to a noticeable increase in disposal rates.
- **Alternate Dispute Resolution (ADR):** Effective for resolving disputes in a conciliatory manner outside courts.
- **Pocket friendly:** No court fees are payable, and any paid fees are refunded if the dispute is settled there (According to NALSA). This enables Lok Adalats to provide a cost-effective and speedy alternative to traditional court proceedings.

- **Non-Appealable:** Awards are deemed decrees of a civil court. An appeal is generally not allowed against an award passed by a Lok Adalat. The award of a Lok Adalat is considered final and binding on all parties involved.

Challenges Faced by Lok Adalats

- **Limited Powers Compared to Regular Courts**: Lok Adalats do not possess the full range of powers that regular courts have. This limits their ability to enforce participation and manage proceedings effectively.
- **Absence of Formal Procedures:** Lok Adalats are not bound by strict legal procedures. While this provides flexibility, it may result in inconsistency and inefficiency in handling disputes.
- **Inability to Compel Party Attendance**: Lok Adalats cannot legally compel parties to appear. This often leads to one or more parties being absent during hearings.
- **Resulting Delays in Disposal:** When parties fail to appear, the intended swift resolution process is disrupted. This defeats the objective of quick and amicable dispute settlement.
- **Complexity**: Repeated sittings with the same judge are often not feasible, breaking the continuity of deliberations.
- **Imposed Justice**: Compromises may be imposed on the poor who may have limited choices.
  - **Eg:** Some litigants may accept reduced compensation or future values of claims to end a long-pending legal process.
- **Patriarchy**: Poor women may be pressured by family courts to compromise matrimonial disputes under romanticized views of marriage.

Way forward

- **State Legal Services Authorities (SLSAs)** have been advised to take up the matter of **infrastructure, facilities, and staffing** at the **State/UT Government and High Court level.**
  - In order to ensure **long-term institutional support** for the efficient functioning of Lok Adalats
- **NALSA proposes to launch extensive awareness initiatives** to:
  - Promote Lok Adalats as effective **Alternative Dispute Resolution (ADR)** mechanisms.
  - Encourage **higher participation**, further boosting efficiency and disposal rates.
- **Literacy Programs:** Provide legal literacy and aid programs for the poor and marginalized.
- **Awareness Camps:** Conduct camps at grassroots levels and use mass media to spread awareness.
- **Increase Remuneration:** Raise remuneration for lawyers from legal service authorities to encourage effective assistance.
- **Establish Balance**: Balance formal and informal forums to encourage redressal through Lok Adalats.
- **Protect Indigenous People:** Address social injustices in rural cultures by integrating some protections from the judicial system.
- **Regularity**: Increase the frequency of Lok Adalats.

Conclusion

Lok Adalats play a **crucial role in advancing "equal access to justice" and clearing case backlog**s. Their success in Indian practice underscores their importance in the justice system.

Rewriting Consent: The Case for Criminalising Marital Rape in India

Syllabus Mapping: GS2: Rights, Legal and Constitutional framework

Context

The issue of criminalising marital rape has returned to public and legal debate following the introduction of a Private Member's Bill that seeks to delete the marital rape exception contained in Section 63 of the Bharatiya Nyaya Sanhita (BNS), 2023.

This renewed discussion gains urgency in light of NFHS-5 data, which indicates that nearly three in ten married women in India have faced spousal violence, even as non-consensual sexual acts within marriage continue to remain outside the definition of rape under criminal law.

Legal Status of Marital Rape in India

- **Present legal position:** Sexual intercourse without consent by a husband with his adult wife does not amount to rape under Indian criminal law, owing to a specific statutory exemption.
- **Statutory basis:** The marital rape exception that existed under Section 375 of the IPC has been carried forward into Section 63 of the BNS, 2023, with the only exception being cases where the wife is below 18 years of age.
- **Alternative legal remedies:** While married women may seek protection under the Protection of Women from Domestic Violence Act, 2005, the law offers civil relief such as protection orders and residence rights, rather than criminal prosecution for rape.

Why the Marital Rape Exception is Considered a Colonial Vestige

- **Colonial patriarchal foundations**: The exception is derived from British common law traditions that viewed wives as subordinate to their husbands, effectively treating them as property under the Doctrine of Coverture.
- **Doctrine of implied consent**: The legal fiction that marriage entails perpetual and irrevocable sexual consent underpins the exception, a concept that has been discarded in contemporary legal systems.
- **Constitutional incompatibility**: The exemption is widely criticised as being inconsistent with Article 14 (equality before law) and Article 21 (right to life, dignity, and bodily autonomy), as interpreted by the Supreme Court in recent jurisprudence.
- **Global rejection of the exception**: Notably, the United Kingdom abolished the marital rape exception in 1991, highlighting the outdated nature of India's continued adherence to the doctrine.
- **Disregard of expert recommendations:** The Justice Verma Committee (2013) unequivocally recommended the removal of the marital rape exception, describing it as legally untenable and contrary to constitutional principles.

Legal Status of Marital Rape in India

- **Prevalence vs legal recognition:** Data from NFHS-5 reveals that nearly 30% of married women have experienced spousal violence, yet forced sexual relations within marriage continue

to remain outside the scope of criminal rape law, raising serious concerns about gender justice.

- **Statutory position under BNS:** The Bharatiya Nyaya Sanhita, 2023, retains the marital rape exemption in Section 63, which excludes sexual acts between a husband and his wife from the definition of rape, provided the wife is 18 years or older.
- **Equality concerns (Article 14):** The exemption results in unequal legal treatment by denying married women the same protection against sexual violence that is available to unmarried women.
- **Violation of personal liberty (Article 21):** Non-criminalisation undermines a woman's right to bodily autonomy, dignity, and personal liberty, all of which form part of the constitutional guarantee under Article 21.
- **Inconsistency with child protection laws:** Sexual intercourse with a wife below 18 years is punishable under POCSO, yet identical conduct against an adult wife is exempt, creating an internal inconsistency in the legal framework.
- **Judicial developments:** Several High Courts have questioned the constitutional validity of the marital rape exception, though the Supreme Court has not yet delivered a definitive ruling on the issue.

Social Implications of the Legal Exemption

- **Reinforcement of patriarchy:** The exemption reflects and perpetuates the belief that marriage grants unconditional sexual access to the husband.
- **Social stigma and silence:** Survivors of marital rape often face societal pressure and disbelief, discouraging reporting and legal action.
- **Mental health impact:** Sustained sexual violence within marriage can result in severe psychological harm, including anxiety, depression, and trauma.
- **Erosion of dignity and right:** The failure to recognise marital rape negates women's status as equal partners within marriage.
- **Limited access to justice:** With no criminal remedy, victims are left with inadequate legal options, fostering insecurity and helplessness.

Arguments in Favour of Criminalisation

- **Advancing gender equality:** Criminalisation would affirm women's equal status and bodily autonomy, aligning domestic law with constitutional principles.
- **Human rights obligation**: International organisations, including the United Nations, regard the criminalisation of marital rape as integral to the protection of human rights.
- **Global practice**: Countries such as the United Kingdom, Canada, and Australia have abolished the marital rape exemption.
- **Closing legal gaps:** Existing laws like the Protection of Women from Domestic Violence Act, 2005 provide civil remedies but do not address criminal accountability.
- **Deterrence against abuse**: Legal recognition would act as a deterrent and send a strong normative signal against sexual violence within marriage.

Arguments Against Criminalisation

- **Risk of misuse:** Critics argue that the law could be misused through false allegations; the NCRB Crime in India Report (2020) noted that about 8% of reported rape cases were classified as false.
- **Impact on marital stability:** There are concerns that criminalisation may increase marital discord and divorce.
- **Adequacy of existing remedies:** Some contend that laws such as the PWDVA already provide protection by ensuring violence-free households.
- **Evidentiary challenges:** Proving lack of consent in a marital relationship may be difficult due to the private nature of the offence.
- **Cultural resistance:** Opposition is often rooted in traditional beliefs about marriage, with marital rape sometimes dismissed as a foreign or Western concept.

Way Forward

- **Criminalise marital rape:** India should remove the statutory exemption, in line with constitutional morality and global human rights standards.
- **Build safeguards against misuse:** Clear procedural guidelines, evidentiary standards, and judicial oversight can prevent abuse of the law.
- **Awareness and sensitisation**: Nationwide campaigns are needed to reshape societal attitudes towards consent within marriage.
- **Judicial and institutional reform:** Fast-tracking cases and providing gender-sensitive training to judges and law enforcement can improve justice delivery.
- **Strengthen survivor support:** Expanded counselling, rehabilitation, and protection services, drawing from models such as Sweden, should be institutionalised.

Conclusion

Recognising marital rape as a criminal offence is central to upholding women's equality, dignity, and autonomy within marriage. For India's legal system to reflect contemporary constitutional values and human rights norms, the marital rape exemption must be revisited and reformed.

Contempt of Court

Syllabus Mapping: GS2: Judiciary

Context

The Supreme Court overturned a Bombay High Court decision that had held a woman guilty of criminal contempt, clarifying that the power of contempt is meant to protect the institution of justice, not to serve as a shield for individual judges against criticism.

Key Takeaways from the Supreme Court's Ruling

- **Not a Tool of Personal Protection:** The Court emphasised that contempt jurisdiction cannot be invoked to silence dissent or critical remarks against judges.
- **Scope for Genuine Apology:** Under Section 12 of the Contempt of Courts Act, 1971, courts may accept a sincere and unconditional apology even after a finding of guilt.

- **Need for Judicial Self-Restraint:** The use of contempt powers must be sparing, balanced, and proportionate to the alleged conduct.
- **Role of Compassion:** Where remorse is genuine, the judiciary's conscience allows room for mercy and forgiveness, rather than retribution.

Introduction

Contempt of court is the **offence of willful disobedience** or disrespectful to the court of law. It is described as an action that **interferes with the judge's ability to administer justice** or that **insults the dignity of the courtroom**. Article 129 and Article 215 empower Supreme court and High courts to punish for their contempt.

Significance of contempt of court	Challenges associated with contempt of court
Upholds the credibility of the judiciary.	Goes against natural justice by allowing judges to act as judges in their own cause.
Provides a reasonable restriction on free speech to maintain judicial independence.	Curtails freedom of expression and discourages genuine criticism.
Ensures public trust and protects judges from undue influence and threats.	The broad and undefined scope of criminal contempt can lead to misuse.
Addresses the high number of pending contempt cases, indicating the ongoing relevance of the law.	Reflects a colonial hangover and sends a wrong signal about judicial tolerance.

Evolution of Contempt Law in India

- **Contempt of Court Act, 1926:** For the first time, High Courts were statutorily empowered to punish contempt of themselves as well as of subordinate courts.
- **Contempt of Courts Act, 1952:** This legislation replaced the 1926 Act and broadened the framework by extending contempt powers to Courts of Judicial Commissioners.
- **Contempt of Courts Act, 1971:** Enacted following the recommendations of the H.N. Sanyal Committee (1963), this Act repealed the 1952 law and remains the principal statute governing contempt in India. It clearly defines contempt and regulates the manner in which courts may exercise this power.
- **Contempt of Courts (Amendment) Act, 2006:** Introduced a significant safeguard by limiting punishment only to acts that substantially interfere, or are likely to substantially interfere, with the administration of justice.

Constitutional Provisions on Contempt of Court

- **Articles 129 and 215** of the Constitution expressly recognise the contempt powers of the Supreme Court and High Courts.
- **Article 129:** Declares the Supreme Court a court of record with inherent authority to punish for contempt of itself.
- **Article 215:** Confers similar status and powers on every High Court.
- **Court of Record:** A court whose judgments and proceedings are preserved as permanent legal memory. Such courts create binding precedents and possess inherent authority to enforce obedience to their orders and protect their dignity.

Types of Contempt

Under the Contempt of Courts Act, 1971, contempt is classified into two categories:

Civil Contempt

- Wilful disobedience of a court's judgment, decree, direction, order, writ or process, or deliberate breach of an undertaking given to a court.

Criminal Contempt

- Any publication or act that:
  - Scandalises or tends to scandalise the court, or lowers its authority; or
  - Prejudices or interferes with judicial proceedings; or
  - Obstructs or tends to obstruct the administration of justice in any other manner.

(The Constitution itself does not define civil or criminal contempt.)

Procedure and Punishment

- Initiation: Proceedings may be initiated suo motu by the court, or on a petition filed with the consent of the Attorney General (for SC) or Advocate General (for HCs).
- Punishment: Simple imprisonment up to six months, or a fine up to ₹2,000, or both.
- Punishment may be waived if the court accepts a bona fide and unconditional apology.
- Legislative Competence: Parliament is empowered to regulate contempt law under Article 142(2).

Landmark Judgments on Contempt

- **Ashwini Kumar Ghosh v. Arabinda Bose (1952)**: Fair and reasoned criticism of judgments does not amount to contempt.
- **Anil Ratan Sarkar v. Hirak Ghosh (2002)**: Warned courts against excessive or improper invocation of contempt powers.
- **PUCL v. Union of India (2003)**: Upheld freedom of speech while recognising its constitutional limitation in matters of contempt.
- **M.V. Jayarajan v. High Court of Kerala (2015)**: Held that abusive public statements undermining judicial authority constitute criminal contempt.
- **Vijay Kurle v. Union of India (2020):** Observed that criticism of courts must be informed and cannot recklessly question judicial integrity.
- **Shanmugam Lakshminarayanan v. High Court of Madras (2025)**: Reiterated that contempt powers exist to safeguard the administration of justice, not to grant personal immunity to judges.

Criticisms and Contemporary Concerns

- **Ambiguity in Definitions:** Phrases such as "scandalising the court" are inherently subjective and prone to misuse.

- **Chilling Effect on Free Speech:** Fear of contempt proceedings discourages public debate on judicial functioning and accountability.
- **Tension with Article 19(1)(a):** Overbroad use of contempt powers may unjustifiably curtail freedom of expression.
- **Judge as Victim and Adjudicator:** The same judges often act as both complainant and decision-maker, raising concerns of natural justice.
- **Need for Reform:** Several democracies, including the UK, have abolished "scandalising the court" as a ground for contempt, favouring openness, transparency, and informed criticism.

Measures to ensure responsible use of contempt of court

1. **Clear Definition:** Contempt should be clearly defined, especially what constitutes "scandalising the court."
   - **E.g.: Justice Katju v. Supreme Court (2015),** the Court clarified that fair criticism is not contempt.
2. **Judicial Tolerance:** Judges must differentiate between defamation and constructive criticism.
   - **E.g. Arundhati Roy case (2002)** Criticised court's handling of Narmada Bachao Andolan and was punished for contempt which triggered debate on intolerance of dissent.
3. **Use as a Last Resort:** Contempt should be invoked only when there is imminent threat to justice, not to silence critique.
   - **Eg: Prashant Bhushan Case (2020)** – Sparked debate on whether personal opinions on judges should invite contempt.
4. **Codification and Review of Contempt Law:** Recommendations of **274th Law Commission (2018)** to retain the law but limit misuse, especially criminal contempt, should be implemented.
   - Emphasis on harm to administration of justice rather than insult to judge.
5. **Parliamentary Oversight & Statutory Safeguards**: Section 5 of Contempt of Courts Act, 1971 – Allows fair criticism of judicial acts. And under Section 13, No contempt of truth is the defence and in public interest.

Law Commission's View (2018)

- The Act should not be amended as the Supreme Court and High Courts derive their contempt powers from the Constitution.
- Deleting the offense from the Act would not affect the inherent constitutional powers of the courts.
- The high number of pending cases justifies the Act's relevance.

International Perspective

- **England**: Abolished contempt laws related to scandalizing the court in 2013.
- **USA**: Does not use contempt laws against comments on judges or legal matters.
- **Canad**a: Allows criticism of the courts unless it poses an imminent danger to the administration of justice.

Therefore to maintain **public trust**, courts must strike a balance between **protecting their authority** and **upholding democratic freedoms**. The contempt power should be used **sparingly, transparently, and only when essential for the administration of justice**.

Securing tomorrow: 10 Years of Atal Pension Yojana

Syllabus Mapping: GS2: Welfare schemes for vulnerable sections

Context

The Atal Pension Yojana (APY) has marked a decade of operation, emerging as a key pillar of social security coverage in India.

About the Scheme

Introduced in 2015, APY is a Central Sector Scheme aimed at providing assured monthly pension support to workers in the unorganised sector, who typically lack formal retirement benefits.

- **Objective:** To build a broad-based and inclusive social security framework for the unorganised workforce by encouraging voluntary, long-term retirement savings.
- **Implementation Mechanism:** The scheme is administered by the Pension Fund Regulatory and Development Authority (PFRDA) and operates within the National Pension System (NPS) architecture.
- **Eligibility Criteria:** Available to non-income-tax-paying individuals aged 18 to 40 years who possess an active bank account.
- **Contribution Structure**: Subscribers make fixed, age-linked contributions for a minimum period of 20 years, with payments collected through an auto-debit facility on a monthly, quarterly, or half-yearly basis.
- **Pension Assurance:** Upon attaining 60 years of age, subscribers receive a guaranteed monthly pension ranging from ₹1,000 to ₹5,000, depending on their contribution plan.
- **Family Security Provisions**: In the event of the subscriber's death, the spouse becomes eligible for the pension. After the demise of both subscriber and spouse, the accumulated corpus is paid to the nominated beneficiary.
- **Exit Provisions:** The scheme allows voluntary exit under specified conditions, usually with deductions. In cases of premature death, the spouse may opt to continue contributions to retain pension benefits.
- **Key Milestones:** As of August 2025, APY has crossed 8.11 crore enrolments, with women accounting for nearly 48% of total subscribers, highlighting its expanding reach and gender-inclusive character.

India's Pension Coverage scenario

- **Limited Pension Depth**: Pension assets in India amount to roughly 17% of GDP, far below the nearly 80% observed in developed economies.
- **Concentration of Benefits**: Pension advantages are largely restricted to government employees and workers in the organised private sector.
- **Narrow Workforce Coverage**: Barely 12% of India's workforce is enrolled in formal pension arrangements. In contrast, the informal sector, which employs around 85% of workers and

contributes over half of GDP, remains mostly outside the pension net.

- **Low Participation in Voluntary Schemes:** Optional retirement products such as the National Pension System (NPS) and Atal Pension Yojana (APY) together covered only about 5.3% of the population in FY24.
- **Future Fiscal Risk:** The persistent exclusion of informal workers represents a major policy gap and could translate into long-term financial and social stress as the population ages.

Key Challenges in India's Pension Architecture

- **Fragmented Framework**: Multiple, overlapping pension schemes, especially for informal and gig workers, create complexity and hinder expansion.
- **Irregular and Low Earnings**: Volatile incomes reduce the ability of workers to make consistent pension contributions.
- **Low Awareness and Trust Deficit:** Limited financial literacy, particularly in rural and unorganised sectors, constrains uptake of voluntary pension products.
- **Sustainability Concerns:** The Mercer CFA Global Pension Index 2024 assigned India a score of 44%, flagging weaknesses in adequacy, coverage, and long-term financial sustainability.
- **Gender and Social Exclusion:** Lower workforce participation and wage gaps restrict women's access to pension benefits. Tribal communities and migrant workers face similar exclusion.
- **Operational Bottlenecks:** Procedural hurdles related to enrolment, KYC norms, and digital access impede smooth participation and account management.

Government Measures to Broaden Pension Coverage

- **Unified Pension Scheme:** Integrates elements of both old and new pension regimes, offering features such as family pensions, minimum assured benefits, and pensions linked to 50% of last drawn salary.
- **Pradhan Mantri Shram Yogi Maandhan:** A voluntary, contributory scheme for unorganised workers that assures a minimum monthly pension of ₹3,000 after the age of 60.
- **Atal Pension Yojana (APY):** Designed for informal sector workers, providing guaranteed pensions ranging from ₹1,000 to ₹5,000 per month upon attaining 60 years.
- **National Pension System (NPS):** A voluntary, defined-contribution retirement savings framework regulated by the Pension Fund Regulatory and Development Authority (PFRDA).

International Best Practices

- **Japan**: Operates a compulsory, flat-rate contributory pension for all residents aged 20–59, regardless of employment category.
- **New Zealand**: Provides a universal, flat-rate public pension to residents aged 65 and above, subject to a minimum 10-year residency requirement.
- **Australia**: Embeds superannuation awareness in school curricula, encouraging early financial planning and retirement literacy.

Way Forward

- Launch structured financial literacy programmes in schools and higher education institutions, with a focus on retirement planning.
- Create simple, digital-first platforms for enrolment, contribution tracking, and disclosures, drawing on India's UPI ecosystem.
- Ensure annual, transparent statements of pension entitlements for all subscribers.
- Strengthen investment oversight and regulatory supervision to safeguard returns and liquidity.
- Move towards a Unified Three-Tier Pension Model:
  - **Tier I:** Mandatory basic contributory pension for all citizens, irrespective of employment status.
  - **Tier II:** Employer-sponsored occupational pensions with automatic enrolment.
  - **Tier III:** Voluntary retirement savings supported through tax incentives and market-linked returns.

Topics for Prelims

Global Indices for Reforms and Growth (GIRG) Framework

Context

The Government of India launched the **Global Indices for Reforms and Growth (GIRG)** initiative.

About GIRG Framework

- It is designed to **track India's standing on selected global indices**, identify performance gaps, and support evidence-based policy improvements.
- It monitors **26 global indices** grouped under four themes—**economy, governance, development, and industry**—which are published by **16 international organisations**.
- A total of **17 nodal ministries** have been designated to oversee and improve India's performance on specific indices relevant to their sectors.
- The **Development Monitoring and Evaluation Office (DMEO) of NITI Aayog** coordinates the initiative by validating data, reviewing index methodologies, and supporting reforms.
- The framework enhances **policy transparency**, strengthens **data-driven governance**, improves **India's global competitiveness**, and promotes both **cooperative and competitive federalism.**

Cases pending in lower courts in India

Context

Union Law Minister Arjun Ram Meghwal informed the Rajya Sabha about the current status of lower courts across India.

Current Issues in the Lower Courts in India

- **4.8 crore cases** are pending in district and subordinate courts across the country.
- Uttar Pradesh has the highest pendency with **1,13,05,841 cases**, making it the top contributor to backlog.

- A total of **90,694 cases** are under trial in lower courts as of December 1, 2025, compared to **70,239 cases in 2021**, indicating rising pendency.
- There are **1,055 vacant judicial officer posts** in Uttar Pradesh alone; other major vacancies include **535 in Gujarat** and **384 in Madhya Pradesh**.
- Among High Courts, **Allahabad High Court** has the highest pendency (**11,66,971 cases**) and the maximum judge vacancies (**60 posts**).

National Commission for Backward Classes

Context

The National Commission for Backward Classes (NCBC) has now recommended to the Union government to exclude 35 communities from the State's Central OBC list.

About National Commission for Backward Classes

- It is a body set up under the National Commission for Backward Classes Act, 1993.
- **102nd Constitution Amendment** Act, 2018 provides constitutional status to the National Commission for Backward Classes (NCBC).
- It has the authority to examine complaints and **welfare measures** regarding socially and educationally backward classes.
- Previously NCBC was a **statutory body** under the Ministry of Social Justice and Empowerment

Process of Inclusion of Communities in Central OBC List

- **NCBC Recommendations → Cabinet Approval → President's notification**.
- **Role of NCBC:** The National Commission for Backward Classes (NCBC) examines requests from states for the inclusion of castes in the Central OBC list.
  - The NCBC forms a Bench to review the proposals and makes a decision on the inclusion.
  - The NCBC forwards its decision to the Union government.
- **Cabinet Approval:** Union cabinet takes a decision regarding the inclusion of communities in the Central list of OBCs.
- **Presidential Notification:** After Cabinet approval, the President notifies the change.

FACT

- States/Union Territories can maintain their own OBC lists. Communities included in the OBC list of a particular state can be different from the Central list.
- Jat Community is listed as OBC in the OBC list maintained by the Delhi Government. However, the community is not included in the Central List of OBCs for Delhi.

Indian Statistical Institute

Context

The Centre's draft Indian Statistical Institute Bill 2025, made public for feedback.

About Indian Statistical Institute

- Set up in **1931** by statistician **P.C. Mahalanobis** as a statistical laboratory at Presidency College, Kolkata.
- **Registered as a society** under the **Societies Registration Act, 1860** and **later under the West Bengal Societies Registration Act, 1961.**
- In **1959**, ISI was declared an **Institution of National Importance** through **Indian Statistical Institute Act, 1959**
  - Empowered to grant degrees and receive Central grants, but structurally continued as a **registered society**.
- **Governance:** Governed by a **33-member Council**, its highest decision-making body.
  - **Council includes:** An elected chairman, Six representatives from the Central government, External scientists, A UGC representative and Director and heads of divisions/centres (ex-officio)
  - **Director** (academic and administrative head) is appointed by the Council.

ISI Bill 2025: Key Amendment Proposals

- **Conversion into a Statutory Body Corporate:** ISI will no longer function as a registered society.
  - Becomes a **statutory body** created by an Act of Parliament, similar to IITs and IIMs.
- **Introduction of a New Governance Model:** Creation of a **Board of Governance (BoG)** as the apex authority.
  - BoG to include: Chairperson nominated by the President (Visitor) on recommendation of Union Government, Representatives from Central ministries, Eminent persons nominated by the Centre, and Director and institute representatives
- **Role of the President of India (Visitor):** President becomes **Visitor**, with powers to order inquiries, conduct reviews and remove the Director in specific circumstances
- **Changes to Director Appointment Process:** Director to be appointed by **BoG Chairperson**.
  - Selection based on recommendations of a **Search-cum-Selection Committee** constituted by the Central Government.
  - Director subject to periodic reviews.
- **Academic Council Restructuring:** Academic Council headed by the Director.
  - Comprises heads of divisions/centres.
  - Makes academic recommendations **subject to approval of BoG**.
- **Powers & Functions of the Board of Governance:** Administrative control, Degree-granting authority, Appointment of faculty and staff, Framing rules and regulations to implement the Act.
- **Repeal of the 1959 ISI Act:** The new Bill will **replace the existing 1959 Act**, effectively dismantling the current governance structure.

Concerns Highlighted Related to Amendment

- **Reduced Autonomy:** Faculty and students argue that the BoG gives the Centre overwhelming control, unlike the broader representation in the current Council.

- **Centralised Appointment of Director:** Director becomes effectively a **Central Government appointee**, undermining academic independence.
- **BoG Authority over Academic Council:** Academic decisions may be overridden by a body dominated by government nominees.
- **Lack of Consultation:** Stakeholders argue the Bill was drafted **without internal consultation**.

Private Member's Bill

Context

Congress MP **Manish Tewari** has introduced a **Private Member's Bill** in the Lok Sabha seeking to **amend the Tenth Schedule (Anti-Defection Law)** so that MPs can vote independently on most bills and motions, except those directly linked to the **stability of the government**.

About Private Member's Bill

- A **Private Member's Bill** is a legislative proposal introduced in Parliament by a **Member of Parliament (MP) who is not a Minister**.
- This includes MPs from both the ruling party (if not a minister) and the Opposition.
- Since Independence, **only 14 PMBs have been passed** and received presidential assent and none has cleared both Houses since 1970.
- In the **17th Lok Sabha (2019-24), 729 PMBs were introduced in the Lok Sabha and 705 in the Rajya Sabha**.
  - However, **only two in the Lok Sabha and 14 in the Rajya Sabha were ever discussed**.
- In the **18th Lok Sabha, only 20 MPs have introduced** PMBs so far.
- During the **inaugural and Budget Sessions of 2024**, 64 PMBs were introduced in the Lok Sabha, but **not a single one was discussed**.

Removal of HC Judge

Context

A group of INDIA bloc MPs has submitted a formal letter to Lok Sabha Speaker Om Birla seeking to initiate an impeachment motion against Justice G.R. Swaminathan of the Madurai Bench of the Madras High Court.

About Process of Removal of Judge

- A judge can be removed from office through a motion passed by Parliament on the grounds of **"proved misbehaviour or incapacity."**
- Although the Constitution does not mention the term "impeachment," it is commonly used to describe the **removal process under Article 124 (for Supreme Court judges) and Article 218 (for High Court judges).**

Procedure Mentioned in Judges (Inquiry) Act, 1968

- **Initiation of Motion:**
  - Lok Sabha: requires signatures of **100 MPs**, or
  - Rajya Sabha: requires signatures of **50 MPs**.
- **Admittance & Committee Inquiry:** The Presiding Officer (Speaker/Chairman) may admit or reject the motion.
  - If admitted, a **three-member inquiry committee** is formed: a Supreme Court judge, a Chief Justice of a High Court, a distinguished jurist.
  - The committee investigates and submits its report.
- **Parliamentary Vote:** If the committee finds the judge guilty, each House must pass the removal motion by:
  - **Special Majority**: majority of total membership + two-thirds of members present and voting.
- **Presidential Order:** After both Houses pass the motion, the **President issues an order removing the judge** from office.

Selection of CEC

Context

Opposition parties in Lok Sabha have questioned the removal of the Chief Justice of India (CJI) from the high-level committee responsible for selecting the Chief Election Commissioner (CEC) and the Election Commissioners (ECs).

Appointment of CEC and EC

- **Article 324**: It says CEC and ECs will be appointed by the President, this is subject to Parliamentary law (if such law exists).
- **Intervention of Supreme Court:** In 2023, the Constitution Bench of the SC in **Anoop Baranwal v. Union of India case** changed the process for Election Commission appointments in order to secure their independence.
  - It created a committee comprising the **PM, the Leader of the Opposition in Parliament and the Chief Justice of India (CJI).**
  - This committee will make recommendations and advise the President on Election Commission appointments **until Parliament enacts a separate law on the subject**.
- **Changes in the 2023 Act:** The **CJI was excluded** from the Selection Committee.

Key Provisions of the 2023 Act

- **Section 5: Eligibility -** Candidates for the post of CEC and ECs must be **current or former Secretary-level officers**.
- **Section 6: Search Committee -** A **Search Committee**, chaired by the **Law Minister**, prepares a panel of **5 names for consideration.**
  - The Search Committee includes **two other members**, both holding ranks not below Secretary to the Government of India.
- **Section 7: Selection Committee -** The **Selection Committee** includes:
  - **Prime Minister**
  - **A Cabinet Minister**
  - **Leader of the Opposition in the Lok Sabha or leader of the single largest opposition party.**
- This committee can choose from the panel prepared by the Search Committee or consider **"any other person"** outside the Election Commission.

Narco Test

Context

The Supreme Court has set aside the Patna High Court order permitting an involuntary narco-analysis test.

About Narco test

- A narco test uses sedative drugs such as Sodium Pentothal to lower a person's inhibitions, potentially prompting disclosure of hidden information.
- It is treated as a non-coercive investigative aid, comparable to lie-detector (polygraph) and brain-mapping techniques.
- **Key Judicial Interpretations and Constitutional Basis:**
  - **Selvi v. State of Karnataka (2010):** Narco-analysis, polygraph, and brain-mapping cannot be conducted without the subject's voluntary consent.
  - **Amlesh Kumar v. State of Bihar (2025):** Patna High Court permitted a forced narco test, which the Supreme Court has now invalidated as unconstitutional.
  - **Article 20(3):** Protects an accused from being compelled to self-incriminate; involuntary narco tests breach this protection.
  - **Article 21:** Safeguards privacy, bodily integrity, and personal liberty—all violated by forced narco-analysis.
  - The Court reaffirmed the **Golden Triangle doctrine (Articles 14, 19, 21)** from Maneka Gandhi (1978) — investigative actions must be fair, reasonable, and just.

Support to Poor Prisoners Scheme

Context

The **Ministry of Home Affairs (MHA)** has **revised the guidelines** of the **Support to Poor Prisoners Scheme** due to a **sub-optimal response by States and Union Territories**.

About Support to Poor Prisoners Scheme

- **Launched:** 2023
- **Central allocation:** ₹20 crore
- **Maximum assistance:** Up to **₹25,000 per prisoner**
- **Objective:** Enable release of indigent prisoners/undertrials unable to pay fines or furnish bail sureties; thus reducing prison overcrowding.
- **Nodal agency:** The National Crime Records Bureau (NCRB).
- **Coverage:**
  - Convicted prisoners unable to pay court-imposed fines
  - Eligible undertrial prisoners unable to furnish bail bonds/ sureties.
- **Exclusions under the Scheme:**
  - **Offences excluded:** Prevention of Corruption Act, Prevention of Money Laundering Act (PMLA), Narcotic Drugs and Psychotropic Substances Act, 1985, Unlawful Activities (Prevention) Act (UAPA).
  - **Heinous crimes excluded** Terrorism and offences affecting national security, Dowry death, rape, human trafficking, and Offences under the POCSO Act.
- **Mode of Assistance:** Financial aid is directly deposited with the court to facilitate release.

Revised Implementation Mechanism

- **Jail Superintendent** must inform the District **Legal Services Authority (DLSA)** within **one week** if a prisoner cannot secure release due to poverty.
- **DLSA Secretary** verifies financial status and recommends the case.
- **The District-level Empowered Committee** approves assistance.
- Committee includes:
  - Nominee of the **District Collector**
  - **Judge-in-charge of the prison**, nominated by the District Judge

Topics for Mains (Economy)

State of Indian Economy in 2025

Syllabus Mapping: GSIII, Indian Economy, Growth and development, State of the Economy

Context

The Indian economy faced a challenging year in 2025, as persistent global and domestic challenges offset the impact of supportive domestic policies.

Economic Performance in 2025

Growth and Production

- **GDP Growth**: India sustained its momentum as the fastest-growing major economy, with real GDP projected to expand **7.3% in FY 2025-26**, demonstrating resilience amid global uncertainty.
- **Industrial Expansion**: The Index of Industrial Production (IIP) recorded 4% year-on-year growth in September 2025, propelled by a robust 4.8% expansion in the manufacturing sector.

Price Dynamics

- **Deflationary Trend**: Retail inflation, measured by the Consumer Price Index (CPI), plummeted to an unprecedented low of **0.25% in October 2025**, primarily driven by deflation in food prices.

External Sector

- **Export Performance**: Despite global disruptions, cumulative merchandise and services exports reached **$491.80 billion during April-October 2025, registering a 4.84% increase.**
- **Energy Import Reconfiguration**: Oil imports from the United States climbed to 10.7% of total energy imports in October 2025, while purchases from sanctioned Russian entities contracted.

Employment

- **Labour Market Improvement**: The Labour Force Participation Rate (LFPR) rose to a six-month peak of **55.4% in October 2025,** with notable gains in female participation rates in rural regions.

Landmark Policy Initiatives

Taxation and Trade

- **GST 2.0 Implementation**: The government unveiled a streamlined Goods and Services Tax structure featuring two primary slabs—5% and 18%—reducing rates on essential items including cement, automotive components, and major household appliances.
- **UK Comprehensive Economic Partnership**: India formalized the Comprehensive Economic and Trade Agreement (CETA) with the United Kingdom, securing duty-free market access for 99% of Indian exports and facilitating enhanced professional mobility.
- **New Zealand Free Trade Agreement**: The bilateral FTA eliminated tariffs on all Indian exports to New Zealand, creating significant opportunities for micro, small, and medium enterprises (MSMEs) and labour-intensive industries.

Structural Reforms

- **SHANTI Bill 2025**: Parliament enacted legislation enabling private sector participation in nuclear power generation, targeting 100 GW of nuclear capacity by 2047.
- **Labour Code Consolidation**: The government implemented four unified Labour Codes, establishing higher minimum wage standards and extending social security coverage to over 15 million gig economy workers.
- **Tax Relief Measures**: Budget 2025 enhanced the standard deduction and restructured income tax brackets to stimulate Private Final Consumption Expenditure (PFCE).

Economic Headwinds in 2025

Trade Disruptions

- **US Tariff Imposition**: In August 2025, the United States levied 50% tariffs on Indian exports, jeopardizing approximately **$87 billion in annual bilateral trade.**
- **Secondary Tariff Penalties**: An additional **25% tariff** was imposed on Indian goods in response to continued procurement of Russian oil, creating a **28-32%** competitive disadvantage relative to Chinese exports.

Investment and Currency Pressures

- **Foreign Investment Reversal**: Trade tensions triggered net foreign direct investment outflows totaling **$3.82 billion during August-October 2025,** marking three consecutive months of negative flows.
- **Currency Depreciation**: The Indian Rupee depreciated to a **historic low of ₹88.78 against the US dollar,** intensifying concerns about imported inflation and elevated debt servicing obligations.

Trade Imbalances

- **Widening Trade Deficit**: The merchandise trade deficit expanded to $223 billion during April-November 2025, driven by elevated energy costs and global supply chain realignment.
- **Corporate Profitability Pressure**: Manufacturing sectors with substantial US market exposure faced projected EBITDA compression of 10-18% due to increased freight costs and tariff barriers.

Strategic Outlook for 2026

Statistical Modernization

- **Base Year Revision**: The Ministry of Statistics and Programme Implementation (MoSPI) will release updated CPI series (Base 2024=100) and revised GDP-IIP data (Base 2022-23) to better capture the digital economy's contribution.

Trade Expansion Initiatives

- **Export Promotion Mission**: A government-led initiative will provide concessional credit and non-tariff support to exporters targeting European Union and African markets.

- **EU Free Trade Agreement**: Ongoing negotiations with the European Union are approaching conclusion, potentially unlocking access to a consumer market of **450 million people for Indian services.**
- **Mission 500**: India is pursuing diversified trade partnerships, aiming to elevate bilateral trade with the United States to **$500 billion by 2030** while strengthening economic ties with MERCOSUR and GCC nations.

Monetary and Fiscal Policy

- **Monetary Policy Transition:** With the **repo rate at 5.25%, the Reserve Bank of India** is expected to pivot from aggressive rate cuts toward liquidity management strategies to support economic growth.
- **Consumption Stimulus:** GST rate reductions scheduled for implementation in 2026 are anticipated to boost rural demand substantially, making essential goods **7-13% more affordable.**

Conclusion

India's economic trajectory in 2025 reflected the tension between domestic policy effectiveness and external vulnerabilities. As the nation enters 2026, strategic focus on **export diversification, monetary calibration, and consumption stimulus** will be critical to sustaining growth momentum while managing global economic uncertainties.

Shanti Bill, 2025

Syllabus Mapping: GSIII, Indian Economy, Energy Sector

Context

The Centre introduced the **Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Bill** in the Lok Sabha to overhaul India's nuclear energy framework. It seeks to incentivise private sector participation in the nuclear power sector to reach 1**00 GW capacity by 2047 and Net Zero by 2070.**

Objectives of the Bill

- Mobilise **₹15-20 lakh crore private capital** to scale nuclear capacity to **100 GW by 2047.**
- Deploy Small Modular Reactors to replace coal use and help industries bypass carbon taxes.
- Facilitate advanced nuclear technology transfers by resolving critical liability barriers.
- Secure nuclear energy as clean baseload power to stabilise the grid against renewable fluctuations.
- Position nuclear energy as the third pillar, alongside solar and wind, to achieve **Net Zero by 2070.**

Key Features of the Bill

Legal and Institutional Transformation

- **Regulatory Modernization**: The SHANTI Act supersedes two foundational statutes—the Atomic Energy Act of 1962 and the Civil Liability for Nuclear Damage Act of 2010 creating a unified, contemporary legal framework for India's nuclear future.
- **Parliamentary Accountability:** The Atomic Energy Regulatory Board (AERB) receives statutory recognition, transforming it from an executive body into a parliamentarily accountable institution with enhanced authority and transparency.
- **Specialized Adjudication:** Nuclear sector disputes will be resolved through the Appellate Tribunal for Electricity (APTEL), leveraging existing infrastructure while establishing domain expertise in energy-related litigation.
- **Dedicated Compensation Authority:** A newly constituted Nuclear Damage Claims Commission will independently adjudicate compensation claims arising from catastrophic nuclear incidents, ensuring expedited and specialized justice.

Unleashing Private Enterprise

- **Market Liberalization:** The legislation dismantles Nuclear Power Corporation of India Limited's (NPCIL) six-decade monopoly, ushering in a competitive era where Indian private entities can develop, own, and operate nuclear facilities.
- **Regulated Entry:** Private operators must secure licenses demonstrating technical competence, financial capacity, and safety compliance, balancing innovation with stringent safety standards.
- **Strategic Capital Controls:** Foreign Direct Investment in nuclear power projects is capped at 49%, ensuring majority domestic ownership while enabling access to international capital and technology partnerships.

Reimagined Liability Architecture

- The SHANTI Bill introduces a graduated liability structure calibrated to plant capacity:
  - **Small Reactors** (<150 MW): ₹100 crore
  - **Medium Facilities** (150 MW - 3.6 GW): Proportionate liability
  - **Large Installations** (>3.6 GW): ₹3,000 crore
  - This risk-proportionate model balances investor protection with victim compensation rights.
- **Equipment Manufacturer Immunity:** By eliminating supplier recourse provisions, the Bill removes a longstanding barrier that previously deterred international technology providers from engaging with India's nuclear sector.
- **Penalty Ceiling:** Regulatory violations attract a maximum financial penalty of ₹1 crore, providing predictable compliance costs.
- **Catastrophic Insurance Pool:** A centrally administered fund covers damages exceeding operator liability caps, ensuring comprehensive victim protection without bankrupting operators.

Innovation and Technology Roadmap

- **Patent Regime Reform:** Amendments to Section 4 of the Patents Act, 1970, now permit patenting of peaceful nuclear energy innovations incentivizing research, development, and technology commercialization in India's nuclear sector.
- **Bharat SMR Initiative:** The ₹20,000 crore Nuclear Energy Mission will accelerate deployment of domestically designed

220 MW Small Modular Reactors (SMRs), positioning India at the forefront of next-generation nuclear technology.

- **Advantages of SMRs:**
  - Reduced capital requirements
  - Faster construction timelines
  - Enhanced safety features
  - Modular scalability
  - Geographic flexibility for deployment
- **Non-Negotiable State Control:** The government retains exclusive authority over sensitive nuclear fuel cycle operations, uranium enrichment, spent fuel reprocessing, and heavy water production ensuring national security while liberalizing power generation.

Nuclear Energy Landscape in India

- **Operational Infrastructure:** India currently operates **25 nuclear reactors** distributed across seven power stations, collectively generating an installed capacity of **8,880 MW.**
- **Energy Mix Contribution:** Nuclear energy represents 3% of India's total electricity generation in FY 2024-25, reflecting its present role in the nation's energy portfolio.
- Capacity Expansion Roadmap: India has established ambitious nuclear capacity targets:
  - **22.5 GW by 2031-32**
  - **100 GW by 2047**
- **Fuel Supply Chain:** Kazakhstan dominates India's uranium supply, providing 80% of total uranium imports. Additional supplies are sourced from Russia, Uzbekistan, and Canada.
- **Operational Restrictions:** The Atomic Energy Act, 1962 confines nuclear power generation exclusively to the central government and public sector undertakings (PSUs), preventing private sector participation.
- **Safety and Compliance Oversight:** The Atomic Energy Regulatory Board serves as the primary authority responsible for nuclear safety, licensing procedures, and regulatory compliance across India's nuclear installations.

Challenges of the Bill

- **High Capital Intensity:** Nuclear power projects have long gestation periods and high upfront costs. Mobilising **₹15–20 lakh crore in private capital** is a massive target, especially when renewable alternatives (solar/wind) are cheaper and faster to deploy.
- **FDI Limitations:** While the bill invites private participation, the **49% cap on Foreign Direct Investment (FDI)** may deter global nuclear giants (like Westinghouse or EDF) who often seek controlling stakes to manage proprietary technology and operational risks.
- **Regulatory Capacity:** Shifting from a government monopoly (NPCIL) to multiple private operators will exponentially increase the burden on the Atomic Energy Regulatory Board (AERB).
- **Fuel Cycle Dependency:** Private players can build and operate reactors, but the government retains control over uranium enrichment and spent fuel reprocessing.
- **SMR Technological Maturity:** While Small Modular Reactors (SMRs) are a key focus, commercially proven SMR technology at scale is still globally nascent.

Way Forward

- **Green Taxonomy Inclusion:** Officially classify nuclear energy as "green finance" to allow access to lower-cost capital, green bonds, and international climate funds.
- **Strict Safety Audits:** Implement a "safety-first" licensing regime where private licenses are subject to periodic, stringent reviews rather than one-time approvals.
- **Public-Private Partnerships (PPP):** Rather than full privatisation immediately, starting with PPP models (e.g., NPCIL forming JVs with private steel or power companies) could smooth the transition.
- **Liability Fund Management:** Ensure the central Liability Fund is capitalised adequately and transparently to handle potential claims exceeding the operator's cap, maintaining public trust.

Conclusion

The SHANTI Bill represents a **transformative policy shift with the potential to unlock India's nuclear capacity ambitions,** yet success hinges on addressing capital mobilization challenges, strengthening regulatory capacity, and implementing phased public-private partnerships. Balancing **private innovation with robust safety oversight and transparent liability management** will determine whether India achieves its ambitious **100 GW nuclear target by 2047.**

India's Changing Oil Basket

Syllabus Mapping: GSIII, Indian Economy, Energy Sector

Context

India's crude oil import basket has undergone a strategic transformation over the last two decades, driven by geopolitics and the need to strengthen long-term energy security.

Evolution of India's Oil Basket: From Dependence to Strategic Diversification

Tracing Four Decades of Energy Sourcing

- **Era of West Asian Dominance (Pre-2005):** India's energy basket was overwhelmingly concentrated in West Asia, with over **70% of crude imports** sourced from **Saudi Arabia, Iraq, Iran, Kuwait, and the United Arab Emirates**, a reflection of geographic proximity and established trade relationships.
- **Initial Diversification (2005–2015):** Recognizing concentration risks, India gradually expanded its sourcing footprint to Africa and Latin America.
  - By **2011–12, Nigeria and Angola** collectively accounted for approximately 2**0% of imports,** marking the first significant shift away from Middle Eastern monopoly.
- **Sanctions-Driven Recalibration: Iran Factor (2010–2015):** International sanctions on Iran triggered a forced diversification. Iran's share declined steadily from 11.3% (2011–12) to approximately 6% by 2015–16, compelling Indian policymakers to accelerate supplier diversification strategies.
- **Brief Revival Window (2016–2017):** Post-sanctions relief witnessed a sharp rebound, with Iran's share surging to 12.7% in 2016–17 demonstrating India's preference for competitively

priced and logistically efficient crude sources when geopolitical constraints ease.

- **Americas and Africa Ascendancy (2017–2021):** Renewed international sanctions on Iran resulted in a dramatic 91.8% reduction in Iranian imports by 2019–20.
  - India compensated by substantially increasing crude procurement from the Americas and Africa, further diversifying its energy portfolio.
- **Post-2022 Transformation:** The Ukraine conflict catalyzed the most dramatic shift in India's import composition. Russia's share skyrocketed from below **2% (2021–22) to 21.6% (2022–23)**, reaching nearly 36% by 2024–25 driven primarily by significantly discounted prices in a reconfigured global oil market.

Current Composition of India's Oil Basket

- **Russia:** ~35% of total crude imports, now India's single largest supplier.
- **Middle East**: ~40–45%, still a core but reduced share compared to earlier decades.
- **Africa:** ~8–10%, mainly Nigeria and Angola.
- **Americas:** ~10–12%, including the United States and Latin American suppliers.

Strategic Drivers of Transformation

- **Geopolitical pragmatism:** Sanctions on Iran and Russia fundamentally reshaped sourcing patterns, compelling India to balance diplomatic considerations with the imperative of uninterrupted energy access for its growing economy.
- **Economic calculus:** Discounted Russian crude with prices declining from approximately **$79/barrel (April 2022) to $66/barrel (March 2025)** improved refinery margins substantially and helped contain domestic inflationary pressures.
- **Technical Flexibility:** Indian refineries possess the technical capability to process diverse crude grades, enabling rapid supply source transitions without requiring major capital expenditure or infrastructure modifications.
- **Risk Mitigation:** Reduced Middle Eastern dependence from over **70% (pre-2005)** to approximately **40–45%** currently has significantly lowered vulnerability to single-region supply disruptions and geopolitical shocks.

Implications for India

Economic and Strategic Implications

- **Current Account Stabilization:** Crude oil constitutes nearly 25–30% of India's total merchandise imports.
  - Cheaper, diversified sourcing has played a crucial role in moderating the current account deficit during FY2023–25.
- **Inflation Control Mechanism:** With fuel and light accounting for 6.84% of the Consumer Price Index (CPI), stable and competitively priced crude sourcing has cushioned pass-through effects and supported headline inflation management.
- **New Vulnerability Exposure:** Russia's supply of approximately 35% of India's crude imports (2024–25) creates fresh exposure to secondary sanctions risks and potential shipping route disruptions replacing one concentration risk with another.
- **Refinery Margin Enhancement:** Indian refiners capitalized on discounted crude availability, achieving gross refining margins of **$8–10 per barrel in parts of FY2023, substantially exceeding long-term averages of $4–6 per barrel.**

Conclusion

India's oil import evolution embodies a fundamental principle of contemporary diplomacy, the courage to chart an independent course guided solely by national interest. From over 70% West Asian dependence to a dynamic, opportunity-driven sourcing strategy spanning four continents, India has demonstrated that **strategic autonomy isn't merely rhetoric but operational reality.**

Maritime Sector in India

Syllabus Mapping: GSIII, Indian Economy, Maritime sector)

Context

The Prime Minister unveiled landmark maritime initiatives to boost growth and sustainability in the maritime sector during India Maritime Week 2025.

India, ranked **16th with under 1% global shipbuilding share**, aims for **top-five status by 2047** under the **Maritime India Vision.** Strategic investments and modernized shipyards will enhance maritime security, exports, and the blue economy.

Major Initiatives Launched during Maritime week

- **Maritime Investment Roadmap:** India invited Singapore to join its $1 Lakh Crores Maritime Investment Roadmap covering shipbuilding, port modernisation, and green-fuel collaboration.
- **Digi Bandar:** A national framework to make all ports data-driven, AI-enabled, and interconnected. It aims to improve efficiency, safety, and transparency across India's ports.
- **Green Tug Programme:** Launched to deploy 100 eco-friendly tugs by 2040, with an investment of approximately ₹12,000 crore, supporting India's transition to cleaner and energy-efficient maritime logistics.

India's Maritime Sector and Vision

- **Trade:** Nearly **95% of India's trade by volume and approximately 70% by value** moves through maritime routes, highlighting the sea as the lifeblood of India's commerce.
- **Indian Ports:** In FY 2024–25, major ports handled approximately 855 million tonnes of cargo, with total port capacity nearly doubling from **1,400 million metric tonnes per annum (MMTPA) to 2,762 MMTPA.** Average vessel turnaround time of major ports has been reduced from 93 hours to just 48 hours, enhancing overall productivity and global competitiveness.
- **Shipping Sector:** Number of Indian-flagged vessels has risen from **1,205 to 1,549** and gross tonnage of the Indian fleet has increased from **10 million gross tonnes (MGT) to 13.52 MGT.**
- **Inland Waterways:** Number of operational waterways has increased remarkably from 3 to 29 with an increase of **710% in cargo movement from 2014.**
- **Workforce:** India's seafarer workforce has surged from **1.25 lakh to over 3 lakh,** now accounting for **12% of the global seafaring workforce**, making the country one of the world's top three suppliers of trained seafarers.

India's Maritime Vision: Key Targets

- **2030 Goal:** Enter the top 10 maritime nations.
- **2047 Goal:** Secure position among the top 5 shipbuilding nations.
- **GDP Contribution:** Raise the maritime sector's share from 4% to 12% of India's GDP.
- **Global Workforce**: Increase Indian seafarers' share in the global workforce from 12% to 25%.

Challenges in Maritime Sector

- **Connectivity Bottlenecks:** Lack of adequate last-mile connectivity to the ports through road and rail hinders trade, market access and increases logistics costs.
- **Transhipment Competitiveness:** Limited transshipment handling capacity and tough competition from nearby transhipment hubs like the Port of Colombo.
- **Indian Flagged Tonnage:** High tax provisions with progressively higher tax on larger vessels discourages ship registration under the Indian flag. India's shipping registry accounts for only 0.8% of the world's vessels.
- **Manufacturing Gaps:** India's share in global shipbuilding remains modest, at approximately 1% and India imports more than 95% of marine engines installed on commercial ships.
- **Maritime Security:** India faces diverse maritime security threats including non-state threats (terrorism, smuggling of drugs and arms, piracy), economic threats (IUU fishing, pollution, greenhouse emissions) and state-led threats from China and Pakistan.

Major Programmes for Atmanirbhar Maritime Sector

- **Maritime India Vision 2030 (MIV 2030):** Launched in 2021, it identifies ten pivotal themes that will shape India's journey toward becoming a global maritime powerhouse.
- **Maritime Amrit Kaal Vision 2047:** A long-term roadmap for India's maritime resurgence, with nearly ₹80 lakh crore invested in ports, coastal shipping, inland waterways, shipbuilding, and green shipping.
- **Sagarmala Programme:** The programme focuses on cutting logistics costs, enhancing trade efficiency, and creating employment through smarter, greener transport networks.
- **Port Development:** India operationalised its first deep-water international trans-shipment hub at Vizhinjam and the One Nation One Port Process initiative aims to unify documentation and processes across all major ports.
- **Legal Transformation:** Parliament passed five key maritime acts, namely Indian Ports Act, Merchant Shipping Act 2025, Carriage of Goods by Sea Act, Bills of Lading Act, and the Coastal Shipping Act, 2025.
- **Favourable Investment Climate:** The government allows 100% Foreign Direct Investment (FDI) in port development.
- **"Jalvahak" Cargo Promotion Scheme:** To promote Inland Water Transport (IWT), it offers 35% reimbursement on operational costs and launching scheduled cargo services on key NW routes.

Conclusion

India's maritime sector is undergoing a decisive transformation from a support service for trade to a strategic engine of economic growth, sustainability, and global influence. With rising port efficiency, expanding inland waterways, a globally competitive seafaring workforce and a strong push towards decarbonisation, India is aligning its maritime growth with the twin imperatives of Atmanirbhar Bharat and climate responsibility.

Growth Convergence among Indian States

Syllabus Mapping: GSIII, Indian Economy, Growth and Development

Context

Indian states with lower per capita income are showing early signs of faster growth and moving toward long-term catch-up with more developed states.

Key Trends in India's Subnational Growth Rebalancing

- **Growth Convergence:** Laggard states like **Bihar (9.2%) and Assam (12%**) outpaced national real **GDP growth (8.2%) in FY24,** reversing the pre-pandemic **FY13-FY19 divergence trend.**
- **Growth Spread**: High growth momentum moved beyond southern states, with **Odisha at 11.2% and Assam at 12% nominal growth in FY25.**
- **Payroll Transition:** Formal employment expanded faster in low-income states. Uttar Pradesh contributed over **5% of the net EPFO payroll additions in 2025.**
- **Female Workforce:** Catch-up states expanded the female labour force, with rural female LFPR in Bihar rising from **24.8% in FY23 to 33.5% in FY24.**
- **Urban Expansion:** Service-sector growth shifted to Tier-2 and Tier-3 cities, which accounted for **60% of new online shoppers in 2025.**

Factors for Growth Convergence in India

- **Capex Support:** Centre allocated a **₹1.5 trillion** interest-free loan under **Special Assistance to States for Capital Investment (SASCI),** financing **20-25% of capital outlay in low-income states.**
- **Fiscal Incentives:** Higher tax devolution is linked with Ease of Doing Business reforms under the 15th and forthcoming 16th Finance Commissions.
- **Digital Leap:** India Stack helped low-income states leapfrog development stages and cut fiscal leakages by **10–15%, freeing capital for infrastructure.**
- **Energy Shift:** Emerging states like Rajasthan and Odisha are attracting industrial investments through large-scale renewable energy capacity expansion.
- **Wage Advantage:** Rising labour costs in southern and western states have pushed labour-intensive manufacturing toward Bihar and eastern Uttar Pradesh.

Key Challenges to Sustaining Growth Convergence

- **Revenue Pressure:** Slower growth in the Centre's divisible tax pool creates immediate revenue stress for developing states.
- **Spending Trade-off:** Pre-election expansion of cash transfer schemes raises revenue expenditure and risks cuts in capital expenditure.
- **Debt Burden:** High Debt-to-GSDP ratios limit fiscal space for new projects due to elevated debt servicing costs. **Bihar's Debt-**

to-GSDP ratio remains near 39%, far above the recommended 20%.

- **Climate Risk:** Extreme weather events in highly vulnerable catch-up states like Bihar and Assam can erase nearly **2% of annual GSDP.**
- **Skill Mismatch:** Limited mid-tech vocational skills keep emerging states confined to low-value construction growth instead of manufacturing.

Way Forward to Sustain Growth Convergence

- **Predictable Capex:** Adopt a **3-5-year multi-year SASCI** outlay instead of annual allocations to ensure financial certainty for large projects.
- **Labour Reforms:** Implement the Industrial Relations Code in states and raise the layoff threshold beyond 300 workers to attract global manufacturers.
- **Municipal Finance:** Empower Tier-2 cities in emerging states to raise funds through municipal bonds, reducing pressure on state budgets.
- **GVC Focus:** Align state manufacturing strategies with specific Global Value Chains, such as mobile assembly in Uttar Pradesh or food processing in Bihar.
- **Regional Corridors:** Develop inter-state economic corridors to pool logistics and power infrastructure to attract larger foreign direct investment than individual states.

Conclusion

India's subnational growth rebalancing marks a significant shift toward inclusive economic development, with historically lagging states demonstrating accelerated growth momentum. Success in maintaining this convergence will be critical to achieving balanced regional development and realizing India's long-term economic aspirations.

Electronics Sector in India

Syllabus Mapping: GSIII, Indian Economy, Electronic sector

Context

The Union Minister for Electronics and Information Technology recently said that India's electronics sector is creating large-scale blue-collar jobs, especially for women.

About Blue-Collar Jobs

Blue-collar workers are individuals who perform manual labour or skilled trades in sectors like manufacturing, construction, and logistics. They constitute about 80% of India's non-agricultural workforce, with nearly 300 million workers. Blue-collar wages are rising by about 5–6% annually in 2025, supplemented by performance-linked incentives to manage high attrition.

India's Electronics Sector

- **Production:** Domestic electronics output reached ₹11.32 lakh crore in FY2024–25, a six-fold increase over the last decade (2014–15).
- **Export:** Electronics became India's third-largest export category in FY2024–25 and FY2025–26, with exports exceeding $40 billion.
- **Mobile Manufacturing:** India is the world's second-largest mobile phone manufacturer, with exports touching ₹2 lakh crore after a rapid decade-long growth.
- **Employment Base:** The electronics sector employs about 25 lakh people nationwide and is India's largest employer of women in organised manufacturing.
- **National Target:** The government aims to build a $500 billion electronics manufacturing ecosystem by FY 2030–31, with $120 billion in exports by FY 2025-26.

India's Electronics Export Performance

- **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).

Key Government Initiatives

- **PLI Scheme 2.0:** The Production-Linked Incentive scheme offers around 5% incentives on incremental sales of IT hardware such as laptops, tablets, and servers manufactured in India.
- **ECMS 2025:** The Electronics Components Manufacturing Scheme promotes passive components and sub-assemblies to reduce import dependence.
- **SPECS:** The Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors offers 25% capex incentives for component manufacturing.
- **DLI Scheme:** The Design Linked Incentive scheme supports domestic chip design through financial and infrastructure assistance.
- **EMC 2.0:** Modified Electronics Manufacturing Clusters create world-class electronics infrastructure, including semiconductor parks.
- **Skilling Push:** The 'Chip-in' programme aims to train industry-ready engineers to meet demand for one million skilled workers by 2030.

Challenges in Electronic exports

- **Overdependence on USA:** A heavy reliance on the USA (60.17%) poses geopolitical and demand risk.
- **Supply-Side Constraints:** The lack of raw material availability, such as rare earths, and high capital costs pose significant barriers.
- **Skill Issue:** No sector-specific skilling programme specifically in the electronics sector.
- **Limited Value Addition:** Export growth remains skewed towards assembly and low-value tasks in the electronics sector.
- **Global Uncertainty:** Fluctuation in global demand, rising protectionism and supply chain issue.

Way Forward

- **Diversify Destinations:** Strengthen ties with trusted partners like Japan, South Korea, and the EU to diversify supply chains.
- **Semiconductor Fabs:** Accelerate the establishment of semiconductor foundries through public-private partnerships (PPP).
- **Bilateral Agreements:** Negotiate technology-sharing agreements with allies such as the US and Japan to access advanced manufacturing expertise.
- **Regional Leadership:** Champion resilient electronics supply chain in the Indo-Pacific through initiatives like the Supply Chain Resilience Initiative (SCRI), enhancing India's strategic influence.

Solar Energy in India

Syllabus Mapping: GSIII, Indian Economy, Solar Energy sector

Context

The Parliamentary Standing Committee on Energy recommends a single-window clearance for solar projects to expedite India's energy transition.

Current Status of Solar Energy in India

- **Rapid Capacity Expansion:** Presently, India has 116 GW of solar power installed capacity and targeted 292 GW solar power capacity by 2030.
- **Dominant Renewable Energy Source:** Solar energy accounts for **47% of India's total renewable energy capacity**, making it the leading RE segment.
- **Installations in 2024: Utility-scale solar: 18.5 GW**, a **2.8x increase** from 2023.
  - **Rooftop solar: 4.59 GW**, marking a **53% rise** from 2023.
- **Solar Manufacturing Growth:** Solar module manufacturing capacity rose from **2 GW (2014)** to **60 GW (2024)**.
- **Top States for Utility-Scale Solar:** Rajasthan, Gujarat, Tamil Nadu, Maharashtra, Madhya Pradesh.

Policy Support and Enablers for Solar Energy in India

- **Strong Potential:** India's **Solar Potential Map estimates** a **total solar capacity of 748.98 Giga Watt peak (GWp).**
- **Investment-Friendly Policies: 100% FDI** permitted under the automatic route for the renewable energy sector.
  - **Waiver of Inter-State Transmission Charges** for solar and wind power projects commissioned by **June 30, 2025**.
- **Boosting Renewable Energy Demand:** A new **Renewable Purchase Obligation (RPO) trajectory** has been notified up to 2029–30, including a dedicated component for **Decentralized Renewable Energy**.
- **Expanding Domestic Manufacturing:** Schemes such as the **Solar Park Scheme** and the **PLI Programme for High-Efficiency Solar PV Modules** aim to strengthen **indigenous solar component production**.
- **Enhancing Consumer Awareness:** The **Bureau of Energy Efficiency (BEE)** introduced **Standards and Labeling** for solar inverters and PV modules (March 2024) to guide consumers and improve efficiency.
- **International Leadership and Partnerships:** India leads global solar cooperation through the **International Solar Alliance (ISA)**.
  - The **Indo-German Solar Energy Partnership (IGSP)** promotes rooftop solar adoption by enabling market mechanisms and investments.
- **Initiatives by Indian Government:**
  - **PM Surya Ghar: Muft Bijli Yojana**: A scheme to promote rooftop solar installations by providing financial support to households for generating free electricity.
  - **PM-KUSUM**: A programme aimed at solarising agriculture through installation of solar pumps, grid-connected solar plants, and farmer-owned solar power projects.
  - **Development of Solar Parks Scheme**: An initiative to create large, pre-approved solar parks with ready infrastructure to facilitate rapid installation of utility-scale solar projects.

What are the Challenges in India's Solar Sector

- **Land Acquisition Delays:** Slow land procurement is delaying the implementation of utility-scale solar projects.
- **Lengthy Forest & Wildlife Clearances:** Transmission projects face prolonged approval processes due to multiple environmental permissions.
- **Transmission Line Delays:** Right-of-Way (RoW) disputes and compensation issues slow down transmission line installation.
- **Inadequate Storage Capacity:** Lack of sufficient energy-storage infrastructure hampers integration of solar power.
- **Weak Domestic Manufacturing Base:** India still lacks strong manufacturing capability for solar components, especially advanced systems.
- **Regional Imbalance:** Some regions with high potential remain underdeveloped in solar energy deployment.

Way Forward

- **Single-Window Clearance System:** Establish a unified mechanism for all land-related and project permissions across Centre and States.
- **Dedicated Portal for Clearances:** Create a specialised portal for transmission-related approvals, integrating forest and wildlife authorities.
- **Streamlined Right-of-Way Compensation:** Encourage States to adopt the Centre's guidelines for RoW payments at market rates to expedite transmission development.
- **Boost R&D in Energy Storage:** Support premier institutions with dedicated capital grants for advancing storage technologies.
- **Strengthen Domestic Manufacturing:** Allocate sufficient funding for HVDC (High Voltage Direct Current)-related R&D and train skilled manpower in HVDC technology.
- **Reduce Regional Disparities:** Promote solar development in low-capacity regions through timely release of central assistance, regular monitoring, and swift resolution of project constraints.

New Insurance Bill, 2025

Syllabus Mapping: GSIII, Indian Economy, Insurance Sector

Context

The **Sabka Bima Sabki Raksha (Amendment of Insurance Laws) Bill, 2025,** aims to modernise India's insurance framework in line with **Insurance for All by 2047.** It has amended the I**nsurance Act 1938, the LIC Act 1956, and the IRDAI Act 1999** to expand the insurance coverage.

Status of Insurance Sector in India

- **Insurance Market (Global):** India's overall insurance market is ranked the 10th largest in the world in terms of total premium volume.
- **Life Insurance Sector:** India also ranks 10th globally in the life insurance business.
- **LIC Global Ranking:** The Life Insurance Corporation of India (LIC) is ranked among the 3rd strongest insurance brands globally according to Brand Finance's 2025 report.
- **Market Size:** The Indian insurance market was valued at approximately USD 303.3 billion (₹25 lakh crore) in 2024 and is expected to grow substantially in the coming decade.
- **Penetration**: Insurance penetration in India stood at around 3.7% of GDP (latest for FY24), with life insurance accounting for approximately 2.8% and non-life for approximately 0.9%.

Need for the New Insurance Bill

- **Low Insurance Penetration:** Insurance penetration in India is only approximately 4% of GDP, compared to the global average of approximately 7%, leaving large populations uninsured.
- **Capital and Investment Deficit:** Long-term insurance requires deep capital, but restricted inflows limited expansion. Raising FDI to 100% can attract global insurers into a market with a 1.4 billion population.
- **Reinsurance Concentration Risk:** India's reinsurance market is dominated by GIC Re (General Insurance Corporation of India Reinsurance), limiting risk diversification.
- **Weak Consumer Protection:** Earlier regulatory tools had limited deterrence against unfair practices.

Key Provisions of the Bill

- **FDI Liberalisation:** Raises insurance FDI cap from 74% to 100%, enabling global capital inflows.
- **Reinsurance Entry:** Cuts Net Owned Funds for foreign reinsurers from ₹5,000 crore to ₹1,000 crore.
- **Equity Flexibility:** Raises IRDAI approval threshold for share transfer from 1% to 5%.
- Autonomy: Allows LIC to open zonal offices and restructure overseas operations without prior approvals.
- **IRDAI Empowerment**: Grants powers for disgorgement, penalties and one-time registration.
- **Disgorgement:** A regulatory enforcement tool that requires entities to return unlawfully gained profits, preventing unjust enrichment and deterring violations.

Key Issues Within the Bill

- **Composite Licensing:** No provision allowing insurers to operate across life and non-life segments.
- **Entry Barriers:** ₹100 crore minimum paid-up capital for insurance companies (life and general insurers) and ₹200 crore for reinsurance companies, remaining unchanged under the Bill.
- **Limited Inclusion:** Missed opportunity for niche, regional, health-only, or micro-insurers.
- **Product Silos:** No permission for bundled insurance or cross-financial product distribution.
- **Risk Innovation:** Absence of a framework for captive insurance for large corporations.
- **Captive Insurance:** A risk-management arrangement where a company creates its own subsidiary insurer to cover internal risks and reduce dependence on external insurance markets.

Way Forward

- **Composite Licensing:** Allow single insurers to operate across life, health and general insurance; global markets like the UK and Australia permit composite insurers.
- **Capital Rationalisation:** Reduce minimum paid-up capital to enable niche and regional players; micro-insurance models in ASEAN markets expanded coverage among low-income households.
- **Inclusive Insurance:** Promote health-only, micro and rural insurers to reach underserved groups; PMFBY and Ayushman Bharat show targeted schemes to improve last-mile coverage.
- **Regulatory Safeguards**: Strengthen IRDAI's supervision alongside liberalisation to protect policyholders; SEBI-style disgorgement powers ensure market discipline.

Conclusion

The New Insurance Bill, 2025, represents a significant step toward modernising India's insurance sector by liberalising FDI limits, reducing reinsurance entry barriers, and empowering regulatory authorities. A balanced approach combining regulatory liberalisation with targeted reforms for underserved segments will be essential to expand insurance penetration, enhance consumer protection, and position India as a major global insurance market.

India's Crude Oil Diversification

Syllabus Mapping: GSIII, Indian Economy, Energy Sector

Context

The Parliamentary Committee has urged closer coordination between the **Ministry of Petroleum and Natural Gas (MoPNG) and the Ministry of External Affairs (MEA)** to diversify crude oil sources. India imports approximately 89% of its crude oil needs, exposing it to global supply shocks.

Why Crude Oil Diversification Is Critical for India?

- **Energy Security Resilience:** Heavy dependence on a few suppliers exposes India to geopolitical shocks. The Russia–Ukraine war (2022) pushed Brent crude above $120/barrel, straining India's supply chain.
- **Fiscal Stability:** Oil imports drive current account deficit and inflation transmission. Petroleum imports form approximately 30% of India's total import bill.

- **Strategic Autonomy:** Overdependence constrains foreign policy choices. Payment and insurance hurdles in Iranian and Russian crude trade post sanctions exemplify this challenge.
- **Supply Route Security:** Chokepoints heighten vulnerability to disruptions. Nearly 60% of India's crude passes through the Strait of Hormuz, a high-risk corridor.

Challenges in Crude Oil Diversification

- **Ageing Oilfields:** Domestic production decline weakens bargaining power abroad. Crude output fell from 34.2 MMT (2018-19) to approximately 28.7 MMT (2024-25) despite higher capex.
- **Price Volatility**: Wide crude price swings complicate long-term contracting. Brent crude fluctuated between $70–$120/barrel (2021–24).
- **Capex Inefficiency:** Upstream PSU capex rose from ₹1.33 lakh crore (2020–21) to ₹1.70 lakh crore (2024–25) without output gains.
- **Regulatory Uncertainty:** Host-country tax and policy changes affect project viability. Regulatory risks reduce returns in Africa and Latin America assets.

Way Forward

- **Diplomatic Coordination:** Integrate the MoPNG with MEA for upstream asset access; targeted energy diplomacy with West Asia and Africa, which supply approximately 65% of India's crude.
- **Contract Flexibility:** Expand hedging and flexible term contracts to manage volatility; spot-term mix helped India absorb the 2022 oil price shock without shortages.
- **Route Diversification:** Strengthen alternate import routes and storage buffers; expand Strategic Petroleum Reserves (SPR) beyond current approximately 39 MMT.
- **Domestic Revival:** Scale Enhanced Oil Recovery (EOR) and frontier basin exploration; EOR can raise recovery by **5–15% in mature fields.**

Conclusion

Crude oil diversification is essential for India's energy security, fiscal stability, and strategic autonomy in an increasingly volatile global landscape. While challenges such as ageing oilfields, price volatility, and regulatory uncertainties persist, a coordinated approach combining diplomatic engagement, contract flexibility, route diversification, and domestic production revival can significantly reduce import dependence.

India's Increasing Push for Free Trade Agreements

Syllabus Mapping: GSIII, Indian Economy, International Agreements

Context

India is signing multiple Free Trade Agreements (FTA) as part of a strategic shift driven by economic needs and geopolitical uncertainty in a volatile global order. An FTA is a binding agreement between countries or economic blocs that reduces or eliminates tariffs, quotas, and other trade barriers to promote trade.

Reasons Behind India's FTA Push

- **Market Access:** Preferential access for Indian goods enhances labour-intensive exports. India–UAE CEPA offers duty-free access for 90% of Indian exports, increasing exports by 12% in year one.
- **Investment Gains:** FTAs establish stable trade conditions, attracting FDI; India-EFTA TEPA commits to a binding $100 billion investment over 15 years.
- **Competitiveness:** Integration into global value chains reduces input costs, improving competitiveness; tariff cuts under the India–ASEAN FTA increased Indian textile exports to ASEAN by 15%.
- **Services Expansion:** Service-focused FTAs, like the one with the UK, open up access to the UK labour market for Indian professionals, particularly in IT and healthcare.
- **Geopolitical Alignment:** FTAs serve as political stabilisers by strengthening partnerships; agreements with QUAD and EU members enhance India's strategic position in the Indo-Pacific.
- **Technology Access:** Agreements like the India–Australia ECTA give Indian companies access to advanced Australian renewable energy technologies essential for India's energy shift.

Key Concerns and Challenges in India's FTA Policy

- **Trade Imbalance:** Imports under pacts like AITIGA rose more rapidly than exports, expanding deficits.
- **Low Utilisation:** Only about 25% of Indian exporters use FTA benefits due to low awareness, complex rules, and heavy documentation.
- **RoO Misuse**: Concerns exist over third-country goods, especially from China, entering India through FTA partners by exploiting Rules of Origin (RoO).
- **Protectionism:** Indian exporters face strict Non-Tariff Barriers (NTBs) that restrict market access in developed countries, despite tariff reductions.
- **Domestic Vulnerability:** Farmers, especially in dairy, fear competition from mechanised, subsidised producers in Australia, New Zealand, and the EU.
- **Sustainability and Labour:** Binding labour provisions restrict policy autonomy; mechanisms such as the EU's CBAM add carbon costs to Indian exports.
- **Overdependence Risk:** Heavy dependence on bilateral FTAs may weaken India's negotiating position in multilateral trade forums.

Way forward: Strengthening India's FTA Framework

- **RoO Simplification:** India should standardise and digitise the RoO framework to decrease compliance costs and prevent misuse.
- **MSME Support:** A targeted Export Promotion Mission should assist MSMEs with documentation and partner-country standards.
- **Domestic Production:** Align Production-Linked Incentive (PLI) schemes with FTA goals to enhance scale, competitiveness, and high-value production.

- **Trade Logistics:** Enhance ports, inland container depots (ICDs), and customs digitalisation to reduce logistics costs and clearance delays.
- **Sector Focus:** Expand access in India's strength areas like services, textiles, and gems while protecting sensitive sectors such as dairy and oilseeds.
- **Sustainability Standards:** Create a mechanism to monitor and engage with partner countries on NTBs and prepare the Indian industry for issues like the EU's CBAM.
- **FTA Review:** Periodic reviews and renegotiations, such as ongoing AITIGA modernisation, to correct imbalances and expand service coverage.

Conclusion

India's strategic embrace of FTAs reflects its ambition to integrate deeper into global value chains, enhance export competitiveness, and strengthen geopolitical partnerships in an uncertain world order. A comprehensive approach combining RoO simplification, MSME capacity building, sector-specific strategies, and regular FTA reviews will be essential to transform these agreements into genuine drivers of inclusive economic growth and strategic autonomy.

Securities Markets Code (SMC), 2025 Bill

Syllabus Mapping: GSIII, Indian Economy, Securities market

Context

The Union Government has introduced the **Securities Markets Code Bill, 2025**, in the Lok Sabha to consolidate multiple legacy laws into a single, principle-based code. India's securities regulation is currently governed by three separate laws: the **SEBI Act, 1992, the Depositories Act, 1996, and the Securities Contracts (Regulation) Act, 1956.**

Key Objectives of the Bill

- **Legal Consolidation:** Replace three separate Acts with a single unified statutory framework.
- **Investor Protection:** Strengthen safeguards, grievance redressal and investor confidence.
- **Capital Mobilisation:** Facilitate broader participation and efficient fundraising for a growing economy.
- **Regulatory Efficiency:** Reduce compliance burden through simplified, principle-based regulation.

Key Provisions of Securities Markets Code

- **Stronger SEBI Governance:** SEBI Board strength expanded from 9 to up to 15 (Chairperson, 2 Central Government nominees, 1 RBI nominee (ex officio), and 11 members (minimum five whole-time members).
- **Conflict of Interest Disclosure:** Mandatory disclosure of direct or indirect interests by board members.
- **Consultative Rule-Making:** Introduces a transparent process for the issuance of subordinate legislation.
- **Streamlined Enforcement:** Single adjudication process for quasi-judicial actions with clear timelines for investigation and interim orders, ensuring regulatory certainty.
- **Grievance Redressal:** Creation of an Ombudsperson to address investor complaints.
- **Regulatory Sandbox:** Empowers SEBI to promote innovation in financial products and services.
- **Inter-Regulatory Coordination:** Enables seamless listing and regulation of instruments overseen by multiple financial regulators.
- **Decriminalisation of Minor Offences:**
  - **Category I:** Only civil penalties for fraudulent or unfair trade practices.
  - **Category II:** Civil and criminal penalties for market abuse and serious violations harming market integrity and public interest.

Potential Concerns of the Securities Markets Code

- **Over-Centralisation:** Consolidation of three Acts increases SEBI's powers; globally, excessive regulator concentration has raised accountability concerns.
- **Transition Uncertainty:** Migration from three legacy laws to a single Code may cause short-term compliance ambiguity; past reforms like GST rollout saw initial litigation spikes of over 30%.
- **Investor Protection Risks**: Decriminalisation of minor offences could weaken deterrence.
- **Enforcement Capacity Strain:** Number of cases pending before the Securities Appellate Tribunal (SAT) jumped to 1,121 in 2024 from 736 in 2023, with 1,105 of those being appeals against SEBI orders.

Way Forward

- **Phased Rollout:** Implement the Code in stages with transition guidelines; similar phased adoption helped Australia's Corporations Act reforms stabilise markets.
- **Clear Rulemaking:** Issue detailed subordinate regulations early; India's Insolvency and Bankruptcy Code gained predictability through timely regulations and circulars.
- **Capacity Strengthening:** Enhance SEBI staffing and tech tools; Singapore's Monetary Authority of Singapore (MAS) invests heavily in reg-tech for faster enforcement.
- **Investor Safeguards:** Balance decriminalisation with strict civil penalties.
- **Judicial Alignment:** Strengthen coordination with appellate tribunals; fast-track securities cases like specialised commercial courts under India's Commercial Courts Act.

Behind China's $1 Trillion Trade Surplus

Syllabus Mapping: GSIII, Indian Economy, External Sector

Context

China has recorded a historic $1 trillion trade surplus in 2025, despite U.S. President Donald Trump's aggressive tariff-led trade war aimed at reducing America's deficit with China.

Reasons Behind China's $1 Trillion Trade Surplus

- **China's Dominance in Global Manufacturing:** China remains the **world's most competitive manufacturer** across sectors electronics, EVs, textiles, machinery.

  - Scale, low labour costs, state support, and industrial ecosystems make its production unmatched.
- **Weak Domestic Demand and Low Imports:** Chinese households and firms are spending less, reducing **imports of foreign goods**.
  - This depresses domestic consumption but **widens the trade gap**.
- **Cyclical Global Demand Shifts:** As demand from the U.S. slows due to tariffs, China redirects exports to **fast-growing regions**—Southeast Asia, South Asia, Africa, Latin America.
- **State-Facilitated Price Competitiveness:** Overcapacity in multiple sectors (EVs, solar panels, electronics) has **collapsed global prices**, pushing out foreign competitors.
  - Low prices boost exports even when demand is weak.
- **Depreciated Yuan (Real Effective Terms):** IMF notes that China's **low inflation** relative to trading partners has caused a **real currency depreciation**, making exports cheaper globally.
- **Export-Focussed Industrial Policy:** China continues to prioritise being a **global manufacturing power**, with national strategies reinforcing export competitiveness rather than shifting to a consumption-led model.
- **Role of Foreign-Invested Enterprises:** Nearly **29% of trade** comes from foreign-invested firms, **19% of trade** linked to global processing and assembly supply chains.
  - China remains a central assembly hub in global production networks.

Lessons for India

- **Strengthen Domestic Manufacturing Competitiveness:** India must build **large-scale industrial clusters**, improve logistics, and reduce input costs to compete with Chinese prices.
  - Production Linked Incentives schemes need expansion into **mid-tech and high-tech manufacturing**, not just assembly.
- **Guard Against Import Surges:** As Chinese goods get diverted due to U.S. tariffs, India risks becoming a dumping ground.
  - Must calibrate **tariffs, quality control orders (QCOs)**, and **non-tariff barriers** to prevent market disruption.
- **Reduce Reliance on China-Centric Supply Chains:** India should accelerate efforts in **"China+1" diversification**, building domestic supply chains in electronics, EV components, and solar equipment.
- **Boost Export Capability:** India must focus on **export-led industrialisation**; otherwise, it will remain a consumption market for foreign producers.
  - Need better trade logistics, FTAs, export finance, and global value chain participation.
- **Stimulate Domestic Demand Without Import Dependence:** China's problem is weak domestic demand; India must avoid this trap.India should grow consumption in a way that **supports domestic industry**, not imports.
- **Invest in Technological Depth:** China's edge is in **manufacturing technology, automation, and scale**.
  - India must expand R&D, robotics adoption, semiconductor capabilities, and advanced materials.
- **Strategic Trade Diplomacy:** India must work with like-minded countries to respond to global gluts in EVs, solar, electronics, and steel created by Chinese overcapacity.

Recent Export Surge

Syllabus Mapping: GSIII, Indian Economy, Exports

Context

India's merchandise exports recorded a **22% surge in November**, reversing declines in September and October, making it one of the strongest export performances despite **50% US tariffs** on several products.

Reasons Behind the Rise in Exports

- **Cost absorption by exporters:** Indian exporters absorbed US tariff costs to retain market access in anticipation of a near-term trade deal with the US.
- **Market diversification:** Exports rose not only to the US but also sharply to **China, Hong Kong and Europe**, reducing overdependence on a single market.
  - **China–Japan trade tensions:** Restrictions by China on Japanese imports boosted Indian exports, especially **seafood**, leading to a **90% rise to China** and **35% to Hong Kong**.
  - **Pre-CBAM stocking in Europe:** European buyers front-loaded imports ahead of the **EU's Carbon Border Adjustment Mechanism (CBAM)**, boosting engineering exports.
- **Growth in tariff-exempt sectors:** Strong expansion in **electronics, pharmaceuticals, food items, tea, coffee and spices**, which face lower or no US tariffs.
- **Base effect:** November exports grew on a low base due to disruptions caused by the **Red Sea crisis** in the previous year.
- **Rupee depreciation:** A weaker rupee made Indian exports more competitive by lowering prices for foreign buyers.
- **Stabilisation of engineering exports:** Engineering goods, India's largest export category, rebounded with over **30% growth**, aided by European demand.

Associated Challenges

- **High US tariff barriers:** The 50% tariffs continue to make many Indian products uncompetitive in the US market.
- **Order diversion to competitors:** Countries like **Vietnam and Bangladesh** are gaining long-term orders at India's expense.
- **Uncertainty of a trade deal:** Exporters are absorbing costs without assurance of a timely India–US trade agreement.
- **Logistics vulnerabilities:** Continued avoidance of the **Red Sea route** keeps freight costs high and supply chains fragile.
- **Dependence on short-term factors:** Export growth is driven by base effects, stockpiling, and currency depreciation rather than structural competitiveness.
- **Regulatory risks in Europe:** The upcoming **CBAM** will raise costs for carbon-intensive Indian exports.
- **Limited value addition:** Overreliance on low- and mid-value manufacturing reduces pricing power.

Way forward

- **Fast-track trade negotiations with the US** to secure tariff rollbacks and long-term market access.
- **Enhance export competitiveness** through PLI schemes, technology upgradation, and scale economies.
- **Strengthen logistics resilience** by reducing port costs, expanding container availability, and diversifying shipping routes.
- **Prepare exporters for CBAM** through green manufacturing, carbon accounting, and climate finance support.
- **Promote market diversification** via FTAs with the EU, UK and Indo-Pacific partners.

Economy Beyond Headline Numbers

Syllabus Mapping: GSIII, Indian Economy, Growth and Development

Context

India posted strong 8.2% GDP growth in Q2 FY26, but the IMF's "C" grade on data quality due to an outdated GDP base year and undercounting of the informal sector highlights the need for greater statistical transparency to sustain global confidence.

Why Is GDP Not Enough?

- **GDP does not reflect job quality or employment creation**, especially in the formal sector.
- **GDP masks inequality**, high growth can coexist with stagnant incomes for large sections of the population.
- **GDP ignores environmental degradation** such as air pollution, water contamination, and ecological loss.
- **GDP does not capture well-being**, health, life expectancy, or quality of life indicators.
- **GDP can rise due to harmful activities** (e.g., more air purifiers sold during pollution), which do not indicate true development.

Structural Issues

- **Outdated GDP base year (2011–12)** that fails to capture structural shifts in the economy.
- **Underestimation of the informal sector**, which makes up nearly 90% of India's economy and is poorly measured.
- **Low formal job creation**, with 46% of workers stuck in low-productivity agriculture.
- **Weak statistical infrastructure**, limited high-frequency data, and inadequate national accounts.
- **Environmental crisis**, including hazardous air quality and contaminated groundwater, undermining health and productivity.

Way Forward

- **Create more productive, formal-sector jobs** by boosting private investment, easing business regulations, and aligning skills with market demand.
- **Modernise India's statistical architecture**, update the GDP base year, and strengthen data collection on the informal economy.
- **Adopt high-quality, transparent economic data systems** to build global and domestic trust.
- **Prioritise environmental sustainability**, with coordinated action on air pollution, clean energy, industrial emissions, and urban transport.
- **Integrate health, environment, and economic policy**, ensuring growth improves life quality, not just headline numbers.

SWAGAT-FI for Low Risk Investors by SEBI

Syllabus Mapping: GSIII, Indian Economy, Capital Market

Context

SEBI has introduced a SWAGAT-FI Framework for low-risk foreign investors by streamlining compliance, easing multiple registrations and reducing repetitive documentation across investment routes. SEBI operationalised the SWAGAT-FI framework by amending the FPI and FVCI Regulations.

Objectives of SWAGAT-FI

- **Provide easier investment access** to objectively identified and verified low risk foreign investors.
- **Enable a unified registration process** across multiple investment routes for such entities.
- **Reduce repeated compliance** and documentation for such entities.
- **Reducing operational friction** and supporting long-term participation of low-risk investors in India's market.

Low-Risk Investors eligible for SWAGAT-FI Framework

- **Government & Government related investors** such as central banks, sovereign wealth funds, international or multilateral organizations controlled directly or at least 75% directly or indirectly owned by such Government or Government related investors.
- **Appropriately regulated Public Retail Funds (PRFs)** with diversified investors and investment base with independent fund managers, as mandated by their home regulator.
  - Appropriately regulated Mutual Funds and Unit Trusts that are open for subscription by retail investors
  - Appropriately regulated Insurance Companies without segregated portfolios.
  - Appropriately regulated Pension Funds.

Currently, SWAGAT-Fis are estimated to contribute more than 70% of total FPI Assets under Custody (June, 2025).

Ease of Compliance under SWAGAT-FI Framework

- **Dual registration as Foreign Portfolio Investors (FPIs) & Foreign Venture Capital Investors (FVCIs):** SWAGAT-FI entities applying for or already holding FPI status will also be able to register as FVCIs without submitting any additional paperwork. Dual registration will allow the SWAGAT-Fi entities to:
  - Invest in listed equities and debt instruments as FPIs.
  - Invest in unlisted companies and start-ups in designated sectors under FVCI rules.
- **Extended validity of registration:** SWAGAT-FI entities will have an extended validity period of registration renewals including fee payments and KYC reviews of 10 years as compared to the current 3-5 years for others.

Benefits of SWAGAT-FI

- **Increased capital flows:** Simplified access will encourage larger and more stable inflows from institutional investors.
- **Reduced compliance burden:** Streamlining documentation & processes will lower entry barriers and operational costs for investors.
- **Enhanced market depth:** Greater participation will improve liquidity in both equity and debt markets, benefitting all market participants.
- **Improved global positioning:** Modernized access regime will enhance India's reputation as a competitive and investor-friendly destination.
- **Alignment with global best practices:** Aligns with the principle of proportionality in regulation - lighter touch for entities verified as low-risk and regulated entities.

Topics for Prelims (Economy)

National Technical Textile Mission (NTTM)

Context

The National Technical Textiles Mission (NTTM) is likely to be extended by two years beyond March 2026.

About NTTM

- **Launched: 2020**
- **Nodal Ministry: Ministry of Textiles**
- **Mission Period:** 2020–21 to 2025–26
- **Total Outlay: ₹1,480 crore**
- **Vision:** To position India as a **global leader in technical textiles**, reduce import dependence, and boost domestic manufacturing and exports.
- Key Components:
  - **Research, Development and Innovation:** Supports R&D in **high-performance fibres and fabrics**
  - **Market Development:** Promotion and wider **domestic adoption** of technical textiles across sectors.
  - **Export Promotion:** Target to raise technical textile exports from **₹14,000 crore to ₹20,000 crore by 2021–22**, with **10% annual growth** thereafter.
    - » Establishment of a dedicated **Export Promotion Council for Technical Textiles**.
  - **Education, Training and Skill Development:** Promotion of **advanced technical education** in engineering and technology related to technical textiles and their applications.

What are Technical Textiles: Textiles manufactured for **functional and performance-based applications** rather than aesthetics, e.g. geotextiles, medical textiles, protective clothing.

CoalSETU policy

Context

The Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister, has approved the CoalSETU policy.

About CoalSETU Policy (Policy for Auction of Coal Linkage for Seamless, Efficient & Transparent Utilisation)

- It is a **new auction-based mechanism under NRS Coal Linkage Policy, 2016** for allocating **long-term coal linkages** for **diverse industrial uses and exports**.
- It aims to ensure **fair access, flexibility and optimal utilisation** of coal resources.
- **Key Features of the Policy:**
  - **Auction-based allocation** of coal linkages for long-term supply under the NRS framework.
  - **Any domestic buyer** requiring coal can participate in the auction, **irrespective of end use**.
  - Coal linkages can be used for own industrial consumption, export of coal, other purposes such as **coal washing**, **resale within India is not permitted**.
  - Linkage holders are allowed to **export up to 50% of the allocated coal quantity**.
  - Provides **flexibility to utilise coal across group companies**, improving operational efficiency.

NCAER Report on Employment

Context

The National Council of Applied Economic Research (NCAER) released a report titled **"India's Employment Prospects: Pathways to Jobs."**

- It highlights skilling and small enterprises as key drivers of job creation to sustain the 8% GDP growth.
- The NCAER is India's oldest and largest independent, non-profit think tank. Established in New Delhi in 1956, it conducts evidence-based economic research to guide public policy.

Key Findings of the Report

- **Employment Pattern**: India's recent employment growth is driven mainly by necessity-based self-employment in low-technology, subsistence household enterprises.
- **Income Level:** Despite economic growth, India's per capita GDP is relatively low, ranking 128th globally.
- **Skill Deficit:** Transition to skilled labour has been slow; only 4.1% workers had vocational training in 2024, much less than in countries like Germany, Singapore, and Canada.
- **Job Potential:** A 9% rise in skilled workers could generate about 9.3 million jobs by 2030.
- **Multiplier Effects:** Moderate growth of labour-intensive sub-sectors could increase employment in manufacturing by 53% and in services by 79%.

Policy Recommendations for Job Creation

- **PLI Reorientation:** Redirect Production-Linked Incentives toward labour-intensive sectors like textiles, garments, footwear, and food processing.
- **Service Sectors:** Increase support for tourism, education, and healthcare to generate large-scale, employment-intensive job opportunities.
- **Digital Adoption:** Improve access to digital technologies and credit, as enterprises using digital technologies hire 78% more workers than non-digital firms.

ADB Raises India's FY26 Growth Outlook

Context

The **Asian Development Bank (ADB) has revised India's FY26 GDP growth** projection upward to **7.2%, marking a sharp upgrade from its earlier estimate of 6.5%.**

Key Details

- **Momentum:** Q2 GDP expanded 8.2% (six-quarter high), taking first-half growth to about 8%, signalling sustained near-term momentum behind the revision.
- **Drivers:** Revision reflects stronger domestic consumption (stimulated by recent tax cuts) and higher investment, with supply-side support from robust manufacturing and services expansion.
- **Regional Impact:** India's stronger outlook lifts Asia's 2025 growth projection to 5.1% (from 4.8%), making India the principal engine of the region's faster expansion.

About Asian Development Bank (ADB)

- **Overview:** Multilateral development bank established in, based in Manila, Philippines. Has 69 members (49 from Asia-Pacific, 19 non-regional); India is a founding member.
- **Functions:** Provides loans, grants and technical assistance with major public-sector lending focused on education, environment and private-sector development.
- **Governance:** Follows a weighted-voting structure with major shareholders being Japan and the US at 15.7% each, China at 6.4% and India at 6.3%. The ADB President is traditionally from Japan.
- **Publications:** Releases the Asian Development Outlook (flagship) along with Key Indicators for Asia and the Pacific, the Asian Development Review, and the Asian Economic Integration Report.

Global Value Chain (GVC) Development Report 2025

Context

Asian Development Bank (ADB), World Trade Organization (WTO), World Economic Forum (WEF) and partners developed Global Value Chain (GVC) Development Report 2025 titled **"Rewiring GVCs in a Changing Global Economy" was released.**

Key Findings

- **Globalisation is being reshaped, not reversed:** GVCs are adapting to technological shifts, green transition, and geopolitical realignments, demonstrating strong resilience.
- **GVC share in global trade:** GVC-linked trade accounts for **46.3% of global trade**, marginally lower than the **2022 peak of 48%**.
- **Services and digital trade surge:** Services have overtaken goods in GVC participation, contributing **over one-third of value added** in manufacturing exports.
- **India's improved GVC integration:** Driven largely by strong growth in **digital services exports**.
- **Regional concentration: Asia, Europe, and North America** dominate GVC trade, while **Latin America and Africa** remain weakly integrated.

Emerging Trends

- **Reshoring:** Major economies such as **China, the US, and the EU** are increasing domestic production to reduce reliance on foreign value addition.
- **Manufacturing diversification:** Efforts to diversify supply chains continue despite China's dominance, including its **76.9% share in global electric vehicle production**.
- **India's global position:** India ranks among the **top 10 value-adding economies**, contributing **2.8% of global domestic value added in exports (2024)**.

India's Two Major Shipbuilding Initiatives

Context

The Ministry of Ports, Shipping, and Waterways (MoPSW) has notified operational guidelines for two significant shipbuilding initiatives. These schemes are:

- Shipbuilding Financial Assistance Scheme (SBFAS) and
- Shipbuilding Development Scheme (SbDS)—aims to bolster India's domestic shipbuilding capacity.

Objective: To establish India among the top five global shipbuilding nations by 2047, in alignment with the Maritime Amrit Kaal Vision 2047.

Shipbuilding Financial Assistance Scheme (SBFAS)

The scheme offers graded support for small, large, and specialised vessels, with stage-wise disbursement linked to defined milestones and secured by appropriate instruments. Features are:

- **Financial Assistance:** The government will provide 15–25% financial assistance per vessel, based on the vessel category.
- **Governance:** The scheme establishes a National Shipbuilding Mission to ensure coordinated planning and execution of all shipbuilding initiatives.
- **Key Feature**: The scheme introduces Shipbreaking Credit Notes, which provide shipowners with 40% of the scrap value as credit when scrapping vessels at Indian yards. This credit may be utilised toward new vessel construction in India.

Shipbuilding Development Scheme (SbDS)

The scheme supports greenfield shipbuilding clusters, brownfield yard modernisation, and an India Ship Technology Centre under the Indian Maritime University. Features are:

- **Greenfield Support:** Greenfield shipbuilding clusters will receive 100% capital support through a 50:50 Centre–State special purpose vehicle.

- **Brownfield Expansion:** Existing shipyards are eligible for 25% capital assistance for dry docks, shiplifts, fabrication facilities, and automation upgrades.
- **Mechanism:** Disbursements will be milestone-based and monitored by independent agencies.
- **Key Feature:** The scheme includes a Credit Risk Coverage Framework that provides government-backed insurance against various risks, thereby enhancing financial resilience.

Bureau of Port Security

Context

The Centre decided to constitute a dedicated Bureau of Port Security (BoPS) to oversee the security of vessels and port facilities.

About the Bureau of Port Security

- **Legal Basis:** Statutory body under Section 13 of the Merchant Shipping Act 2025, for ship security.
- **Institutional Set-up:** Headed by a Director General under the Ministry of Ports, Shipping and Waterways; modelled on the Bureau of Civil Aviation Security (BCAS).
- **Core Functions:** Timely analysis, collection and exchange of security information, dedicated focus on cybersecurity to protect port Information Technology (IT) systems.
- **Risk-Based Security:** Implementation to be graded and risk-based instead of one-size-fits-all.
- **Role of CISF:** Central Industrial Security Force (CISF), earlier designated as Recognised Security Organisation (RSO) for seaport facilities, is also tasked to train private security agencies.
- **Transition:** For one year, the shipping safety regulator's head will function as Director General of the Bureau of Civil Aviation Security to ensure continuity.

Anti-Dumping Duty on Chinese Steel Imports

Context

India imposed anti-dumping duties on cold-rolled steel from China for five years.

Reasons for Imposing Anti-Dumping Duty on China

- **Unfair Pricing Practices:** Chinese producers were found exporting cold-rolled steel to India at prices significantly below normal value, constituting dumping and distorting fair competition.
- **Injury to Domestic Industry:** Persistent low-priced imports led to declining capacity utilisation, suppressed prices, and reduced profitability for Indian steel manufacturers.
- **Strategic Sector Protection:** Steel is a core infrastructure and manufacturing input; safeguarding it is essential for construction, automobiles, defence, and capital goods.

Anti-Dumping Duty

- **Dumping:** Dumping is an unfair trade practice where a country or company exports a product at a price lower than its domestic price or below its average production cost.
- **Anti-Dumping Duty:** ADD is a tariff imposed by an importing country to counteract the margin of dumping and restore fair domestic prices.
- **WTO Rule:** GATT Article VI permits ADDs only after an investigation confirms dumping, injury to the domestic industry, and a causal link between the two.

National Pension System Reforms 2025

Context

The Pension Fund Regulatory and Development Authority has revised National Pension System norms in 2025 to enhance flexibility for non-government subscribers.

About National Pension System (NPS)

- **Launch:** Introduced in 2004 for government employees; opened to all citizens in 2009.
- **Objective:** Ensure long-term retirement income security and reduce old-age dependency.
- **Nature:** Voluntary, defined-contribution pension scheme with market-linked returns.
- **Coverage:** Government employees, corporate sector employees and all citizens of India.
- **Structure:** Contributions invested through professional Pension Fund Managers (PFMs) across equity, corporate debt and government securities.

Key Changes Made in NPS 2025

- **Enhanced Lump-sum Withdrawal:** Up to 80% withdrawal allowed at exit for non-government subscribers. The earlier limit was 60% lump sum + 40% annuity.
- **Government Subscribers:** 60% lump-sum withdrawal continues without any change.
- **Corpus-Based Withdrawal Rules**
  - Corpus ≤ ₹5 lakh: 100% lump-sum withdrawal permitted.
  - Corpus ≤ ₹8 lakh: Full withdrawal (100%) allowed at superannuation.
  - Corpus ₹8–12 lakh: ₹6 lakh lump sum, remaining amount used for annuity / structured withdrawal.
  - Corpus > ₹12 lakh: For Non-government Subscribers Up to 80% lump sum + 20% annuity, and for Government Subscribers Up to 60% lump sum + 40% annuity

Exit & Deferment Provisions

- **Normal Exit:** Allowed after 15 years of subscription or on attaining 60 years, whichever is earlier.
- **Deferment Option:** Subscribers may defer lump-sum withdrawal or annuity purchase up to age 85.
- **Premature Exit:** At least 80% of corpus must be annuitised. If corpus ≤ ₹5 lakh, full withdrawal is allowed.
- **Special Situations**
  - **Death of Subscriber**: Entire accumulated corpus paid to nominee / legal heir.
  - **Missing Subscriber:** 20% interim relief to nominees. The remaining amount was paid after the legal presumption of death under Bharatiya Sakshya Adhiniyam, 2023.
  - **Renunciation of Citizenship:** Full lump-sum withdrawal permitted after closing the NPS account.

- **Disability:** For ≥75% disability, exit is allowed with medical certification from a government doctor.

Pension Fund Regulatory and Development Authority (PFRDA)

- **Establishment:** Statutory body under the PFRDA Act, 2013.
- **Headquarters:** New Delhi.
- **Mandate:** Regulate, promote and ensure orderly growth of the pension sector in India

Multi-Lane Free Flow (MLFF) Tolling System

Context

The Union Minister for Road Transport and Highways announced the nationwide rollout of the Multi-Lane Free Flow (MLFF) system by the end of 2026.

Multi-Lane Free Flow (MLFF) system

- The MLFF is a barrier-free electronic tolling system that enables toll collection without needing vehicles to stop or slow down.
- It uses a combination of Radio Frequency Identification (RFID) to read FASTags and Automatic Number Plate Recognition (ANPR) cameras to capture Vehicle Registration Numbers (VRN).
- Unlike FASTag lanes with boom barriers, MLFF removes physical toll booths and gates entirely.
- **Implementing Bodies:** The National Highways Authority of India (NHAI) and its subsidiary IHMCL.
- **Future Integration**: The system is designed to integrate with GNSS-based satellite tolling for distance-based pay-as-you-use charging.
- **Key Benefits:** MLFF reduces congestion, fuel consumption, emissions, and supports the National Logistics Policy target of reducing logistics costs to single digits.
- **Inaugural Sites:** India's first barrier-free toll plaza began on NH-48 in Gujarat, followed by NH-44 in Haryana in 2025.

Masala Bond

Context

The Enforcement Directorate investigated the Masala Bonds issued by the Kerala Infrastructure Investment Fund Board (KIIFB).

What is meant by Masala Bond?

- They are rupee-denominated debt instruments sold in overseas markets by Indian entities to raise capital.
- It was launched in 2014 by International Finance Cooperation (IFC)
- **Investor Eligibility**: Those residing in countries that are members of the Financial Action Task Force (FATF) and the International Organisation of Securities Commissions (IOSCO).

National Strategy for Financial Inclusion (NSFI)

Context

Reserve Bank of India releases National Strategy for Financial Inclusion (NSFI): 2025-30

About NFSI: 2025-30

- It sets out five core goals—called **Panch-Jyoti**—supported by 47 targeted action points to deepen and strengthen financial inclusion across India.
- **Panch-Jyoti Goals**:
  - **Enhance access** to and usage of an equitable, affordable, and suitable range of financial services to **promote financial safety and security for households and micro-enterprises.**
  - **Implement a gender-responsive approach** to advance women-led financial inclusion and adopt differentiated strategies to build financial resilience among underserved and vulnerable groups.
  - **Integrate livelihoods, skill development, and related support systems** with financial inclusion efforts to improve economic outcomes.
  - **Use financial education** as a means to encourage **responsible financial behaviour and discipline.**
  - **Improve customer protection standards** and strengthen grievance-redress mechanisms to ensure trust and transparency.

Meaning of Financial Inclusion (FI)

As defined by the World Bank, FI ensures that individuals and businesses can access affordable and appropriate financial products and services that meet their needs in a responsible and sustainable manner.

Domestic Systemically Important Banks

Context

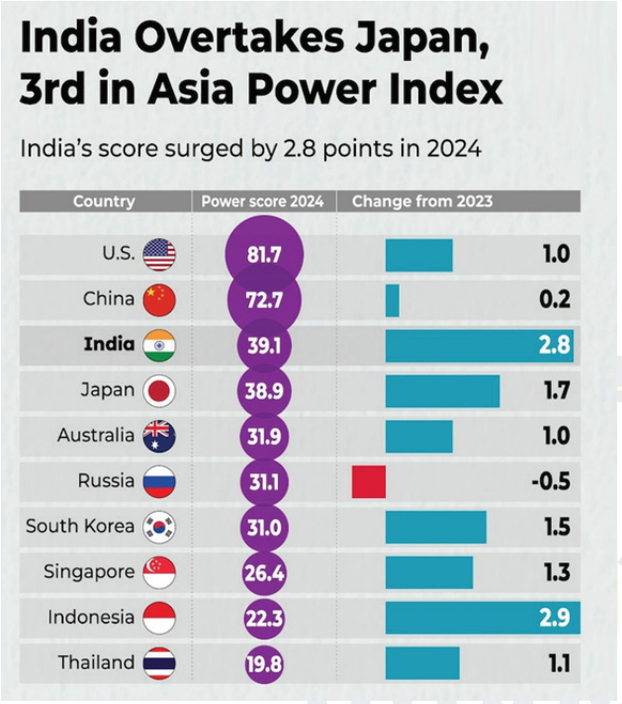
RBI identifies SBI, HDFC Bank, ICICI Bank as Domestic Systemically Important Banks in 2025 list.

About Domestic Systematically Important Banks (D-SIB)

- D-SIB is a financial institution that is so large and significant that its failure could have a catastrophic impact on the financial system and economy. They are also known as **"Too Big To Fail" (TBTF) banks.**
- **Qualifying Criteria:** To identify the D-SIBs, the RBI considers only those banks whose size is equal to or more than **2% of GDP.**
- **The Basel Committee on Banking Supervision (BCBS)** has recommended **4** indicators to assess the importance of a bank: **size, interconnectedness, substitutability and complexity.**
- Presently **SBI, ICICI Bank and HDFC Bank** have been identified as Domestic Systemically Important Banks (D-SIBs
- **Bucket-Based Surcharges**: Banks are categorised into buckets based on systemic importance scores. These buckets determine the **Common Equity Tier 1 (CET1) capital requirement**:
  - **SBI (Bucket 4)**: Additional CET1 requirement of **0.80%**.
  - **HDFC Bank (Bucket 3)**: Additional CET1 requirement of **0.40%**.
  - **ICICI Bank (Bucket 1)**: Additional CET1 requirement of **0.20%**.

Global Systemically Important Banks (G-SIBs)

- The **Financial Stability Board (FSB)** in consultation with the **Basel Committee on Banking Supervision** annually identifies G-SIBs.
- **Qualifying Criteria:** Only 75 largest Global Banks considered.
- In 2023, **29 banks** were accorded G-SIB status.
  - **Important G-SIBs:** JP Morgan Chase, Bank of America, Citigroup, HSBC, Agricultural Bank of China, Bank of China, Barclays etc.



Asia Power Index 2025

Context

India has secured the third rank in the Asia Power Index 2025.

About the Asia Power Index

- It is an **annual assessment** that gauges how effectively countries in Asia can **influence and respond to their external strategic environment, while mapping the region's power dynamics.**
- **Launched in 2018**, its **2025 edition marks the seventh release** of the index.
- It is **developed and published by the Lowy Institute**,(Australia).
- The index evaluates the **relative power of 27 countries and territories** across the Asian region.
- The eight thematic dimensions assessed are:
  - **Resources:** Economic Capability, Military Capability, Resilience, Future Resources
  - **Influences:** Diplomatic Influence, Economic Relationships, Defence Networks, Cultural Influence

Large Exposures Framework (LEF)

Context

RBI clarified that Indian branches of foreign banks must treat exposures to their head office and overseas branches as normal counterparty exposures under LEF caps.

What is Large Exposures Framework (LEF)?

- It is an RBI rule that prevents banks from giving too much money or exposure to any single borrower or group of connected borrowers.
- Applies to **all scheduled commercial banks**, including **Indian banks and foreign banks operating in India**.
- Typically, a bank's exposure to a single borrower must **not exceed 20 % of its eligible capital base (Tier-1 capital),** though in some cases an additional 5 % cushion may be allowed.
- Exposure to a group of related borrowers (connected counterparties) must not exceed 25 % of capital base.
- LEF aligns with the **Basel Committee on Banking Supervision (BCBS) large exposure norms**, promoting uniform global prudential practices.

Open Market Operations (OMO) Purchase

Context

In its December 2025 policy review, the RBI announced that it will inject durable liquidity by conducting **₹1 trillion in OMO purchases** of government securities and a **three-year $5 billion dollar–rupee buy/sell swap**.

About Open Market Operations (OMO)

- OMO refers to the **buying and selling of government securities (G-Secs) in the open market by the Reserve Bank of India (RBI)** to regulate liquidity in the banking system.
- **How does OMO Work?**
  - **OMO Purchase** → RBI **buys** government securities from banks → More liquidity in the banking system →**Interest rates fall** → Loans become cheaper → Boosts investment and economic activity.
    - » **Stock market benefits** due to increased liquidity.
  - **OMO Sale** → RBI **sells** government securities to banks → Reduces liquidity → Banks have less money to lend → **Interest rates rise** → Loans become expensive → Controls inflation.
    - » **Stock market may decline** due to reduced liquidity.

Hindu Rate of Growth

Context

Prime Minister Narendra Modi stated that the term "Hindu rate of growth" represents a colonial-era mindset.

About Hindu Rate Of Growth

- It referred to the **persistent slow economic growth** from the 1950s to the 1980s, **despite changes in governments, policies, wars, and crises.** The phrase—controversially—**implied cultural or structural stagnation.**
- Coined in **1982 by economist Raj Krishna**, it described India's **low, stagnant GDP growth of around 3.5%** per year in the decades after Independence.
- Data shows India **broke out of the "Hindu rate of growth" before 1991**.
  - Between **1956–1975**, GDP growth averaged **3.4%**.

– Between **1981–1991**, it improved to **5.8%**, marking a structural shift toward higher growth.

Finland to Host Circular Economy Roadshows in India

Context

Finland will hold **circular economy roadshows across Indian cities** as India prepares to host the **World Circular Economy Forum in October 2026.**

About Circular Economy

- **Concept:** Economic model focused on designing out waste, extending product lifespan and closing material loops through reuse, repair, remanufacturing and recycling.
- **Drivers:** Enabled by design innovation, material recovery technologies and producer-responsibility frameworks supporting closed-loop systems.
- **Potential:** United Nations Development Programme (UNDP) estimates circular transition could unlock $4.5 trillion in economic value by 2030 while reducing emissions and resource pressure.
- **India Scenario:** India's circular economy potential is estimated at $2 trillion and 10 million jobs by 2050, with a current focus on waste management and recycling.
- **Priority Sectors:** Textiles, electronics, construction, mobility, packaging, and clean energy value chains (including battery materials) are identified as key circular transition domains.

Goldar Committee Recommendations on National Account Statistics

Context

An Advisory Committee on National Account Statistics (ACNAS) under the chairmanship of professor B.N. Goldar has recommended revising the base year for National Accounts.

What are the Recommendations?

- **Base Year Update:** Recommended revision of the **national accounts base year from 2011–12 to 2022–23** to reflect the current economic structure.
- **Improved Data Integration:** Proposed incorporation of **new and updated datasets**, including **GST data, digital economy indicators, PLFS**, and other administrative sources.
- **Capturing Structural Changes:** Aimed at better accounting for **structural shifts in the economy**, including formalisation and sectoral transformation.
- **Informal & Digital Economy Coverage:** Sought improved estimation of the **informal sector and digital activities** to enhance the accuracy and credibility of GDP estimates.

ASPIRE Scheme

Context

The Ministry of Micro, Small and Medium Enterprises (MSME) is implementing the ASPIRE (A Scheme for Promotion of Innovation, Rural Industry, and Entrepreneurship) scheme to promote entrepreneurship and livelihood opportunities in rural areas,

About ASPIRE Scheme

- **Launch:** Introduced in **2015** by the **Ministry of Micro, Small and Medium Enterprises (MSME)**.
- **Purpose:** Aims to promote **innovation and entrepreneurship** by establishing a nationwide network of **Livelihood Business Incubators (LBIs)**.
- **Key Features:**
  - **Skill Development:** Focuses on **skilling and re-skilling** unemployed youth, self-employed individuals and wage earners, particularly in **agro-based and rural sectors**.
  - **Capital Support:** Provides up to **₹1 crore** to government agencies and **₹75 lakh** to private agencies for procurement of **plant and machinery**.
  - **Operational Support:** Offers up to **₹1 crore** to both government and private agencies to meet **operational expenses**, including manpower and incubation costs.

Risk-based deposit insurance for banks

Context

The Central Board of the RBI approved the risk-based deposit insurance premium framework which will replace the current flat-rate system (of 12 paise per Rs 100 deposit).

What is Risk-based Deposit Insurance for Banks

- It is a system where the insurance fees (premiums) that banks pay to protect their depositors are determined by the bank's individual risk profile.
- **Key Objectives:**
  - **Reducing Moral Hazard:** When insurance is flat-rate, banks might take excessive risks because they know the insurance fund will cover them if they fail. RBP makes risk-taking expensive for the bank.
  - **Rewarding Prudence:** It financially rewards well-managed banks by lowering their operational costs.
  - **Fairness:** It ensures that riskier institutions—which are more likely to drain the insurance fund—contribute a larger share toward it.
- **How the Framework Works:**
  - **Risk Indicators:** Regulators look at metrics like **Capital Adequacy**, **Asset Quality** (non-performing loans), and **Management/Governance**.
  - **Grading**: Banks are often grouped into categories (e.g., "Well-Capitalized" vs. "Undercapitalized").
  - **Premium Calculation:** A "Well-Capitalized" bank with low risk pays a lower premium rate, while a "Risky" bank pays a higher rate—up to a specific ceiling.

Deposit Insurance and Credit Guarantee Corporation (DICGC)

It is a wholly-owned subsidiary of the Reserve Bank of India (RBI)—is the body responsible for protecting bank deposits.

Goldilocks period

Context

RBI's Monetary Policy Committee (MPC) has cut the repo rate by 25 bps to **5.25%**, completing **125 bps of rate cuts in 2025** amid sharp disinflation and strong growth.

- With inflation falling to **0.3%** and growth staying robust, Governor Malhotra called this India's "rare Goldilocks moment."

What is a Goldilocks Period?

- A Goldilocks economy refers to a macroeconomic phase where economic conditions are **"just right"**- neither too hot (high inflation) nor too cold (slow growth).
- It features **moderate, stable, and sustainable growth** alongside **low, controlled inflation**.
- The term is inspired by the children's story **"Goldilocks and the Three Bears"**, where Goldilocks finds a bowl of porridge that is "just right."
- Policymakers value this phase because it allows for **stable monetary policy**, supports investment, improves consumer confidence, and reduces the risk of overheating or recession.
- India's situation in 2025- **inflation below 2% and GDP growth above 8%**—fits this ideal macroeconomic description.

Topics for Mains (Agriculture)

India's journey from GM crops to Genome Editing

Syllabus Mapping: GSIII, Indian Economy, Agriculture- Technology in Agriculture sector

Context

India's progress in genetically modified (GM) crops has largely stagnated since 2006 with no approvals beyond Bt cotton, but the rapid development and regulatory backing for genome-edited (GE) crops evident in the recent clearance of GE rice varieties such as **Samba Mahsuri and MTU-1010** and advanced trials of GE mustard signals a significant shift in the country's agricultural biotechnology policy.

What is Meant by Genetically Modified Crops?

- They are plants whose DNA has been altered using genetic engineering techniques to introduce desirable traits—such as resistance to pests, diseases, herbicides, or environmental conditions, and improved nutritional content.
- This is done by inserting genes from unrelated species, resulting in crops that do not occur naturally.

Historical Background of GM Crops in India

- **1990s:** Research on GM crops begins in India.
- **2002:** Bt cotton (genetically modified to resist bollworm) becomes the first and only GM crop commercially approved in India, under the Vajpayee government.
- **Post-2002:** Bt cotton adoption rises sharply—over 90% of India's cotton area is under Bt cotton by 2020s.
- **2009:** Bt brinjal (eggplant) is developed but put under indefinite moratorium due to public and scientific concerns.
- **2016–2022:** GM mustard (DMH 11) developed by Delhi University receives in-principle approval from GEAC in 2016 and conditional environmental release in 2022, but full commercialisation is on hold pending further regulatory and legal review.
- **Present:** Only GM cotton is legally grown. Other GM crops (brinjal, mustard, soybean, corn) remain unapproved for commercial cultivation.

About Genome-Edited Crops

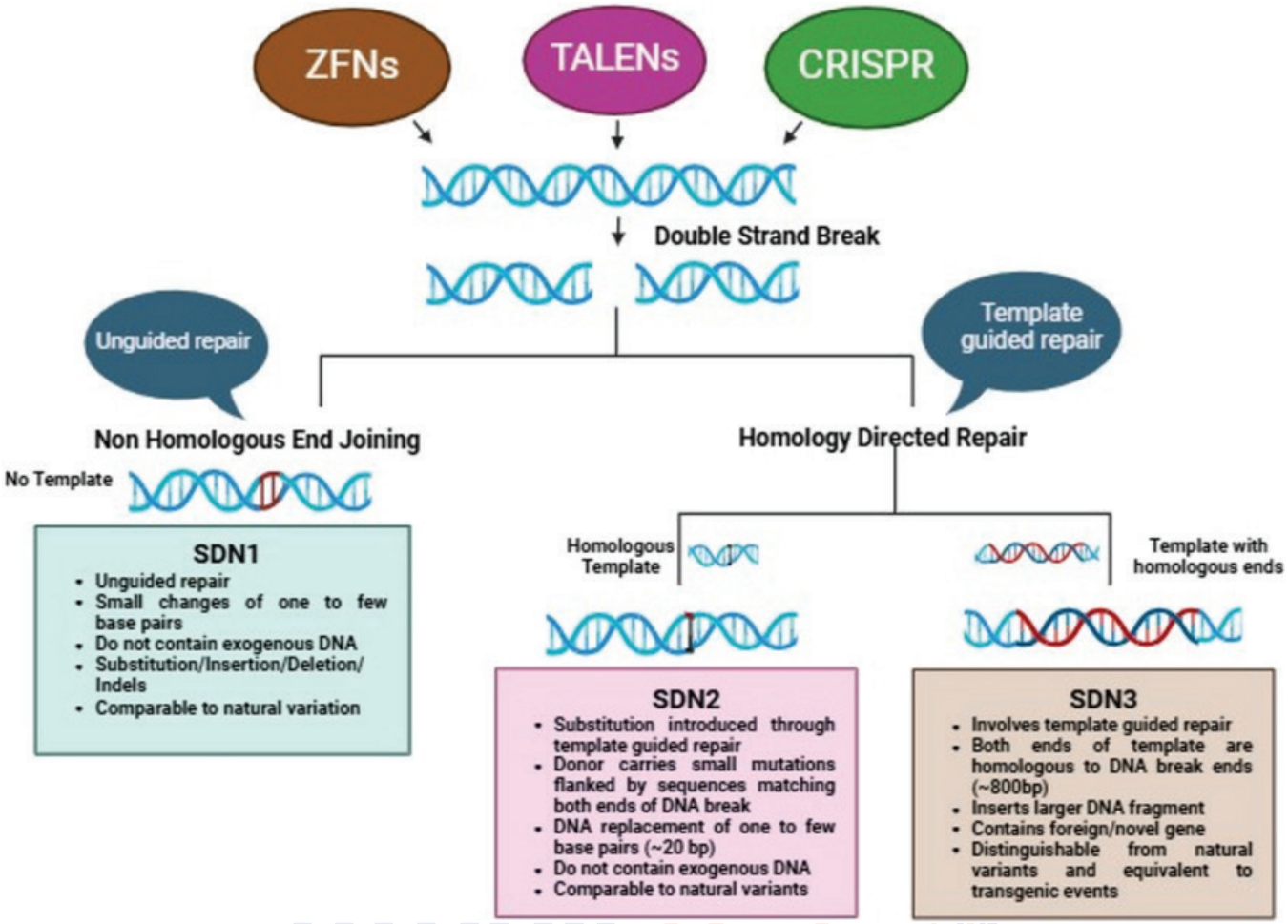
Genome-edited (GE) crops are plants whose DNA has been precisely modified using advanced gene-editing tools—most commonly **CRISPR-Cas9**, **TALENs**, or **Zinc Finger Nucleases**—to introduce beneficial traits **without adding foreign genes from another species**.

What are the Arguments Against GM Crops

- **Food Safety:** Fears of allergenicity, toxicity, or unforeseen health impacts.
  - Lack of long-term studies on human health effects.
- **Environmental Risks:** Potential for cross-pollination with wild relatives or non-GM crops ("gene flow").
  - Evolution of super-pests and herbicide-resistant weeds.
  - Threat to biodiversity and non-target species (e.g., pollinators).
- **Socio-Economic Issues:** Dependence on a few multinational seed companies.
  - High seed costs for farmers.
  - Risk of illegal and unregulated GM seed circulation.
- **Regulatory and Ethical Issues:** Lack of transparency and public consultation.
  - Insufficient biosafety testing and regulatory capacity.
  - Ethical concerns about tampering with nature and food systems.
- **Trade Concerns:** Potential loss of export markets to countries that ban GM imports.

Recent Developments in GE Crop Policy & Science in India

- In March 2022, the Ministry of Environment, Forest & Climate Change (MoEF&CC) **exempted genome-edited plants that do not contain exogenous (foreign) DNA** — i.e. GE crops developed via SDN-1 or SDN-2 — from the stricter biosafety regulations that apply to traditional genetically modified (GM) crops.
- The Department of Biotechnology (DBT) **issued the "Guidelines for the Safety Assessment of Genome Edited Plants" in 2022**, along with Standard Operating Procedures for regulatory review under SDN-1 and SDN-2 categories.
- In May 2025, the Indian Council of Agricultural Research (ICAR), through its constituent institutes, released India's first publicly announced genome-edited rice varieties — **DRR Rice 100 (Kamala) and Pusa DST Rice 1 — developed via CRISPR-based editing.**



Genome Editing vs Genetic Modification

Parameter	Genetically Modified (GM) Crops	Genome-Edited (GE) Crops
Source of Genetic Change	Introduce **foreign genes** from unrelated species (e.g., Bt gene from **Bacillus thuringiensis**)	Modify or mutate **native genes already present** in the plant
Nature of DNA Change	Contains **transgenes** permanently inserted into the genome	Creates **precise edits** without adding external DNA; final plants are **transgene-free**
Mechanism	Gene insertion via gene gun, Agrobacterium, or vectors	Gene editing using CRISPR-Cas9, Cas12a etc., guided by specific RNA molecules
Mode of Trait Expression	New trait expressed due to foreign gene (e.g., insecticidal protein)	Altered expression/function of native genes (e.g., reduced cytokinin degradation for higher yield)
Examples of Traits Developed	Insect resistance, herbicide tolerance	Higher yield, drought/salt tolerance, improved quality traits
Presence of Editing Tools in Final Crop	Not applicable; transgene remains	Cas proteins used only in early generations; **segregated out** later, leaving a clean, edited plant
Regulation	Strict biosafety oversight; requires GEAC approval	Lighter regulation for SDN-1/SDN-2 edits; treated similar to conventional breeding
Social Acceptance	Often controversial; labelled "GMO"	More accepted since edits mimic natural mutations
Commercialization Speed	Slow, costly, highly regulated	Faster due to minimal regulatory barriers

Challenges with Genome-Edited Crops in India

- **Regulatory Grey Zones:** Even after exempting SDN-1 and SDN-2 edits from strict GMO rules, India still lacks a unified, long-term regulatory system to oversee biosafety, post-release monitoring, and farmer-level compliance.
- **Weak Detection and Traceability Systems:** Many GE edits resemble natural mutations, and India currently lacks robust laboratories capable of reliably detecting off-target changes or distinguishing edited crops from conventionally bred ones.
- **Off-Target and Ecological Risks:** Precision editing tools like CRISPR may still trigger unintended genetic alterations, and

India's ecological risk-assessment frameworks are not yet equipped to evaluate such subtle molecular changes.

- **Institutional Capacity Constraints:** Public sector labs have limited access to high-end sequencing facilities, bioinformatics expertise, and trained manpower required for rigorous validation of genome edits.
- **Public Perception and Acceptance Gaps:** Farmers and consumers often conflate GE with GM crops, creating mistrust that can hinder adoption unless supported by extensive outreach and transparent communication.
- **Trade and Export Uncertainty:** With countries adopting divergent rules on GE foods, India risks trade barriers if its genome-edited crops do not align with the regulatory frameworks of major export markets.

Way Forward

- Establish a dedicated **Genome Editing Regulatory Authority** with clear post-release surveillance protocols, risk-assessment norms, and transparent approval processes.
- **Invest in national-level genome sequencing hubs**, standardised detection tools, and bioinformatics platforms to ensure traceability and regulatory integrity.
- **Mandate whole-genome sequencing and multi-season field trials** for GE crops, along with ecological impact assessments similar to international best practices.
- **Strengthen ICAR, SAUs, and public labs through capacity-building programmes**, long-term grants, and international research partnerships (like GETin fellowships).
- **Align India's GE guidelines with Codex Alimentarius** and negotiate **bilateral equivalence agreements** to safeguard agricultural exports.

Formalisation of Micro Food Processing Enterprises

Syllabus Mapping: GSIII< Indian Economy, Agriculture, Food Processing in India

Context

The Ministry of Food Processing Industries (MoFPI) informed Parliament about the progress of the PM Formalisation of Micro Food Processing Enterprises (PMFME) Scheme.

About PMFME Scheme

- **Objective:** To formalise and enhance the competitiveness of **micro food processing enterprises**, especially in the **unorganised sector**.
  - Promote value addition, branding, and market integration of micro units.
- **Key Features:**
  - **Centrally Sponsored Scheme** implemented by MoFPI.
  - Supports setting up and upgradation of **micro food processing enterprises** nationwide.
  - Strong focus on **ODOP (One District One Product)** to promote balanced regional development.
- **Financial Assistance Under PMFME:**
  - **Individual/Group Micro Enterprises**: 35% credit-linked capital subsidy, up to ₹10 lakh per unit.
  - **SHG Seed Capital: ₹40,000 per SHG member** engaged in food processing
    - » Up to **₹4 lakh per SHG federation**.
  - **Common Infrastructure: 35% subsidy**, up to **₹3 crore** for FPOs, SHGs, cooperatives, and government agencies.
    - » Infrastructure is available for other units on a hiring basis.
  - **Branding & Marketing: Up to 50% grant** for branding and marketing by groups of SHGs, FPOs, cooperatives, or SPVs.
  - **Capacity Building:** Entrepreneurship Development Programmes (EDP) and **product-specific skill training** tailored to the food processing sector.

One-District, One-Product(ODOP)

- ODOP products selected for 726 districts across 35 States/UTs, including GI-tagged products.
- Aims to promote district-specific products through branding, marketing, and value-chain interventions.

Food Irradiation

Syllabus Mapping: GSIII, Indian Economy, Agriculture, Food Processing

Context

The Ministry of Food Processing Industries (MoFPI) has invited proposals for setting up multi-product Food Irradiation Units under the ICCVAI component of the Pradhan Mantri Kisan Sampada Yojana (PMKSY).

What is Food Irradiation?

- Food irradiation is the **controlled exposure of food to ionising radiation** to destroy bacteria, insects, fungi, and parasites without making the food radioactive.
- It helps **extend shelf life**, prevent sprouting (potatoes, onions), and reduce microbial contamination in fruits, vegetables, spices, cereals, and pulses.
- Recognised as safe by global bodies such as **AMA, ADA, IFT**, and evaluated rigorously by national and international laboratories.
- Used in India for commodities like **mangoes, spices, potatoes, onions, cereals, pulses, oilseeds**, meeting quarantine and export norms.
- **Radiation Techniques Used in Food Irradiation:**
  - **Gamma Radiation:** Derived from **radioactive Cobalt-60** sources.
    - » Deep penetration; suitable for bulk commodities (spices, grains, packed produce).
  - **X-ray Irradiation:** Produced when high-energy electrons strike a heavy-metal target.
    - » Offers high penetration similar to gamma rays.
    - » Widely used in industrial and medical applications.
  - **Electron Beam (E-Beam):** Uses high-energy electrons from an accelerator directed onto food.
    - » Faster processing; ideal for surface treatment and thin products.
    - » No radioactive source involved.

Initiatives for food irradiation in India

- The **Union Budget 2024-25** has allocated funds to establish **50 multi-product food irradiation units** in the MSME sector.
- India has established **34 irradiation processing facilities nationwide,** of which **16 are supported by the Ministry of Food Processing Industries (MoFPI).**
- To encourage growth, MoFPI offers financial assistance of up to **Rs 10 crore per projec**t for setting up food irradiation units that aim to boost the treatment of perishable produce like fruits and vegetables.
- MoFPI has also invited **"Expressions of Interest"** from entrepreneurs under the **Integrated Cold Chain and Value Addition Infrastructure scheme.**

Global Adoption and Standards

- While food preservation through radiation is not new, modern interest has surged following global standards established by the **Codex Alimentarius Commission.**
- Countries like the **US, Japan, Australia, Canada,** and those in the EU extensively use irradiation for both domestic and export markets. For example, the 2012 agreement allowed Indian mangoes to be exported to the **US after a 20-year ban,** thus facilitating international trade.

Challenges

- One major challenge is the high capital cost of establishing a facility.
  - **Single 1 MCi Cobalt 60 irradiation** unit requires an investment of Rs 25-30 crores, excluding land and infrastructure costs.
- The commissioning process involves multiple stages – **site approval, safety assessments, and ongoing maintenance, overseen by Bhabha Atomic Research Centre & Atomic Energy Regulatory Board.**

Kerala Rubber Producer Societies Crisis

Syllabus Mapping: GSIII, Indian Economy, Agriculture, Rubber

Context

Kerala's Rubber Producer Societies (RPSs), created to correct middlemen dominance in natural rubber markets, are weakening, threatening the cooperative model.

- RPSs were initiated in **1986 by the Rubber Board** as grower collectives to improve bargaining power, pool infrastructure/services, and enable joint marketing for smallholder rubber cultivators.

Rubber Cultivation in India

- **Production Share:** India contributes **5.4% of global natural rubber (NR) output (FAO, 2025).**
- **Area & Growers:** Over **1.3 million smallholders** cultivating rubber, mostly in small holdings (0.57 ha).
- **Top Producing States:** Kerala (dominant), followed by Tamil Nadu, Karnataka, and northeastern states.
- **Strategic Input:** Natural rubber is essential for tyres, defence, health and industrial goods.

Rubber Board

- **Statutory Body:** Established under the **Rubber Act, 1947.**
- **Administrative Ministry:** Ministry of Commerce and Industry, Government of India.
- **Headquarters:** Kottayam, Kerala.
- **Objective:** Development, promotion, and regulation of the natural rubber industry in India.
- **Advisory Role:** Advises the Central Government on rubber policy and industry development.

Current Crisis of Rubber Producer Societies (RPSs)

- **Institutional Decline:** Roughly **20% of RPSs are defunct, and another 35% dysfunctional.**
- **Approval Withdrawals:** The Rubber Board withdrew approvals to 336 (2020–21), 111 (2021–22), and 89 (2022–23) RPSs, underscoring systemic stress.
- **Inactive Procurement:** In a Kerala survey, <50% of RPSs engaged in active rubber procurement/sales.
- **Weak Value Addition:** Only **11% of RPSs** have processing equipment (rollers/smokehouses).
- **Financial Fragility:** Average revenue about **₹2.5 lakh with 27% dependent on grants/loans/subsidies.**
- **Disengaged Members:** Active participation is low (<50%), and leadership is predominantly older (72% above 50), weakening institutional innovation.

Way Forward

- **Cooperative Value Integration:** Thailand Rubber Authority model integrates smallholders into processing and export-linked cooperatives, enabling value addition and better price realisation.
- **Cluster-Based Value Addition:** Rubber Board's Integrated Rubber Development Scheme (IRDS) promotes smoke houses, rollers, and sheet processing units at the RPS cluster level.
- **Market Linkage Platforms:** e-Rubber portal (Rubber Board) pilots transparent price discovery and reduces intermediary dependence for small growers.
- **Institutional Buyer Tie-ups:** RPS–Tyre Industry MoUs in Kerala & Tripura for assured offtake contracts, stabilising farmer incomes.
- **Governance & Youth Inclusion:** Kerala Cooperative Department's digital audit and training pilots encourage transparency, women's participation, and younger leadership in primary cooperatives.

Conclusion

- The crisis of Kerala's Rubber Producer Societies threatens the livelihoods of 1.3 million smallholder cultivators and India's cooperative agricultural model.
- Reviving RPSs requires urgent implementation of cluster-based value addition, transparent market linkages, and modernized governance with youth participation.
- Drawing lessons from Thailand's cooperative success and leveraging existing schemes like IRDS and e-Rubber platforms can transform these institutions from struggling collectives into sustainable models for smallholder empowerment and India's rubber self-reliance.

Topics for Prelims (Agriculture)

State of Marginal Farmers in India 2025 Report

Context

A recent report, **'State of Marginal Farmers in India 2025'**, examines the engagement of marginal farmers in cooperatives.

- Marginal farmers in India are defined as those cultivating up to one hectare of land; they constitute about **68.5% of India's agricultural holdings.**

Key Findings of the Report

- **Low Participation:** Less than 25% of marginal farmers participate in cooperatives, with the weakest engagement in Bihar, Tripura, and Himachal Pradesh.
- **Income Impact:** Cooperative-linked marginal farmers earn 45% higher household incomes and achieve 42% higher crop yields.
- **Gender Leadership Gap:** Despite 21.25 lakh women members, only 3,355 women hold cooperative board positions nationwide.
- **Digital Divide:** Digital adoption remains minimal; 77% cooperatives in Tripura and 25% in Bihar do not use any digital tools.
- **Informal Dependence:** Farmers outside cooperatives rely on moneylenders, becoming 2.5 times more vulnerable to climate shocks and price volatility.

Barriers Affecting Cooperative Engagement

- **Procedural Hurdles:** Membership and credit processes of Primary Agricultural Credit Societies (PACS) are document-heavy and less attractive than informal credit channels.
- **Social Exclusion:** Local power structures marginalise SC/ST communities and women during credit disbursement or decision-making.
- **Digital Divide:** Low digital literacy restricts access to platforms like AgriStack and e-NAM, sustaining middlemen dependence.
- **Awareness Deficit:** Awareness of the benefits of cooperatives remains extremely low in some regions, reaching just 2.3% in Tripura.
- **Gender Constraints:** Restrictive social norms, limited mobility, and unpaid care work limit active membership roles for women.

Key Recommendations for Cooperative Engagement

- **PACS Reform:** Transforming PACS from credit-lending bodies into integrated multi-service rural hubs.
- **Simplified Procedures:** A single-window digital membership system to reduce paperwork and intermediary dependence.
- **Gender Reservation:** Mandatory reservation for women on all agricultural cooperative boards
- **FPO Convergence:** Formal collaboration between cooperatives and Farmer-Producer Organisations to improve market access.
- **Policy Incentives:** Direct investment incentives for smallholders adopting climate-resilient practices.
- **Targeted Outreach:** State-specific campaigns led by Kisan Mitras to communicate tangible benefits of cooperative membership.

Kuttanad Wetland Agricultural System

Context

Kuttanad paddy fields globally recognised below-sea-level farming are under stress due to rising soil acidity and aluminium toxicity.

About Kuttanad Wetland Agricultural System (Kerala)

- A **unique agro-ecological system** comprising a **mosaic of interconnected landscapes**.
- **Three key components:**
  - **Wetlands:** Used for paddy cultivation and fish harvesting.
  - **Garden lands:** Support food crop plantations.
  - **Water bodies:** Utilised for inland fisheries and shell collection.
- **Unique feature:** The **only agricultural system in India** where **rice is cultivated below sea level**, on land reclaimed from **brackish deltaic swamps**.
- **Global recognition:** Designated as a **Globally Important Agricultural Heritage System (GIAHS)** by the **FAO**.

Agroforestry as a Climate Tool

Context

A **nine-year ICAR field study in Odisha's Eastern Ghats** shows that **smallholder agroforestry can simultaneously deliver climate mitigation, livelihood security, and food production.**

Key Findings of the ICAR Study

- **Carbon Sequestration:** One-acre agroforestry farms sequestered up to **154.5 Mg CO_2e** in nine years, demonstrating high mitigation potential on small landholdings.
- **Slope Advantage:** Lower-slope farms stored **73.1 Mg CO_2/acre, nearly 3 times higher than upper slopes (27.2 Mg),** due to better moisture and nutrient retention.
- **Species Selection:** Cashew and mango emerged as dual-benefit species, combining high biomass carbon storage with strong farm incomes.
- **Carbon Markets:** At **$20/Mg CO_2,** potential carbon credits could reach **₹2.56 lakh per acre over nine years, subject to verification costs.**
- **Income Security:** Farmers earned **₹1.1–1.13 lakh** annually, while maintaining yields.
- **Ecosystem Services**: Farms released **112.4 Mg oxygen/acre, improving local.**

About Agroforestry

- Agroforestry is the practice of integrating trees with crops or livestock on the same land unit.
- **Legal Framework:** It is primarily governed under the National Agroforestry Policy, 2014.
- **Area Estimate:** India has ~25 million hectares under agroforestry, covering about **8% of its area.**
- **Significance:** It contributes to sustainable land use, biodiversity, and climate resilience.

Types of Agroforestry

- **Agrisilviculture:** This system combines crop cultivation alongside timber or fuelwood trees.
- **Silvopasture:** It integrates trees with grazing lands to provide fodder and shelter for livestock.
- **Agrihorticulture:** This model intercrops fruit-bearing trees with seasonal crops.
- **Apisilviculture:** It promotes flowering tree plantations to support beekeeping and pollination.
- **Aqua-forestry:** This system pairs tree planting around ponds with fish farming activities.

Digital Platforms for Price Transparency and Unified Agricultural Markets

Context

The Union Government highlighted the role of **Agmarknet Portal and e-National Agriculture Market (e-NAM)** in providing farmers with real-time mandi price information.

About Agmarknet Portal

- It is an **e-governance portal launched in 2000 under the Ministry of Agriculture & Farmers Welfare** to provide nationwide agricultural marketing information.
- It provides real-time daily arrival and price data for **300+ commodities and 2,000 varieties, linking 4,367 mandis across India.**
- Implemented by the National Informatics Centre (NIC), the portal was upgraded to **Agmarknet 2.0 in November 2025,** along with a mobile app for on-spot mandi data entry.
- It functions under the **Marketing Research and Information Network (MRIN)** of the Integrated Scheme for Agricultural Marketing to strengthen price discovery and market efficiency.

National Digital Livestock Mission (NDLM)

Context

The National Digital Livestock Mission (NDLM) was launched by the Government of India.

About National Digital Livestock Mission

- It is a **digital ecosystem launched by the Department of Animal Husbandry and Dairying** to create a national database of livestock and related services.
- **Bharat Pashudhan** is the technology platform under NDLM, consisting of an Android mobile application and web interface, and is used by field workers to digitally record livestock-related activities.
- Livestock animals are provided a **12-digit Pashu Aadhaar** through bar-coded ear tags, for recording breeding, vaccination, disease, and ownership data.
- The **1962 Livestock Owner App replaces e-Gopala,** to enable livestock owners access to their animals' digital records and information on government schemes and services.
- Implemented across all States integrating programmes like the Rashtriya Gokul Mission, it covers about **9.5 crore livestock owners and 35.96 crore animals.**

Expansion in Rabi Crops Cultivation

Context

The **Ministry of Agriculture and Farmers** Welfare highlighted that the total area under rabi crops cultivation has increased this year.

Key Findings

- The **total area sown under rabi crops in the ongoing winter season went up by 8.11 lakh hectares** to **580.70 lakh hectares compared to last year.**
- **Wheat, pulses (Urad, Masur and Moong), millets (jowar, bajra, ragi)** and **oilseeds** such as rapeseed and mustard all saw an increase in total cultivated area this year.
- **Good monsoon rains and Cabinet Committee on Economic Affairs (CCEA)'**s decision to raise Minimum Support Price (MSP) for all mandated rabi crops for 2026-27 have facilitated this expansion.

About Rabi Crops

- Rabi crops are **winter crops sown after the southwest monsoon (Oct-Dec)** and harvested in **spring (Mar-Apr)**, mainly dependent on irrigation and western disturbances.
- Compared to **kharif crops, rabi crops** face lower pest pressure, require assured irrigation rather than rainfall, and are less vulnerable to monsoon failure, making output more predictable.
- They account for the **bulk of India's wheat and mustard production** and play a key role in maintaining buffer stocks and price stability in the food economy.

Purple Revolution

Context

The **Aroma Mission team**, which led **India's Purple Revolution,** received the **Rashtriya Vigyan Team Puraskar 2025 at the Rashtriya Vigyan Puraskar ceremony.**

About India's Purple Revolution

- It was launched in **2016 by the Ministry of Science and Technology** to promote aromatic crops based **agro-economy; it is also known as the "Lavender Revolution."**
- The initiative was launched on a **pilot basis in the Doda district of Jammu and Kashmir (J&K), now known as the "Lavender Capital of India."**
- It is implemented through **Council of Scientific and Industrial Research's (CSIR) "Aroma Mission"** with technical assistance from the Indian Institute of Integrative Medicine (IIIM), Jammu.
- The mission provides free Lavender saplings and training for farmers, while installing **50 distillation units to facilitate on-site processing.**
- **Lavender-J&K model** is now being replicated with new aromatic crops like lemon grass and citronella in other Himalayan states, including in the North East of India.

ICAR Data Breach

Context

The Indian Council of Agricultural Research (ICAR) experienced a major data breach on its primary server in Delhi and subsequently on its backup server in Hyderabad.

About Indian Council of Agricultural Research (ICAR)

- **The Indian Council of Agricultural Research (ICAR)** is the apex body coordinating agricultural research and education in India.
- **Foundation:** It was **established in 1929** as a registered society under the name Imperial Council of Agricultural Research.
- **Administrative Status:** ICAR operates as an autonomous organisation under the Department of Agricultural Research and Education **(DARE), Ministry of Agriculture and Farmers Welfare.**
- **Objective:** Its mandate is to plan, promote, and coordinate research and education in agriculture, animal husbandry, and fisheries.
- **Leadership**: The **Union Agriculture Minister serves as the ex-officio President of the ICAR Society, and the Minister of State for Agriculture serves as Vice-President.**
- **Director General:** The **Secretary of DARE concurrently serves as the Director General of ICAR.**

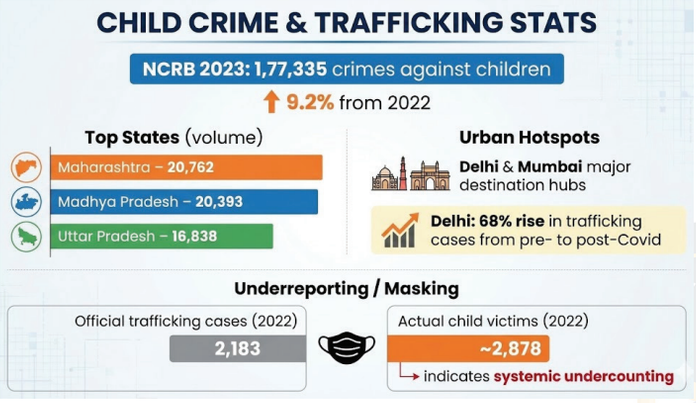
Topics for Mains

Child Trafficking in India: A Silent Human Rights Crisis

Syllabus Mapping: GS-II - Social Justice, Vulnerable Sections

Context

Recently, the Supreme Court of India highlighted the deeply disturbing issue of child trafficking and commercial sexual exploitation by organized cartels in the country.



About Child Trafficking

- As per the UN, child trafficking involves the recruitment, transportation, or harbouring of children for exploitation, including forced labour, begging, or sexual abuse. **Consent does not matter** because a child cannot legally or morally give consent.

Types of Child Trafficking in India

- **Trafficking for Sexual Exploitation:** Children, mostly girls, are forced into prostitution or pornography. Traffickers often promise jobs, marriage, or education. Once trapped, children are locked up, threatened, and repeatedly abused.
- **Trafficking for Forced Labour:** Children are made to work in Brick kilns, Carpet factories, Farms, Construction sites etc. They work long hours, get little or no pay, and live in unsafe conditions.
- **Domestic Servitude:** Children, especially girls, are taken to cities to work as domestic helpers.
- **Forced Begging and Criminal Activities:** Traffickers use children for begging, pickpocketing or drug delivery.
- **Trafficking for Child Marriage and Illegal Adoption:** Girls are trafficked as brides in regions with fewer women. Poor parents are tricked or pressured into giving away children. Poverty turns children into commodities.

Causes of Child Trafficking

Socio-Economic Causes

- **Poverty and unemployment:** Economic distress compels families to trust traffickers promising jobs or education, unknowingly pushing children into exploitation.
- **Debt bondage:** Loans taken during crises result in children being sent away to "repay" debts, normalising exploitation.

Social and Cultural Causes

- **Gender discrimination:** Girls are disproportionately trafficked due to entrenched patriarchy, dowry practices, and lower investment in female education.
- **Child marriage traditions:** Social acceptance of early marriage creates fertile ground for trafficking under the guise of marital arrangements.

Institutional Causes

- **Weak law enforcement:** Low conviction rates reduce deterrence, encouraging organised trafficking syndicates.
- **Lack of documentation:** Poor birth registration makes children legally invisible, complicating rescue and rehabilitation.

Contemporary Drivers

- **Migration and urbanisation:** Large-scale distress migration separates children from protective social networks.
- **Digital exploitation:** Social media and encrypted platforms enable anonymous recruitment and abuse, outpacing traditional policing methods.

International framework on child trafficking

Anti-Trafficking Framework in India

Constitutional Provisions

- **Article 23 – Prohibition of trafficking and forced labour:** This is a **fundamental right** under the **Constitution of India**, making trafficking unconstitutional and enforceable through courts.

- **Article 24 – Child labour prohibition:** Protects children from hazardous employment, indirectly preventing trafficking for labour exploitation.
- **Article 39(e) & (f) – Directive Principles:** Mandates the State to ensure children are protected from abuse and exploitation.
- **Article 21 – Right to life and dignity:** Judicial interpretation has expanded this to include freedom from sexual exploitation and inhuman treatment.

Key Legislations

- **Immoral Traffic (Prevention) Act, 1956:** Targets trafficking for prostitution but is often criticised for being outdated and overly focused on sex work.
- **Juvenile Justice Act, 2015:** Treats trafficked children as **victims in need of care and protection**, emphasising rehabilitation over punishment.
- **Bonded Labour System (Abolition) Act, 1976:** Addresses trafficking linked to debt bondage.
- **Child Labour Act, 1986:** Restricts employment of children, addressing labour-based trafficking.
- **IPC Sections 370 & 370A:** Provide a comprehensive definition of trafficking and penalise exploiters.
- **POCSO Act, 2012:** Addresses sexual offences against children, many of which arise from trafficking contexts.

Government Measures to Curb Child Trafficking

- **Anti-Human Trafficking Units (AHTUs):** Dedicated police units to identify, rescue, and investigate trafficking cases.
- **Mission Vatsalya / ICPS:** Focus on care, protection, rehabilitation, and reintegration of trafficked children.
- **CHILDLINE 1098:** 24×7 emergency helpline for children in distress
- **TrackChild Portal:** National tracking system for missing and rescued children
- **Ujjawala Scheme:** Prevention, rescue and rehabilitation of victims of trafficking for sexual exploitation
- **Rescue and rehabilitation protocols:** Coordination between police, NGOs, CWCs, and shelter homes ensures immediate protection and long-term support.
- **Child-friendly justice mechanisms:** Special courts and procedures reduce trauma during trials.

Challenges in Curbing Child Trafficking in India

- **Underreporting of Child Trafficking:** Underreporting is one of the most fundamental challenges in addressing child trafficking in India. A large number of cases never reach law-enforcement agencies due to:
  - **Social stigma and victim-blaming** discourage families from approaching authorities, especially in sexual exploitation cases.
  - **Fear of retaliation** from organised trafficking networks deters complaints.
  - **Distrust in law enforcement** due to past insensitivity or inaction.
  - **Low awareness** in rural and tribal areas where trafficking occurs through false job offers, marriage, or adoption.
- **Low Conviction Rates:** Despite multiple laws, conviction rates in trafficking cases remain low, which undermines deterrence.
  - **Weak investigations** due to poor inter-district coordination, limited forensic use, and lack of victim-centric approaches.
  - **Witness intimidation** leading to hostile testimonies.
  - **Delayed trials** causing evidence loss and victim fatigue.
  - **Overemphasis on inconsistencies** in traumatised victims' statements.
- **Inter-State Coordination Gaps:** Child trafficking is rarely confined to one location; it is **inter-district and inter-State in nature**.
  - **Jurisdictional fragmentation** as policing is a State subject.
  - **Poor real-time data sharing** on missing children and traffickers.
  - **Divergent State priorities** between source and destination regions.
  - **Cross-border legal complexities** in international trafficking.
- **Secondary Victimisation of Children:** Secondary victimisation occurs when victims suffer **additional trauma** during rescue, investigation, and trial.
  - **Repeated and insensitive questioning** retraumatises children.
  - **Inadequate child-friendly procedures** in police stations and courts.
  - **Social disbelief and stereotyping** of victims.
  - **Prolonged institutional care** without psychological support.
- **Technology-Driven and Online Trafficking:** The nature of child trafficking has evolved rapidly with **digital technologies**.
  - **Online grooming and recruitment** via social media and apps.
  - **Digital sexual exploitation** including live-streaming and CSAM.
  - **Encrypted platforms** hindering surveillance and evidence gathering.
  - **Limited cyber capacity** of law enforcement.

Recent Supreme Court Guidelines on Child Trafficking

The Supreme Court of India recently issued victim-centric guidelines to improve adjudication of child trafficking cases.

- **Victim as injured witness:** A trafficked child must be treated as a victim of organised crime, not as an accomplice.
- **Minor inconsistencies ignored:** Small contradictions in testimony should not be grounds for disbelief due to trauma and fear.
- **Sole testimony sufficient:** Credible and convincing victim testimony can alone sustain conviction.
- **Sensitivity to vulnerability:** Courts must consider the child's age, socio-economic background, and marginalisation.
- **No stereotyping:** Failure to resist or complain immediately cannot be used to doubt credibility.
- **Avoid secondary victimisation:** Judicial processes must minimise retraumatisation of the child.

Way Forward

- **Victim-centric governance:** Shift focus from crime control to child rights and dignity.

- **Strengthen investigation and prosecution:** Specialised training and fast-track courts.
- **Data integration:** Unified national database for missing and rescued children.
- **Inter-State and international cooperation:** Joint operations and intelligence sharing.
- **Preventive social policies:** Poverty reduction, universal education, and social security.
- **Technology as a solution:** AI-based monitoring of online platforms.
- **Community vigilance:** Empower local institutions to act as the first line of defence.

Disability Rights in India: Progress, Gaps and the Road Ahead

Syllabus Mapping: GS-II - Social Justice, Vulnerable Sections

Context

India has steadily strengthened its commitment to disability rights, inclusion, and accessibility, guided by a rights-based approach that emphasises dignity, equality, and full participation of Persons with Disabilities (PwDs) in social, economic, and political life.

Disability Landscape in India: Data and Facts

- **Magnitude of disability:** As per **Census 2011**, India has **2.68 crore Persons with Disabilities (PwDs)**, accounting for **2.21% of the total population** (1.50 crore are males and 1.18 crore are females).
- **Underestimation of numbers:** Disability data is widely underreported due to reliance on self-reporting, social stigma, and the frequent exclusion of invisible or episodic conditions such as mental illness, blood disorders, and neurological disabilities.
- **Socio-economic profile:** PwDs are disproportionately affected by poverty, unemployment, poor health outcomes, and low educational attainment, making disability both a cause and consequence of deprivation.
- **Global context:** According to the World Health Organization, around **15% of the world's population** lives with some form of disability.

Definition of Disability in India

- Under the Rights of Persons with Disabilities Act, 2016, a person with disability is defined as someone who has a long-term physical, mental, intellectual, or sensory impairment which, in interaction with social, physical, or attitudinal barriers, hinders their full and effective participation in society on an equal basis with others.
- This definition reflects a **socio-medical model**, recognising that disability arises not only from impairment but also from inaccessible environments and discrimination.
- **Persons with Benchmark Disabilities (PwBD):** A person with 40% or more of a specified disability, as certified by a competent authority, is categorised as a Person with Benchmark Disability.

Legal and Policy Framework for Disability Rights

Constitutional Foundations

- **Article 14** ensures equality before law.
- **Article 15** prohibits discrimination and enables affirmative action.
- **Article 21** guarantees life with dignity, which courts have interpreted to include accessibility and autonomy.
- **Directive Principles (Article 41)** urge the State to provide public assistance in cases of disability.

Rights of Persons with Disabilities Act, 2016 (RPwD Act)

The Rights of Persons with Disabilities Act, 2016 is a landmark legislation in India which recognizes that PWD are entitled to the same rights and opportunities as any other citizen, and seeks to ensure inclusive growth. The PWD constitutes 2.21% of the total population. (2011 census)

- **Rights-based approach:** Replaced welfare-oriented language with enforceable rights to equality, dignity, non-discrimination, community living, education, employment, and political participation.
- **Benchmark disability concept:** Persons with **40% or more disability** are entitled to reservations and specific benefits.
- **Affirmative action:**
  - 5% reservation in higher education
  - 4% reservation in government employment
  - Free education for children with benchmark disabilities (6–18 years)

Effectiveness of the Act

- **Accessibility:** The act mandated all public buildings, transportation, and information and communication technologies and spaces be made accessible to persons with disabilities.
  - **Eg:** Building ramps, lifts, accessible toilets
- **Affirmative action:** The act also provides for reservations in education and employment for PWD.
  - **Eg:** Quantum of reservations for PWD from 3% to 4% in government jobs
- **Social security:** The act includes provisions related to social security,welfare schemes and benefits.
  - **Eg:** Established a nati-onal fund for PWD
- **Special courts:** The Act provides for the designation of special courts to handle cases of violation of the act.

Inefficiencies of the Act

- **Exclusion error:** Scheme for PWD did not feature in the list of major schemes as released by the finance ministry. Hence it may not prioritise its implementation and allocation of resources.
  - **Eg:** Accessible India Campaign (AIC)
- **Implementation issues:** Implementation of provisions such as education, employment, health, and social security through a single scheme may not address the diverse needs of the population.
  - **Eg:** Scheme for Implementation of Persons with Disabilities Act (SIPDA)
- **Outdated data:** The government relies on 12-year-old data for disabled people in the country. Any reliance on this data for determining financial allocation will be antithetical to the welfare mandate of the state.

- **Differential treatment:** Negative attitudes and stereotypes towards persons with disabilities can result in discrimination, exclusion, and marginalisation, which can limit their access to the benefits of the Act.

Supporting Institutional Framework

- **Rehabilitation Council of India (RCI):** Regulates training and standards of rehabilitation professionals.
- **National Trust Act, 1999:** Focuses on autism, cerebral palsy, intellectual and multiple disabilities.
- **India's international commitment:** India is a signatory to the **United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)**, committing to inclusion, accessibility, and autonomy.

Key Supreme Court Judgements

- **Javed Abidi vs Union of India:** Ordered **50% travel concession** for PwDs in domestic flights.
- **Vikash Kumar vs UPSC (2021):** Ordered **scribes for disabled candidates** in exams.
- **Suchita Srivastava vs Chandigarh Administration:** Recognized **consent rights of mentally disabled women** in abortion cases.

Global Efforts

- **UNCRPD (20026):** Legally binding treaty promoting **social inclusion** of PwDs.
- **International Classification of Functioning, Disability & Health (ICF):** WHO framework for assessing disabilities.
- **Incheon Strategy**: Asia-Pacific initiative for PwD rights, signed by India.

Challenges faced by PWD in attaining a dignified life

- **Inhumane living conditions:** Institutionalisation of a person with a disability without their consent is a **form of arbitrary detention.**
  - **Eg: Human rights watch** found that residents were detained in wards with locked gates, limiting their opportunity to move around the **Shelter home for PWD in Delhi, Asha Kiran.**
- **Access to public services:** Public transport such as most buses are not accessible to wheelchair users. Similarly, trains have bogies for PWD but the process of booking under the quota remains challenging.
  - **Eg: 67.1% PWD faced difficulties in accessing public transport (76th NSS)**
- **Political participation:** Exclusion of disabled persons from the political space leads to their lack of representation and absence of a voice to put forward their demands.
  - **Eg: Braille electronic voting machines** have not been adapted by most constituencies in the voting process.
- **Poor access to education:** Educational institutions lack the infrastructure and trained staff to support inclusive education incorporating the needs of PWD.
  - **Eg:** Many schools **lack ramps, accessible toilets** required for PWD which leads to their low enrolment and high dropout rates. **(UNESCO report)**
- **Health inequities:** Persons with disabilities hold twice the risk of developing conditions such as depression, asthma, obesity and poor oral health. It leads to an increase in **out-of-pocket expenditure on health.**
- **Employment Disparities:** Low Employment Rates: PwDs face lower employment rates, especially in the private sector.
- **Discrimination and Social Exclusion:** Persistent negative attitudes and discrimination against PwDs within families and society. Stigma around mental health & intellectual disabilities leads to social exclusion.

Government Interventions and Initiatives

- **Sugamya Bharat Abhiyan (Accessible India Campaign):** Focuses on accessibility in built environment, transport, and ICT. Promotes universal design and barrier-free infrastructure.
- **Unique Disability ID (UDID):** Creates a centralised national database of PwDs. Enables uniform certification, portability of benefits, and transparency.
- **Assistance to Disabled Persons (ADIP) Scheme:** Provides **assistive devices**, including wheelchairs, prosthetics, hearing aids, and cochlear implants. Supports corrective surgeries where required.
- **Skill Development and Employment:**
  - **PM-DAKSH Portal:** Links PwDs with skill training and employment opportunities.
  - **National Divyangjan Finance and Development Corporation (NDFDC):** Provides concessional loans for self-employment.
- **Institutional Support:**
  - **National Institutes and Composite Regional Centres (CRCs):** Deliver rehabilitation services, professional training, and awareness programmes.
  - Promotion of **Indian Sign Language** through dedicated TV channels, digital repositories, and NCERT textbook translation.

Way Forward

- **Government intervention:** Legislations such as **Rights of persons with disabilities Act, 2016** mandates accessible public building, education and employment to improve quality of life for PWD.
- **Insurance agencies: IRDAI in 2023** issued a circular **mandating all the insurers** to provide **annual health coverage to all PWDS, HIV-positive persons** and to those with **mental disabilities.**
- **Community participation:** Various **NGOs** work towards empowering PWDs through training, social connections, employment opportunities and providing entrepreneurial support to navigate through social barriers.
  - **Eg: Disabled people's association (DPA) and Enable India**
- **Private sector initiatives: Private companies like TATA consultancy services (TCS)** have implemented initiatives to hire and support employees with disabilities by providing an accessible work environment alongside equal opportunities.
  - **Eg: Microsoft's Autism Hiring Program** has on boarded over 200 PwDs on the autism spectrum, **Lemon Tree Hotel chain** has over 380 employees with disability (EWD)

- **Public awareness:** Rights and capabilities of PWD need to be brought to light to increase awareness and an inclusive approach towards a special cause.
  - **Eg: Accessible India campaign and Divyang Sarthi programme.**
- **Role of media:** Social stigma is countered by positive portrayals of PWD through entertainment to develop empathy and acceptance in public perception.
  - **Eg: Movies like 'Taare zameen par' and 'Margarita with a straw'**.

Safety and Protection of Women in the Unorganised Sector

Syllabus Mapping: GS-1 Indian Society, Women Issues

Context

The Parliamentary Committee on Empowerment of Women recently released a report titled "Safety and Protection of Women in the Unorganised Sector, highlighting various issues and problems faced by women in the sector.

Women in the Unorganised Sector: Data and Landscape

- Around **90% of India's workforce** is employed in the unorganised sector.
- Women constitute a **disproportionately high share** in: Domestic work, Agriculture and allied activities, Construction, beedi-making, Home-based manufacturing, Street vending and waste picking etc.
- According to PLFS data, a large proportion of women workers are: Informally employed, Paid less than men and Engaged in unpaid or underpaid family labour.
- These sectors are marked by:
  - Absence of written contracts
  - Poor workplace visibility (homes, fields, streets)
  - Limited access to grievance redressal

Major Safety and Protection Concerns for women in Unorganised Sector

- **Workplace Sexual Harassment:** Women domestic workers, agricultural labourers, and construction workers often face **sexual harassment**, including verbal abuse, physical advances, and coercion. The private and informal nature of workplaces makes **reporting difficult** and retaliation common.
- **Unsafe Working Conditions:** Exposure to hazardous tools, chemicals, extreme weather, and long working hours without safety gear. Pregnant and lactating women face heightened health risks due to lack of maternity protection.
- **Economic Exploitation and Wage Insecurity:** Irregular payments, wage theft, and gender wage gaps are widespread. Economic dependence reduces women's bargaining power and increases tolerance of unsafe conditions.
- **Absence of Social Security:** Limited access to health insurance, maternity benefits, pensions, or accident compensation increases vulnerability after workplace injuries or abuse.
- **Lack of Legal Awareness and Access to Justice:** Many women are unaware of their rights under labour and criminal laws. Fear of job loss, social stigma, and costly legal processes discourage complaints.

Key Laws Relevant to Women in the Unorganised Sector

- **Unorganised Workers' Social Security Act, 2008:** Provides a framework for social security schemes related to health, maternity, disability, and old age. Implementation remains weak due to lack of registration and awareness.
- **Code on Social Security, 2020:** Seeks to extend social security to gig, platform, and unorganised workers. Enables creation of national databases and welfare schemes, but **operationalisation is pending**.
- **Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013:** Applies to **all workplaces, including unorganised and informal sectors**. Mandates **Local Committees (LCs)** at the district level for women without formal employers. However, LCs remain under-functional in many districts.
- **Minimum Wages Act / Code on Wages, 2019:** Guarantees minimum wages and timely payment, crucial for economic security and safety.

Government Interventions and Initiatives

- **Social Security and Welfare Schemes:**
  - PM Jan Arogya Yojana (PM-JAY) for health coverage.
  - PM Matru Vandana Yojana for maternity benefits.
  - Atal Pension Yojana for old-age security.
- **Labour Codes Reform:** Consolidation of labour laws aims to: Simplify compliance; Extend protections to informal workers.
- **Registration and Digital Platforms: e-Shram Portal** for unorganised workers:
  - Creates a national database
  - Enables portability of benefits
  - Women constitute a significant share of registered workers, improving visibility.
- **Urban Livelihood Missions: DAY–NULM** supports women in informal urban employment through SHGs, skill training, and credit access.

Key Challenges in Ensuring Safety

- **Weak Law Enforcement:** Although POSH and labour laws apply to the informal sector, poor inspections and non-functional Local Committees leave women without effective grievance redressal.
- **Invisible Workplaces:** Work in homes, farms and streets lacks identifiable employers, making regulation difficult and enabling abuse to go unreported.
- **Fear of Job Loss:** Absence of contracts and job security discourages women from reporting harassment due to fear of dismissal or wage denial.
- **Low Legal Awareness:** Limited awareness of workplace rights, combined with low literacy and digital exclusion, restricts access to legal remedies and welfare schemes.

- **Lack of Social Security:** Inadequate health cover, maternity benefits and pensions force women to prioritise income over safety.
- **Patriarchal Attitudes:** Social norms normalise harassment and discourage complaints, weakening justice delivery.

Parliamentary Committee on Safety and Protection of Women in the Unorganised Sector

Key Issues Identified by the Parliamentary Committee

- **Inter-State migrant women workers:** Their economic contribution remains largely invisible, exposing them to exploitation and lack of recognition.
- **Pradhan Mantri Shram Yogi Maandhan (PM–SYM) scheme:** Significant **regional disparities** in enrolment of women workers, with extremely low participation in **Lakshadweep and Sikkim**.
- **Sexual Harassment of Women at Workplace Act, 2013:** Many **Local Committees (LCs)** are either non-functional or workers lack awareness about their existence and role.
- **Palna Scheme under Mission Shakti:** Very **low utilisation of funds (6.24%)** and poor operationalisation, with only **2,425 Anganwadi-cum-Creche centres functional out of 14,599 approved**.

Key Recommendations of the Committee

- **Strengthen the Inter-State Migrant Workmen Act, 1979** by creating a **national digital database linked to e-Shram**, addressing women migrants' safety, dignity, and living conditions.
- **Intensify district-level enrollment drives under PM–SYM**, especially through women-led networks such as SHGs, Anganwadi workers, and ASHAs.
- Ensure **full functionality and adequate funding of Local Committees**, along with wider community awareness.
- **Strengthen One Stop Centres and District Legal Services Authorities**, and include domestic workers under labour protection frameworks.
- **Improve budget execution** under the Palna Scheme and ensure faster operationalisation of Anganwadi-cum-Creche centres.

Way Forward

- **Stronger Enforcement:** Ensure functional POSH Local Committees and regular labour inspections, with accountability of local authorities.
- **Worker Registration:** Expand e-Shram registration with gender-disaggregated data to improve access to social security.
- **Community Support:** Use SHGs, worker collectives and local bodies as first points of reporting and assistance.
- **Legal Awareness:** Conduct rights-awareness campaigns in local languages through community platforms.
- **Gender-Sensitive Social Security:** Implement the Code on Social Security, 2020 with focus on maternity, health and accident cover.
- **Global Alignment:** Consider ratifying ILO Convention 190 to strengthen protection against workplace violence and harassment.

Viksit Bharat Shiksha Adhishthan Bill 2025

Syllabus Mapping: GS-II, Education and Human Resources

Context

The Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025 was tabled in the Lok Sabha during the recent Winter Session of Parliament and was referred to a Joint Parliamentary Committee for detailed examination.

About Viksit Bharat Shiksha Adhishthan (VBSA)

- VBSA Bill, 2025 is a landmark legislative proposal aimed at overhauling the regulatory architecture of higher education in India. The Bill seeks to replace the fragmented and multi-layered regulatory system with a single umbrella framework, in alignment with the vision of the National Education Policy 2020.
- **Core Objective:** The stated objective of the Bill is to create a "light but tight" regulatory framework that:
  - Reduces regulatory duplication
  - Enhances institutional autonomy
  - Improves academic quality and outcomes
  - Promotes innovation, research, and global competitiveness

Key Institutional Architecture Proposed by the Bill

Creation of the Viksit Bharat Shiksha Adhishthan (VBSA)

- VBSA is proposed as a 12-member apex commission that will provide strategic direction for higher education.
- **Composition includes:**
  - Chairperson (appointed by the President on Centre's recommendation)
  - Presidents of three councils
  - Secretary, Ministry of Education (ex officio)
  - Two professors from State HEIs
  - Five eminent experts
  - Member Secretary
- VBSA is envisaged as a **coordinating and steering body**, not a day-to-day regulator.

Three Councils under VBSA

The Bill separates functions into three distinct but coordinated councils (each with up to 14 members):

- **Regulatory Council – Viksit Bharat Shiksha Viniyaman Parishad:** Regulates entry and functioning of HEIs by enforcing minimum norms, granting graded autonomy, overseeing foreign collaborations, and ensuring public disclosure of academic and financial information.
- **Accreditation Council – Viksit Bharat Shiksha Gunvatta Parishad:** Implements an outcome-based accreditation system focused on learning outcomes, employability, and real-world impact through an independent accreditation ecosystem.
- **Standards Council – Viksit Bharat Shiksha Manak Parishad:** Sets academic standards, learning outcomes, and qualification frameworks while ensuring uniformity of standards across disciplines and institutions.

Subsuming Existing Regulators

- The Bill proposes to: Repeal the **University Grants Commission Act, 1956**, **All India Council for Technical Education Act, 1987**, and **National Council for Teacher Education Act, 1993**
- Dissolve UGC, AICTE, and NCTE, transferring their regulatory functions to the new councils

Major Changes Introduced by the Bill

- **Separation of Funding from Regulation:**

  - Unlike the UGC and AICTE, the VBSA framework has no grant-giving powers. Funding to centrally funded institutions will be done through **mechanisms devised by the Ministry of Education**.
  - This follows NEP 2020's principle that **regulation and funding should be institutionally separated**.
- **No Fee Regulation Powers:** The Bill does **not empower the Regulatory Council to regulate fees**, even though it is tasked with preventing commercialisation. This is a significant departure from earlier regimes where UGC/AICTE could issue fee-related norms.
- **Strong Penalty Regime:** Introduces **graded penalties**:
  - ₹10 lakh to ₹2 crore for violations
  - Suspension of degree-granting powers
  - Closure of institutions for repeated non-compliance.
  - This marks a sharp contrast with the UGC Act, where the maximum fine was ₹1,000.
- **Centralised Decision-Making:** In case of disputes on whether an issue is "policy-related," the **Centre's decision is final**. The Centre can **supersede the commission or councils** for up to six months.

Significance of the VBSA Bill

- **Ending Regulatory Fragmentation:** Addresses long-standing concerns about over-regulation, multiple approvals, and inspector raj. Creates a **single-window, technology-driven regulatory system**.
- **Promoting Institutional Autonomy:** Emphasises graded autonomy, allowing capable institutions to become self-governing. Reduces micromanagement by regulators.
- **Shift to Outcome-Based Quality Assurance:** Moves away from infrastructure-centric evaluation to student learning outcomes, skills, and employability. Aligns Indian higher education with global best practices.
- **Globalisation of Indian Higher Education:** Facilitates:
  - Entry of select foreign universities into India
  - Expansion of Indian universities abroad
  - Supports India's aspiration to become a **global education hub.**

Key Drawbacks / Concerns

- **No fee regulation powers**, weakening the ability to curb commercialisation of higher education.
- **Separation of funding from regulation** may dilute accountability and equity in resource allocation.
- **Excessive centralisation**, with the Centre having overriding authority and limited role for states.
- **Marginalisation of State Higher Education Councils**, unlike earlier reform proposals.
- **High penalties without corresponding financial support**, especially burdensome for smaller institutions.
- **Risk of regulatory overreach**, as autonomy is coupled with strong punitive powers.
- **Exclusion of professional education sectors** (medical, legal, dental, pharma), limiting holistic reform.

Major Challenges Facing India's Higher Education System

- **Quality and Employability Deficit:** Many graduates lack industry-relevant skills. Weak linkage between curriculum, research, and labour markets.
- **Over-Regulation and Under-Autonomy:** Historically, HEIs faced rigid controls on curriculum, staffing, and expansion. Compliance-focused governance stifled innovation.
- **Inadequate Public Funding:** India's public spending on higher education remains low compared to global standards. Institutions depend heavily on fees, leading to commercialisation.
- **Faculty Shortages and Research Gaps:** High vacancy rates, limited research funding, and weak international collaboration. Low global ranking of Indian universities.
- **Federal and Regional Imbalances:** Higher education is a Concurrent List subject, yet States often have limited voice in regulation. Quality institutions are unevenly distributed across regions.

How India's Higher Education Can Be Revitalised

- **Balance Autonomy with Accountability:** Autonomy must be backed by transparent accreditation and public disclosure. Regulatory oversight should focus on outcomes, not procedures.
- **Strengthen Public Funding with Safeguards:** While separating funding from regulation, arm's-length funding mechanisms must be ensured to protect academic freedom. Clear, rule-based grant allocation is essential.
- **Address Affordability and Equity:** Absence of fee regulation requires strong:
  - Scholarship systems
  - Income-linked fee support
  - Student loan safeguards
- **Reinforce Federal Participation:** Greater role for States and State Higher Education Councils in policy and implementation. Cooperative federalism in higher education governance.
- **Build a Research and Innovation Ecosystem:** Expand funding for research universities. Encourage interdisciplinary and industry-linked research and Promote global academic collaboration.

The Changing Patterns of India's Student Migration

Syllabus Mapping: GS-II, Education and Human Resources

Context

India is witnessing a sharp rise in outbound student migration, increasingly driven by self-financed education, with over 13.35 lakh Indian students abroad in 2024 and numbers projected to rise further, raising concerns about debt, underemployment, exploitation, and "brain waste" rather than assured upward mobility.

Current Trends in Student Migration for Education

- **Rapid growth in numbers:** According to the **Ministry of External Affairs**, over **13.2 lakh Indian students** were studying

abroad in 2023, rising to **13.35 lakh in 2024**, with projections of **13.8 lakh in 2025**, spread across more than **70 countries**.

- **India as a top global sender:** India is now among the largest exporters of international students worldwide.
  - **US and Canada** together host around **40%** of Indian students.
  - Other major destinations include the **UK, Australia, and Germany**.
- **Shift from elite to mass migration:** Earlier, overseas education was confined to elite universities or scholarship-based mobility. The current phase is characterised by:
  - **Self-financed education**
  - Heavy dependence on **education loans and family savings**
  - Participation of **middle- and lower-middle-class households**
- **Regional concentration – the Kerala example:** As per the **Kerala Migration Survey (2023)**:
  - Student migration doubled from **1.29 lakh (2018)** to **2.5 lakh (2023)**
  - Students now form **11.3% of total emigrants -** This reflects a shift from traditional labour migration to **education-led migration**.

Major Reasons Behind Student Migration

- **Aspirations for Social Mobility and Global Citizenship:** For many students, foreign education is not merely academic but a pathway to permanent residency, higher social status, and global mobility, particularly in OECD countries.
- **Limitations of the Domestic Education System:** Perceived quality gaps in higher education, limited global recognition of Indian degrees and intense competition for seats in top Indian institutions.
- **Employment Prospects and Wage Differentials:** Expectation of better-paying jobs abroad, Weak domestic absorption of skilled graduates & Credential inflation within India.
- **Role of Education Agents and Private Colleges:** Recruitment agents operate in a grey regulatory zone, Students are often channelled into lower-tier universities and vocational colleges, driven by commission-based incentives rather than employability outcomes.
- **Socio-cultural Push Factors:** Desire to escape social hierarchies and perceived "third-world" constraints. Migration as a marker of **success and status** within communities.

Impact of Student Migration

Economic Impact

- **Positive effects:** Skill exposure and potential knowledge transfer & Expansion of India's global diaspora networks
- **Negative effects:**
  - **Reverse remittances:** Indian households spend ₹40–50 lakh per student on tuition and living expenses, often through debt, effectively **subsidising foreign economies**.
    - » **Eg:** In **Canada**, international students contributed **$30.9 billion to GDP (2022)**.
    - » **Eg:** In **US**, Indian students spend **$7–8 billion annually**.
- **Social Impact:**
  - Increased household debt and financial stress
  - Mental health pressures due to academic failure, visa insecurity, and underemployment
  - Social prestige of migration masking **downward mobility abroad**
- **Labour Market Impact:**
  - **Deskilling and underemployment**, with graduates working in low-wage, unskilled jobs
  - Limited transition to skilled employment: In the UK, only about **one in four Indian postgraduates** secure a sponsored skilled visa
- **National Development Impact:** Shift from brain drain to brain waste, where education does not translate into productive skill utilisation. Loss of productive youth years without commensurate returns.

Key Challenges in India's Student Migration

- **Unregulated Education Agents:** The education consultancy sector remains weakly regulated, allowing agents to misguide students into low-quality institutions through exaggerated claims, with little accountability or grievance redressal.
- **Education-Employement Mismatch:** Many overseas programmes lack labour market relevance, leading to underemployment, deskilling, and limited career mobility due to restrictive post-study work options.
- **Rising Student Debt:** Student migration is largely debt-financed, and failure to secure skilled jobs abroad often leaves families burdened with long-term loans and reverse remittance pressures.
- **Visa policy uncertainty:** Frequent changes in visa rules, caps, and work rights create legal and economic insecurity for students who have little control over host-country policy shifts.
- **Informal Labour Exploitation:** Students unable to find skilled jobs often enter informal work, facing wage theft and unsafe conditions while fearing visa violations if they report abuse.
- **Weak Student Support Systems:** Indian missions abroad provide limited proactive support, leaving students without adequate legal, mental health, or employment assistance during crises.
- **Domestic Push Factors:** Poor quality of higher education, limited global recognition of degrees, and lack of high-quality jobs at home push students abroad out of compulsion rather than choice.

Way Forward

- **Agent Regulation:** Introduce licensing, transparency norms, and penalties to curb deceptive recruitment practices.
- **Pre-departure Counselling:** Mandatory counselling on costs, visas, and employment risks can enable informed decision-making.
- **Bilateral Agreements:** Student-focused agreements can ensure quality standards and labour protection abroad.
- **Embassy Outreach:** Strengthen embassy-level welfare desks, legal aid, and mental health support for students.

- **Data-driven Policy:** A national student migration database can help track risks and guide timely interventions.
- **Stronger Indian Universities:** Improving quality and global engagement under NEP 2020 can reduce distress migration.
- **Job Creation:** Expanding high-quality, skill-linked jobs in India can turn migration into a choice, not necessity.

Child Marriages in India

Syllabus Mapping: GS-I, Society Women Issues, GS-II, Vulnerable Sections

Context

The Union government marked the first anniversary of its Bal Vivah Mukt Bharat Abhiyan.

Facts Related to Child Marriages in India

- **Decline in Child Marriages:** Child marriage rates in India **halved from 47.4% to 23.3% between 2006 and 2019-21**, following the enactment of the **Prevention of Child Marriage Act, 2006.**
  - Over **2 lakh child marriages** were prevented in the past year.
- **Prevalence of Child Marriage in India: One in five girls** in India is still married before turning 18.
- **Improvement in Sex Ratio at Birth:** 918 in 2014-15 to 930 in 2023-24.
- **States with High Burden of Child Marriages:**
  - **West Bengal (41.6%), Bihar (40.8%), Tripura (40.1%),** Rajasthan, Jharkhand, Assam, and Andhra Pradesh.

UNICEF Report (2023)

- **One in three** of the **world's child brides live in India**.
- Over half of the girls and women in India who married in childhood live in five states: Uttar Pradesh (highest), Bihar, West Bengal, Maharashtra and Madhya Pradesh.
- The majority of young women who married in childhood gave birth as adolescents.

Key Reasons Behind Child Marriage

- **Poverty & economic insecurity:** Families marry off children early to reduce household expenses and perceived economic burden.
- **Gender inequality & patriarchy:** Girls are viewed as dependents, with marriage seen as their primary role.
- **Social norms & traditions:** Deep-rooted customs and community pressure normalise early marriage.
- **Lack of education:** Low school enrolment and high dropout rates, especially among girls, increase vulnerability.
- **Safety concerns:** Parents marry daughters early to avoid sexual harassment, trafficking, or social stigma.
- **Weak law enforcement:** Poor implementation of the Prohibition of Child Marriage Act and low conviction rates.
- **Crisis situations:** Disasters, pandemics, migration, and conflicts intensify economic stress and early marriages.

What are the impacts?

- **On Health:**
  - **High maternal mortality and morbidity** due to early pregnancies.
  - **Poor child health outcomes**, including low birth weight and malnutrition.
- **On Education & Economy:**
  - **School dropouts**, especially among girls, limiting their skill development.
  - **Intergenerational poverty**, as early marriage restricts earning potential.
- **On Rights & Well-being:**
  - **Increased domestic violence and abuse** due to power imbalance.
  - **Loss of agency and decision-making capacity** for young girls.
- **On Society:**
  - **High population growth** due to early and repeated pregnancies.
  - **Hampered human capital development**, affecting national growth.

Key Measures to Address Child Marriage

- **Legal framework:** The **Prohibition of Child Marriage Act, 2006** mandates States to appoint **Child Marriage Prohibition Officers** for prevention, monitoring, and enforcement.
- **Government schemes:** Initiatives such as **Beti Bachao Beti Padhao (BBBP)** promote girls' education, awareness, and empowerment to reduce early marriages.
- **Grassroots initiatives:** The **Surajpur Model (Chhattisgarh)** demonstrated community-led action, with **75 Panchayats declared 'Child Marriage-Free'** through local vigilance and social mobilisation.
- **Global commitments:** India is a signatory to the **United Nations Convention on the Rights of the Child (UNCRC)** and has committed to achieving **SDG 5**, which aims to eliminate child, early, and forced marriage by **2030**.

Way Forward

- **Stronger Law Enforcement:** Fill CMPO vacancies, empower them with resources, improve conviction through fast-track courts, and fix accountability of local administrations.

- **Preventive Governance:** Use Panchayat-level early-warning systems and integrate child marriage prevention into district planning and GPDPs.
- **Girls' Education Retention:** Prioritise secondary education through hostels, scholarships and safe, gender-sensitive schools to prevent dropouts.
- **Economic Security:** Link vulnerable families to livelihoods and promote skills for adolescent girls to delay marriage.
- **Community Behaviour Change:** Scale community-led models and run sustained campaigns to challenge patriarchy and dowry norms.
- **Adolescent Empowerment:** Strengthen life skills, health awareness and legal literacy, and create safe platforms for youth voices.

Topics for Prelims

Khiamniungan Tribe

Context

Recently, the Prime Minister of India referred to the Khiamniungan tribe in his 'Mann Ki Baat' address.

About Khiamniungan tribe

- **Distribution:** Eastern Nagaland (India) and north-western Myanmar.
  - Their **settlements lie in mountainous and riverine regions**, spreading **up to the Chindwin River in Myanmar.**
- **Beliefs:** Follow **animistic, nature-centric beliefs**.
  - Rituals often include animal sacrifice and symbolic offerings.
  - The **village priest (Am-pao)** plays a central role in ceremonies.
- **Economy:** Known for **traditional cliff-honey harvesting practices**
- **Major Festivals:** Tsokum Sumai and Khaotzao Sey Hok-ah Sumai.

Polygamy in India

Context

Assam has recently passed the Assam Prohibition of Polygamy Bill, 2025.

What is Polygamy?

- Polygamy refers to a marital arrangement in which a person has more than one spouse at the same time.
- In India, it generally takes the form of **polygyny (a man having multiple wives)**, while **polyandry (a woman with multiple husbands)** is extremely rare and largely confined to a few tribal communities such as **Hatti (Himachal Pradesh), Jaunsari (Majorily Uttarakhand), Kinnaura (Himachal Pradesh).**
- **Laws Related in India:**
  - **Hindus, Sikhs, Jains, Buddhists**: Polygamy is **illegal** under the Hindu Marriage Act, 1955. A second marriage while the first is still valid is void and punishable under IPC Sections **494–495** (bigamy).
  - **Christians and Parsis**: Both communities are governed by their respective laws (Indian Christian Marriage Act, 1872 and Parsi Marriage & Divorce Act, 1936), which mandate **monogamy**.
  - **Special Marriage Act, 1954** (civil/secular marriages): Polygamy is **not permitted**.
  - **Bhartiya Nyaya Sanhita: Section 82** of BNS deals with marrying again during the lifetime of a husband or wife, punishable with up to seven years' imprisonment and a fine.
  - **Muslims**: Under Muslim Personal Law, a Muslim man may marry **up to four wives**, provided he treats them equally; however, this allowance does not apply if he marries under the Special Marriage Act.
  - **Tribal communities**: Some Scheduled Tribes follow customary practices that may include polygamy, but these vary and are not governed by codified personal laws.

Femicide

Context

The Italian Parliament has passed a law that criminalizes femicide.

About Femicide

- It refers to the **intentional killing of women or girls because of their gender**.
- It is recognised as the most extreme form of **gender-based violence.**
- The latest report from the UN Office on Drugs and Crime (UNODC) and UN Women, highlighted that **in 2024, around 50,000 women and girls worldwide** were killed by their intimate partners or other family members (including fathers, mothers, uncles and brothers).
- **Countries with Laws Against Femicide:** Mexico, Cyprus, Morocco, North Macedonia, Türkiye, Gabon, and Chile and now Italy.

- **Belém do Pará Convention (1994):** It recognises state responsibility in preventing femicide and is legally binding for Latin American countries.

Femicide in India

While India does not use the term "femicide" officially, practices equivalent to femicide are highly prevalent:

- **Dowry Deaths: 15,489 cases were registered** under the **Dowry Prohibition Act in 2023** — up from 13,479 in 2022 and 13,568 in 2021 (as per latest NCRB data).
- **Honour Killings:** Still prevalent in parts of Haryana, Rajasthan, Punjab, UP.
- **Female Infanticide / Sex-Selective Abortion**
- **Witch Hunting:** Reported in Jharkhand, Odisha, Chhattisgarh, Assam.

- **Domestic Violence:** 29% of married women have experienced domestic violence (as per NFHS-5).
  - » **Laws Related to it:** India does not explicitly recognise "femicide" as a distinct legal category. However, several laws address forms of gender-based killing.
- Prohibition of Child Marriage Act, 2006
- Pre-Conception and Pre-Natal Diagnostic Techniques Act (PCPNDT), 1994
- Protection of Women from Domestic Violence Act, 2005 (PWDVA)
- POCSO Act, 2012

World Inequality Report 2026

Context

The World Inequality Report 2026 was recently released by the World Inequality Lab.

Key Findings of the Report

Global Landscape of Inequality

- **Extreme concentration of global wealth:** The **top 0.001% (56,000 adults)** own **6% of global wealth** — more than the **bottom 50% of humanity (4 billion people)** combined.
  - The world's richest individuals in the **top 1-in-100-million club (56 people)** each hold average wealth of **€53 billion**, exceeding the GDP of many African countries.
- **High-income economies show inequality but at lower levels**
  - **US:** Top 10% hold 47% of income; bottom 50% hold 13%.
  - **China:** Top 10% hold 41%; bottom 50% hold 18%.
  - **France:** Top 10% hold 33%; bottom 50% hold 22% (one of the most equal among major economies).
- **Developing countries show severe inequality**
  - **South Africa** remains the world's most unequal large economy (Top 10%: 66%; Bottom 50%: 10%).
  - **Brazil** also exhibits extreme concentration (Top 10%: 59%; Bottom 50%: 12%).

India's Inequality – WIR 2026 Findings

- **India emerges among the most unequal large economies:**
  - **Top 10% income share:** 58%
  - **Top 1% income share:** 22.6% (highest since Independence)
  - **Bottom 50% income share:** 15%
- **Wealth concentration is even sharper**
  - **Top 10% own 65% of wealth**
  - **Top 1% own 40.1%** — second only to South Africa globally
- **Inequality comparable to colonial-era levels**
  - 1922: Top 10% share 55–57%
  - 1982: Fell to ~35%
  - 2025: Back to **58%**, signalling reversal of post-Independence egalitarian gains
- **Gender, caste and regional inequalities persist**
  - Female labour income share: **18%**
  - Rural bottom 50% income: **₹32,000/year**
  - Urban top 1% income: **₹53 lakh/year**
  - STs and SCs concentrated in bottom 40%
- **Drivers of India's rising inequality**
  - Skill-biased technology benefiting high-skill urban sectors
  - Privatisation & crony capitalism
  - Weak labour laws → stagnant wages
  - Regressive taxation (tax-to-GDP only 17%)
- **Policy recommendations for India**
  - **2% wealth tax** on net worth above ₹10 crore
  - Reintroduce **inheritance tax**
  - **Super-tax** on top 1% incomes
  - Expand **Universal Basic Services**: education, healthcare, childcare
- **Growth without distribution**
  - Per capita income rose from €1,900 (2014) to €6,200 (PPP) in 2025
  - Yet the **gains went disproportionately to the top**, exacerbating inequality

Shilp Didi Programme

Context

The Union Secretary of Textiles announced that the Shilp Didi Programme has significantly boosted women artisans' income.

About Shilp Didi Programme

- It is a programme designed to **economically empower women artisans ("Shilp Didis")** by providing training, digital capabilities, and expanded market access.
- **Launched:** 2024, with a **100-day pilot** beginning in June 2024.
- **Implementing Agency:** Ministry of Textiles, through the **Office of the Development Commissioner (Handicrafts)**.
- **Key Features:**
  - **E-training modules** on entrepreneurship, regulatory requirements, social media use, and e-commerce onboarding.
  - **Marketing opportunities** via Dilli Haat, craft fairs, and curated promotional events.
  - **E-commerce integration** for wider national and global market reach.
  - Inclusion of **100 women artisans** from **72 districts in 23 states** during the pilot phase.
  - Coverage of **30 handicraft sectors**, such as textiles, pottery, metal crafts, and embroidery.
  - **Capacity-building** support through NHDP (National Handicrafts Development Programme) clusters.

Dandami Madia Tribe

Context

The Dandami Madia (also spelt as Maria) people have long shaped the cultural landscape of southern Chhattisgarh.

About Dandami Madia Tribe

- They are also called **Madia Gond** are a **Particularly Vulnerable Tribal Group (PVTG)** belonging to the larger Gond tribe.
- **Geographical distribution:** They primarily inhabit the forested and hilly regions of **Dantewada and Bijapur districts of**

Chhattisgarh, with extensions into parts of **Maharashtra (Gadchiroli)** and **Telangana**.

- **Language:** They speak **Madia**, a Dravidian language, and also use Gondi and regional languages.
- **Livelihood:** Traditionally dependent on **shifting cultivation (podu)**, hunting–gathering, minor forest produce, and small-scale agriculture.
- **Social and cultural life:** Society is clan-based, with strong community bonds, distinctive folk dances (such as **Dandami dance**), ritual practices, and nature worship.

Global Declaration on Noncommunicable Diseases (NCDs) and Mental Health

Context

At the 80th United Nations General Assembly (UNGA), a resolution on Non-Communicable Diseases (NCDs) and mental health was adopted.

Key Highlights of the Declaration

- The declaration broadens the NCD agenda to include areas such as **oral health, lung health, and childhood cancers.**
- It **explicitly covers environmental and chemical risk factors**, including air pollution, clean cooking access, lead exposure, and hazardous chemicals.
- For the first time, it acknowledges **harms from excessive screen time, social media use, misinformation, and disinformation.**
- It calls for **tighter regulation of tobacco, unhealthy foods, trans fats, and e-cigarettes**.
- **Whole-of-government and whole-of-society approach:** It promotes coordinated action involving civil society, youth, persons with disabilities, and the private sector.
- It mandates progress reporting by the UN Secretary-General, with technical support from the WHO.

Global Health Targets to be Achieved by 2030

- **First-ever Global Fast-Track Targets:**
  - Reduce the number of **tobacco users by 150 million**.
  - Ensure **150 million more people have controlled hypertension**.
  - Provide **150 million more people with access to mental health care**.
- **System-Level Process Targets:**
  - At least **80% of countries** to have **policy, legislative, fiscal, and regulatory measures** addressing NCDs and mental health.
  - At least **80% of primary health centres (PHCs)** to have **affordable WHO-recommended essential medicines and technologies**.
  - At least **60% of countries** to provide **financial protection for mental health services**.

SHAKTI Scholars – NCW Young Research Fellowship

Context

National Commission for Women launched SHAKTI Scholars - NCW Young Research Fellowship to encourage policy-oriented research on women-related issues across India

About SHAKTI Scholars - NCW Young Research Fellowship

- **Objective:** Promote multidisciplinary, evidence-based research that can inform laws, policies, and programmes for women's empowerment and protection.
- **Key Research Themes:** Women's safety and dignity, Gender-based violence, Legal rights and access to justice, Cyber safety, Implementation of the Prevention of Sexual Harassment (POSH) framework, Women's leadership and political participation, Health and nutrition, Education and skill development, Economic empowerment and labour force participation, Socio-cultural practices and work–life balance
- **Eligibility:**
  - Indian citizens aged 21–30 years
  - Minimum qualification: Graduation from a recognised institution
  - Preference to candidates pursuing or having completed post-graduation or higher research
  - Independent researchers with proven research capability are also eligible
- **Fellowship Support:**
  - Research grant of ₹1 lakh
  - Duration: 6 months
  - Funds released in phases based on research progress

UNESCO Report - Bhasha Matters: State of the Education Report for India 2025

Context

UNESCO Released its flagship report - Bhasha Matters: State of the Education Report for India 2025.

Key recommendations of UNESCO (India Education Report 2025)

- Establish a **coordinated national framework** with strong institutional alignment between the Centre and States.
- Implement **clear MTB-MLE policies** tailored to local and regional linguistic contexts.
- Recruit and train **multilingually competent teachers**, and reform both pre-service and in-service teacher education systems.
- Create **flexible language learning pathways** that reflect learners' diverse linguistic backgrounds.
- Institutionalise **community participation and integration of local knowledge systems** within school education.
- Develop **high-quality multilingual textbooks, assessments, and learning resources** across all grade levels.
- Integrate **MTB-MLE into middle, secondary, and alternative schooling**, with explicit attention to gender sensitivity.
- Leverage **digital platforms** to support multilingual teaching, learning, and continuous teacher mentoring.
- Invest in **translation tools, speech technologies, and AI**, while actively addressing the digital divide.
- Ensure **adequate and equitable financing** for multilingual education and language-responsive technologies.

SCIENCE & TECHNOLOGY

Topics for Mains

India's STEM Future

Syllabus Mapping: GS-3 Research Ecosystem

Context

A national debate has arisen after concerns that limiting PhD research to "emerging national priorities" may constrain academic freedom and exposes deeper structural weaknesses in India's STEM ecosystem.

What does "emerging national priorities" mean in STEM terms?

In policy, "national priorities" usually refer to mission-mode or strategic areas such as:

- **Health & Biosecurity** (vaccines, AMR, diagnostics, genomics)
- **Climate & Energy Transition** (green hydrogen, batteries, CCUS, renewables, nuclear safety)
- **Agriculture & Food Systems** (precision agri, climate-resilient crops, soil/water tech)
- **Semiconductors & Advanced Manufacturing** (materials, chip design, fab ecosystem)
- **AI/Quantum/Cyber** (trustworthy AI, quantum communication, post-quantum security)
- **Space & Defence** (launch systems, autonomy, drones, EW, dual-use tech)
- **Critical Minerals & Materials** (rare earths, recycling, strategic supply chains)

Key Issues and Implications

Dimension	Key Concern	Why it Matters
Academic Freedom	Restriction on choice of research topics	Limits curiosity-driven and foundational research essential for long-term innovation
Policy Rationale	Emphasis on national priorities	Public funding seeks societal and strategic returns
Short-term Bias	Focus on applied, immediate outcomes	Weakens basic science and long-horizon research
Centralisation	Top-down definition of priorities	Promotes conformity and ignores regional or local needs
Research Quality	Topic control instead of systemic reform	Does not fix mentoring, infrastructure, or evaluation gaps
Innovation Risk	Over-regulation of PhD research	Discourages talent and reduces global competitiveness

Trends in India's STEM Demography

- **Large Graduate Pool:** India produces 25–30 lakh STEM graduates annually, making it the **world's second-largest producer after China (**AISHE 2021–22).
- **Gender Drop-off in Research:** Although women make up **43% of STEM graduates**, they account for only **14% of researchers**, reflecting persistent societal and institutional barriers.
- **Low Researcher Density:** India has only **~260 researchers per million population**, far below China (~1,500), the US (~4,500), and South Korea (~8,000).
- **Sectoral Concentration:** The STEM workforce is **disproportionately concentrated in IT and software services**, while core research domains—biotechnology, materials science, physics—face acute talent shortages.

Challenges to STEM Education & Research

- **Research pipeline: Quantity vs quality: PhD expansion without proportional supervisory capacity** leads to weak mentoring and fragmented labs.
  - Excess focus on **credentialism** rather than research apprenticeship.
- **Incentives: "Publish or perish" distortions**
- Incentives can reward **counting publications** over originality, replication, open science, or patents.
- Predatory journals and low-quality conferences exploit evaluation gaps.
- Over-standardisation (e.g., rigid indexing/Q1 mandates) can also be problematic if it becomes a box-ticking tool rather than a quality culture.
- **Stagnant R&D Spending:** India's Gross Expenditure on R&D **remains ~0.64% of GDP**, far below the global average (~1.8%) and China's 2.4%.
- **Weak Private Sector Participation:** Industry contributes **less than 40% of R&D expenditure**, while advanced economies see over **70% private funding**.
- **Weak university–industry–startup integration:** Limited industry-funded PhDs, fewer co-supervised doctoral projects, and low mobility between academia and industry.
- IP/patenting support, tech transfer offices, and proof-of-concept funding are uneven.
- **Administrative Bottlenecks:** Long delays in fellowship payments and rigid procurement procedures discourage researchers.
- **Brain Drain in High-End Fields:** A large share of elite graduates—nearly **90% of top AI researchers**—move abroad due to better research environments.
- **Infrastructure Gaps:** Most state universities lack modern laboratories and access to high-quality scientific journals.

Way Ahead

- **Increase R&D Spending to 2% of GDP:** India needs a firm commitment to raise research investment to global benchmarks.
- **Enhance Industry–Academia Collaboration:** Encourage companies to fund university research through CSR requirements or targeted R&D tax incentives.
- **Simplify Research Administration:** Introduce a **single-window system** for grant approvals and lab equipment purchases to minimise bureaucratic delays.

- **Improve Talent Retention:** Expand post-doctoral positions with competitive salaries and ensure timely, automated fellowship payments.
- **Broaden Research Access Nationwide:** Extend ANRF support to **state and rural institutions**, reducing concentration of funding within IITs and IISc.

Initiatives Taken in India

- **Anusandhan National Research Foundation (ANRF), 2023:** Established with a **₹50,000 crore, five-year corpus** to expand research funding across universities and colleges, not just premier institutions.
- **National Education Policy (NEP) 2020:** Promotes **multidisciplinary learning**, enabling STEM students to study humanities for broader intellectual development
- **National Quantum Mission:** ₹6,000 crore allocated to build intermediate-scale quantum computers.
- **IndiaAI Mission:** ₹10,372 crore approved to develop AI infrastructure and multimodal language/vision models.
- **Atal Innovation Mission**: It has set up **10,000+ Atal Tinkering Labs** to nurture early skills in robotics, IoT, and problem-solving.

Reforms needed in energy Policy in era of AI

Syllabus Mapping: GS-3: AI and Energy Policy

Context

India's energy landscape is undergoing a major structural shift due to two transformative forces, the global climate crisis and the exponential rise of energy-intensive AI data centres. While India has historically succeeded in ensuring access, affordability, and energy security, the emerging scenario demands balancing economic growth, environmental sustainability, and geopolitical risks.

Increasing Energy Demand in the AI Era

The rapid diffusion of **Artificial Intelligence (AI)** across governance, industry, defence, healthcare, and finance has triggered a **structural rise in energy demand**, primarily through energy-intensive **data centres, cloud computing, and semiconductor manufacturing**.

- **Computational Intensity**
  - Training large AI models requires massive parallel computing using GPUs and specialised chips.
  - Repeated training, fine-tuning, and inference multiply electricity consumption.
- **24×7 Data Centre Operations**
  - AI services demand uninterrupted power and low-latency operations.
  - Backup systems (diesel generators, redundancy) add to energy footprint.
- **Cooling and Water Demand**
  - Servers generate high heat loads.
  - Cooling systems consume large amounts of electricity and water, intensifying the energy–water nexus.
- **Semiconductor Ecosystem:** Chip fabrication plants (fabs) are among the most power- and water-intensive industrial units.

Economic, Environmental, and Geopolitical Implications

- **Economic**: Higher energy costs may affect competitiveness of AI-driven sectors.
- **Environmental**: Increased emissions risk undermining Net-Zero commitments.
- **Geopolitical**: Dependence on imported energy and critical minerals for AI hardware creates new vulnerabilities.

Emerging Trade-Offs in India's Energy Landscape

- **Green Transition vs Social–Political Realities:** Coal India employs ~3.5 lakh directly, millions indirectly.
  - Phasing down coal risks job losses and electoral backlash.
  - But India hosts **6 of the 10 most polluted cities (2024)**. Thus there is an urgent need to decarbonise.
- **Dependence on China for Green Energy Supply Chains:** 80% global solar panels, 95% polysilicon wafers, 80% lithium-ion processing dominated by China.
  - Importing from China accelerates renewable deployment at the lowest cost, but increases India's strategic vulnerability.
- **Power Demand Surge from AI Data Centres:** Tech giants (Google, Reliance, Amazon) planning gigawatt-scale centres.
  - These require vast quantities of reliable renewable energy and battery storage.
  - But rising AI-driven demand may push India to extend the life of **thermal power plants**, creating a tension between **growth and decarbonisation**.
- **Fragmented Energy Governance Structure:** Multiple ministries (Power, Coal, Petroleum, MNRE) and states thus slow decision-making.
  - No integrated institution to manage climate, AI, supply chains, private investment, and geopolitics collectively.
- **Private Sector Constraints:** Regulatory uncertainty, land clearances, grid bottlenecks, lack of long-term policy visibility.
  - Difficulty navigating geopolitical risks and domestic compliance hurdles.

Rising Electricity Demand in India

- **Structural Trends:** India's electricity demand grew modestly (~5%) for two decades, but new drivers - **data centres, EVs, 5G, green hydrogen** are now accelerating it.
- **AI's Role:**
  - AI computing is **base-load intensive** - it runs continuously, unlike peak-hour demand from households.
  - India's projected data centre capacity expansion could **add 50–70 GW of new power demand by 2030**, roughly equivalent to the total installed capacity of France.
- **Regional Concentration:** Data centres are often built near metros (Mumbai, Chennai, Hyderabad) - stressing local power grids.
- **Implication:** Without planning, India risks **power deficits, fossil dependence, and higher carbon emissions, threatening its net-zero 2070 trajectory.**

Implications For India

- **Renewed Energy Insecurity:** Continued dependence on imported solar, battery and critical mineral supply chains could

expose India to fresh vulnerabilities in its renewable energy system.

- **Pressure to Increase Fossil Use:** The sharp rise in AI-related electricity demand may compel states to rely more on coal and gas, potentially jeopardising India's Paris Agreement commitments and NDC targets.
- **Reduced Competitiveness for High-Tech Industries:** Inadequate progress in grid modernisation and energy storage could deter investments in AI, semiconductors, EV manufacturing and aerospace sectors.
- **Socio-Economic Risks from Coal Transition:** A poorly planned coal phase-down may lead to job losses, fiscal instability in coal-dependent states, and significant political resistance.
- **Governance Bottlenecks Slowing Strategic Ambitions:** Fragmented energy decision-making could impede India's goal of becoming a leading global hub for aviation, AI and advanced technologies, as reliable clean energy becomes a critical constraint.

Way Forward

- **Establish a National Energy Commission:** Integrated body like the US Dept. of Energy; harmonises ministries, states, and industry.
- **Implement a Just Transition Framework:** Social protection, reskilling programmes for coal regions (South Africa's Just Energy Transition Partnership (JETP) as model).
- **Develop Domestic Green Manufacturing:** Strengthen PLI schemes; secure critical minerals through Australia–Africa partnerships.
- **Modernise Grid & Storage Infrastructure:** Expand Green Energy Corridors; invest in battery storage and pumped hydro.
- **Enable Private Sector Participation:** Stable regulations, green bonds, PPPs for data centre power needs and renewable expansion.

Digital Sovereignty for India

Syllabus Mapping: GS-3 Digital India

Context

India is facing global pressures related to data governance, digital taxation, and Big Tech regulation. It is to be decided whether to assert digital sovereignty or risk remaining dependent on external actors that control critical parts of its digital ecosystem.

What is Digital Sovereignty?

Digital sovereignty refers to a nation's **capacity to control, regulate, and secure its digital infrastructure, data, and technologies** in line with its constitutional values, economic interests, and security priorities.

Key elements include:

- Control over **data generated within national borders**
- Regulatory authority over **digital platforms and markets**
- Autonomy in **critical digital infrastructure** (cloud, telecom, semiconductors)
- Ability to **shape global digital norms**

India's Current Digital Landscape

- Over **850 million internet users** place India as the **world's second-largest digital market**.
- The **digital economy contributes nearly $500 billion to GDP** and is projected to exceed **$1 trillion by 2030.**
- Cyber risks are rising, with CERT-In reporting around **1.3 million cyber incidents in 2024.**
- India's Digital Public Infrastructure—Aadhaar, UPI, DigiLocker, ONDC—serves as a global benchmark for scalable and low-cost service delivery.

Why India Needs Digital Sovereignty

- **Data as a strategic asset:** National control over data **enhances economic value creation and strengthens strategic autonomy,** especially in a global data economy exceeding $3 trillion.
- **Preserving policy independence:** Protects India's ability to **impose digital taxes and regulate Big Tech without external interference**, as reflected in ongoing OECD Pillar-1 negotiations.
- **National security imperatives: Reduces exposure to foreign-controlled digital and financial infrastructures;** geopolitical exclusions such as Russia and Iran from SWIFT highlight such vulnerabilities.
- **Technology leadership:** Supports indigenous development in AI, semiconductors, and digital platforms; India's DPI alone is projected to contribute nearly $100 billion annually.

Barriers to Achieving Digital Sovereignty

- **Continued US dominance:** Western platforms control global financial and digital networks, with **US firms accounting for 90% of worldwide digital advertising revenue**.
- **Trade agreement pressures:** Proposed FTA provisions seek to prevent India from mandating data localisation or imposing digital taxes.
- **Human-capital outflow:** India contributes a substantial share of the global AI workforce, but economic gains primarily accrue to foreign firms.
- **Systemic digital dependence**: India relies heavily on foreign cloud services, operating systems, and payment infrastructures, with three US companies controlling nearly 80% of the cloud market.

Key Global Pressures Shaping India's Choices

- **Data Governance Regimes**
  - **US model**: Free cross-border data flows, market-driven regulation.
  - **EU model**: Strong data protection, digital regulation (GDPR, DMA, DSA).
  - **China model**: State-centric control, data localisation, tech nationalism.
  - India must craft a **hybrid model** aligned with its developmental and democratic context.
- **Digital Taxation Conflicts**
  - India's **Equalisation Levy** and proposed global minimum tax face resistance from developed economies.
  - OECD-led negotiations often reflect interests of tech-exporting countries.

  - Digital sovereignty requires **fair taxation of digital value creation** within India.
- **Big Tech Regulation**
  - Global platforms dominate search, social media, app stores, cloud services.
  - Network effects and data monopolies restrict Indian startups and innovation.
  - India faces pressure against "over-regulation" from trade partners and firms.

Risks and Trade-offs in Asserting Digital Sovereignty

- **Innovation and Investment Concerns:** Over-regulation may deter foreign investment and innovation. Compliance costs could burden startups if poorly designed.
- **Fragmentation of the Internet:** Excessive localisation may contribute to **"splinternet"**, raising costs and reducing efficiency.
- **Capacity Constraints:** Effective digital sovereignty requires strong regulators, skilled manpower, and technological depth—areas where India still faces gaps.

Way Forward: A Balanced Sovereignty Strategy

- **Strategic Autonomy, Not Digital Isolation**
  - Protect core sovereign interests while remaining integrated with global digital trade.
  - Focus on **risk-based data governance**, not blanket restrictions.
- **Strengthen Digital State Capacity**
  - Invest in regulatory expertise, cyber security institutions, and data governance frameworks.
  - Improve coordination between MeitY, CCI, CERT-In, RBI, and sectoral regulators.
- **Promote Indigenous Innovation**
  - Support Indian platforms, AI models, and cloud services through public procurement and standards.
  - Leverage DPI to create open, competitive markets.
- **Shape Global Digital Norms**
  - Play a leadership role in G20, WTO, and UN discussions on digital governance.
  - Advocate for **development-friendly digital rules** that recognise data as a shared economic resource.

Topics for Prelims (Science & Technology)

Sanchar Saathi App

Context

The Department of Telecommunications has mandated that all new smartphones must come with the Sanchar Saathi app pre-installed.

About Sanchar Saathi App

- It was introduced in 2025, aims to improve transparency and strengthen security across mobile communication networks.
- **Key Features:**
  - **Chakshu Module**: Allows users to report potentially fraudulent calls, SMS, or WhatsApp messages, including scams related to KYC updates.
  - **IMEI-Based Tracking and Blocking**: Provides a facility to locate and block lost or stolen mobile devices anywhere in the country through their IMEI numbers.
  - **Device Authenticity Verification**: Enables users to check whether a mobile handset they purchase is legitimate.
  - **Flagging Masked International Calls**: Helps identify international calls that are disguised as domestic ones using numbers beginning with +91 and followed by 10 digits.
  - **ISP Identification**: Lets users find their Internet Service Provider by entering a PIN code, specific address, or the ISP's name.

GLP-1 Drugs

Context

The World Health Organization (WHO) issues global guidelines on the use of GLP-1 medicines in treating obesity.

About GLP-1 Drugs

- **Glucagon-like peptide-1 receptor agonists (GLP-1RAs)** are a class of medications that treat type 2 diabetes and obesity.
  - They work by: Increasing insulin secretion, Slowing stomach emptying and Reducing calorie intake.
- **GLP-1 receptor** is a protein that plays a key role in regulating blood glucose levels, insulin secretion and other physiological functions in the human body.
- **Obesity stats:**
  - Globally 1 in 8 people is living with obesity. **890 million adults and 160 million** adolescents affected by it.
  - India ranks **3rd** globally in obesity, **after USA and China.**
  - 44 million women and 26 million men have obesity in India.

DHRUVA System

Context

The Department of Posts created DIGIPIN as an open-source digital public infrastructure, forming the backbone for smart address labels under DHRUVA.

What is DHRUVA?

- **DHRUVA** stands for **Digital Hub for Reference and Unique Virtual Address**.
- It is a **user-centric, standardised digital addressing framework** developed by the Department of Posts.
- It allows people to create **digital address labels** that can be shared easily with service providers, just like a UPI ID.
- Users can grant companies **time-bound access** to their actual address, after which re-authorisation is required.
- It aims to streamline deliveries, improve address accuracy, and reduce repeated form-filling.

What is the DIGIPIN System?

- It is a **10-character alphanumeric code** that represents the **precise latitude and longitude** of any address.
- DIGIPIN was developed to ensure **accurate geolocation**, especially in rural areas where textual addresses are unreliable.

AstroSat

Context

The Indian Institute of Astrophysics (IIA) celebrated 10 years of successful operation of the UltraViolet Imaging Telescope (UVIT), the primary UV payload aboard AstroSat, India's first dedicated space observatory.

About Astrosat

- **Launched by**: ISRO
- **Launch Date**: 28 September 2015
- **Launch Vehicle**: PSLV-C30
- **Features:**
  - India's **first dedicated astronomy satellite**.
  - Provides **simultaneous multi-wavelength observations** of celestial objects.
  - Covers **X-ray, Ultraviolet (Near and Far), and limited optical ranges**.
  - Energy coverage: **0.3 keV to 100 keV**.
- **AstroSat has enabled major discoveries in:** Star formation and stellar evolution, Black hole and neutron star behaviour, Galaxy evolution and AGN studies, UV structures in nearby and distant galaxies, Detection of high-energy cosmic events.
- **Payloads:**
  - **UVIT (Ultra-Violet Imaging Telescope)**: Far-UV, Near-UV, limited optical.
  - **LAXPC (Large Area X-ray Proportional Counter)**: High time resolution X-ray studies (3–80 keV).
  - **SXT (Soft X-ray Telescope)**: Imaging in 0.3–8 keV band.
  - **CZTI (Cadmium Zinc Telluride Imager)**: Hard X-ray spectroscopy (10–100 keV).
  - **SSM (Scanning Sky Monitor)**: Detects and monitors X-ray transients.

Onchocerciasis

Context

Niger becomes the 1st country in the African Region to eliminate onchocerciasis.

About Onchocerciasis

- **Type:** It is a **parasitic disease** caused by the filarial worm Onchocerca volvulus**.**
- **Transmission:** Spread through the **bite of infected black flies** (Simulium species), which breed near fast-flowing rivers and streams — hence the name river blindness**.**
  - It is the **second leading infectious cause of blindness worldwide,** after trachoma.
- **Distribution:** Rural populations in sub-Saharan Africa, and Yemen, with smaller endemic areas found in parts of Latin America.
- **Lifecycle:** Adult worms live in human nodules for up to 15 years.
  - They release thousands of microfilariae, which migrate to eyes and skin causing severe inflammation.

Neurotechnology

Context

A recent analysis highlights how **neurotechnology—especially Brain–Computer Interfaces (BCIs)**—is rapidly advancing globally and emerging as a critical area for India in healthcare, biotechnology, AI, and national innovation.

What Does Neurotechnology Mean?

- It refers to technologies that **interact directly with the brain** using mechanical, electrical, or computational tools.
- These systems **record, monitor, or influence neural activity**, helping understand, restore, or enhance brain function.
- At the core is the **Brain–Computer Interface (BCI)**, which decodes neural signals and converts them into digital commands—allowing users to operate **prosthetic limbs, wheelchairs, robotic arms, or computer cursors** using thought alone.
- **Key Features of Neurotechnology:**
  - **Combines** neuroscience + AI + engineering + computation**.**
  - Can be **non-invasive** (EEG headsets) or **invasive** (implanted electrodes).
  - Used for diagnosis, rehabilitation, neuroprosthetics, and treating disorders like depression or Parkinson's.
  - Experimental research shows potential for **brain-to-brain communication**, though human use remains mostly therapeutic.

Global Examples of Neurotechnology

- **Neuralink (United States) – BCI Implant Trials:** Received **FDA approval** (May 2024) for in-human clinical trials.
  - Demonstrated BCIs that allow paralysed patients to **control robotic limbs or cursors** via thought
  - Focus on high-precision implants with AI-based neural decoding.

- **The BRAIN Initiative (United States):** A large federal–private partnership led by the National Institutes of Health (NIH) to develop advanced neurotechnologies for mapping, recording, and modulating brain activity.
- **China Brain Project (2016–2030):** A national project with three goals: **Understanding cognition and the brain**, **Brain-inspired AI**, and **Neurological disorder treatment**.
- **Chile – First Country to Legally Recognise Neurorights:** Passed constitutional amendments (2021–23) protecting mental privacy, brain data, and autonomy from neurotechnological misuse. Serves as a global model for neuro-rights legislation.

Aditya L1

Context

Aditya-L1, working with six U.S. satellites, has helped scientists understand why the May 2024 solar storm (Gannon's storm) behaved unusually.

About Aditya L1

- Aditya-L1 is **India's first solar observatory spacecraft**.
- It was launched by **PSLV-C57** on **September 2, 2023**, and is on its way to the **Sun-Earth Lagrange point 1 (L1)**, which is located about 1.5 million kilometres from Earth.
- Objective: **Studying the Sun's upper atmosphere**, including the chromosphere and corona.

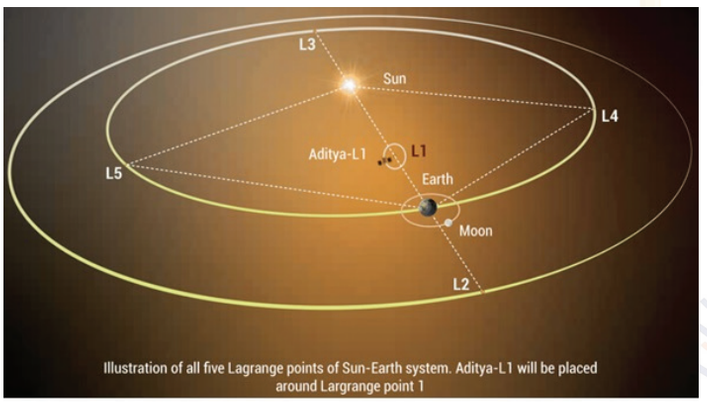


Illustration of all five Lagrange points of Sun-Earth system. Aditya-L1 will be placed around Largrange point 1

- Payloads: The spacecraft is **equipped with seven payloads**:
  - **VELC (Visible Emission Line Coronagraph)** – Studies the corona and its dynamics.
  - **ASPEX (Aditya Solar Wind Particle Experiment)** – Analyzes solar wind particles.
  - **PAPA (Plasma Analyzer Package for Aditya)** – Measures charged particles in solar wind.
  - **SoLEXS (Solar Low Energy X-ray Spectrometer)** – Observes X-ray emissions.
  - **HEL1OS (High Energy L1 Orbiting X-ray Spectrometer)** – Studies high-energy solar radiation.
  - **MAG (Magnetometer)** – Measures interplanetary magnetic fields.
  - **SUIT (Solar Ultraviolet Imaging Telescope) -** observe the **Sun's photosphere and chromosphere** in the **ultraviolet (UV) wavelength** range.

About L1

- L1 is a balanced gravitational location between the Earth and the Sun, and it is **an ideal place to study the Sun** without interference from Earth's atmosphere.
- Placing a satellite in a halo orbit around the L1 point offers the significant benefit of maintaining **uninterrupted observation of the Sun**, free from any periods of occultation or eclipses.

International Telecommunication Union (ITU)

Context

The International Telecommunication Union is under pressure to reform global spectrum and orbital slot governance as satellite megaconstellations intensify competition and strain existing coordination frameworks.

About International Telecommunication Union (ITU)

- A **United Nations specialized agency** for information and communication technologies (ICTs).
- **Established in: 1865**, making it the **oldest UN agency**.
- **Headquartered**: **Geneva, Switzerland** with regional offices worldwide.
- **Members: 194 Member States** and **1000+ sector members** (companies, universities, international organizations).
- **Functions:**
  - **Facilitates global connectivity** in communication networks.
  - **Allocates radio-frequency spectrum and satellite orbits** globally.
  - Develops **international technical standards** enabling seamless interconnection of telecom and digital networks.
  - Supports **digital inclusion**, capacity building, and ICT development, especially in underserved regions.
  - Provides a **multilateral forum** for negotiation, standard-setting, and knowledge exchange.
- **Key Areas of Work:**
  - **ITU-R:** Radio communication – spectrum management, satellite coordination.
  - **ITU-T:** Telecommunication standards – protocols, cybersecurity, 5G/6G standards.
  - **ITU-D:** ICT development – bridging the digital divide, policy and capacity support.

Mephedrone

Context

Directorate of Revenue Intelligence (DRI) dismantled a Mephedrone manufacturing facility in Maharashtra under **Operation Hinterland Brew.**

About Mephedrone

- It is a synthetic drug created to mimic the effects of well-known illegal narcotics (also known as New Psychoactive Substance (NPS)).
- It is regarded as an **empathogen–stimulant**, it enhances feelings of empathy while **accelerating communication between the brain and the rest of the body**.

Nuclear Power Generation in India

Context

India's nuclear power generation touched a new record in FY 2024-25, with NPCIL producing 56,681 million units of electricity.

India's Three Stages Nuclear Programme

- **Stage 1: Pressurised Heavy Water Reactors (PHWRs):**
  - Uses **natural uranium** as fuel in **heavy-water moderated and cooled PHWRs**.
  - Generates **electricity** and produces **plutonium (Pu-239)** as a by-product from irradiated uranium.
  - Output fuel: **Plutonium + depleted uranium**, which becomes feedstock for Stage 2
- **Stage 2: Fast Breeder Reactors (FBRs):**
  - Fuel: **Mixed oxide fuel (MOX)** made from **plutonium + natural/ depleted uranium**.
  - FBRs "breed" more fuel than they consume by converting: **Thorium (Th-232)** → **U-233**, and **U-238** → more plutonium.
  - Produces significantly higher power output (up to **300 GWe** potential).
  - Objective: Build sufficient stock of **U-233** for Stage 3.
- **Stage 3: Thorium-based Reactors (U-233 Fuelled Reactors):**
  - Uses a mix of **thorium and uranium**, with thorium transmuting into **U-233**, which becomes the primary fissile fuel.
  - U-233-based breeder reactors generate **very large amounts of electricity** with high sustainability.
  - This stage enables India to become energy self-sufficient by exploiting its **massive thorium reserves** (one of the largest globally).

Nuclear Power in India

- Contributes **around 3%** of the country's total electricity generation.
- India has set a **target of achieving 100 GW of nuclear power capacity by 2047**.
- **Recent Achievements in Capacity Expansion:**
  - **Kakrapar Units 3 & 4 (Gujarat):** The first pair of indigenous **700 MWe PHWRs** began commercial operation in FY 2023–24.
  - **Mahi Banswara Project (Rajasthan):** Construction launched for **four 700 MWe PHWRs** under the MBRAPP.
  - **Rawatbhata Unit 7 (Rajasthan):** The **third indigenous 700 MWe PHWR** commenced commercial operations in 2025.
- **Key Initiatives to Advance Nuclear Power:**
  - **Nuclear Energy Mission (Budget 2025–26):** Launched to strengthen R&D in **Small Modular Reactors (SMRs)**.
  - **Small Modular Reactors (SMRs):** Advanced reactors with a capacity of **up to 300 MW(e)** — roughly one-third the capacity of conventional reactors.
  - **Bharat Small Reactors (BSRs):** Indigenous **220 MW PHWRs** designed for high safety and proven performance.

RAMBHA-LP

Context

RAMBHA-LP onboard Chandrayaan-3 has recorded that the lunar south-polar region hosts a significantly denser and more energetic plasma environment.

About Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere – Langmuir Probe (RAMBHA-LP)

- It is a scientific payload onboard the Vikram lander of Chandrayaan-3 mission.
- **Developed by:** Space Physics Laboratory (SPL) at the Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram.

- **Function:**
  - It is designed to study the near-surface lunar plasma environment at the Moon's south polar region.
  - It is used to characterise plasma, the fourth state of matter consisting of charged particles like ions and free electrons.

National Hub for Quantum Communication

Context

The Indian Institute of Technology Madras (IITM) has established the IITM C-DOT Samgnya Technologies Foundation, designated to function as India's National Hub for Quantum Communication.

About National Hub for Quantum Communication

- **Objective:** to **strengthen India's capabilities in quantum-secure communication** to protect national digital systems from emerging threats posed by quantum computing.
- **Focus areas:** Developing **Quantum Key Distribution (QKD) networks**, advancing **post-quantum cryptography**, and working on **quantum memory, quantum repeaters, and satellite-enabled quantum communication**.
- The hub will also promote **co-development initiatives**, establish **large-scale experimental testbeds**, and provide **support for deep-tech startups** in the quantum ecosystem.

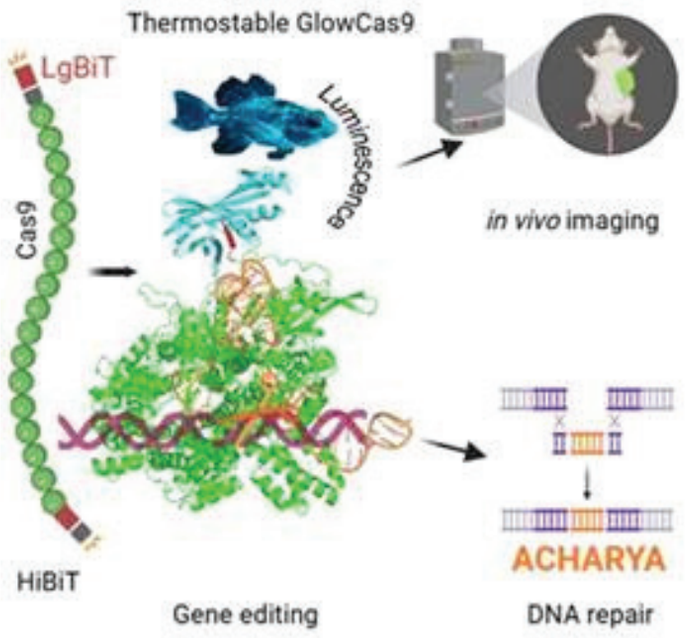
GlowCas9

Context

Recently, Indian scientists have developed GlowCas9.

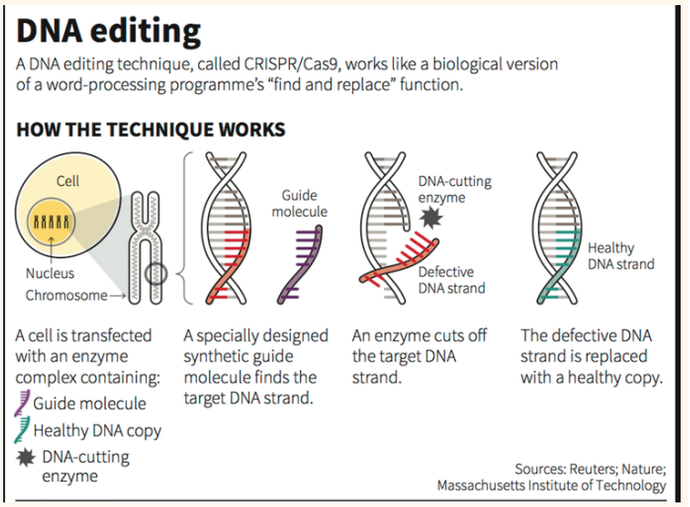
About GlowCas9

- GlowCas9 is a **bioluminescent Cas9 variant**, created by linking Cas9 with an enzyme sourced from deep-sea shrimp.
- Its glow enables **real-time tracking of CRISPR activity** in living cells and tissues without causing damage.



What is CRISPR/Cas9?

- **CRISPR** (Clustered Regularly Interspaced Short Palindromic Repeats) is a **revolutionary gene-editing technology**.
- It acts like **molecular scissors**: guided by a piece of RNA, CRISPR targets a specific sequence in the DNA and **cuts it at a precise location**.
- **Two key components:**
  - **Cas9,** an enzyme acting as '**molecular scissors**' to cut DNA at specific locations.
  - **Guide RNA (gRNA)**, designed to direct Cas9 to a precise genome spot.
    - » The gRNA binds to a matching DNA sequence, guiding Cas9 to make strategic cuts.
- This allows scientists to:
  - **Delete** a faulty gene
  - **Insert** a healthy gene
  - Or **correct** a single incorrect "letter" (nucleotide) in the DNA code



Hydrogen Fuel Cell Passenger Vessel

Context

India launched its first fully indigenous hydrogen fuel cell-powered passenger vessel.

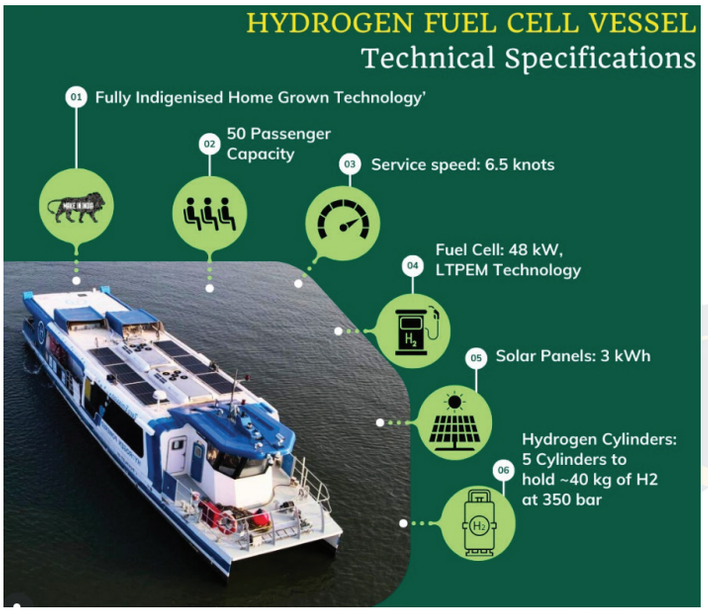
About the Vessel:

- It uses a **Low-Temperature Proton Exchange Membrane (PEM) fuel cell**, converting stored hydrogen into electricity with **only water as a by-product** (zero smoke/zero pollution).
- **Hybrid system:** Hydrogen fuel cells + **batteries** + **solar power**, enabling **up to 8 hours** of operation on a single hydrogen fill.

About Hydrogen Fuel Cell

- It is a **clean electrochemical energy device** that converts **hydrogen and oxygen into electricity**, producing **only water and heat** as by-products.
- **How a Hydrogen Fuel Cell Works:**
  - **Fuel Supply:** Hydrogen gas is fed into the **anode**, where it acts as the primary fuel.
  - **Electrochemical Reaction:** A **catalyst** at the anode splits hydrogen (H_2) into **protons (H^+)** and **electrons (e^-)**.

- **Proton Movement:** The protons pass through the **proton exchange membrane (PEM)** towards the cathode.
- **Electron Flow:** Electrons cannot cross the membrane and instead move through an **external circuit**, generating **electric current**.
- **Power Generation:** This controlled flow of electrons provides **usable electrical energy**.
- **Water Formation:** At the **cathode**, oxygen combines with protons and electrons to form **water**, releasing **heat**.



Bluebird 6

Context

Indian Space Research Organisation (ISRO) will launch America's commercial satellite BlueBird-6.

About Bluebird 6

- **Type:** Commercial **communications satellite** for space-based cellular broadband.
- **Developer: AST SpaceMobile**, a Texas-based U.S. company.
- **Purpose:** To provide **direct-to-device cellular connectivity** from space, enabling ordinary smartphones to connect without specialised ground terminals.
- **Constellation:** Part of AST SpaceMobile's **Block-2 satellite constellation**.
- **Orbit: Low Earth Orbit (LEO)**.
- **Mass:** Approximately **6.5 tonnes** — the **heaviest U.S. commercial satellite launched by India** to date.

MahaCrimeOS AI

Context

Microsoft CEO Satya Nadella launched MahaCrimeOS AI for Maharashtra police.

About MahaCrimeOS AI

- Maharashtra's statewide **AI-powered crime investigation platform** developed using **Microsoft Foundry**.
- **Purpose:** To **speed up cybercrime investigations**, automate routine tasks, analyse complex data, and support officers with structured investigation workflows.
- **Developed by: CyberEye** (Microsoft partner ISV), **Maharashtra Government's MARVEL initiative**, and **Microsoft India Development Centre (IDC)**.
- **Technology:** Powered by **Microsoft Azure OpenAI Service** with multimodal AI capable of processing **PDFs, audio, handwritten notes, images**, and multilingual inputs.
- **Crime coverage:** Focuses on **four categories**—cybercrime, financial fraud, crimes against women, and narcotics.
- **Key capabilities:**
  - Automates administrative work and provides real-time dashboards of cases and pending actions.
  - Reads **Marathi FIRs** and auto-generates **step-by-step investigation plans** aligned with Maharashtra Police protocols and **Supreme Court/High Court guidelines**.
  - Analyses telecom and digital data and prepares **court-ready case diaries**.

Nitrofurans

Context

Food Safety and Standards Authority of India (FSSAI) directed its regional offices to collect samples of eggs for testing the presence of nitrofurans residues.

About Nitrofurans

- Nitrofurans are a group of **synthetic broad-spectrum antimicrobial compounds** derived from nitrofuran, containing a nitro group attached to a furan ring.
- **Common examples:** Nitrofurantoin, Furazolidone, Furaltadone, Nitrofurazone.
- **Uses:** Nitrofurantoin is widely used for **urinary tract infections (UTIs)** in humans.
  - Earlier used in **veterinary medicine and aquaculture** to treat bacterial infections.
- It is **banned in food-producing animals** in many countries, including India, the EU, and the USA.

Jumping Genes

Context

A new study has found that some bears in Greenland are using jumping genes to modify their DNA.

About Jumping Genes

- They are **mobile DNA sequences** that can move from one position to another within an organism's genome.
- **Function:** Their insertion at different genomic sites can **alter gene expression**, sometimes leading to adaptive traits.
  - They can drive **genetic variation and evolution**, and may help organisms adapt to environmental stress.
- **Discovery:** Identified by **Barbara McClintock**, who was awarded the **Nobel Prize in Physiology or Medicine in 1983**.

Nuclear Energy Mission

Context

The Union government has informed Parliament that **India plans to develop and operationalise at least five indigenously designed Small Modular Reactors (SMRs) by 2033** under the **Nuclear Energy Mission**

What are the Key Features of Nuclear Energy Mission

- Achieve **100 GW of nuclear power capacity by 2047**, aligned with India's long-term energy transition strategy and the **Viksit Bharat** vision.
- Installed nuclear capacity stands at **8,180 MW (January 2025)**, with plans to expand to **22,480 MW by 2031–32**.
- Focus on **research, development, and deployment of Small Modular Reactors (SMRs)**, with a target of setting up **at least five indigenously developed SMRs by 2033**.
- Proposed amendments to the **Atomic Energy Act, 1962** and the **Civil Liability for Nuclear Damage Act, 2010** to encourage **private sector participation** in nuclear power projects.
- Promotion of **public–private partnerships** for setting up **Bharat Small Reactors (BSRs)**, R&D of **Bharat Small Modular Reactors**, and development of **advanced nuclear technologies**.
- Development of **SMRs by BARC (Bhabha Atomic Research Centre)** for repurposing retiring coal-based power plants and meeting electricity needs in **remote and underserved regions**.
- Emphasis on **indigenous reactor technologies**, particularly **Bharat Small Reactors (220 MW PHWRs)** designed for captive and flexible use.
- Introduction of **advanced reactor systems**, including **high-temperature gas-cooled reactors** for hydrogen co-generation and **molten salt reactors** to utilise India's thorium reserves.
- Support to India's broader **energy transition and climate commitments**, including **500 GW of non-fossil fuel capacity by 2030** and **50% energy requirements from renewables** as pledged at **COP26 (Glasgow, 2021)**.

Thalassemia

Context

Four children with thalassemia test HIV-positive at Madhya Pradesh hospital.

About Thalassemia

- **What it is:** Thalassemia is a **genetic blood disorder** characterised by reduced or absent production of **haemoglobin**, the protein in red blood cells that carries oxygen.
- **Cause:** It is caused by **inherited mutations** in the genes responsible for haemoglobin synthesis and is passed from parents to children.
- **Types:**
  - **Alpha thalassemia:** Reduced production of alpha globin chains.
  - **Beta thalassemia:** Reduced production of beta globin chains; includes **thalassemia minor (trait)**, **intermedia**, and **major (Cooley's anaemia)**.
- **Symptoms:** Ranges from mild anaemia and fatigue to severe anaemia, growth retardation, bone deformities, and organ damage in severe cases.

Autophagy

Context

Researchers at Jawaharlal Nehru Centre for Advanced Scientific Research have identified the exocyst protein complex as a crucial missing link in early autophagosome formation, opening new possibilities to therapeutically target autophagy-related disorders such as Alzheimer's, Parkinson's, and cancer.

About Autophagy

- Autophagy is a regulated cellular process through which cells degrade and recycle damaged organelles, proteins, and pathogens to maintain cellular homeostasis.
- In 2016, the **Nobel Prize** in Physiology or Medicine was awarded to **Yoshinori Ohsumi** for his discoveries of the mechanisms for autophagy.
- **Mechanism:**
  - **Initiation:** Cellular stress or nutrient deprivation activates autophagy-related (ATG) proteins.
  - **Nucleation:** A membrane structure (phagophore) begins to form around the targeted cellular material.
  - **Elongation**: The phagophore expands and encloses the cargo, forming a double-membraned autophagosome.
  - **Fusion:** The autophagosome fuses with a lysosome to form an autolysosome.
  - **Degradation:** Lysosomal enzymes break down the contents, and the recycled molecules are reused by the cell.
- **Types:**
  - **Macroautophagy:** Bulk degradation of cytoplasmic components via autophagosome formation.
  - **Microautophagy:** Direct engulfment of cytoplasmic material by the lysosomal membrane.
  - **Chaperone-mediated autophagy:** Selective degradation of specific proteins transported directly into lysosomes via chaperone proteins.
- **Role:**
  - Maintains cellular quality control by removing damaged organelles and protein aggregates.
  - Ensures neuronal survival and function in long-lived cells.
  - Supports immune defense by eliminating intracellular pathogens.
  - Prevents early tumor development by preserving genomic stability but may support cancer progression at later stages.

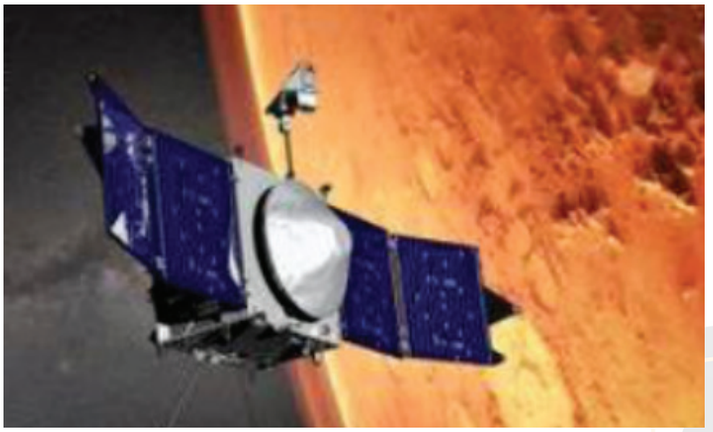
MAVEN Craft

Context

NASA's MAVEN (Mars Atmosphere and Volatile EvolutioN) spacecraft experienced a loss of signal with ground stations on Earth on December 6.

About MAVEN Spacecraft

- It is a **NASA Mars-orbiting mission** launched to study the **upper atmosphere, ionosphere, and solar wind interaction** of Mars.
- **Objective:** To understand **how Mars lost most of its atmosphere and water over time**, transforming from a warm, wet planet to a cold, arid one.
- **Launch vehicle:** Atlas V
- **Orbit type:** Highly elliptical orbit around Mars



Ghost Pairing

Context

CERT-In has issued advisory warning Indian users about the WhatsApp Account takeover campaign (also known as GhostPairing).

What is Ghost Pairing?

- A **new cyber fraud technique** that enables attackers to **take control of a WhatsApp account** without requiring the user's password or SIM card.
- **How the attack works:**
  - The scam **misuses WhatsApp's device-linking feature**.
  - Users are **tricked into approving a pairing request** that appears legitimate.
  - Attackers send **deceptive messages** such as "Hi, check this photo" to prompt user action.
- **Nature of the compromise:** Once pairing is approved, the attacker's device becomes a **hidden linked device**.
  - The hacker gains **full access to chats, contacts, and account activity**, effectively hijacking the account.

Financial Fraud Risk Indicator

Context

The Financial Fraud Risk Indicator of the Department of Telecommunications has helped prevent cyber fraud losses worth about ₹660 crore within just six months.

About Financial Fraud Risk Indicator (FRI)

- It is a risk assessment tool designed to flag mobile numbers that may be linked to financial fraud.
- A multi-dimensional analytics system developed under the Digital Intelligence Platform.
- **Mechanism:** Categorises mobile numbers into Medium, High, or Very High risk based on inputs from banks, telecom service providers, law-enforcement agencies, and citizen complaints.
- **Utility:** Helps banks and financial institutions issue early warnings, undertake enhanced due diligence, and block fraudulent transactions in time.

About Digital Intelligence Platform (DIP)

- A secure, real-time data-sharing platform connecting telecom operators, banks, fintech firms, and government agencies.
- **Coverage:** Enables large-scale onboarding of financial institutions for coordinated detection of cyber fraud.
- Includes over 1,000 organisations such as central security agencies, police forces of all States and Union Territories, banks, financial institutions, and social media platforms like WhatsApp.
- **Utility:** Facilitates faster intelligence sharing to detect, track, and disrupt the misuse of telecom identifiers.

SIRT6 Enzyme

Context

Researchers have discovered a key molecular pathway involving the enzyme SIRT6 that plays an important role in regulating brain ageing and neurodegeneration.

About SIRT6 (Sirtuin 6) Enzyme

- A longevity-associated enzyme that functions as a metabolic regulator and gatekeeper of tryptophan metabolism.
- Controls how tryptophan, an essential amino acid, is utilised in the brain.
- **Functions:**
  - When SIRT6 activity is maintained, tryptophan is efficiently balanced between energy-producing pathways and neurotransmitter synthesis.
  - With declining SIRT6 activity during ageing, tryptophan metabolism becomes dysregulated.
  - This imbalance leads to the formation of neurotoxic byproducts, contributing to nerve cell damage and neurodegeneration.

About Tryptophan

- An essential amino acid required for cellular energy production.
- Serves as a precursor for neurotransmitters such as serotonin and melatonin, which regulate mood, sleep, and neural stability.

PM 2.5 and Rheumatoid Arthritis

Context

AIIMS researchers highlighted that PM 2.5 can lead to Rheumatoid Arthritis.

What is PM2.5?

- **PM2.5 (Particulate Matter ≤ 2.5 micrometers)** refers to extremely tiny airborne particles—about **1/30th the width of a human hair**.

- **Key features:**
  - Can **penetrate deep into the lungs** and enter the bloodstream.
  - **Contains toxic substances:** heavy metals, sulphates, nitrates, carbon compounds.
  - **Sources include**: vehicle exhaust, biomass burning, industrial emissions, construction dust, and winter smog.
- **Why it is dangerous:**
  - Causes **systemic inflammation**, oxidative stress, lung damage, and immune disturbances.
  - Linked to heart disease, asthma, cancers, and now, autoimmune disorders like rheumatoid arthritis.

What is Rheumatoid Arthritis (RA)?

- It is a **chronic autoimmune disease** where the immune system mistakenly attacks the body's own **joints**, especially the synovium (lining of the joints).
- **Key Features:**
  - Joint pain, swelling, morning stiffness, disability.
  - Triggered by a mix of **genetic + environmental factors** (pollution, smoking, infections).

SIM Binding

Context

The government has mandated SIM binding for messaging apps to curb cyber fraud.

What is Meant by SIM Binding?

- SIM binding means linking a user's messaging app account to the specific SIM card used during registration, **allowing access only when that SIM is physically present in the device**.
- **Need for SIM Binding:**
  - **Surge in Cyber-Frauds:** SIM binding aims to curb frauds conducted using Indian numbers from abroad. In 2024 alone, India recorded over **1.1 lakh cyber-fraud cases**, with nearly **70% linked to messaging apps**.
  - **Proliferation of Fake KYC SIM Cards:** Large numbers of SIMs issued using forged or mule identities are enabling account misuse. DoT's Sanchar Saathi flagged **6.3 lakh fraudulent SIMs** in 2023–24.
  - **Apps Working Even After SIM Removal:** Many apps function even when the original SIM is removed, allowing misuse. A DoT audit found **45% of scam-related accounts** operated without the registered SIM present.
  - **Rise of Cross-Border Fraud Networks:** Investigations show major cyber-crime modules functioning from outside India using unverified accounts. Karnataka Cyber Police traced frauds worth **₹850+ crore (2023–25)** to such overseas handlers.

DHRUV64 Microprocessor

Context

Recently, the Ministry of Electronics and Information Technology (MeitY) announced the launch of **DHRUV64** Microprocessor.

What is DHRUVA64 Microprocessor

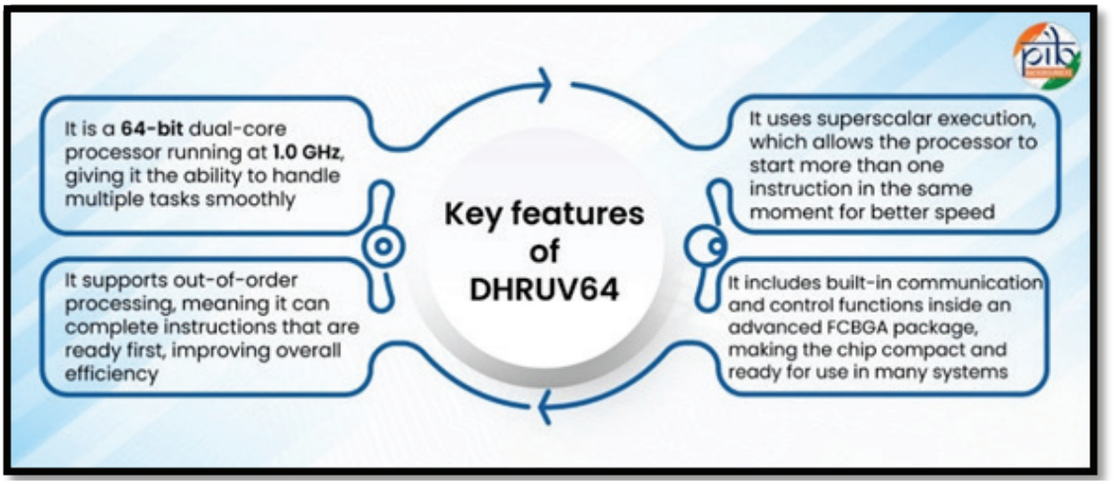
- **DHRUV64** is a **64-bit, dual-core, 1 GHz general-purpose microprocessor** developed by **C-DAC** under MeitY's **Microprocessor Development Programme**.
- It is based on the **RISC-V open instruction set architecture (ISA)** and is part of the **Digital India RISC-V (DIR-V) programme**.
- The processor is designed to support **operating systems and embedded applications**, targeting use cases such as **telecom equipment, industrial automation, control systems, and strategic sectors**.

About Digital India RISC-V (DIR-V) programme

- DIR-V is a **national programme under the Ministry of Electronics and Information Technology (MeitY)** aimed at developing an **indigenous ecosystem of RISC-V–based microprocessors** in India.
- DIR-V has led to chips such as **THEJAS32**, **THEJAS64**, and **DHRUV64**, with more advanced processors like **DHANUSH and DHANUSH+** under development.

RISC-V–Based Architecture

- Built on **RISC-V**, an **open-source, license-free instruction set architecture (ISA)**.
- Unlike proprietary architectures such as **x86 (Intel)** or **ARM**, RISC-V allows:
  - Full **customisation**
  - **Sovereign control** over design and security
  - Freedom from licensing restrictions and geopolitical risks



Topics for Mains

Decline of Indus Valley Civilisation

Syllabus Mapping: GS-1 - Ancient History

Context

A new study has claimed that the Indus Valley Civilisation (IVC) declined due to centuries-long recurring droughts, not a single catastrophic event.

About Indus Valley Civilisation

- The Indus Valley Civilisation, also known as the **Harappan Civilisation**, was one of the world's earliest urban civilisations, contemporary with Mesopotamia and Ancient Egypt.
- It flourished roughly between **3300 BCE and 1300 BCE**, with its mature phase from **2600–1900 BCE**.
- Extended across present-day **India, Pakistan, and Afghanistan**, covering over **1.3 million sq km**—the largest among ancient civilisations.
- Major sites include **Harappa, Mohenjo-daro, Dholavira, Lothal, Kalibangan, Rakhigarhi**, and **Banawali**.

Key Features of the Indus Valley Civilisation (IVC)

- **Urban Planning & Architectural Features:** The Indus Valley Civilisation exhibited highly planned cities with grid layouts, advanced drainage systems, and well-built public structures using standardised construction techniques.
  - **E.g., Mohenjo-daro (**Grid layout, Great Bath, advanced drainage), **Dholavira** (Three-tier city plan with reservoirs), **Lothal (**Dockyard and well-developed drainage system).
- **Economic Organisation & Craft Specialisation:** Agriculture, regulated trade, weights and measures, specialised crafts.
  - **E.g., Chanhudaro** – bead-making centre, **Lothal** – trade port and bead factory, **Harappa** – standard weights and seals indicating controlled trade
- **Art, Craft, and Technology:** Bronze casting, pottery, jewellery, terracotta figurines, metallurgy.
  - **E.g., Mohenjo-daro** – "Dancing Girl" bronze statue.
- **Seals, Script, and Symbolism:** Steatite seals with pictographic signs and animal motifs.
  - **E.g., Harappa** – unicorn seal, **Mohenjo-daro** – Pashupati seal
- **Religious and Cultural Life:** Mother goddess figurines, sacred symbols, proto-Shiva motifs.
  - **E.g., Mohenjo-daro** – Pashupati seal, mother goddess figures
- **Scientific & Technological Innovations**: Standardised weights, brick ratios (1:2:4), maritime engineering.
  - **E.g., Lothal**, **Harappa** – precision weights and measures.

Recent Study Findings Related To Decline of IVC

- **Gradual decline driven by repeated mega-droughts (2425–1400 BCE):** The study identifies **four prolonged drought events**, each lasting over **85 years**, with the most severe one around **1733 BCE**, continuing for nearly **164 years**.
  - These drought cycles created centuries of **hydrological stress**, steadily weakening agriculture, trade, and urban systems.
- **Weakening monsoons due to warming of the tropical Pacific:** Climate data show a shift from a **cool, La Niña-like phase (3000–2500 BCE)** to a **warmer, El Niño-like phase**, causing a **10–20% reduction in monsoon rainfall**.
  - This drastically lowered water availability for rivers, reservoirs, and agricultural fields.
- **Major hydrological changes leading to river shrinkage and soil drying:** Evidence from lake cores, stalagmites, and climate models shows reduced flows in the **Sutlej–Ghaggar system, Beas**, and other tributaries.
  - Soil moisture dropped, salinity increased, and farmland productivity declined—especially in regions away from the main Indus River.
- **Agricultural stress and shift in cropping patterns:** Frequent crop failures forced a transition from **wheat and barley** to **millets**, which are drought-resistant.
  - Reduced agricultural surplus undermined the economic base of large cities.
- **Collapse of long-distance trade networks:** Falling river levels made navigation difficult, cutting connectivity with **Mesopotamia**, the key external trade partner.
  - With declining rainfall, overland routes also became riskier, causing widespread job loss in urban craft industries and weakening the urban economy.

Other Classical Theories of IVC Decline

Theory	Key Scholars / Proponents	Main Arguments and Evidence
Aryan Invasion Theory	Mortimer Wheeler, Gordon Childe	Suggested Aryans from Central Asia invaded the subcontinent and contributed to the decline of the Indus Civilization; references in the Rig Veda to destruction of forts; discovery of human skeletons at Mohenjodaro interpreted as evidence of sudden and violent deaths.
Natural Calamities & Environmental Factors	K.A.R. Kennedy, Fairchild, Aurel Stein, Amalanand Ghosh, Mackay, S.R. Rao, Sood, D.P. Aggarwal, Dales, Robert Raikes	Climate change, ecological imbalance, recurrent floods (Mohenjodaro, Chanhudaro), drying of rivers (Kalibangan, Banwali), earthquakes and geological disturbances damaged urban infrastructure, agriculture and water systems, leading to decline.
Decline of Oceanic Trade	Shereen Ratnagar	Breakdown of long-distance and maritime trade networks weakened the economic base of the Indus Civilization, causing economic instability and social decline.
Epidemic Outbreaks	(general hypothesis)	Diseases such as malaria may have reduced population, disrupted agriculture, trade and governance, and strained resources in urban centres.
Gradual Fading Away Theory	Multi-causal interpretation (modern historians)	Decline was not sudden but gradual, resulting from a combination of environmental stress, trade decline, health issues and socio-economic changes over time.

The decline of the Indus Valley Civilisation was not the result of invasion or sudden catastrophe but a long, climate-driven process, marked by recurring droughts that steadily eroded its agrarian, urban and trade foundations. Recent evidence reinforces the view that the civilisation adapted and dispersed gradually, offering an early lesson in how environmental stress can reshape even the most advanced urban societies.

Topics for Prelims

Kashi Tamil Sangamam 4.0

Context

The Ministry of Education is set to conduct Kashi Tamil Sangamam (KTS) 4.0 from 2 December 2025.

About Tamil Snagamam 4.0

- **Previous Editions:** The first KTS was held in 2022, followed by editions in 2023 and February 2025.
- **Theme:** The 2025 edition is centred on "Learn Tamil – Tamil Karkalam".
- **Objective:** To encourage Tamil learning across the country and enhance appreciation for India's classical linguistic and literary traditions.
- **Vision:** Inspired by the idea of strengthening cultural, linguistic and civilizational bonds between Tamil Nadu and Kashi under the spirit of Ek Bharat Shreshtha Bharat.
- **Coordinating Institutions:** IIT Madras and Banaras Hindu University (BHU), Varanasi.
- **Participant Categories:** Students, Teachers, Writers and Media Professionals, Agriculture and Allied Sectors, Professionals and Artisans, Women, and Spiritual Scholars and Practitioners.
- **Major Initiatives Under KTS 4.0:**
  - **Sage Agasthya Vehicle Expedition (Tenkasi to Kashi):** A symbolic journey recalling the Pandiyan ruler Adi Veera Parakrama Pandiyan's efforts to promote cultural unity, including his construction of a Shiva temple and renaming of the region as Tenkasi (Dakshin Kashi), while showcasing shared heritage from Chera, Chola, Pandya, Pallava, Chalukya and Vijayanagara eras.
  - **Teaching Tamil in Varanasi Schools:** Under the "Tamil Karkalam" campaign, 50 Tamil teachers proficient in Hindi will teach Tamil to students in Kashi.
  - **Tamil Learning Study Tours for Uttar Pradesh Students:** Three hundred college students from Kashi will travel to Tamil Nadu for a 15-day Tamil learning programme supported by the Central Institute of Classical Tamil (CICT), with host institutions arranging academic and cultural exposure tours.

Ek Bharat Shreshtha Bharat programme

- It aims to enhance interaction & promote mutual understanding between people of different states/UTs through the concept of state/UT pairing.
- The states carry out activities to promote a sustained and structured cultural connection in the areas of language learning, culture, traditions & music, tourism & cuisine, sports and sharing of best practices, etc.

New GI Tag for Products from Tamil Nadu

Context

Some products from TN were accorded the GI tag recently.

GI Tag Products

Worayur Cotton Sarees	• Known for **thin borders, Korvai technique**, geometric motifs, and vibrant colour palettes (green, violet, vaadamalli, copper-brown). • Woven traditionally by the **Devanga community** with Chola-era heritage.
Thooyamalli Rice	• Native variety meaning **"pure jasmine"**, known as pearl rice due to its shine; rich in fibre and micronutrients.
Ambasamudram Wooden Toys (Choppu Samaan)	• Brightly coloured, **lacquered wooden toys** shaped like miniature kitchenware; eco-friendly, non-toxic, child-safe. • Made traditionally using woods like **kadamba, teak**, now rubberwood and eucalyptus; valued for artisans' craftsmanship.

Namakkal Soapstone Utensils	• Known as **kalchatti** utensils, ideal for cooking acidic foods (tamarind, lime) as stone is corrosion-resistant. • • Highly durable, handmade stoneware used for **pickles, curd, milk**, lamps, idol making, dosa pans, and kitchenware.
Kavindapadi Nattu Sarkarai	• Hand-made traditional sugar with **golden-brown colour** and high sweetness; produced from cane fed by Bhavani river canals.

About GI tag

- It is a form of **intellectual property protection** for products that originate from a specific geographical region and possess qualities, reputation, or craftsmanship linked to that region.
- **Legal Framework:** Geographical Indications of Goods (Registration & Protection) Act, 1999.
- **Administered by:** Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM), GoI.
- **Benefits of GI Tag:**
  - Ensures authenticity by preventing fake and unauthorized use of the product name.
  - Boosts marketability, exports, and premium pricing.
  - Supports traditional knowledge and rural/artisan livelihoods.

Related Facts

- With these additions, **Tamil Nadu's total number of GI-tagged products has increased to 74**.
- Tamil Nadu now holds the **second-highest number of GI products in India**, ranking just after **Uttar Pradesh**, which has **79 GI products**.

Ponduru Khadi' gets GI tag

Context: Ponduru Khadi (Andhra Pradesh), has received the Geographical Indication (GI) tag from the Geographical Indications Registry.

About Ponduru Khadi

- It is a traditional **handspun and handwoven cotton fabric** produced in **Ponduru village, Srikakulam district, Andhra Pradesh**, locally known as **Patnulu**.
- **Key features:**
  - Made from **indigenous cotton varieties** such as hill cotton, punasa cotton, and red cotton native to the Srikakulam region.
  - The entire process—from cleaning the cotton to spinning and weaving—is done **manually**, preserving centuries-old artisanal skills.
  - Cotton is cleaned using the **jawbone of the Valuga fish**, a globally unique technique practiced only in Ponduru.

Mahad Satyagraha

Context

Mahad became one of India's earliest human rights movements, shaping the ethical foundations of the Indian Constitution.

About Mahad Satyagraha

- Occurred in **Mahad** (present-day Raigad district, Maharashtra), then part of the **Bombay Presidency.**
- **Mahad Satyagraha 1.0 (March 19–20, 1927)**
  - Led by **Dr. B. R. Ambedkar**, supported by his followers (anuyayis).
  - Asserted Dalits' right to draw water from the **Chavadar Tank** based on the **S. K. Bole Resolution (1923)** allowing untouchables access to public facilities.
  - Despite rights granted, locals obstructed access; satyagrahis purchased water worth ₹40 to symbolically claim equality.
  - Upper castes performed **purification rituals** afterward, reinforcing caste discrimination and triggering Ambedkar's next phase of agitation.
- **Mahad Satyagraha 2.0 (December 25–26, 1927)**
  - Held after courts issued a stay on Dalits' access, claiming the tank was private property.
  - Ambedkar launched his journal **Bahishkrut Bharat** and addressed human rights, democratic values, and gender equality.
  - At the conference, Ambedkar **burned the Manusmriti**, symbolically rejecting the Brahmanical caste order.
  - The event emphasised **women's rights**, marking early efforts to integrate gender into the struggle against caste oppression.

Major satyagrahas/movements led by Dr. B.R. Amedkar

Movement / Satyagraha	Year & Place	Core Issue and Significance
Kalaram Temple Entry Satyagraha	1930, Nashik (Maharashtra)	Asserting Dalits' right to enter Hindu temples; challenged religious exclusion and exposed limits of caste-based reform within Hindu orthodoxy; marked a shift from symbolic protest to sustained mass mobilisation.
Parvati Hill Satyagraha	1929, Pune	Protested denial of Dalits' access to public religious spaces; reinforced the idea that public places funded or maintained by society cannot be restricted by caste.
Chowdar Tank Satyagraha (Mahad precursor)	1926–27, Mahad	Early mobilisation demanding access to public water sources; laid groundwork for Mahad Satyagraha by framing water as a civic right rather than a charity.
Samata Sainik Dal Movement	1927 onwards, Bombay Presidency	Formation of a disciplined volunteer force to protect Dalit gatherings and assert self-respect; aimed at building collective confidence and political consciousness among the oppressed.
Kalaram Temple Entry Conference	1930, Nashik	Focused on ideological critique of caste Hindu society and debated alternatives including conversion.
Yeola Conversion Resolution	1935, Yeola (Nashik district)	Declaration that Dalits would leave Hinduism as it denied equality; not a satyagraha but a culmination of earlier struggles, redefining freedom as religious and civilisational emancipation.
Independent Labour Party (ILP) Mobilisations	1936–39, Bombay Presidency	Used constitutional and mass politics to fight caste and class oppression; bridged social justice movements with legislative action.

UNESCO's Intangible Cultural Heritage List

Context

Deepavali has been inscribed on UNESCO's List of the Intangible Cultural Heritage of Humanity, announced at the 20th UNESCO Intergovernmental Committee session at New Delhi.

About Deepavali

- Deepavali, also known as Diwali, is a light festival celebrated annually by diverse individuals and communities across India, that marks the last harvest of the year and the start of a new year and new season.
- Based on the lunar calendar, it falls on the new moon in October or November and lasts several days.

Other Indian Elements on the UNESCO List of Intangible Cultural Heritage

Intangible Cultural Heritage	Key Details
Ramlila	- Dramatic performance of Ramayana. - Includes song, narration, recital, and dialogue. - Performed during Dussehra to celebrate Rama's return. - Key locations: Ayodhya, Ramnagar, Varanasi, Vrindavan, Almora, Satna, Madhubani. - Based on Ramacharitmanas by Tulsidas (16th century). - Duration: 10–12 days (Ramnagar: 1 month). - Features battle between Rama and Ravana. - The audience participates in singing and narration. - Unites people of all castes, religions, and ages.
Vedic Chanting	- Oldest unbroken oral tradition. - Chanting of Vedic mantras in classical Sanskrit. - Recited during rituals and daily in Vedic communities. - Preserved in regions: Maharashtra, Saurashtra, Varanasi, Tamil Nadu, Mysore, Andhra Pradesh. - Only 13 out of 1,000+ Vedic branches survive. - Rigveda and Samaveda chanting, with specific tonal accents. - Preserved through patterns like Vakya, Pada, Karma, etc. - Represents global heritage and ancient knowledge.
Kutiyattam	- Ancient Sanskrit theatre from Kerala. - Stylized performances with eye and hand gestures. - Focus on the character's thoughts and emotions. - Training lasts 10–15 years, emphasizing breathing and subtle muscle movements. - Performances can last up to 40 days. - Performed in temple theatres (Kuttampalams). - Combines ritual and artistic elements.
Ramman Festival	- Celebrated in Garhwal Himalayas, Uttarakhand. - Honoring Bhumiyal Devta, a local deity. - Held annually in late April. - Includes recitation, song, and masked dance. - Villagers play roles based on caste and occupation. - Reflects the community's spiritual, cultural, and environmental values. - UNESCO recognized it as an intangible cultural heritage.
Mudiyettu	- Performed in Kerala villages near rivers. - Depicts the battle between goddess Kali and demon Darika. - Held after the summer harvest, with purification rituals. - Community-wide participation in temple performances. - Transmission of moral and ethical values. - Part of Kerala's rich ritual traditions, recognized as intangible heritage.
Kalbelia	- Traditional dance and music of Rajasthan. - Performed by Kalbelia community, historically snake handlers. - Dance mimics serpent movements, accompanied by khanjari and poongi. - Represents community identity and pride. - Transmitted through oral tradition without written texts.
Chhau Dance	- Regional dance from Jharkhand, with three styles: Seraikella, Purulia, Mayurbhanj. - Themes: Mahabharata, Ramayana, local folklore. - Performed at night, accompanied by reed pipes and drums. - Training involves techniques inspired by animals, birds, and village chores. - Integrates diverse social and cultural practices.
Buddhist Chanting of Ladakh	- Spiritual chanting in Mahayana and Vajrayana Buddhism. - Performed in monasteries across Ladakh. - Involves prayers for purification, peace, and blessings. - Accompanied by instruments like bells, drums, cymbals, and trumpets. - Integral to Buddhist life-cycle rituals.
Sankirtana	- Devotional song and dance from Manipur's Vaishnava community. - Narrates Krishna's life and deeds. - Performed in temples and domestic courtyards. - Strengthens community bonding and divine manifestation. - Knowledge passed through mentor-disciple tradition.
Traditional Brass and Copper Craft	- Practice of utensil making by Thatheras in Punjab. - Involves shaping brass and copper into bowls, pots, and plates. - Metal is believed to have health benefits. - Passed down through generations orally. - Recognized as part of India's intangible cultural heritage.
Yoga	- Holistic practice combining poses, meditation, and breathing techniques. - Aims to promote self-realization and alleviate suffering. - Practiced globally, fostering mental, physical, and spiritual well-being. - Rooted in ancient Indian philosophy, taught through the Guru-Shishya model.
Nuvroz	- Celebrated as a New Year festival across regions like India, Iran, and Central Asia. - Takes place on March 21, lasting two weeks. - Key traditions: Table gathering, wearing new clothes, gift exchange, street performances. - Promotes cultural diversity and social bonds.
Kumbh Mela	- The world's largest peaceful pilgrimage gathering. - Held every four years in Allahabad, Haridwar, Ujjain, and Nasik. - Pilgrims bathe in sacred rivers for cleansing and liberation. - Includes diverse social and cultural activities, integrating spirituality and tradition.
Durga Puja	- Celebrated in September/October, primarily in Kolkata. - Marks worship of goddess Durga for 10 days. - Involves artisan crafting of Durga idols, Mahalaya rituals, and immersion. - Represents unity, creativity, and community spirit.
Garba	- A devotional dance from Gujarat performed during Navratri.

Intangible Cultural Heritage (ICH)

- It refers to practices, representations, expressions, knowledge and skills that communities, groups, and individuals recognise as part of their cultural identity.
- **Forms of Intangible Heritage:** UNESCO classifies ICH into five major domains:
  - **Oral traditions and expressions** (stories, folk narratives, proverbs)
  - **Performing arts** (dance, theatre, music)
  - **Social practices, rituals, and festive events** (festivals, rituals, community gatherings)
  - **Knowledge and practices concerning nature and the universe** (traditional ecological knowledge, healing practices)
  - **Traditional craftsmanship** (skills related to crafting, artisanal techniques)

UNESCO's Intangible Cultural Heritage List

- It **recognises living cultural traditions** such as oral traditions, performing arts, rituals, social practices, traditional craftsmanship, and knowledge of nature that communities inherit, practice, and transmit across generations.
- Its purpose is to **safeguard cultural diversity**, promote **intercultural dialogue**, and **support communities** in preserving their living heritage.

Note: India will host the 20th session of the UNESCO Intergovernmental Committee for Safeguarding of the Intangible Cultural Heritage.

Preah Vihear Temple

Context

India calls for protection of Preah Vihear Temple.

About Preah Vihear Temple

- A Hindu temple located in the Dangrek Mountains (Northern Cambodia).
- **Dedicated to Lord Shiva.**
- Constructed during the **Khmer Empire's** golden era (11th–12th century).
- Initially built by **King Suryavarman I (1002–1050) and later expanded by Suryavarman II (1113–1150).**
- Recognized as a UNESCO World Heritage Site.
- **Architectural Features:**
  - A prime example of classical Khmer temple architecture.
  - Built along an 800-metre-long north–south axis with a series of sanctuaries.
  - It comprises more than five gopuras (entrance towers), connected by long pavements and staircases.
  - Unique for its multi-tiered platforms and gopuras connected by a central path.
  - Some gopuras have stone roofs; others originally had wooden roofs, many now in ruins.

Ancient Indian Temples Located Outside India

Temple & Location	Key Details and Significance
Angkor Wat, Cambodia	World's largest religious monument; originally a **Hindu temple dedicated to Vishnu**, later converted to Buddhism; built in the 12th century by **King Suryavarman II**; pinnacle of classical Khmer architecture; UNESCO World Heritage Site.
Angkor Thom (Bayon, Baphuon), Cambodia	Royal city of the Khmer Empire; Bayon temple shows Hindu–Buddhist syncretism; reflects Indian cosmology, Mount Meru symbolism and Sanskrit inscriptions.
Ta Prohm, Cambodia	Originally a **Hindu monastery dedicated to Prajnaparamita** (later Buddhist); built by **Jayavarman VII**; famous for temple–nature integration; shows Indian monastic traditions abroad.
My Son Sanctuary, Vietnam	Cluster of Hindu temples dedicated to **Lord Shiva (Bhadreshvara)**; built by the Champa kings between 4th–13th century CE; major centre of Shaivism in Southeast Asia; UNESCO World Heritage Site.
Po Nagar Temple, Vietnam	Dedicated to **Bhagavati / Yan Po Nagar**, linked to Shakti traditions; built by the Cham civilization; strong Indian religious and architectural influence.
Prambanan Temple, Indonesia	9th-century Hindu temple complex dedicated to **Trimurti—Brahma, Vishnu, Shiva**; built by the Sanjaya dynasty; tallest Hindu temple structure in Indonesia; UNESCO World Heritage Site.
Muara Takus Temple, Indonesia (Sumatra)	Early Hindu–Buddhist temple complex; reflects spread of Indian religious ideas via maritime trade routes.
Wat Phu Temple, Laos	Pre-Angkorian **Shaivite temple** dedicated to Shiva; associated with Mount Lingaparvata (Mount Meru symbolism); UNESCO World Heritage Site.
Pura Besakih, Bali (Indonesia)	Known as the "Mother Temple of Bali"; largest and most sacred Hindu temple complex outside India; shows continuity of Indian religious traditions.
Candi Sukuh, Java (Indonesia)	Late Hindu temple with Shaivite elements; unique pyramid-like structure; reflects Tantric and fertility symbolism from Indian traditions.

Natyashastra

Context

The Indira Gandhi National Centre for the Arts (IGNCA) organised an academic programme titled "Natyashastra – Synthesis of Theory and Praxis" at the Red Fort, New Delhi, during the 20th Session of UNESCO's Intergovernmental Committee for the Safeguarding of Intangible Cultural Heritage.

About Natyashastra

- The **Natyashastra** is an ancient Indian treatise on **performing arts**, traditionally attributed to **Bharata Muni** (c. 2nd century BCE–2nd century CE).

- It lays down the **theoretical and practical foundations** of **drama (natya), dance (nritya), music (sangeeta), stagecraft, aesthetics, and dramaturgy**.
- Central to the text is the concept of **Rasa** (aesthetic experience), explaining how emotions are evoked in the audience through **Bhava, Abhinaya, Raga, Tala, and Natya**.
- It treats performance as a **holistic knowledge system**, integrating philosophy, psychology, ethics, and artistic technique.
- Recognised globally, the Natyashastra has been inscribed in **UNESCO's Memory of the World Register**, underscoring its civilisational significance.

About Indira Gandhi National Centre for the Arts (IGNCA)

- **Established:** 1987
- **Under:** Ministry of Culture, Government of India
- **Mandate:** Acts as a **national research and documentation centre** for India's **arts, culture, heritage, and knowledge systems**.
- **Core Focus Areas:**
  - Performing arts, visual arts, architecture, literature, philosophy, and cultural history
  - Interdisciplinary research linking **art, science, ecology, and society**
- **Functions:**
  - Research, documentation, publication, and archiving of cultural knowledge
  - Organising seminars, exhibitions, academic programmes, and international collaborations
- **Role in Heritage Conservation:**
  - Active engagement with **UNESCO cultural conventions**, including intangible cultural heritage
  - Promotes classical texts like the Natyashastra as **living knowledge traditions**
- **Location:** New Delhi

Petra and Ellora Caves

Context

India and Jordan have signed a twinning agreement between the UNESCO World Heritage Sites of Ellora Caves and Petra to enhance cultural cooperation, heritage conservation, tourism exchange and archaeological collaboration.

About Petra (Jordan)

- Petra is located in **southern Jordan**, strategically positioned between the **Dead Sea and the Gulf of Aqaba**, along ancient caravan trade routes.
- It was established around the **4th century BCE** and flourished as the capital of the **Nabataean civilisation**, an Arab trading community.
- Petra is renowned for its **rock-cut architecture**, carved directly into distinctive **rose-red sandstone cliffs**, earning it the name "Rose City."
- The city served as a major hub for trade in **spices, incense, silk and precious metals**, linking Arabia, Egypt and the Mediterranean.
- Key monuments include **Al-Khazneh (Treasury)**, known for its Hellenistic façade; **Ad-Deir (Monastery)**, a massive rock-cut structure; the **Royal Tombs**; and the **Siq**, a dramatic narrow gorge serving as the ceremonial entrance.
- Petra displays a **fusion of architectural influences**, combining Nabataean traditions with Hellenistic, Roman and Near Eastern elements.
- Advanced **water-management systems**, including channels, cisterns and dams, enabled Petra to thrive in an arid desert environment.
- Petra was designated a **UNESCO World Heritage Site in 1985** and is recognised as one of the **New Seven Wonders of the World**.

About Ellora Caves (India)

- The Ellora Caves are located in the **Aurangabad district of Maharashtra**, along ancient trade and pilgrimage routes in the Deccan.
- The caves were excavated between the **6th and 10th centuries CE**, reflecting sustained royal patronage.
- Major dynasties associated with Ellora include the **Chalukyas, Rashtrakutas and Kalachuris**.
- Ellora represents one of the finest examples of **rock-cut cave architecture in basalt**, carved vertically into the Charanandri hills.
- The site is unique for showcasing **three major Indian religious traditions at one location**:
  - **Buddhist caves (1–12)** focusing on monastic life and meditation.
  - **Hindu caves (13–29)** dedicated to Shaivism and Vaishnavism.
  - **Jain caves (30–34)** emphasising asceticism and spiritual discipline.
- The crowning achievement is the **Kailasa Temple (Cave 16)**, a monolithic temple carved top-down from a single rock, dedicated to **Lord Shiva**.
- The caves were declared a **UNESCO World Heritage Site in 1983**.

Punjab's New Holy Cities

Context

The Punjab government has granted the "Holy City" status to Amritsar, Anandpur Sahib, and Talwandi Sabo (3 of the 5 Sikh Takhts).

Effect of Holy Site Status

- The sale of liquor, tobacco, cigarettes, and meat will be prohibited within the city limits.
- To promote religious tourism, devotees will be offered additional transport facilities such as mini buses and e-rickshaws.

About Takht

- It means a **throne**, is a seat of **temporal authority for Sikhs.**

- **Akal Takht (Amritsar, Punjab)**: Established in 1606 by Guru Hargobind, it is the highest seat of Sikh authority and symbolises the integration of miri (temporal power) and piri (spiritual authority).
- **Takht Sri Keshgarh Sahib (Anandpur Sahib, Punjab)**: The sacred site where Guru Gobind Singh founded the Khalsa in 1699.
- **Takht Sri Damdama Sahib (Talwandi Sabo, Punjab)**: Associated with Guru Gobind Singh's final compilation of the Sikh scriptures.
- **Takht Sri Harimandir Ji Patna Sahib (Patna, Bihar)**: Revered as the birthplace of Guru Gobind Singh.
- **Takht Sachkhand Sri Hazoor Sahib (Nanded, Maharashtra)**: Marks the place of Guru Gobind Singh's last days and his cremation in 1708.

Ancient Buddhist Site Discovered in Kashmir

Context

A major archaeological discovery at Zehanpora village in Baramulla district, Jammu and Kashmir, has brought renewed attention to the region's long-neglected Buddhist heritage.

About the Excavation

- Excavations have revealed a 2,000-year-old Buddhist site, prompting the Prime Minister to describe the discovery as a reflection of Kashmir's deep civilisational roots.
- Excavations revealed stupas, monastic structures and other architectural remains.
- The findings date back to the Kushan period, providing material evidence of organised Buddhist activity in Kashmir nearly two millennia ago.
- **Links to Kushan-Era Kashmir**
  - Archaeologists suggest that Zehanpora functioned as an important **Buddhist centre during Kushan rule**.
  - The site is believed to have links with **Huvishkapura**, an important but still archaeologically elusive Kushan capital.
  - Architectural features of the stupas and monastic cells resemble **Gandharan Buddhist layouts**, indicating strong cultural and religious exchanges.
  - The discovery highlights Kashmir's integration into the **north-western Buddhist world** during the early centuries CE.
  - Zehanpora lies along an ancient trade and pilgrimage corridor connecting Gandhara with the Kashmir Valley. This strategic location likely facilitated the movement of monks, traders, pilgrims and religious ideas

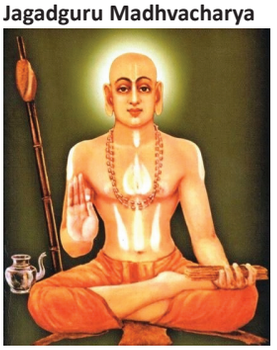
Kashmir's Buddhist Heritage

- Kashmir emerged as an important Buddhist centre during the Kushan period (1st–3rd century CE) under rulers like Kanishka.
- The Fourth Buddhist Council (Sarvastivada tradition) is believed to have been held in Kashmir during the reign of Kanishka.
- Chinese pilgrims such as Xuanzang (Hsüan-Tsang) and Faxian mention Kashmir as a significant Buddhist region.

Buddhist Site	Location	Key Prelims Facts
Harwan Monastery	Near Srinagar (Zabarwan range, Dal Lake)	Kushan period site; known for terracotta tiles with floral and human motifs; reflects Gandharan influence; among the earliest Buddhist monastic sites in Kashmir.
Parihaspora	Baramulla district	Founded by Lalitaditya Muktapida (8th century CE); had Buddhist stupas and monasteries alongside Hindu temples; indicates religious coexistence.
Ushkur / Hushkapura	Near Baramulla	Identified with Huvishkapura founded by Kushan king Huvishka; mentioned by Xuanzang as a flourishing Buddhist centre; served religious and administrative roles.
Kanispora	Baramulla district	Associated with Kanishka; evidence of stupas and viharas; highlights strong Kushan–Buddhist connection in Kashmir.
Narastan	Pulwama district	Site of an ancient Buddhist stupa; indicates spread of Buddhism into South Kashmir.
Vijeshwara / Bijbehara	Anantnag district	Shows Buddhist occupation layers; later evolved into a Hindu centre, reflecting religious transition and continuity.

Personalities in News

Jagadguru Madhvacharya



News: Prime Minister Narendra Modi visited Sri Krishna Matha (founded by Jagadguru Madhvacharya) in Udupi, Karnataka.

About Jagadguru Madhvacharya

- Founder of **Dvaita Vedanta** (Dualism), born in **Pajaka, Udupi (Karnataka)**.
- Taught that **God (Vishnu)**, the **individual soul**, and **matter** are **eternally distinct**.
- Central doctrine: **Panchabheda (Five Eternal Differences)**—between God, soul, matter, and among souls and objects.
- Emphasised **bhakti (devotion)** and God's grace as the path to liberation.
- Wrote **37 works**, including Brahma Sutra Bhashya**,** Gita Tatparya Nirnaya**, and** Mahabharata Tatparya**.**
- Established the **Udupi Krishna Temple** and the **Ashta Matha system**, institutionalising the Paryaya rotation of temple administration.
- Major figures of Vedanta along with **Shankara (Advaita)** and **Ramanuja (Vishishtadvaita)**.
- Influenced the **Haridasa and Bhakti movements** and later Dvaita scholars like **Jayatirtha** and **Vyasaraja**.

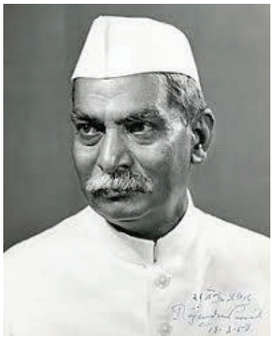
Swargadeo Chaolung Sukapha

News: Statue of Swargadeo Chaolung Sukapha Unveiled in Nazira on Asom Diwas.

About Swargadeo Chaolung Sukapha

- He was a **Tai prince from the Mong Mao kingdom** (near present-day **Yunnan, China**) who, after being denied the throne, **undertook a 13-year migration before entering Assam** on 2 December 1228.
- **Key Contribution:**
  - He **laid the foundation of the Ahom Kingdom** and established his capital at **Che-rai-doi in 1253 CE.**
  - Ahom Kingdom expanded across the **entire Brahmaputra valley** and endured as a major political power for **over 600 years**.

Dr. Rajendra Prasad

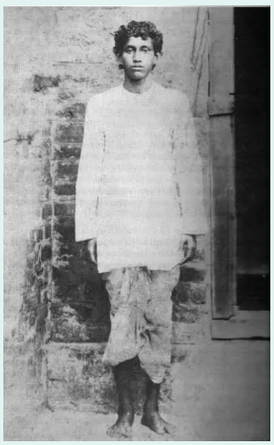


News: President of India paid floral tributes to Dr Rajendra Prasad on his birth anniversary.

About Dr. Rajendra Prasad

- **Born**: **3 December 1884**, Ziradei, Saran district (Bihar).
- **Education**: Studied at **Calcutta Presidency College**; earned a **Doctorate in Law**.
- **Profession**: Lawyer, professor, freedom fighter, and statesman.
- **Contribution:**
  - Joined **Indian National Congress** in 1911.
  - Close associate of **Mahatma Gandhi**; actively participated in **Champaran Satyagraha** (1917) and **Non-Cooperation Movement** (1920).
  - Also served as **president of Bhartiya Adim Jati Sevak Sangh (BAJSS)**
  - Elected **President of the Constituent Assembly** (1946–1950).
  - Became **India's first President** on **26 January 1950**.
  - Only President to serve **two full terms** (1950–1962).
  - Authored influential books such as **"India Divided"**, **"Autobiography"**, and **"Satyagraha at Champaran"**.
- **Award: Bharat Ratna** in **1962**.

Khudiram Bose

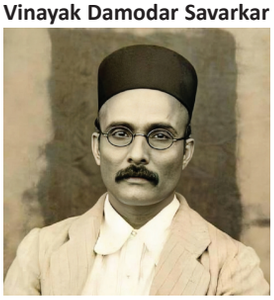


News: Khudiram Bose was paid tribute on his birth anniversary.

About Khudiram Bose

- **Birth:** Born in Mohobani village, Medinipur district, West Bengal.
- **Early Inspiration:** Deeply influenced by the Swadeshi Movement and nationalist thought from a young age.
- **Key Contributions:**
  - **Revolutionary Activities:** Became a member of the Anushilan Samiti, a prominent revolutionary organisation in Bengal.
  - **Muzaffarpur Conspiracy (1908):** Attempted to assassinate British magistrate Douglas Kingsford.
    - » On April 30, 1908, along with Prafulla Chaki, threw a bomb at a carriage in Muzaffarpur; mistakenly killed two British women.
    - » Chaki took his own life to avoid arrest.

Vinayak Damodar Savarkar



News: A statue of Vinayak Damodar Savarkar unveiled at Beodnabad in the Andaman and Nicobar Islands.

About Vinayak Damodar Savarkar

- **Birth**: Vinayak Damodar Savarkar was born on May 28, 1883, in Bhagur, a village near Nashik, Maharashtra.
- **Demise**: Passed away on February 26, 1966, following a fast unto death.
- **Contributions:**
  - **Abhinav Bharat Society**: Founded this secret society, initially called Mitra Mela, in 1904 along with his brother Ganesh Damodar Savarkar.
  - **International Involvement:** Engaged with India House and the Free India Society during his time in the United Kingdom.
  - **Hindu Mahasabha Leadership**: Served as the president of the Hindu Mahasabha from 1937 to 1943.
    - » During his tenure he he **engaged in political negotiations** with the British during the **Cripps Mission and Wavell Plan discussions**
  - **Literary Works**: Authored 'The History of the War of Indian Independence', detailing guerrilla tactics in the 1857 Sepoy Mutiny, and **'Hindutva: Who is a Hindu?'**.

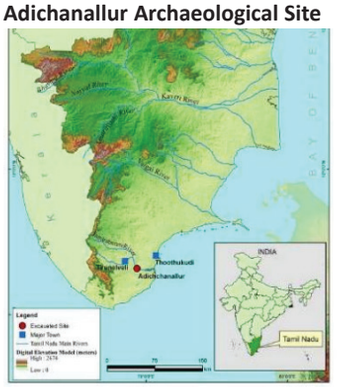
Perumbidugu Mutharaiyar II

News? A postage stamp in honour of the king Perumbidugu Mutharaiyar II (Suvaran Maran) was released by Vice President C P Radhakrishnan.

About Perumbidugu Mutharaiyar II (705–745 CE.)

- He was also known as **Suvaran Maran** or **Shatrubhayankar**.
- He belonged to the **Mutharaiyar dynasty**, powerful feudatories of the **Pallava Empire** in early medieval South India.
- His domain covered **central Tamil Nadu**, including present-day **Thanjavur, Tiruchirappalli, Pudukkottai, Perambalur**, and regions along the **Cauvery basin**.
- **Tiruchirappalli** functioned as a major political centre during his reign.
- Known as a **valiant military leader**, he fought alongside Pallava king **Nandivarman II** in multiple campaigns.
- A strong patron of **Shaivism**, while also allowing **philosophical debates** with Jain and Buddhist scholars.
- Jain monk **Vimalachandra** is recorded as visiting his court, indicating **religious pluralism and intellectual engagement**.
- The Mutharaiyars were notable **temple builders**, particularly of **rock-cut cave temples and early structural stone temples**.

News in Short

Topic	Details
Adichanallur Archaeological Site 	**Context:** The Madras High Court has ordered that no sand mining be permitted anywhere near the Adichanallur archaeological site. **About Adichanallur Archaeological Site** • Dates back to **Iron Age (905 BCE and 696 BCE)** • **Location:** Tamil Nadu, on the banks of the Thamirabarani river. • **Major Discoveries:** – Discovery of **large urn burials**, **skeletal remains of diverse ethnic groups** (Negroid, Australoid, Caucasoid, Mongoloid, Dravidian), and **pottery with iron and bronze artefacts**. – **Gold diadems, weapons, pottery, and over 4,000 antiquities**
Charaichung Festival	**Context:** Assam's Majuli island hosted the second edition of the Charaichung Festival. **About Charaichung Festival** • The festival marks the **392-year-old legacy** of **Asia's first protected Royal Bird Sanctuary, Charaichung**, established in **1633 AD by Ahom king Swargadeu Pratap Singha**. • **Objective:** To revive Charaichung sanctuary, strengthen bird conservation and promote Majuli as a global tourism destination. • Includes a special forest conservation exhibition showcasing biodiversity protection efforts.
Hornbill festival	**Context:** The Hornbill festival started in Nagaland. **About Hornbill Festival** • It is a 10 day annual tourism promotional event organised by the Nagaland State Govt. to showcase its rich and traditional cultural heritage in all its ethnicity, diversity and grandeur. • It is named after the **Hornbill bird** given its association with the socio-cultural life of the Nagas through folklore, dances, songs and usage of the **bird's feather as motifs on ceremonial attires and men's headgear.** • It was started in **2000.** **Facts** • **Pakke Paga Hornbill Festival (PPHF)** is celebrated in Arunachal Pradesh. • It is celebrated by the Nyishi **community (largest ethnic group in Arunachal Pradesh).**
Burtele Foot	**Context:** Scientists have solved the mystery of 3.4 million-year-old fossils called the "Burtele Foot" **About Burtele Foot** • It a set of **3.4 million-year-old fossilized foot bones** discovered in **2009 at Burtele in the Afar region of Ethiopia** • It is a fossil of a **bipedal hominin with an opposable big toe**, indicating tree-climbing. • It belonged to **Australopithecus deyiremeda.**

Topic	Details
Karahan Tepe 	**Context:** New archaeological discoveries at Karahan Tepe have offered fresh insights into early Neolithic life. **About Karahan Tepe** • **Location:** Situated in the Southeastern Turkiye, within the Upper Mesopotamian region. • **Age and Cultural Context:** Dates to the **Pre-Pottery Neolithic period (c. 9500–9000 BCE)** • **Features:** – Also known as the **Sister site of Gobekli Tepe.** – Contains **T-shaped stone pillars**, similar to Göbekli Tepe. – Rich in **human-centred symbolism**, including stone figurines with stitched lips, carved faces, and symbolic objects. – Recent finds include a **serpentinite bead with expressive faces** carved on both sides.
Karthigai Festival	**Context:** The Karthigai Deepam festival celebration began in Tamil Nadu. **About Karthigai Festival** • It is a three-day festival celebrated in the Tamil month of **Karthigai** (November–December). • It aligns with the **full moon (Pournami)** and is marked by the lighting of **clay oil lamps (agal vilakku)** to dispel negative forces. • Dedicated to **Lord Karthikeya/Murugan**, symbolising light, valor, and protection. • References to Karthigai Deepam appear in **Ahananuru**, a prominent work of **Sangam literature**. • The revered Sangam-era poet **Avvaiyar** also mentions and celebrates the festival in her literary works.
Boreendo 	**Context:** Boreendo (Bhorindo) has been officially inscribed on UNESCO's List of Intangible Cultural Heritage. **About Boreendo** • It is an **ancient clay folk musical instrument** from Sindh, Pakistan. • Considered one of South Asia's oldest surviving musical traditions **over 5,000 years old**, with origins traced to the **Indus Valley civilisation (Mohenjo Daro)**.
United Nations Alliance of Civilisations (UNAOC)	**Context:** The UN Alliance of Civilisations completed two decades of efforts to bridge global divides. **About UNAOC** • **Establishment:** Launched in **2005** by the **United Nations**, at the initiative of **Spain and Türkiye**. • **Objective:** To **promote dialogue and cooperation among cultures, religions, and civilizations** and to counter extremism, polarization, and intolerance. • **Rationale:** Created in the post-9/11 context to address rising **cultural mistrust, identity-based conflicts, and radicalization**. • **Key Initiatives:** – **Youth Solidarity Fund (YSF):** Supports youth-led projects on peacebuilding and social inclusion. – **PLURAL+ Initiative:** Youth video festival on migration, diversity, and social inclusion.