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APRIL 2025



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- Syllabus mapping for all topics
- Revision & Memorisation friendly presentation

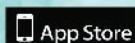


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GEOGRAPHY, ENVIRONMENT & DISASTER MANAGEMENT

TOPICS FOR MAINS

India's Growing Heatwave Crisis: Causes, Impacts, and Urgent Solutions

Syllabus Mapping: GS-I- Geography, GS-3- Disaster Management

Context

In the last decade, the number of severe heat days and the severity/intensity of heatwaves have been rising.

Heat wave Scenario	40°C	30°C	
Maximum Temperature	Plains	Hills	
Heat wave conditions prevail when...		Severe heat wave conditions prevail when...	
Normal maximum temperature	Deviation from normal	Normal maximum temperature	Deviation from normal
			
Above		Above	
40°C	4-5°C or more	40°C	6°C or more
			
At or below		At or below	
40°C	5-6°C or more	40°C	7°C or more

About Heatwaves

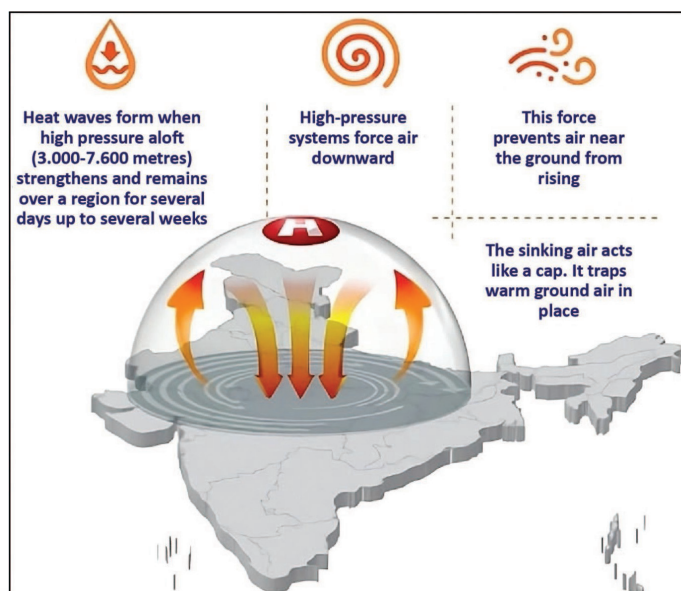
- Heat waves are prolonged periods of excessively hot weather, typically lasting for several days or even weeks.
- In India, a heatwave is typically defined as a period when the maximum temperature in a particular area reaches or exceeds 40 degrees Celsius for the Plains region, and at least 30 degrees Celsius for Hilly regions.

Causes of heatwaves

- Hot and Dry Air Masses:** Extensive zones of hot, dry air serve as heat reservoirs, and prevailing winds transport this heated air to adjacent regions, raising local temperatures further.
- Lack of Atmospheric Moisture:** Moist air helps trap heat and moderate temperature rise, whereas dry air permits more solar radiation to reach the surface and escape quickly at night, leading to sharper increases in daytime temperatures.
- Clear Skies and Enhanced Solar Heating:** In the absence of clouds, more sunlight directly reaches the Earth's surface, significantly increasing surface temperatures due to the lack of reflective shielding.
- High-Pressure Anticyclonic Systems:** Anticyclones involve descending air that warms through compression (adiabatic heating), which adds to surface temperature rise and sustains heatwave conditions.
- Geographical and Climatic Factors:** Heatwaves are more common in dry regions like Northwest India, and during summer, westerly winds often carry this heat toward central and eastern parts of the country, expanding the impact.
- El-Nino:** El Niño weakens trade winds, reducing moisture and heat availability, which disrupts rainfall patterns and contributes to heatwave conditions in India.
- Urbanization:** Rapid urbanization and the growth of concrete jungles in cities can lead to the phenomenon known as the "urban heat island effect."
- Climate Change:** The IPCC's 6th Assessment Report projects that, for 1.5°C of global warming, there will be increasing heat waves, longer warm seasons and shorter cold seasons.

Impact of heatwaves

- **Human Health:** Heat stress increases risks of heat-related illnesses, dehydration, and worsens respiratory and cardiovascular conditions.
 - According to the “Heat Watch 2024” report, in 2024, between March and June, 733 deaths due to heatstroke were reported across 17 states in India.
- **Agricultural Productivity:** Extreme heat reduces crop yields, damages livestock, and disrupts plant growth.
 - Punjab and Haryana reported 20–30% wheat yield losses in 2022 due to early, intense heatwaves affecting the grain-filling stage.
- **Water Resources:** Heatwaves increase evaporation and water demand, straining supply.
 - According to the article Global Water Gaps Under Future Warming Levels, water gaps are expected to widen as consumption outpaces renewable availability.
- **Energy Demand and Power Supply:** Rising temperatures drive up electricity demand, stressing grids
 - During the May 2023 heatwave, peak power demand in India hit a record 239 GW
- **Economic Impact:** Heat stress causes lost labor hours and crop losses in India, costing billions annually, driving food inflation, and severely impacting the informal workforce.
 - According to the World Bank (2022), India could account for 34 million of the projected 80 million global job losses from heat stress associated with productivity decline by 2030.



Measures taken in India

- **IMD's colour codes for heatwave warning**

Colour code	Alert	Warnings
Green (No Action)	Normal day	Comfortable temperature. No cautionary action required.
Yellow Alert (Be Updated)	Heat Alert	Moderate temperature. Heat is tolerable for public but moderate health concern for vulnerable people e.g., infants, elderly, people with chronic diseases
Orange Alert (Be Prepared)	Severe Heat Alert	High temperature. Increased likelihood of heat illness symptoms in people who are either exposed to sun for a prolonged period or doing heavy work. High health concern for vulnerable people e.g., infants, elderly, people with chronic diseases.
Red Alert (Take action)	Extreme Heat Alert	Very high likelihood of developing heat illness and heat stroke in all ages

NDMA Guidelines for Preparation of Action Plan–Prevention and Management of Heat Wave: Prepared by NDMA in 2019, the guidelines aim to improve and strengthen India's preparedness and response to heatwaves in the short term and mitigate their adverse impact in the long term. Major strategies suggested include:

- A rapid heat alert system
- The task of disseminating information should be a shared responsibility between the Nodal agency and relief agencies
- upgraded medical facilities with heat treatment units,
- widespread public advisories,
- mass awareness campaigns across media,
- Collaboration with NGOs for shelters
- Improved water delivery systems in public areas
- **Heat wave action Plans:** It involves a combination of early warning systems, preparedness measures, and response strategies to reduce heat-related illnesses and fatalities.
 - Many states and cities have developed their action plans for heat wave hazard mitigation. E.g., Ahmedabad, Delhi

Challenges with Heatwaves Management in India

- **Notifying Heat waves as a Disaster:** Heat waves are not notified as a disaster at the national level under the existing disaster relief policies.
- **Lack of Cool Roofing:** Challenges arise in executing the cool roof program due to its absence from building codes, while uncertainties persist regarding its effects on human health and energy usage.
- **No heat related work standards:** Unlike the ACGIH (American Conference of Governmental Industrial Hygienists) standards in the USA, there are no established heat-related work standards in India.
- **Issues with Heatwave action plans:**
 - **Not built for local context:** Most heat action plans are not built for local context and have an oversimplified view of hazards.
 - **Inadequate targeting of vulnerable groups:** A study by the Centre for Policy Research (CPR) found that only 2 out of 37 HAPs include vulnerability assessments, leaving implementers with limited data to effectively allocate scarce resources and risking poor targeting.
 - **Underfunded:** Only 11 of 37 HAPs discuss funding sources. Of these, eight asked implementing departments to self-allocate resources, indicating a serious funding constraint.
 - **Weak legal foundations:** There is a lack of legal authority in heat action plans, leading to reduced bureaucratic compliance with plan instructions.
 - **Insufficiently transparent:** There is no national repository of heat action plans, very few plans are listed online, and it is unclear whether the plans are being updated periodically.

Recommended Measures to Strengthen Heatwave Management in India

Short-Term Measures	Long-Term Measures
1. Improving Early Warning Systems for heatwaves to enable timely preventive action and better preparedness among the public. 2. Replace generic “stay indoors” messages with hyperlocal warnings that consider neighborhood-specific heat risks and housing conditions. 3. Launch awareness campaigns to educate people on heatwave risks and promote lifestyle changes to improve resilience. 4. Ensure Basic Amenities such as drinking water stations and distribution of ORS/electrolytes during heatwaves. 5. Encourage staggered or cooler-hour work shifts, especially for outdoor and informal sector workers. 6. Create Summer Shelters particularly for urban poor and homeless populations. 7. Develop or update localized HAPs that incorporate humidity data and vulnerability assessments. 8. Data-Driven Mortality Analysis to identify vulnerable groups and neighborhoods for targeted support.	1. Conduct a comprehensive, nationwide heat vulnerability assessment and develop adaptive, hyper-local heat action plans. 2. Increase government investment in green infrastructure, particularly in heat-prone urban areas. 3. Promote large-scale use of reflective and insulating roofing materials to provide thermal comfort, especially for low-income households. E.g., Telangana’s Cool Roof Policy 4. Implement dual day-night temperature tracking along with predictive modeling for thermal comfort. E.g., UK’s Heat Health Alert system 5. Invest in Long-Term Urban and Housing Resilience such as climate-sensitive architecture. 6. Recognize heatwaves as a social equity issue by prioritizing support for vulnerable populations through integrated efforts. 7. Focus on affordable interventions that minimize healthcare strain and economic disruptions, including integrating insurance for heat-related work interruptions.

When the Sky Breaks: Understanding Cloudbursts in India

Syllabus Mapping: GS-I- Geography, GS-3- Disaster Management

Context

A catastrophic cloudburst struck the Ramban district of Jammu and Kashmir.

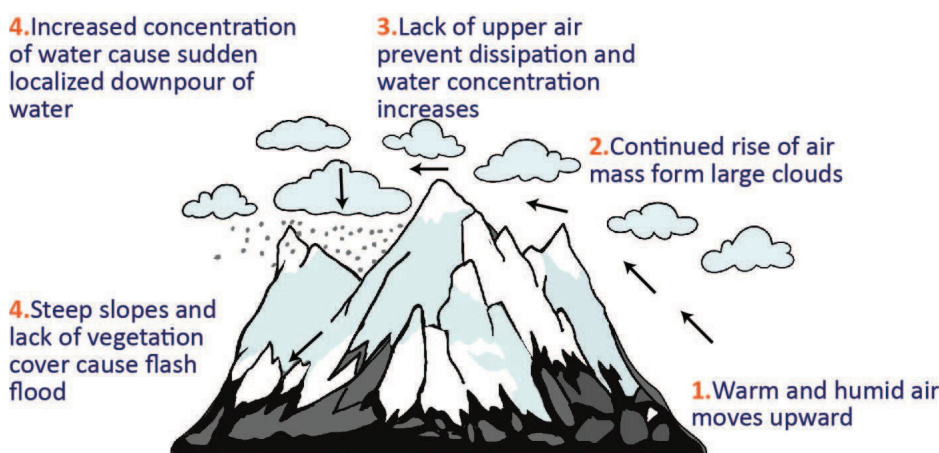
About Cloudbursts

- It is a sudden spell of localized, heavy rainfall over a small area.
- The India Meteorological Department defines cloudburst as the condition where the amount of rainfall over a particular area exceeds 100 millimetres in an hour.

- In India, cloudbursts occur during monsoon season over orographically dominant regions like Himalayan region, northeastern states and Western Ghats.

How does cloudburst occur?

- A cloudburst occurs when moisture-laden air is forced upward over a mountainous region, leading to the formation of tall, dense Cumulonimbus clouds.
- This process, known as orographic lift, often results in intense rain, thunder, and lightning.
- These unstable clouds can release heavy rainfall over a very small area in a short period, causing flash floods.
- **Conditions for cloudbursts**
 - The upward movement of clouds provides the required energy for a cloudburst. It usually happens at 1,000-2,500 meters above sea level.
 - The moisture is usually provided by low-level eastern winds associated with a low-pressure system over the Gangetic plains.



Why do Cloud Burst occur in Hilly Areas?

Cloudburst are more likely to occur in mountainous zones mainly because of terrain and elevation.

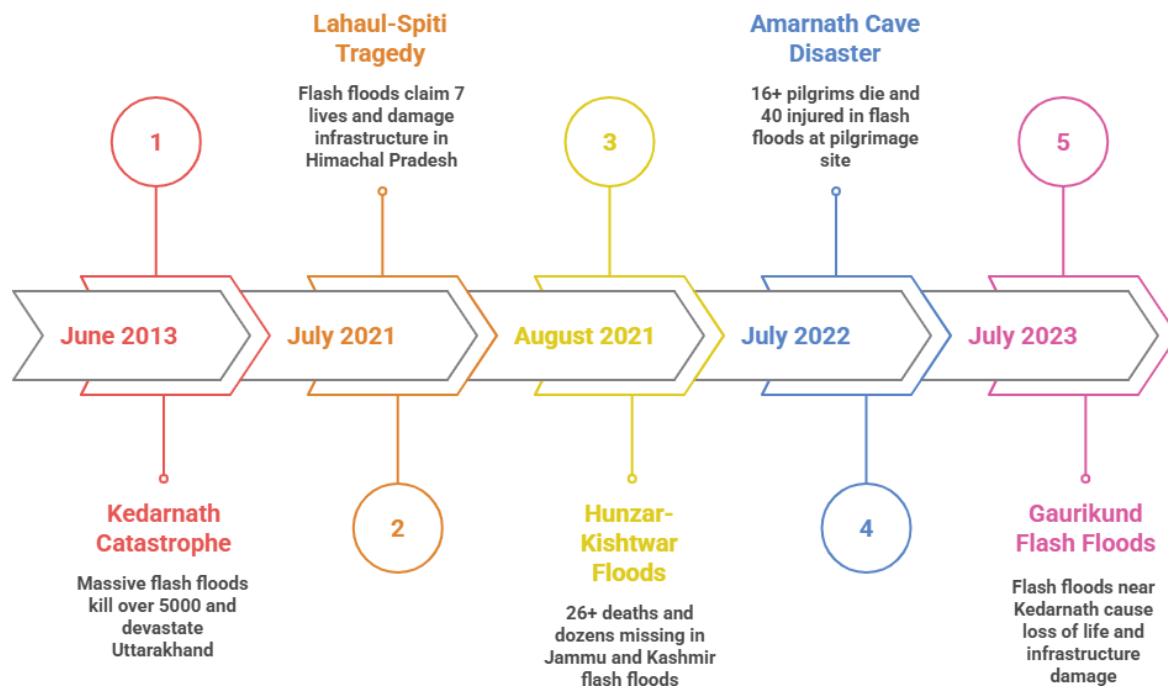
- It is because, in hilly areas, sometimes saturated clouds ready to condense into rain cannot produce rain, due to the upward movement of the very warm current of air.
- Instead of falling downwards, raindrops are carried upwards by the air current.
- New drops are formed and existing raindrops increase in size. After a point, the raindrops become too heavy for the cloud to hold on to, and they drop together in a quick flash.

Impact of Cloudbursts

- **Flash Floods:** Cloudbursts often cause sudden flash floods that overwhelm rivers and sweep away people, vehicles, and livestock.
 - E.g., In July 2023, a cloudburst in Kishtwar, Jammu & Kashmir triggered flash floods
- **Landslides:** The heavy rainfall saturates the soil, increasing the risk of landslides.
 - In August 2023, a cloudburst in Himachal Pradesh's Mandi district led to multiple landslides
- **Infrastructure Damage:** Roads, bridges, buildings, and communication networks are frequently damaged or destroyed.
- **Loss of Lives and Livelihoods:** Many lose their homes, sources of income, and essential resources, leading to long-term socio-economic hardship.
- **Environmental Degradation:** Cloudbursts contribute to severe soil erosion, loss of vegetation cover, and degradation of the local environment.
 - E.g., Frequent cloudbursts in the Western Ghats and Himalayan regions have caused extensive soil erosion
- **Disruption of Relief Operations:** The destruction of roads and bridges makes it difficult for rescue teams and relief agencies to reach affected areas quickly, delaying aid and increasing the suffering of survivors.
- **Widespread Chaos and Displacement:** Large numbers of people may be displaced, leading to temporary shelters and humanitarian crises.

- E.g., the 2013 Uttarakhand disaster where thousands lost their homes.
- **Long-term Societal Impact:** The aftermath of cloudbursts can have lasting effects on the mental health, economic stability, and overall well-being of affected populations.

Major Cloudburst Events In India (2013–2023)



Measures taken in India

- **Cloudburst Prediction:** India Meteorological Department (IMD) monitors the thunderstorm activities leading to cloud burst through its surface observation network and Doppler Weather Radar (DWR) Network.
 - The Himalayan region has seven doppler radars two in Jammu and Kashmir (Sonmarg and Srinagar), one each in Uttarakhand (Kufri), Mukteshwar (Uttarakhand), Mohanbari (Assam), Meghalaya (Sohri) and Tripura (Agartala).
 - High resolution Numerical Weather Prediction (NWP) models are also available with IMD to provide forecasts on occurrence of thunderstorms in short range.
- **NDMA Guidelines:**
 - **Early Detection:** Use Doppler radars and satellites for accurate cloudburst prediction.
 - **Resilient Infrastructure:** Build drainage systems, protective walls, and flood barriers in vulnerable areas.
 - **Smart Land Use:** Identify cloudburst-prone zones and restrict construction there.
 - **Reforestation & Soil Stabilization:** Promote native tree planting and erosion control methods like terracing.
 - **Community Training:** Provide disaster response training, including rescue and medical aid.
 - **Public Awareness:** Run campaigns on preparedness, emergency kits, and evacuation plans.
 - **Collaborative Response:** Ensure coordination between government, communities, NGOs, and private sectors.

Challenges in Cloudbursts Forecasting

- **Small Spatial Spread:** Cloudbursts are hyperlocal events, often affecting areas less than 20–30 km² and lasting minutes to hours.
- **Complex Himalayan Topography:** The interplay of steep terrain, wind patterns, and moisture convergence in mountainous regions like Uttarakhand and Himachal Pradesh creates unpredictable convective systems.
 - Numerical weather models struggle to simulate localized cloud dynamics and microphysical processes (e.g., ice-phase interactions) at the required 1–2 km resolution.
- **Technological and Infrastructural Gaps:** Current satellite and radar systems lack the resolution to detect such microscale phenomena, leading to missed warnings.

- **Data Scarcity and Prediction Tools:** India has only 31 recorded cloudburst events, limiting training data for machine learning models.
 - Researchers often rely on adapted international datasets, reducing prediction accuracy.
 - Traditional rain gauges fail to capture sudden intensity spikes, while newer methods like laser-based atmospheric monitoring remain experimental.
- **Short Lead Time:** Even with improved monitoring, cloudburst warnings typically provide only 1–3 hours of lead time—insufficient for large-scale evacuations or infrastructure preparation.
- **Climate Change Complications:** Warmer temperatures amplify moisture retention, increasing rainfall intensity. However, linking specific cloudbursts to climate change remains uncertain due to chaotic atmospheric feedback.
 - **E.g.,** In July 2021, Uttarakhand's Chamoli district saw devastating floods from an unpredicted cloudburst.

Suggested Measures to Strengthen Cloudburst Management in India

- **Enhance Predictive Capabilities:** Scale up India's High-Performance Computing (HPC) capacity to 100 PetaFlops by 2024 to enable 1–3 km resolution forecasting, critical for detecting micro-scale cloudburst dynamics.
 - Expand Doppler radar coverage beyond the current 7 Himalayan stations to include vulnerable regions like Himachal Pradesh and Uttarakhand.
- **Data Infrastructure Development:** Build India-specific datasets (currently only 31 recorded events) by integrating historical data, satellite inputs, and IoT sensors for real-time monitoring.
 - **E.g.,** Adapt global datasets (e.g., from Australia) with Indian meteorological variables to train ML models while addressing data scarcity.
- **Early Warning Systems:**
 - **48-Hour Probabilistic Forecasts:** Leverage upgraded HPC to provide probabilistic warnings 2 days in advance, as planned by the Ministry of Earth Sciences by 2024.
 - **Hyperlocal Alerts:** Use 3 km resolution forecasts to issue location-specific warnings, reducing false alarms and improving community response.
- **Infrastructure and Policy Measures:** Enforce building codes for flood-resistant structures, improve stormwater drainage, and create retention ponds in cloudburst-prone areas.
 - Promote reforestation, green roofs, and soil conservation to enhance water absorption and reduce landslide risks.
- **Community Preparedness:** Educate communities on evacuation protocols and emergency response, particularly in high-risk Himalayan villages.
 - Establish emergency shelters (modeled after heat/cold shelters) with stockpiles of food, water, and medical supplies.
- **Interagency Coordination:**
 - **Disaster Risk Reduction (DRR) Integration:** Mainstream cloudburst mitigation into national policies, aligning with the Sendai Framework (2030 targets).
 - Partner with neighboring countries for cross-border data sharing and technology transfer, especially in shared river basins.
- **Post-Disaster Management:** Deploy AI-powered drones and GIS tools to map affected areas and prioritize resource allocation.
 - Provide insurance for lost wages and expedite financial aid through digitized relief distribution systems.

India's Weather Watch: Significance, Challenges, and the Road Ahead

Syllabus Mapping: GS-I- Geography

Context

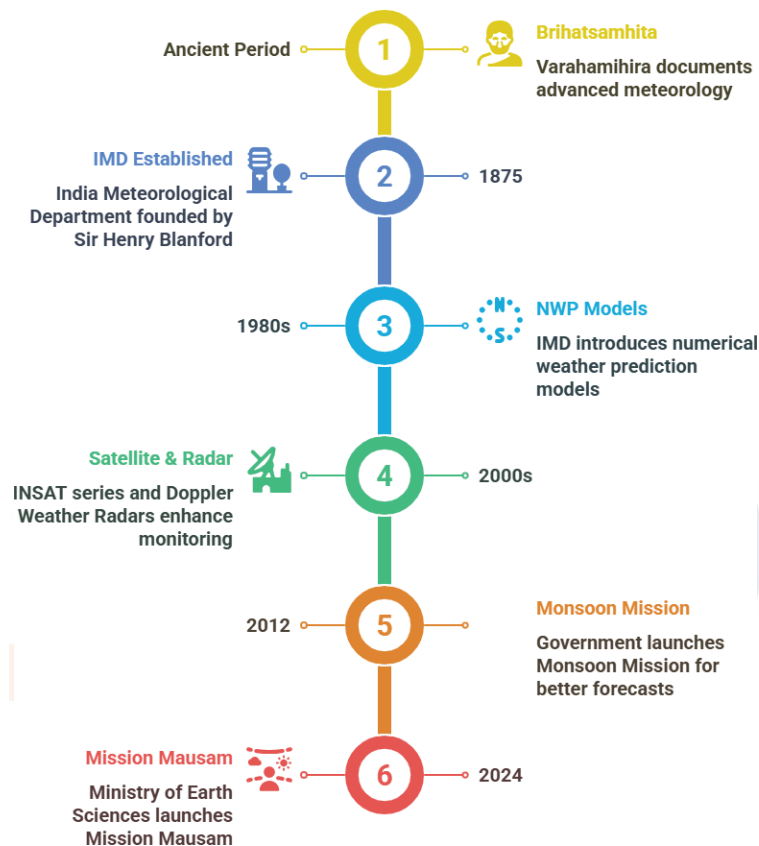
The Ministry of Earth Sciences has established a dedicated AI and ML centre to enhance short-range rain forecasts, create high-resolution urban weather datasets, and use Doppler radar data for real-time rainfall and snowfall prediction.

Significance of Weather Forecasting in India

- **Disaster Management:** Accurate weather forecasting helps mitigate the impact of natural disasters like cyclones, floods, and heatwaves.
 - **E.g.,** Timely warnings of Cyclone Fani in 2019 and Amphan in 2020, reduced loss of life and property.

- **Agricultural Planning:** Farmers rely on weather forecasts for crop planning, irrigation scheduling, and managing harvests.
 - E.g., IMD's Agromet Advisory Services provide valuable insights to farmers for decision-making.
- **Transport and Logistics:** Accurate weather forecasts are essential for ensuring the safety and smooth operation of road, rail, and sea transport.
 - E.g., winter fog predictions assist in managing flight schedules effectively.
- **Urban planning:** Weather forecasts play a critical role in construction and urban planning, by helping to prevent delays, ensure worker safety, and reduce costs.
 - E.g., in cities like Mumbai, accurate monsoon predictions are used to schedule construction activities.
- **Energy Production:** Weather forecasts guide energy generation and distribution, particularly renewable energy sources like wind and solar.

Key Milestones in Indian Weather Forecasting



Institutions Involved in weather forecasting in India

- **India Meteorological Department (IMD):** It is the principal agency responsible for meteorological observations, weather forecasting and seismology. It operates under the Ministry of Earth Sciences and is headquartered in New Delhi.
- **National Centre for Medium Range Weather Forecasting (NCMRWF):** Located in Noida, NCMRWF focuses on medium-range weather forecasting using advanced numerical models.
- **Indian Institute of Tropical Meteorology (IITM), Pune:** IITM focuses on research in tropical meteorology and climate science, it functions as a national center for basic and applied research in monsoon meteorology.
- **The Indian National Centre for Ocean Information Services (INCOIS):** It is an autonomous body under the Ministry of Earth Sciences, established in 1999, that provides ocean information, warnings, and advisory services to various stakeholders.
- **Space Applications Centre (SAC), ISRO:** SAC is the lead centre in the development of key payload technologies for Earth Observation, Communication, Navigation and Space Exploration.

Satellites used in Weather Forecasting by India

- **INSAT Series:** INSAT is a fleet of Indian geostationary satellites providing telecom, broadcasting, weather monitoring, and rescue services.
 - Currently, **INSAT-3D (2013)** and **INSAT-3DR (2016)** are operational for meteorology, offering weather updates every 15 minutes.
 - **INSAT-3D:** Launched in 2013 by ISRO, INSAT-3D is designed for enhanced meteorological observations, monitoring of land and ocean surfaces, generating vertical profile of the atmosphere in terms of temperature and humidity for weather forecasting and disaster warning.
 - **INSAT-3DR:** Launched in 2016 as an advanced version of INSAT-3D, with a 6-band imager for tracking clouds, sea temperatures, radiation, and more.
- **OCEANSAT Series (1, 2, 3):** Part of IRS, these satellites monitor ocean parameters useful for fisheries, marine studies, and climate research.
- **SARAL:** An Indo-French satellite with instruments ALTIKA (altimeter) and ARGOS (data collection), used to study sea surface height and ocean circulation.
- **Megha-Tropiques:** A 2011 Indo-French satellite focused on tropical weather and climate, studying cloud systems and their effect on global climate.
- **International Satellite Support:** India also leverages data from international satellites such as METEOSAT-8 (EUMETSAT) and Himawari-8 (Japan), enhancing global weather data integration for better regional forecasting accuracy.

Forecasting Models and Tools



The Global Forecast System (GFS), operated by IMD, provides deterministic weather forecasts with a 12 km resolution.



The Unified Model, used by NCMRWF, provides medium-range weather predictions, while the Global Ensemble Forecast System (GEFS from IITM) offers probabilistic outcomes, useful in risk-based forecasting.



Short-range models such as the Weather Research and Forecasting (WRF) and High-Resolution Rapid Refresh (HRRR) are used for nowcasting and thunderstorm prediction.



To visualize satellite data, forecasters use RAPID, a real-time data interpretation tool co-developed by SAC and IMD.

Weather Forecasting Services Provided by IMD

- **General Public Forecasts:** IMD issues daily forecasts that include information on temperature, rainfall, wind speed, humidity, and sky conditions.
- **Nowcasting Services:** IMD provides nowcasts for 897 locations using inputs from Doppler radars, satellites, lightning detection networks, and surface observations.
 - Nowcasting refers to very short-term forecasting, usually within 0 to 3 hours.
- **Impact-Based Forecasting:** IMD has introduced an Impact-Based Forecasting (IBF) system to help decision-makers prepare for extreme events.
 - E.g., Warnings for heavy rainfall are color-coded and are accompanied by information about the expected societal and infrastructure impact.
- **Agro-Meteorological Advisory Services:** The Agromet Advisory Service (AAS) provides weather-based agricultural guidance to millions of farmers.
 - District-level forecasts are issued twice a week and shared through the Meghdoot app, Kisan Call Centres, and local media.
- **Urban Meteorological Services:** IMD provides detailed city forecasts for 110 urban centers.
 - These include parameters such as heat index, air quality, urban flooding risk, and event-specific advisories for tourism or political functions.
- **Marine Forecasting:** Marine services include high-seas and coastal forecasts, port warnings, and guidance for the Indian Navy. Bulletins are issued in both text and pictorial format, especially for fishermen and coastal administrations.

Mission Mausam

- **Aim:** To make India 'Weather Ready' and 'Climate Smart'.
- **Objectives:**
 - Develop Cutting Edge Weather Surveillance Technologies & Systems

- Implement Higher resolution atmospheric observations with better temporal and spatial sampling/coverage
- Implement Next-generation radars, and satellites with advanced instrument payloads
- Implement High-Performance Computers (HPC).
- Improve understanding of weather and climate processes and prediction capabilities
- Develop improved earth system models, and data-driven methods (use of AI/ML)
- Develop Technologies for weather management
- Develop state-of-art dissemination system for last mile connectivity
- **Nodal Ministry:** Ministry of Earth Sciences
- **Implementing Agencies:** India Meteorological Department, the Indian Institute of Tropical Meteorology, and the National Centre for Medium-Range Weather Forecasting.

Challenges in Weather Forecasting in India

- **Tropical Weather:** Unlike temperate areas where weather is largely driven by well-defined fronts and jet streams, tropical weather features rapidly evolving convection, localized thunderstorms, and low-pressure systems with little lead time.
- **Diverse Climatic Zones:** India's vast and varied topography adds complexity to weather forecasting.
- **Climate Change:** The unpredictability caused by changing climate patterns increases the complexity of weather forecasting, making accurate long-term predictions difficult.
- **Lack of Data assimilation and modelling:** The integration of diverse and accurate data into numerical weather prediction models is challenging.
 - E.g., during the 2015 Chennai floods, the IMD faced difficulties in assimilating satellite data, which affected the precision of their predictions.
- **Poor Hyper-local Predictions:** The lack of 3km X 3km grid, makes localized monsoon prediction unreliable
 - E.g., IMD's rainfall forecasts for Mumbai in July 2024 were inaccurate about 40% of the time.
- **Limited Observational Infrastructure:** The IMD faces difficulties due to outdated and inadequate observational tools, such as early warning systems.
 - E.g., during the 2013 Uttarakhand floods, the failure of EWS to effectively disseminate information
- **Lack of Cross-Border Collaboration:** The IMD struggles with limited collaboration in data sharing on transboundary air pollution and shared water resources with neighboring countries like China and Pakistan.
- **Hindrances to Technology Adoption:** India's capacity to deploy advanced weather forecasting tools is constrained by limited funding and infrastructure.
 - E.g., only five Doppler weather radars currently cover the entire western coastline.

The Early Warnings for All (EW4All) initiative

- It is an UN initiative which aims to ensure universal protection from hazardous hydrometeorological, climatological and related environmental events through life-saving multi-hazard early warning systems, anticipatory action and resilience efforts by the end of 2027.
- It has four pillars
 - Disaster risk knowledge - led by the United Nations Office for Disaster Risk Reduction (UNDRR)
 - Detection, observation, monitoring, analysis, and forecasting - led by the World Meteorological Organization (WMO)
 - Warning dissemination and communication - led by the International Telecommunication Union (ITU)
 - Preparedness and response capabilities - led by the International Federation of Red Cross and Red Crescent Societies (IFRC)

Measures to Strengthen Weather Forecasting in India

- **Climate-Adaptive Models:** Develop forecasting models that incorporate the growing impact of climate change to improve long-term predictions and disaster preparedness.
- **Technology Upgrade:** IMD should use AI and ML algorithms to process large sets of meteorological data that can help refine prediction models and significantly increase the accuracy of weather forecasting.
- **Localized Forecasting:** Enhancing localized and hyper-local forecasts by developing 3 km x 3 km grids, is crucial for timely and actionable warnings.
- **Research and Development:** IMD should engage with research from universities and institutions.

- E.g., the collaboration between IMD and IIT Bombay in 2024 has led to the development of advanced computing technologies that offer more precise rainfall predictions.
- **International collaboration:** IMD should collaborate with global weather agencies for knowledge sharing, improved forecasting techniques, and early warning systems.

How can AI transform Weather Forecasting?

- **Smarter Predictions with Data:** AI systems can study vast amounts of past weather data to recognize patterns and forecast events like monsoons, cyclones, and heatwaves—without relying on the fixed equations used in traditional models.
 - E.g., A machine learning model developed at IIT Delhi achieved 61.9% accuracy in predicting monsoons (2002–2022), outperforming many conventional systems.
- **Faster and Scalable Forecasting:** AI tools can quickly generate short-term forecasts with lower computing demands, making them ideal for real-time warnings and nowcasting.
- **Improved Forecasting of Extreme Events:** Because AI can understand complex relationships between different weather variables, it's particularly useful for predicting rare and sudden events like flash floods or tornadoes.
- **Blending AI with Traditional Methods:** By combining AI with physics-based models, forecasters can increase both the accuracy and trustworthiness of weather predictions.

Urban Forests Under Pressure: Issues and Interventions in Indian Cities

Syllabus Mapping: GS-III- Environment

Context

For weeks, the 400-acre Kancha Gachibowli Forest near the University of Hyderabad (UoH) has been at the center of a fight over Hyderabad's urban development.

Components of Urban Forestry



About Urban Forests

- Urban forests can be defined as networks or systems comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas.
- They include forests, street trees, trees in parks and gardens, and trees in derelict corners.

• Urban forests in India- Key Facts (ISFR 2023)

- The forest cover in India's top seven mega cities was estimated at 509.72 sq km, showing a 0.5% increase over the previous assessment.
- Delhi recorded 195.44 sq km of green cover, constituting a significant portion of its total geographical area.
- Bangalore reported 89.61 sq km of green cover. While there were concerns about a decline in moderately dense forest, the overall forest cover for Bengaluru showed a marginal increase (around 0.59%).
- Mumbai showed 111.30 sq km of green cover, with pressures from population density affecting green space retention.

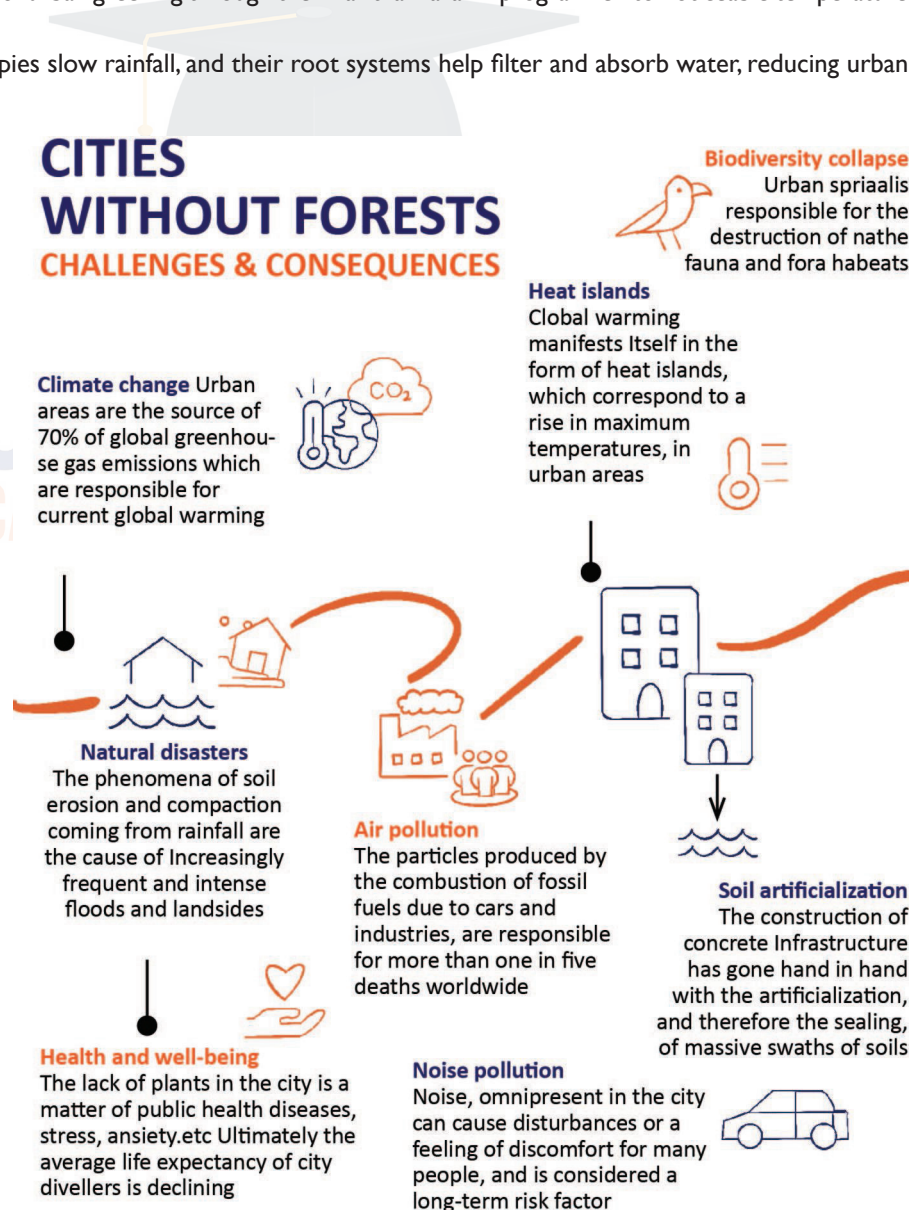
Benefits of Urban Forests

Environmental Benefits

- **Air Quality Improvement:** Urban trees absorb pollutants such as nitrogen dioxide, ozone, and particulate matter.
 - E.g., A 2016 study by the Forest Survey of India found that Delhi's green cover helped remove over 6,000 tonnes of air pollutants annually.
- **Carbon Sequestration:** Trees act as carbon sinks—one mature tree can absorb up to 22 kg of CO₂ per year.
- **Urban Heat Island (UHI) Mitigation:** Trees provide shade and release moisture, reducing surface and ambient temperatures.
 - E.g., In Hyderabad, the implementation of urban greening through the "Haritha Haram" program led to noticeable temperature reductions in densely planted areas.
- **Stormwater Management:** Tree canopies slow rainfall, and their root systems help filter and absorb water, reducing urban flooding and recharging aquifers.
 - E.g., In Bengaluru's Cubbon Park, tree cover aids groundwater retention
- **Soil Protection and Dust Reduction:** Trees stabilize soil, reduce erosion, and trap dust particles.
 - E.g., In Jaipur, urban forests help combat wind-blown dust and desertification at city edges.
- **Biodiversity Conservation:** Urban forests create microhabitats that support birds, insects, and small mammals.
 - E.g., Delhi's Sanjay Van is home to over 200 species of birds and multiple plant species

Social Benefits

- **Health and Well-being:** Access to green spaces reduces stress, promotes physical activity, and lowers the risk of lifestyle diseases.
 - E.g., A study in Mumbai found a positive correlation between access to parks and improved mental health.
- **Community Building:** Green spaces encourage social interaction, and are linked with lower crime rates.
- **Cultural and Natural Heritage Preservation:** Urban forests often include sacred groves or historically significant trees.



- E.g., In Kerala, temple groves (kaavus) are protected for their cultural value and play a key role in biodiversity conservation within cities.

Economic Benefits

- **Cost Savings:** By cooling buildings and enhancing water security, urban forests reduce public and private spending on energy and water infrastructure.
 - E.g., green roofs and tree cover in Chennai have been shown to cut household energy bills by 10–15%.
- **Increased Productivity and Economic Output:** Better public health leads to fewer sick days and higher workplace productivity.
 - E.g., The World Bank estimates that India loses about 4.3% of GDP annually to environmental degradation, including poor urban air and heat conditions—issues urban forests directly mitigate.
- **Boost to Tourism and Real Estate:** Urban greenery enhances city aesthetics, attracting tourists and raising property values.
 - E.g., Lodhi Garden in Delhi is a popular tourist destination.

Measures Taken to promote Urban forestry in India

- **Nagar Van Yojana:** Launched in 2020 by the Ministry of Environment, Forest and Climate Change (MoEFCC), it aims to develop 1000 Nagar Vans by the year 2027.
 - The scheme offers financial support of ₹4 lakh per hectare for developing and maintaining urban forests, promoting active participation from citizens, students, and various stakeholders.
 - Nagar Van areas span between 10 to 50 hectares and are applicable in all cities governed by Municipal Corporations, Municipalities, and Urban Local Bodies (ULBs).
- **Green India Mission (GIM):** Part of National Action Plan on Climate Change (NAPCC), GIM promotes ecosystem restoration, including urban and peri-urban green spaces.
- **School Nursery Yojana (SNY):** Aimed at raising awareness about the importance of plants, this scheme encourages tree planting in schools across India.
- **CAMPA:** Urban forestry is a permissible activity under the provisions of Compensatory Fund Act, 2016 and the Rules made thereunder.
- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT):** Launched by the Ministry of Housing and Urban Affairs, AMRUT supports green infrastructure in over 500 cities by funding the development of city parks, biodiversity zones, and green buffers.
- **Smart Cities Mission:** One of the objectives of the mission is Preserving and developing open spaces — parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in areas and promote ecobalance.

State Level Initiatives

- **Kochi, Kerala:** The Kawaki initiative, supported by WRI India, engages local communities to create urban forests using scientific mapping and vulnerability assessments.
- **Mumbai, Maharashtra:** It adopted the Japanese Miyawaki technique to develop one of India's largest urban forests in Chandivali, using dense native plantations that support biodiversity with minimal maintenance.
- **Vijayapura (Bijapur), Karnataka:** Vijayapura transformed 250 hectares of barren land into an urban forest by planting 250,000 native trees with solar-powered drip irrigation.

Challenges faced by Urban Forests in India

- **Harsh Conditions for Growth:** Urban trees face extreme heat, pollution, soil compaction, waterlogging, and limited root space, making healthy growth difficult and increasing vulnerability to pests and diseases.
- **Climate Change:** Shifting weather conditions and more frequent extreme events place additional stress on urban trees.
- **Encroachment:** Urban forests are frequently cleared for roads, buildings, and real estate, reducing canopy cover.
- **Policy Gaps and Institutional Overlap:** Lack of a unified, enforceable urban forestry policy leads to fragmented implementation. Multiple agencies with overlapping mandates often delay or dilute conservation efforts.
- **Insufficient Resources for Maintenance:** Municipal bodies often lack funds and trained personnel to care for trees.

- **Weak Public Awareness and Support:** Urban trees are often seen as expendable, with limited understanding of their environmental and health benefits among the general public and policymakers.
- **Social Inequities in Urban Greening:** Tree planting and green space development often occur in wealthier neighborhoods. Marginalized groups are frequently excluded from decision-making processes and denied access to these green benefits.
- **Resistance from Developmental Lobbies:** Environmental concerns are portrayed as obstacles to public infrastructure projects like highways or metro lines.

Suggested Measures to Strengthen Urban Forest Management

- **Urban EIA:** India needs policies for urban environmental impact assessment and the ecological carrying capacity of all the towns.
- **Comprehensive Policies:** Urban forestry should be integrated into city master plans with clear guidelines for tree conservation, plantation targets, and biodiversity goals.
 - E.g., The Delhi Master Plan 2041 includes a dedicated chapter on green-blue infrastructure to balance development with ecological sustainability.
- **Urban Forest Cells:** Dedicated Urban Forestry Units with trained arborists, ecologists, and planners should be created within municipalities for planning, execution, and monitoring.
- **Adoption of climate resilient species:** Tree plantation drives should prioritize native, drought-tolerant, and pest-resistant species to ensure sustainability and biodiversity conservation.
 - E.g., Pune Municipal Corporation collaborated with ecologists to create species-specific urban plantations using indigenous trees like neem, peepal, and jamun.
- **Proper Road planning:** Urban roads, flyovers, parking zones, and building rooftops should be systematically designed to incorporate green buffers, tree canopies, and bioswales.
 - Further, linking parks and forests with tree-lined streets helps pollinators move and boosts ecosystem resilience.
- **Data Inventory:** A regularly updated GIS-based tree inventory should be maintained to help monitor tree health, density, and biodiversity across urban zones.
 - E.g., Bengaluru's Tree Census, started in partnership with citizen groups and NGOs, uses geo-tagging to record species, girth, and condition of trees.
- **Innovative Techniques:** In land-constrained cities, compact and high-density forest models like Miyawaki forests, rooftop gardens, and vertical greenery systems should be promoted.
 - E.g., Chennai Corporation created more than 150 micro Miyawaki forests between 2020–2023.
- **Ensuring accessibility:** Green spaces must be equitably accessible to ensure wider benefits and build appreciation for nature.

Greening the Economy: Understanding the Framework of Green Taxonomy

Syllabus Mapping: GS-III- Environment

Context

The Indian government has released the Draft Framework of India's Climate Finance Taxonomy.

What is Green Taxonomy?

- A green taxonomy is a framework for defining what can be called environmentally sustainable investments.
- It acts as a guide for investors and companies, helping them make informed decisions about which investments contribute to environmental goals like climate change mitigation and adaptation, and a circular economy.
- It is a way to "green-label" investments, preventing greenwashing and promoting sustainable practices.

Need for Green Taxonomy in India

- **Bridging the Climate Finance Gap:** India needs an estimated USD 2.5 trillion (at 2014-15 prices) by 2030 to meet its climate goals. A clear taxonomy can direct investments toward the right sectors, improving efficiency in climate finance mobilization.
- **Preventing Greenwashing:** With increasing interest in sustainable investments, a defined taxonomy helps in verifying the authenticity of green claims, ensuring transparency and accountability.

- **Aligning with National Goals:** The taxonomy supports India's national climate strategies, including Net Zero by 2070 and developmental ambitions under the 'Viksit Bharat@2047' initiative.
- **Enhancing Investor Confidence:** By setting clear performance criteria, the taxonomy helps domestic and international investors assess which projects truly support low-carbon transitions, reducing ambiguity and risk.
- **Supporting Policy Implementation:** It complements national missions like NAPCC and SAPCC by guiding financial flows in a targeted, principle-driven manner.

Figure 2: Objectives of the Climate Finance Taxonomy

✓ Facilitate greater resource flow to climate-friendly technologies and activities, and building resilience	 Mitigation Avoidance of GHG emissions, reduction in emission intensity, improvements in energy efficiency, and R&D for mitigation.
	 Adaptation Resilience action including resilient infrastructure, agriculture practices, climate resilient seeds, sustainable water management, ecosystem protection and restoration, geography-specific adaptation measures, and R&D for adaptation.
	 Support transition in hard-to-abate sectors Transition activities in line with pathway for hard-to-abate industries, innovation and R&D, taking into account the available technology, its access and viability.
✓ Prevent Greenwashing	
✓ Consistency with Viksit Bharat @2047	

About Draft Framework of India's Climate Finance Taxonomy

- **Aim:** To facilitate greater resource flow to climate-friendly technologies and activities, enabling achievement of the country's vision to be Net Zero by 2070 while also ensuring long-term access to reliable and affordable energy.
- **Features:** The draft framework of India's green taxonomy is structured as a living document and is being developed in phases.
 - It adopts a hybrid design—combining qualitative principles with quantitative benchmarks and is tailored to reflect India's developmental priorities and acknowledges sector-specific challenges.
 - It includes qualitative assessments (alignment with national goals) and will gradually integrate quantitative performance thresholds (like GHG intensity reduction targets).
- **Core Principles:** It is based on eight foundational principles-
 - Consistency with stated position on Climate Action and development priorities
 - Do no significant harm to other objectives of the climate finance taxonomy
 - Focusing on pathways and trajectories in the country context
 - Interoperability and consistency
 - Support Transition Activities.
 - Promoting the use of Indigenous technologies
 - Be science-based and transparent:
 - Proportionality - Support for MSMEs
- **Classification:** Activities are categorised into two broad baskets:
 - **Climate-supportive activities:** These directly avoid greenhouse gas emissions, reduce emission intensity, or promote adaptation and resilience. They are divided into two tiers:
 - Tier I: Involves absolute emission avoidance, such as the use of non-fossil fuel sources.

- Tier 2: Involves emission intensity reduction where complete emission avoidance isn't yet feasible, especially due to technology limitations.
- **Transition activities:** These are activities where currently no viable low-emission alternatives exist but efforts are made to reduce emission intensity or improve energy efficiency in line with national policy.
- **Sectors Covered:**
 - **Power:** Promotion of renewables, green hydrogen, nuclear, and clean coal technologies.
 - **Mobility:** Electric and hybrid vehicles, public transit systems, and emission-reducing fuels.
 - **Buildings:** Green construction standards, energy-efficient appliances, and design innovation.
 - **Agriculture, Food, and Water Security:** Enhancing climate resilience through irrigation, crop diversification, and water conservation.
 - **Hard-to-abate sectors:** Including iron, steel, and cement industries, with an emphasis on technology upgrades and transition finance.

Figure 4: Reflection of India's Climate Finance Taxonomy Principles in Global Taxonomies

Consistency with Global Taxonomies	
India's Principles	Global Taxonomies reflecting consistency with India's principles
Consistency with stated position on Climate Action and development priorities	EU, China, South Africa, ASEAN, Indonesia, Singapore, Egypt, Latin America, Malaysia, Sri Lanka, Brazil, EU-China Common Ground Taxonomy, IPSF-UNDESA G20 Sustainable Finance Working Group
Do no significant harm to other objectives of the climate finance taxonomy	EU, South Africa, ASEAN, Indonesia, Latin America, Malaysia, Sri Lanka, IPSF-UNDESA G20 Sustainable Finance Working Group
Focusing on pathways and trajectories in country context	EU, South Africa, ASEAN, Indonesia, Latin America, Malaysia, Sri Lanka, IPSF-UNDESA G20 Sustainable Finance Working Group
Interoperability and consistency	EU, ASEAN, Singapore, Indonesia, EU-China Common Ground Taxonomy
Support Transitional Activities	EU, ASEAN, Latin America, Malaysia, Singapore, Brazil
Promoting the use of Indigenous technologies	China, Brazil, Malaysia
Be science-based and transparent	EU, ASEAN, Indonesia, Malaysia, Sri Lanka, Brazil, IPSF-UNDESA G20 Sustainable Finance Working Group
Proportionality -Support for MSMEs	ASEAN, Indonesia, Malaysia, Brazil

Challenges in Implementing Green Taxonomy

- **Data Availability and Quality:** Limited access to sector-wise emissions and climate impact data hampers accurate classification and monitoring of eligible activities.
- **Technological Constraints:** Many sectors, especially MSMEs and agriculture, lack access to cutting-edge, low-emission technologies, making compliance difficult.
- **Financial Barriers:** High upfront costs and limited concessional finance options can deter investment in transition and adaptation projects.
- **Institutional Capacity:** Regulatory bodies and financial institutions may need substantial capacity-building to assess, certify, and monitor climate-aligned investments.
- **Balancing Development and Climate Goals:** India must carefully navigate its developmental needs without compromising its sustainability objectives, particularly in hard-to-abate sectors.

Suggested Measures

- **Strengthen Data Infrastructure:** Develop comprehensive databases and standard reporting mechanisms for climate-related data across sectors.
- **Promote Technology Transfer:** Encourage global partnerships and R&D investments to bring affordable clean technologies to key sectors, especially MSMEs.
- **Facilitate Green Finance Access:** Provide policy support, green bonds, and concessional loans to lower the cost of capital for green projects.
- **Build Institutional Capacity:** Train financial institutions, regulators, and project developers to effectively apply taxonomy principles and compliance mechanisms.
- **Foster Public-Private Collaboration:** Involve industries, financial institutions, and civil society in the development and periodic review of the taxonomy to ensure practicality and inclusiveness.

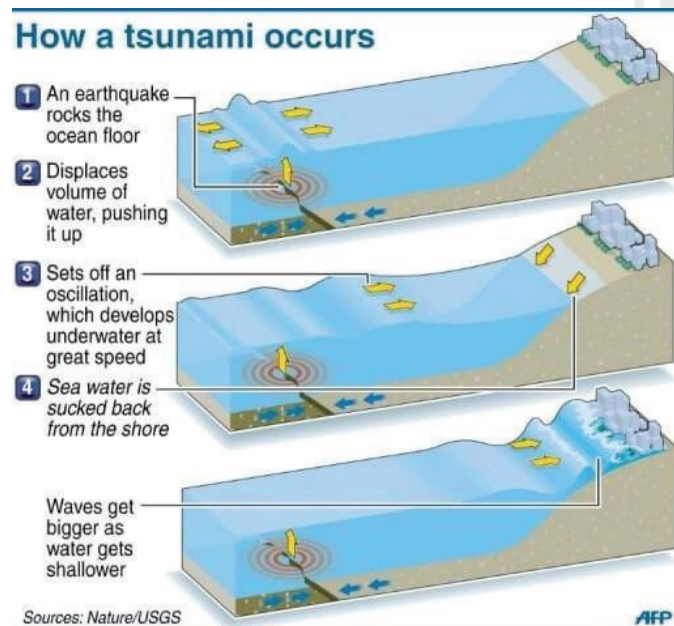
TOPICS FOR PRELIMS (GEOGRAPHY)

Tsunami Zones

Context

As per the latest report of INCOIS, all Indian coastal Union Territories and states are prone to tsunami.

How a tsunami occurs



Subduction Zone:

- It is a tectonic boundary where one plate slides beneath another into the Earth's mantle.
- Subduction zones are highly active geologically – leading to earthquakes, volcanoes and tsunamis.

Key subduction zones affecting India:

- **Andaman-Nicobar-Sumatra Island Arc:** It is a 5,000 km long chain of islands and mountains from Myanmar in the north to Indonesian archipelago in the south.
- **Makran Subduction Zone** (near Iran-Pakistan): It is a tectonic plate boundary where the Arabian Sea Plate is subducting beneath the Eurasian Plate.

Indian National Centre for Ocean Information Services (INCOIS)

- It is an autonomous body under the **Ministry of Earth Sciences**.
- It was established in 1999.
- Its primary mission is to provide ocean information, warnings and advisory services to various stakeholders, including the public, government and scientific community.

Indian Continental Plate

Context

According to a recent discovery, the Indian Plate is splitting into two, with a portion of it sinking into the mantle.

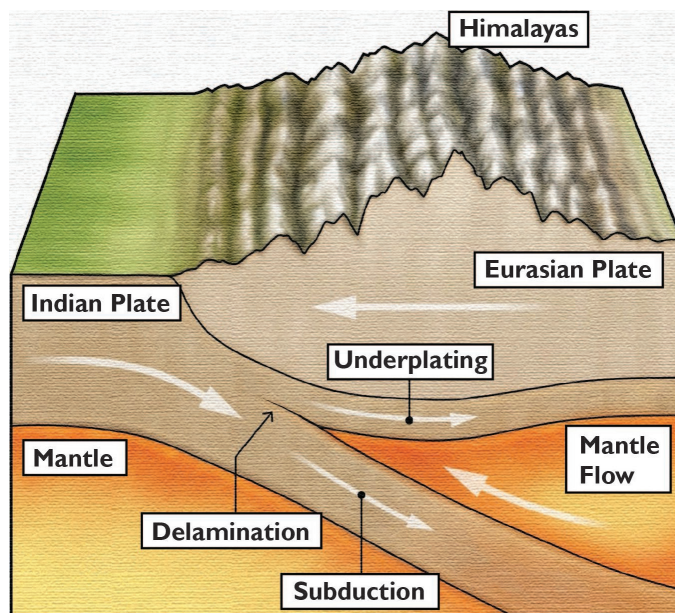
About the Indian Continental Plate

About Tsunami

- It is a series of large sea waves caused by the sudden displacement of a large volume of water in an ocean.
- **Causes of Tsunamis:**
 - **Undersea Earthquakes** (most common cause)- Especially those occurring at **subduction zones**.
 - Underwater landslides
 - **Volcanic eruptions** (submarine volcanoes)
 - **Meteorite impacts** (very rare).

- The Indian plate is a small tectonic plate situated in the northeastern hemisphere.
- It is surrounded by four major plates: the Eurasian plate to the north, the Australian plate to the southeast, the African plate to the southwest, and the Arabian plate to the west.

- Its northward movement results in a convergent boundary with the Eurasian plate.
- It shares a divergent boundary with the African plate and a transform boundary with the Arabian plate due to their lateral motion.
- It was once fused with the adjacent Australian plate to form a single Indo-Australian plate, but recent studies suggest that India and Australia may have been separate plates for at least 3 million years.
- The Himalayan mountain range and Tibetan plateau have formed as a result of the collision between the Indian Plate and Eurasian Plate which began 50 million years ago and continues today.



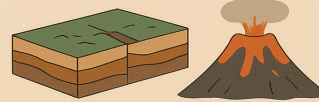
Delamination of the Indian Plate

- Delamination refers to a vertical tearing and peeling away of the dense lower layer of a tectonic plate.
- The lower part detaches and sinks into the Earth's mantle, while the upper part may remain in place or move differently.
- Scientists discovered that a portion of the Indian Plate is undergoing delamination.
- This means the plate is splitting into two, and one part is sinking into the mantle.
- Delamination increases earthquake risks by changing how stress builds up in the Earth's crust.
- **Areas at Risk:**
 - Tibetan Plateau – already prone to earthquakes.
 - Cona-Sangri Rift – a deep geological fracture possibly caused by this ongoing tear; may become a new seismic hotspot.

EARTHQUAKE BASIC

Causes of Earthquake

1. Plate Tectonics

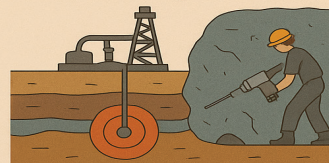


3. Faulting



4. Anthropogenic Causes

- drilling activities
- deep underground mining
- blasting of rocks by dynamites
- nuclear explosion tests
- storage of massive volumes of water in big reservoirs



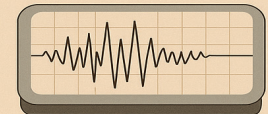
Measurement of Earthquake

1. Richter Scale

measures magnitude

2. Modified Mercalli Scale

measures intensity



Earthquake in Myanmar

Context

Myanmar was struck by a magnitude 7.7 earthquake, causing significant devastation in the country.

Cause of the earthquake

• Tectonic Plate Movements:

- The Earth's lithosphere is divided into tectonic plates, which have been moving for billions of years. Their interactions create earthquakes and other geological features.
- The Myanmar earthquake occurred due to “strike-slip faulting”, which happens when two plates rub sideways against each other.

• Sagaing Fault:

- It is a 1,200 km long fault line, runs from north to south through Mandalay and Yangon.
- Areas along this line are one of the country's most earthquake-prone areas.

Davis Strait proto-microcontinent

Context

A hidden landmass called the Davis Strait proto-microcontinent has been found beneath the icy waters of the Davis Strait.

About Davis Strait Proto-Microcontinent

- A new landmass has been discovered under the frozen waters of the Davis Strait, between Baffin Island (Canada) and Greenland.
 - Davis Strait separates Canada's Baffin Island from Greenland.
- It has been classified as a "proto-microcontinent"—a primitive, partially detached continental crust.
- It has been named the Davis Strait proto-microcontinent since it formed owing to the tectonic evolution of the Davis Strait.
- **Size:** Estimated to be 19 to 24 km wide.

About Proto-Microcontinent?

- It is a fragment of continental crust that has broken off from a larger continent but hasn't drifted away completely.
- Other microcontinental features discovered:
 - Jan Mayen - Iceland
 - East Tasman Rise - near Tasmania.
 - Gulden Draak Knoll - Western Australia

Intermediate-Mass Black Holes (IMBHs)

Context

Indian scientists detected an Intermediate-Mass Black Hole (IMBH) using the Devasthal Optical Telescope (DOT).

About Intermediate-Mass Black Holes (IMBHs)

- IMBHs are the 'missing link' in the black hole family:
 - They are smaller than supermassive black holes & larger than stellar-mass black holes (a few times the Sun's mass).
 - Estimated mass range: 100 to 100,000 solar masses.
 - They are believed to be seeds of supermassive black holes. Their discovery helps understand black hole growth and galaxy evolution.
- It was detected using a technique called Spectrophotometric Reverberation Mapping.

About Devasthal Optical Telescope (DOT)

- DOT is India's Largest Optical Telescope, commissioned in 2016.
 - Size: 3.6 metres in diameter.
- It is located at Devasthal Observatory, near Nainital, Uttarakhand.
- It is managed - ARIES – Aryabhata Research Institute of Observational Sciences
 - ARIES is an autonomous institute under the Department of Science and Technology (DST), Government of India.

Atmospheric Rivers

Context

A large part of the United States witnessed heavy rain, strong winds and severe thunderstorms due to atmospheric rivers.

About Atmospheric Rivers

- They are relatively long, narrow regions in the atmosphere – like rivers in the sky – that are responsible for 90 percent of the movement of moisture from the tropics toward the poles.
- **Size:** average atmospheric river is about 2,000km long, 500km wide and nearly 3km deep
- **Occurrence:** Between December and February in the Northern Hemisphere– and in the Southern hemisphere – typically between June and August, when extratropical cyclones are prevalent.
- **Conditions required for formation:**
 - Strong low-level winds that act as a highway for water vapour to be transported across.
 - The jet streams in the Northern and Southern hemispheres act as these highways, with speeds reaching as high as 442km/h (275mph).
 - High moisture levels
 - Orographic lift
- **Impact of Atmospheric Rivers**
 - Redistribute freshwater globally.
 - Increase water levels and snowpack in watersheds.
 - Responsible for more than half of the rainfall in parts of the coasts of North America, France, Spain, Portugal, the United Kingdom, South America, Southeast Asia, and New Zealand.
 - Can cause landslides, mudslides, and major flooding.
 - Seven of India's 10 most severe floods in the monsoon seasons between 1985 and 2020 were associated with atmospheric rivers.
- **Categories:** Five types based on their size and strength: Weak, Moderate, Strong, Extreme and Exceptional.

Pineapple Express:

- Example of an atmospheric river storm that causes torrential rains on the US West Coast, particularly California.
- Known as the "Pineapple Express" due to its moisture source from tropical Hawaiian waters.
- Powered by the southern branch of the polar jet stream, transporting warm, moist air from Hawaii.

Rare Earth Magnets

Context

China has suspended exports of several critical rare earth elements, metals and magnets in response to US Tariffs.

About Rare Earth Magnets

- Rare earth magnets are strong permanent magnets made from rare earth elements, like neodymium, samarium and dysprosium.
- They are 10–20 times stronger than traditional magnets like ferrite or alnico.
- **Applications:**
 - **Electric motors:** Used in hybrid vehicles and other applications requiring high efficiency.
 - **Generators:** Used in wind turbines and other energy generation systems.
 - **Hard disk drives:** Used in computer storage devices.
 - **Audio speakers:** Enhancing sound quality and performance.
 - **Medical devices:** Found in MRI machines and other imaging equipment.

- **Defense:** Used in precision-guided missiles, aircraft and electronic warfare systems.

About Rare Earth Elements

- The International Union of Pure and Applied Chemistry (IUPAC) defines rare earth minerals as a set of seventeen chemical elements in the periodic table. These metals have similar properties.
 - Thulium and lutetium are the two rare earth elements with the lowest abundance.
 - Cerium, yttrium, lanthanum, and neodymium are the most plentiful rare earth elements.
- China produces ~90% of the world's rare earth elements (REEs).
- Highest Reserves Worldwide: (1) China (2) Brazil (3) India (4) Russia (5) Australia

Rare Earth Element	Present Applications
Yttrium	Phosphors, ceramics, metal alloys
Lanthanum	Batteries, catalysts for petroleum refining
Cerium	Auto catalysts, Chemical Catalyst, glass polishing, metal alloys
Praseodymium	High power magnets, yellow ceramic pigment
Neodymium	High power magnets
Promethium	Beta radiation source
Samarium	High temperature magnets,
Europium	fluorescent lighting
Gadolinium	Magnetic resonance imaging contrast agent, nuclear reactor rods
Terbium	Phosphors for lighting, high power high-temperature magnets
Dysprosium	High power high-temperature magnets, lasers
Holmium	Highest power magnets in existence
Erbium	Lasers, glass colorant
Thulium	Ceramic magnetic materials, which are still under development
Ytterbium	Fibre optic technology, solar panels
Lutetium	PET scanners

Golconda Blue

Context

The Golconda Blue, once owned by Indian royalty, is set to be auctioned at Christie's Magnificent Jewels sale in Geneva, Switzerland.

About Golconda Blue

- It is a 23.24-carat fancy vivid blue diamond known for its exceptional clarity & rich blue hue.

- It is one of the rarest and most valuable diamonds globally.
- It was mined in the Golconda region of present-day Telangana.
 - Golconda mines were famed for producing high-quality diamonds like the Kohinoor and Hope Diamond.
- Historically it was owned by the Royal families of Indore (Holkars) & Baroda.

About Diamonds

Formation:

Diamonds form in the Earth's mantle and are brought to the surface through volcanic activity. They are found in volcanic landforms like dykes and sills.

Uses:

Diamonds are utilised in jewellery, industrial cutting tools, and polishing due to their hardness.

Global Diamond Production

- **Leading producers:** Russia, Botswana, Canada, Angola, Democratic Republic of Congo (DRC).
- **Largest Reserves:** Russia, Botswana, DRC, Angola, South Africa

Diamonds in India:

- **Madhya Pradesh:** Highest in both Production and Reserves
- **Other Areas:**
 - Wajrakarur Kimberlite pipe: Anantapur district, Andhra Pradesh
 - Krishna River basin gravels: Andhra Pradesh



Note: Kimberley Process (KP) is a global initiative to prevent conflict diamonds from entering the mainstream market. KP works in partnership with the United Nations.

TOPICS FOR PRELIMS (ENVIRONMENT)

Seaweeds

Context

India's seaweed farming is expected to grow significantly from its current Rs 200 crore value to Rs 3,277 crore in the next decade.

About Seaweeds

- Seaweed, or macro algae, refers to thousands of species of macroscopic, multicellular, marine algae.

BENEFITS OF SEaweeds



- It includes Rhodophyta, Phaeophyta and Chlorophyta macro algae. They range in colours from red, green, brown and black.
- They vary in size, from microscopic to large underwater forests.

Seaweed V.S. Seagrass:

- Seaweeds, classified as algae in the kingdom Protista, are plant-like organisms. They lack features such as a true stem, roots, leaves, and vascular tissues.
- In contrast, seagrass is a marine flowering plant with distinct stem, roots, and leaves.
- Seagrass also has the ability to produce fruits and seeds, unlike seaweeds.

Species of Seaweed Found in India

- There are around 844 species of seaweed in Indian waters. India has the highest number of seaweed taxa compared to other countries bordering the Indian Ocean.
 - Gracilariaverrucosa in Chilika Lake, Odisha
 - Ulva Linza or Ulva prolifera in Chilika Lake, Odisha
 - Gracilaria dura in Gujarat
 - Ulva Lactuca or Ulva fasciata or Ulva indica all over India coast
 - Kappaphycus all over Indian coast
- Tamil Nadu produces the highest amount of seaweed.

Initiatives taken in India for Promotion of Seaweed Cultivation

- Seaweed Mission launched in 2021 is a program by the Technology Information, Forecasting and Assessment Council (TIFAC) to commercialise seaweed farming and processing in India.

- The Indian government is promoting seaweed cultivation as part of the Pradhan Mantri Matsya Sampada Yojana.
- Guidelines for Import of Live Seaweeds into India: To import live seaweed into India, a detailed application to the Department of Fisheries triggers a review by the National Committee on Introduction of Exotic Aquatic Species, and upon approval, an import permit is issued within four weeks for high-quality seaweed germplasm.

CPCB's classification of industries

Context

The Central Pollution Control Board (CPCB) has revised the classification of industries based on their pollution potential.

Features of New Classification

- Industries are classified in **5** categories according to their pollution potential.
- A new category, called the **"Blue Category"**, has been introduced specifically for industries that provide **Essential Environmental Services (EES)**.
- It includes industries or utilities essential for environmental management, such as:
 - Waste-to-Energy plants
 - Certain Compressed Biogas (CBG) plants
 - Landfill maintenance services
 - Biomining operations
- Extended Validity:** Industries in the Blue category will receive an additional 2 years validity for their Consent to Operate (CTO), as an incentive.

Criteria & Examples of Industries

Industry	Pollution Index (PI) Range	Examples
Red	PI > 80	Thermal power plants, Cement manufacturing, Tanneries
Orange	55 ≤ PI < 80	Brick manufacturing, Dry cell battery, coal washeries etc.
Green	25 ≤ PI < 55	Ice cream manufacturing, Assembly units (non polluting)
White	PI < 25	Solar power generation, Medical oxygen etc.
Blue	Variable PI	Waste to Energy plants, Landfill operators, CBG plants

Central Pollution Control Board (CPCB)

- It is a statutory body constituted in 1974, under the Water (Prevention and Control of Pollution) Act, 1974. It is also entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981.
- Functions:
 - Preventing, controlling and abating water pollution
 - Preventing, controlling, and abating air pollution & Improving air quality.
 - Advising the central government on water and air pollution

Salt Pan Lands

Context

The Maharashtra Government has approved allocation of 256 acres of salt pan land to rehabilitate slum dwellers under the Dharavi Redevelopment Project (DRP).

Costal Regulation Zone Rules, 2011

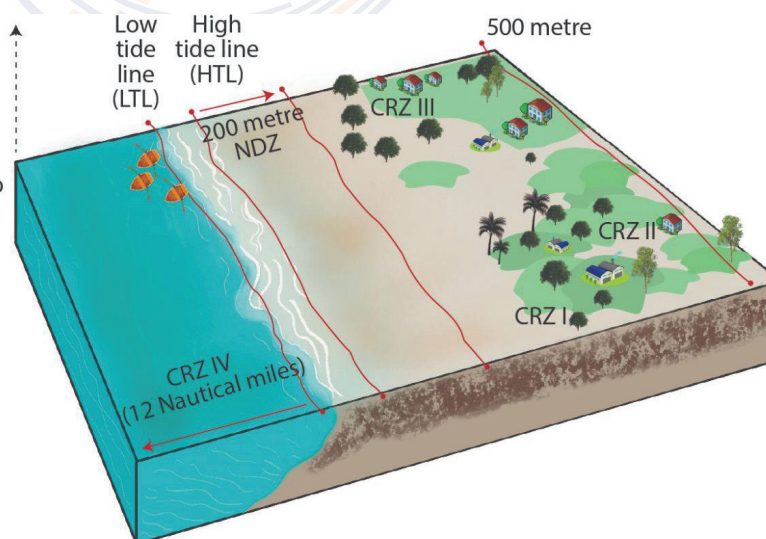
CRZ I: Eco-sensitive and intertidal areas

CRZ II: Areas which have been developed up to or close to the shore

CRZ III: Areas that are relatively undisturbed and do not fall under CRZ-I or CRZ-II

CRZ IV: Areas between Low Tide Line and 12 nautical miles into the sea/tidal influenced waterbodies

NDZ: No development zone that extends up to 200m from High Tide Line towards land in CRZ-III area



Costal Regulation Zone Rules, 2019

CRZ I A: Eco-sensitive areas

CRZ I B: Inter-tidal areas

CRZ II: Areas which have been developed up to or close to the shore

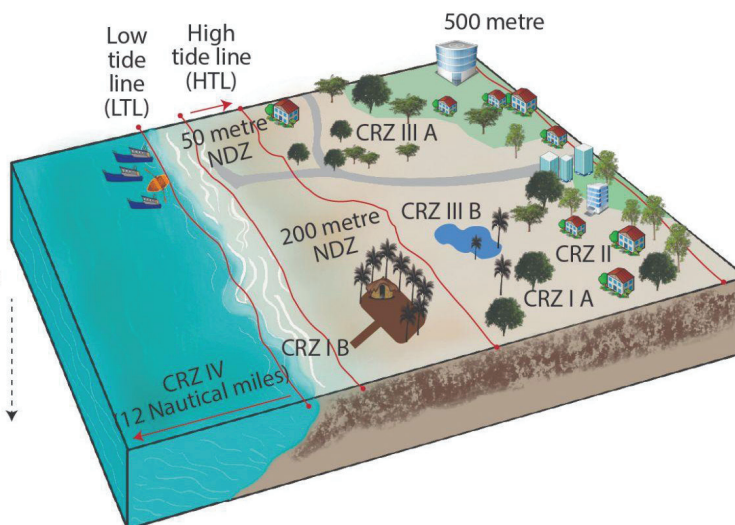
CRZ III A: CRZ-III areas, where the population density is more than 2,161/sq km as per 2011 Census

CRZ III B: Areas with population density of less than 2,161 per sq km, as per 2011 Census

CRZ IV A: 12 nautical miles from the Low Tide Line towards the sea

CRZ IV B: Tidal influenced waterbodies

NDZ: 50 metres from High Line in CRZ III A areas, 200 m from HTL in CRZ-III B areas



About Salt Pan Lands

- They are low-lying areas where seawater flows in and evaporates, leaving behind salt and minerals.
- Under the Coastal Regulation Zone (CRZ) notification of 2011, salt pans fall under **CRZ-IB**, which restricts economic activities except for salt extraction and natural gas exploration.
- **Ecological Importance of Salt Pans:**
 - **Flood Protection:** Salt pans, together with mangroves serve as natural flood barriers absorbing excess water during heavy rainfall and high tides. This reduces the risk of severe waterlogging in Mumbai.
 - **Biodiversity:** These areas support a diverse range of bird species and marine life, playing an important role in maintaining the local ecosystem.

Bioluminescent Beaches - Kavaru

Context

Bioluminescent blue waves were observed in the backwaters of Kochi, Kerala.

About Bioluminescence or Kavaru

- It is emission of light by living organisms in the water caused by microscopic organisms:
 - **Plankton** (Noctiluca scintillans or sea sparkle)
 - **Certain algae**, fungi and bacteria
- These organisms produce light through a chemical reaction inside their bodies.
- The reaction involves a light-emitting pigment (**luciferin**) and an enzyme (**luciferase**).

- When water is disturbed — by waves, movement of boats or even footsteps — the organisms light up as a defense mechanism or to attract mates.
- The glow is usually **blue**, but sometimes **red or brown** (called **red tide**) depending on species and concentration.
- It got popularised in the public imagination through the Malayalam film “**Kumbalangi Nights**”.
- **What Causes These Blooms?**
 - **Environmental Factors:** Eutrophication, High salinity and turbidity in estuarine and coastal waters, rising temperatures and reduced rainfall.
 - **Human-Induced Drivers:** Agricultural runoff, urban discharge and Industrial effluents from nearby regions.
- **Bioluminescence can occur in:** Beaches and shallow waters, Backwaters and estuaries & Paddy fields near coasts (like Kerala's pokkali fields)
- **Famous Indian Spots:**
 - Kumbalangi & Chellanam (Kochi, Kerala)
 - Thiruvananthapuram Beach (Chennai)
 - Betalbatim Beach (Goa)
 - Bangaram Island (Lakshadweep)

Ecological Implications

- **On Marine Ecosystems:**
 - Algal blooms can lead to **Harmful Algal Blooms (HABs)** causing **hypoxia (low oxygen)** → fish deaths, biodiversity loss.
 - It releases **toxic compounds** like: Hepatotoxins, Neurotoxins, Dermatotoxins etc.
- **On Aquatic Food Chains:** While plankton are crucial in the marine food chain, in excess they release harmful substances:

- Dimethyl sulfide, dissolved organic carbon, ammonium etc.

Global Geoparks

Context

UNESCO has added 16 new sites across 11 countries to its Global Geoparks Network.

About UNESCO Global geoparks

- UNESCO Global Geoparks are **single, unified geographical areas** where sites and landscapes of **international geological significance** are managed with a holistic concept of protection, education and sustainable development.
- At present, there are **229 UNESCO Global Geoparks in 50 countries**.
- **Key Features:**
 - Recognizes **geological heritage** of global value.
 - Promotes **sustainable development, geo-education, geotourism, and community involvement**.
 - Encourages participation of **local and indigenous communities** in maintaining cultural and scientific traditions.
- It was established in **2015** by the **United Nations Educational, Scientific and Cultural Organization (UNESCO)**.
- Presently, **India does not have any site** included in the **UNESCO Global Geoparks list**.

UNESCO

- The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialised agency of the United Nations (UN).
- It was founded in 1945 as the successor to the League of Nations' International Committee on Intellectual Cooperation.
- **Members:** UNESCO has 194 Members and 8 Associate Members.
 - India has been a member of UNESCO since its inception.
- **HQ** - Paris (France).

Flue Gas Desulphurisation

Context

In 2015, India's Environment Ministry mandated all 537 coal-fired plants to install FGD systems by 2018 to curb SO₂ emissions, but due to multiple challenges, the deadline has now been extended to 2027–2029.

About Flue Gas Desulphurisation (FGD)

- FGD refers to a set of technologies designed to remove sulfur dioxide (SO₂) from the exhaust flue gases of fossil-fuel power plants and other industrial processes.

- The primary goal is to reduce **SO₂ emissions**, which contribute to acid rain and respiratory problems.
- It uses various methods such as **Wet scrubbing, Dry Scrubbing** etc.
- **Advantages of FGD:**
 - It can remove up to 90% or more of SO₂ from flue gases.
 - The gypsum (byproduct) produced can be used in the construction industry, reducing waste.
 - It helps power plants meet stringent environmental regulations regarding SO₂ emissions.
- **Challenge**
 - FGD systems are **capital-intensive**, with significant **maintenance requirements**.
 - Wet FGD systems require excess water, which can be a concern in water-scarce regions.

National Institute of Advanced Studies (NIAS) Study on FGD

- **Findings of the Study:**
 - 92% of coal used in Indian plants has low sulfur content (0.3%-0.5%), reducing the necessity for FGDs.
 - Only **8%** of plants have installed FGDs, with 230 in various stages of installation and 260 yet to place orders.
 - FGD installation costs are estimated at ₹1.2 crore per MW
- **Recommendations:**
 - FGD installation should be limited to plants using imported coal or coal with sulfur content above 0.5%.
 - Focus should shift to controlling particulate matter (PM) emissions, which are more detrimental to air quality in India.
 - Electrostatic precipitators, costing ₹25 lakh per MW, can reduce PM pollution by 99% and are more cost-effective than FGDs.

Blue Flag Certification

Context

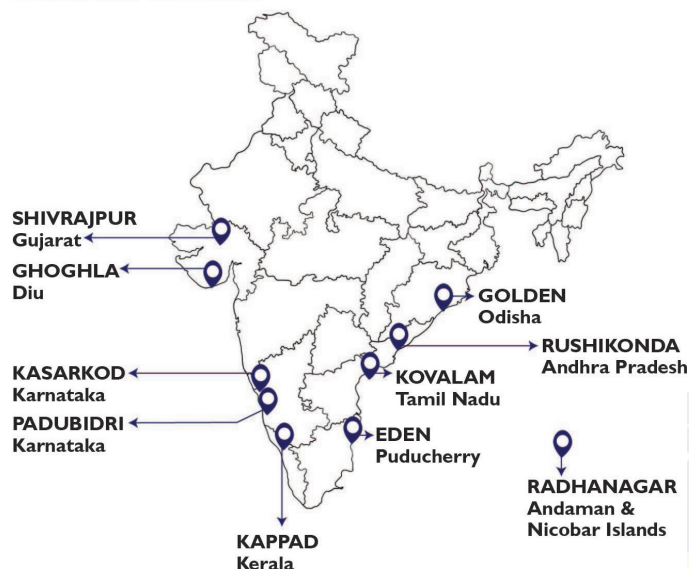
Rushikonda Beach wins back the Blue Flag tag which was earlier withdrawn due to poor maintenance.

About Blue Flag Certification

- The **Blue Flag Certification** is an **international eco-label** awarded by the **Foundation for Environmental Education (FEE), Denmark**.
- It is given to **beaches, marinas and sustainable boating tourism operators** that meet high environmental, safety and cleanliness standards.
- **Criteria:** To receive the Blue Flag tag, a beach must fulfill **33 stringent criteria** across **four major categories**:
 - Environmental Education and Information.

- Water Quality.
- Environmental Management.
- Safety & Services.
- India has **12** Blue Flag certified beaches.

BEACHES IN INDIA



International Big Cat Alliance

Context

An agreement was signed between IBCA and the Government of India, formalising India as the permanent host of the IBCA Headquarters and Secretariat.

About International Big Cat Alliance (IBCA)

- It is a global coalition comprising 96 big cat range and non-range countries dedicated to conserving seven big cat species and their habitats.

Species	IUCN Red List Status	CITES Appendix
Tiger	Endangered	Appendix I
Lion	Vulnerable	The Asiatic Lion: Appendix I, All other lion populations: Appendix II.
Leopard	Vulnerable	Appendix I
Snow Leopard	Vulnerable	Appendix I
Cheetah	Vulnerable	Appendix I (except for the populations of Botswana, Namibia, and Zimbabwe, which are included in Appendix II)
Jaguar	Near Threatened	Appendix I
Puma	Least Concern	Appendix II

Emission Trading Scheme

Context

A latest study on the Surat ETS has revealed that employing the market mechanism helped reduce pollution by 20-30% in industrial clusters.

- It was proposed by India's Prime Minister in 2019 and was officially launched in April 2023 to commemorate 50 years of Project Tiger.
- **Objectives:**
 - Combat illegal wildlife trade involving the seven big cat species.
 - Promote the preservation of natural habitats.
 - Mobilize financial and technical resources for conservation efforts.
 - Mitigate climate change impacts and align biodiversity conservation with local needs, contributing to the UN Sustainable Development Goals.
- **Focus Species:** Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma.
- **Governance:** Assembly of Members, a Standing Committee, and a Secretariat in India.
 - It follows a framework inspired by the International Solar Alliance (ISA), with a Director-General appointed by the Ministry of Environment, Forest, and Climate Change (MoEFCC).
- **Members:** Currently, India, Nicaragua, Eswatini, and Somalia.

About Big cats

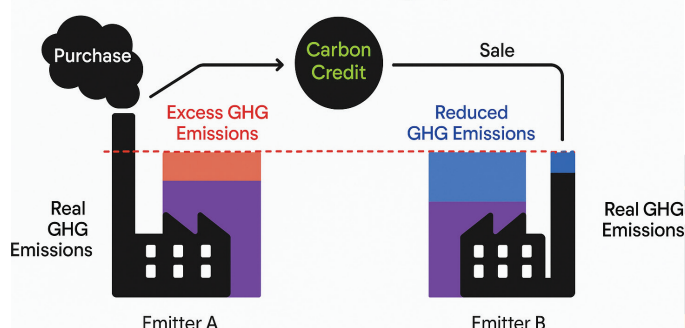
- Big cats are large wild cat species, primarily from the Panthera genus, although some species outside this genus are also included.
- In general, scientists categorize big cats based on two specific qualities: they belong to the genus Panthera and have a special two-piece hyoid bone in their throat that allows them to roar.
- The Siberian tiger is the largest big cat.
- The Indian subcontinent has historically been home to the Bengal tiger, Asiatic lion, Indian leopard, Indian/Asiatic cheetah (extinct in 1952), and Snow leopard.

About Emission Trading Scheme

- It is a regulatory tool designed to reduce air pollution (especially greenhouse gases and particulates) by creating a market-based system of permits.

- It is also known as “**cap-and-trade**”, it sets a **maximum limit (cap)** on emissions and allows industries to **buy and sell emission permits**.
 - Industries that pollute less can **sell** their unused permits.
 - Industries that exceed limits can **buy permits** to remain compliant.
- Objectives of ETS:**
 - Reduce pollution in a **cost-effective and flexible** way.
 - Incentivize industries to invest in **cleaner technology**.
 - Replace punitive regulatory enforcement with **market mechanisms**.

How an emission trading system works



About Surat ETS

- It is the first ETS in the world to target particulate matter & India's first emissions market for any pollutant.
- It was introduced in **2019** across **342** highly polluting industries to control fine particulate pollution emitted due to the use of solid fuel sources, such as coal, lignite, diesel etc.
- Key Findings from the Study on Surat ETS:**
 - Participating plants **reduced pollution by 20–30%**.
 - A total of 162 plants were studied** – those under the ETS performed better than those under standard regulation.
 - ETS plants had permits to cover emissions **99% of the time**.
 - Non-ETS plants failed to meet norms **for nearly 1/3rd of the study period** (almost two years).

India's Current Model (Command-and-Control):

- Currently Central and state regulators (MoEFCC, CPCB, SPCBs) monitor and penalize violators.
- Problems:**
 - Staff shortage, inefficient enforcement, bureaucratic red tape.**
 - One-size-fits-all** approach doesn't account for size and capacity of industries.
- ETS Advantage:**
 - Flexible:** Allows smaller units to buy time by purchasing permits.
 - Market-driven:** Encourages investment in pollution-reducing tech.
 - Self-regulating:** Less burden on government inspection.

Fluoride

Context

Sonbhadra, Uttar Pradesh's second-largest district, faces severe fluoride contamination in drinking water due to natural leaching from granite rocks and widespread reliance on borewells and hand pumps.

Health Concerns

Fluorosis

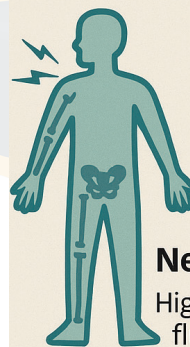
Dental Fluorosis

Overexposure to fluoride during childhood can lead to white spots or streaks on teeth.



Skeletal Fluorosis

Prolonged high fluoride intake can cause joint pain, stiffness and damage to bones



Neurotoxicity

High levels of fluoride exposure may impair cognitive development in children



Thyroid Function

Excess fluoride affects thyroid function



About Fluoride

- Fluoride is a naturally occurring mineral found in soil, water, plants and rocks.
- It is the ionic form of fluorine, a highly reactive element.
- Sources:**
 - Natural:** Groundwater and volcanic emissions.
 - Artificial:** Added to water supplies, dental products like toothpaste and some pharmaceuticals.
- Uses of Fluoride**
 - Dental Health:** Strengthens Tooth Enamel & reduces cavities.
 - Industrial Applications:** Used in the manufacturing of aluminum, pesticide, and refrigerants.
 - Public Health:** Added to drinking water to reduce dental decay, known as water fluoridation.

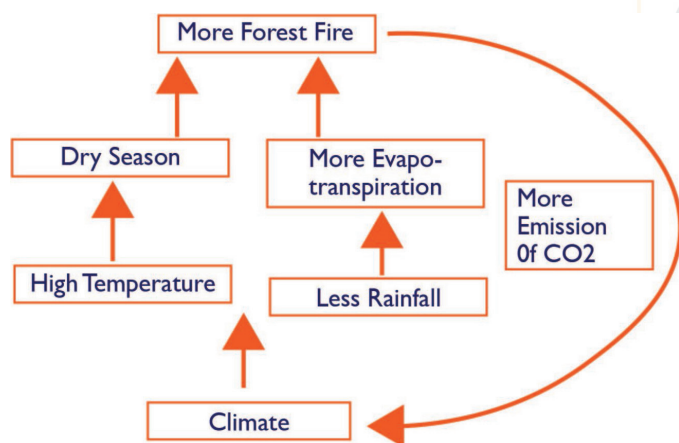
Fluoride Contamination in India

- **Permissible Limit:**
 - **Bureau of Indian Standards (BIS)** - 1-1.5 mg /l. It is believed that levels above or below this could cause dental decay.
 - **WHO** - 1.5 mg/L
- Fluoride levels exceeding permissible limits have been detected in isolated pockets across **370 districts in 23 states**.
- **Rajasthan, Andhra Pradesh, Telangana, Tamil Nadu, Gujarat and West Bengal** are the relatively high-fluoride-contaminated states in India.

Carbon Emissions From Wildfires

Context

According to the European Union's Copernicus Atmosphere Monitoring Service (CAMS), wildfires released approximately 800,000 tonnes of carbon into the atmosphere in January 2025 alone.



Carbon Emissions from Wildfires

- The burning of forests, peatlands, and grasslands contributes to significant atmospheric carbon levels.
- Forests typically act as carbon sinks, absorbing CO₂.
- When they burn, they release stored carbon and lose their carbon absorption capacity for years or decades.
- **Implications:**
 - Contributes to global warming as they burn through the natural carbon reservoirs that have historically helped regulate the earth's climate.
 - Increases public health risks due to smoke and particulate matter.
 - Affects biodiversity and soil quality.

Hotspots for Wildfires in India

- As per India State of Forest Report 2023, Uttarakhand (alone witnessed 5,315 forest fires), Odisha, and Chhattisgarh reported the highest number of forest fires during the year.

- The report also noted a declining trend in the number of fire hotspots across the country — from 2.23 lakh in 2021–22 to 2.12 lakh in 2022–23, and further down to 2.03 lakh in 2023–24.
- Forest fires in India emit approximately 69 million tonnes of CO₂ annually.

Arctic Boreal Zone Reversing Trend

- According to a 2024 study published in Nature Climate Change:
 - Over 30% of the ABZ has shifted from absorbing carbon to releasing it, primarily due to increasingly frequent and intense wildfires.
 - Researchers tracked carbon patterns across 200 sites (1990–2020), noting that while the ABZ remained a net sink from 2001–2020, one-third of the region has now become a net source of CO₂.
- This reversal is driven by:
 - **Wildfires:** Events like the Eastern Siberia fires (2003) and Timmins wildfire (Canada, 2012) released more carbon than the ABZ could absorb.
 - **Thawing permafrost:** Warming temperatures lead to soil drying, vegetation changes, and the decomposition of organic matter, releasing stored carbon.



De-extinction

Context

Colossal Biosciences, a Texas-based biotechnology company, announced the birth of three dire wolf pups.

About De-extinction

- De-extinction is the process of reviving extinct species using technologies like:
 - **Gene editing (e.g., CRISPR)**
 - **Cloning**

- **Cross-breeding with modern relatives.**
- **Colossal's De-extinction Targets:** Woolly mammoth, Thylacine (Tasmanian tiger) & Dodo.

Controversy around De-extinction

- **Scientific Concerns:** Reintroducing extinct animals into ecosystems may:
 - Disrupt existing biodiversity
 - Harm modern ecosystems not adapted to support them.
- **Habitat Change Over Millennia:** Ancient habitats that supported species like the dire wolf:
 - Had different climate, prey species and plant communities.
 - Modern landscapes are fragmented and human-altered.

Buffer Zones in Tiger Reserves

Context

The Madhya Pradesh government has approved a scheme for developing buffer zones in the State's nine tiger reserves.

Key Features of the Scheme

- **Chain-Link Fencing:** Installation in ecologically sensitive buffer areas to prevent human-wildlife conflicts.
- **Habitat Development:** Creation of grasslands and water resources to support wildlife.
- **Wildlife Protection Measures:** Implementation of fire safety protocols and health monitoring for wild animals.
- **Community Engagement:** Skill development training programs for local communities to promote sustainable livelihoods and involvement in conservation efforts.
- Madhya Pradesh is the **"Tiger State" of India**. It has witnessed a significant increase in its tiger population within buffer zones:
 - **2019:** 526 tigers
 - **2023:** 785 tiger

About Tiger Reserves

- They are declared and administered by the National Tiger Conservation Authority via Wild Life (Protection) Amendment Act, 2006 under Project Tiger. They are divided into two zones- namely, Core and Buffer.
- **Core Zone:** It has the highest level of protection and restrictions to protect its population and dependent prey.
 - In addition, it has equal legal status as the National Park and Wildlife Sanctuary.
 - Activities such as grazing, forestry operations, and other human activities are strictly prohibited in this zone.
- **Buffer Zone:** It has less level of protection as compared to the Core zone., and its boundary starts from the outer circumference of the core zone.

- Certain activities with regulations are allowed in this zone such as grazing, scientific research, settlement of forest dwellers, cultural activities, etc.
- **Key Facts about Tiger Reserves in India**
 - **Total Number of Tiger Reserves:** 57
 - **Largest Tiger Reserve:** Nagarjunsagar-Srisailem Tiger Reserve (Andhra Pradesh).
 - **Smallest Tiger Reserve:** Bor Tiger Reserve (Maharashtra)

Antibiotic Pollution

Context

A study estimates that of the 29,200 tonnes of top-used antibiotics consumed globally, about 8,500 tonnes (29%) enter rivers and 3,300 tonnes (11%) reach oceans or inland sinks after metabolism and treatment.



Scientists used a global river dataset (RiverATLAS) to estimate how much antibiotic pollution exists in the world's rivers.



They studied 21 commonly used antibiotics and estimated their levels in 8.5 million river segments, covering around 36 million kilometer of rivers worldwide.

Main contributing antibiotics:
Amoxicillin, Ceftriaxone & Cefixime

80% of Indian rivers are at risk of antibiotic contamination



Cefixime (used to treat bronchitis and other infections) is the biggest contributor to river pollution in India

Other High-Risk Countries: Nigeria, Pakistan, Ethiopia and Vietnam

Sources of Antibiotic Pollution

- **Pharmaceutical Industries:** Despite having wastewater treatment systems, pharmaceutical industries often fail to effectively remove antibiotic residues.
- **Livestock farming:** In India, livestock farming heavily uses antibiotics for growth promotion, leading to their seepage into soil and nearby water bodies.
- **Aquaculture:** Indian aquaculture, especially shrimp farming along coastal areas, relies heavily on antibiotics due to frequent infections from warm waters.

- **Human Waste:** Undigested antibiotics from human waste enter sewage systems through urine and feces.
 - **Poor wastewater treatment:** Inadequate wastewater treatment allows antibiotics to pass through and flow into rivers.
- Impact of Antibiotic pollution**
- **Environmental Damage:** Antibiotics in rivers harm aquatic life.
 - They can disrupt natural microbial ecosystems in water.
 - **Antibiotic Resistance:** The biggest threat is that bacteria in rivers become resistant to antibiotics. These resistant bacteria can:
 - Enter human or animal bodies through water or food.
 - Cause infections that cannot be treated by common medicines.

News in Short

Topic	Details
Project ICE-CRUNCH	• ICE-CRUNCH stands for: Ice nucleating particles and Cloud Condensation Nuclei properties in the North-Western Himalayas. • It is a collaborative project between India & Switzerland to study microphysical processes in clouds — particularly focusing on ice nucleating particles (INPs) and cloud condensation nuclei (CCN) — in the north-western Himalayas. • INPs and CCN play a crucial role in cloud microphysics — they affect how clouds form, grow, and lead to precipitation. • It will operate from the newly inaugurated Himalayan High Altitude Atmospheric and Climate Research Centre, Nathatop, Jammu & Kashmir.
Pink Moon	• Pink Moon is the name given to the full moon that occurs in the month of April. • It is not actually pink in color — the name comes from a pink wildflower that blooms in early spring and not from the moon's appearance. • In 2025, the Pink Moon occurred on April 12. It was also a Micromoon: – A micromoon appears smaller and dimmer because the Moon is at apogee – its farthest distance from Earth in its orbit. – Opposite of a Supermoon (which occurs at perigee – closest point to Earth).
Mesoscale Convective Systems (MCS)	• According to a recent study Soil moisture levels can serve as an early warning signal for severe mesoscale convective systems (MCS) • MCS is a large, organized cluster of thunderstorms. • It can cover areas larger than England and travel hundreds of kilometres. • Impact: – It causes intense rainfall. – It leads to flash floods, landslides, damage to infrastructure, livestock, and human lives. • Rainfall Contribution: In tropical regions, MCSs account for 50% to 90% of total rainfall. • Major Hotspots for MCSs: West and Central Africa, northern India, Argentina, China and Great Plains of United States.
Paste Fill Technology	• South Eastern Coalfields Limited (SECL) will be the first coal PSU in India to adopt paste fill technology in underground coal mining. • Target Mine: Singhali Underground Coal Mine in Korba area, Chhattisgarh. What is Paste Fill Technology? • Paste filling is an underground mining method used to fill mined-out voids. • The paste mixture includes: Fly ash (from thermal power plants), Crushed overburden (from opencast mines), Cement, Water and Binding chemicals. • After coal extraction, the underground voids are filled with this paste. No surface land needs to be acquired or disturbed. • Environmental and Structural Benefits: – Prevents land subsidence. – Improves mine stability and safety. – Recycles industrial waste (fly ash and overburden) – Reduces environmental degradation.

Topic	Details
Echolocation	- A new study has revealed how bats use adjusted echolocation to avoid collisions when flying in large groups. - Echolocation is a physiological process for locating distant or invisible objects (such as prey) by means of sound waves reflected back to the emitter by the objects. - Echolocation is used for orientation, obstacle avoidance, food procurement, and social interactions. - Other Animals That Use Echolocation - Dolphins - To find fish and navigate underwater. - Toothed Whales - To hunt prey and avoid obstacles. - Oilbirds & Swiftlets - To fly through dark caves.
Green Grabbing	- Green grabbing is the appropriation of land and resources under the pretext of environmental conservation or sustainability projects. - It often displaces indigenous communities, small farmers, and marginalized groups. - The term is similar to “land grabbing” but is justified through claims of climate action, conservation or renewable energy development.
Baku to Belem Roadmap	- India has urged BRICS nations to unite on ‘Baku to Belem Roadmap’ during the recent BRICS Environment Ministers’ Meeting. - Baku to Belém Roadmap is an initiative established during the 29th United Nations Climate Change Conference (COP29) held in Baku, Azerbaijan, in 2024. - Its primary objective is to scale up climate finance for developing countries. - It aims to mobilize at least \$1.3 trillion annually by 2035 to support low greenhouse gas emissions and climate-resilient development pathways.
Indonesia’s food and energy estate” program	- Indonesia is planning to clear forests the size of Belgium to grow: - Sugarcane (for bioethanol) - Rice and other food crops - The project is part of a government-backed “food and energy estate” program. - Food Estates are Large-scale plantations to boost food security. - It is considered the largest current planned deforestation operation in the world. - Rich Biodiversity of Indonesia: - Indonesia has the third-largest rainforest in the world. - Endangered species like orangutans, elephants, Papuan turtles and giant forest flowers. Total rainforest loss since 1950: 74 million hectares (285,715 sq miles) — twice the size of Germany.
BatEchoMon	- BatEchoMon is a fully automated bat detection and classification system, and the first of its kind in India. - Developed by: Kadambari Deshpande and Vedant Barje at the Indian Institute for Human Settlements (IIHS), Bengaluru. - It uses Audiomoth as an ultrasonic detector and a Raspberry Pi microprocessor for data processing. - It is the First system globally to integrate recording + real-time classification. - Features: - Activates automatically at sunset when bats begin flying. - Records, stores, processes and analyses bat activity autonomously. - Identifies species-wise bat calls, activity levels and behavioral patterns. - It costs only about one-third of advanced international detectors.

Species in News

Species	Details
Great Indian Bustard 	- It is endemic to the Indian subcontinent. - Habitat: open grasslands, arid plains and scrub forests. - Range: Its population is confined mostly to Rajasthan and Gujarat. Small population found in Maharashtra, Karnataka and Andhra Pradesh. - Only less than 150 GIBs are left in the wild and almost exclusively restricted to India. - Features: - 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. - Conservation Status IUCN status: Critically Endangered Wildlife Protection Act, 1972: Schedule I CITES: Appendix I - Covered under species recovery program. - Threats: - Power lines (disturbs visibility) - Habitat destruction and fragmentation & Overgrazing. - Steps taken to conserve GIB: - Under Species Recovery Programme - Project Great Indian Bustard by Rajasthan Govt - Firefly Bird Diverters - Artificial Hatching
Wombats 	- It is a short, chunky animal from Australia that lives underground in long, cool tunnels (Burrows). - There are three species of wombats: Common wombat, Southern hairy-nosed wombat, Northern hairy-nosed wombat (Critically endangered). - It is nocturnal - Active mainly at night. - Diet: Herbivore - mainly eat grass. - It has super strong claws for digging (not hunting). - Wombats are the only known animal to produce cube-shaped feces due to the shape and elasticity of their intestinal muscles. - Wombats are Marsupials (Marsupials are animals that carry and nurse their young in a pouch). - Other Marsupials: Kangaroo, Koala, Bandicoot, Wallaby, Tasmanian devil etc. - All Marsupials do not have pouches.
Colossal Squid 	- It is a massive squid that lives in the deep sea surrounding Antarctica. - It is the largest invertebrate on Earth. - It lives in cold, dark environments with low light and pressure. - Features: - Shorter arms, bulky body (unlike the giant squid). - Large, rotating hooks on its tentacles to capture prey. - Basketball-sized eyes – among the largest in the animal kingdom, adapted for deep-sea vision. (Larger than great Whale) - As it matures, it can grow up to 7 metres in length and weigh nearly 500 kg - making it the heaviest invertebrate on Earth. - It belongs to the class Cephalopoda, which includes octopuses, cuttlefish and other squids.

Species	Details
Nilgiri Tahr 	- It is a mountain goat endemic to the Western Ghats of India. It is locally known as “Varayadu” in Tamil and Malayalam. - It is the only mountain ungulate in southern India amongst the 12 species present in India. - Ungulate: A herbivorous hoofed mammal. E.g. cow, sheep, horse. - It is also the state animal of Tamil Nadu. - Habitat: Prefers montane grasslands (Shola-grassland ecosystem) at elevations of 1,200–2,600 meters. - Eravikulam National Park has the highest density and largest surviving population of Nilgiri tahr. - A grown up male of Nilgi Tahr is known as Saddle Back. (Due to light colored patch on their back) - Horn Rings: Its age is determined by counting the growth rings on its horns, which form annually, similar to tree rings. - Conservation Status: - IUCN - Endangered - WPA, 1972 - Schedule I - CITES - Appendix I
Malabar Grey Hornbill 	- It is endemic to the Western Ghats and associated hills of southern India. - Characteristics: - They have a large beak but lack the casque that is prominent in some other hornbill species. - It has a black undertail with white tips, and a pale eyebrow. - They move around in pairs or small groups, feeding on figs and other forest fruits. - Their loud cackling and laughing call makes them familiar to people living in the region. - Habitat: They are found mainly in dense forest and around rubber, arecanut or coffee plantations. - IUCN Status: Vulnerable. - India is home to nine hornbill species, including the Great Hornbill, Malabar Pied Hornbill, Rufous-necked Hornbill, Indian Grey Hornbill etc. Note: A team of researchers from Kerala has been awarded the Future Conservationist Award by the Conservation Leadership Programme (CLP) for their project on conserving the Malabar Grey Hornbill. - CLP is a partnership between Fauna & Flora International, BirdLife International and Wildlife Conservation Society. - Aim: To build the capacity of young conservationists, particularly in developing countries where resources for conservation are often limited.
Indian Grey Wolf 	- It is a subspecies of the grey wolf found across Southwest Asia and the Indian subcontinent. - Habitat: Scrublands, grasslands and semi-arid agroecosystems. - Characteristics: - It lives in smaller packs and is less vocal. - It's primarily a nocturnal hunter, active from dusk to dawn. - Conservation Status: - IUCN: Endangered - CITES: Listed in Appendix I - WPA, 1972: Schedule I
Mantis Shrimp 	- Mantis shrimp is a small, colourful crustacean (~10 cm long). - It uses a hammer-like appendage called the dactyl club to strike prey at a speed of 23 m/s (82.8 km/h). - This strike speed is about 50 times faster than the blink of an eye. - The energy released is powerful enough to: - Create shockwaves in water. - Cause cavitation bubbles (tiny vapour bubbles) due to low-pressure zones. - Collapse of these bubbles releases high-frequency shockwaves (hundreds of MHz) — a secondary blow to the prey. - IUCN Status: Least Concern

Species	Details
Bone Collector Caterpillar  Five photographs of Bone Collector Caterpillars are arranged in two rows. The caterpillars are covered in small, light-colored, bone-like fragments, giving them a camouflaged appearance. A scale bar at the bottom indicates 5 mm.	• A new species of carnivorous caterpillar, named the “bone collector”, has been discovered on the Hawaiian island. • Bone collector is a carnivorous caterpillar that feeds on trapped insects in spider webs. • It is not just a scavenger but an active predator, consuming insects already caught by spiders. • It constructs a silk case made from insect parts, such as ant heads and fly wings. • The decorated case serves as a form of camouflage, helping it blend in with its environment and avoid detection by spiders. • Predatory caterpillars are extremely rare, and the bone collector is a unique example of such behavior. – Researchers have found only 62 of these caterpillars during 20 years of observations. • Bone collector caterpillars have also been observed to eat each other.

Places in News

Place	Details
Black Sea  A map of the Black Sea region showing the sea and surrounding countries: Romania, Bulgaria, Ukraine, Russia, Georgia, and Turkey. Major cities like Istanbul, Ankara, and Moscow are marked. The sea is labeled 'Black Sea'.	News: Russia and Ukraine have agreed to halt military strikes in the Black Sea and on energy infrastructure. Details • It is a large inland sea located between Eastern Europe and Western Asia. • It is connected to the Mediterranean Sea via the Bosphorus Strait, the Sea of Marmara, and the Dardanelles Strait. • Countries bordering Black Sea: Turkey, Bulgaria, Ukraine, Russia, Georgia & Romania. • Rivers draining in Black Sea: Danube, Dnieper, Don.
Turkey  A map of Turkey and its surrounding region. Turkey is highlighted in orange. Neighboring countries include Iraq, Iran, Syria, Lebanon, Israel, Cyprus, Greece, Bulgaria, Romania, Moldova, Ukraine, Georgia, Armenia, Azerbaijan, and Saudi Arabia. Major water bodies like the Black Sea, Mediterranean Sea, and Aegean Sea are labeled. The capital, Ankara, is marked.	News: Large-scale protests have erupted in Turkey following the arrest of Istanbul Mayor Ekrem Imamoglu, a key rival to President Recep Tayyip Erdogan. Details • Location: It lies partly in Asia and partly in Europe. • Bordering Countries: Georgia, Armenia, Greece, Bulgaria, Azerbaijan, Iran, Iraq and Syria. • Surrounding water bodies: Black Sea, Mediterranean Sea and Aegean Sea. • Major Rivers: Euphrates, Tigris and Kizilirmak. • Important Straits: Bosphorus strait and Dardanelles strait. • Turkey is a member of NATO. It has 2nd Largest Army in NATO after the USA.

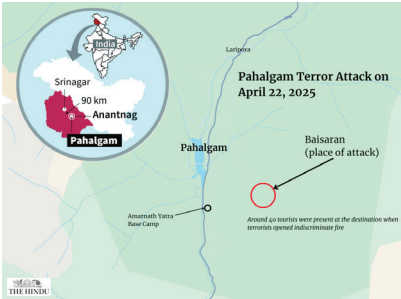
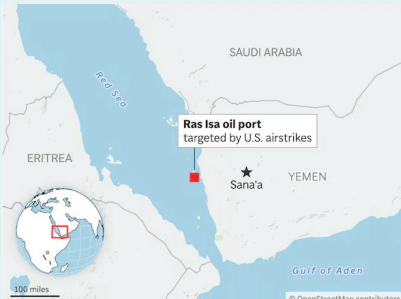
Sea of Marmara



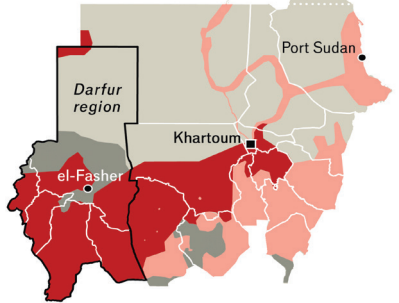
News: Recently a 6.2-magnitude earthquake struck the Marmara Sea.

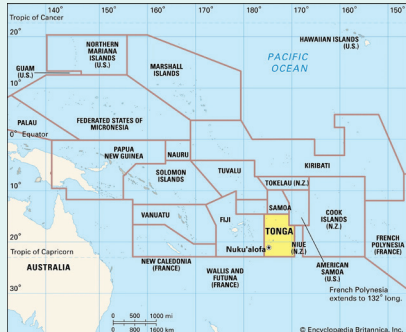
Details

- It is an inland sea partly separating the Asian and European parts of Turkey.
- It is entirely within the borders of Turkey.
- The Bosphorus strait connects it with Black Sea & Dardanelles strait connects it with the Aegean Sea.

Place	Details
Shahid Rajaei Port 	News: A recent explosion at Iran's Shahid Rajaei port killed 28 people and left 800 injured. The explosion took place in a shipment of "sodium perchlorate rocket fuel". Details: • Location: Northern shores of the Strait of Hormuz. On the west-southwest of the Port of Bandar Abbas. • It is part of Bandar Abbas Port Complex. • Shahid Rajaei port is Iran's largest and most advanced terminal.
Baisaran Valley 	News: Terror attack in Baisaran Valley Details: • Location: About 5 km from Pahalgam town, accessible only by foot or pony. • It is encircled by dense pine forests and snow-capped peaks. • It is nicknamed as Mini Switzerland for its alpine meadows and European landscape-like scenery. • Pahalgam is located in Anantnag district. It is known as the "Valley of Shepherds."
Ras Isa oil Port 	News: A recent U.S. strike on Yemen's Ras Isa fuel terminal has killed around 74 people. Details: • Location: Red Sea coast of Yemen. • It is a strategic oil port of Yemen. • It plays a vital role in Yemen's maritime trade and energy exports. • Yemen Bordering Countries: Saudi Arabia & Oman. • Major ports of Yemen: Aden, Al Hodeidah, Mocha etc.
Aral Sea 	News: The dried-up Aral Sea has become the hazardous Aralkum Desert, which ranks as a major global dust source. Details: • Location: Between Kazakhstan (north) and Uzbekistan (south) in Central Asia. • It was fed by Amu Darya and Syr Darya rivers. • Historically, it was the 4th largest inland water body in the world by surface area. • From 68,000 sq km in 1960, it shrank by over 90% by 2010. • Why the Aral Sea Dried Up? – Diversion of the Amu Darya and Syr Darya rivers during the Soviet era.

Place	Details
Tuti Island 	News: Impact of Sudan Civil war on Tuti Island Details - It lies at the confluence of the Blue Nile and White Nile rivers in Khartoum, Sudan. - It is also Known as “Khartoum’s Garden”. - Bordering Countries of Sudan: Egypt, Eritrea, Ethiopia, Red Sea, South Sudan, Central African Republic, Chad and Libya.
Morag Axis 	- Morag axis is a newly established Israeli-controlled corridor in Gaza. - It cuts between the southern cities of Rafah and Khan Yunis, linking to the Philadelphi Route (along the Egypt-Gaza border). - It creates a wider Israeli-controlled “security zone”, allowing the Israeli military to: - Sever southern Gaza into segments. - Control movement within Gaza. 
Slovakia 	News: Recently the President of India visited Slovakia. Details - Location: It is a landlocked country of central Europe. - Bordering Countries: Poland, Ukraine, Hungary, Austria, and Czech Republic. - Slovakia is a member of the European Union & NATO. - It was part of Czechoslovakia until the “velvet divorce” in January 1993. - Topography: Its northern part is dominated by the Carpathian Mountains. (Highest Peak - High Tatras) - Major Rivers: Danube, Vah & Morava.
Ream Naval Base Location of Ream naval base in Cambodia 	News: Recently Cambodia and China jointly inaugurated the renovated Ream Naval Base in Sihanoukville, southwestern Cambodia. Details - It is located on Cambodia’s southern coast, near the Gulf of Thailand. - It’s in proximity to the disputed South China Sea, a region where China claims nearly all territorial waters. - It is capable of docking large naval vessels & warships.

Place	Details
El Fasher Sudan, areas of control At May 23rd 2024 ■ RSF ■ SAF ■ Militias and rebel groups  Source: Thomas van Linge ■ Sparsely populated areas	- It is the capital of North Darfur. - It serves as a key military and logistics base in Darfur. - It is an important centre for humanitarian operations, including UN peacekeeping missions (UNAMID). - Currently under siege by the paramilitary Rapid Support Forces (RSF). - Currently El-Fasher remains the only regional capital not under RSF control.
Dier-Al-Balah 	News: A recent attack by Israel on a school in Dier Al Balah in Gaza has killed around 31 people including children and women. Details - Deir al-Balah is a Palestinian city in the central Gaza Strip. - It is the administrative capital of the Deir al-Balah Governorate of the State of Palestine. - It is located over 14 kilometers south of Gaza City. - The city is known for its date palms, after which it is named. - Deir El-Balah refugee camp is the smallest refugee camp in the Gaza Strip.
Heard and McDonald Island 	News: Recently US President Donald Trump imposed tariffs on remote and uninhabited territories, including Australia's Heard and McDonald Islands. Details - Heard and McDonald Islands: - It is located 4,100 km southwest of Perth, Australia. - It is covered in glaciers and mostly barren. - It has no recorded human activity for nearly a decade. - Cocos (Keeling) Islands: It is also an uninhabited Australian territory. - Norfolk Island: Only 2,000 residents live here but the tariff applied here (29%) is more than mainland Australia (10%).
Taiwan Strait 	News: Recently China completed a two-day military drill named "Strait Thunder-2025A" in the middle and southern parts of Taiwan Strait. Details - Location: China's Fujian Province (west) and Taiwan (east). - It is a 110-mile-wide (180 km) waterway separating mainland China and Taiwan. - It is also called Formosa strait. - One-third of the world's shipping traffic passes through the Taiwan Strait. - It connects the South China Sea and the East China Sea. - Rivers draining: Jiulong and Min. - Major Ports of Taiwan: Kaohsiung, Anping, Keelung, Suao.

Place	Details
Tonga 	News: Recently a powerful 7.1 magnitude earthquake struck near Tonga. Details • Location: Polynesia, South Pacific Ocean • It consists of some 170 islands divided into 3 main island groups: Tongatapu in the south, Ha'apai in the centre and Vava'u in the north. • Tonga is a member of the Commonwealth and United Nations. • It is part of the Pacific Ring of Fire, making it prone to earthquakes and tsunamis.
Thangjing Hills	News: Recently Meitei pilgrims were forced to abandon their annual pilgrimage to Thangjing Hills in Manipur due to opposition from the Kuki-Zo community. Details • Location: Churachandpur district of Manipur, to the west of Moirang town. • The hill is considered a sacred site by the Manipuri people, especially by the people of Moirang region. • The Meitei community undertakes a pilgrimage every year to the summit of the hill in devotion to the deity.
Naini lake	• Location: It is a Kidney shaped lake situated in Nainital, Uttarakhand, it is one of the most famous natural lakes in India. It is surrounded by seven hills. • It was discovered by P. Barron, a British businessman, in the mid-19th century. • It is not a Ramsar site. Factors Contributing to Water Depletion • Increased Population and Tourism Pressure. • Unplanned construction and encroachments near the lake. • Degradation of recharge zones, particularly Sukhatal Lake, a major aquifer recharge area for Naini Lake. • Discharge of untreated wastewater into the lake. • Decreasing Rainfall
Protected Areas in News	
Asola Bhatti WLS	News: Delhi Government has planned to replace all Petrol, Diesel and CNG vehicles with EVs that are currently used to supply food, water and other essential supplies. Details • Location: On the Southern Delhi Ridge of the Aravalli range. – It borders Delhi-Haryana, covering southern Delhi and northern parts of Faridabad and Gurugram districts in Haryana. – It is part of Sariska-Delhi Wildlife Corridor. • Fauna: Golden Jackals, Striped-Hyenas, Indian crested-Porcupines, Civets, Jungle Cats, Snakes, Monitor Lizards, Mongoose etc. • Flora: – It features plants with xerophytic characteristics like thorns, wax-coated and succulent leaves. – Prosopis juliflora and the Diospyros montana cover a major area of it.

Place	Details
Phawngpui National Park	News: Recently erupted forest fires in several parts of Mizoram's Phawngpui National Park have affected nearly one-ninth of the park's total area. Details • Location: Lawngtlai district of Mizoram, near the India-Myanmar border. • It is also known as Blue Mountain National Park. • It is a sacred place for local mizo people, they believe it is inhabited by the spirits of their ancestors. • The name "Phawngpui" is derived from the local Lai language, where "phawng" means "meadow" and "pui" means "great," reflecting the park's expansive meadows. • Phwangpui is the highest peak of Mizoram. (2157 m.). • Flora: Montane Subtropical forests including oak, rhododendrons and rare species of bamboos. • Fauna: Slow Loris, Tiger, Leopard, Leopard Cat, Serow, Asiatic Black Bear, Stump-tailed Macaque and Capped Langur. • Avifauna: Rare Blyth's Tragopan, Dark Rumped Swift etc.
Agasthyamalai Biosphere Reserve	News: Recently a SC bench has ordered the Central Empowered Committee (CEC) to conduct an extensive survey of the Agasthyamalai landscape. Details • It is located in southern Western Ghats in Tamil Nadu and Kerala. • It is named after Sage Agastya, a revered figure in Indian mythology. • It was designated as a UNESCO Biosphere Reserve in 2001 • Biodiversity Hotspot: ABR is part of the Western Ghats–Sri Lanka biodiversity hotspot. • Protected Areas Within the Biosphere Reserve: – Kalakad Mundanthurai Tiger Reserve (KMTR) – Tamil Nadu – Peppara Wildlife Sanctuary – Kerala – Shendurney Wildlife Sanctuary – Kerala – Neyyar Wildlife Sanctuary – Kerala – Srivilliputhur Grizzled Squirrel Wildlife Sanctuary – Tamil Nadu – Meghamalai and Thirunelveli Wildlife Sanctuaries – Tamil Nadu
Similipal Tiger Reserve (STR)	News: The Odisha government has notified the Similipal Tiger Reserve (STR), the world's only home to wild melanistic tigers, as a national park. It will be the 2nd NP of Odisha after Bhitarkanika. Details • Location: Mayurbhanj District, in the Northern-most part of Odisha. • It is a National Park, Tiger Reserve & Biosphere Reserve. • Flora: Mix of deciduous with some semi-evergreen forests. Sal is the dominant tree species. • Fauna: Tiger, Elephant, Leopard, Barking deer, jungle cat, four-horned antelope etc. – It holds the highest tiger population in the state of Odisha. – Black tigers (melanistic tigers) are found here. • At Least 12 rivers cut across the Tiger reserve, all of which drain into the Bay of Bengal. – Budhabalanga, Palpala Bandan, Salandi, Kahairi and Deo. • Prominent tribes: Erenga Kharias, Mankirdia, Khadia, Kolha etc. • UNESCO Biosphere Reserve: Declared a biosphere reserve in 1994. – It is also a part of the UNESCO World Network of Biosphere Reserves since 2009. • STR is part of the Mayurbhanj Elephant Reserve, which also includes the Hadagarh Wildlife Sanctuary and Kuldiha Wildlife Sanctuary.

Place	Details
Gandhi Sagar Wildlife Sanctuary	News: The Cheetah Project Steering Committee has cleared the proposal to relocate some cheetahs from Kuno National Park to Gandhi Sagar Wildlife Sanctuary. Details • Location: Mandsaur and Neemuch district in western Madhya Pradesh, bordering Rajasthan. It was notified as a WLS in 1974 • River: The River Chambal flows through the sanctuary, dividing it into two parts. • IBA: Gandhi Sagar Wildlife Sanctuary and the reservoir is also a designated Important Bird and Biodiversity Area (IBA). • Flora: Khair, Salai, Tendu, Palash etc. • Fauna: Chinkara, Nilgai, and Spotted Deer, Leopard, Striped Hyena, and Jackal etc. – It also has a good population of crocodiles and turtles. • Historical Places: Chaturbhujnath temple, Bhadkaji rock paintings & Hinglajgarh fort.
Mahuadanr Wolf Sanctuary	• Location: Latehar district of Jharkhand. • It is part of Palamau Tiger Reserve. • It is India's first and only dedicated wolf sanctuary • The landscape is inhabited predominantly by tribal communities, with over 80% followers of "Sarna Dharma" — a nature-worshipping faith



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TOPICS FOR MAINS

Rising tensions in the Arctic

Syllabus Mapping: GS-2 Policies of Developing and Developed Countries

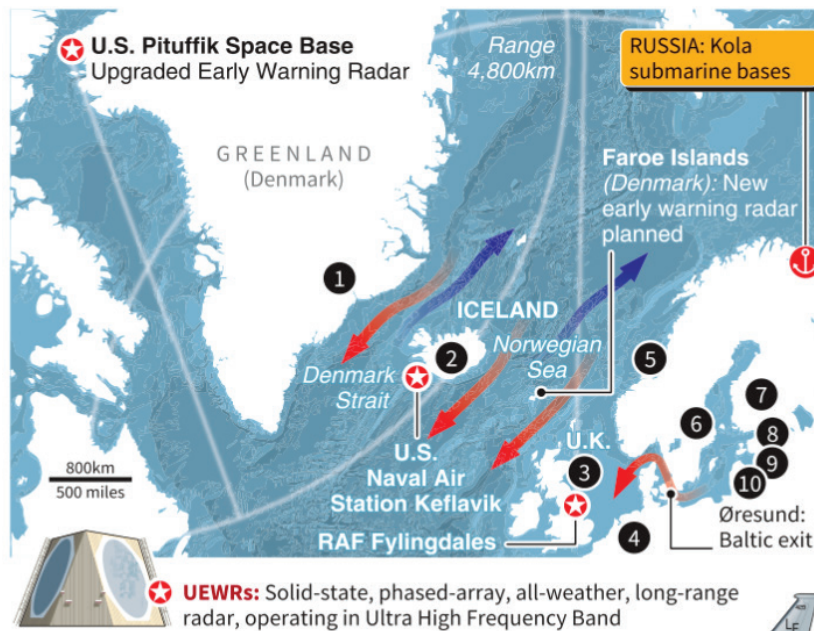
Context

International observers have expressed concerns about rising tensions in the Arctic, cautioning that if not addressed, they could potentially lead to conflict in the region.

Current Scenario in the Arctic

Ice cold war

The melting of Arctic sea ice has prompted renewed interest in the region. The U.K. has repeatedly emphasised the strategic importance of the Greenland-Iceland-U.K. (GIUK) gap, a critical choke point for NATO's naval defences



- The Arctic is witnessing rising geopolitical tensions as climate change accelerates ice melting, unlocking new opportunities for resource extraction, trade routes, and military expansion.
- Nations such as Russia, the U.S., Canada, Denmark, and China are asserting their claims and strategic interests, leading to growing concerns over potential conflict.
- NATO and Russia are increasing military posture in the region, with Russia maintaining a strong icebreaker fleet and military bases, while NATO allies, including Sweden and Finland, are expanding their Arctic presence.

Impact of Climate Change in the Arctic

- **Melting Sea Ice:** September Arctic sea-ice is shrinking by **12.2% per decade** (NASA).
 - Indicates global warming and serves as a **canary in the coal mine** for climate catastrophe.
- **Emergence of New Trade Routes:**
 - Melting ice is opening the **Northern Sea Route (NSR)** — the shortest sea route between Europe and Asia.
 - Saves **time and freight cost**, potentially transforming global cargo flow.

- **Climate Feedback Loop:** Melting ice reduces the **Earth's albedo (reflectivity)**, accelerating warming.
 - Directly affects **monsoon patterns** and **agricultural outputs** in the Global South, including India.

How is the Arctic Controlled?

Arctic Council

- **Established:** 1996 by the **Ottawa declaration**
- **Objective:** To promote **cooperation, coordination and interaction** among the **Arctic States** together with the **indigenous communities** and other **Arctic inhabitants**.
 - To promote research and facilitates cooperation among Arctic countries on issues related to the environmental **protection and sustainable development of the Arctic region**.
- **Arctic Council Secretariat:** The standing **Arctic Council Secretariat** formally became operational in 2013 in **Tromsø, Norway**.
- **Members:** The Council has **members, ad hoc observer countries** and **"permanent participants"**
 - **Permanent:** Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the U.S..
 - **Observer status:** It is open to **non-Arctic states**, along with **inter-governmental, inter-parliamentary, global, regional and non-governmental organizations** that the **Council determines** can contribute to its work.
- **India holds the Observer status** in the Arctic Council.
- **Sovereign Territories:** Eight Arctic nations (Permanent members of Arctic Council) control land and resources within their Exclusive Economic Zones (EEZs).
- **UNCLOS Regulations:** Nations can extend claims beyond their 200-nautical-mile EEZ if they prove the seabed is a natural extension of their continental shelf. Overlapping claims by Russia, Canada, and Denmark remain unresolved.

Current Status: It is now **struggling with geopolitical rivalries**, particularly after Russia's invasion of Ukraine.



Importance of Arctic region

- **Resource Reserves:** The Arctic is estimated to hold **13% of the world's undiscovered oil and 30% of its untapped natural gas reserves**, along with rare earth elements, phosphates, and copper, making it a key battleground for energy security.
- **New Trade Routes:** Melting ice is opening up strategic shipping routes like the **Northeast Passage** (along Russia's coast) and the **Northwest Passage** (through Canada), potentially **reducing maritime travel distances between Asia and Europe**.

- For China, the Northern Sea Route provides a strategic alternative to the Strait of Malacca, a critical chokepoint in its energy supply chain.
- **Strategic Significance:** The Arctic has become an area of military interest, particularly for NATO and Russia. The **Greenland-Iceland-U.K. (GIUK) gap** is a key naval choke point.
- The Arctic sits at a critical position between North America and Eurasia, making it a powerful strategic position from which to project military strength.
- **New Theatre for strategic dominance:**
- **Russia-China Cooperation in Arctic Circle:** Russia has joined forces with China, a self-declared “near Arctic state,” in expanding military and economic infrastructure in the High North.
- Russia has been building up its Arctic force as the region is critical to its nuclear posture
- **For Scientific Research:** Arctic research is important as it is considered to be a barometer of global climatic change, a subtle change in the Arctic becomes important and the rest of the world’s climate is affected by the changes in climate in the Arctic region

How Has Russia Made Its Presence Known in the Arctic?

- **Military Expansion:** Russia has **reopened Soviet-era Arctic military bases** and modernized its presence with **air defense systems, radar stations, and Arctic brigades**.
- **Icebreaker Fleet:** Russia has the **world’s largest fleet of icebreakers**, including **nuclear-powered** ones, giving it unmatched access to Arctic waters.
- **Territorial Claims:** Russia has submitted claims to the **UN Commission on the Limits of the Continental Shelf**, arguing that large parts of the Arctic seabed belong to its continental shelf.
- **Symbolic Acts:** In **2007**, Russia planted a **titanium flag on the Arctic seabed** at the North Pole, signaling its ambitions.
- **Strategic Partnerships:** Russia has conducted **joint naval exercises with China** and controls key segments of the **Northern Sea Route**, crucial for trade between Europe and Asia.

Opportunities for India

- **Strategic Trade Access:** NSR can boost India’s maritime trade — **Chennai-Vladivostok Maritime Corridor** can link to NSR ports.
 - Cuts transport time to Europe and Russia.
- **Geopolitical Balancing:** India must balance relations with both the **West (U.S., Japan)** and **Russia**.
 - Can play a **neutral, bridge-building role** in Arctic diplomacy.
- **Arctic Research & Climate Impact:** India has a research base “**Himadri**” in Svalbard.
 - Indian studies have shown Arctic ice melt **alters monsoons** — vital for food security.
- **Shipbuilding & Infrastructure:** India’s 2025-26 Budget allocates **\$3 billion Maritime Development Fund**.
 - Promoting **Arctic-grade shipbuilding** (icebreakers) through new clusters.
- **Multilateral Engagement:** **Arctic Circle India Forum (May 2025)** is a platform to promote India’s Arctic vision.
 - India can advocate a **reformed, inclusive Arctic Council** and perhaps appoint a **‘Polar Ambassador’**.

INDIA'S ARCTIC POLICY RESTS ON SIX Pillars

01 Science and Research

02 Climate and Environmental Protection

03 Economic and Human Development

04 Transportation and Connectivity

05 Governance and International Cooperation

06 National Capacity Building

Positions of Major Countries

Country	Position & Interests
Russia	• Dominates the Arctic coastline. Building Arctic ports like Pevek and Sabetta. • Controls much of the NSR. India-Russia working group on NSR established.
China	• Promoting the Polar Silk Road, part of Belt Road Initiative (BRI). • Wants Arctic access to bypass traditional routes like the Malacca Strait. • Not an Arctic nation, but aggressively asserting interests.

Country	Position & Interests
United States	• Strategic and military interest. • Keen to limit Russia-China influence. • Less infrastructural investment so far in Arctic trade routes.
European countries	• Concerned about climate impact but interested in trade and environmental governance. • Some Arctic Council members like Norway and Sweden are cautious of China-Russia moves.
Japan & South Korea	• Wary of China-Russia alliance in the Arctic. • Share India's concerns. • Could become India's partners in sustainable and balanced Arctic engagement.

Issues in the Arctic Region

- **Geopolitical Rivalries Intensifying:** U.S.-Canada disputes over the Northwest Passage, Russia's military buildup, and China's growing Arctic ambitions are expected to fuel tensions.
- **Increased Militarization:** Russia and NATO are conducting military drills in the Arctic, while China is developing nuclear-powered icebreakers to expand its presence.
- **Expanded Commercial Interests:** As Arctic sea routes become more viable, countries will compete for economic benefits, particularly in resource extraction and shipping.
- **Environmental and Legal Challenges:** Rising global temperatures and the absence of a comprehensive Arctic treaty (like the Antarctic Treaty) may lead to uncontrolled exploitation, further straining international relations.

Way Forward

- **Promote Multilateral Governance**
 - **Establish a comprehensive Arctic treaty** modeled on the Antarctic Treaty to ensure peaceful cooperation, environmental protection, and equitable resource sharing.
 - **Strengthen the role of the Arctic Council** by expanding its mandate beyond scientific collaboration to include dispute resolution and security dialogue.
- **Enhance Confidence-Building Measures**
 - Initiate **military transparency agreements** among Arctic and interested non-Arctic nations to reduce tensions and avoid accidental conflict.
 - **Conduct joint rescue, environmental, and scientific missions** to build trust and foster collaboration.
- **Ensure Sustainable Development**
 - **Implement strict environmental regulations** for commercial activities like shipping and resource extraction to minimize ecological harm.
 - Promote the **use of green technology and renewable energy** in Arctic operations to reduce carbon footprints.
- **Protect Indigenous Rights and Ecosystems**
 - Guarantee the **participation of indigenous communities** in policy decisions affecting their land and livelihood.
 - **Support community-based conservation programs** and traditional ecological knowledge in managing Arctic resources.
- **Internationalize Scientific Cooperation**
 - **Facilitate open access to Arctic research** and shared use of scientific infrastructure to promote transparency and innovation.
 - Establish an **Arctic Scientific Exchange Program** to foster collaboration between Arctic and non-Arctic nations.

Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) And India

Syllabus Mapping: GS-2 Regional Organisations

Context

The 6th Summit of the Heads of State/Government of the member States of BIMSTEC) was held in Bangkok, Thailand.

About BIMSTEC

BIMSTEC

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation.












OBJECTIVE

To accelerate the economic growth and social progress in the sub-region through joint endeavors in a spirit of equality and partnership.

MAIN SECTORS OF COOPERATION

Trade & Investment, Transport & Communication, Energy, Tourism, Technology, Fisheries, Agriculture, Public Health, Poverty Alleviation, Counter-Terrorism & Transnational Crime, Environment & Disaster, Management, People-to-People, Contact, Cultural Cooperation, Climate Change.

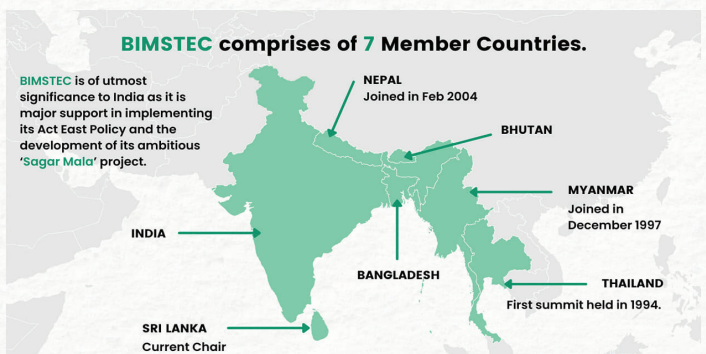
6 JUNE 1997

is the establishment date of BIMSTEC.

FACTORS

- BIMSTEC has headquarters in **Dhaka, Bangladesh**.
- BIMSTEC countries house **1.73 billion** people
- BIMSTEC has combined GDP of **\$ 4.4 trillion**.
- The current Secretary General of the BIMSTEC is Ambassador **Tenzin Lekphell** from **Bhutan**.

BIMSTEC comprises of 7 Member Countries.



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Importance of BIMSTEC for India

- It host 22% of the world population with a combined GDP of US\$3.697 trillion/per year.
- **Foreign policy Goal:** It is aligned with the foreign policy goal of India to gain trade and security prominence in the Indian Ocean region
- **Regional leader:** Through BIMSTEC India can counter China's inroads in the Indian ocean region.
- **Regional Cooperation:** BIMSTEC emerged as an alternative platform to the SAARC, which has stalled over the years due to Indo-Pak relations.
- **Address shared Challenges:** BIMSTEC provides a platform to address shared challenges like Climate change, Natural disaster and transnational security challenges.
- **BIMSTEC Charter:** Enabled it to cooperate with international and regional organisations; admit States, regional organisations & international organisations
- **Regional Stability:** joint exercises and collaborative frameworks enhance regional security architecture, thereby fostering trust and stability among member nations.
- **Economic cooperation:** BIMSTEC is important owing to the land and maritime trade potential of the member countries.
- **Regional Connectivity:** BIMSTEC focuses on improving regional connectivity through the BIMSTEC Master Plan for Transport Connectivity.

Challenges in India-BIMSTEC Relations

- **Economic Disparities:** Wide economic gap among member countries, with India as the dominant economy.
 - Smaller nations like Bhutan and Nepal face constraints in funding and execution of joint projects.

- Trade imbalances persist; non-tariff barriers (NTBs) and restrictive trade policies — notably raised by Bangladesh — hamper equitable trade.
- **Connectivity and Infrastructure Gaps:** Inadequate transport and communication networks limit regional integration.
 - Key projects such as the Kaladan Multi-Modal Transit Transport Project face delays due to logistical and operational hurdles.
 - Inefficient customs and border management worsen connectivity issues.
- **Institutional Limitations:** BIMSTEC's institutional framework remains weak; the secretariat in Dhaka is under-resourced and understaffed.
 - Poor implementation and monitoring of regional initiatives due to administrative inefficiencies.
 - Slow progress on key agreements like the BIMSTEC Free Trade Agreement reflects these shortcomings.
- **Political Instability:** Unstable political situations in countries like Myanmar affect regional cooperation and project continuity.
 - Frequent government changes disrupt long-term planning and implementation of BIMSTEC agendas.
 - Border-related tensions (e.g., India–Myanmar) strain bilateral and regional ties.
- **Security Threats:** Maritime security risks in the Bay of Bengal from piracy, smuggling, and illegal fishing activities.
- **Environmental Vulnerabilities:** Frequent natural disasters such as cyclones and rising sea levels threaten coastal member states.
 - Countries like Bangladesh and Sri Lanka are especially at risk, highlighting the need for joint disaster management efforts.
- **Geopolitical Challenges:** China's increasing strategic and economic presence in countries like Myanmar, Bangladesh, and Thailand undermines India's influence.
 - India's strained relationship with China complicates its leadership aspirations within BIMSTEC.
- **Uneven Member Engagement:** Some member countries prioritize other regional groupings like ASEAN or SAARC over BIMSTEC.
 - Fragmented participation leads to inconsistent commitments and diluted regional focus.

Way Forward

- **Proactive role of India:** For BIMSTEC to flourish, India (as the region's most powerful country) will have to step up, invest resources, and sustain interest in the Bay of Bengal's leading institution.

India's Efforts in BIMSTEC

- **Centre of Excellence Initiatives:** India has proposed specialized BIMSTEC centres for disaster management, sustainable transport, traditional medicine, and agricultural innovation.
- **BODHI Program:** Launched to support capacity building and human resource development across member countries.
- **Strengthening institutional mechanism:** Strengthening secretariat with more funding and manpower.
 - Members must endow it with greater financial assets by increasing the size of their respective contributions.
- **Regular engagement:** member states must prioritize holding meetings more regularly as only six summits have taken place in twenty five years.
- **Connectivity Boost:** Promoting infrastructure development through multi-modal transport corridors and regional energy grids to enhance physical and energy connectivity.
- **Cultural Diplomacy:** Strengthening people-to-people ties through cultural events like the BIMSTEC Games and music festivals to foster regional identity and cooperation.
- **Tackle the emerging challenges:** i.e. Rise in cyber threats requires joint cybersecurity frameworks and coordination.

India- Chile Relations

Syllabus Mapping: GS-2 Bilateral Relations

Context

Chilean President Gabriel Boric Font was on a state visit to India from April 1 to 5.

Chile

- **Capital:** Santiago.
- **Border:** **Peru** to the north, **Bolivia** to the northeast, **Argentina** to the east, and extends to the **Drake Passage** (turbulent waterway connecting South America and Antarctica) in the south.
- **Key Places:** **Atacama Desert**, one of the driest places on Earth (due to the **Humboldt ocean current**), is a key source of **sodium nitrate fertilizer**.
 - **Chuquibambilla:** Largest copper mining town in Chile.



Significance of Chile for India

Chile holds strategic importance for India in multiple domains, including trade, investment, minerals, renewable energy, and diplomatic cooperation.

- **Trade and Economic Importance:**
 - **5th Largest Trading Partner in South America:** With bilateral trade touching \$3.8 billion in 2024 from \$1.5 billion in 2020).
 - **Preferential Trade Agreement (PTA):** The expansion of the India-Chile PTA to 2,829 tariff lines has boosted trade.
 - **Double Taxation Avoidance Agreement:** Between India and Chile was signed on 9 March 2020.
- **Resource-Rich Partner**
 - **Lithium and Copper Reserves:** Chile is the **world's largest producer of copper and one of the top three producers of lithium**, both critical for India's electronics, EV, and renewable energy industries.
 - **Potential Collaboration in Mining:** India's mining delegations have explored investment opportunities in Chile, particularly in copper and lithium extraction.
- **Diplomatic and Strategic Significance**
 - **Support for India at the UN:** Chile has consistently supported India's bid for a permanent seat at the UNSC.
 - **Global Governance and Multilateral Forums:** Both countries collaborate in UN, WTO, and climate negotiations.
- **Renewable Energy and Climate Cooperation**
 - **Common Interests in Green Energy:** India and Chile share strong commitments to climate action, especially in solar and wind energy.
 - Chile also signed the **International Solar Alliance Framework Agreement** in November 2017.
 - **Hydrogen and Clean Energy Cooperation:** Chile is a global leader in green hydrogen, an area where India is also expanding.
- **Cultural and People-to-People Ties**
 - **Growing Popularity of Indian Culture:** Yoga, Ayurveda, and Indian spiritual movements have a strong following in Chile.
 - **Indian Diaspora:** Around 4,000 people of Indian origin, mainly from the Sindhi community, play a key role in business and trade.
- **Latin American Gateway:** Chile provides India with access to Latin American markets and serves as a bridge for economic expansion in the region.

India -Latin America Relation

Latin America is typically believed to include the **entire South American continent, as well as Mexico, Central America, and the Caribbean islands** whose residents **speak Spanish, Portuguese, and French**.

Areas of Cooperation:

- **Trade relation:**
 - India imports crude oil, lithium, copper, and agricultural products (like soybeans) from countries such as Brazil, Argentina, and Venezuela.
 - Exports: India exports pharmaceuticals, automobiles, machinery, and IT services to Latin America.
- **Energy Security:**
 - Latin America is a key source of crude oil for India (e.g., Venezuela, Brazil, Mexico).
 - **Lithium Triangle:** India is engaging with Bolivia, Chile, and Argentina for lithium supplies, crucial for EV batteries.

- **Information Technology:** Indian IT firms such as TCS, Infosys, and Wipro operate in countries like Brazil, Mexico, and Colombia, offering outsourcing and digital services.
- **Education and Culture:** Academic exchanges, scholarships, and cultural events have increased. Interest in learning Spanish in India and Hindi in Latin America is growing.
- **Multilateral cooperation:** India and Latin American nations collaborate in forums like the BRICS (Brazil), G20, and UN to promote South-South cooperation and global governance reforms.

Challenges in Relation

- **Geographical distance:** Lack of direct shipping routes and limited air connectivity also restrict people-to-people and business ties.
- **Lack of engagement:** Many Indian businesses lack awareness of Latin American markets, and vice versa. Cultural and language barriers (Spanish/Portuguese vs. English/Hindi) reduce mutual familiarity.
- **Low Political Priority:** India's top foreign policy priorities are more focused on neighbors, the U.S., China, and the Indo-Pacific. Similarly, Latin American countries often prioritize ties with the U.S., China, and Europe over distant partners like India.
- **Trade Imbalance and Limited Diversification:** Trade is heavily commodity-focused, with India importing natural resources but exporting mostly low to mid-value goods.
- **Limited Institutional Mechanisms:** Fewer high-level visits, economic forums, or institutional partnerships compared to other regions.
- **Dominance of China:** China has made massive investments and extended loans across Latin America, becoming a dominant economic partner.
- **Political instability:** Political instability, currency volatility, and regulatory uncertainty in countries like Venezuela or Argentina pose risks for Indian investors.

Way Forward for India

- **Strengthen Diplomatic and Political Engagement:** Regular High-Level Visits (Organize annual summits and ministerial meetings), Dedicated Latin America Policy, Embassy Expansion.
- **Enhance Connectivity: Direct Shipping and Air Routes:** Promote agreements for direct cargo and passenger links, ink trade facilitation agreements to reduce costs and improve customs efficiency.
- **Deepen Economic Cooperation**
 - **Diversify Trade:** explore sectors like IT, biotechnology, fintech, education, and healthcare.
 - **Encourage Indian Investment:** Offer incentives for Indian businesses to invest in Latin American markets, especially in energy, agriculture, and mining.
 - **Expand Trade Agreements:** Finalize and update Free Trade Agreements with MERCOSUR, Chile, and Peru.
- **Strategic Use of Soft Power**
 - **Bollywood and Ayurveda:** Promote Indian culture and wellness products which already have appeal in parts of Latin America.
 - **Tech Diplomacy:** Use India's digital expertise as a tool for capacity building and diplomacy.
- **Create India-LAC Dialogue Platforms:** Establish track 1.5 and track 2 dialogues for academia, business, and civil society engagement.



Decline of Religious Minority Rights in Bangladesh

Syllabus Mapping: GS-2 India's Neighbourhood

Context

Violence targeting Hindus in Bangladesh have sparked concerns about the safety and status of religious minorities in the country.

Comparative Decline of Religious Minority Rights in South Asia

Current **political trends** in all Pakistan and Bangladesh suggest a **continued erosion of minority rights**. The trajectory points towards a **regional decline** rather than isolated national issues.

Partition's Lingering Legacy

- **Partition of British India in 1947** was intended to resolve the **Hindu-Muslim minority issue**, but it left behind a **complex legacy**. It has become a **central, enduring political issue** in South Asia.
- **New socio-political identities**: New identities created i.e. **Mohajirs** in Pakistan (Muslim migrants from India).

Impact on Partition:

- The **Kashmir conflict** is another ongoing consequence of Partition.
- Partition also complicated the position of **non-Hindu, non-Muslim minorities** like **Sikhs and Christians**, increasing their vulnerability.
- **Bangladeshi refugees** in India (especially post-1971).

Post-Partition Political Proposals and Responses

- Political leaders in early independent India — Syama Prasad Mookerjee and B.C. Roy — debated **population exchange** as a solution.
- **Sardar Patel** proposed **military occupation of Khulna and Jessore** in East Pakistan to resettle Hindu migrants.
- The **Nehru-Liaquat Ali Pact (1950)** was signed to address:
 - The rising **refugee crisis**.
 - **Protection of minorities** on both sides.
 - **Prevention of war** between India and Pakistan.
- The pact led to the **resignations of K.C. Neogy and Mookerjee**, who saw it as insufficient.

Evolution of Regional Geopolitics

- Over time, the **Nehru-Liaquat Pact** failed to safeguard even **Muslim majority rights in East Pakistan**, especially **Bengali Muslims**.
- This neglect helped fuel the **1971 Bangladesh Liberation War**, leading to the **creation of Bangladesh**.
- The **two-nation theory** thus ironically resulted in the emergence of **three nations**: India, Pakistan, and Bangladesh.

Reason for Minority Safety issues in Bangladesh

- **Change in Attitude after formation**: Despite India's crucial role in **liberating Bangladesh**, relations are no longer based on gratitude. The **status of Hindus in Bangladesh** has become a contentious issue in bilateral relations.
- **Impact of Internal Politics of India**: In Bangladesh, India's internal policies like CAA and NRC have created **backlash against Hindus**, who are perceived by some as **sympathetic to India** or as beneficiaries of Indian favoritism.
 - Islamist groups in Bangladesh portray India's right-wing tilt under the BJP as evidence of a **Hindu nationalist agenda**.
- **Impact of Internal Politics of Bangladesh**: When India and Bangladesh enjoy good diplomatic relations, as seen under Sheikh Hasina's Awami League government, minorities in Bangladesh—especially Hindus—tend to experience relative calm.
- **Threat on secularism**: There is **no ideological consensus** within Bangladeshi society on secularism, making **minority safety precarious**.
- **Minorities Viewed as Pro-India**: During periods of anti-India sentiment (e.g., over CAA/NRC, Teesta water disputes), this perception leads to **targeted attacks**, boycotts, and social ostracization.
- Key debates include:
 - Whether violence is **politically motivated** or represents a **systematic targeting** of Hindus.
 - Critics argue India's foreign policy has become overly **personalized around Sheikh Hasina's family**, neglecting **broader democratic engagement**.

Way Forward

- **Need for Regional Recalibration and New Approaches**
 - A **new political vocabulary** and **regional institutions** are necessary to ensure minority rights.
 - Lessons from the **limited success of the Nehru-Liaquat Pact** remain relevant.
 - The idea that people with a **shared past** can build a **shared future** is still possible.
 - There is an urgent need for **fresh initiatives to revive secular values and minority protections**.

- **Strengthening Bilateral Mechanisms for Minority Protection**
 - Create a joint India-Bangladesh Minority Protection Commission to monitor incidents and suggest policy actions.
 - Establish **cross-border emergency response protocols** for communal violence (e.g., quick information-sharing, hotline between interior ministries).
- **De-linking Minorities from Geopolitical Rivalries:** Governments and media in both countries must avoid **framing minorities as extensions of foreign influence**.
 - Hindus in Bangladesh are Bangladeshi citizens, not “India’s people.”
 - Muslims in India must not be treated as foreigners or suspected Bangladeshis.
- **Regional and International Oversight:** SAARC, BIMSTEC, or UN agencies can play a constructive monitoring and mediating role.

Conclusion

- The **minority issue in South Asia**, rooted in Partition and shaped by decades of political decisions, remains a **central challenge** for the region’s peace and stability.
- Addressing it requires **transcending religious identities**, fostering **cross-border democratic engagement**, and **strengthening secular institutions**

U.S.’s reciprocal Tariffs and its implication

Syllabus Mapping: GS-2 Policies of Developed Countries

Context

US President Donald Trump celebrated America’s “Liberation Day” on April 2 by announcing “reciprocal tariffs” against all major trading partners.

More in News

- There were two sets of tariffs announced.
 1. A base tariff of 10% against all countries (Earlier 2.5%).
 2. Country-specific tariffs.

What are Reciprocal Tariffs ?

- Reciprocal tariffs refer to the practice of imposing tariffs on imports from other countries at a rate that matches the tariffs those countries impose on imports from the country imposing the reciprocal tariff.
 - **E.g.**, if Country A charges a 10% tariff on imports from Country B, then Country B might also charge a 10% tariff on imports from Country A.

What is Tariff?

A tariff is a **tax imposed** by one country **on the goods and services imported** from another country to **raise revenue, protect domestic industries, or exert political leverage** over another country.

Advantages and Disadvantages of Tariffs

Pros

- Produce revenues
- Open negotiations
- Support a nation's goals
- Make a market predictable

Cons

- Created issues between governments
- Initiates trade wars

Reasons Behind Imposing Reciprocal Tariffs

- **To Encourage Domestic Manufacturing:** Reciprocal tariffs are intended to make imported goods more expensive, thereby incentivizing companies to shift their production facilities to the United States.
- **Job Creation and Wage Growth:** By promoting local production, the administration aims to create more employment opportunities within the country and potentially increase wages for American workers.
- **As a Negotiating Tactic:** The tariffs serve as a pressure tool to push other countries into trade negotiations.
- **Counter Unfair Trade Practices:** The U.S. administration suggests that tariffs may be reduced or eliminated if trading partners agree to remove what are considered unfair trade practices or reduce trade imbalances.
- **To Address Trade Deficits:** The tariffs are also aimed at reducing the U.S. trade deficits with specific countries. By discouraging imports and encouraging exports, the policy seeks to rebalance trade flows.

Country	Trump estimates of tariffs on US goods	Trump's 'reciprocal' tariffs	US trade deficit in 2024 (with a minus sign) in \$ millions	US Trade Deficit as a percentage of the total US Trade deficit	Per capita income (US is at \$ 89,680)
Cambodia	97%	49%	-12,300	1.0	\$ 2,950
Vietnam	90%	46%	-1,22,071	10.1	\$ 4,990
Sri Lanka	88%	44%	NA	NA	NA
Bangladesh	74%	37%	-6,152	0.5	\$ 2,770
Thailand	72%	36%	-45,609	3.8	\$ 7,750
China	67%	34%	-2,95,402	24.6	\$ 13,870
Taiwan	64%	32%	-73,937	6.1	\$ 34,920
Indonesia	64%	32%	-17,883	1.5	\$ 5,250
Switzerland	61%	31%	-38,463	3.2	\$ 1,11,720
South Africa	60%	30%	-8,837	0.7	\$ 6,520
Pakistan	58%	29%	-2,989	0.2	NA
India	52%	26%	-45,664	3.8	\$ 2,940
South Korea	50%	25%	-66,007	5.5	\$ 37,670
Japan	46%	24%	-68,468	5.7	\$ 35,610
Malaysia	47%	24%	-24,830	2.1	\$ 14,420
EU	39%	20%	-2,31,769	19.3	\$ 45,240
Israel	33%	17%	-7,425	0.6	\$ 54,370
Philippines	34%	17%	-4,880	0.4	\$ 4,440
UK	10%	10%	11,857	-1.0	\$ 54,280
Brazil	10%	10%	7,351	-0.6	\$ 10,820
Singapore	10%	10%	2,829	-0.2	\$ 93,960
Chile	10%	10%	NA	NA	\$ 17,930
Australia	10%	10%	-73,927	6.1	\$ 67,980
Turkey	10%	10%	-1,453	0.1	\$ 16,880
Colombia	10%	10%	1,347	-0.1	\$ 7,900
World			-12,02,872		\$ 14,450

Source: White House, IMF, Indian Express Research

Impact of Reciprocal Tariffs on the Global Economy

- **Disruption of Global Trade:** Reciprocal tariffs disrupt established global supply chains, increase costs for producers and consumers, and reduce trade volumes.

- **E.g.,** Countries like Vietnam, Bangladesh, Cambodia, and Sri Lanka face steep tariffs (up to 54%) on key exports such as garments and footwear. These nations heavily rely on the US market for **over 25% of their exports**.
- **Shift in US Import Sources (Trade Diversion):** Countries with preferential trade access to the US — such as Kenya, Ethiopia (under AGOA), and Nicaragua (via CAFTA-DR) — may gain market share as US buyers shift away from high-tariff Asian suppliers.
- **Increased Inflation:** Tariffs raise the price of imported goods, causing inflationary pressures in both importing and exporting countries.
 - **In the US:** Consumers pay more for goods like electronics, clothing, and auto parts.
 - **Globally:** Countries affected by a weaker currency due to retaliatory tariffs may face costlier imports, especially of essentials like crude oil.
- **Risk of Stagflation:** When high inflation is coupled with stagnant or negative growth — known as stagflation — it creates a particularly difficult policy challenge.
 - **Central banks** may struggle to manage inflation without worsening unemployment or stalling growth further.
 - **Investment sentiment** weakens, further hurting growth.
- **Uncertainty and Investor Pullback:** Tariff wars introduce uncertainty in global markets, deterring long-term investment.
 - **Stock markets** may dip due to uncertain earnings outlook.
 - **Firms** delay expansion plans or hiring due to unpredictable trade policy environments.
- **Shift in Global Alliances and Trade Blocs:** Reciprocal tariffs may accelerate the formation of alternative trade blocs or the strengthening of regional ties.
 - **EU and Asia** might align more closely to reduce reliance on the US market.
 - **India and ASEAN** could emerge as more significant partners in global supply chains if they maintain lower trade barriers.
- **Potential for Currency Wars:** To offset tariff impacts, countries might devalue their currencies intentionally to maintain export competitiveness.
 - **Result:** Competitive devaluation could lead to currency instability, capital flight, and economic shocks in emerging markets.

Impact on Indian Exports to the U.S.

- **Moderate Export Dependence:** India's reliance on exports is moderate, and shipments to the U.S. have been on a decline. Therefore, the overall economic impact of the 26% tariff is expected to be limited but will vary across sectors.
- **Sectors Likely to Be Hit:** Key Indian exports that may face pressure include:
 - Electrical machinery
 - Machinery and mechanical appliances
 - Made-up textile articles
- **Sectors Less Affected:**
 - **Gems and jewellery:** Likely to remain stable due to inelastic demand.
 - **Pharmaceuticals:** Exempt from the new tariff measures.
- **Comparative Advantage:** India retains a relative edge as competitor nations like **China, Vietnam, and Bangladesh** face steeper reciprocal tariffs. **South Korea** faces a similar tariff rate of 25%.

Various responses from Countries to US Reciprocal Tariffs

- **Retaliation:** Imposing similar or higher duties on US goods and services.
 - **E.g.,** China responded by imposing 34% tariffs on all imports of US goods.
 - **Challenges:**
 - Economically harmful — mimics the same negative effects as the US tariffs.
 - **Only large economies** like India, China, or the EU can make a significant dent in US exports.
 - May provoke **further escalation** by the US (e.g., tariffs on critical sectors like **pharma or semiconductors**).
 - Politically ineffective, as the current US administration views withdrawal as a **sign of weakness**.
- **Re-orienting Exports & Finding New Markets:** Diversifying export destinations to reduce dependency on the US.
 - **Strategies:** Market research and new trade partnerships.
 - **Speed up trade agreements** like:

- AfCFTA (Africa)
- EU-Mercosur Agreement
- India–Sri Lanka FTA
- **Negotiating with the US:** Countries may adjust their own **MFN (Most Favoured Nation) tariffs** or trade policies to align with US expectations.
 - Countries like **Bangladesh, Sri Lanka, or Fiji** may reduce their tariffs on US goods.

Opportunities For India

Opportunity Area	Description
Relative Tariff Advantage	India faces a 26% tariff, which is lower than China (54%), Vietnam (46%), Bangladesh (37%) — boosting competitiveness in sectors like textiles and garments.
Value-Added Manufacturing	Encourages Indian exporters to focus on quality, innovation, and branding to justify higher prices in global markets.
Trade Diversification	Pushes India to explore alternate export markets like EU, ASEAN, Africa, and the Middle East.
Supply Chain Realignment	India can attract global manufacturers looking to diversify away from China (China+1 strategy).
MSME Sector Upgradation	Tariff pressure can lead to formalization, digital transformation, and productivity boosts in MSMEs.
Strategic Diplomacy	Leverage the situation to negotiate better terms in Indo-US trade, services, and investment frameworks.

Way Forward for India

- **Avoid Aggressive Retaliation:** India should refrain from aggressive countermeasures like China, which triggered steep retaliatory U.S. tariffs (up to 245% on some goods).
- **Adopt a Balanced, Strategic Approach:** A multi-pronged response is advised:
 - **Boost U.S. Imports:** Increasing imports from the U.S. can help reduce India's reciprocal tariff burden.
 - **E.g.,** Redirecting \$25 billion in oil imports to the U.S. could lower the tariff from **26% to 11.8%**, just above the default 10% threshold.
- **Engage in Trade Talks:** Proactively initiate trade consultations with the U.S. to negotiate a mutually beneficial long-term agreement.
- **Watch for Dumping:** Closely monitor imports from heavily impacted countries like **China**, which may resort to dumping surplus goods in India at lower prices.

US-Iran Nuclear Talks

Syllabus Mapping: GS-2 Policies of Developed Countries and its impact

Context

Recently Iran's Foreign Minister Abbas Araghchi and US Special Envoy Steve Witkoff held **indirect talks** in **Muscat (Oman)**.

Reason for willingness of Iran to Talk

- **Generational Shift in Iran:**
 - **The average Iranian is 32 years.** Younger generations have **not experienced** the 1979 Islamic Revolution, the Iran-Iraq War or the 1989 leadership transition.
 - They are **more concerned about jobs and economy** than ideology.
- **Economic Pressure:**
 - Iran is facing **double-digit inflation** and **high unemployment**.
 - **E.g.** Iran's currency **Rial** has depreciated to an all-time low of over **1 million rials per US dollar**.
 - The government sees foreign investment as necessary for survival.
 - **E.g.** In August 2024, President **Masoud Pezeshkian** said Iran needs **\$100 billion in foreign investment**.
- **Shift in Domestic Politics:**
 - Reformists are pushing for a deal to get **sanctions relief**.

- Conservatives, despite their majority in Parliament, are **not obstructing negotiations**.
 - **E.g.** Supreme Leader Khamenei (85 years old) is seen to be open to deals for regime stability.
- **Shifting Geopolitics:**
 - **Weakened ‘Axis of Resistance’:**
 - Iran’s regional influence via its **“Axis of Resistance”** (Hezbollah, Houthis, etc.) is **weakened**.
 - **Changing Arab Views:**
 - Countries like **Saudi Arabia**, who earlier opposed the 2015 deal, now **support a negotiated solution and economic engagement with Iran**.
 - **Russia’s Changing Stance:**
 - **Russia**, although supported Tehran’s nuclear stance post-Ukraine war, is now **reiterating support** for a deal.

The Iran-Trump Equation From Hostility to Pragmatism

- **History of Talks:**
 - Iran has negotiated with the **E3** (France, Germany, UK) since **2003** and with the **US** since **2013**.
 - These talks often happen while the US **increases military threats** to gain leverage.
- **Impact of Trump’s 2018 Withdrawal:**
 - Trump pulled out of the **2015 JCPOA** nuclear deal.
 - Iran responded with:
 - **Greater uranium enrichment** (up to 60%)
 - A **“no war, no talks”** stance announced by Khamenei in 2018.
 - Iran’s distrust of the US intensified after: **Assassination of Gen. Qassem Soleimani** in **Jan 2020**.
 - Despite this, **Iran didn’t fully abandon diplomacy** — keeping room open for talks.

Joint Comprehensive Plan of Action (JCPOA) - 2015

- It is a landmark nuclear agreement **between Iran and a group of world powers - P5+1**:
 - **P5**: Permanent members of the UN Security Council- **US, UK, France, Russia, China**
 - **+1 - Germany**
- **Key Terms of the JCPOA:**
 - Iran agreed to enrich uranium only up to **3.67%** (far below the ~90% needed for weapons).
 - Iran would cut its stockpile by **98%**, from ~10,000 kg to 300 kg.
 - The **Fordow underground facility** could not be used to enrich uranium for 15 years.
 - The **IAEA (International Atomic Energy Agency)** was given full access to nuclear sites.
 - **Iran got relief from US, EU and UN sanctions.**
- **Strategic Patience:**
 - Iran avoided formally rejoining the **JCPOA under Biden** (2021–22 Vienna talks).
 - This approach has allowed it to now **negotiate a new deal under Trump**, giving him a chance to claim success.

Issues in Iran-US nuclear deal

- **Instance on complete denuclearisation:** US Insist on complete denuclearisation of Iran Which is opposed by Iran
- **Hawkish approach:** Iran claims Trump approach as hawkish as it do nt want to Iran for civilian nuclear program
 - Donald Trump threatened Tehran with attacks if it did not negotiate.
- **Advance stage of nuclear weaponisation:** Now Iran has more nuclear material, more machines (gas centrifuges) to produce that nuclear material that no new nuclear deal will be able to roll back Iran’s capabilities to where they were before the JCPOA.
- **Issue in Monitoring:** Need of Advance monitoring of the Nuclear facilities by the IAEA will be an issues considering the issues undemocratic and non-transparent governance in Iran
- **Issue in implementation:** Unlike the JCPOA deal which was negotiated between P+I countries and Iran, this nuclear deal is negotiated by US and Iran that will complicate the implementation of the Nuclear deal. Thus a multinational, unified front was especially important during the implementation phase of the deal.

Impact Iran-US nuclear deal on India

- **Energy Security:**
 - An easing of sanctions will stabilise and deepen global energy markets in the short term as well as long term, which will be favourable for India.
 - **Long Term Impact:** Iran's return to the world energy market will also have a long term impact on the supply of oil as well as natural gas.
 - **Increased investment and access to technology and markets:** It can help to substantially increase Iran's production—which will also be a long-term stabilising factor for the world oil market.
- If Iran returns to the mainstream, it can benefit ONGC, Indian Oil, and Oil India, which are jointly exploring for oil and gas in Iran.
- **Benefit to the Chabhar port:** Delay in the Chabhar port will be removed due to the sanction on india communities.
- **Counter the Chinese influence in Iran:** With the western sanction in force Iran is more tilted towards China. With easing tension with the US and Israel, strategic dependence of Iran on China will be less.
- **Relation with Iran and Israel:** managing the relation with Iran and Israel will be easy for India with this deal

Future possibilities to the Iran-US Nuclear Deal

- **Iran's Religious Position:**
 - **Supreme Leader Khamenei's fatwa** prohibits **nuclear weapons**.
 - Iran maintains nuclear enrichment is **defensive**, not offensive.
- **Potential Roadblocks:**
 - Trump may **demand more** than just disarmament:
 - Curtailment of Iran's ballistic missile program
 - **Ending support to proxy groups** (Houthis, Hezbollah)
 - Despite these there are shared goal i.e. **The US wants Iran's nuclear disarmament** whereas Iran wants Sanctions relief and economic engagement.
- **Israel:**
 - **Israel wants a full stop** to Iran's nuclear activity. Netanyahu favours a **military option** over diplomacy.
 - However, if **Arab states support Iran** during Trump's upcoming regional visit, Netanyahu's ability to block a deal may weaken.
- **Can the Deal Happen:**
 - **Khamenei has given Araghchi full authority** to negotiate.
 - **Blueprint from 2015 (JCPOA)** still exists; it can be updated quickly.

Need of structural reform WTO

Syllabus Mapping: GS-2 International Organisations

Context

Amid rising protectionism and U.S. reciprocal tariff, World Trade Organisation (WTO) relevance is questioned, demanding urgent structural reforms.

About WTO

- **Established:** 1 January 1995 by Marrakesh Agreement (signed in 1994)
 - **Predecessor:** General Agreement on Tariffs and Trade (GATT), 1947
- **Purpose:**
 - To promote **free, fair, and predictable international trade**.
 - To provide a **rules-based framework** for global trade.
 - To ensure **non-discriminatory trade** among member nations (e.g., MFN & National Treatment principles).
 - To resolve trade disputes between countries.
 - To assist developing countries in trade capacity building.

Erosion of WTO's Core Functions

The WTO was built around **three core pillars**:

- **Negotiation Function:** The WTO's primary goal was to negotiate multilateral agreements under the principle of non-discrimination and consensus.
 - **Issues:** The **Doha Development Round** (launched in 2001) aimed at addressing issues like agricultural subsidies and development concerns has been stalled due to mismatched ambitions and lack of flexibility.
 - **Only one multilateral agreement — the Fisheries Subsidies Agreement** — has been partially concluded.
- **Dispute Settlement Function:** The **Dispute Settlement Mechanism (DSM)** is governed by the **Dispute Settlement Understanding (DSU)**.
 - The **Appellate Body**, acting as the WTO's highest court for trade disputes, has been **dysfunctional since December 2019** because the U.S. blocked appointments to it — first under President Obama, and later intensified by President Trump.
 - U.S. critics argue that the Appellate Body **overstepped its mandate and began “legislating,”** instead of merely interpreting trade rules (violating **Article 3.2 of the DSU** which restricts judicial overreach).
- **Trade Monitoring Function:** Under **Article X of the Marrakesh Agreement**, the WTO is responsible for reviewing members' trade policies and ensuring transparency.
 - **Issue:** the WTO struggles to monitor opaque trade practices, especially from major economies that fail to disclose domestic trade measures.
- **Paralysis in Decision-Making:** WTO operates on **consensus-based decision making (Article IX of the Marrakesh Agreement)**.
 - Attempts to introduce **voting-based reforms** have been opposed by countries like **India and the U.S.**
 - This rigid structure prevents even basic institutional reform, such as restoring the Appellate Body or resolving deadlocks in negotiations.
- **MFN Principle Undermined:**
 - **Article I of GATT (MFN Clause):** Requires that any favorable treatment granted to one country must be extended to all WTO members.
 - Increasingly, countries are prioritizing **Free Trade Agreements (FTAs)**, which are an exception to the MFN rule under **Article XXIV of GATT**.
 - The WTO has failed to rigorously scrutinize these FTAs, weakening the universality of the MFN principle.
- **Can't Avert a Future Crisis:** WTO lacks enforcement power, flexibility, and trust to act swiftly in emergencies.
 - It is not a forum conducive to honest multilateral engagement in a time of rising economic nationalism and strategic competition.

U.S. China, India And WTO

Aspect	United States	China	India
WTO Membership	Founding Member (1995)	Joined in 2001	Founding Member (1995)
Role in WTO	Major funder and rule-setter; influential in forming GATS, TRIPS	Rapid economic rise post-accession; major exporter	Vocal leader of developing countries; defender of food security and Special and Differential Treatment SDT
Key Contributions	Advocated for liberalization of services and IP	Complied with WTO commitments to open markets post-accession	Strong focus on agriculture and public stockholding
Trade Practices Criticized For	Unilateral tariffs (Section 232, 301); Appellate Body blockage	Market distortion, subsidies, limited access, overcapacity in key sectors	Blocking consensus on subsidies, e-commerce; high tariffs on imports
Dispute Settlement Stance	Regularly uses DSM; currently blocks Appellate Body appointments	Involved in many disputes as respondent; maintains procedural compliance	Active DSM participant; supports Appellate Body reform, not dismantling
Stance on Reform	Wants Appellate Body restricted; prefers bilateralism over multilateralism	Opposes reforms that undermine developing country benefits	Supports reform but insists on preserving development flexibilities and consensus decision-making

Aspect	United States	China	India
FTAs vs Multilateralism	Shifted toward bilateral deals under Trump; continues under Biden	Uses WTO but also signs bilateral and regional FTAs	Prefers multilateral system but now also pursuing FTAs with UK, EU, UAE
Developing Country Status	Opposes self-declaration of developing status by advanced economies (e.g., China)	Claims developing country status, enjoys SDT	Strong advocate of SDT and policy space for development
Major Areas of Disagreement	Dispute over Appellate Body, MFN principle, agricultural subsidies	Trade transparency, subsidies, forced technology transfers	Public stockholding, agricultural subsidies, opposition to labor/environmental linkages at WTO

Way Forward

- **Reviving the Dispute Settlement Mechanism:**
 - **Restore the Appellate Body** by unblocking appointments and revising procedural concerns raised by the U.S.
 - Implement **reforms to increase transparency, efficiency, and timelines** in dispute resolution.
- **Reforming decision-making (consensus to qualified majority):**
 - Move away from rigid consensus rules for certain issues; use **plurilateral agreements** (agreements among subsets of members) where appropriate, especially in areas like e-commerce or climate.
- **Rebalance “Special and Differential Treatment” (SDT)**
 - Redefine “developing country” status based on **objective economic indicators**, or create **tiered SDT categories** (e.g., least developed, lower-middle income).
 - Tailor benefits based on **actual need and sectoral capacity**, not self-declared labels.
 - Strengthen the role of **special and differential treatment** in ways that are tailored and performance-based, not one-size-fits-all.
- **Update Trade Rules for the 21st Century**
 - Updating rules to address new trade realities (e.g., digital trade, climate-linked trade, industrial overcapacity),
 - Rebalancing developed vs developing country interests.
- **Revitalize Multilateral Negotiations:** The Doha Development Round collapsed, and most progress has since been made through bilateral or plurilateral deals.
 - Use **issue-based “coalitions of the willing”** to break deadlocks on specific topics.
 - Focus negotiations on **realistic, actionable areas** like:
- Fishery subsidies (already progressing),
- Pandemic response (e.g., IP waivers),
- Food security and agriculture reform.
- **Increase Transparency and Compliance Monitoring**
 - Strengthen the WTO’s **Trade Policy Review Mechanism**.
 - Impose mild **penalties for non-compliance** with notification requirements.
 - Enhance the WTO Secretariat’s role in **independent data collection and publication**.
- **Strengthen Political Support and Global Legitimacy:**
 - Convene **high-level ministerial forums** with political leaders—not just trade ministers—to renew commitment to multilateralism.
 - Improve **communication and public outreach** to explain WTO’s benefits, counter misinformation.

Conclusion

Practical Relevance of WTO has reduced. The world is moving toward bilateral and regional arrangements, bypassing WTO norms. Despite this its **symbolic relevance** still provides a foundational legal framework for trade and a reference point for disputes.

The gradual transformation of the Home Ministry

Syllabus Mapping: GS-3 Internal security agencies and their mandate

Context

The Ministry of Home Affairs (MHA) has seen various gradual transformations over years.

Key Reforms Undertaken

- **Legislative Reforms:**
 - Passage of three new criminal laws: Bharatiya Nyaya Sanhita, Bharatiya Nagarik Suraksha Sanhita, and Bharatiya Sakshya Adhiniyam in 2023.
 - Amendments to the NIA Act and UAPA to define terrorism in Indian law and financially choke terror groups.
 - Over 27 legislative reforms since 2019 to establish strong security jurisprudence.
- **Institutional Modernization:** Establishment of the National Forensic Sciences University (NFSU).
 - Full implementation of the Crime and Criminal Tracking Network and Systems (CCTNS), integrating police stations, courts, jails, and forensic labs.
 - Revamping intelligence-sharing mechanisms like the Multi-Agency Centre (MAC).
- **Budgetary Expansion:** The MHA budget crossed ₹1 lakh crore in 2019 and surged to ₹2.33 lakh crore in 2025.
 - Enhanced expenditure on Central Paramilitary Forces from ₹38,000 crore in 2013-14 to ₹97,000 crore in 2024-25.
- **Focus on Technology and Coordination:** Creation of technology databases for intelligence.
 - Promotion of a “duty to share” culture among agencies.
- **Conflict Resolution:**
 - Dilution of Article 370 for Kashmir integration.
 - Peace accords in the North-East.
 - Dual strategies combining security measures with development initiatives in Naxal-affected areas

Impact on the Ground

- **Reduction in Violence:** Violence across Kashmir, North-East, and Naxal areas has declined by 70%.
 - Stone-pelting incidents in Kashmir have reduced substantially.
 - Insurgency in the North-East has weakened.
- **Integration and Stability:** Political stability and economic growth are evident in previously conflict-prone regions.
 - Social transformation is visible in Naxal strongholds due to development initiatives.
- **Enhanced Governance:** Improved coordination between states and the Centre through Articles 355 and 356 of the Constitution.
 - Strengthened federal governance structures integrating security with administrative functions

Issues in the Home Ministry

- **Focus on Hotspots Only:** For decades, violence in Kashmir, insurgency in the North-East, and Naxalite movements in Central India dictated the Ministry's priorities.
 - This resulted in significant loss of life and extensive deployment of the Central Armed Police Forces (CAPFs) due to states' inability to modernize their police forces.
- **Reactive (Event-Driven) Legislation:** Laws were made in response to specific incidents:
 - **Terrorist and Disruptive Activities (Prevention) Act (TADA)** after Punjab insurgency.
 - **Prevention of Terrorism Act (POTA)** after the 2001 Parliament attack.
 - **National Investigation Agency (NIA)** was formed after the 26/11 Mumbai attacks.
- **Leadership Instability:** Frequent changes in leadership, particularly during Indira Gandhi's third term and Rajiv Gandhi's tenure, led to instability in internal security reforms.

- This instability hindered the implementation of long-term strategies, as seen with multiple Home Ministers during their tenures.
- **Crisis Management Frameworks:** While the MHA was involved in crisis management, broader frameworks for disaster management were developed later.
 - The National Disaster Management Act of 2005 led to the establishment of the National Disaster Management Authority (NDMA) and the National Crisis Management Committee (NCMC), which aimed to provide a more coordinated and proactive approach to disaster management.
- **Ethnic Violence and Regional Instabilities: Manipur ethnic violence** has exposed limitations in the MHA's ability to curb unrest despite central intervention.
 - Critics argue that the tussle between state and central powers has further complicated governance.
- **Hasty Drafting of Laws:** Critics have pointed out that legislative enactments often lack thorough scrutiny and stakeholder consultations, leading to implementation challenges.
 - **E.g.,** The Gram Nyayalaya Act failed to adequately address operational issues such as financial implications or its impact on reducing judicial pendency.
- **Resurfacing of Sikh Militancy: Pro-Khalistan elements** gaining visibility — both in India and abroad, especially in Canada.
 - Two radical Sikh leaders won Lok Sabha seats — showing **growing support for hardliners**.
- **Sino-India Border Tensions:** Despite military-level talks, the **border dispute with China** is unresolved.
 - MHA must ensure **internal preparedness**, especially in border areas like Ladakh and Arunachal Pradesh.
- **Ending Maoist Violence:** Violence is down 70%, but the job isn't over.
 - The Home Minister has promised a **Maoist-free India in 3 years** — needs smart operations, local support, and development.
- **Concluding the Naga Peace Accord:** Other peace accords in the North-East have worked, but **Naga talks remain stuck**.

Way Forward

- **Move from Reactive to Preventive Legislation**
 - Pre-legislative consultations: Make stakeholder engagement mandatory for all security-related bills.
 - Review and sunset clauses: Introduce periodic reviews and sunset clauses for special security laws to prevent misuse (e.g., as seen with TADA/POTA).
 - Unified Internal Security Code: Codify fragmented laws into a cohesive internal security framework with provisions for terrorism, insurgency, organized crime, and cyber threats.
- **Build Continuity in Security Leadership**
- **Minimum fixed tenure for Home Secretaries and Intelligence Chiefs** to reduce disruption of long-term strategies.
- **Establish Internal Security Advisory Board** composed of retired intelligence, police, and military experts to provide continuity across governments.
- **Improve Quality and Execution of Laws**
 - Implement new laws with proper training and infrastructure support.
 - **Impact assessment of security laws:** Conduct regular audits of laws like NIA Act or UAPA to ensure they're effective and not misused.
 - **Local judiciary capacity:** Fast-track deployment of special courts with trained judges in high-conflict zones.
- **Strengthen intelligence-sharing and surveillance in vulnerable regions.**
- **Promote inclusive dialogue to address ethnic and regional unrest.**
 - **Clear-hold-build model:** Focus not only on eliminating Maoist influence (clear) but also establishing state services (hold) and ensuring long-term development (build).
 - **Land and forest rights:** Accelerate recognition of tribal land rights and forest resource access to undercut Maoist narratives.
- **Link internal security efforts with local development initiatives.**
 - **Border area development:** Accelerate infrastructure and socio-economic programs in Ladakh, Arunachal, and other frontier districts.
 - **Civil-military fusion cells:** Establish joint planning bodies at district levels for coordination between local administration, BRO, ITBP, and the Army.

Terror Attack In Pahalgam (J&K)

Syllabus Mapping: GS-3, Terrorism and Border Security

Context

26 tourists killed in the terror attack in Pahalgam (J&K) raises again the question of Pakistan Based Terrorism.

India's Response to the Terror attack

The **Cabinet Committee on Security or CCS** - the country's highest-decision making body on national security has taken **some strict and punishing measures against Pakistan** over the **"cross-border linkages"** that have surfaced in the investigation.

- **Suspended Indus Waters Treaty (1960)**
- **Integrated Check Post at the Attari-Wagah border is to be closed** with immediate effect.
 - Individuals who have crossed into India with valid travel endorsements may return via the same route by **01 May 2025**.
- Pakistani nationals will **no longer be permitted** to travel to India under the **SAARC Visa Exemption Scheme (SVES)**. All previously issued SVES visas are cancelled.
 - Pakistani nationals currently in India under this scheme must depart within **48 hours**.
- **Military Attachés and Advisers:** Defence officials posted as naval and air advisers at the Pakistani High Commission in New Delhi are declared persona non grata and are required to leave India within **one week**.
 - Correspondingly, India will withdraw its defence advisers from its High Commission in Islamabad.
 - These military advisory positions are henceforth annulled.
 - Additionally, five support staff members from both missions will be withdrawn immediately.
- **Reduction in Diplomatic Staff:** The overall diplomatic staff strength at the High Commissions in both countries will be reduced from **55 to 30**, to be implemented by **01 May 2025**

Introduction

- There are multiple definitions of **terrorism** because it is a **highly politicized and context-dependent** term, and different stakeholders (governments, international organizations, scholars, and media) define it based on their own **ideological, strategic, or**
- There are nearly 200 definitions of terrorism globally, with **no universally binding legal definition exists under international law**, including within the **United Nations system**.
- Despite these multiple interpretations, terrorism is widely recognized as a deliberate use of violence aimed at creating fear to achieve political or ideological goals.
- Terrorist acts—such as **hijacking, murder, arson, and hostage-taking**—are criminal in nature.
- What distinguishes them as terrorism is the **intent to intimidate or coerce** a government or civilian population for political or social ends.
- States have also indirectly supported terrorist activities during warfare. For example, **Iran's support to Hamas and Hezbollah** in their conflict against Israel reflects how terrorism can serve as a **strategy within war**, particularly by proxy actors.

Types of Terrorism

Type of Terrorism	Definition / Motivation	Example
Religious Terrorism	Motivated by religious ideologies or belief in divine duty	ISIS, Al-Qaeda attacks
Ethno-Nationalist Terrorism	Driven by ethnic identity or the desire for a separate homeland	Liberation Tigers of Tamil Eelam (LTTE) in Sri Lanka
Left-Wing Terrorism	Aims to overthrow capitalist systems; inspired by communist or socialist ideologies	Naxal-Maoist insurgency in India
Right-Wing Terrorism	Based on ultra-nationalism, racism, or anti-immigration sentiment	Christchurch mosque shooting (2019), New Zealand
State-Sponsored Terrorism	Terrorist activities supported or financed by a sovereign state	Pakistan's alleged support to LeT (Lashkar-e-Taiba), JeM (Jaish-e-Mohammed)

Type of Terrorism	Definition / Motivation	Example
Narcoterrorism	Use of violence by drug cartels to influence governments or eliminate opposition	Colombian drug cartels
Cyber Terrorism	Use of cyberspace to cause disruption or spread fear	ISIS's cyber propaganda and recruitment
Environmental Terrorism	Violence in the name of environmental or animal rights causes	Earth Liberation Front (ELF) in the U.S.
Lone-Wolf Terrorism	Individual acts of terrorism without direct links to any organization	Orlando nightclub shooting (2016), USA

Means of Terrorism

- **Bombings and Explosives:** Terrorists often use IEDs (Improvised Explosive Devices) and car bombs to cause mass casualties and destruction.
 - **E.g., 2008 Mumbai Attacks** – Series of coordinated bombings and shootings by Lashkar-e-Taiba operatives.
- **Hijackings:** Seizing control of vehicles (planes, trains, ships) to make political demands or inflict mass fear.
 - **E.g., Indian Airlines Flight IC-814 (1999)** hijacked by Pakistani terrorists to demand the release of militants.
- **Cyberterrorism:** Use of digital means to disrupt critical infrastructure, hack systems, or spread propaganda.
 - **E.g., Suspected cyberattacks on Estonia (2007)** crippled banking and government websites, linked to political motives.
- **Assassinations:** Targeted killing of political figures, security officials, or community leaders to spread fear or destabilize governance.
 - **E.g., Rajiv Gandhi assassination (1991)** by LTTE suicide bomber.
- **Kidnappings and Hostage-taking:** Abducting civilians, diplomats, or foreigners to pressure governments or gain ransom/favors.
 - **E.g., 2004 Beslan school siege (Russia)** – over 1,000 hostages taken by Chechen terrorists; over 300 killed.
- **Bioterrorism and Chemical Attacks:** Using harmful biological or chemical agents to cause panic, illness, or death.
 - **E.g., 1995 Tokyo subway sarin gas attack** by Aum Shinrikyo cult killed 13 and injured over 5,000.
- **Lone Wolf Attacks:** Acts of terror carried out by individuals without direct connection to terrorist organizations but influenced by their ideologies.
 - **E.g., 2016 Nice truck attack (France)** – Individual drove a truck into a crowd, killing 86 people.
- **Financing and Propaganda:** Funding terror networks and spreading radical ideologies through social media or underground networks.
 - **E.g., ISIS using Telegram and dark web** platforms to recruit foreign fighters and raise cryptocurrency-based funding.

Reason for Kashmir Valley as a Terrorism Hotspot

- **Historical Grievances:** The **1947 Partition** of British India left Kashmir's status unresolved, leading to **multiple wars between India and Pakistan**.
 - The **accession of Kashmir to India** was contested by Pakistan, which continues to claim it.
 - The **disputed 1987 elections** disillusioned many Kashmiris, pushing youth toward militancy.
- **Pakistan's Proxy War Strategy:** Pakistan uses **terrorism as a low-cost, high-impact strategy** to keep Kashmir unstable without open warfare.
 - Its intelligence agency, the **ISI**, has supported and trained militant groups like **Lashkar-e-Taiba** and **Jaish-e-Mohammad**.
 - It recruits, arms, and infiltrates militants across the **Line of Control (LoC)** to sustain unrest.
- **Rise of Religious Radicalization:** Initially, the insurgency was about **political autonomy** and Kashmiri identity.
 - After the **Soviet-Afghan war**, radicalized fighters and **jihadi ideology** flooded into Kashmir.
 - The conflict was reframed from a nationalist struggle to **Islamic jihad**, which attracted more foreign fighters and funding.
- **Geography and Border Porosity:** Kashmir's **mountainous terrain** makes it difficult to monitor and secure borders.
 - This allows **infiltration** of militants, movement of arms, and establishment of hideouts.
 - Terrain also helps militants **evade Indian security operations**.
- **Political Instability and Governance Deficit:** Periods of **governor's rule**, **frequent clampdowns**, and limited democratic participation have alienated locals.

- Political uncertainty creates **power vacuums** that militant groups exploit.
- Even after the **abrogation of Article 370 in 2019**, alienation and distrust linger among some segments.
- **Shifting Strategy of Militants:** With tighter security in the Kashmir Valley, **terror attacks are now spreading into Jammu region**.
 - Attacks on **civilians and tourists**, like the **Pahalgam attack (2025)**, aim to disrupt normalcy and tourism.
 - These attacks are **calculated moves** to signal that Kashmir is still unstable.

Shortfalls Highlighted in Recent Attacks

- **Intelligence Failure:** Despite the known **terror threat landscape** in the region, intelligence agencies failed to intercept communication or detect movements.
 - The **failure to track groups like The Resistance Front**, a known proxy of Lashkar-e-Taiba, indicates inadequate surveillance and HUMINT (human intelligence).
- **Underutilization of Surveillance Infrastructure:** **Inadequate use of drones and electronic surveillance** tools, especially in high-footfall tourist zones like Pahalgam.
 - India has invested heavily in tech-driven surveillance, yet its absence in a hotspot like Baisaran points to **deployment and coordination gaps**.
- **Complacency in Security Preparedness:** The Valley was experiencing **increased tourist inflow**, making it a **soft target**.
 - Security forces appear to have **lowered their guard**, assuming a return to normalcy.
 - **Amarnath Yatra route proximity** should have warranted heightened vigilance, which was clearly lacking.
- **Reactive Rather Than Preventive Policing:** The response to the attack was **after-the-fact**, showing a **lack of proactive threat anticipation**.
 - Absence of **pre-emptive patrolling**, **area sanitization**, and **alert systems for tourists** points to a **gulf between strategy and execution**.
- **Poor Inter-agency Coordination:** There seems to be a **disconnect between central and local intelligence, police, and paramilitary forces**.
 - The **integration of intelligence inputs** and ground-level operations was insufficient, leading to **blind spots** in security coverage.
- **Failure to Protect Symbolic Targets:** **Tourism is a key symbol of peace and normalcy** in Kashmir — making it an obvious strategic target for terrorists.
 - The attack shows a **failure to identify and secure symbolic/publicly significant zones** that represent economic and psychological recovery in Kashmir.

Way Forward

- **Enhanced Intelligence and Surveillance:** Strengthen intelligence gathering through **human intelligence (HUMINT)**, advanced **drones, CCTV**, and **electronic surveillance** systems to monitor high-risk areas like tourist spots and the **Line of Control (LoC)**.
- **Improved Security Forces and Rapid Response:** Deploy more **security personnel** along critical tourist routes and **establish rapid reaction teams (QRTs)** to ensure quick, effective responses to attacks.
- **Strengthening Civil Society and Social Movements:** Kashmir's **civil society** must rise above condemnation and engage in proactive peace-building efforts. A **people's initiative for peace** needs to be built on **conviction and values**, not just political ideologies. Social movements that advocate for **tolerance, liberalism**, and **coexistence** must be encouraged, with grassroots involvement ensuring sustained engagement over generations.
- **International and Diplomatic Pressure on Pakistan:** Continue diplomatic efforts to **isolate Pakistan** on international platforms, pressuring it to end its support for cross-border terrorism and strengthen counter-terrorism measures.
- **Economic and Social Development:** Invest in **economic development** in Kashmir, focusing on **employment opportunities, education, and infrastructure**, to address the root causes of radicalization and ensure long-term peace and stability.
- **Use of multilateral organisation:**
 - India can actively engage in BRICS, the UN Security Council Counter Terrorism Committee (UNSC CTC), and the UN Counter-Terrorism Trust Fund (CTTF) to counter state sponsored terrorism.

TOPICS FOR PRELIMS (INTERNATIONAL RELATIONS)

Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation

Context

PM Modi visited Thailand to attend the **6th BIMSTEC Summit**.

About BIMSTEC

- BIMSTEC is a multilateral regional organisation to accelerate shared growth and cooperation among countries in the Bay of Bengal region.
- Origin and Membership:**
 - Founded as BISTEC** (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in June **1997** with the **Bangkok Declaration**.
 - Current Strength** - 7 (After addition of Myanmar (1997) & Nepal, Bhutan (2004).
 - Secretariat:** Dhaka, Bangladesh.
- The charter of BIMSTEC came into effect recently in (May, 2024).**
 - The document gives the organisation a legal personality,
 - Establishes a mechanism for admitting new members and observers,
 - Enables negotiations and agreements with countries and other regional and international groupings.
- Current Chair - Thailand** (Chairmanship rotates among countries alphabetically)
- Working Mechanism:**
 - Summits:** Held every **two** years.
 - Ministerial Meetings:** Foreign and Commerce Ministers meet annually to decide on trade and economic affairs.



About 6th BIMSTEC Meeting

- This is the **first physical meeting** since 2018. (Last was in Nepal)
- Theme: “Prosperous, resilient and open BIMSTEC (PRO BIMSTEC).”**

New Initiative launched:

- BODHI [BIMSTEC for Organized Development of Human Resource Infrastructure]:** For training and scholarships to professionals, students, researchers, diplomats and others
- India would be hosting a BIMSTEC Athletics Meet this year and the first BIMSTEC Games in 2027.
- The Indian PM launched the Young Leaders’ Summit, a Hackathon and a Young Professional Visitors programme.

India offered to establish:

- BIMSTEC Centres of Excellence in India:** on Disaster Management, Sustainable Maritime Transport, Traditional Medicine, and Research and Training in Agriculture.
- Pilot study by India to assess regional needs in Digital Public Infrastructure
- Capacity building programme for cancer care in the region
- BIMSTEC Chamber of Commerce and to organize the BIMSTEC Business Summit every year in India.

Biological Weapons Convention

Context

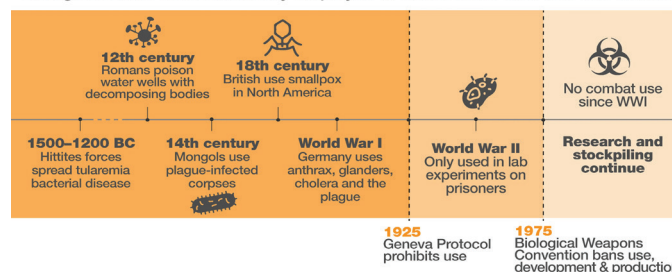
26 March 2025 marks the 50th anniversary of the entry into force of the Biological Weapons Convention.

About Biological Weapons Convention (BWC)

- BWC is the first multilateral disarmament treaty** that bans an **entire category of weapons of mass destruction (WMDs)**. It entered into force on 26th March **1975**.
- Biological weapons** are disease-causing organisms or toxins, like bacteria, viruses or fungi, intentionally used to harm or kill humans, animals or plants for military or terrorist purposes.

Biological weapons

Biological toxins were historically employed in warfare until their use was banned.



Sources: Al Jazeera, UNODA | Icons: Vanessa Choi, Ben Davis, BomSymbols - The Noun Project

- It supplements the 1925 Geneva Protocol, which had prohibited only the use of biological weapons.

- It prohibits the **development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons.**
- **Aim:** To ensure that **biological sciences and biotechnology are used only for peaceful purposes.**
- **Negotiated** by the Conference of the Committee on Disarmament in Geneva, Switzerland.
- **Members:** 188 countries. (**India is a member**).
 - **States that have neither signed nor ratified BWC:** Chad, Djibouti, Eritrea, Israel.
- **Review Conferences:** The BWC holds review conferences every five years to evaluate its effectiveness and discuss any concerns or issues.

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.

NATO Countries Plan to Withdraw from Ottawa Treaty

Context

Recently **Poland, Finland, Baltic states (Estonia, Latvia, Lithuania)** have announced plans to **withdraw** from the Mine Ban treaty. These countries argue they need landmines as a **deterrent** against potential Russian aggression.



About Ottawa Treaty - 1997

- It is a **multilateral treaty** aimed at **eliminating anti-personnel landmines** around the world.
- A legally binding international agreement.
- Also known as the **Mine Ban Treaty**.
- It prohibits: **Use, Development and production, Stockpiling & Transfer of anti-personnel landmines** to other states or groups.

- Additionally, it **requires**:
 - Destruction of existing stockpiles within **4 years**.
 - **Clearance** of mined areas within **10 years**.
 - **Assistance to mine victims**, including rehabilitation and reintegration.
- **Membership:** 164 Countries.
- **Countries That Have Not Joined:** India, Russia, China, USA, Pakistan & Israel.
 - India cites **security concerns** due to porous borders and ongoing insurgencies.
- The International Committee of the Red Cross (ICRC) and NGOs like the **International Campaign to Ban Landmines (ICBL)** played a key role in advocating for the treaty.
- **Landmine Monitor** is the main body that tracks: Implementation of the treaty, Global mine contamination etc.

Note: According to a 2024 UN report, **Ukraine is the most mined country** in the world.

India, Italy agree to take forward IMEEC initiative

Context

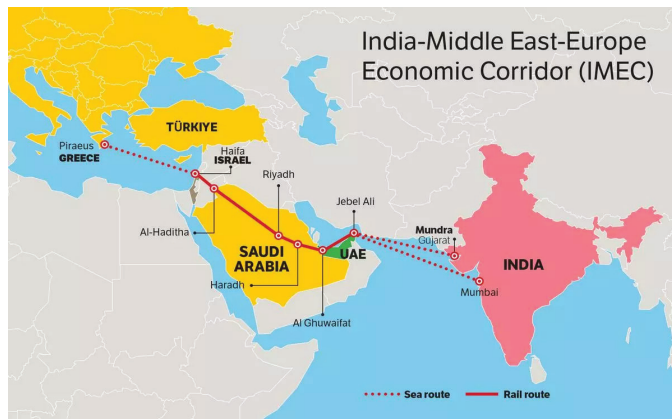
India and Italy have decided to work jointly in implementing the ambitious India- Middle- East- Europe- Economic Corridor (IMEEC).

Ports which are Part of IMEEC	
Country	Port
India	Mundra, Kandla, Jawaharlal Nehru Port Trust (Mumbai).
UAE	Fujairah, Jebel Ali, Abu Dhabi
Saudi Arabia	Dammam, Ras Al Khair
Israel	Haifa
Greece	Piraeus
Messina	Italy
Marseille	France

About IMEEC

- IMEEC is a strategic trade and connectivity initiative linking Asia, Europe and the Middle East via Railroad, Ship-to-Rail networks.
- **Origin:** It was announced on the sidelines of the **G20 meeting in New Delhi**.

- **Member Countries:** India, European Union, US, Saudi Arabia, United Arab Emirates (UAE), France, Germany and Italy.
- **Aim:** To integrate Asia, Europe, and the Middle East and enhance economic cooperation across these regions.
- IMEEC comprises of 2 corridors:
 - **East Corridor:** Connecting India to the Arabian Gulf.
 - **Northern Corridor:** Connecting the Gulf region to Europe.



Joint Strategic Action Plan (JSAP) 2025–29

- It was launched in **November 2024** at **Rio de Janeiro** by **PM Narendra Modi** and **PM Giorgia Meloni**.
- **JSAP Focus Areas:** Trade & Investment, Defence & Security, Clean Energy & Green Transition, Space, Science & Technology, Education & Mobility.

Global Pandemic Treaty

Context

After over three years of negotiations, WHO member states have agreed on a draft of a **legally binding treaty** aimed at improving global preparedness and response to future pandemics.

Key Provisions of the Draft Pandemic Treaty

- **Pathogen Access & Benefit-Sharing System (PABS):**
 - It is designed to enable **timely and fair access** to data and products during a pandemic.
 - **Pharma companies get access** to pathogen samples and genomic data.
 - **In return:**
 - They must **reserve 10%** of vaccines/diagnostics/therapeutics for **WHO allocation**.
 - Another **10%** to be sold at **affordable prices**.
- **Technology and Knowledge Sharing:**
 - Member states should **facilitate or incentivize** technology transfer.
 - Empowering **developing countries** to manufacture their own drugs and vaccines.

Government Intervention Allowed:

- Governments will be empowered to **intervene in markets** during pandemics to ensure access, especially for drugs developed with **public funding**.

- This treaty, set to be ratified at the World Health Assembly in May.
- It will become the **2nd legally binding** treaty in WHO's history—1st - **2003 tobacco control treaty**.

Limitations

- **No Power to Enforce:** WHO cannot override national laws or policies.
 - It cannot: **Mandate travel bans, Order lockdowns etc.**
- **Unclear Implementation:** No clear framework yet on how the **PABS** (pathogen access and benefit sharing) system will work.
- **No U.S. Participation:** The **United States** has **withdrawn** from the treaty process

India-Sri Lanka Relation

Context

Prime Minister of India visited Sri Lanka to strengthen bilateral ties with key MoU's in defence, energy, and digitization. The visit also addressed China's growing influence in the Indian Ocean region.

Major MoUs signed

- MoU on defence — the first such framework agreement between the two countries — aims to formalise joint military exercises, training programmes, and high-level exchanges.
- MoU to interconnect their electricity grids to facilitate power trade.
- A tripartite MoU involving the United Arab Emirates (UAE) was signed to develop Trincomalee as an energy hub.
- MoU which will allow India to share its digital solutions with Sri Lanka to support its digital transformation.
- MoU to collaborate in the field of health and medicine.
- MoU to promote cooperation in the area of pharmacopoeial standards and practices.
- Multi-sectoral Grant Assistance for Eastern Province

Projects inaugurated during the visit

- groundbreaking ceremony for the Sampur Power Project, a strategic initiative to be executed by NTPC and the Ceylon Electricity Board.
- India's developmental assistance for construction of a temperature-controlled warehouse in Dambulla

- Installation of rooftop solar systems in 5,000 religious institutions
- Maho-Omanthai railway line.
- Indian support for Sri Lanka's Unique Digital Identity project, the conversion of 100 million US dollars in loans to grants, a 2.4 billion Lankan rupees package for the Eastern Province

India-Bangladesh Transshipment Facility

Context

India revoked the 2020 transshipment facility allowing Bangladesh to use its territory for third-country exports, citing logistical and strategic concerns.

About the India-Bangladesh Transshipment Facility

- In June 2020, India allowed Bangladesh to use its Land Customs Stations (LCSs) for transshipment of export cargo destined for third countries including Bhutan, Nepal, and Myanmar.
- **Aim:** facilitate smoother trade flows and reduce logistical costs for Bangladesh

Benefit to Bangladesh:

- Advantage to exporter of readymade garment (RMG) sector
- cargo could be transported through Indian borders and shipped from Indian ports or airports
- It enable faster global access to Bangladeshi Products

Why India withdrew from the facility

- **Congestion at Indian airport:** Rising freight costs and congestion at Indian ports and airports, particularly Delhi, impacted India's own exporters.
- **Tilt towards China:** Bangladesh's growing proximity to China and remarks undermining India's strategic position in the northeast added to concerns.
- **Sovereignty issues:** Bangladesh inviting Chinese investments near India's Siliguri Corridor (e.g., Lalmonirhat airbase) raised red flags.
- The move could be interpreted as a diplomatic message to discourage geopolitical drift away from India's influence.

ASEAN-India Trade in Goods Agreement (AITIGA)

Context

The 8th Meeting of the ASEAN-India Trade in Goods Agreement (AITIGA) Joint Committee concluded in New Delhi.

Objective of meeting

- advance the ongoing review of the AITIGA, aiming to modernize the agreement to be more effective, user-friendly, and conducive to trade.

About ASEAN-India Trade in Goods Agreement (AITIGA)

- It is a free trade agreement between India and the 10 ASEAN member states, often termed the **ASEAN-India FTA**.
- It entered into force on January 1, 2010, covers trade in physical goods and products, excluding services.
- The Framework Agreement on Comprehensive Economic Cooperation between ASEAN and India was signed in October 2003 and served as legal basis to conclude further agreements, including Trade in Goods Agreement.
- Under the AITIGA, ASEAN Member States and India have agreed to open their respective markets by progressively reducing and eliminating duties.
- **Key Features**
 - **Tariff Liberalization:** Gradual reduction of import duties on over **75% of traded goods**.
 - **Rules of Origin:** Ensures only ASEAN-India goods get preferential treatment.
 - **Exclusion Lists:** Sensitive items (e.g., agriculture, auto parts) excluded from tariff cuts.

About AITIGA joint committee

- In September 2022, both sides tasked the AITIGA joint committee to undertake the review to make the agreement more trade facilitative and mutually beneficial.
- A total of eight sub-committees have been constituted under the AITIGA joint committee for undertaking negotiations on different policy areas related to the agreement.
- after finalising its Terms of Reference and Negotiating Structure, AITIGA JC and its Sub-Committees started negotiations in February 2024.

ASEAN-India bilateral Trade

- ASEAN accounts for approximately 11% of India's global trade.
- In the fiscal year 2023-24, bilateral trade between India and ASEAN reached USD 121 billion.

India-Saudi Arabia Relationship

Context

Prime Minister of India visited to Saudi Arabia and co-chaired the second leaders meeting of the India-Saudi Arabia Strategic Partnership Council (SPC) to strengthen the growing India-Saudi Strategic Partnership.

Major decision taken during the visit

- **The following MoUs were signed during the visit:**
 - in the field of space activities for peaceful purposes.
 - on Cooperation in the Field of Health.
 - Bilateral Agreement for inward foreign surface parcel.
 - for cooperation in the field of anti-doping and prevention.
- **SPC decided to create following under SPC**
 - a new Ministerial Committee on Defence Cooperation under the SPC.
 - new Ministerial Committee on Tourism and Cultural Cooperation under the SPC.

- High Level Task Force on Investment (HLTF) showed commitment to rapidly promote investment flows.
- Both sides agreed to collaborate on establishing two refineries in India

India-Saudi Strategic Partnership Council (SPC)

- It is a high-level mechanism established between India and Saudi Arabia in 2019
- It consists of various sub-committees, addressing various aspects of cooperation
- India is the fourth country with which Saudi Arabia has formed such a strategic partnership, after the UK, France and China.

SAARC Visa Exemption Scheme (SVES)

Context

India has suspended the SAARC Visa Exemption Scheme (SVES) for Pakistani nationals following the Pahalgam terror attack that killed 26 people

About SAARC Visa Exemption Scheme

- **Launched:** in 1992, based on the decision of the 4th SAARC Summit in 1988 held in Islamabad
- **Objective:** permitting select individuals from member countries to travel without a visa using a Special Travel Document.
- **Covers:** 24 categories of entitled persons, which include Dignitaries, Judges of higher courts, Parliamentarians, Senior Officials, Businessmen, Journalists, Sportsmen etc.
- **Validity:** generally for one year.
- **Implementation:** By the Immigration Authorities of SAAR Member States.
- **India Specific Provisions:** For Pakistani nationals, only select categories were eligible for multiple-entry Business Visa—initially valid for one year and limited to 10 locations. In 2015, the validity increased to 3 years with restriction to 15 designated places.
- **Security Oversight:**
 - SAARC nations reserve the right to **deny entry** on national security grounds.
 - SVES is **not a blanket waiver** and is subject to scrutiny by immigration authorities at ports of entry.
- **Suspension Clause:**
 - The scheme is based on **bilateral and multilateral trust**, not a binding international treaty.
 - Member countries may **suspend or revoke access unilaterally** in the interest of national security or public order.

Simla Agreement 1972

Context

Pakistan suspended the 1972 Simla Agreement and closed the Wagah border, in retaliation to India's response to the Pahalgam terror attack and suspension of the Indus Waters Treaty.



About Shimla Agreement

- It is a peace treaty signed in Shimla, India, between India and Pakistan, after 1971 Indo-Pakistani war
- It was signed by Indian Prime Minister Indira Gandhi and Pakistani President Zulfikar Ali Bhutto in Shimla
- **Kashmir issue dispute resolution:** Through peaceful bilateral negotiations without involving third-party mediation.
- **LoC:** ceasefire line in Jammu and Kashmir, as it existed on December 17, 1971, was officially designated the LoC
- **Prisoner of War:** India agreed to release over 93,000 Pakistani soldiers captured during the 1971 war.
- India and Pakistan pledged to respect each other's sovereignty, territorial integrity, and political independence and refrain from interference in internal affairs.

Significance of Shimal Agreement

- It formally ended the 1971 Indo-Pakistani War.
- It was a significant step towards de-escalation and normalization of Bilateral relations
- Provided a framework for future bilateral engagement
- This agreement dismissed previous UN resolutions (like UNSC Resolution 47) that called for a plebiscite in Kashmir.

Impact of suspension

- Pakistan's non-recognition of the LoC as a de facto border could lead to increased ceasefire violations or attempts to alter the status quo.
- Suspension undermines regional stability, particularly in the context of nuclear-armed neighbours.
- There might be an attempt by Pakistan for international mediation or intervention in resolving disputes.
- It may further affect the cooperation in regional organizations like SAARC and increase the trust deficit.

Salami Slicing

- China is using Salami Slicing tricks in the **Yellow Sea** to capture new territory.

About Salami Slicing

- It is a geopolitical tactic involving the **gradual, incremental encroachment** of disputed territory or maritime zones without provoking full-scale conflict.
- The term was coined by **Stalinist dictator Mátyás Rákosi** during the 1940s.
- China is using this technique in **Yellow Sea**:
 - China uses **civilian structures, coast guard actions, and non-military means** to:
 - Slowly **assert control & Avoid triggering a military response**
- A similar strategy was used in the **South China Sea** (e.g., **Spratly Islands, Scarborough Shoal**).
- Yellow Sea bordering countries:** China, North Korea and South Korea.



Palestine Liberation Organisation (PLO)

- The PLO has voted to establish the position of Vice President, potentially paving the way for a successor to Palestinian President Mahmoud Abbas.

About PLO

- It was conceived in **1964 at an Arab League summit in Cairo, Egypt** with the sole aim of liberating Palestine with the help of an armed struggle.
- It is a coalition of **smaller Arab groups (except Hamas and Islamic Jihad)**.
- In the 1990s, it was officially recognised by the **Arab League and the United Nations General Assembly** as the “sole legitimate representative of the Palestinian people”.
- It was invited to participate in all UN activities under **observer status**.
- In 1988, it endorsed a two-state solution to the conflict with Israel.

Kailash Mansarovar Yatra

- India and China are speeding up efforts to restart the Kailash Mansarovar pilgrimage.
- It is suspended from **2019** due to COVID-19 pandemic (2020–2022) & India-China tensions after Galwan clashes (2020).

About Kailash Mansarovar

- It is a sacred pilgrimage site in the Western Himalayan ranges of the Tibetan Autonomous Region.
- It includes **Mount Kailash (highest peak in Kailash Ranges)** and **Lake Mansarovar (world's highest freshwater lake)**.
- It is considered a holy mountain by **Hindus, Buddhists, Jains and Bonpos**.
- The Yatra is accessible through 2 different routes:
 - Lipulekh Pass** (Uttarakhand)
 - Nathu La Pass** (Sikkim).

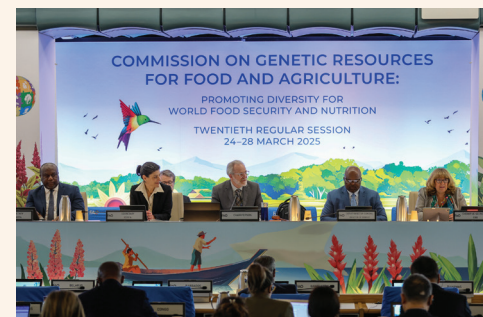


Commission on Genetic Resources for Food and Agriculture (CGRFA)

- 20th meeting of the Commission on Genetic Resources for Food and Agriculture (CGRFA-20) was recently held in Rome.

What is CGRFA?

- The **CGRFA** is the **only permanent intergovernmental body** addressing biodiversity for food and agriculture.
- It **promotes the sustainable use of biodiversity** to enhance **food security, human well-being and economic development**.
- It coordinates global policies on genetic resources and monitors their implementation.
- **Members:** 179 countries (**India is also a member**).
- **History:**
 - It was initially established by the Food and Agriculture Organization (FAO) in **1983** to address plant genetic resources (PGR).
 - In 1995, the commission's mandate was broadened to cover all components of biodiversity relevant to food and agriculture.

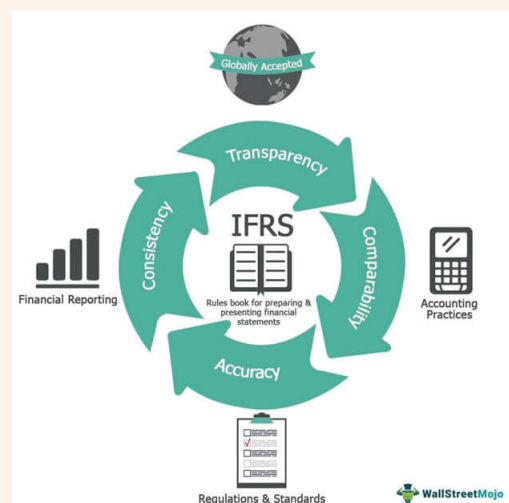


International Standards of Accounting and Reporting

- India has been **elected uncontested** to the United Nations Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR).
- **Tenure: 2025–2027**

About ISAR

- ISAR is a UN body that promotes **global accounting and reporting standards**.
- It was created by **ECOSOC in 1983** and **coordinated by UNCTAD**.
- It holds its annual sessions in Geneva to address emerging issues in enterprise accounting and reporting.
- **Objectives of ISAR:**
 - Corporate financial reporting.
 - Accounting standards.
 - Environmental, social and governance (ESG) disclosures.
- **Focus Areas**
 - Financial and non-financial reporting
 - Sustainability and climate-related disclosures
 - Corporate governance and social responsibility
 - SME accounting frameworks and capacity building



Operation Atlanta

- The European Union Naval Force (EUNAVFOR) under Operation ATALANTA has proposed a joint naval exercise with the Indian Navy.

About Operation Atlanta

- It is European Union's military operation to contribute to maritime security in the **Western Indian Ocean and Red Sea** started in **2008**.
- It operates under the **Common Security and Defence Policy (CSDP)**
- **Nations Involved:**
 - **Core participants:** EU member states including Spain, Italy, Germany, France, and others.
 - Supported by associated partners like Norway and Serbia at different points.
- Its initial focus was on combating piracy and armed robbery off the Somali coast.
- Over the years, it has diversified its operations.
 - It now protects World Food Programme vessels and
 - monitors illegal activities such as drug trafficking and unregulated fishing.
- **Significance:**
 - Enhances security along critical shipping lanes such as the **Bab-el-Mandeb Strait** and **Gulf of Aden**.
 - Strengthens EU's global maritime presence and supports international efforts for a **free, open, sustainable, and inclusive Indian Ocean**.
 - Partnership with major naval powers like the **Indian Navy** ensures greater coordination in **anti-piracy operations, humanitarian aid protection, and regional stability**.



TOPICS FOR PRELIMS (DEFENCE & SECURITY)

Rafale-M Jets

Context

The Cabinet Committee on Security (CCS), has approved a ₹63,000 crore deal with France for the purchase of **26 Rafale-M** (Marine) fighter jets for the Indian Navy.



About Rafale-M Fighter Jets

- It is the naval variant of the Rafale multi-role fighter jet developed by Dassault Aviation (France). It is designed specifically for aircraft carrier operations.
- **Key Features of Rafale-M:**
 - **Tail hook** for arrested landings on aircraft carriers.
 - Strengthened landing gear for **ski-jump** or catapult launches.
 - **Folding wings** for compact storage on carriers.
- It is equipped with Advanced avionics, radar and electronic warfare systems.
- It can perform air-to-air, air-to-ground, reconnaissance and nuclear strike missions.
- These jets are to be deployed on **INS Vikramaditya** and **INS Vikrant** (India's two aircraft carriers).
 - Both carriers use **ski-jump launch systems** (STOBAR – Short Take-Off But Arrested Recovery).
- The Indian Navy currently uses **MiG-29K** fighters on both its aircraft carriers.
- Rafale is a **4.5 generation aircraft** with maximum speed **1.8 Mach** (1 Mach=1235km/hr). (Asked in UPSC Prelims -2024).

Cabinet Committee on Security (CCS)

- **Headed by:** Prime Minister.
- **Members:** Ministers of Defence, Home Affairs, Finance and External Affairs.
- **Permanent Invitees:** National Security Advisor, Cabinet Secretary, and key Secretaries of Defence, Home, and External Affairs.
- **Functions:**
 - It makes all the important decisions on defence policy and expenditure.
 - It is the apex body regarding appointments of the officials in the national security bodies.
 - Deals with all issues related to the law and order and national security of India.

LRGB Gaurav

Context

DRDO has successfully conducted release trials of long range glide bomb (LRGB) 'Gaurav' from a fighter aircraft.



About LRGB GAURAV

- It is an air launched 1,000 kg class glide bomb capable of hitting targets at long distances.
- **Indigenous Design:** It is designed and developed by the **Research Centre Imarat (RCI) in Hyderabad & Armament Research and Development Establishment (ARDE)**.
- It uses an **Inertial Navigation System (INS)** with satellite guidance and digital control for accuracy.
- **Range:** 30-150 km
- DRDO has developed two glide bombs - **Gaurav and Gautham**.

Long Range Glide Bomb (LRGB)

- It is a precision-guided weapon that combines the characteristics of a bomb and a missile.
- **Cost effective:** The bomb is equipped with guidance systems that allow it to accurately hit its target without the need for a powered flight, making it a cost-effective and versatile option for air-to-ground strikes.
- **Glide Capability:** The bomb is released from a high altitude, allowing it to glide towards the target using aerodynamic surfaces such as **wings or fins**.
 - This capability enables the bomb to cover long distances without requiring propulsion, extending the reach of the aircraft delivering it.

Laser Weapon System

Context

DRDO Successfully Tests Mk-II(A) Laser-Directed Energy Weapon (DEW) System. The system is fully indigenously designed and developed by **DRDO**.

What are Laser Weapons?

- Laser weapons or DEWs are systems that use focused beams of light (laser) to damage, disable or destroy enemy targets.
- **LASER stands for:** Light Amplification by Stimulated Emission of Radiation.
- These weapons emit a **high-energy beam of coherent light**, often in the **infrared** or **visible spectrum**.
- With this achievement, **India** joins an elite group of countries, including **USA, China and Russia** that possess advanced laser weapon capabilities.
- **Advantages of Laser Weapons:**
 - **Speed-of-light engagement:** Instantaneous hit on target.
 - **Low cost per shot:** Only requires electrical energy (cheap compared to missiles).
 - **Stealth:** No sound, recoil or smoke trail.
 - **Precision:** High accuracy, minimizes collateral damage.
 - **Unlimited magazine:** Can be fired repeatedly as long as power is available.
- **Challenges associated:**
 - **High energy demand** limits mobile deployment.
 - **Laser performance drops** in rain, dust, fog or smoke.
 - Requires **direct visibility to the target**.



Types of Laser Weapons

- **Tactical High-Energy Lasers (HELs):** Targets small UAVs, mortars, rockets etc..
 - Power: 10–100 kW.
 - E.g. DRDO's **Mk-II(A) DEW system**
- **Strategic High-Energy Lasers:** Targets missiles, aircraft and satellites at long ranges.
 - Power: Exceeds 100 kW or more.
- **Low-Power Lasers:** For non-lethal uses like blinding enemy sensors or disabling cameras.
 - Power: <10 kW
 - Used in riot control or temporary disabling missions.
- **Fiber Lasers:** Light is generated and amplified within fiber optics.

Project Varsha

- It is a **classified Indian Navy project** to develop a **strategic underground naval base**.
- **Location:** near Rambilli village, Andhra Pradesh.
- It will house **nuclear-powered ballistic missile submarines (SSBNs)**—a critical arm of **India's nuclear triad**.
- India currently has **4 nuclear submarines**.
- A similar project to safeguard India's west coast is also under construction in **Karwar (Karnataka)**. It is named **Project Sea-Bird**.

What is Nuclear Triad ?

- It refers to the capability of delivering nuclear weapons by **aircraft, land based ballistic missiles and submarine launched missiles**.

Exercise Tiger Triumph

- It is a **bilateral Tri-Service Humanitarian Assistance and Disaster Relief (HADR) Exercise** between **India and the United States**.
- **Objective:** To enhance **interoperability** for HADR operations and to facilitate smooth coordination between the **Indian and US Joint Task Forces (JTF)** during **crises and contingencies**.
- In this exercise the aim is for the formulation of Standard Operating Procedures (SOPs) to establish a Combined Coordination Center (CCC)
- The 4th edition of this exercise took place on the **Eastern Seaboard of India from April 1 to April 13, 2025**.

Operation Brahma

- The Government of India has launched **Operation Brahma** to provide **Humanitarian Assistance and Disaster Relief (HADR)** to **Myanmar**.
- This operation is being conducted under the **Ministry of External Affairs (MEA)** in coordination with the **Integrated Defence Staff (IDS), Indian Army, Indian Air Force and the National Disaster Response Force (NDRF)**.

Major Assistance Programmes launched by India in recent years

- Operation Indravati (2024) - Haiti
- Operation Kaveri (2023) - Sudan
- Operation Ajay (2023) - Israel
- Operation Dost (2023) - Turkey & Syria
- Operation Ganga (2022) - Ukraine
- Operation Devi Shakti (2021) - Afghanistan

INIOCHOS-25

- The **Indian Air Force (IAF)** participated in **Exercise INIOCHOS-25**. It was scheduled to take place at **Andravida Air Base, Greece**.
- INIOCHOS is a **biennial multinational air exercise** hosted by the **Hellenic Air Force (Greece)**.
- It provides an opportunity for air forces to enhance their skills, share tactical expertise and build stronger military relationships.
- The IAF contingent included Su-30 MKI fighters along with combat enabler IL-78 & C-17 aircraft.

Hansa-3 (Next Generation - NG)

- Recently Pioneer Clean AMPS Pvt Ltd. has signed a Technology Transfer Agreement (ToT) to produce Hansa-3 aircraft.

About HANSA- 3

- It is a Twin-seater indigenous civil aircraft , developed by **National Aerospace Laboratories (NAL), Bengaluru**.
 - NAL works under **CSIR** (Council of Scientific and Industrial Research).
- **Use:** Primarily for **pilot training, recreational flying, and aerodynamic research**
- **Key Features:**
 - It is powered by an advanced fuel-efficient Rotax 912 iSc3 Sports engine.
 - It has a range of 620 nautical miles, 7 hours of endurance
- It is the latest version of the **HANSA series, which began in 1998**.
- This is the first time the aircraft will be manufactured in India using fully indigenous technology.



DUSTELIK - VI

- It is an annual joint military exercise between **India and Uzbekistan**, held alternately in each country.
- Its 6th edition was held in **Aundh, Pune from 16 April 2025**.
- This edition focused on Joint Multi-Domain Sub-Conventional Operations in a semi-urban scenario.
- **Objective:**
 - Enhance tactical coordination in sub-conventional operations.
 - Exchange best practices in joint military procedures.
 - Deepen defence partnership with Central Asia



Navy-Marine Expeditionary Ship Interdiction System (NMESIS)

- NMESIS is a land-based, **anti-ship missile system** developed by the U.S. Marine Corps to target and destroy enemy ships from coastal areas and islands.
- It gives small, mobile units the ability to strike maritime targets with precision from land-based positions.
- It features the US Navy's latest anti-ship missile, the **Naval Strike Missile (NSM)**.
- It is mounted on an unmanned Joint Light Tactical Vehicle.
- It will be used during this year **Balikatan exercises** and will be deployed in the drills to test "integrated air missile defence" for the first time.
- **After the Typhoon**, it will be deployed in the Philippines **to counter China's aggression**.



Exercise Desert Flag-10

- It is a multinational exercise being hosted by the **UAE Air Force at Al Dhafra Air Base**.
- **Participating Countries:** Australia, Bahrain, France, Germany, Qatar, Saudi Arabia, Republic of Korea, Turkey, UAE, United Kingdom, USA.
- Indian Air Force's **MiG-29 and Jaguar aircraft will participate** in the exercise
- **Aim:** undertaking complex and diverse fighter engagements, with exchange of operational knowledge and best practices with some of the most capable Air Forces in the world.
- The IAF's participation underscores India's commitment to strengthening defence ties and interoperability with friendly nations in the region and beyond.



INDRA 2025

- It is a **Bilateral Naval Exercise between India & Russia**.
- It was started in **2003**. This one is the **14th** edition.
- Exercise Focus:
 - It focuses on enhancing maritime cooperation and exchanging best operational practices.
 - Simulating coordinated manoeuvres and engagements.
 - Focusing on countering maritime threats.

- **Strategic Goals:** Enhance joint operations, promote global peace, maritime order
- The exercise was conducted in two phases - Harbour phase from 28 to 30 Mar 25 at Chennai, and Sea phase from 31 Mar to 02 Apr 25 in Bay of Bengal.

Nag Anti-Tank Missile System (NAMIS)

- The Ministry of Defence has signed a contract under the Buy (Indian-Indigenously Designed Developed and Manufactured) category for procurement of NAMIS.

About NAMIS

- NAMIS is an indigenously developed, **third-generation, fire-and-forget missile** designed to destroy heavily armored enemy tanks and other combat vehicles.
 - **Fire-and-Forget Capability:** Once launched, the missile autonomously tracks and engages the target without the need for further guidance.
 - It locks onto targets using an **Imaging Infrared (IIR) Seeker** before launch.
- **Developed by:** Defence Research & Development Laboratory of Defence Research and Development Organisation (DRDO).
- **Range:** 500 meters to 4 km.
- **NAMICA (Nag Missile Carrier):**
 - Based on Russian-origin BMP-II Infantry Fighting Vehicle.
 - Amphibious capability for mobility across varied terrains.
- **Nag ATGM** aims to provide the Indian Armed Forces with a potent anti-tank weapon capable of operating in all weather conditions, day and night.
- **Benefits to Indian Force:** It is set to transform the conduct of mechanised operation and offer operational advantage against the adversary.



POLITY & GOVERNANCE

TOPICS FOR MAINS

Public trust in Judiciary

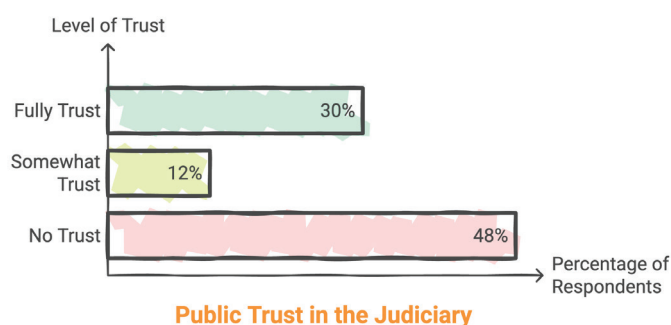
Syllabus Mapping: GS-Paper 2, Judiciary

Context

Judicial corruption undermines public trust and weakens the foundation of rule of law. India has put in place several formal and informal mechanisms to uphold judicial integrity and accountability. However, the effectiveness of these mechanisms remains a subject of debate.

Introduction

In the words of **Martin Luther King Jr.** - 'Arc of the moral universe is long but it bends towards justice' implies that change might take a long time, but it does take place in favour of justice.



Reasons for declining public trust in the Judiciary

Lack of representation

- **Skewed representation:** Vulnerable sections, women and minorities lack representation in the higher judiciary.
 - **Eg: Till 2024, only 11 women judges have been appointed to the Supreme Court.**
- **Collegium:** Women representation in collegium in the higher judiciary is absent.
 - **Eg: At present there is no female member in the collegium.**
- **Perceived Judicial Corruption:** Allegations or perceptions of corruption within the judiciary, even if not proven, weaken its moral authority.
 - **Eg: The recent cash-scandal involving Justice Verma from the Delhi High Court.**

Lack of transparency and accountability

- **Breach of Independence:** In various instances, judges of higher judiciary have availed post retirement posts in the government which questions their credibility in dispensing justice.
 - **Eg: Former CJI nominated as Rajya Sabha MP**
- **Decisions behind closed doors:** No clear parameters have been laid down for transfer of high court judges which raises questions on the transparency of the process.
 - **Eg: Justice Tahiramani got transferred from Madras High court in 2019 behind closed doors.**
- **Lack of Transparency in appointments:** The decisions made by the Collegium are not subject to public scrutiny, and there are **no clear guidelines or criteria for the selection of judges.**
 - **Eg: Uncle-Judge Syndrome** is highly prevalent in Indian Judiciary due to concerns of favouritism and nepotism in the appointment process.

Hampered justice delivery

- **Burden of undertrials:** The slow pace of justice delivery leads to a large number of poor and marginalised people languishing in jails as undertrials in crowded and unhealthy conditions.
 - **Eg: As per a report by NCRB, 77% prisoners in India were undertrials in 2021.**
- **Judicial overreach:** At times, the Judiciary has overstepped its jurisdiction in the legislative sphere leading to breach of separation of power doctrine (Article 50)
 - **Eg: Banning the sale of liquor within 500m of highways.**
- **Pendency of cases:** Prolonged delays erode public confidence and **“Justice delayed is justice denied”** becomes a reality. Fast track courts were established to provide speedy justice related to grave matters of women, child and other vulnerable sections. However, their efficiency is doubted due to huge pendency.

- **Eg: 2.43 Lakh POCSO cases are pending trial in Fast track special courts. (2023)**
- **Eg: As per National Judicial Data Grid (NJDG), 57,987 cases in Supreme Court (SC) and 49 lakh cases are pending in High Courts.**

Instances of Judiciary winning public trust

- **Widening Scope of fundamental rights:** SC recognized sexual harassment as a violation of a woman's fundamental right to equality under **Article 14** of the Constitution.
 - **Eg: Vishakha v. State of Rajasthan (1997)**
- **Widening the reach of justice:** SC decriminalised homosexuality in **Navtej Singh Johar case (2018)**
- **Ensure justice for all:** Greater presence of women would enhance the willingness and confidence of other women to seek justice.
 - **Eg: The Vulnerable Witness Project by Justice Gita Mittal** has been instrumental in ensuring that witnesses could share their testimony in a confidential space.
- **Environment protection:** The SC established the **Compensatory Afforestation Management and Planning Authority (CAMPA)** to prevent the misuse of funds raised for afforestation, which resulted in legislation on the **CAMPA Act 2016**.

Recommendations to build public trust in the Judiciary

- **Malimath Committee on Reforms of Criminal Justice System:** Recommended public access to court proceedings and judgments to enhance transparency. It emphasized the need for simplified procedures and timely publication of judicial decisions to build public trust.
- **E-Courts Project:** Initiated under the **National e-Governance Plan**, the e-Courts project has digitized case records and enabled online access to case statuses, judgments, and cause lists.
 - **Eg:** By 2023, over 23,000 courts were integrated, improving public access and trust in judicial efficiency.
- **Live Streaming of Supreme Court Hearings:** Since 2018, the Supreme Court of India has livestreamed constitutionally significant cases (Like Sabarimala and Ayodhya cases), allowing public and media scrutiny, which enhances transparency.
- **Fixed quota:** There is a need for a fixed quota for women just like in Panchayati Raj Institutions.
- **Attorney General KK Venugopal suggestions:**
 - To promote internal sensitization amongst judges with a patriarchal outlook.
 - SC Collegium must achieve 50% representation of women
- **Justice Deepak Gupta:** recommended that the retired senior civil servants need to be inducted into the body appointing judges.
- **Justice J.S. Khehar (2015):** raised issues regarding the involvement of the Minister of Law and Justice in the commission. Instead any bureaucrat or former civil servant should replace him in the commission.

The Indian judiciary has evolved from judgements such as **ADM Jabalpur case (1975)** where the **apex court denied** fundamental rights including **Right to life** during **national emergency** to inclusive judgements such as **Triple Talaq and Sabarimala case** which can in turn help instil public faith in the justice system.

Police Torture and Prisons in India

Syllabus Mapping: GS-Paper 2, Executive

Context

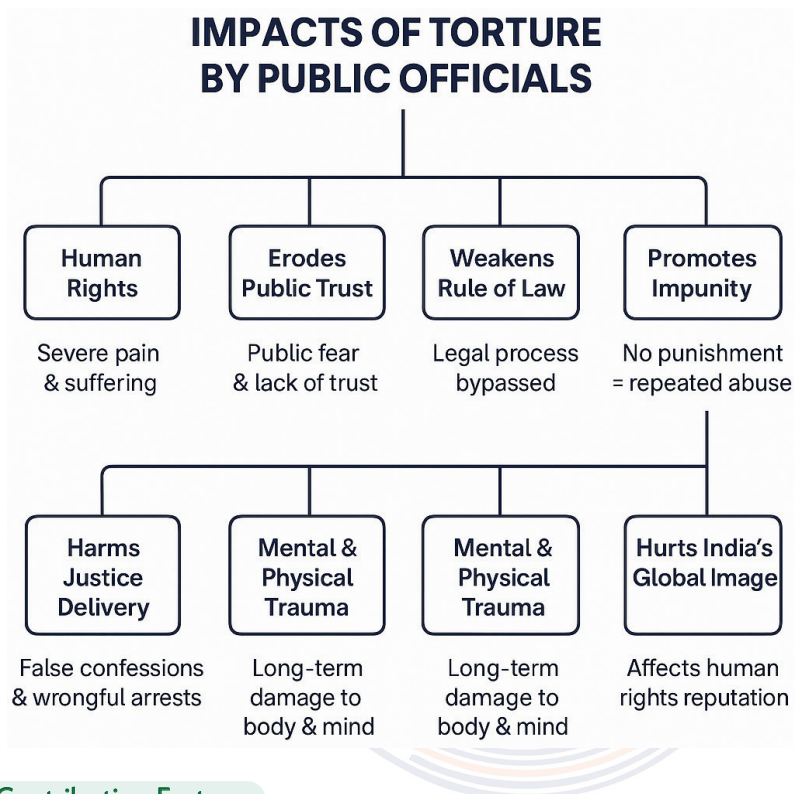
Recently, Common Cause (NGO), in collaboration with the Lokniti Programme of the Centre for the Study of Developing Societies (CSDS), released a comprehensive report on police torture and (un)accountability.

UN Definition of Torture (as per the United Nations Convention Against Torture, 1984 — Article 1)

- Torture means **deliberately causing severe physical or mental pain** to someone by a **government official** for purposes such as **obtaining information, punishment, intimidation, coercion, or discrimination**.
- **Note:** It **excludes** pain and suffering arising only from, inherent in, or incidental to **lawful sanctions**.

Nature of Police Violence and Torture in India

- **Widespread Acceptance of Tough Methods:** 55% of police personnel believe it is important to use “tough methods” to instill fear.
 - **Eg:** 30% justify third-degree methods for serious crimes; 9% even for petty offences.
- **Justification of Extra-Legal Actions:** 22% prefer killing dangerous criminals over legal trial.
 - **Eg:** One in four justify mob violence in sexual harassment and child-lifting cases.
- **Disproportionate Targeting of Marginalised Groups:** Victims largely include Adivasis, Dalits, Muslims, illiterate individuals, and slum dwellers.
- **Lack of Legal Oversight & Accountability:** Procedures of arrest often not followed; in some states, only 41% report “always” following procedure.
 - **Eg:** Near-zero convictions for custodial deaths between 2018–22 despite multiple reported cases.



Underlying Causes and Contributing Factors

- **Colonial Legacy of Policing:** Continued use of colonial-era mindset of control, coercion, and fear.
- **Lack of Accountability Mechanisms:** No effective punishment or deterrent for custodial torture or deaths.
 - Discrepancies in data and lack of transparency (e.g., different agencies reporting different custodial death figures).
- **Political & Institutional Pressure:** Pressure from politicians and senior officers to deliver “quick results” leads to shortcuts and coercion.
- **Inadequate Training:** Lack of training in human rights and modern interrogation techniques..
- **Passive Role of Judiciary and Medical Examination:** Magistrates often act as “silent spectators,” not questioning or documenting custodial abuse.
 - **MLE** is usually conducted by **non-specialist doctors** like eye specialists, anesthesiologists, or general physicians, which undermines the integrity of the findings.
- **Public Support for Quick Justice:** Public disillusionment with the slow judicial process leads to **societal tolerance of police excesses**.
- **No Standalone Law Against Torture:** India has **not ratified the UN Convention Against Torture**.
 - Absence of a specific anti-torture law enables continued impunity.

- **Medico-Legal Examination (MLE):** This is a **mandatory medical examination** done when a person is taken into police custody, produced before a magistrate, or alleges torture or abuse.
- **Who Should Conduct It?:** A government doctor trained in forensic medicine (e.g., forensic pathologist, medico-legal officer)

Way Forward

- **Legal and Policy Reforms:** India must ratify the Convention and enact specific anti-torture legislation to criminalize custodial violence as a distinct offense.
- **Amend Laws and Guidelines:** Update the **Police Act, 1861**, and enforce Supreme Court directives like those in the D.K. Basu case to ensure transparency in arrests, detentions, and interrogations.
- **Accountability Mechanisms:** Establish independent oversight bodies to investigate allegations of police abuse and ensure prosecution of guilty officers.
- **Training and Capacity Building Human Rights Training:** Incorporate human rights laws into police training curricula to sensitize officers about the illegality and immorality of torture.
- **Modernized Policing Techniques:** Equip police with tools for non-violent interrogation methods, forensic science, and technology-driven crime investigation.
- **Depoliticization of Police:** Implement measures like empowering State Security Commissions to reduce political interference in policing.
- **Workload Reduction:** Address manpower shortages and improve working conditions to reduce stress that often leads to violent behavior.
- **Community Policing Grassroots Engagement:** Adopt community policing models that bridge trust gaps between police and citizens.
 - Initiatives like **Kerala's Janamaithri Suraksha Project** can be scaled nationwide.
- **CCTV Surveillance in Police Stations:** Install night-vision cameras as mandated by the NHRC to monitor custodial practices and deter torture.
- **Victim Protection Laws:** Enact robust victim and witness protection legislation to encourage reporting of torture cases without fear of retaliation.
- **Cultural Change Shift Police Culture:** Address the moral justification many officers hold regarding torture through systemic changes in institutional values and community engagement.

Prisons in India

According to the Prisons Act of 1894, a “prison” refers to any jail or facility—whether used on a permanent or temporary basis—designated by the State Government for the detention of prisoners. This includes all associated land and buildings. However, it excludes:

- Facilities used solely for holding individuals in police custody,
- Any location specifically designated by the State Government, and
- Any place declared as a subsidiary jail through a general or special order by the State Government.

President Droupadi Murmu unveiled a report:

“Prisons in India: Mapping Prison Manuals and Measures for Reformation and Decongestion.”

A key recommendation of the report is the **electronic tracking of prisoners** as a strategy to address prison overcrowding.

Issues Faced by Prisons in India

1. Overcrowding

- **Definition:** The occupancy rate reflects the number of inmates housed in jails relative to their sanctioned capacity (e.g., 100 inmates for a capacity of 100 = 100% occupancy).
- **Despite a reduction from 140% (2007) to 131% (2022),** Indian prisons continue to remain overcrowded
- Notably, the occupancy rate among transgender inmates is alarmingly high at 636.4%.

2. High Proportion of Undertrial Prisoners:

According to Prison Statistics India 2020, undertrials constitute over 75% of the prison population.

- Undertrials increased by 11.7% from 2019, with most lodged in:
 - District Jails (50%)
 - Central Jails (36.1%)
 - Sub-Jails (11.9%)
- 3. Unnatural Deaths in Custody:** Includes suicides, inmate violence, neglect, and other causes.
 - Prison Statistics 2020: Out of 189 unnatural deaths, 156 were suicides, followed by 8 murders and 8 accidental deaths.
- 4. Understaffing:** As of December 2020, only 61,296 personnel were in service against a sanctioned strength of 87,961, hampering prison management.
- 5. Judicial Backlogs:** Over 4.7 crore cases are pending (2022), especially in subordinate courts.
 - Delays in trials prolong the detention of undertrials and burden the prison system.
 - Solution: Increase judge strength and improve case disposal rates.
- 6. Systemic Discrimination:** Corruption and caste/class bias within prisons result in inhumane treatment of socio-economically weaker inmates.
 - Basic rights are often denied, and custodial torture is prevalent.
- 7. Poor Health and Mental Well-being:** Overcrowding, poor sanitation, limited healthcare access, and lack of mental health support worsen physical and psychological conditions.
 - Mental health remains a neglected aspect of prison welfare.
- 8. Economic and Social Disparities:** Marginalized groups encounter more obstacles in seeking justice.
 - **Eg:** The President of India highlighted the **black coat syndrome** in courts which describes the anxiety experienced by ordinary citizens in court settings.

Steps to Improve Prison Conditions

1. Effective Implementation of the Model Prison Manual, 2016

- Aligns with Article 39A of the Constitution (free legal aid).
- Key provisions:
 - District-level Undertrial Review Committees
 - Legal aid clinics in prisons
 - Appointment of competent defense lawyers
 - Better living conditions, especially for women
 - Annual reviews of implementation

2. E-Prisons Project

- Supported by MHA (Ministry of Home Affairs)
- Uses the **Prisoner Information Management System (PIMS)** to digitally store prisoner data: biometrics, legal history, medical records, etc.
- Legal aid web application launched in 2017 by NALSA for undertrial support.

3. Bail for Eligible Undertrials

- **268th Law Commission Report (2017):** Recommends bail for undertrials who have served one-third of the maximum sentence for offences punishable up to 7 years.

4. Alternate dispute redressal:

- **Lok Adalats** help in ease of communication where parties can directly interact with the judge.
- **Fast track courts:** Special courts for speedy trials to make the judiciary more effective and to avail justice as fast as possible.

5. Skill Development Initiatives

- Enhances post-release employability and rehabilitation.
- Prison wages must be revised to meet global standards.

6. Promotion of Open Prisons

- Minimum-security facilities for well-behaved convicts.
- Encourage agricultural or community-based work.

7 Mulla Committee (All India Jail Reforms Committee) Recommendations

- Establish a **National Prison Commission**.
- Ban housing juvenile offenders with hardened criminals.
- Enact protective laws for juvenile delinquents.

8. Leverage ICT Tools

- Use of video conferencing for trials.
- Supreme Court's FASTER system for prompt transmission of bail orders.

9. Model Prisons Act, 2023

- Focuses on rehabilitation, vocational training, and societal reintegration.
- Emphasizes gender sensitivity and transparency in prison governance.

10. End Caste-Based Labour Division

- In 2024, SC ruled caste-based assignment of work in prisons unconstitutional, citing violation of Article 15(1)

Prison administration forms a vital part of the criminal justice system. It must consistently strive to enhance prison conditions in India while focusing on the reformation and behavioural transformation of both convicts and undertrials.

Governor's Assent to Bills

Syllabus Mapping: GS-Paper 2, Executive

Context

The Supreme Court has delivered a strong judgment against Tamil Nadu Governor R.N. Ravi for inaction on 10 Bills passed by the Tamil Nadu State Legislature.

Introduction to the role of Governor's

Article 153 in Part VI of the Constitution provides for the office of Governor, who is described as a **lynchpin in India's federal polity**, Governors are expected to hold together the various units of the government by upholding the spirit of the Constitution.

Challenges Associated with Governors withholding assent to Bills

- **Partisan Behaviour:** Governors appointed by the central government have often interfered with the functioning of elected state governments, making them non-functional.
 - This includes delays in giving assent to bills, meddling in the appointment of vice-chancellors, and involvement in the legislative processes, which are typically the domain of elected representatives.
- **Conflict with State Governments:** Governors have interfered in state matters by withholding or delaying assent to bills passed by state legislatures, summoning or proroguing assemblies arbitrarily, and editing customary addresses.
 - **Eg:** Tamil Nadu governor withholding assent to bills for months and referring them for presidential reconsideration, which was deemed arbitrary and unconstitutional.
- **Lack of Security of Tenure:** Governors can be removed at the **discretion of the central government**, leading to a lack of independence.
 - This lack of security makes them susceptible to acting in favor of the Centre.
- **Discretionary Powers Misused:** Governors have been accused of misusing their discretionary powers under **Article 200** (assent to bills) and **Article 163** (aid and advice of the council of ministers).
 - Absolute discretion often leads to arbitrary decisions that undermine federalism.
- **Appointment Process:** Despite recommendations from bodies like the **Sarkaria Commission**, governors are often appointed without consulting state chief ministers or other stakeholders, leading to questions about their impartiality.

Supreme Court stance on Governor withholding assent to bills

- The Supreme Court ruled that governors **do not have absolute discretion under Article 200** regarding assent to bills.
 - It laid down **strict timelines** for governors to either assent, return for reconsideration, or reserve a bill for presidential assent.

- The Court deemed all pending bills as **assessed** if they were delayed arbitrarily by the governor, emphasizing that such delays are unconstitutional.
- **Reaffirmation of Constitutional Duties:** The Court highlighted that under **Article 159**, governors are obligated to **preserve, protect, and defend** the Constitution.
 - It criticized instances where governors delayed decisions for political reasons.
- **Federalism and Democracy:** The judgment emphasized that **elected representatives** should have **more authority than nominated governors** in a federal system.
 - It upheld the principle that states should be **free to legislate on subjects under their exclusive jurisdiction** (7th Schedule).
- **Historical Precedents:** In *Raghukul Tilak v. State of Gujarat* (1979), the Court held that governors are **not employees of the Centre** but hold high constitutional office.
 - The recent judgment builds on this precedent by curbing arbitrary actions by governors.

Implications of Supreme Court directives

- **Strengthening Federalism:** The ruling reinforces federal principles by limiting governors' discretionary powers and ensuring they do not act as extensions of the central government.
- **Timely Legislative Processes:** By imposing strict timelines for assent or reconsideration of bills, legislative processes will become more efficient and less prone to political manipulation.
- **Curtailing Arbitrary Actions:** The judgment sets a precedent against arbitrary delays or misuse of discretionary powers by governors, ensuring they act within constitutional boundaries.
- **Increased Accountability:** Governors will now be held accountable for delays or actions that are not bona fide, reducing instances of partisan behavior.
- **Reforms in Appointment Process:** While not directly addressed in this judgment, the ruling may reignite discussions on reforming the process of appointing governors to ensure impartiality and independence.
- **Impact on Centre-State Relations:** The judgment could lead to a recalibration of Centre-state relations by reducing the scope for interference by centrally appointed governors in state matters.

Role of Governor as the cornerstone of federalism

- **Appointment of Chief Ministers:** In exceptional circumstances, this power helps to ensure smooth functioning of the state governments.
 - **E.g.-** Discretionary powers of Governor to appoint Chief Minister in case of no clear majority.
- **Checks and balances:** Governor ensures that the state government abides by the federal provisions enshrined in the Constitution.
 - **E.g.-** Under **Article 356** of the Constitution, the Governor can send a report to the President in case of Constitutional Machinery Failure.
- **Bridge between Centre and States:** On critical matters, the Governor acts as a link between central and state governments.
 - **E.g.-** Under **Article 200** of the Constitution, the Governor can reserve a bill for the assent of the President.
- **Safeguarding State Interests:** The governor ensures that the state's concerns, aspirations, and developmental needs are given due consideration.
 - **E.g.-** Role of Governor in administration of **5th and 6th Schedule areas**.
- **Mediating Conflicts:**
 - **E.g.-** Role of Governors in mediating discussions for the implementation of GST.

Timeline for Governor's Action

Under Article 200

Withholding assent or reserving for the President
The Governor must act within one month

Returning the bill with a message
(if withholding assent contrary to Council of Ministers' advice)
The Governor must return the bill within three months

Reservation of bills for the President
(contrary to advice of the State Council of Ministers)
Must be done within three months

Granting assent to re-presented bills
Must be done within one month

Sarkaria and Punchi Commission on strengthening Governor's office:

- The procedure of consulting the Chief Minister in the appointment of Governor should be mentioned in the Constitution itself.
- The Governor should be given a fixed term of five years and their removal should not be at the will of the Government at the Centre.

The role of the Governor as a constitutional bridge between central and state governments is crucial. Transparent and merit-based appointments, along with enhanced inter-state cooperation and engagement of civil society, can further strengthen the governor's office.

Dual Citizenship for Indian diaspora

Syllabus Mapping: GS-Paper 2, Citizenship

Context

The 25th anniversary of the High-Level Committee's report has renewed discussions on granting dual citizenship to Indians abroad.

About Dual citizenship

- **Dual citizenship:** Grants an individual legal status as a citizen of two or more countries.
- **Countries offering dual citizenship:** US, Finland, Albania, Israel, Pakistan, etc.
- **Alternatives:** India offers OCI program to Persons of Indian Origin, excluding ones who migrated to Pakistan and Bangladesh
- **Benefits:**
 - Members with dual citizenship can hold passports of both countries
 - Can actively participate in political affairs of both countries
 - Avail visa exemptions for travel purpose
 - Engage in employment in either nation.

Importance of Indian Diaspora for the Indian Economy

- **Major Source of Remittances:** The Indian diaspora contributes approximately 3.5% to India's GDP annually in remittances — significantly higher than the \$42 billion India receives through FDI.
- **Macroeconomic Impact:** These remittances help bridge India's trade and current account deficits and contribute to strengthening foreign exchange reserves.
- **Changing Composition of Remittance Sources:** While the Gulf was traditionally the major source, advanced economies now contribute more, reflecting the evolving economic profile of the diaspora.
- **Higher than Other Financial Inflows:** Remittances have surpassed many other forms of capital inflow, highlighting the economic importance of Indians living abroad.

Constitutional provisions regarding Citizenship

Article 5	Citizenship at the commencement of the constitution.
Article 6	Rights of citizenship of certain persons who have migrated to India from Pakistan.
Article 7	Rights of citizenship of migrants to Pakistan who returned to India for resettlement
Article 8	Rights of citizenship of certain persons of Indian origin residing outside India.
Article 9	Persons voluntarily acquiring citizenship of a foreign State not to be citizens.
Article 10	Continuance of rights of citizenship.
Article 11	Parliament to regulate the right of citizenship by law.

Citizenship (Amendment) Rules, 2024

- **Eligibility:** Applying for citizenship by naturalisation or registration a person must be-
 - A person of Indian origin
 - Person married to an Indian citizen
 - A minor child of an Indian citizen

- Person whose parents are registered as an Indian citizen
- Parents or the person was a citizen of Independent India
- Person is registered as an OCI cardholder
- **Citizenship by naturalisation:** Applicants must have knowledge of one of the languages as listed in the 8th schedule of the Constitution.
- **Renouncing citizenship:** Application must have a declaration of renouncing citizenship irrevocably if the application of Indian citizenship has been approved.

Arguments in Favor of Dual Citizenship

- **Strengthening Diaspora Ties:** Dual citizenship could deepen emotional and cultural ties with the Indian diaspora, encouraging them to contribute to India's development and global influence.
- **Economic Contributions:** The diaspora could play a larger role in investments, technology transfer, and business collaborations, boosting India's economy.
- **Global Mobility and Flexibility:** Granting dual citizenship may help Indian-origin individuals living abroad retain stronger links with their heritage without giving up opportunities in their adopted countries.
- **Soft Power Enhancement:** A robust diaspora with dual citizenship could act as informal ambassadors, strengthening India's diplomatic and trade relations.
- **Precedents in Other Countries:** Several countries, like the U.S. and the U.K., allow dual citizenship without significant issues. Adopting this approach might align India with global practices.

Arguments Against Dual Citizenship

- **Divided Loyalties:** Dual citizenship could lead to conflicting political loyalties, particularly during international disputes involving India and the other nation.
- **Erosion of Sovereignty:** Allowing dual citizens to vote and influence policymaking may give individuals with foreign loyalties a say in India's internal matters, threatening national sovereignty.
- **Administrative and Legal Complexities:** Managing dual citizenship would introduce challenges in areas like taxation, legal disputes, and law enforcement, especially if conflicts arise between the two countries' laws.
- **Security Risks:** Dual citizens could exploit their status for espionage, illegal financial activities, or other actions harmful to India's interests.
- **Unequal Treatment:** The privileges of dual citizenship could disproportionately favor wealthier and well-placed diaspora communities, leading to socio-economic imbalances.
- **Political Manipulation:** There is a risk of foreign influence on India's political processes, especially if dual citizens are allowed to vote or hold public office.

Asian Countries with Dual Citizenship

- **Cambodia:** Dual citizenship is permitted through investment, naturalization, descent, or marriage. Citizens can possess multiple passports without renouncing their original citizenship.
- **Bangladesh:** Allows individuals to retain Bangladeshi citizenship while holding citizenship from other countries. Dual citizenship can be acquired through investment, marriage, or naturalization.
- **Thailand:** Dual citizenship is allowed for foreigners meeting criteria such as permanent residency, employment, and marriage to Thai nationals.
- **Hong Kong:** Provides pathways for residency and potential citizenship through schemes like the Quality Migrant Admission Scheme (QMAS) and investment opportunities.
- **Pakistan:** Allows dual citizenship with 19 specific countries, including the United States, the UK, Canada, and Australia.

Way Forward

- **Constitute a New Expert Committee:** Set up a high-level committee of legal experts, policymakers, diaspora representatives, and security advisors to draft a comprehensive dual-citizenship framework.
 - Task it with balancing enhanced diaspora rights against national security, fiscal, and diplomatic considerations.

- **Amend Constitutional and Legal Provisions:** Propose targeted **amendments to Article 9** of the Constitution (which currently prohibits dual citizenship) and relevant sections of the Citizenship Act, 1955.
 - Clearly define the scope of dual-citizen rights (e.g., voting, property ownership) and exclusions (e.g., certain public offices, armed forces) to prevent legal ambiguity.
- **Introduce a Tiered Citizenship Model:** Develop a graded approach—full dual citizenship for non-sensitive civil and economic rights, and “limited” citizenship for strategic domains.
 - Allow voting and property ownership, while restricting eligibility for high-security posts or candidacy in certain constituencies.
- **Transform and Consolidate OCI/PIO Schemes:** Merge OCI and PIO into the new dual-citizenship category, automatically upgrading existing cardholders while extending enhanced rights.
 - Streamline application, renewal, and revocation processes to ensure the status is perceived as a right rather than a privilege.
- **Build Safeguards and International Coordination:** Establish robust vetting, tax-compliance checks, and anti-money-laundering protocols to mitigate security and fiscal risks.
 - Negotiate bilateral treaties or MOUs with host countries to align legal definitions, data-sharing, and consular protections for dual citizens.

Amendment to the RTI Act through DPDP Act, 2023

Syllabus Mapping: GS-Paper 2, Significant provisions of the Indian Constitution

Context

Recent amendments in RTI Act via the Digital Personal Data Protection (DPDP) Act, 2023, have raised concerns over potential dilution of transparency by restricting access to certain personal information.

Right to Information Act (2005)

- It is regarded as a **landmark legislation** in Indian democracy which has:
 - Enhanced **accountability** and **transparency** in governance.
 - Empowered citizens to seek information from public authorities.
- Over the past two decades, RTI has made **governance more participatory and answerable** to the public.
- As per the **2nd ARC** report, ‘RTI is the master key for good governance’

Key Sections of the RTI Act

- **Section 3:** Provides that **every citizen has the right to information** under the Act.
- **Section 8:** Lists **exemptions** under which information can be denied.
 - **Section 8(1)(j):** Exempts disclosure of personal information unless it is in **larger public interest** or unless the same information would be provided to **Parliament or State Legislature**.
- **Section 19:** Provides for a **two-tier appellate mechanism**:
 - **First appeal** to the senior officer in the public authority.
 - **Second appeal** to the **Central or State Information Commission**.

What led to the passing of the DPDP Act, 2023?

- **Surge in Digital Data Usage:** According to Nokia’s Mobile Broadband Index (MBiT), Indian users consumed an average of 24.1 GB of data per person per month in 2023, reflecting the exponential rise in digital activity.
- **Judicial Backing:** The Supreme Court’s recognition of the Right to Privacy as a fundamental right under Article 21 (in **K.S. Puttaswamy v. Union of India**) reinforced the need for robust legislation to safeguard personal data in the digital era.
- **Global Parallels:** The DPDP Act aligns with international standards like the EU’s **General Data Protection Regulation (GDPR)**, reflecting a global consensus on regulating digital data.
- **Evolution of Legislation:** The 2023 Act evolved from previous drafts, including the Personal Data Protection Bill, 2019, which saw repeated revisions due to concerns over state access, data localization, and regulatory burdens on businesses.
- **Cybercrime Surge:** As per NCRB data 2024, the Indian Cyber Crime Coordination Centre (I4C) received about 7,000 cybercrime complaints daily—marking a 60.9% increase from 2022 and a 113.7% rise from 2021.
- **Widespread Data Use in Governance:** The growing reliance on digital platforms like Aadhaar and Direct Benefit Transfer (DBT) schemes has made data protection increasingly critical to ensure trust and accountability.

Salient Features of the DPDP Act, 2023

- **Scope and Applicability:**
 - The Act covers digital personal data processed within India, whether collected online or offline (if later digitized)
 - Also applies to foreign entities processing data related to offering goods or services to individuals in India.
- **Key Stakeholders Defined:**
 - **Data Principal (DP):** The individual to whom the personal data belongs.
 - **Data Fiduciary:** The entity determining the purpose and means of processing.
 - **Data Processor:** The entity processing data on behalf of the fiduciary.
- **Enforcement and Penalties:**
 - Financial penalties ranging from ₹10,000 to ₹250 crore for non-compliance.
 - The Act **does not impose criminal liability**.
- **Legal Precedence:**
 - Provisions of the DPDP Act override other existing laws in case of any inconsistency, but act as supplementary otherwise.
- **Data Protection Board of India (DPBI):**
 - An independent adjudicatory body empowered to enforce the Act.
 - Can impose penalties, handle complaints, and initiate suo moto proceedings.
 - Appeals can be filed before the jurisdictional High Court.
- **Rights of Citizens (Data Principals):**
 - Right to Information: Know how and why their data is being used.
 - Right to Correction and Erasure: Request rectification or deletion of personal data.
 - Grievance Redressal: File complaints related to misuse or breach of data.
 - Right to Nominate: Designate someone to exercise their rights in the event of death or incapacity.

Changes introduced in RTI Act by DPDP Act

- **Section 44(3) of the DPDP Act** amends **Section 8(1)(j)** of the RTI Act.
 - This amendment allows public authorities to **deny access to “personal information”** without any consideration of public interest.
 - The DPDP Act **replaces** this clause with a broader exemption that **simply states that any “personal information” is exempt from disclosure, removing the “larger public interest” test.**
- **Original RTI Provision:**
 - **Section 8(1)(j)** of the RTI Act permits withholding of **personal information** only if:
 - Disclosure would **invade privacy**.
 - It is **not related to public activity** or interest.
 - **Safeguard Clause:** Even such personal information can be disclosed **if larger public interest justifies it.**
 - **E.g. caste certificates or educational degrees** of public servants.

Concerns Raised by Civil Society & Experts

- **Restriction on Public Information Access:** The previous provision allowed disclosure of personal information if it was in public interest (**E.g. government officers’ assets and liabilities**).
- **Impact on RTI Decisions and Precedents:** Over the years, several decisions of the Central Information Commission (CIC) and state Information Commissions have been **based on the “public interest” clause in Section 8(1)(j)**
 - The new provision **removes the discretion to allow access to such data**, affecting these past rulings.
- **Changing the RTI Act via another law (DPDP)** was **not the intent** of the **K.S. Puttaswamy judgment**.
- **Possible Consequences of the Amendment:**
 - It will **reduce transparency** in governance.
 - Increased difficulty in accessing information about public servants and officials.

- Weakening of RTI Act in holding the **government accountable**.

Committee Recommendations

- **Justice A.P. Shah Committee (2012):** It explicitly cautioned against allowing data protection to override access rights under the RTI Act.
- **Girish Ramchandra Deshpande vs. Central Information Commissioner (2012):** The Supreme Court prioritised privacy but also observed that necessary information **can be disclosed if it is in the public interest**.
- **Justice BN Srikrishna Committee (2018):** Recommended narrowly tailored exemptions - permitting non-disclosure only where there is a risk of grave harm. E.g. identity theft, discrimination
- **Suo-motu disclosure:** Promoting public entities to readily disclose information of public interest as per Section 4 of the RTI Act.

Linking Aadhaar with voter ID endangers the right to vote

Syllabus Mapping: GS-Paper 2, Significant provisions of the Indian Constitution

Context

- There is a renewed push by the Election commission of India to link Aadhaar with Voter ID.
 - Some believe that this move endangers the individual right to vote.

Facts

- The right to vote is **not a Fundamental Right** but is a **statutory right**.
- It is mentioned under **Article 326** in the Constitution of India.
- The **61st Constitutional Amendment Act, 1988** reduced the **voting age (21 to 18 years)** in India.

Benefits of Linking Aadhaar with Voter IDs

- **Elimination of Duplicate Voter IDs:** Migration or address changes often lead to duplicate voter registrations. Linking can identify and eliminate such duplicates.
 - This was experimented with biometric data collection in Goa but was discontinued when Aadhaar was introduced.
- **Curbing Proxy Voting:** Aadhaar's authentication can prevent impersonation during voting.
- **Transparency in Electoral Rolls:** Ensures that one person has only one voter ID.
 - Helps identify errors or deliberate manipulation of rolls.
- **Elimination of Duplicate and Fake Voters:** Aadhaar, with its biometric-based unique identification system, can help identify and remove duplicate or fraudulent voter entries in the electoral rolls. This ensures a cleaner voter database, enhancing the accuracy of elections.
 - **Eg:** In Andhra Pradesh and Telangana, Aadhaar linkage helped detect over **5 lakh duplicate entries** in 2015.
- **Improved Electoral Roll Accuracy:** Linking Aadhaar can streamline the process of updating voter details, such as address changes, by cross-verifying with Aadhaar's centralized database. This reduces errors and ensures that voters are registered at their correct polling stations.
 - **Eg:** In urban areas with high population mobility, like Bengaluru, linking Aadhaar could simplify voter registration updates for migrant workers, reducing instances of voters being unable to vote due to outdated records.
- **Enhanced Voter Authentication at Polling Stations:** Aadhaar-based verification can introduce biometric authentication at polling booths, reducing impersonation and fraudulent voting. This strengthens the credibility of the electoral process.
 - **Eg:** Similar to how Aadhaar is used for authentication in Direct Benefit Transfer (DBT) schemes, biometric voter verification could minimize electoral malpractices, as seen in small-scale trials in states like Haryana.
- **Facilitation of Online Voting and Digital Electoral Services:** Aadhaar linkage can enable secure online voter registration and potentially pave the way for e-voting systems by providing a robust identity verification mechanism.
 - **Eg:** The ECI's Voter Helpline app, which allows online voter services, could integrate Aadhaar for secure access, making electoral services more accessible, especially for young and tech-savvy voters.
- **Cost and Time Efficiency:** By leveraging Aadhaar's existing infrastructure, the ECI can reduce the administrative burden and costs associated with manual voter verification and electoral roll maintenance.

- **Eg:** The **National Electoral Roll Purification and Authentication Programme (NERPAP) in 2015** demonstrated that Aadhaar linkage could significantly reduce the time taken to verify voter identities compared to traditional door-to-door verification.

Challenges associated with linking Aadhaar with Voter ID

- **Risk of Genuine Voters Being Removed:** When Aadhaar is linked with voter IDs, mismatches or inaccuracies in the Aadhaar database can result in legitimate voters being wrongly removed from electoral rolls.
 - **E.g.:** During the **2015 National Electoral Roll Purification and Authentication Programme**, around **55 lakh voters were dropped** in Telangana and Andhra Pradesh.
- **Threat to Privacy and Personal Autonomy:** Aadhaar contains sensitive biometric data, and linking it to voter IDs could raise concerns about unauthorized access or misuse.
- **Erosion of Voluntary Consent:** Although claimed to be optional, the process leaves voters with little choice.
 - **E.g.: Form 6B** requires voters to either provide their Aadhaar number or declare they don't have one.
 - This coercive framing has resulted in the seeding of **over 66 crore Aadhaar numbers** by September 2023, often without informed consent.
- **Disproportionate Burden on Vulnerable Citizens:** The requirement for physical appearance to justify Aadhaar non-submission affects those already on the margins.
 - **E.g.: Elderly, disabled, migrant workers**, and remote-area residents face difficulty attending in-person hearings before Electoral Officers—leading to potential disenfranchisement.
- **Lack of Procedural Safeguards:** There is no clear, accessible, or time-bound appeal process if a citizen's justification is rejected.
 - **E.g.:** In *Lal Babu Hussein v. Electoral Registration Officer (1995)*, the Supreme Court emphasized that voter deletions must follow principles of **natural justice and procedural fairness**.
- **Constitutional and Legal Inconsistencies:** Aadhaar was never meant to verify citizenship.
 - **E.g.:** Section 9 of the Aadhaar Act, 2016 explicitly states Aadhaar is not proof of citizenship.
 - Even **non-citizens** can obtain Aadhaar by residing in India for 182 days. The **UIDAI and multiple High Courts** have affirmed this.
- **Data Privacy and Surveillance Risks:** Linking Aadhaar opens the door to voter profiling and surveillance.
 - **E.g.:** The **Digital Personal Data Protection Act, 2023** allows broad exemptions for government entities.
 - With Aadhaar linkage, voter data can potentially be cross-referenced and **misused for political targeting or manipulation**.
- **Concerns Around Aadhaar Database Integrity:** The Aadhaar system itself suffers from significant errors.
 - **E.g.:** The **2022 CAG report** highlighted that **4.75 lakh Aadhaar numbers were cancelled** due to duplication and biometric errors, calling into question the reliability of Aadhaar for electoral verification.

Way Forward

- **Strengthen Traditional Verification Practices:** Rather than depending solely on Aadhaar, the Election Commission can reinforce manual verification through local-level mechanisms.
 - **E.g.:** In-person checks and door-to-door verification by Booth Level Officers (BLOs) are proven, inclusive methods to keep electoral rolls accurate without risking mass exclusions.
- **Ensure Transparency Through Independent Oversight:** Setting up **independent audits and social monitoring mechanisms** can help build public trust and prevent arbitrary deletions.
 - **E.g.:** Establishing accessible grievance redressal forums and allowing civil society participation can act as a check against politically motivated manipulation of voter lists.

Conclusion

The Aadhaar-voter ID linkage, while projected as a cleanup exercise, carries serious implications for the health of Indian democracy. It risks excluding genuine voters, violates privacy principles, and undermines the independence of electoral processes. A citizen's right to vote must remain free from technological compulsion and rooted in constitutional protections—not in administrative convenience.

State Commission for Women (NCW)

Syllabus Mapping: GS-Paper 2, Statutory Bodies

Context

The Maharashtra State Women Commission (MSWC) has urged the National Commission for Women to take action against obscene content on web platforms.

Introduction

The National Commission for Women was set up as a statutory body for **speedy grievance redressal mechanism** over women related issues. At the state level, **similar state commissions for women (SCW)** are established with mandates to enhance women's status, investigate rights violations, and recommend necessary improvements.

SCW advocating the rights of women of today across states

- **Uplifting status of women:** SCW has proposed steps to rationalise terms referring to women in order to ensure their respect and dignity is maintained.
 - **Eg: Karnataka SCW plans to set up a 24*7 call centre** for assisting women in distress and to uphold their overall dignity.
- **Curbing sexual harassment:** SCW has campaigned for issues and increased investigative functions on issues faced by women on a day to day basis.
 - **Eg: Tamil Nadu SCW** urging the state government to take action against **Kalakshetra foundation** for alleged sexual harassment complaints following students protests.
- **Speedy grievance redressal:** Bharosa cell and missing cells have been established in states, but the issue of missing girls/ women has been probed by the SCW.
 - **Eg: As per a report by NCRB**, the highest number of missing women are from Maharashtra, to which the **SCW reacted by establishing a search committee** to probe into the issue.

Variations and limitations in the functioning of SCW across states

- **Vacancy in posts:** As witnessed in various SCW, the multi-member body is often understaffed with increased vacancies which can lead to increase in pendency of women related cases.
 - **Eg: Gujarat SCW** has the post of **Chairperson vacant since 2022** and **Jharkhand SCW** has been functioning **without a Chairperson since 2020**
- **Infrastructure Issues:** Such as lack of a functional website, lack of investment on physical and digital infrastructure of SCW hampers its overall functioning and dispensation of justice.
 - **Eg: Mizoram SCW** does not have a functional website
- **Financial constraints:** One-point crisis centres were proposed following the 2012 Delhi gangrape case to provide women facing sexual and domestic abuse a single point for speedy aid. But lack of funds, infrastructure and training has bottlenecked effectiveness in the SCW.
 - **Eg: Only two out of 11 one-point crisis centres in Maharashtra** were functioning, namely **Alibaug and Satara**, while the other centres witnessed lack of training and delayed funds from the state government.

Conclusion

Just like the NCW, the state commission for women also needs to be expanded in light of the evolving nature of crimes against women to address cyber crimes, trafficking, violence against women, etc in lieu of achieving equality in line with **SDG goal 5 of Gender equality**.

Constitutional Benches of the Supreme Court

Syllabus Mapping: GS-Paper 2, Judiciary

Context

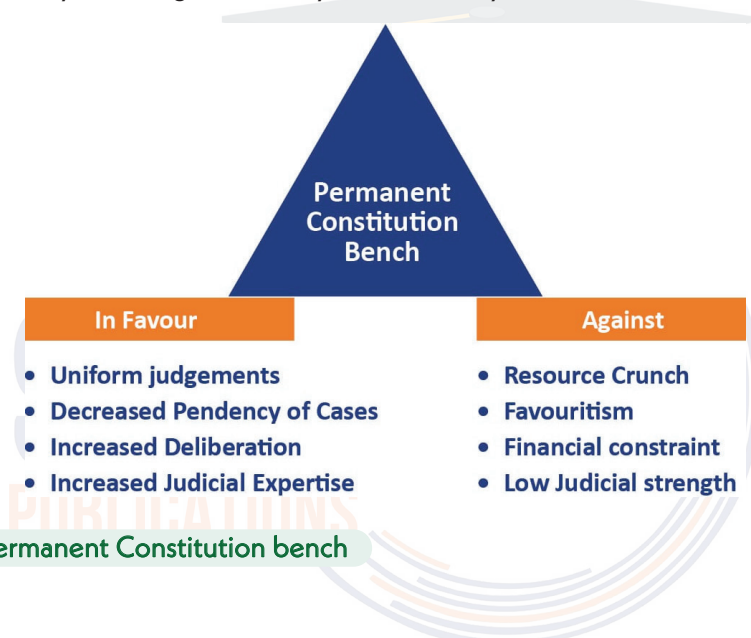
There have been inordinate delays in hearing Constitution Bench cases by the apex court. This brings into light the relevance of Constitutional benches.

Introduction

The Former **Chief Justice of India** was committed to **establishing a permanent Constitution bench** at the Supreme Court. According to the **data by the Union law ministry (2023)**, the number of cases being disposed of by Constitution benches has decreased, with **440 cases during 1950-1959 to 79 cases adjudicated between 2010-2019**.

Circumstances for establishing permanent Constitution benches

- **Article 143:** The President seeks the Supreme Court's opinion under law to address questions important for public welfare. The CJI is authorised to form the Constitution bench under the Article.
 - **Eg:** Judgement upholding the validity of constitutional amendments to **Section 334 about reservation for SCs and STs**
- **Article 145(3):** The minimum number of Judges who sit for the purpose of deciding any case involving a substantial question of law as to the interpretation of this Constitution or for the purpose of hearing any reference under Article 143 shall be five.
 - **Eg: Constitutional bench judgement on the validation of Section 6A of the Citizenship Act.**
- **Conflicting Judgments:** The Constitution benches are set up on an ad hoc basis when two or more judge benches of the Supreme Court have given conflicting judgements. It necessitates a definite interpretation of the law by a larger bench.
 - **Eg: Landmark cases such as AK Gopalan v. State of Madras, Kesavananda Bharati v. State of Kerala** in which the court settled the law by some degree of finality was decided by the Constitution benches



Need for establishing a permanent Constitution bench

Arguments in favour

- **Uniformity in judgements:** A permanent bench ensures that landmark constitutional questions are addressed which can reduce the variability in interpretations arising from ad hoc benches.
 - **Eg: Coherent jurisprudence as witnessed in Puttaswamy judgement of the Constitution bench upholding the right to privacy.**
- **Pendency of cases:** The Supreme Court of India faces the challenge of a backlog of cases with about 78,000 pending cases (2023). Cases of a substantial question of law are time taking, a permanent Constitutional bench can lead to speedy disposal of cases.
 - **Eg: Expedite the grievance resolution.**
- **Judicial expertise:** Judges on the permanent Constitution Bench can develop deeper expertise in constitutional law, leading to more nuanced and informed judgments impacting the lives of thousands of people.
 - **Eg: Light motor vehicle driving licence case** concerned the livelihood of thousands of drivers across the country.
- **Transparency and Accountability:** A dedicated bench for constitutional matters can enhance public trust in the judicial commitment to upholding the Constitution and as a protector of fundamental rights.
 - **Eg: Navtej Singh Johar case and the decriminalisation of Section 377 of IPC**
- **In-depth deliberation:** A permanent Constitution bench can consider all questions of law pertaining to a case in a speedy and deliberative decision making.

- **Eg: The landmark Kesavananda Bharati case (1973)** was heard by one of the largest benches (13 judges) in Indian legal history. The case holds relevance even today when considering the basic structure of the Constitution.

Arguments against

- **Judicial strength:** The Supreme Court of India has a limited number of judges with a strength of 34 judges since 2019. Allocation of a dedicated bench for constitutional matters could further add to delays in the disposal of pending cases.
 - **Eg:** There should be **50 judges per million population**, however India has 21 judges per million population. (**Law commission**)
- **Resource crunch:** Setting up a permanent constitution bench calls for additional courtroom and digital infrastructure and other logistical support.
 - **Eg:** The country has about **20,000 court rooms and only 27% judges** are empowered with **video conferencing**.
- **Bench selection:** Centralised power for the selection of judges can be misused for observing partisanship instead of merit and expertise in Constitutional law.
- **Financial constraint:** A permanent bench would require increased investment in terms of infrastructure, salaries and other resources.
 - **Eg:** The budget of the Law and Justice ministry is only **0.1% of the total budget**.

Conclusion

Therefore, a system needs to be adopted to select and rotate judges in the permanent bench that must be representative alongside providing a fair opportunity to all the judges in order to benefit from the rich and varied experiences they bring with them.

TOPICS FOR PRELIMS

Improvements in Child Adoptions (2024-25)

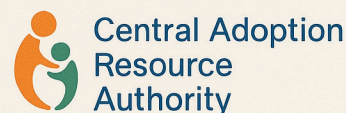
Context

India has witnessed a significant improvement in child adoptions in FY 2024-25, with 4,515 adoptions recorded, marking the highest figure in 12 years.

About Adoption Process

- Adoption is the formal process through which a child is permanently separated from their biological parents to become the lawful child of their adoptive parents.
- **Legislations that deal with the adoption of a child:**
 - The Hindu Adoption and Maintenance Act, 1956 (HAMA)
 - The Juvenile Justice (Care and Protection of Children) Act, 2015
- **Stakeholders Involved:**
 - **CARA:** Oversees the adoption process and issues guidelines.
 - **SARA:** State-level nodal body for adoption and non-institutional care.
 - **SAA:** Specialised Adoption Agencies place children for adoption.
 - **AFAA:** Authorised Foreign Adoption Agencies facilitate international adoptions.
 - **DCPU:** District Child Protection Units identify children eligible for adoption.

CENTRAL ADOPTION RESOURCE AUTHORITY (CARA)



- It is a statutory body established under the Juvenile Justice (Care and Protection of Children) Act, 2015.
- Nodal Ministry: Union Ministry of Women & Child Development
- It deals with adoption of orphan, abandoned and surrendered children through its associated/recognised adoption agencies
- CARA is designated as the Central Authority to deal with inter-country adoptions in accordance with the provisions of the *Hague Convention on Inter-country Adoption, 1993*



CARINGS

A database of children and registration of prospective parents is done on a centralised Child Adoption Resource Information and Guidance System (CARINGS), which is maintained by CARA

Rajya Sabha passes Bill for airline-lessor disputes

Context

Recently the Rajya Sabha passed 'The Protection of Interests in Aircraft Objects Bill, 2025', which seeks to turn into law the provisions of the Cape Town Convention and Protocol.

Key Provisions of the Bill

- **Legal Implementation of CTC in India:**
 - **Section 3:** The Convention and Protocol **shall have the force of law in India.**
 - The **Directorate General of Civil Aviation (DGCA)** will be the **regulatory authority** for implementation.
- **Responsibilities of Debtors (Airlines):**
 - Airlines must **maintain and submit records of dues related to aircraft and engines.**
 - Ensures **transparency in financial transactions** between airlines and lessors.
- **Rights of Creditors (Lessors & Financiers):**
 - Creditors can **exercise asset recovery rights** under CTC.
 - Before taking action, the **DGCA must be notified** about any airline **default.**
- **Handling of Aircraft During Airline Insolvency:**
 - The **resolution professional can keep aircraft assets for 60 days**, provided that **usage and maintenance charges are paid.**
 - This provision is **controversial** as the **aircraft leasing industry prefers immediate asset repossession.**
- **Exclusion from the Insolvency and Bankruptcy Code (IBC), 2016:**
 - As per Ministry of Corporate Affairs notification (April 2024), aircraft should not be part of insolvency proceedings.

Cape Town Convention (CTC) - 2001

- CTC is an international treaty that standardizes transactions involving:
 - Movable property such as aircraft, engines, and helicopters
 - Legal protection for creditors, financiers and lessors
 - Rules for asset recovery during airline defaults or insolvencies
- **India's Status in CTC**
 - Signed in 2008 but not ratified, so provisions were not legally binding.
 - The **new bill gives the Convention and Protocol the force of law in India**, ensuring compliance with international aviation financing norms.

Importance of Aircraft Leasing in India

- **86% of the nearly 850 aircraft in India's domestic airline fleet are leased** rather than purchased outright.

- Leasing aircraft helps airlines **preserve liquidity** by avoiding heavy capital investment.

150th Summit of International Parliamentary Union

Context

Lok Sabha Speaker Om Birla is leading the Indian Parliamentary Delegation (IPD) for the 150th Inter-Parliamentary Union (IPU) Summit which will be held in Tashkent (Uzbekistan).

About IPU



Inter-Parliamentary Union

For democracy. For everyone.

- It is an international organization of national parliaments that promotes parliamentary dialogue, diplomacy and cooperation among nations.
- **Founded:** In 1889 (Paris), it was the world's first permanent forum for political multilateral negotiations.
- **The IPU's work includes:**
 - Promoting peace, democracy, and sustainable development
 - Establishing cooperation between parliamentarians on issues of common concern
 - Facilitating parliamentary diplomacy
- **Membership:** It has 180 members and 15 associate members.
- **Main political body:** IPU's main political body is the Assembly, which is **held twice a year**. At the Assembly, MPs from around the world can:
 - Exchange good practice
 - Adopt parliamentary resolutions on global issues.

SC Judgement on assent to Bills by Governor

Context

The Supreme Court has delivered a strong judgment against Tamil Nadu Governor R.N. Ravi for inaction on 10 Bills passed by the Tamil Nadu State Legislature.

Key points of the Supreme Court Judgment

Article-200 ▶▶ When a bill is sent to the Governor, he/she can:

- Assent the bill.
- Withhold his/her assent to the bill
- Return the bill (if it is not a money bill) for reconsideration of the state legislature.
- **However, if the bill is passed again by the state legislature with or without amendments, the Governor has to give his/ her assent to the bill.**

- **Governor's Inaction Unconstitutional:**
 - SC held that the prolonged delay by the Tamil Nadu Governor in acting on 10 Bills was **unconstitutional and violated Article 200** of the Constitution.
- **Assent Deemed Given:**
 - The court used its powers under **Article 142** to deem that **all 10 re-passed Bills** had received **valid assent**.
- **Governor Cannot Delay Indefinitely:**
 - Governors must act **"as soon as possible"** and cannot **sit indefinitely** on Bills — this would amount to a **pocket veto**, which is not allowed.

Article-201 ▶▶ **Reservation for President's consideration; He/She can**

- Give assent to the bill
- Withhold assent to the bill
- Direct the governor to return the bill (**exception: money bill**) for reconsideration of the state legislature.

Reconsideration of Reserved Bills:

- The legislature must reconsider a returned Bill within six months.
- Once passed again, it is presented to the President.
- The President is **not obligated to grant assent to a reconsidered Bill**.

- **No Presidential Reservation After Re-passage:**
 - Governor **cannot refer a re-passed Bill to the President**. If he wanted to reserve it, he should have done so the **first time**.
- **Governor Must Follow Constitutional Advice:**
 - Governor is **bound by the advice** of the **State Cabinet** and cannot act on **personal discretion**, especially after a Bill is re-passed.
- **Time Limits Introduced:**
 - SC has **fixed specific timeframes** within which a Governor must act on Bills to ensure **transparency, accountability, and constitutional governance**.

Governor's action on Bill

Time Limit

Assent to a Bill	Within 1 Month
Withhold assent and return the Bill with message	Within 3 months
Reserve the Bill for President's consideration	Within 3 months
Assent to a re-passed Bill (after return by Governor)	Within 1 month (Mandatory)

Time limit set for President to Assent Bills

Context

In a recent judgement in the '**State of Tamil Nadu vs Governor of Tamil Nadu**', SC has set a timeline for the President to act on the Bills which the Governor has reserved for the President's assent.

Key Points of the Supreme Court Ruling

- **Three-Month Time Limit:**
 - The President must take a decision **within 3 months** from the date of receiving the Bill from the Governor.
 - If delayed, **appropriate reasons must be recorded and conveyed to the State government**.
 - This is the first time the Supreme Court has set a specific timeline for Presidential action under Article 201.

Article-201 ▶▶ **Reservation for President's consideration; He/She can**

- Give assent to the bill
- Withhold assent to the bill
- Direct the governor to return the bill (**exception: money bill**) for reconsideration of the state legislature.

Reconsideration of Reserved Bills:

- The legislature must reconsider a returned Bill within six months.
- Once passed again, it is presented to the President.
- The President is **not obligated to grant assent to a reconsidered Bill**.

- **No Absolute Veto:**
 - The President **cannot** exercise an absolute veto.
 - **Withholding of assent must be justified** with clear, sound and specific reasons.
- **Reference to SC under Article 143:**
 - If a Governor reserves a Bill due to **perceived unconstitutionality**, the President is **expected to seek SC's opinion** under **Article 143**.
 - **Article 143** allows the President to seek **SC's advisory opinion** on legal or constitutional matters.

- Although the reference is **not mandatory**, the President **ought** to seek the Supreme Court's opinion as a measure of prudence.
- **Quasi-Federal Balance:**
 - Article 201 must be **interpreted in the spirit of cooperative federalism**.
 - The **absence of a timeline** in the Constitution **does not mean indefinite delay is acceptable**.

Commissions and Official Guidelines referred by SC

- **Sarkaria Commission (1983):** Recommended setting **definite timelines** for decisions under Article 201.
- **Punchhi Commission (2007):** Reiterated the need for **clear timelines** to prevent delays in legislative processes.
- **Ministry of Home Affairs (OMs dated 4 Feb 2016):** Two **Office Memorandums (OMs)** issued to all Ministries/ Departments:
 - **3 months** for deciding on Bills reserved for the President
 - **3 weeks** for urgent ordinances,

Operation Chakra-V

Context

The Central Bureau of Investigation (CBI) has launched a new phase of Operation Chakra to combat Cybercrime.

About Operation Chakra-V

- It is the 5th phase of **Operation Chakra** (launched to target cybercrime and organized crime).
- Chakra-V is to combat Transnational Organized Cybercrime and **Digital Arrests**.
- **Previous phases (Chakra I to IV) focused on:** OTP frauds, Loan app scams, Job scam rackets & Fake investment schemes.
- **Objectives:**
 - Combating cybercrime and protecting citizens and global communities.
 - Working with international law enforcement agencies like FBI and Interpol to dismantle cybercrime networks.

Central Bureau of Investigation (CBI)

- **Established:** In **1963** on the recommendations of **Santhanam Committee**.
- **Legal Status:** It is **not** a statutory body
 - It derives its power to investigate from the **Delhi Special Police Establishment Act, 1946. (DSPE Act)**
- **Works under:** CVC (in corruption cases) and DoPT (for all other matters)
- **Appointment of CBI Director:** Appointed by the Appointment Committee on the recommendation of a Selection Committee, as per the **Lokpal and Lokayuktas Act, 2013**
 - **Selection Committee: PM, LoP, CJI**

- **Term of CBI Director:** 2 years

- After completion of 2 years, he can be given **3 extensions of 1 year each**.

- **General consent:**

- **Section 6 of DSPE Act:** Requires CBI to obtain consent from the state government to investigate within its jurisdiction **unless it's a union territory or railway area**.

- Since 2015, states like Chhattisgarh, Jharkhand, Kerala, Mizoram, Punjab, Rajasthan, Telangana, Meghalaya, and West Bengal have withdrawn their general consent

- **Case where Consent not needed:**

- If an investigation is directed by the Supreme Court or High Court.
- For Union Territories

52nd CJI of India

Context

Chief Justice of India (CJI) Sanjiv Khanna has recommended the name of Justice B.R. Gavai to the government for appointment as the 52nd Chief Justice of India.

About the Appointment Procedure of CJI

- Under **Article 124 (2)** CJI is appointed by the President of India.
- The Union Law Ministry seeks the recommendation of the outgoing CJI for the appointment of the next Chief Justice of India.
- After receipt of the recommendation from the outgoing CJI, the Union Law Ministry forwards recommendation to the Prime Minister.
- He then advises the President on the matter of appointment.
- Generally the outgoing CJI recommends the name of the most senior judge of the Supreme Court as the next Chief Justice.

Facts

- The convention to appoint the Senior most judge as CJI has been broken **3 times** till date.
- The Constitution **does not provide a minimum age of qualification for SC judges**.
- **Qualifications for SC Judge:**
 - Citizen of India .
 - At least 5 years of experience as a judge of a High Court or two or more High Courts in succession.
 - Advocate of a High Court or two or more High Courts in succession for at least ten years.
 - Distinguished jurist in the opinion of the President.

Challenges to the Waqf act

Context

The Supreme Court has questioned certain provisions of the Waqf (Amendment) Act, 2025.

Major Contentious Issues in the Waqf Act, 2025

- **Removal of “Waqf by Use” Concept:**
 - **Earlier Position:** The idea of **Waqf by use (Waqf-by-user)** allowed land **used continuously for religious or charitable purposes** (e.g., mosques, graveyards) to be **deemed Waqf property**, even if not registered.
 - **New Provision (2025 Act):**
 - **Future dedications** via Waqf-by-use are not allowed.
 - Only already **registered properties** will be recognised.
 - In case of a dispute (especially when land is claimed by the government), it will **not be considered Waqf-by-use** unless registered.
 - **Concerns:**
 - Many Waqf-by-use properties are **centuries old and unregistered**. Registration is practically difficult for such lands.
 - In **2019 Ayodhya judgment** SC recognised the **legal validity of Waqf-by-use**.
- **Powers of District Collector:**
 - If a **district collector identifies Waqf land as government land**, it **ceases to be Waqf land immediately**, until a court decides.
- **Inclusion of Non-Muslims in Waqf Boards:**
 - The new Law permits **non-Muslim members** on Waqf Boards and in the Central Waqf Council.
- **Applicability of the Limitation Act:**
 - Earlier Law **Excluded** waqf law from the Limitation Act.
 - i.e. Waqf boards could initiate action against encroachments **without time limits**.
 - **2025 amendment applies the Limitation Act**, setting time limits to initiate legal action on encroachments.

Article - 142

Context

Recently The Supreme Court invoked Article 142 of the Constitution to protect 250 students from facing hurdles in education due to the shifting of their institute's campus in Mangluru.

Key Features of Article 142

- **Complete Justice:** The primary aim of this Article is to ensure that justice is served comprehensively, addressing situations where statutory provisions may fall short.

- **Discretionary Nature:** The powers under this article are discretionary, meaning the Court can choose when and how to exercise them based on the specifics of each case.

Recent Supreme Court Judgments Involving Article 142

- **Governor of Tamil Nadu inaction on Bills case (2025):**
 - **Context:** The Supreme Court dealt with a constitutional crisis where the Governor of Tamil Nadu had indefinitely withheld assent on 10 Bills passed by the State Legislature.
 - The Governor had reserved these Bills for the President's consideration but failed to act upon them for an extended period, effectively stalling the legislative process in the state.
 - **Significance:** The Supreme Court invoked Article 142 to ensure “complete justice” and held that the Governor's prolonged inaction was unconstitutional.
- **Shilpa Sailesh v Varun Sreenivasan (2023):**
 - **Context:** The Supreme Court ruled that it could directly grant a divorce on the grounds of “irretrievable breakdown of marriage” under Article 142.
 - **Significance:** This judgement allows the Supreme Court to bypass the usual procedural requirements set by the Hindu Marriage Act, which typically involves a cooling-off period for mutual consent divorces.
- **Chandigarh Municipal Corporation Elections (2023)**
 - **Context:** In this case the Supreme Court overturned election results and ensured electoral democracy was upheld.
 - **Significance:** This case illustrates how Article 142 can be used to rectify procedural irregularities in electoral processes.

Transfer of High Court Judges

Context

The Union government has notified the transfer of Justice Yashwant Varma back to the Allahabad High Court from the Delhi High Court.

About Transfer of High Court Judges

- **Article 222(1):** Empowers the **President** to transfer a High Court judge to another High Court, in **consultation** with the **Chief Justice of India (CJI)**.
- **Recommendation by the Collegium:**
 - The **Supreme Court Collegium**, led by the **CJI**, initiates the transfer process.
 - Involves **consultation with four senior-most Supreme Court judges**.
 - **Inputs are sought** from:
 - Chief Justice of the concerned High Court.

- Supreme Court judges who have previously served in the concerned High Court.
- **Review by the Government:**
 - The **Law Minister** reviews the recommendation and advises the **Prime Minister**.
 - The **PM forwards it to the President** for approval.
- **Presidential Approval & Notification:**
 - The **President issues an order** approving the transfer & **Gazette notification** is published to formalize the transfer.

New FCRA rules on Foreign Funds

Context

Recently the Ministry of Home Affairs has issued updated rules regarding acceptance of foreign funds under FCRA.

About Foreign Contribution Regulation Act (FCRA)

- It is a legislative framework established by the Indian Parliament to oversee the receipt and usage of foreign contributions by individuals, associations and companies.
- It was enacted in **1976 during the Emergency period** to address concerns about foreign interference in India's internal affairs.
- Contributions made by a **Non-Resident Indian (NRI)** from their personal savings through normal banking channels are not treated as foreign contributions under FCRA.
- The **Ministry of Home Affairs (MHA)** implements FCRA.
- **2020 Amendment in FCRA:** Introduced restrictions on fund transfers, reduced administrative expense allowance from 50% to 20%, and mandated a specific SBI branch in New Delhi for foreign fund receipts.

About latest amendment in rules

- **Mandatory Prior Permission:** Any entity under this category must **apply and obtain approval** from the MHA before receiving any foreign funds.
 - These are entities that are **not permanently registered** under FCRA but seek to receive foreign funds for a specific project or activity.
- Once prior permission is granted, the recipient is allowed to **receive foreign contributions only for up to 3 years** from the date of approval.
- **Time Limit to Utilize the Funds:** Within **4 years** from the date of approval.
- If the entity **receives or uses** foreign funds **beyond these time limits**, it will be treated as a **violation** of the **FCRA, 2010**.

FCRA Registration Criteria and Regulations

- **Eligibility:** FCRA registrations are issued to entities engaged in specific sectors such as culture, economy, education, religion and social work.
- **Applicant Authenticity:** Applicants must be genuine, not fictitious or in someone else's name, and must not have engaged in forced or induced religious conversions.
- **Validity Period:** An FCRA registration remains valid for **five years**, requiring renewal submissions **six months before its expiration**.
- **Cancellation Conditions:** Registrations can be revoked if false information is discovered in the application.
- **Post-Cancellation Restrictions:** NGOs with cancelled registrations face a **three-year prohibition on re-registration**.
- **Suspension Authority:** The government can suspend an NGO's registration for up to **180 days** during investigations and can also freeze its financial assets.
- **Legal Recourse:** Decisions made by the government regarding FCRA matters can be appealed in the High Court.

Prime Minister's National Relief Fund (PMNRF)

- Recently PM has announced an ex-gratia from PMNRF to Fire Factory explosion victims in Gujarat's Banaskantha.

About PMNRF

- **PMNRF** was established in **1948** by **Jawaharlal Nehru** to provide **financial assistance** to victims of:
 - **Natural disasters** (earthquakes, cyclones, floods, etc.)
 - **Major accidents** (fire incidents, industrial explosions, etc.)
 - **Medical treatment for serious diseases** (heart surgeries, kidney transplants, etc.)
- The fund is managed by the **Prime Minister** and operates with voluntary donations from individuals and institutions. **(No Budgetary Support)**.
- Contributions to PMNRF are **exempt from Income Tax under Section 80(G)**.
- PMNRF is **audited** by an independent auditor outside the Government. **(Not CAG)**

Restricted Island in Andaman

- Recently a US national was arrested in the Andaman and Nicobar Islands for allegedly entering the prohibited tribal reserve area of **North Sentinel Island**.
- **North Sentinel Island** is a **highly restricted area**, and **entry is prohibited** under Indian law to protect the tribe from **external threats and diseases**.
 - **Sentinelese** are designated as a **Particularly Vulnerable Tribal Group (PVTG)**.

Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (ANPATR)

- This law prohibits **unauthorized entry, photography, videography, and interaction** with indigenous tribes.
- **Amended in 2012**, it **strictly bans tourism and unapproved visits** to areas inhabited by Particularly Vulnerable Tribal Groups (**PVTGs**) like the **Sentinelese, Jarawas, Onges, and Shompens**.
- Violators can face **imprisonment of up to 3 years** and **fines up to ₹10,000**.
- **Other Restricted Islands in Andaman & Nicobar:** Jarawa Reserve, Strait Island, Shompen Reserve, Dugong Creek etc.

Article - 311

- In a recent judgement a SC bench has clarified that Article 311(1) does not mandate appointing authority's approval to **initiate** disciplinary proceedings against a state employee.
- **For dismissal**, appointing authority's approval will be required.

About Article - 311

- It provides safeguards to civil servants against arbitrary dismissal, removal or demotion by the government. It includes civil posts under both Union and State.
 - **Article 311 (1):** Members of Civil service cannot be dismissed or removed by any authority subordinate to the appointing authority.
 - **Article 311 (2):** Members of Civil Service can be dismissed, removed or reduced in rank after according him/her a reasonable opportunity of being heard post an inquiry.

Section 44(3) of The Digital Personal Data Protection (DPDP) Act, 2023

- The DPDP Act **modifies Section 8(1)(j) of the RTI Act, 2005**, which deals with the **exemption of personal information from disclosure**.
- Previously, **Section 8(1)(j)** stated that information **related to personal matters could be disclosed if it served a larger public interest** and did not constitute an "unwarranted invasion of privacy."
- The DPDP Act **replaces this clause with a broader exemption** that **simply states that any "personal information" is exempt from disclosure, removing the "larger public interest" test**.

Concerns Raised by Activists

- **Restriction on Public Information Access:** The previous provision allowed disclosure of personal information if it was in public interest (E.g. government officers' assets and liabilities).
- **Impact on RTI Decisions and Precedents:** Over the years, several decisions of the Central Information Commission (CIC) and state Information Commissions have been **based on the "public interest" clause in Section 8(1)(j)**.
 - The new provision **removes the discretion to allow access to such data**, affecting these past rulings.

UGC (Recognition and Grant of Equivalence to Foreign Qualifications) Regulations, 2025

- Recently UGC has notified guidelines to streamline and formalise the process of recognizing foreign educational qualifications (degrees/diplomas/certificates) for use in India.
- It replaces the existing system managed by the **Association of Indian Universities (AIU)**.

About Equivalence Certificate

- An **equivalence certificate** is an official document that **certifies** that a **foreign educational qualification** — such as a degree, diploma, or certificate — is **comparable in academic level and value to an Indian qualification**.
- A foreign qualification (degree/diploma/certificate) is eligible for equivalence if:
 - The awarding institution is recognised under the laws of its home country.
 - The programme's admission norms (credits, thesis, internship, etc.) are **comparable** to similar Indian qualifications.
 - The student must have completed the course as per the **norms of the foreign institution**.
 - Qualifications from **offshore campuses** of foreign institutions can also be recognised.

Registrar General and Census Commissioner of India (RGCCI)

- RGCCI has issued a caution to private and government hospitals regarding non-reporting of birth and death events.
- Presently only **90%** of birth/death events are registered across India. (Target - 100%).
- Due to delay in conducting census, **civil registration records** have become vital for estimating **population size, structure and distribution**.

About Registrar General and Census Commissioner of India (RGCCI)

- It is responsible for conducting India's decennial Census, compiling demographic and population data and overseeing the Civil Registration System (CRS) nationwide.
- It operates under the **Union Home Ministry**.
- It has developed CRS mobile app for easing registration of birth & deaths.

CRS Mobile App

- **Developed by:** Registrar General and Census Commissioner of India.
- It aims to simplify and accelerate the registration process, making it more accessible and efficient for citizens.
- Through the new app, individuals can conveniently register births and deaths at any time, from any location, in their state's official language.
- The **digital birth certificates will be a single document to prove the date of birth** for various services such as admission to educational institutions, government jobs and marriage registration.
- According to the Registration **of Births and Deaths (Amendment) Act, 2023**, all reported births and deaths in the country occurring from October 1, 2023, are to be digitally registered through **the Centre's CRS portal**.

National Investigation Agency (NIA)

- After the successful extradition of terrorist Tahawwur Rana from USA, the court has granted 18 days' custody to the NIA.

About NIA

- It is the Central Counter-Terrorism Law Enforcement Agency of India.
- **Origin:** It was constituted under the **National Investigation Agency (NIA) Act, 2008**, aftermath of the 26/11 Mumbai terror attack.
- **Nodal Ministry:** Ministry of Home Affairs.
- The agency is empowered to deal with the investigation of terror-related crimes across states under written proclamation from the Ministry of Home Affairs without special permission from the states.

ECONOMY AND AGRICULTURE

TOPICS FOR MAINS

Rising Jobs Deficit in India

(Syllabus Mapping: General Studies III, Indian economy and issues related to Growth and Development, Employment)

Context

Formal jobs shrinking due to AI, automation, & rising capital intensity.

More in News

- Since 2017-18, India's **working-age population** has increased by **9 crore**, but **formal sector jobs** have only risen by **6 crore**, creating a **deficit of 50 lakh jobs annually**.
- Most new employment has been generated through **self-employment in rural areas** or **informal services**, leading to concerns over both **job quantity and quality**.

Challenges of Job Creation in the Formal Sector

- **Technological Progress & Labour Intensity:** There is a **steady decline in the labour intensity of production** due to **increasing capital intensity** in both manufacturing and services.
 - AI and automation are likely to **accelerate this shift**, further reducing demand for low-skilled labour.
- **Capital Intensity Increasing in a Labour-Abundant Economy:**
 - **Demand-side Factors:** Firms prefer **capital-intensive methods** to increase **productivity and value addition** at a lower cost.
 - **Supply-side Factors:** A lack of **skilled labour** makes firms more dependent on machinery.
- **Key Observations on Sectoral Trends:**
 - **Services Sector:** Increased value addition; higher share in **GDP and GVA**.
 - **Manufacturing Sector:** **Stagnant contribution** to GDP.
 - **Agriculture:** Declining GDP contribution.
- **Impact of Falling Capital Costs & Skill Shortages:** **Real wages** have remained stagnant, but **capital costs (machinery, technology)** are **declining** due to global technological advancements.
 - Less than **10% of India's workforce** has **formal technical or vocational training**.
 - Many **educated youth lack employment-ready skills**.
- **Skill-Biased Technological Change:** New technology **reduces demand for low-skilled workers** as firms opt for **automated, high-productivity** processes.
 - **Upskilling and re-skilling** of workers is essential for employment sustainability.

Government Strategies for Job Creation

Production-Linked Incentive (PLI) Scheme

- **Objective:** Expand **production capacity** and encourage **high-value manufacturing**.
- **Budget Allocation:**
 - Over **50% of PLI funds** go to **large-scale electronics, IT hardware, and drones**.
 - However, **the highest job creation** has been in **food processing & pharmaceuticals**.
 - **Mismatch:** High budget allocation to **capital-intensive** sectors, while **labour-intensive** sectors receive lesser focus.
- **Constraints in PLI Implementation:**
 - The lack of **skilled workers** hinders job creation.
 - The majority of India's workforce has **low or medium-level skills**.

Employment-Linked Incentive (ELI) Scheme

- **Objective:** Encourage **formal sector hiring** by subsidizing **EPFO contributions** for new employees.

- **Key Features:**
 - Targets **labour-intensive industries**.
 - Reduces initial **hiring cost** for firms.
 - The government bears some risk of hiring untrained workers.
- **Challenges in ELI Implementation:**
 - The subsidy period is **short (2-3 years)**, raising concerns about **long-term employment sustainability**.
 - **Lack of data** to track **interns' career progression**.
 - **Uncertainty** over whether firms will invest in **upskilling workers** post-subsidy.

Proposed Policy Recommendations

- **Better Integration of Production & Skilling Strategies:** Align **PLI and labour skilling policies** to ensure job creation matches sectoral needs.
 - Address **both demand- and supply-side factors** to drive **structural transformation** towards high-value manufacturing.
- **Improving Inter-Ministerial Coordination:** Ministries of **Industry, Labour, and Skilling** should work together to map:
 - **Current and expected future** labour supply.
 - **Skill demand** across sectors.
- **Reforming ELI Scheme for Sustainable Job Creation:** Shift from **flat incentives** to **graded incentives** → **Higher transfers** for each additional level of skill certification.
 - Extend ELI to **skilling institutions (e.g., ITIs)** to improve:
 - **Employment outcomes.**
 - **Skill quality** linked to **future industry demand.**
- **Addressing Labour Regulations:** Labour laws **increase hiring costs**, pushing firms towards **capital-intensive** methods.
 - **State governments must adopt flexible labour policies** to encourage hiring.

Conclusion

- India must **simultaneously invest in quantity** (job creation) and **quality** (skilling & upskilling).
- A **dynamic policy framework** is critical to align **job market trends** with **India's vision for Viksit Bharat** (developed India).
- Policymakers must ensure a **workforce ready for high-value industries** as the nation moves up the **global production value chain**.

State of India's workforce

(Syllabus Mapping: GS-III, Indian economy and issues related to Growth and Development, Employment)

Context

The **World Economic Forum's Future of Jobs Report 2025** and **QS's World Future Skills Index** contain critical insights into the **state of India's workforce and its preparedness for the future**.

Key Insights of the Report on India's Workforce Preparedness

- **Major Disruptions Expected:** Global labour markets will be shaped by **technology, climate action, economic shifts, and geopolitical changes**.
 - **E.g.:** 170 million new jobs could be created, but **92 million roles may become obsolete** by 2030.
- **Upskilling is Critical:**
 - **59% of workers will need retraining**, especially in:
 - Analytical thinking
 - Resilience
 - Technological literacy
 - High-growth roles include **AI engineers** and **Big Data specialists**.

- **India's Strengths:**
 - Ranked **2nd globally** in **AI and green skill preparedness**.
 - Scored **99.1** in 'Future of Work' (ability to identify and recruit future-focused skills).
- **Gaps Identified:** Weak performance in '**Skills Fit**' (score of 59.1): Mismatch between **available workforce skills and job market demands**.
 - Poor **Academic Readiness** (ranked 26th globally).
 - Alarmingly low score (**15.6/100**) in **future-oriented innovation and sustainability**.
 - Insufficient **investment in R&D** hinders India's edge in green technologies and innovation.

Note

A recent **FICCI-KPMG** study, '**Global Mobility of Indian Workforce**', has estimated that by **2030**, the demand for **skilled workers** will exceed supply, leading to a **talent shortage of over 85.2 million people**.

Did you Know?

- **Work** refers to the performance of tasks that demand mental and physical effort, aimed at producing goods and services to meet human needs.
- **Employment**, on the other hand, is a contractual arrangement between two parties in which the work performed is compensated.
- **Formal worker:** In India, the term 'formal worker' is defined differently across various contexts:
 - Employees working in enterprises registered under the Factories Act, 1948 (this definition excludes many in the services sector).
 - Workers employed in enterprises with 10 or more employees, as well as all government employees.
 - Individuals who have a formal employment contract, irrespective of the size of the enterprise (as per the **Arjun Sengupta Committee Report**).

Opportunities for India

- **Curriculum Reform:** Shift focus to **creativity, problem-solving, entrepreneurship, and adaptability**.
 - Use **interdisciplinary and experiential learning** models (e.g., design thinking, hackathons).
- **Green and Sustainable Education:** Introduce a **green curriculum** and create **centres for sustainability research**.
 - Promote **student-led environmental projects** at the community level.
- **Strengthening Academia-Industry Linkages:**
 - Co-create curriculum with industry.
 - Enable **internships, skill centres, and mentoring** programmes.
 - Align graduates with **market-ready competencies**.
- **Faculty and Infrastructure Upgrades:** Invest in **faculty development**, international exchange, and teaching innovation.
 - Build **digital infrastructure**, especially in **rural and semi-urban India**, to reduce the digital divide.
- **Government's Role:** Increase **investment in skill development, R&D, and innovation**.
 - Create an **enabling policy ecosystem** for a dynamic and future-ready higher education system.

Conclusion

- The alignment of insights from the **WEF and QS reports** highlights a strategic opportunity for India.
- By overhauling its **education and skill development systems**, India can not only tackle labour market challenges but also establish itself as a global frontrunner in emerging fields such as **AI, sustainability, and digital technologies**.

Social Security For Gig Workers

(Syllabus Mapping: GS-III, Indian economy and issues related to Growth and Development, Employment, Inclusive Growth)

Context

The central scheme currently awaiting Cabinet approval is a comprehensive social security initiative designed for gig and platform workers in India.

Proposed benefits in the Social Security Scheme for Gig Workers

- **Health Coverage under Ayushman Bharat (PM-JAY):** Gig workers will be covered under the **Ayushman Bharat** scheme, providing them with **₹5 lakh annual health insurance** for secondary and tertiary care hospitalization.
- **Registration on the eShram Portal:** Gig workers will be **registered on the eShram portal**, a national database for unorganised workers. This registration will enable access to **various government welfare schemes**, including accidental insurance and other social security benefits.
- **Transaction-Based Pension Scheme:** A pension scheme linked to gig work transactions is proposed:
 - A **Universal Account Number (UAN)** will be assigned to each worker.
 - This UAN will help **track earnings across multiple platforms**.
 - A portion of each transaction will go toward the worker's **pension contribution**.
 - Platform companies (like Zomato, Uber, etc.) will also **contribute a small percentage (1-2% of turnover, capped at 5%)** towards the workers' pension fund.

About Gig Workers

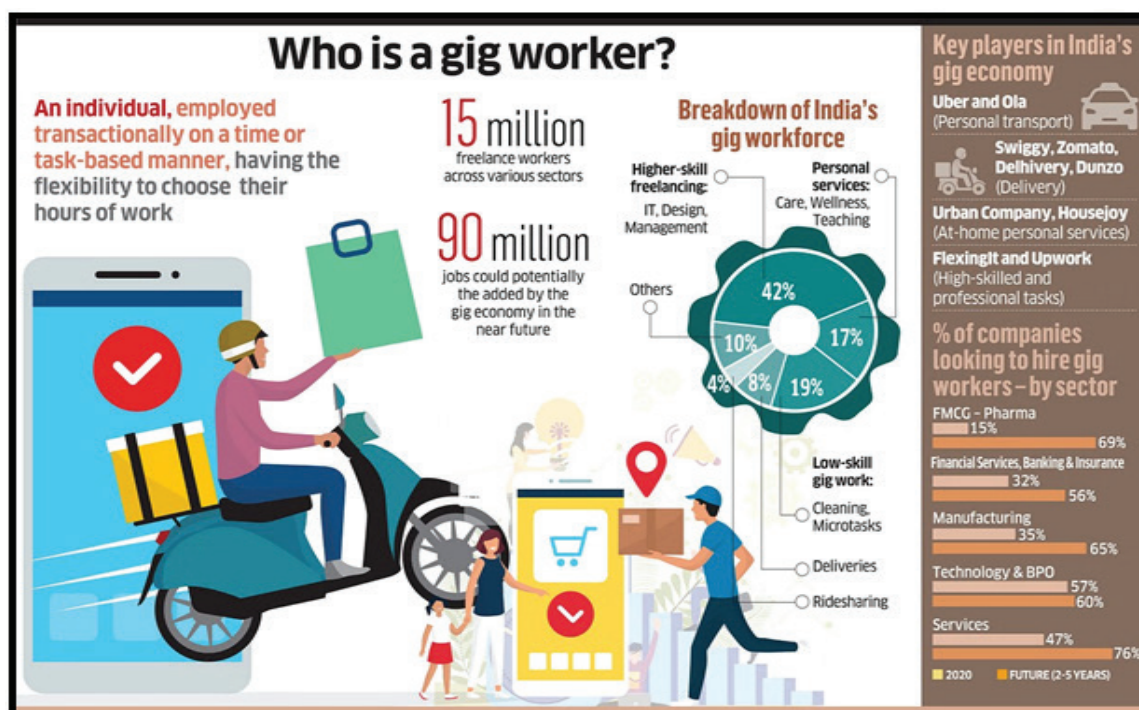
- The **new Labour Codes of 2019** define a gig worker as “a person who performs work or participates in a work arrangement and earns from such activities outside of a traditional employer-employee relationship.”
 - This category includes freelancers, contract-based workers, project-based workers, and those engaged in short-term employment. A significant portion of gig work is platform-based, involving services such as food delivery (e.g., **Zomato, Swiggy**) and e-commerce operations (e.g., **Amazon, Flipkart**).
- In **2020–21**, an estimated 77 lakh individuals were part of the gig economy, accounting for 2.6% of the non-agricultural workforce and **1.5%** of the total workforce in India.
 - In its working policy paper on the gig economy, NITI Aayog has made projections of the gig workforce **expanding to 23.5 million workers by 2030**.

Reasons Behind the Rise of Gig Workers

- **Technological Advancements:** The **development of digital platforms and mobile apps** has made it easier for workers to find and complete short-term jobs.
 - **Increased internet and smartphone penetration** have enabled more people to access gig work opportunities.
- **Economic Factors:** **Traditional job creation has been slow**, and gig work has become a crucial livelihood source for many job-seekers.
 - Gig work provides an **additional income stream for individuals** needing to supplement their earnings from other jobs or those between jobs.
- **Flexibility and Autonomy:** Gig work offers **flexibility in work hours and locations**, appealing to those seeking better work-life balance.
 - This led to increased labour participation by students/women by offering part-time work as per convenience.
- **Demand for On-Demand Services:** There is a growing **demand for on-demand services** such as ride-sharing, food delivery, and freelance work, driving the need for gig workers.

Work Issues Faced by Gig Workers

- **Revenue Sharing:** Gig workers often protest against the unfair revenue sharing models set by the platforms.
- **Financial Instability:** Earnings can be inconsistent and unpredictable, leading to financial instability.
- **Long Working Hours:** Many gig workers face long and irregular working hours **without additional compensation**.
- **Lack of Legal Protections:** The existing legal framework is not well-suited to address the complexities of gig work, as it is **based on traditional employer-employee relationships**.
 - Platforms classify gig workers as
 - As independent contractors, which excludes them from benefits and protections available to traditional employees.
- **No Access to Benefits:** Gig workers lack access to essential social security benefits such as health insurance, paid leave, and retirement plans.
 - Overwork and lack of safety regulations can lead to accidents and health issues.



State government Initiatives for Gig Worker in India

- Rajasthan** enacted the **Platform-Based Gig Workers (Registration and Welfare) Act, 2023**, mandating registration, transaction-based welfare cess, and a grievance redressal system for gig workers.
- Karnataka** introduced the **Platform-Based Gig Workers (Social Security and Welfare) Bill, 2024**, which ensures algorithmic transparency, fair contracts, and aggregator contributions to a welfare board.
- Tamil Nadu** launched a scheme offering **₹20,000 subsidies for e-scooters, insurance coverage, and worker lounges** for registered gig workers.
- Andhra Pradesh** runs the **YSRVahana Mitra Scheme**, providing ₹10,000 annually to self-employed drivers for vehicle maintenance and insurance.

Flaws in the Existing System

- Lack of Alignment with International Standards:** India has not ratified the **ILO's (International Labour Organisation) Social Security (Minimum Standards) Convention, 1952 (No. 102)**, reflecting weak commitment to universal social protection.
- Ambiguities in the Social Security Code, 2020:** The Code provides **unclear definitions** of gig and platform workers.
 - Diluted safeguards** and **centralised oversight** have led to **delays in implementation**, limiting its impact on ground.
- Dysfunctional Welfare Boards:** Welfare Boards, the main distribution mechanism for benefits, have proved **inefficient and opaque**:
 - ₹70,744 crore** in cess funds for construction workers remain unused.
 - In **Tamil Nadu**, ₹221.8 crore in dues were not remitted by 99 local bodies.
 - In **Kerala**, only **5 out of 16** boards were found functional; some reported **zero beneficiaries**.
- Fragmented and Piecemeal Approach:** Targeted schemes for specific sectors (e.g., beedi workers, gig workers) create **inequity** and fail to address the **shared precarity** of informal labour.
 - Such an approach **neglects intersectionality** and leads to **exclusion** of equally vulnerable groups like domestic workers.
- Overreliance on Gig Work as a Solution:** The assumption that gig work will formalise informal labour is **flawed**.
 - Most gig jobs lack **security, stable income, and employer accountability**, which are core features of formal employment.
- Ineffective Use of Data and Platforms:** While initiatives like **eShram** aim to register informal workers, the **lack of integration with welfare delivery mechanisms** limits real benefits.
 - Absence of **real-time data sharing** across departments weakens targeting and tracking.

Way Forward

- **Universal Social Protection Floor:** Shift from targeted schemes to a **rights-based, universal framework**, ensuring **minimum social security for all workers**, regardless of category.
- **Strengthen and Reform Welfare Boards:** Ensure **transparency, fund utilisation, and real-time audits** of Welfare Boards.
 - Introduce **performance-based reviews** and **technology-driven tracking** of beneficiaries.
- **Decentralised yet Coordinated Governance:** Leverage the **flexibility given to states** under the Code to **innovate and adapt** schemes locally while ensuring **national minimum standards**.
- **Clarify Legal Definitions:** Amend the Code to provide **clear, inclusive definitions** of gig, platform, and other informal workers to reduce ambiguity.
- **Integration of Databases and Portals:** Link **eShram, Ayushman Bharat**, and **pension accounts** with **labour management systems** for better tracking and delivery of benefits.

India: A global talent hub

(Syllabus Mapping: GS-III, Indian economy and issues related to Growth and development, Employment, Effects of Liberalisation)

Context

By **2040**, high-income nations may face a **160 million** worker shortage. India, with its youthful workforce, can become a global talent hub, creating jobs and enhancing global influence.

Overview: Factsheet

- A recent **FICCI-KPMG** study titled Global Mobility of Indian Workforce forecasts a global talent shortfall exceeding **85.2 million people by 2030**, potentially leading to **\$8.45 trillion** in lost annual revenue.
- This highlights the pressing need for countries to build a workforce equipped for the future. With its large base of young and skilled professionals, India is well-positioned to bridge this gap and play a pivotal role in the global economy.

Global Labour Shortage and Opportunities For India

- **Labour Shortages in Advanced Economies:** Developed countries face increasing worker shortages in sectors like healthcare, engineering, education, and industry.
- **India's Youthful Workforce:** India has a large, young population capable of meeting global labour demands—but only 1.3% migrate abroad, far less than countries like Mexico (8.6%) or the Philippines (5.1%).
- **Economic Gains Through Remittances:** Indian migrants send home \$125 billion annually, contributing 3% to the GDP—more than any single export sector.
- **Poverty Reduction via Migration:** A global study shows that a 10% rise in remittances can lead to a 3.5% drop in poverty in low-income countries.

Seven Steps to Build India's Global Workforce Footprint

- **Strengthen Migration Governance:** Enhance the Ministry of External Affairs' migration arm to identify target markets, sign migration agreements, and match skills with global demand.
- **Align Education with Global Job Markets:** Incorporate foreign languages and international skills into the Indian education system. Facilitate joint certifications and mutual recognition of qualifications with key destination countries.
- **Reduce Migration Costs:** With current costs ranging from ₹1–2 lakh (GCC) to ₹5–10 lakh (Europe), India should implement the **Philippines-style ESA-pay model**, where licensed recruiters or employers bear major pre-departure expenses.
- **Expand Bilateral Agreements:** Proactively secure G2G migration deals to remove visa hurdles, ensure Indian qualifications are recognized, and ease the socio-cultural integration of Indian workers abroad.
- **Establish a National Mobility Body:** Create an industry-wide institution to standardize overseas recruitment, ensure ethical practices, align training with global standards, and enhance coordination between public and private stakeholders.
- **Ensure Migrant Welfare Abroad:** Uphold fair wages, timely payments, adequate housing, health access, legal assistance, and protection from exploitation, in line with ILO standards.

- **Facilitate Returnee Integration:** Tap into the skills and global exposure of returning migrants by offering reintegration support and opportunities to contribute to domestic development.

Conclusion

- **Building India into a global talent powerhouse** will boost **foreign exchange through remittances**, enhance **India's global soft power**, and promote **inclusive development**.
- **"Make in India"** combined with **"India for the World"** can serve as the **twin pillars** of India's growth and global influence in the 21st century.

Creative Economy

(Syllabus Mapping: Indian economy and issues related to Growth and Development)

Context

As India strives to become a \$5 trillion economy, it must revamp its innovation strategy, fostering creativity across all levels.

Current Situation of Creative Economy in India

- **Economic Value:** As of 2024, India's creative economy is valued at **\$30 billion**. It provides employment to about **8% of the total workforce**, which includes sectors like media, design, crafts, and digital services.
- **Export Contribution:** In 2019, India exported around **\$121 billion** worth of creative goods and services — **\$100 billion** of this came from services like software design, IT, and digital media.
- **Growth Trend:** In 2024 alone, India's creative exports grew by **20%**, earning over **\$11 billion**, indicating steady global demand.
- **Dominant Segments:** The **design sector** makes up the bulk of India's creative goods exports (87.5%), while **traditional arts and crafts** contribute about 9%.
- **Creative Economy Outlook 2024:** According to the **United Nations Trade and Development (UNCTAD)** report on the creative economy, three sectors are the main contributors of the creative economy (2022): **software services (41.3%)**, **research and development (30.7%)**, **advertising, market research and architecture (15.5%)**.

Concerns Related to Creativity and Innovation in India

- **Gap Between Creativity and Innovation:** India has many creative individuals and ideas, especially in rural areas, but **most ideas don't turn into useful products or businesses**. This is due to lack of funding, mentorship, or platforms for growth.
- **Limited Investment at Local Level:** While urban tech sectors get significant investments (e.g., climate tech got \$2.85 billion in 2023), **grassroots innovations receive very little financial support**.
- **Weak Intellectual Property (IP) Support:** Many local creators don't have access to **affordable or simple IP protection**, like patents or design registrations, making it easier for their ideas to be copied.
- **No Unified Policy:** India currently does not have a **comprehensive national policy** to guide or support the creative economy. Different sectors work in silos without coordination.
- **Urban-Rural Imbalance:** Creative sectors in cities benefit from digital tools and funding. But **rural sectors, like handicrafts or traditional skills, are underfunded and declining**.

New Pathways for Strengthening India's Creative Economy

- **One District One Innovation (ODOI):** Inspired by the ODOP (One District One Product) model, every district can identify and promote **a unique innovation**, whether it is in design, technology, or cultural products.
- **Scale-Up Grassroots Innovations:** Invest in scaling grassroots creative ideas like the **Mitticool refrigerator**, **amphibious bicycle**, or **pedal washing machines**.
 - **Grassroots Innovations Augmentation Network (GIAN)** have resulted in popularising hundreds of grassroots creative ideas.
- **Reform IP System for Informal Sector:** Create **simplified, low-cost IP registration processes** for small-scale inventors and traditional artists to protect their innovations and earn from them.

- **Dedicated Creative Economy Policy:** Develop an integrated national policy that brings together ministries related to **culture, MSMEs, education, and technology** under one framework for better coordination.
- **Encourage Nature-Inspired Design (Biomimicry):** Take lessons from natural structures to solve real-world problems — like Indonesia's **Antrodam Project**, which used ant nest designs to manage floods.

Antrodam Project (Indonesia)

- **Initiative:** Conceived by students of Binus School, Bekasi to tackle flooding.
- **Inspiration: Biomimicry** — structures modeled on Indian harvester ant nests and natural elements like rose petals, coral, and bird anatomy.
- **Impact:** The system redirects water like natural tunnels, showing how **nature-inspired solutions** can address local problems.
- **Lesson for India:** School and college-level students can be incubators of real-world solutions.
 - Need for mentorship and seed funding to move from ideas to innovation.

India's Aviation Revolution

(Syllabus Mapping: GS-III, Infrastructure: Airports)

Context

India's aviation sector is among the fastest-growing sectors in the country's economy.

Factsheet

- India is the world's **3rd-largest** market in the aviation sector (1st- USA, 2nd- China).
- India boasts **13–18% of women pilots**.
- **The 2nd Asia-Pacific Ministerial Conference on Civil Aviation** was hosted in **New Delhi**.

Legislative Reforms Driving Systemic Transformation

- **Protection of Interest in Aircraft Objects Bill, 2025:** Aligns Indian laws with the **Cape Town Convention, 2001**.
 - Reduces **leasing costs** for Indian carriers (previously 8–10% higher).
 - Boosts **investor confidence** in Indian aviation.
 - Improves **contract enforceability** and **repossession certainty**.
 - Aims to foster **domestic aircraft leasing hubs**.
- **Bharatiya Vayuyan Adhiniyam, 2024:** Replaces the colonial-era **Aircraft Act of 1934**.
 - Supports **Make in India** and **Atmanirbhar Bharat** in aviation.
 - Aligns with **ICAO and Chicago Convention** norms.
 - Streamlines **licensing and regulatory processes**.
 - Introduces **appeal mechanisms** and removes outdated provisions.

Infrastructure Expansion Building the Future of Indian Aviation

- **New Terminal Development:** Foundations laid in **Varanasi, Agra, Darbhanga, Bagdogra**.
- **Operationalised Greenfield Airports (12 out of 21):** Includes **Durgapur, Shirdi, Kannur, Mopa, Kushinagar, Shivamogga**, etc.
 - Progress underway at **Noida (Jewar)** and **Navi Mumbai**, targeted for **FY 2025–26**.
- **Ambitious Targets Ahead: 50 new airports** in the next **5 years**.
 - **120 new destinations** over **10 years**.
- **Capital Investment:** ₹91,000 crore earmarked under **National Infrastructure Pipeline (NIP)** (FY20–FY25).
 - ₹82,600 crore already spent by **Nov 2024**.

Other Key Government Initiative

- **National Civil Aviation Policy (NCAP) – 2016 (MoCA):** Enhances domestic aviation growth by rationalizing MRO taxation, supporting international expansion, and creating a more investor-friendly aviation ecosystem.

- **NABH (NextGen Airports for Bharat) Nirman (MoCA):** Focuses on modernizing airport infrastructure and increasing capacity to accommodate the rising number of air passengers.
- **DigiYatra (MoCA):** Introduces biometric-based, paperless travel to streamline airport processes and improve the passenger experience.
- **GAGAN (GPS-Aided GEO Augmented Navigation) – ISRO + AAI:** Enhances flight navigation accuracy and efficiency, improving operational safety through satellite-based augmentation.
- **100% FDI in Aviation (DPIIT):** Permits full foreign ownership in greenfield airport projects and up to 49% in domestic airlines via the automatic approval route to attract global investment.
- **Krishi Udan Scheme (MoCA):** Supports air transportation of perishable agricultural products, aiming to boost farmers' income and reduce post-harvest losses.
- **Aircraft Leasing & Financing at GIFT City (IFSCA):** Establishes a domestic hub for aircraft leasing and financing to reduce reliance on foreign leasing companies.
- **Open Sky Policy (MoCA):** Liberalizes international airspace access, encouraging greater global connectivity and foreign airline participation.

Union Budget 2025–26: Key Initiatives to Strengthen India's Aviation Sector

- **Revamped UDAN Scheme:** The government has announced a modified UDAN initiative aimed at strengthening regional air connectivity.
 - The updated scheme will add 120 new destinations and is expected to serve an additional 4 crore passengers over the next 10 years.
- **Infrastructure Development:** Major plans include the expansion of Patna Airport and the development of a brownfield airport at Bihta in Bihar to enhance aviation infrastructure.
- **Focus on Remote Areas:** The UDAN scheme will also support the establishment of helipads and small airports in hilly regions, aspirational districts, and the Northeastern states, promoting access in underserved areas.
- **Budget Allocations:** The Ministry of Civil Aviation has been allotted ₹2,400.31 crore, a decrease from ₹2,658.68 crore in the previous year.
 - Funding for the **UDAN scheme** has been **reduced to ₹540 crore from ₹800 crore.**

About Regional Connectivity Scheme- Ude Desh ka Aam Naagrik (RCS-UDAN)

- **Launched:** 2016
- **Ministry:** Ministry of Civil Aviation
- **Objective:** To connect small and medium cities with big cities through air service.
- **Funding:** Jointly funded by the central government and state governments.
- **Features:** Linking **small and medium towns** to **major cities** through air connectivity.
 - Ensuring air travel is **affordable, economically sustainable, and commercially viable.**
 - Offering **financial incentives** to select airlines to promote services from **unserved and underserved airports.**

Significance of UDAN Scheme

- **Enhanced Regional Connectivity:** The scheme promotes **balanced regional development** by connecting smaller cities and remote areas with major urban hubs through air routes.
 - It boosts **intra-state and inter-state connectivity**, particularly in the North-Eastern states, hill states, and islands.
- **Affordable Air Travel:** UDAN caps airfare at **₹2,500 for a one-hour flight**, making flying more accessible to the common man.
 - This democratizes air travel, encouraging **middle-class and lower-middle-class** participation.
- **Infrastructure Development:** Development of **airports in tier-2 and tier-3 cities** fosters local infrastructure growth.
 - Reviving unused or underused airstrips helps in **optimizing national assets.**
- **Economic and Tourism Boost:** Enhanced connectivity promotes **tourism, trade, and employment generation.**
 - It leads to the **development of regional economies** and supports the **Make in India** and **Startup India** missions.
- **Environmental and Social Benefits:**
 - Better air connectivity reduces **road traffic congestion** and can **lower fuel usage** for long journeys.
 - Improves **medical evacuation** and emergency services access in remote areas.

What are the Concerns Associated With Aviation Sector

Operational Concerns

- **Grounded aircraft:** Over 160 aircraft (~25% of the fleet) remain non-operational due to financial stress and supply chain issues, reducing service capacity.
- **Crew shortages:** A 12-15% pilot deficit and lack of engineers/cabin staff lead to delays, cancellations, and safety risks (e.g., Vistara flight cancellations, Air India fines for unqualified crew).
- **Safety lapses:** Frequent technical failures, emergency landings, and runway incidents (e.g., **Kozhikode/Mangaluru crashes linked to pilot fatigue**).
- **Supply chain disruptions:** Delays in aircraft/engine deliveries from Boeing/Airbus exacerbate fleet shortages.

Financial Stress

- **Losses:** Airlines projected to lose \$1.6–1.8 billion in FY24, with net losses of ₹2,000–3,000 crore anticipated in FY25–26.
- **High costs:** Aviation Turbine Fuel (ATF) constitutes 45–50% of expenses, taxed at 40–50% (among the world's highest).
- **Debt burden:** Insolvencies of Jet Airways, Go First, and SpiceJet's precarious position reflect unsustainable debt levels.

Infrastructural Deficiencies

- **Airport congestion:** Major hubs like Delhi face capacity constraints, with each of India's 149 airports serving ~94 lakh people on average.
- **UDAN limitations:** Tier-2/3 cities remain underserved despite regional connectivity schemes.
- **Maintenance, Repair & Overhaul (MRO) gaps:** Reliance on foreign maintenance facilities increases costs.
- **Structural risks:** Incidents like Delhi airport's roof collapse highlight rushed infrastructure development.

Environmental Pressures

- **Carbon emissions:** Compliance with CORSIA mandates costly sustainable aviation fuel (SAF) adoption.
- **Sustainability gaps:** Limited investment in green airports and carbon-neutral technologies.

Additional Risks

- **Global factors:** Oil price volatility and geopolitical tensions strain profitability.
- **Skill mismatches:** Training programs fail to address real-world operational challenges (e.g., unstable approaches)

Way Forward

- **Infrastructure Modernization & Expansion:** Accelerate the 200-airport target by 2025 and 4,000-aircraft fleet plan through \$11 billion in infrastructure investments.
 - **Prioritize greenfield airports in underserved regions and upgrade existing hubs** (e.g., Delhi, Mumbai) to handle rising traffic, which is projected to double by 2029.
- **Legislative & Policy Reforms:** Implement the Protection of Interest in Aircraft Objects Bill, 2025 to align leasing laws with global standards.
- **MRO Ecosystem Development:** Establish MRO clusters near major airports and streamline customs for faster spare-part clearances.
- **Workforce & Safety Enhancements:** Address 12–15% crew shortages through accelerated training programs and partnerships with global institutes.
 - Mandate AI-driven safety protocols and fatigue management systems to reduce incidents like unstable approaches and runway overruns.
- **Sustainable Aviation Initiatives:** Scale sustainable aviation fuel (SAF) production to meet CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) 2050 targets, supported by subsidies and R&D investments.
 - Convert airports to net-zero carbon operations via solar energy and energy-efficient designs (e.g., Delhi's T3 solar plant).
- **Technological Integration & Global Collaboration:** Adopt AI/ML for predictive maintenance and digital twin systems to optimize operations.
 - Partner with firms like Airbus for "Make in India" aviation manufacturing, starting with the TATA-Airbus C-295 facility in Vadodara.
 - Expand UDAN 5.0 to enhance last-mile connectivity through electric/hybrid aircraft pilots.

TOPICS FOR PRELIMS (ECONOMY)

Transition of Weak UCBs from SAF to PCA Framework

Context

The **Reserve Bank of India (RBI)** has decided to replace the **SAF with the PCA** framework to strengthen supervisory intervention for financially weak UCBs.

About Urban Cooperative Banks (UCBs)

- UCBs are financial institutions that operate in **urban and semi-urban areas in India**.
- UCBs are **registered as cooperative societies** under the respective
 - **State Cooperative Societies Acts** (for single-state operations) or
 - **Multi-State Cooperative Societies Act, 2002** (for operations across multiple states).
- **Regulation:** UCBs function under a dual regulatory framework:
 - **Banking Regulation Act, 1949:** Since 1966, RBI has been supervising UCBs regarding licensing, capital adequacy, loan policies and financial stability.
 - **The Banking Regulation (Amendment) Act, 2020** has given RBI more control over UCBs, allowing it to intervene in their management and governance.
 - **Registrar of Cooperative Societies (RCS):** The respective state governments or the central government control administrative functions through the RCS.
- The **1st urban cooperative credit society of India** was **“Anyonya Sahakari Mandali,”** established in **1889** in Baroda.
- **Categories of UCBs:**
 - **Tier 1** – Deposits up to Rs 100 crore.
 - **Tier 2** – Deposits above Rs 100 crore and less than Rs 1,000 crore.
 - **Tier 3** – Deposits above Rs 1,000 crore and less than Rs 10,000 crore.
 - **Tier 4** – Deposits above Rs 10,000 crore.

About Prompt Corrective Action (PCA) Framework

- It is a supervisory tool used by the RBI to address financial stress in banks.
- **Key areas of monitoring:** Adequate capital, asset quality and profitability.
- It will replace the **Supervisory Action Framework (SAF)**, which was introduced in **2012**.
- **Conditions for Invocation of PCA:**
 - **Capital Adequacy Ratio (CAR):** If CAR falls **up to 250 basis points (bps)** below the required level.

- **Asset Quality (Net Non-Performing Assets - NPAs):** If Net NPAs exceed 6% but remain below 9% of total advances.
- **Profitability:** If the UCB incurs losses for **two consecutive years**.
- **Application:** All UCBs in tier 2, tier 3 and tier 4 categories.

Key Shift in Remittance Trends

Context

According to the recently released **RBI remittance survey**, **Advanced Economies** now account for **more than 50% of total remittances to India**.

What are Remittances?

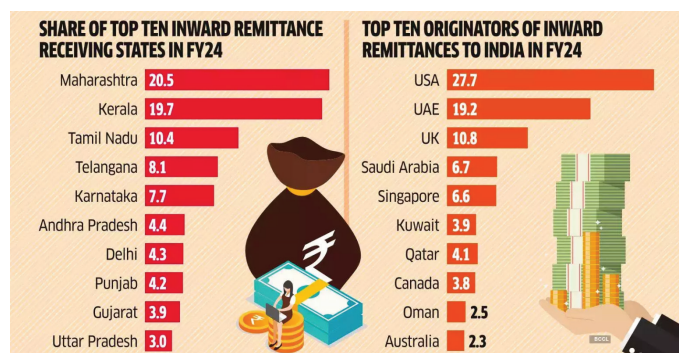
- Remittances are **money transfers made by individuals working abroad to their families or relatives in their home country**.
- For India, they are a vital source of: Foreign exchange reserves, Household income support & Development finance.
- Remittance comes under the **transfer payment category** in the current account of the **Balance of Payments (BoP)**.
- India is the **world's top recipient of remittances**.

Highlights of RBI's Remittance Survey (2023-24)

- **Advanced Economies (AEs)** now account for **more than 50%** of total remittances to India.
- The **United States** is the **largest contributor**, with a **27.7% share** of total remittances in 2023-24.
- Gulf countries' share is **declining steadily**.

Reasons for the decline of Remittances from the Gulf are Declining

- **Historical Background:** Gulf Cooperation Council (GCC) countries — **UAE, Saudi Arabia, Kuwait, Qatar, Bahrain, Oman** — have traditionally been top sources due to high Indian blue-collar migration.
- **Reasons for Decline:**
 - **Post-Covid Economic Downturn:** Job losses and pay cuts reduced remittance capacity.
 - **“Nationalisation” Policies:** E.g. **Saudisation/Nitaqat** in Saudi Arabia promotes local employment over foreign workers.
 - **Falling Contribution Share (2016-17 → 2023-24):**
 - **UAE:** 26.9% → 19.2%
 - **Saudi Arabia:** 11.6% → 6.7%
 - **Kuwait:** 6.5% → 3.9%



Reasons behind Rise of Remittances from Advanced Economies

- Higher per capita remittances due to: **Higher wages**, especially in **STEM, finance, healthcare** sectors
- Larger Indian diaspora of skilled professionals in Advanced Economies.
- Educational migration** → **professional settlement** → **remittances**.

Repo Rate

Context

Recently the **Monetary Policy Committee (MPC)** of **RBI** has decided to cut the **repo rate by 25 basis points to 6%**.

Monetary Policy Committee

- MPC was constituted in **2016** as a **statutory body** under the **RBI Act** to formulate monetary policy in India (**on recommendation of Urjit Patel committee**)

- Composition (**Chairperson + 5 Members**): Quorum: 4 members.
 - RBI Governor - ex-officio chairperson
 - RBI Deputy Governor + 1 more member from RBI to be nominated by the Central Board of Directors.
 - 3 other members are appointed by the Central Government.

- Members of MPC hold office for a period of **4 years** and are **not eligible for re-appointment**.

- MPC is required to **meet at least four times in a year**.

- MPC takes decisions based on **majority vote** (by those who are present and voting. In case of a tie, the **RBI governor will have the second or casting vote**).

- The decision of the committee is binding on the RBI.**



Vizhinjam Port

Context

Recently one of the world's largest and most fuel-efficient container ships, **MSCTürkiye**, docked at Vizhinjam International Seaport.

About Vizhinjam International Seaport

- It is **India's first deepwater transshipment port** located in **Vizhinjam (near Thiruvananthapuram), Kerala**.

RBI's Monetary Policy Stances

Withdrawal of Accommodation



It indicates a tightening of monetary policy where the RBI aims to reduce liquidity in the economy to control inflation.

Neutral Stance



The RBI maintains the current interest rate while monitoring inflation and growth indicators closely.

Accommodative/Expansionist Stance



RBI lowers interest rates to boost liquidity and stimulate investment and consumption.

About Repo Rate

- Repo Rate** : It is the rate at which RBI lends money to commercial banks.
- Reverse Repo Rate**: It is the Interest paid by RBI to commercial banks when they park their excess cash with the central bank.
- Impact of Repo Rate on Economy**:
 - Decrease in Repo Rate**: Stimulates economic activity.
 - Increase in Repo Rate**: Helps in controlling inflation.

- **Designing, Building, Financing and Operating** the project during the contracted period.
- **Transferring the project back to the public sector** after the end of contract period.

India's Port Sector

- India is the **16th largest maritime country in the world.**
- The Indian maritime sector contributes to **95% of India's trade by volume and 70% by value.**
- **Major Port:** Controlled by the **Ministry of Ports, Shipping & Waterways** controls major ports in India.
- **Minor Port:** Controlled by State Maritime Boards/Governments. There are 200 non-major ports.
- There are **12 Major Ports in India:** Chennai, Cochin, Deendayal (Kandla), Jawaharlal Nehru (Nhava Sheva), Kolkata, Mormugao, Mumbai, New Mangalore, Paradip, V. O. Chidambaram (Tuticorin), Visakhapatnam and Kamarajar Port Limited.
- **13th -Vadhavn Port (under construction).**
- India's **largest port by volume of cargo** handled is **Paradip Port, Odisha.**
- India owns over **30% global market share in the ship breaking industry** and is home to the **largest ship-breaking facility in the world at Alang (Gujarat).**

Rise in Gold loan NPA's

Context

The **RBI** is drafting a new framework for gold loans in response to a surge in both gold loan outstanding and **Non-Performing Assets (NPAs)** in this segment.

Growth in Gold Loans and NPAs

- As per **RBI data: Gold loan NPAs rose by 28.58%** in one year.
 - **Loan outstanding** grew by 27.26%.
- **NPAs spiked from ₹5,307 crore (Dec 2023) to ₹6,824 crore (Dec 2024).**
- **Total gold loan outstanding** as of Dec 2024: ₹11,11,398 crore (vs ₹8,73,701 crore in Dec 2023).

Reasons behind increasing Gold Loan Defaults

- **Deficiencies in Loan Segment flagged by RBI:**
 - Weak monitoring of loan-to-value (LTV) ratios.
 - Incorrect application of risk weights.
 - Lack of transparency in gold auctions.
 - Valuation without customer presence.
- **Rising Indebtedness:** A slowing economy has impacted income levels, reducing borrowers' repayment capacity.
- **High Gold Prices:**
 - Increased gold prices encouraged people to pledge gold to meet expenses like household needs, education fees and medical bills.

- Borrowers often defaulted due to the loan amount exceeding the gold's purchase price, impacting their credit scores.
- **Earlier practice - Evergreening:**
 - Borrowers could **repledge jewellery** by just paying interest.
 - It allowed indefinite loan extensions without principal repayment.
 - **Recent change** – Borrowers must repay full principal + interest before replying.

Non-Performing Assets (NPA)

- It is a loan or advance for which the **principal or interest payment** remains **overdue** for a period of **90 days.**
- **Classification (as per the RBI guidelines):**
 - **Substandard assets:** Assets which have **remained NPA for a period less than or equal to 12 months.**
 - **Doubtful assets:** An asset that has remained in the substandard category for a period of 12 months.
 - **Loss assets:** It is considered **"uncollectible"** or of such little value that its continuance as a bankable asset is not warranted, although there may be some recovery value.
- **Metrics that help us to understand the NPA situation of any bank:**
 - **Gross NPA:** It refers to the total NPAs of the banks.
 - **Net NPA:** Net NPA is calculated as Gross NPA -Provisioning Amount.
 - i.e. Net NPA gives the exact value of NPAs after the bank has made specific provisions for it.

RBI's Draft Guidelines

- Ban on lending against: **Financial assets backed by gold/silver** (e.g. ETFs, gold mutual funds).
- **LTV cap:** Max **75% for consumption gold loans.**
- **Loan Purpose:** Same gold collateral **can't be used for both consumption and income-generating purposes.**
- **Collateral Verification:** Lenders must ensure **clear ownership records** and maintain verification proof.
- **Loan Tenure:** **Bullet repayment loans** (principal + interest paid at maturity) capped at **12 months.**

Rise in CSR spending

Context

Total **CSR** spending by listed companies has increased by **16% to ₹17,967 crore in 2023-24.**

What is CSR (Corporate Social Responsibility) ?

- It is a concept whereby companies integrate social and environmental concerns in their business operations.
- In India, Companies Act, **2013** has made **CSR contribution mandatory.**

- **India was the first country in the world to make CSR spending compulsory by law .**
- A company must spend on CSR if it meets **any one** of these conditions:
 - **Net worth** of ₹500 crore or more,
 - **Revenue (turnover)** of ₹1,000 crore or more,
 - **Net profit** of ₹5 crore or more (during any financial year).
- **At least 2% of the average net profits of the preceding three financial years** must be spent on CSR activities.
- **CSR Committee:** Companies required to spend CSR amounts must form a **CSR Committee**:
 - Minimum **3 directors** (including at least **one independent director**).

What Happens if a Company Fails to Spend CSR Money?

- If a company **fails** to spend the required amount:
 - It must **explain the reason** in its Board Report.
 - The **unspent amount** must be:
 - ° Transferred to a special **Unspent CSR Account** within **30 days** of the financial year-end & utilized within **three financial years**.
- If still unspent after three years, it must be transferred to:
 - **PM CARES Fund**
 - **Prime Minister's National Relief Fund**
 - Other specified government funds.

Recent Trends (As per 2023-24 Data)

- Total CSR spend: ₹17,967 crore (16% rise over last year).
- **Top areas funded:** Education (₹1,104 crore), Healthcare (₹720 crore)
- **Top companies by CSR spend:**
 - **HDFC Bank** (₹945.31 crore)
 - **Reliance Industries** (₹900 crore)
 - **TCS** (₹827 crore)
- Public Sector Units (PSUs) also increased their CSR spending by 19%.

Commissioner of Railway Safety

Context

Recently CRS has made a report regarding the safety measures to be taken by the Railways for operation of high-speed trains.

About Commissioner of Railway Safety (CRS)

- CRS is a **statutory authority under the Ministry of Civil Aviation, not Railways.**
- It is an Independent safety regulator for Indian Railways.
- **Key Functions:**
 - **Safety Oversight** of new railway infrastructure and systems.

- **Approval of Railway Projects** (new lines, gauge conversions etc.).
- **Investigation of Railway Accidents.**
- Recommendations on Railway Operations and Safety Measures.
- **Why Not Under Railways?**
 - To maintain **independence and objectivity**, the CRS reports to the **Ministry of Civil Aviation**.

Key Concerns Highlighted in Safety Report

- **The leading coach** of Vande Bharat trains is **lighter than conventional locomotives.**
- This makes it **more vulnerable** to serious accidents in **case of collisions**, especially:
 - Cattle run-overs
 - Obstructions on the track
- Risk becomes severe **at higher speeds (up to 160 kmph).**

Recommendations by the CRS Report

- **Fencing and Trespassing Prevention:** Railways should **build sturdy fencing** along tracks to prevent:
 - Cattle intrusions
 - Human trespassing
- **Eliminate Level Crossings:** Eliminate all **level crossing gates** on routes with **160 kmph speed operations.**
- **Identify & Monitor Risk Zones:** Identify areas with:
 - Frequent trespassing
 - Regular cattle entry
- **Suggested safety measures:**
 - Deployment of Railway Protection Force (RPF)
 - Regular patrolling
 - Constructing subways for safe crossings

United States Federal Reserve

Context

US President Donald Trump has expressed a desire to remove current **Chair Jerome Powell** over policy disagreements.

About US Federal Reserve (US Fed)

- The Federal Reserve is the most powerful economic institution in the United States.
- It is responsible for managing monetary policy and regulating the financial system.
- **Structure of the Federal Reserve System:**
 - **Board of Governors (Washington, D.C.)**
 - 7 members, appointed by the President, confirmed by the Senate.

- **Chair** (currently Jerome Powell) and **Vice Chair** chosen from among them.
- **Tenure**: 14 years (Chair serves a 4-year renewable term).
- It oversees the entire Federal Reserve System and sets broad policies.
- **12 Regional Federal Reserve Banks**:
 - Conduct research, supervise banks, and participate in monetary policy implementation.
- **Federal Open Market Committee (FOMC)**:
 - Main policy-making body for monetary decisions (e.g. interest rates).
 - Meets 8 times a year to decide on monetary policy stance.
- **Mandate**:
 - **Price Stability** – keeping inflation under control.
 - **Maximum Sustainable Employment** – keeping unemployment low.
- **Independent within Government**: Not under White House control, but accountable to Congress.

Comparison between Fed & RBI

Feature	US Federal Reserve	Reserve Bank Of India
Establishment	1913 (Federal Reserve Act)	1935 (RBI Act, 1934)
Headed by	Fed Chair (Jerome Powell)	RBI Governor (Sanjay Malhotra)
Appointment	President of USA (Confirmed by Senate)	Union Government (Appointments Committee of the Cabinet)
Tenure	Chair - 4 Years (Renewable), 14 Years (Governor)	3 Years (Extendable)
Main Mandate	Price stability + Employment	Inflation targeting + Monetary stability
Policy Body	Federal Open Market Committee (FOMC)	Monetary Policy Committee (MPC)
Ownership	Independent public institution	Owned by the Government of India (Nationalization in 1949)
Directions	Govt. cannot directly issue directions to the Fed	Union govt. Can issue directions in Public Interest (Section-7 RBI Act)
Removal	For cause" (misconduct or incapacity), not for policy disagreements.	Not explicitly defined, influenced by the government.

Liquidity Coverage Ratio

Context

The Reserve Bank of India has issued **new guidelines regarding Liquidity Coverage Ratio(LCR)**.

What is LCR (Liquidity Coverage Ratio)?

- **LCR** refers to the minimum amount of **High-Quality Liquid Assets (HQLA)** a bank must hold to meet **short-term obligations** in a **30-day stress scenario**.
- High LCR **decreases money supply** by requiring banks to hold a larger proportion of highly liquid assets.
- A **run-off factor** is used to estimate how much of the bank's liabilities (like deposits) may "run off" (i.e., be withdrawn) under stress.

Key Changes in LCR Norms

- **Reduced Run-off Factor for Digital Deposits**:
 - Banks are now required to assign an additional **2.5% run-off factor** for retail deposits accessible via Internet and Mobile Banking (IMB), including platforms like UPI. (Previously - 5%)
- **Adjusted Run-off Rates Based on Deposit Stability**:

- **Stable IMB-enabled retail deposits**: Run-off factor increased from 5% to **7.5%**.
- **Reclassification of Non-Financial Entity Funding**:
 - Funding from entities like trusts, partnerships, and LLPs will now attract a **40% run-off rate**, down from the previous 100%.
- **Treatment of Small Business Customer Funding**:
 - Unsecured wholesale funding from non-financial small business customers will be treated similarly to retail deposits, attracting an additional **2.5% run-off factor**.

Historic Gold Price Surge in India

Context

Recently the price of **24-karat gold** has touched **₹1,01,350 per 10 grams**. This is the **first time** gold prices in India have breached the **₹1 lakh mark**.

Key Drivers Behind the Surge in Price

- **Weakening U.S. Dollar**:
 - The **U.S. Dollar Index (DXY)** dropped to a **three-year low below 98**.
- **Treasury Bond Sell-Offs**:

- Investors sold U.S. Treasury bonds, seeking **higher returns and safety**, moving capital to gold.
- **India's Position in Gold Market:**
 - India is the **second-largest gold consumer** globally (after China).
 - **Around 85% of India's gold is imported**, making domestic prices highly sensitive to international trends.
- **U.S.-China Trade Tensions:**
 - Ongoing Tariff war between US and China. This renewed **geo-political tension** triggered **safe-haven buying**.
- **Federal Reserve Pressure:**
 - US President **Donald Trump** unveiled plans to **overhaul the US Federal Reserve**.
 - Trump's statements **shook investor confidence**, contributing to:
 - **Dollar devaluation & A rise in safe-haven demand for gold.**
- **Strong Central Bank Buying:**
 - Ongoing purchases by China and other central banks signal: **Long-term confidence in gold & Strategic reserve accumulation.**
- Investors **seek gold** as a hedge against currency devaluation.
- Global buyers find **gold cheaper**, boosting demand.
- **Current Scenario:**
 - The **Dollar Index has fallen below 98** – Gold more **attractive asset**, contributing to the price rise.

India's Gold Reserves

- RBI holds **854.73 metric tonnes of gold**, of which 510.46 metric tonnes were held domestically & 324.01 metric tonnes of gold were kept in safe custody with the **Bank of England and the Bank for International Settlements (BIS)**.
- As of September 2024, the share of gold in the total foreign exchange reserves is about **9.32%**.
- **Top Gold Reserve Holding Countries:**
 - United States (8,133.46 tonnes)
 - Germany
 - Italy
 - France
 - India (8th)
- **Top Gold Producers:** China, Australia, Russia, Canada, USA.
- **Karnataka is the largest producer of gold in India.**
 - **Hutti Gold Mines** (Karnataka) is the only producer of primary gold in the country

About Dollar Index

- **Dollar Index (DXY)** is a measure of the value of the U.S. dollar relative to a basket of foreign currencies.
- **Basket of Currencies:** DXY compares the U.S. dollar against six major currencies:
 - **Euro (EUR)** – 57.6% (highest weight)
 - **Japanese Yen (JPY)** – 13.6%
 - **British Pound (GBP)** – 11.9%
 - **Canadian Dollar (CAD)** – 9.1%
 - **Swedish Krona (SEK)** – 4.2%
 - **Swiss Franc (CHF)** – 3.6%
- **Base Year and Calculation:** It was established in **1973**, shortly after the Bretton Woods Agreement was dissolved with a base value of **100**.
- **Factors Influencing DXY:**
 - **Monetary Policy:** U.S. Federal Reserve interest rate changes.
 - **Economic Indicators:** GDP growth, employment rates, inflation.
 - **Global Events:** Wars, recessions or financial crises impact the index.

Relationship Between Dollar Index and Gold

- **Gold is priced in U.S. dollars** on the international market.
- When the **dollar weakens**:
 - It takes **more dollars to buy the same amount of gold**.

Financial Action Task Force

Context

Recently India hosted the **Financial Action Task Force (FATF) Private Sector Collaborative Forum (PSCF) 2025 in Mumbai**. It was organised by the **RBI & Finance Ministry**.

About Financial Action Task Force (FATF)

- It is an inter-governmental body that has developed standards to prevent and combat money laundering and terror financing.
- **Headquarters:** Paris, France.
- **Background:** It was established in **1989** during the G7 Summit in Paris to develop policies against money laundering.
- **Objective:**
 - To establish international standards and to develop and promote policies, both at national and international levels for combating money laundering and terror financing.
- **Members: 40** (38 Countries + 2 Organisations - European Union and Gulf Cooperation Council)
 - Major countries: US, India, China, Saudi Arabia, UK, Germany, France, .
 - India became a member of FATF in **2010**.

FATF Lists

- **Black List:**
 - Includes countries considered safe havens for supporting money laundering and terror funding.

- Presently **Iran, North Korea, and Myanmar** are currently on the FATF Black List.
- **Grey List:**
 - Includes countries that are considered to have weak anti-money laundering (AML) and counter-terrorism financing (CFT) regimes.
 - This inclusion serves as a warning to the country that it may enter the blacklist.
- **Effects of being on the FATF Blacklist:**
 - No financial help is given to those countries by the International Monetary Fund (IMF), World Bank, Asian Development Bank (ADB) and the European Union (EU).
 - They also face a number of international economic and financial restrictions & sanctions.

Indian has decided to abolish Google Tax

Context

The central government has proposed to abolish the **Equalisation Levy on online advertisements**.

What is the Equalisation Levy (EL)?

- EL is a direct tax aimed at **'equalising'** the tax component of resident and non-resident e-commerce companies.
- Introduced in **2016**, it initially imposed a **6% tax on digital advertisements** provided by offshore companies.
- The two conditions to be met to be liable to equalisation levy:
 - The payment should be made to a **non-resident service provider**.
 - The annual payment made to one service provider exceeds **Rs.1,00,000 in one financial year**.
- It is informally referred to as the **"Google tax"** because it affects global tech giants such as **Google, Meta and Amazon**, requiring them to withhold and remit this tax to the Indian government.

Government's Proposal to Abolish Equalisation Levy

- As part of the **35 amendments** to the **Finance Bill, 2025**, the **6% equalisation levy on digital ads will be abolished from April 1, 2025**.
- This move follows the earlier **repeal of the 2% equalisation levy on e-commerce in 2024**.

Gold Monetisation Scheme

Context

The Government of India has decided to discontinue the **Medium-Term and Long-Term Deposits (MLTGD)** under the **Gold Monetisation Scheme (GMS)**.

About Gold Monetisation Scheme

- The **Gold Monetisation Scheme (GMS)** was launched in **November 2015** as a revamped version of the older **Gold Deposit Scheme**.
- **Objectives of GMS:**
 - **Utilizing Idle Gold** – Encouraging individuals and institutions to **deposit their gold** in banks.
 - **Reducing Gold Imports** – Enhancing domestic gold availability to **decrease dependency on imports**.
 - **Providing Interest on Gold Deposits** – Offering a **return on gold holdings** instead of keeping them idle.
 - **Supporting the Jewellery Industry** – Allowing banks to **lend gold to jewelers**, increasing liquidity in the sector.
- The scheme had three deposit options:
 - **Short-Term Bank Deposits (STBD):** 1-3 years (Interest decided & borne by banks).
 - **Medium-Term Government Deposits (MTGD):** 5-7 years (Interest decided & borne by the government).
 - **Long-Term Government Deposits (LTGD):** 12-15 years (Interest decided & borne by the government).

Challenges Faced by GMS

- **Low Participation:** Indians prefer holding physical gold over financial gold products.
- **Trust Issues:** People are hesitant to deposit family heirlooms and jewelry.
- **Storage & Liquidity:** Banks face difficulties in effectively utilizing collected gold.

Discontinuation of Sovereign Gold Bonds

- This is the **second gold-related scheme to be discontinued recently**, following the government's decision to **stop issuing Sovereign Gold Bonds (SGBs)**.
- Under the **Sovereign Gold Bond Scheme**, bonds were issued in **denominations of 5g, 10g, 50g, and 100g** for **5-7 years** with interest based on the metal's value at the time of investment.
- The scheme had an **annual cap of 500 grams per individual**.
- The **government is moving away from gold-related investment schemes**, likely due to **rising gold prices and market conditions**.

Why the Confidence in US Dollar is falling

Context

Recently the **US dollar** has started losing value due to **reciprocal tariffs**.

What is the Bond Market?

- **Bond = A Loan to Government or Company**

- When a government or company needs money, they **borrow from investors** by issuing “bonds”.
- A **bond** is a promise to repay the money after a fixed time, with regular interest payments.
- **Government Bonds = Very Safe Investments**
 - Bonds issued by governments (like UK, US, India) are considered **low-risk**, because governments rarely default.
 - These are often called “**sovereign bonds**”.
- **Bond Price and Yield**
 - **Bond Price**: The cost of buying the bond in the market.
 - **Yield**: The return you get (like interest) from the bond.
 - If bond **prices go down, yields go up**, and vice versa.
- High yields typically attract investors, but in this case, rising yields were interpreted as a **sign of increased risk and poor fiscal management** (especially with national debt exceeding \$35 trillion).
- **Result**: Investors **demand higher returns**, signaling **lower trust** in long-term US financial stability.
- **Shift to Other Stable Currencies**: With rising global volatility, investors traditionally prefer the US dollar. However, during this phase, they **preferred the euro, yen, Swiss franc**, etc.
 - This shift shows a **loss of faith in the dollar as a “safe haven”**, a title it held for decades.
- **Falling Oil Prices & Energy Market Woes**: Trump’s policy of **energy dominance (“drill baby drill”)** was hit by **slumping crude oil prices**.
 - **Below \$60/barrel**, US shale oil becomes **uneconomic**, threatening one of the key pillars of US trade power.
 - This undermined investor confidence in the **US energy-backed economic narrative**.
- **Huge US Debt Burden**: With **\$35 trillion in national debt**, rising yields mean the US has to **pay more in interest**.
 - This raises concerns about **long-term debt sustainability**, pushing investors away from US assets and reducing dollar demand.
- **Political Interference & Policy Instability**: The **Federal Reserve’s independence** has been a key reason behind global trust in the dollar.
 - Any signs (even indirect) of political interference in monetary policy (as feared under Trump) **undermines investor faith** in the system’s credibility.

Relation Between Bond Market and Currency Value

- **Rising Yields = Investors Demand Higher Returns**
 - If investors think a country’s economic policy is risky (like too much borrowing), they sell that country’s bonds.
 - This pushes **bond prices down** and **yields up**.
- **Higher Yields = Higher Cost for the Government**
 - The government has to **pay more interest** to borrow money in the future.
 - This can **hurt government finances** and investor confidence.
- **Investor Confidence Affects Currency Value**
 - If investors **lose trust** in a country’s economy, they may also lose trust in its **currency**.
 - They start selling the currency and pull out their money.
- **Selling of Currency = Currency Weakens**
 - If many investors sell a currency (like the pound), its **value falls** compared to other currencies (like the US dollar).
- **Example: UK Under Liz Truss (2022)**
 - Investors feared her tax-cut + spending plans would worsen debt and inflation.
 - They sold UK bonds → yields rose → lost faith in the pound → **pound crashed to a 37-year low**.

Why Confidence in the US Dollar Falling?

- **Investor Uncertainty due to Unpredictable Tariff Policies**: President Trump’s **tariff-heavy approach** — especially against allies and adversaries alike — created **global uncertainty**.
 - Lack of clarity on end goals and arbitrary tariff rates **spooked global markets**, leading investors to **diversify away from the US dollar**.
- **Rising US Government Bond Yields**: Investors **sold US government bonds**, causing bond **prices to fall** and **yields to rise**.

Govt notifies revised criteria for classifying MSMEs

- The Union government has notified significant revisions to turnover and investment criteria for classifying MSMEs that will take effect from April 1.

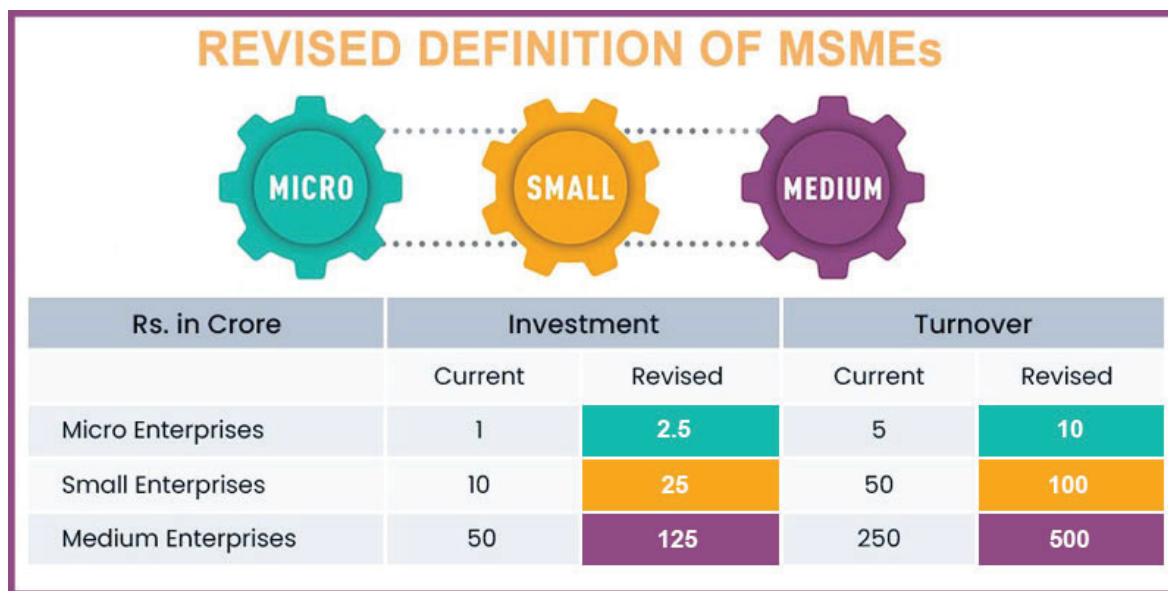
Government Initiatives for MSME

- **Credit guarantee cover** for micro and small enterprises enhanced from 5 crore to 10 crore.
- **10 lakh** customized credit cards with 5 lakh limit for micro enterprises registered on **Udyam portal** to be introduced.
- **Export Promotion Mission** to facilitate easy access to export credit and support MSMEs to tackle non-tariff measures in overseas markets.
- New fund of funds of Rs. 10,000 crore to be set up for start-ups.
- **Scheme of Fund for Regeneration of Traditional Industries (SFURTI)**: It aims to organize traditional

artisans into collectives or clusters, facilitating product development, diversification, and value addition.

- **Prime Minister's Employment Generation Programme (PMEGP):** It is a credit linked subsidy

scheme for providing employment opportunities through establishment of micro-enterprises in the non-farm sector.



Fiscal Slippage

- In a recent interaction with the Indian Diaspora, the Union Finance Minister has stated that the government's debt is being managed well and the fiscal deficit will not slip out of control.

What is Fiscal Slippage?

- **Fiscal slippage** refers to a **deviation from the government's targeted fiscal deficit** — when the **actual fiscal deficit exceeds the budgeted or projected level**.
- Fiscal Deficit = **Total Expenditure** – (Revenue Receipts + Non-debt Capital Receipts)
 - It shows how much the government needs to borrow to meet its expenses.
- **What Causes Fiscal Slippage?**
 - Revenue Shortfall – Lower-than-expected **tax revenues**
 - Higher Expenditure – Rise in **subsidy bills**, Increase in **interest payments etc.**

- External Shocks – **Global recession**, war, or pandemic (covid-19) etc.

Implications of Fiscal Slippage

- **Increased Government Borrowing:**
 - It can lead to **higher interest rates** in the economy (crowding out private investment). – High **debt-to-GDP ratio**.
- **Pressure on Credit Rating:**
 - Global agencies like **Moody's or S&P** may downgrade India's sovereign rating.
- **Inflation Risk:**
 - If deficit is financed via **monetary expansion** (printing money)– it can cause **inflation**.
- **Loss of Investor Confidence:**
 - May discourage **foreign investment** and raise concerns about macroeconomic stability.

News in Short

Slippage Ratio

- Slippage ratio is the **rate at which good loans are turning bad**.
- **It is measured by:** Fresh accretion of NPAs during the year × 100/Total standard assets at the beginning of the year
- **Trends:**
 - **High slippage ratio** suggests that a bank is experiencing a significant increase in bad loans, which can negatively impact its profitability and financial health.
 - **Low or no slippage ratio** indicates that a bank is effectively managing its asset quality.

Countercyclical Capital Buffer (CCyB)

- CCyB is a regulatory tool that mandates banks to **build up capital buffers in good times** so that they can **absorb losses and maintain credit flow** during economic downturns.
- **Purpose:**
 - Maintain credit flow to the real sector during stress.
 - Curb **indiscriminate lending** during times of excess credit growth.
 - Enhance the resilience of the banking sector.
- **Main Indicator: Credit-to-GDP gap** is the **primary metric**, used along with supplementary indicators.
- It was introduced by the RBI in **2015 under Basel III**, but never used so far.

Oil Import Dependency Reaches Record High

- In FY25, India's **oil import dependency rose to 88.2%**, up from 87.8% in FY24.
- Out of 88.2% only **11.8%** of petroleum product consumption was met through **domestically produced crude**.
- **Natural Gas Import Dependency:**
 - Natural gas import dependency has reached **50.8%** in FY25, up from **47.1%** in FY24
 - India's goal is to **raise the share of natural gas in the energy mix to 15% by 2030** (currently around over 6%).
- **Factors behind growing demand:**
 - Expansion of **energy-intensive industries**
 - Rise in **vehicle sales** and **aviation growth**
 - Rise in **vehicle sales** and **aviation growth**
 - Greater consumption of **petrochemicals**
 - Population growth and urbanization.

About PPAC (Petroleum Planning & Analysis Cell)

- It is an attached office under the **Ministry of Petroleum and Natural Gas (MoPNG)**.
- It is the **most authentic official source** for data and policy analysis on the **Hydrocarbon sector in India**.
- It was established in **2002**. (HQ- New Delhi)
- **Key functions:**
 - Provides **data and analysis** on production, consumption and imports
 - Assists in **policy formulation and pricing**
 - Prepares import dependency reports and energy demand forecasts.

Financial Intelligence Unit – India (FIU-IND)

- The Financial Intelligence Unit and Reserve Bank of India (RBI) have signed a MoU for effective implementation of the Prevention of Money Laundering Act and Rules framed.

About FIU

- It was established by the Government of India in **2004**.
- FIU is a central national agency in India responsible for receiving, processing, analysing and disseminating information about suspicious financial transactions.
- It also plays a role in coordinating national and international efforts to combat financial crimes, working with other FIUs and law enforcement agencies.
- It operates independently and reports directly to the **Economic Intelligence Council (EIC)**, led by the Finance Minister.

India's First Cooperative University

- The **Tribhuvan Sahkari University Bill, 2025**, was passed by the **Lok Sabha** to establish **India's first national cooperative university**.

About National Cooperative University

- It will be established at the **Institute of Rural Management Anand (IRMA)**, Gujarat.
- The university is named after **Tribhuvan Kashibhai Patel**, the founder of **Amul** and a pioneer of India's cooperative movement.
- **Structure and Functioning:**
 - The university will function on a **hub-and-spoke model**.
 - **Cooperative training institutes in all states** will be registered as schools or colleges under the university.
 - It will offer **degree, diploma, and PhD courses** in cooperative studies.
 - An estimated **8 lakh people** are expected to receive certification annually.

About Institute of Rural Management Anand (IRMA):

- It was established in **1979**, by **Verghese Kurien** (Founder of India's White Revolution) in Anand, Gujarat.
- It aims to provide professional education in rural management and develop leaders for the cooperative sector.

Facts

- The UN General Assembly has declared **2025 as the International Year of Cooperatives (IYC2025)**. (Theme - **Cooperatives Build a Better World**).
- The **Ministry of Cooperation** was created by the Union Government in **July, 2021** with the mantra of '**Sahkar se Samridhi**'.

BHIM 3.0

- **National Payments Corporation of India (NPCI)** has recently launched the BHIM (Bharat Interface for Money) 3.0.

Key Features of BHIM 3.0

- **Enhanced Payment Features:**
 - **Bill Splitting:** Users can **split bills with friends and family**, making shared expenses more manageable.
 - **Expense Tracking:** Users can **track shared expenses** and assign payments to specific individuals.
 - **Task Assistant:** A **built-in reminder system** to notify users about pending bills linked to the BHIM app.
 - **Optimised for low internet areas:** Ensures uninterrupted transactions even in regions with weak or unstable network connectivity.
- **Introduction of BHIM Vega:** BHIM Vega allows payments **directly within the app**, eliminating the need to switch to third-party apps.
- **Expanded language support:** Now available in **15+** Indian languages.

RRBs Achieve Record Profit in FY 2023-24

- Regional Rural Banks (RRBs) have posted their highest-ever consolidated net profit of **₹7,571 crore** in FY 2023-24.

About Regional Rural Banks (RRBs)

- **RRBs** are aimed at **providing banking services in rural areas**, particularly to small farmers, artisans, rural entrepreneurs and weaker sections of society.
- Established under the **RRB Act of 1976**, on recommendation of **Narasimham Committee on Rural Credit**.
- **Ownership structure:** Central Government (50%), State Government (15%), and Sponsor Bank (35%).
- **Regulation:** Regulated by Reserve Bank of India (RBI) and supervised by NABARD.
- **First RRB of India** - Pratham Grameen Bank. It was established on **October 2, 1975**.
- **Priority Sector Lending (PSL) Target of RRB - 75%**

SAMARTH Udyog Bharat 4.0

- It is an initiative under the **Scheme for "Enhancement of Competitiveness in the Indian Capital Goods Sector."**
 - The scheme aims to accelerate the adoption of **smart manufacturing technologies** among Indian **Micro, Small, and Medium Enterprises (MSMEs)**.
- It is a **Pan-India, demand-driven scheme** focused on **smart manufacturing and Industry 4.0 adoption** in India.
- The initiative focuses on **automation, data exchange, cyber-physical systems, IoT (Internet of Things), cloud computing and AI-driven manufacturing solutions**.
- **Four Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) Centres** have been established under this initiative.

Niveshak Didi Initiative

- It is a **financial literacy** initiative for training rural women as financial educators.
- Its first phase was launched in November 2022.
- **Launched by: Investor Education and Protection Fund Authority (IEPFA)**, in collaboration with **India Post Payments Bank (IPPB)**.
- Under this initiative **Women postal workers** and **community leaders** are trained to become "Niveshak Didis", who act as **local financial educators**.

About IEPFA

- It is a statutory body established under the **Union Ministry of Corporate Affairs**, as per the Companies Act 2013.
- It was established to **promote investor education** and **protect investors' interests**.

Sunrise Sectors

- The Union Finance Minister stated that India aims to double the share of manufacturing in GDP to 23% helped by sunrise sectors.

What are Sunrise Sectors

- Sunrise sectors are industries in their early stages of development that are expected to experience rapid growth and have a significant impact on the global economy.

- **Key Characteristics of Sunrise Sectors:**

- High growth potential
- Innovation driven
- Investment Attractions
- Emerging Startups

- **Examples of Sunrise Sectors:**

- **Clean Energy:** Solar, wind, green hydrogen and other renewable energy technologies.
- **Semiconductors & Electric Mobility:** Electric vehicle manufacturing and battery technologies.
- **Digital Technologies:** Artificial intelligence, blockchain, quantum computing and cybersecurity.
- **Biotechnology:** Genome editing, synthetic biology, and related fields.
- **Space Tourism:** Commercial space travel and related industries.
- **Food Processing:** Industries that transform agricultural products into ready-to-eat or packaged goods.

- **NITI NCAER States Economic Forum Portal**

- It is a **comprehensive repository** of data on **social, economic, and fiscal parameters** of Indian states spanning **30 years (1990-91 to 2022-23)**.
 - It provides **research reports, expert commentaries, and fiscal analyses** to facilitate data-driven policy decisions.
 - It is developed by **NITI Aayog** in collaboration with the **National Council of Applied Economic Research (NCAER)**.
 - **Benefits of the portal:**
 - The portal will ensure availability of **reliable financial data for Indian states**.
 - It will help states compare fiscal strategies and learn from best practices of other states.
 - It will facilitate data-driven economic policymaking for better financial management.
-

- **BharatNet**

- It is an ambitious project of the Government of India aimed at providing broadband connectivity to all Gram Panchayats (GPs) in the country.
- It is one of the biggest rural telecom projects in the world.
- **Implementing agency:** Bharat Broadband Network Limited (BBNL).
- BharatNet project is funded through **Digital Bharat Nidhi**.

- **About Digital Bharat Nidhi (DBN)**

- Digital Bharat Nidhi is a pool of funds generated by charging a **5% Universal Service Levy on the Adjusted Gross Revenue (AGR) of all telecom operators**.
- It has replaced the **Universal Service Obligation Fund (USOF) which was established under the Indian Telegraph (Amendment) Act, 2003**.
- As per '**The Telecommunications Act, 2023**' the Universal Service Obligation Fund, has become the Digital Bharat Nidhi.
- **Mandate of DBN:** To promote access and delivery of telecommunication service in underserved rural, remote and urban areas.

- **National Industrial Corridor Development Corporation (NICDC)**

- Recently NICDC was honoured with the **Udyog Vikas Award** for its outstanding contribution to developing Greenfield Industrial Smart Cities.

- **About NICDC**

- NICDC is India's premier government body for planning, developing and implementing industrial corridors across India.
- It was established in **2007** Delhi-Mumbai Industrial Corridor Development Corporation. It was later renamed **NICDC** in **December 2020**.
- **Key Objectives of NICDC:**
 - **Develop Industrial Corridors** as a global manufacturing and investment destination.
 - **Integrate industrial development** with urban infrastructure (like smart cities, logistics hubs, and transport networks).
 - Facilitate **Make in India, Atmanirbhar Bharat**, and **Ease of Doing Business** initiatives.

- **RBI Operationalises .bank.in Domain for Indian Banks**

- The Reserve Bank of India (RBI) has decided to operationalise the exclusive internet domain '**.bank.in**' for banks.

- **About.bank.in Domain**

- **Domain name** is a **unique, easy-to-remember address** used to access websites
 - **Purpose:** To **combat rising digital payment frauds**.
 - **Migration Deadline:** Banks must migrate to .bank.in by **October 31, 2025**.
 - **Registrar:** Institute for Development and Research in Banking Technology (IDRBT) has been authorised as the exclusive registrar.
-

- **Under Supervision of:** National Internet Exchange of India (NIXI), functioning under Ministry of Electronics and IT (MeitY).
- **Current Domains:** Banks are currently using **.com**, **.co.in**, and other **generic domains**.

Expected Benefits

- **Enhanced Cybersecurity:** Harder for fraudsters to impersonate banks.
- **Reduction in Phishing Attacks:** More difficult to create fake bank websites.
- **Stronger Customer Trust:** A **standardised, exclusive domain** will reassure customers of authenticity.
- **Streamlined Digital Services:** Safer and more secure banking and payment experiences.

Expansion in banking facilities for Minors

- Reserve Bank of India (RBI) has recently amended rules related to banking facilities available for Minors.

Changes made by RBI

- **Minors aged 10 years or above can now:**
 - **Open and operate savings and term deposit accounts independently** (without needing a guardian).
 - Use additional banking services (if permitted by the bank).
- **Some facilities will be on Bank's Discretion:** Banks can decide:
 - The **amount limits** on transactions.
 - The **terms and conditions**, based on their **risk management policies**.
 - Whether to provide extra facilities like:
 - **Internet banking**
 - **ATM/debit cards**
 - **Cheque book**
 - Minors Below **10 Years** can Still Open Accounts But **only through a natural or legal guardian**.

Restrictions on Minor Accounts (All Ages)

- **No Overdraft Allowed**
 - These accounts **must always have a credit balance**.
 - Cannot go into a negative balance under any circumstances.
- **Due Diligence Required**
 - Banks must:
 - Conduct **proper background verification** when opening minor accounts.
 - **Regularly monitor** the accounts for any unusual activity (ongoing due diligence).

Standing Deposit Facility (SDF)

- SDF has completed three years of its launch. It is part of the Reserve Bank of India's liquidity management framework.

About Standing Deposit Facility (SDF)

- It is a monetary policy tool of the RBI to absorb excess liquidity in the banking system.
- It allows banks to deposit their surplus funds with the RBI without requiring them to provide collateral in return.
- It helps **reduce inflationary pressure** by **absorbing extra money**.
- Any entity eligible for the **Liquidity Adjustment Facility (LAF)** can also utilize the **Standing Deposit Facility (SDF)**.

Global Capability Centres (GCC)

- During a recent Nasscom Summit, Secretary to the Union Ministry of Electronics and Information Technology stated that facilitating growth of GCC in the country is a priority for the government.

What are GCC's ?

- It is a strategic outpost/branch set up by multinational corporations (MNCs) to perform specialised functions for their parent organisation.
- In India, GCCs have evolved into **Innovation Hubs and Centers of Excellence (CoEs)**.
- **Top Destinations for setting up GCCs in India:** Bengaluru, Gurugram, Hyderabad, Mumbai, Delhi-NCR, and GIFT City
- **Functions of GCC:**
 - **Driving Innovation:** Create new products or services, and conduct research.
 - **Managing Technology:** Handling IT systems, software development, cybersecurity, and other tech needs.
 - **Handling Back-Office Tasks:** They take care of finance, human resources, procurement, and customer support.
 - **Ensuring Compliance:** They make sure the company meets legal requirements and manages risks in global operations.

Serious Fraud Investigation Office (SFIO)

- It is a multi-disciplinary organization that investigates corporate fraud in India.

- **Nodal Ministry:** Ministry of Corporate Affairs.
- It was established in 2003 in response to major failures in the financial sector, the stock market scam, and the phenomenon of vanishing companies.
- SFIO is headed by a **Director** who is a Joint Secretary to the Government of India
- It has regional offices in **Mumbai, Chennai, Hyderabad and Kolkata.**
- **Functions:**
 - Detects and prosecutes white-collar crimes and frauds
 - Investigates complex cases with multi-disciplinary ramifications
 - Investigates cases involving public interest
 - Investigates cases that could improve systems, laws, or procedures.

Steel Industry

- To protect the domestic steel industry from a surge in low-cost imports, the Indian government has imposed a **12 percent provisional safeguard duty** on certain non-alloy and alloy steel flat products.
- **Top steel producing countries:** (1) China (2) India (3) Japan (4) USA (5) Russia

Steel Industry in India

- **India is the 2nd largest steel producer** in the world (after China).
- **Crude steel production (2023): ~125 million tonnes (MT)**
- **Major players:** SAIL, Tata Steel, JSW Steel, JSPL etc.
- **Employment:** Directly and indirectly employs over **2 million people.**
- **Challenges Faced by Indian Steel Industry:**
 - Surge in cheap imports, especially from: **China, South Korea, Vietnam, etc.**
 - Price volatility in global markets
 - **High input costs: Coking coal, logistics.**

Green Steel

- Green steel is a type of steel that is manufactured without using any fossil fuels.
- It uses alternative energy sources such as **hydrogen, coal gasification or electricity in production.**

Khadi and Village Industries Commission (KVIC)

- **KVIC** is a **statutory body** under the **Union Ministry of Micro, Small and Medium Enterprises (MSME).**
- It was established in **1956** under the **Khadi and Village Industries Act, 1956**, to promote, develop and regulate **Khadi and village industries** in rural India.
- **Key Initiatives of KVIC:**
 - **Prime Minister's Employment Generation Programme (PMEGP):** To provide financial assistance for setting up new micro-enterprises in the non-farm sector.
 - **Khadi Vikas Yojana:** To modernize and strengthen the Khadi sector, ensuring higher wages for artisans.
 - **Honey Mission:** To promote bee-keeping as a source of income for farmers and unemployed youth.
 - **RE-HAB" (Reducing Elephant-Human Attacks using Bees) project:** To prevent elephant attacks by using bee boxes as a fence along elephant corridors.



SMILE Program

- SMILE stands for Strengthening Multimodal and Integrated Logistics Ecosystem.
- It is designed to enhance **India's logistics infrastructure, reduce costs and increase efficiency.**
- The initiative aligns with the National Logistics Policy (NLP) and PM Gati Shakti National Master Plan.
- It is funded by the **Asian Development Bank (ADB).**
- **Nodal Ministry:** Ministry of Commerce and Industry (Department for Promotion of Industry and Internal Trade - DPIIT).

YuWaah Initiative

- The Ministry of Rural Development (MoRD) and United Nations Children's Fund (UNICEF) YuWaah have signed a Statement of Intent (SOI) to empower rural women and youth across India.

About YuWaah

- YuWaah (Generation Unlimited India) is a multi-stakeholder global initiative led by **UNICEF**, launched in **2019.**
- It is aimed at empowering young people with skills, employment opportunities and civic engagement platforms.

- YuWaah collaborates with government agencies, private sector companies, civil society organizations and youth networks to create an inclusive and productive future for India's youth.
- **YuWaah Youth Platform:** A one-stop digital platform for career counseling, training, and job matching.

New Pamban Bridge

- Prime Minister Narendra Modi will inaugurate the New Pamban Bridge on the occasion of Ram Navami.

About New Pamban Bridge

- It is **India's first vertical-lift railway sea bridge**.
- The bridge is **2.05 km long**, featuring a **unique 72-m vertical lift span** for ship movement.
- It connects **Rameswaram on Pamban Island to Mandapam** on the mainland in Tamil Nadu.
- It will replace the **iconic Pamban Bridge**, India's first sea bridge, which opened in 1914.
- The new bridge is being built parallel to the old Pamban Bridge by Rail Vikas Nigam Limited

TOPICS FOR PRELIMS (AGRICULTURE)

Crisis in India's Cotton Production

Context

India's cotton output in the **2024-25** has declined to **294 lakh bales**. It is lowest since 2008-09 (290 lakh bales).

Cotton: Basics

- Cotton is a **kharif crop**. It is grown mainly for its **fiber** (used in textiles) and **seeds** (used for oil and fodder).
- It is also called "**White Gold**" because of its economic importance to farmers and the textile industry.
- India is the **largest producer** of cotton globally, it accounts for **23%** of total global cotton production.
- **Ideal Conditions for Cotton Cultivation**
 - Warm, dry climate with uniformly high temperatures (21°C to 30°C)
 - Frost-free period of at least **200 days**
 - Moderate rainfall (**50-100 cm**).
- **Major Cotton Producing States in India:** (1) Gujarat (2) Maharashtra (3) Telangana

Why is Cotton Production Declining in India?

- **Pink Bollworm (PBW)**
 - **PBW is a pest** whose larvae damage cotton bolls (fruits), destroying seeds and lint (cotton fiber).
 - It has **developed resistance to Bt cotton** (GM variety used in India).
- **No New GM Approvals**
 - Existing Bt cotton (with cry1Ac and cry2Ab genes) is now **ineffective**.
 - **New GM hybrids** developed by Indian companies are stuck in **regulatory trials**.
 - No GM crop has been commercialised since **2006** due to opposition and long approval processes.
- **Climate Change:** Erratic rainfall, unseasonal rains and long dry spells affect cotton growth.

- **Low Profitability:** Rising **input costs** (seeds, fertilizers, pesticides).
- **Monocropping & Poor Crop Rotation:** Continuous cotton cropping without rotation → **soil nutrient depletion** and **pest buildup**.

Relief to Tobacco Farmers

Context

The government has amended the **Tobacco Board Rules, 1976**, to extend the **registration validity for Virginia tobacco growers from one year to three years**.

About Tobacco

- Tobacco cultivation in India was introduced by the **Portuguese in 1605**.
- It is one of the important **commercial crops cultivated in India**.
- **Tobacco types cultivated in India:** Flue-cured Virginia (FCV), Burley, Bidi, Chewing, Natu, Oriental, HDBRG, Lanka, Hookah, Motihari and Jati tobaccos etc.
- **Ideal conditions for growth:**
 - **Frost-Free Climate:** Tobacco requires about 100 to 120 days of frost-free climate to mature.
 - **Temperature:** An average temperature of around 80°F (27°C)
 - **Soil:** Tobacco is grown in warm climates with rich, well-drained soil.
- India is the only country which produces tobacco in **2 seasons**.
- **Highest Production in India:** (1) Gujarat (41%) (2) Andhra Pradesh (22%) (3) Uttar Pradesh
- **Highest Production Worldwide:** (1) China (2) India (3) Brazil

Tobacco Board of India

- It was **established in 1976 as a statutory body** under Section (4) of the Tobacco Board Act, 1975. (**HQ - Guntur, Andhra Pradesh**)
- **Nodal Ministry:** Union Ministry of Commerce and Industry
- **Functions:**
 - To promote the export of tobacco and its related products.
 - To ensure that tobacco growers receive fair and remunerative prices for their produce.

News in Shorts

Warangal Chapata Chilli

- Recently Warangal Chapata Chilli from Telangana has been granted the GI (Geographical Indication) tag.
- It is known for its bright red color and mild pungency, making it a preferred choice among pickle makers.
- It is also known as **Tomato chilli** as its round shape resembles tomato.



National Pest Surveillance System (NPSS)

- It is an AI-based platform that will help farmers connect with agriculture scientists and experts on controlling pests.
- It was launched in **August 2024**.
- **Purpose:** To enhance surveillance and management of pest diseases across India using advanced digital technologies.
- **Key Features of NPSS:**
 - **Pest Identification and Management:**
 - Farmers can **identify pests and diseases** in **61 different crops**.
 - It provides **pest management advisories** for **15 major crops**.
 - **Multilingual Support:** NPSS is available in **four languages - English, Hindi, Marathi, and Punjabi**.
 - **Real-time Advisory System:** Farmers receive **instant solutions** regarding **pest attacks, crop diseases and crop damages**.
 - **Technology used:** Artificial Intelligence (AI) & Machine Learning (ML).

Comprehensive Remote Sensing Observation on Crop Progress (CROP)

- ISRO has estimated that India's wheat production from eight major wheat-producing states will reach **122.724 million tonnes as of March 31, 2025**, by using advanced satellite-based remote sensing technologies.

About CROP

- CROP is a semi-automated and scalable framework developed by **ISRO's National Remote Sensing Centre (NRSC)**.
- It provides a real-time view of the sowing, growth and harvest progress of crops, especially wheat during the Rabi season.
- It uses **data from Multiple Satellite Data Sources:**
 - **EOS-04 (RISAT-1A)** – Synthetic Aperture Radar (SAR)
 - **EOS-06 (Oceansat-3)** – Ocean and terrestrial observation
 - **Resourcesat-2A** – Multispectral imaging (optical data)
- The eight primary wheat-growing states covered by the ISRO study are **Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab, Haryana, Bihar, Gujarat and Maharashtra**.

SOCIETY AND SOCIAL JUSTICE

TOPICS FOR MAINS

LGBTQ+ Rights Landscape

Syllabus Mapping: GS Paper I, Social empowerment

Context

International Transgender Day of Visibility, which is observed on **March 31**, highlights the challenges that transgender individuals face.

Introduction

Transgender Persons (Protection of Rights) Act, 2019 defines “**Transgender person**”, as a person whose gender does not match with the gender assigned to that person at birth and includes trans-man or trans-woman, person with intersex variations, genderqueer and person having such **socio-cultural identities as kinner, hijra, aravani and jogta**.

September 2018 was not an ordinary month, but a momentous month for the LGBT community across the country enjoying their victory. It was over the historic **Supreme Court verdict on decriminalising homosexuality** which was against the 200 year old British era law that criminalises same sex relationships.

LGBTQ+ rights landscape in Indian history

TIME IN HISTORY	WORK & EVENTS
ANCIENT INDIA	Mahabharata and Puranas: Contain stories involving gender fluid identities such as deity Shiva depicted as Ardhanarishvara, half-male, half-female figure
	Kama Sutra by philosopher Vatsyayana (400 BC): Describes homosexual acts in detail
	Manusmriti: It included detailed punishments for same-sex couples.
MEDIEVAL INDIA	Mughal rule: “Unnatural intercourse” was prohibited under the Fatawa.
MODERN INDIA	Colonial Act of introducing Section 377 IPC (1861): Modelled after Britain’s Buggery Act, 1533
	First pride march in Kolkata, 1999: It marked the beginning of LGBTQ+ activism in India

Significance of rights landscape for LGBTQ+ community

- **Cultural coherence:** Legal reforms for LGBTQ+ community increase their visibility in media, arts and mainstream narratives.
 - **Eg:** Movies like **Shubh Mangal Zyada Saavdhan** depicting same-sex marriages
- **Education:** Kerala in 2015 introduced **India’s first transgender policy** aiming improvement in education, employment and healthcare services for transgender individuals.
 - **Eg:** Kerala established a transgender boarding school
- **SDGs:** UN noted the negative impact of exclusion of LGBTQ+ community on decent work, economic growth and progress in achieving SDGs.
 - **Eg:** In line with efforts towards **Goal-5 Gender equality of SDGs**

Challenges Faced by LGBTQ+ community

Social

- **Exclusion error:** A recent report by research firm Kantar, the Advertising Standards Council of India (ASCI) and the UN Stereotype Alliance, India is missing out on this opportunity as cultural diversity remains significantly low in its advertising.
 - **Eg:** **Less than 1% of the Ads** in India featured members of the LGBTQ+
- **Social backfire:** The **tragic death of 16 year old makeup influencer from Ujjain, Priyanshu Yadav** put the spotlight on the toxic impact of cyberbullying on youth.
- **Housing bias:** There exists a high rate of eviction and refusal to rent out houses to the LGBTQ community in India

- **Criminal justice:** High rate of discrimination against the queer individuals in prisons.
 - **Eg: Put in Solitary confinement**

Legal

- **Marital inequality:** As same-sex marriages are not legally recognised as yet, the community is unable to avail benefits and rights such as tax benefits, joint adoption rights.
- **Bureaucratic inefficiency:** Absence of a uniform third gender norm, creates a hurdle in documentation.
- **Absence of adoption rights:** Juvenile justice (Care and Protection of Children) Act, 2015 and adoption guidelines in India do not specifically address the rights of same-sex couples to jointly adopt children.

Psychological

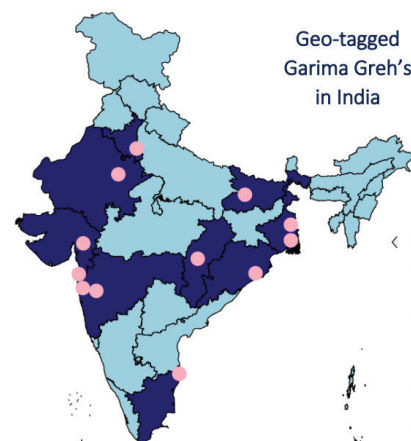
- **Criminal acts:** Without rights, the community is more prone to drug abuse and involvement in crimes like drug abuse, human trafficking and prostitution.
 - **Eg: Need for more gender neutral laws**
- **Hampered mental health:** Social exclusion leads to high suicide rates and mental health issues.
 - **Eg: National Survey 2022** conducted by the **TREVOR Project**, LGBTQ community is 2.4 times more vulnerable to mental disorders like depression and anxiety.

Steps towards social change

- **Social sensitisation:** A culture of tolerance adopted towards young adults.
- **Anti-ragging measures:** Strict guidelines by UGC to stop homophobic & transphobic bullying in Higher educational institutions
 - **Eg: UGC recognised gender identity and sexual orientation as the grounds for discrimination in 2016.**
- **Increased recruitment:** Ensuring job opportunities for the LGBTQ+ community brings inclusivity and entry into the workforce which adds to their financial security and reduced bias.
 - **Eg: Kochi metro recruited 23 members of the transgender community**
- **Sensitising police:** Instruments of the State which are tasked with protecting human rights, in various instances perpetuate violence.
 - **Eg: The Supreme Court ordered 'sensitisation' of police** to concerns of those of LGBTQ+ communities after it abolished section 377 of the IPC four years ago.
- **Healthcare inclusion:** Odisha government in 2023 set up **medical boards at district level** to assist transgender persons.

Welfare schemes

- **National portal for transgender persons:** By the Ministry of Social Justice and empowerment to empower transgender persons to apply online for an Identity certificate/card.
 - **Eg: To legally assert transgender identity while accessing welfare schemes.**
- **NISHTHA:** NCERT has been training teachers, educators and school heads on gender sensitization with an all-inclusive approach.
- **SMILE:** Support for marginalised individuals for livelihood and enterprise provides financial assistance in the form of scholarships to transgender students studying in classes Ninth till post-graduation.
- **Garima Greh scheme:** Aims to establish shelter homes for transgender persons and provide for shelter, food, medical and recreational facilities.
 - **Eg: There are about 12 Garima Greh facilities across the country.**
 - **Eg: Despite the presence of Garima Grah shelters in nine states, Uttar Pradesh, (with the largest transgender population) currently lacks such a facility. (2023)**
- **National Education Policy, 2020:** Identifies transgender children as Socio-economically disadvantaged groups and provides for Gender inclusion funds and special education zones.



Conclusion

LGBTQ+ individuals comprise about **3.8% of India's population (Census 2011)**. Ensuring rights of the queer group will lead to upholding the democratic principles of tolerance and diversity.

Elderly Population

Syllabus Mapping: GS Paper 1, Globalisation and GS Paper 2, Vulnerable sections

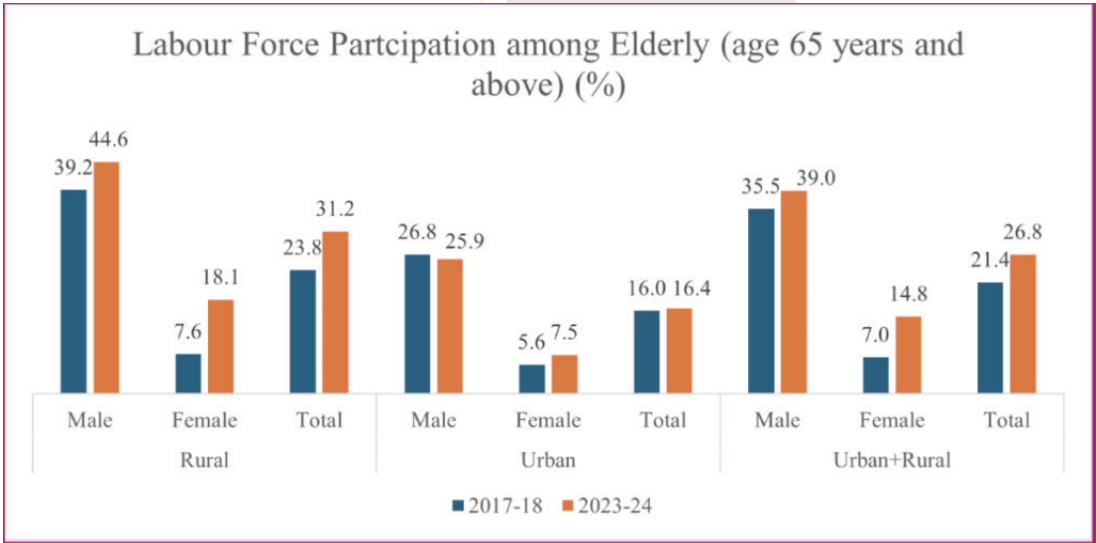
Context

The IMF's World Economic Outlook (2025) highlights both the challenges and economic potential of healthy ageing in ageing societies like India.

Key Demographic Trends

Metric	Data
Elderly Population (2031 Projection)	13.1% of total population (up from 8.6% in 2011)
Annual Growth Rate of Elderly	3.28%
States with Higher Elderly Population	Kerala (12.6%), Goa (11.2%), Punjab (10.3%), Tamil Nadu, AP, HP

Workforce Participation Trends



Silver Economy

- **National Policy on older persons, 1999** declares **elderly as resources** which should be active participants in economic development.
- The silver economy **integrates the elderly into the economy**.
- It is a system of production, distribution and consumption of goods and services that aim at utilising the purchasing potential of elderly people.
- **The silver economy is worth about Rs 73,082 crore.**
- **Silverisation of sectors** will enable new products and services to emerge in the market adapted to the needs of older persons.
- In turn leading to creation of jobs and improvements in health care.

Data on Elderly population

DIMENSION/ REPORT	KEY FINDINGS
Population	Census 2011: 104 million people aged 60+ years (8.6% population)
Sex Ratio	Increased among elderly from 939 women per 1000 men in 1971 to 1033 in 2011.

DIMENSION/ REPORT	KEY FINDINGS
India ageing Report, 2023	Current elderly population is of 153 million and is expected to reach 347 million by 2050
UN population fund's India ageing report, 2023	Global trend: 60+ aged population in India to double from 10.5% (14.9 crore, 2022) to 20.8% (34.7 crore, 2050) Social implication: One in five individuals would be senior citizens by 2050 with an increase in life expectancy and decreasing fertility rates. Inter-state variation: Southern states have a higher share of elderly population, gap expected to widen by 2036 Economic crunch: Two-fifths of elderly belong to the poorest section. (5% in Punjab to 47% in Chhattisgarh)
ADB Report - "Ageing well in Asia, 2024"	In the Indian context, the old age dependency ratio which was less than 20% in 2022, is now expected to be over 30% by 2050.

Constitutional safeguards

ARTICLE	PROVISION
Article 14	Equality before law and equal protection of law for all citizens
Article 21	Every individual holds the right to life and personal liberty
Article 41	State to ensure provisions for securing the right to work, education and public assistance
Article 46	Promoting the educational and economic interests of SC, STs and other weaker sections

Key Challenges faced by the elderly population

- **Isolation:** There has been a trend of nuclear families which disintegrates the traditional joint family setup. This is backed by increased internal and external migration abandoning the elderly population.
- **Change in value system:** Due to the generation gap, there have been instances of difficulty in cohabitation of the elderly with their grandparents.
 - **Eg: Inability to adapt to the digital ecosystem causes cultural dissonance.**
- **Poor financial autonomy:** Elderly population in rural areas lack awareness on financial matters. Inflation further affects the interest rate on savings, leading to a lesser pool of financial resources.
 - **Eg: As per the State of pension report 2018, many states provide rupees 200 for pensions per month.**
- **Healthcare crunch:** Various disorders are prevalent with age such as **Alzheimer and dementia**. There is an added **lack of geriatric care infrastructure** in the country.
 - **Eg: 75% of elderly people suffer from one or the other chronic disease (LASI Report)**
- **Livelihood lost:** In various cases of brain drain, parents are being sent to old age homes where the quality of life is poor. In house nurses concept in India is yet at its nascent stage.

Welfare schemes for Elderly Population

- **National Varishtha mediclaim policy:** As offered by National health insurance company caters to senior citizens between 60-80 years of age. The sum insured for hospitalisation and domiciliary hospitalisation is Rs. 1 Lakh and Rs. 2 Lakh for critical illnesses.
- **Atal Pension scheme:** To provide a steady stream of income after retirement.
- **PM Bay Vandana scheme:** Ensures social security by assuring 8% per annum return on deposits.
- **SACRED portal:** Senior able citizens for re-employment in dignity (SACRED) provides work opportunities to persons above 60 years of age. It will enable decision making and financial stability for senior citizens.
- **SAGE:** Senior Care ageing growth engine initiative (SAGE) is a one-stop access portal for elderly care products and services by identified start-ups. It will enable innovation in areas such as food, housing, finance, health for elderly persons.
- **Rashtriya Vayoshri Yojana:** The central sector scheme is funded by the Senior citizens welfare fund. It provides Physical Aids and Assisted-living Devices for Senior citizens belonging to BPL category.
- **Elder Line:** Pan-India toll free helpline number for senior citizens - 14567

- **Pradhan Mantri Vaya Vandana Yojana:** It is a social security pension scheme for senior citizens that guarantees guaranteed returns monthly, quarterly and half yearly/annual basis for a period of 10 years.

Effect of globalisation on elderly population

Positive effect

- **Technological inclusion:** Children of various aged people live over foreign lands for better job and career opportunities, however they are now able to provide for their old parents back at home due to technological advancements.
 - **Eg: SWIFT Account or PayPal**
- **Life expectancy:** Due to a rise in the pharmaceutical industry with availability and accessibility to cheaper medicines, health has advanced leading to improved in average life expectancy of the aged.
 - **Eg: In India, Female life expectancy 73.3 years (2022) and Male's at 69.6 years (2022)**
- **Connectivity:** With the industrial revolution 3.0 and the growth in communication technology, the aged people are now able to interact with their children living far away from home.
 - **Eg: Platforms like ZOOM, Whatsapp and Skype** provide seamless connectivity.
- **Ageless society:** With the phenomena of age being just a number, various employment and re-employment opportunities are now made available to the aged population paving way for increased productivity and a longer will to live healthy and hearty.
 - **Eg: Involvement in plantation drives and NGOs**

Negative effect

- **Post-retirement hassle:** With a growing age, parents tend to become dependent on children economically which leads to role reversal of the father being the breadwinner and the decision maker of the family.
- **Neolocal households:** With the disintegration of the joint family setup, for better career opportunities, children are moving to bigger cities for lucrative jobs while leaving their parents at home resulting in isolation, loneliness and psychological trauma.
 - **Eg: Increase in nuclearisation of families and disintegration of joint family**
- **Savings crunch:** With the increasing level of inflation, a big chunk of the savings are spent on healthcare which leads to a reduction in the standard of living.
 - **Eg: Monthly per capita health spending** of elderly households is **3.8 times higher** than that of non-elderly households.

Way Forward

- **Change Retirement Age:** Align retirement age with rising life expectancy.
- **Utilize Experience:** Retired professionals (e.g., ex-army) in security, strategy, mentorship
- **Workplace Innovation:** Promote age-friendly and flexible work environments
- **Skilling & Education:** Create opportunities for reskilling and lifelong learning
- **Social Security:** Strengthen Atal Pension Yojana (APY) and National Pension System (NPS), Pradhan Mantri Shram Yogi Maan-Dhan (PM-SYM), MGNREGA, Pradhan Mantri Rojgar Protsahan Yojana (PMRPY), Garib Kalyan Rojgar Abhiyaan (GKRA) etc.
- **Entrepreneurship:** Encourage elderly-led small businesses and community initiatives.
- **Healthcare:** Invest in preventive healthcare & AI-based medical screening.
- **Gender Equity:** Improve gender equity in employment.

Tribals in the post-conflict India

Syllabus Mapping: GS Paper 1, Social empowerment and GS Paper 2, Vulnerable sections

Context

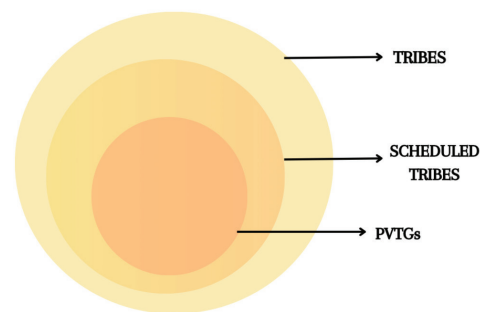
In 2005, around 50,000 Gond tribals were forced to migrate from Chhattisgarh to then-undivided Andhra Pradesh (now parts of Telangana).

Introduction

Scheduled Tribes (STs) are indigenous communities recognized under **Article 342** of the Indian Constitution. These groups are often geographically isolated, maintain a distinct culture, and have historically been socio-economically disadvantaged.

As per the **2011 Census**, Scheduled Tribes constitute about **8.6% of India's population** (approximately **104 million people**), scattered across various states with a significant concentration in the Northeastern states, Odisha, Madhya Pradesh, Chhattisgarh, and Jharkhand.

Classification of tribes in India



Quotes

DR. B.R. Ambedkar

The tribal people of India are the most vulnerable and marginalised, yet they carry with them a rich heritage of culture, art, and wisdom.

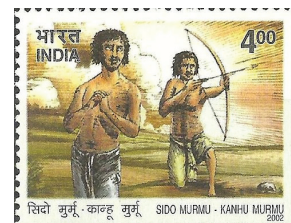
Mahatma Gandhi

The Adivasis of India have lived in harmony with nature for centuries. They are the real custodians of India's forests, rivers, and mountains

**Ramchandra Guha
(Historian)**

The Adivasis are the original environmentalists of India. Long before the concept of 'sustainable development' entered our vocabulary, tribal communities practised it in their daily lives

Tribal leaders shaping India's quest for freedom



Birsa Munda: The iconic tribal leader from Jharkhand who led the Munda Rebellion or the **Great Tumult** against the British forces in the 19th century.

Tantya Bhil: Also referred to as the **Robin Hood of tribals** as he fought against the British exploitation of tribal communities in Central India during the 19th century.

Rani Gaidinliu: Born in a Naga village, at the age of 13 she joined the **Heraka religious movement** and began organising resistance against British rule. Her defiance led to her arrest in 1932, and she spent 14 years in prison.

Earning the title of **"Rani"** from Jawaharlal Nehru for her courage.

Sidhu and Kanhu Murmu: Lead the **Santhal Rebellion** in 1855-56 against the EIC and local zamindars for unfair taxation and land policies.

Reasons for displacement of tribal people

- **Strategic Hamletting to Counter Maoists (2005):** The Government of India launched a **"Strategic Hamlet"** programme (inspired by the Vietnam War model) in **Chhattisgarh** to eliminate Maoist presence.
 - Tribals were forcibly relocated from their forest homes to roadside camps for security and surveillance, leading to mass displacement.
- **Fear of Maoists:** Some tribals did **not return home out of fear of Maoist retaliation**.
 - Maoists often **threatened or targeted tribals** who were seen as supporting or collaborating with government forces.
- **Continued Violence in Bastar Region:** Even after the initial hamletting, **violence between Maoists and security forces persisted**.
 - The **ongoing armed conflict** in the Bastar region led to **continued displacement**, especially in the border areas.
- **Neglect and Denial of Rehabilitation:** The **Chhattisgarh government denied displacement**, claiming no tribals had migrated due to violence.

- There was **no proper survey or recognition** of the internally displaced people (IDPs), delaying rehabilitation or resettlement.

Associated Challenges with tribals

- **Lack of Legal Protection:** India lacks a **comprehensive national or international legal framework** to protect the rights of **Internally Displaced Persons (IDPs)**.
 - **No birth certificates** and hence **no Aadhaar**, making children **ineligible for government welfare schemes** and admission to **Eklavya Model Residential School (EMRS)** and **Kasturba Gandhi Balika Vidyalaya (KGBV)** schools.
- **Hostile Treatment in New Settlements:** In Andhra Pradesh and Telangana, they are seen as **“encroachers” or migrants**.
 - Their **houses are demolished**, and they are **denied tribal status**, even though many were born there after 20 years.
- **Poor Access to Health Facilities:** Settlements in **remote, hilly terrain** lack roads and ambulance access.
 - High prevalence of **home births (non-institutional delivery)**.
 - Risk to **maternal and child health** due to absence of medical aid.
- **Lack of Employment:** Geographic isolation and lack of documents like Aadhaar or caste certificates hinder access to job opportunities and government schemes such as MGNREGA.

Way forward

- **Mobile Documentation Drives: Integrated Tribal Development Agencies (ITDAs)** deploy **mobile Aadhaar centres** to reduce the burden of long travel for displaced tribal families.
 - **Women and Child Development officials** and **ASHA workers** are actively involved in helping families obtain **birth certificates**.
- **Skill Training Programs:** Launch tribal-centric livelihood and skill development initiatives under schemes like **DDU-GKY** (Deen Dayal Upadhyaya Grameen Kaushalya Yojana).
- **Access to Healthcare:** Set up **Mobile Health Units (MHUs)** with antenatal, postnatal, and child care services.
 - Incentivize **institutional deliveries** with maternity benefits and ambulance connectivity.
 - Train local **tribal women as health workers** to bridge cultural gaps and improve trust.
- **Cultural & Social Integration:** Involve tribes in **local governance (PESA Act)** and **forest conservation (FRA Act)**
 - Address **discrimination and exclusion** through awareness and sensitization drives.

Mechanisms to promote Social Justice for Scheduled Tribes

Constitutional mechanism

ARTICLE	PROVISION
Article 46	Mandates the promotion of their educational and economic interests.
Article 330 & 332	Reservation of seats for STs in Lok Sabha and State Legislative Assemblies
Article 244	Allows for special administration of Scheduled Areas and Tribal Areas through provisions of Fifth and Sixth Schedule.
Article 338A	National Commission for Scheduled Tribes (NCST) established through the 89th Amendment Act, 2003.
Article 342	The President, after consultation with the Governor, specified tribes deemed to be STs in the State/UT.
Article 366	Defines STs as tribes or tribal communities which are deemed under Article 342 of the Constitution

Legal mechanism

- **Forest Rights Act, 2006:** Implemented to recognise forest rights and occupation in forest land to forest-dwelling STs.
- **Protection of Civil rights Act, 1955:** Punishment for practising untouchability
- **SC/ST prevention of Atrocities Act 1989:** Provides for special courts for the trial of offences and for relief and rehabilitation of victims of such offences.
- **PESA, 1996:** Empowers tribal communities to manage their resources and govern as per traditional practices. It promotes decentralised governance through Gram Sabhas.

- **Bonded Labour system (Abolition) Act, 1976:** Abolishes bonded labour to prevent economic-physical exploitation of weaker sections (STs) in accordance with Article 23.

Institutional mechanism

- **NCST:** The **National Commission for Scheduled Tribe** is a **Constitutional Body** that monitors matters safeguards for STs and investigates complaints on violations.
 - The commission submits annual reports to the President and advises the GOI on socio-economic development of STs.
- **Tribal Sub Plan (TSP) strategy:** GOI initiative aimed for rapid socio-economic development of tribals. The funds are in equal proportion to the ST population of each State/UT.
 - Tribal Sub Plan funds are **non-divertible and non-lapsable**.
- **TRIFED:** A national-level organisation under the Ministry of Tribal Affairs whose primary objective is to promote socio-economic development of India's tribal communities by facilitating marketing of tribal products to ensure they get fair price for their products.
 - **Eg: #VocalforLocal and Aadi Mahotsav display tribal arts at Dilli Haat.**
- **Ministry of Tribal Affairs:** Established in 1999 as the nodal agency for welfare of STs and responsible for implementation of Vanbandhu Kalyan Yojana, Forest Rights Act, etc.

Committee recommendations

- **Dhebar commission:** Recommended an area be declared tribal with more than 50% of people as tribals.
- **Lokur committee:** Recommended five criteria for defining STs namely, primitive traits, distinct culture, geographical isolation, shyness of contact with the community and backwardness.
- **Bhuria commission:** Focused on a wide range of issues from 5th schedule to tribal land and forests, health and education, working of Panchayats and status of tribal women.
- **Professor Virginius Xaxa:** High level committee studied issues related to tribal communities namely, livelihood and employment, education, health, involuntary displacement and migration, legal and constitutional matters.

India's Higher Education Institutions (HEIs)

Syllabus Mapping: GS Paper 2, Education

Context

India's HEIs are witnessing a shift from traditional to transformative **social justice** in education.

Introduction

The Higher education sector in India comprises a three-tier structure of university, college and courses forming a vital link with the regulatory structure in maintaining quality and standards in this sector. India is estimated to have over 800 universities (40,000 colleges affiliated to them) and their regulations call for reforms.

Current regulatory structure for HEIs in India

- **UGC:** The University Grants commission regulates universities and colleges teaching general subjects. It determines and maintains standards along with disbursement of grants.
- **AICTE:** All India Council for Technical Education regulates technical education namely engineering, management and architecture.
 - **Eg: National board of accreditation (NBA) was established by AICTE**
- **Other regulators:** Institutions offering courses/degrees related to medical, legal, nursing or teacher education are regulated by 14 professional councils.
 - **Eg: Bar Council, Medical Council and Nursing Council.**

Need to restructure the regulatory system for HEIs under one umbrella body

- **Committee recommendations:** Expert bodies like **National knowledge commission (2009), Yashpal committee (2010) and the committee for evolution of NEP (2016)** suggested reforms in higher education to address issues related to access, quality, funding and governance.
 - **Eg:** Recommended the **need for consolidating all existing regulators for HEIs** under an independent regulator.

- **UGC:** The UGC was **set up by S. Radhakrishnan in 1948**, however today it operates in an **ad-hoc structure** with lack of coordination with other regulators. It is lagging behind in adopting new measures for enhancing student mobility and internationalisation in higher education.
 - **Eg:** As per the **UGC Act, 1956** no institute can use the word “university” without the commission’s approval, however the issue of **Fake universities and Ghost institutes** prevail.
- **AICTE:** It is a **statutory body** and a national level council for technical education, however it has been accused of approving institutions with questionable credentials. It is also criticised for following non-transparent accreditation processes and limited linkage with industry.
 - **Eg:** Employability of graduates is limited as there exists a **wide gap between industry requirements and curriculum taught at colleges**.
- **NBA:** The **National Board of Accreditation** was established by **AICTE Act, 1994** was established to assess the qualitative competence of programmes offered by educational institutions. However it has had limited impact on quality improvement of HEIs due to funding constraints.
 - **Eg:** Limited accreditation results in large backlogs.

Quality issues in India’s Higher education system

- **People to teacher ratio:** To ensure better outcomes, academia needs to be reoriented according to needs of the 21st century.
 - **Eg:** Pupil-teacher ratio in **Universities in the USA is 12.5:1 compared to 19.5:1 in India**.
- **Poor outcome:** Jobless growth and increased number of degrees not turning into jobs, leads to increased unemployment and discontent.
 - **Eg:** **47% graduates in India are not employable** for any industry role according to a report by the firm **Aspiring Minds**.
- **Poor research infrastructure:** India lacks priority and high level outcomes where there is not an immediate need.
 - **Eg:** India’s **R&D is very poor at 0.7% of India’s GDP, below USA (2.8%), Israel (4.3%) and South Korea (4.2%)**
- **Professors and teachers:** Improper teacher training, recruitment of undergraduates as teachers and a low pay scale lead to hampered learning outcomes.
 - **Eg:** **Only 1 in 4 teachers in India are trained to teach online classes. (UDISE data)**

Advantages of allowing foreign institutions

- **International Best Practices:** Indian students and faculty will be exposed to international best practices in education, research, and innovation as a result of the arrival of foreign educational institutions.
 - **Impact:** **Advanced careers and better work opportunities.**
- **Quality Curriculum:** Foreign universities are renowned for their excellent teaching methods and curriculum, which can help Indian universities improve their own programs through collaborations or by establishing campuses in India.
 - **Impact:** **Learning 21st century skills**
- **Autonomic admission process:** Foreign higher education institutions (FHEIs) would be allowed to decide admission process, criteria, faculty and staff recruitment.
 - **Impact:** **Transparent and reasonable fee structure**
- **Audit:** FHEIs will undergo a quality assurance audit report submitted to UFC to certify compliance with law of the land. (**FEMA Act and FCRA Act**)
 - **Impact:** **Increased accountability of foreign institutions**

Issues in allowing foreign institutions

- **Increase in Education Inequity:** The entry of foreign educational institutions can increase education inequality in India as they are likely to charge high fees, which may deprive a significant section of Indian students of access to quality education.
- **Entry of Substandard Institutes:** There is a possibility that substandard foreign educational institutions may enter India, offering courses of questionable quality, and eventually affecting the savings of the middle class.
- **Cartelization of Education:** Impact the regulation of universities in India by UGC. It could create an environment where foreign universities work together to dominate the market, resulting in limited choice for students and faculty.

Government measures to grant autonomy to HEIs

- **Legislative measure:** Passage of the **Indian Institutes of Management Act, 2017** reduced government representation on IIM Boards.
 - **Eg: Allowing the IIM Board to appoint the Director.**
- **Institutes of Eminence** were provided with greater autonomy in admitting foreign students, fixing the fee structure and recruiting foreign faculty.
- **UGC Guidelines:** The NEP 2020 framework and UGC 2023 guidelines facilitate the setting up of foreign university campuses in India.
 - **Eg: Establishment of foreign university campuses in India's GIFT city.**

Key initiatives

- **Samagra Shiksha scheme:** It integrates the Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan and Teacher education.
- **PARAKH:** The initiative was established by NCERT and aims to align assessments with the goals of holistic education. (Recommendation by NEP, 2020)
- **PM POSHAN:** Covers over 12 crore children to be provided with a nutritious meal.
- **School nutrition gardens:** Initiative to spread awareness and availability of nutritious food to school children.
- **Sankalp Saptaah:** Conducted in schools across the Aspirational blocks to elevate education in underprivileged areas.

UGC Regulations, 2023 were released to facilitate the **entry of FHEIs in India**, in line with the NEP, 2020. The robust initiative will help increase access to quality education, reduce foreign exchange outflow, improve research opportunities and control problems like brain drain in India.

Eradicating Manual Scavenging

Syllabus Mapping: GS Paper 1, Social empowerment and GS Paper 2, Vulnerable sections

Context

The recent Delhi sewer death throws light on the limitations to eradicate manual scavenging. Further, the Supreme Court has directed a ban on manual scavenging in metropolitan cities such as Delhi, Mumbai, Chennai, Kolkata, Bengaluru, and Hyderabad.

Introduction

In the **Union Budget (2023)** Finance Minister mentioned that all cities and towns would switch to 100 percent mechanical desludging of septic tanks and sewers, putting an end to manual scavenging. As per official figures, **there are 58,098 “eligible manual scavengers”** across the country, who manually clean sewers and septic tanks and handle human excreta.

Constitutional and legal provisions against manual scavenging

- **Article 17:** Bans the practice of untouchability, which includes enforcing manual scavenging based on caste.
- **Article 21:** Ensures the right to life and personal liberty, emphasising human dignity for all citizens.
- **(PEMSR), 2013: Prohibition of Employment as Manual Scavengers and their Rehabilitation Act** bans the use of any individual for manually cleaning, carrying, disposing of or otherwise handling human excreta till its disposal.
 - **Eg: The definition includes people employed to clean septic tanks, ditches or railway tanks.**
- **Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993:** Prohibits the construction of dry latrines and employment of manual scavengers.
- **National Commission for Safai Karamcharis Act:** Establishes a statutory body to oversee the welfare of sanitation workers.

Roadblocks in ensuring complete elimination of manual scavenging

Social roadblocks

- **Stigma and exclusion:** Individuals involved in manual scavenging face severe stigma and social exclusion, reinforcing their marginalised status.
- **Gender dynamics:** A significant number of manual scavengers are women, who face compounded discrimination due to both caste and gender.

- **Poverty and social immobility:** Economic vulnerabilities and lack of alternative livelihood opportunities trap individuals and communities in degrading occupations

Economic roadblocks

- **Lack of employment opportunities:** Many manual scavengers lack access to education and skills training, limiting their ability to pursue alternative careers.
- **Exploitative practices:** Contractors often exploit vulnerable workers by **paying low wages (Rs 300-500 daily)** for hazardous work, perpetuating the cycle of poverty.

Administrative roadblocks

- **Inadequate law enforcement:** Despite legal prohibitions, weak enforcement and loopholes in implementation allow the practice to persist.
- **Sanitation infrastructure:** Deficiencies in sanitation infrastructure, such as improper septic tanks and inadequate sewage systems, contribute to the reliance on manual scavenging.
- **Policy failures:** Programs like Swachh Bharat, while aimed at improving sanitation, have often overlooked the mechanisation of cleaning processes, thus perpetuating manual scavenging.

Measures to make India free from manual scavenging

Welfare schemes

- **NAMASTE (National Action for Mechanised Sanitation Ecosystem) Scheme (2022):** Aims to eradicate unsafe sewer and septic tank cleaning practices through mechanisation and skill development.
- **Safai Mitra Suraksha Challenge (2020):** Promotes mechanised cleaning of sewers and septic tanks, enhancing safety measures for sanitation workers.
- **Rashtriya Garima Abhiyan: National Campaign for Dignity and Eradication of Manual Scavenging,** focuses on social awareness and rehabilitation.

Technological measures

- **Bandicoot (Robot):** Deployed in **Thiruvananthapuram** for automated cleaning of manholes, reducing human intervention.
- **Bio-toilets:** Installed in **Indian Railways** to eliminate the need for manual scavenging in train sanitation.

Social measures

- **NGO and Civil Society Engagement:** Organisations like **Safai Karamchari Andolan** play a crucial role in advocacy and ground-level intervention.
- **Community Empowerment:** Prioritising manual scavengers families in government schemes and providing alternative employment opportunities.

Therefore it is imperative to ensure justice reaches the last mile and the 21st century witnesses a new wave against oppression and exclusion caused due to manual scavenging. Ensuring justice and dignity to individuals are key to achieve **Sabka Sath, Sabka Vikas, Sabka Vishwash and Sabka Prayas**.

India's triumph in poverty eradication

Syllabus Mapping: GS Paper 2, Poverty and Hunger

Context

Recently the Government of India published its commitment and achievements in eradicating poverty, inclusive development focusing on both urban and rural areas.

Introduction

According to the **World Bank**, poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. **India has lifted 171 Million from Extreme Poverty in 10 Years, Says the World Bank.**

Poverty refers to social deprivation in terms of human needs like food, shelter, clothing, health, education. In the words of **Indira Gandhi**, "**Poverty is the biggest polluter**". On the other hand, **Amartya Sen** saw poverty as a failure to achieve certain minimum capabilities and such lack of capabilities is absolute.

Dimensions of poverty

- **Absolute poverty:** Lack of basic necessities such as food, shelter and water. It is also called subsistence poverty.
 - **Eg:** Global measure for absolute poverty is the **international poverty line** set by World Bank, stands at around **\$2.15 per day** (adjusted for purchasing power parity)
- **Relative poverty:** A condition where people lack the minimum amount of income needed to maintain the average standard of living in the society in which they live. Absolute poverty deals with survival needs (food, shelter, clothing) while Relative deals with social exclusion.
 - **Eg: Residents of Dharavi slum of Mumbai** may earn enough to afford basic necessities (food, shelter), but are unable to access quality education and healthcare.
- **Environmental poverty:** a condition where people suffer from a lack of access to essential environmental resources, such as clean water, clean air, fertile land, and a healthy ecosystem.
 - **Eg:** In **Rajasthan's Barmer district**, many families walk long distances to fetch water from contaminated sources.
- **Collective poverty:** A situation where large groups of people, often entire communities, experience poverty due to systemic, structural, or historical factors.
 - **Eg: Gond and Santhal tribes**, spread across Chhattisgarh, Odisha, and Jharkhand, have long suffered from poverty due to social exclusion

Measurement of poverty in India

- **VM Dandekar and N Rath committee (1971):** Used the **data from NSO** and suggested the criteria for the poverty line to be according to the spending value in rural and urban areas that would supply **2250 calories per day**.
- **Alagh Committee (1979):** Constructed a poverty line for rural and urban areas on the basis of nutritional requirements and related consumption expenditure. People consuming less than 2100 calories in the urban areas or less than 2400 calories in the rural areas are poor.
- **Lakdawala Committee (1993):** Basket of goods and services used to calculate Consumer Price Index-Industrial Workers (CPI-IW) and Consumer Price Index-Agricultural Laborers (CPI-AL) reflect the consumption patterns of the poor.
- **C Rangarajan Committee (2012):** The committee suggested a poverty line of ₹22 a day for rural areas. The Rangarajan committee estimation is based on an independent large survey of households by CMIE
- **Niti Aayog:** Poverty estimation in India is now carried out by NITI Aayog's task force through the calculation of poverty line based on the data captured by NSO.

Causes of poverty

- **Failed social contract:** The poor fail to receive government subsidies, schemes and awards due to lack of proper documentation, middle man issue.
 - **Eg:** As per a recent report, around **90 million people** in India were **excluded** from the **PDS system**
- **Inadequate Social Safety Nets:** India lacks an effective social safety net to support the poor, particularly during times of economic hardship.
 - **Eg: 65% of health expenditure** out of pocket has pushed families into poverty.
- **Poor Access to Food:** Despite India's large food surplus, many people still lack access to adequate food due to inadequate food distribution systems, particularly in rural areas.
 - **Eg: Social cleavages like the caste system**
- **Changed occupational structure:** Rural working people are migrating in large numbers to urban centres or other rural areas in search of work. Most of such migration is temporary and seasonal over large distances.
 - **Eg: 33.3% of the Scheduled caste group lives in multidimensional poverty.**
- **Unequal distribution of resources:** As people attain fewer rights based on their ethnicity or tribal affiliation, they are provided with fewer opportunities and unequal access to resources resulting in poverty.
 - **Eg:** Farmers in **Marathwada, Maharashtra**, have faced years of drought, leading to crop failures and pushing them into debt.
- **Individual factors:** Extravagant lifestyles, engagement in habits like betting and gambling

- **Eg:** Farmers with small landholdings borrow more for weddings than peers with larger holdings which dives them deeper into debt.

Consequences of poverty

- **Child labour:** Poverty forces children to work rather than complete schooling.
- **Terrorism:** In the words of **UN Secretary-General Antonio Guterres**, 'Poverty, inequalities and social exclusion give terrorism fuel'.
- **Crimes:** Unemployment and marginalisation lead to theft and criminal activities.
 - **Eg:** Economic crisis coupled with the devastating floods of 2022 have increased extreme poverty in Pakistan which fuelled a rise in violent crimes.
- **Lack of education:** As per UNICEF, about 25% children in India do not gain education. Chances of earning a living wage from employment get low with lack of education.
- **Migration:** Inter-state migration and migration across national borders are perpetuated by poverty.
 - **Eg:** About 80% of people living on less than \$2 a day, poverty is more widespread in the Sahel region than in most parts of Africa which fuels migration.

Shifts in India's extreme poverty levels

1. Rural and Urban poverty

- In Rural areas, extreme poverty fell from 18.4 percent in 2011-12 to 2.8 percent in 2022-23.
- In Urban centres, extreme poverty reduced from 10.7 percent to 1.1 percent over the same period.
- The gap between rural and urban poverty shrunk from 7.7 percentage points to 1.7 percentage points, with an annual decline rate of 16 percent between 2011-12 and 2022-23.

2. Key states contribution in poverty reduction

- The five most populous states i.e. Uttar Pradesh, Maharashtra, Bihar, West Bengal, and Madhya Pradesh, represented 65 percent of India's extreme poor in 2011-12.
- By 2022-23, these states contributed to two-thirds of the overall decline in extreme poverty

3. Decline in Multidimensional Poverty

- Non-monetary poverty, as measured by the Multidimensional Poverty Index (MPI), which considers factors like education, health, and living conditions, declined from 53.8 percent in 2005-06 to 16.4 percent by 2019-21.
- The World Bank's Multidimensional Poverty Measure stood at 15.5 percent in 2022-23, reflecting ongoing improvements in living conditions.

4. Employment trends

- Employment growth has outpaced the working-age population since 2021-22, with rising employment rates, especially among women.
- Urban unemployment fell to 6.6 percent in Q1 FY24/25, the lowest since 2017-18.
- Recent data indicates a shift of male workers from rural to urban areas for the first time since 2018-19, while rural female employment in agriculture has grown.
- Self-employment has risen, particularly among rural workers and women, contributing to economic participation.

Conclusion

The **Spring 2025 World Bank's Poverty and Equity Brief** highlights these achievements. It underscores the country's commitment to inclusive development. The sharp decline in both extreme and lower-middle-income poverty, along with the narrowing rural-urban poverty gap, reflects the effective efforts of the Government of India.

Climate Rights

Syllabus Mapping: GS Paper I, Social empowerment, Climate

Context

Beijing India Report 2024 (India's Report on Beijing+30) **lacks a robust integration of gender and climate** considerations.

The report fails to leverage climate action as an **opportunity to bridge gender inequality and enhance resilience**.

Introduction

In various judicial pronouncements, the apex court has held the right to pollution free air and a healthy environment under the ambit of right to life under **Article 21** of the Indian Constitution. (**Subhash Kumar case and the M.C. Mehta vs. Union of India case**)

Current provisions of the Constitution ensuring climate change rights

- **Limiting noise pollution:** **Article 19 (1)(a) and Article 21** guarantee the right to a decent environment and to live peacefully.
 - **Eg:** In the **SP Kottayam case**, the Kerala High Court held that the freedom of speech under **Article 19 (1)(a)** does not include the freedom to use loud speakers or sound amplifiers.
- **Protecting animal husbandry:** The Supreme Court recognized the State's duty to ensure a healthy environment under **Article 48** which alongside deals with the organisation of agriculture and animal husbandry on modern and scientific lines.
 - **Eg:** UP Government recently **restricted inter-state cattle transportation** in order to stop the spread of **lumpy skin disease**.
- **Polluter pays principle:** Public interest litigations (PILs) filed under **Article 32 and 226** of the Constitution have led to a wave of environmental litigation.
 - **Eg:** In the **Vellore citizens welfare forum vs Union of India case**, the court observed the **"Precautionary principle" and the "Polluter pays principle"** are essential for Sustainable development.

Role of Women in Climate Adaptation and Mitigation

- **Keepers of Traditional Knowledge:** Women in villages often know how to grow crops in tough weather and manage forests sustainably.
 - They **preserve and use climate-resilient seeds** suited to local conditions.
- **Main Contributors to Food Production:** Women produce nearly **half of the world's food**, especially through small-scale farming.
 - They **naturally use sustainable methods** to deal with changing climates.
- **First Responders in Disasters:** Women's groups are often the first to act during floods, droughts, or forest fires.
 - They help protect their families, communities, and natural resources.
- **Support through Women's Collectives:** Women form groups to share workload, improve income, and spread awareness.
 - These collectives increase productivity and resilience.
- **Leaders in Local Climate Solutions:** Women are involved in activities like water conservation, organic farming, and managing waste.

How Climate Change Affects Women

- **Health Issues Worsen:** Extreme heat, poor nutrition, and lack of clean water affect women's health, especially during pregnancy.
 - Over **50% of pregnant women in India are anaemic**, and climate-related food shortages make it worse.
- **Increased Unpaid Work:** Due to droughts or water scarcity, women walk longer to collect water and fuel.
 - On average, women in India do **71% of their work unpaid**, and climate change adds to this burden.
- **Loss of Livelihood:** Most rural women depend on farming. Droughts, floods, and heat reduce crop yields and income.
 - **Around 33% income loss** occurs in non-farm livelihoods due to climate impacts.
- **Girls Drop Out of School:** Families facing migration or income loss often make girls leave school to help at home or earn money.
 - Education gets interrupted especially in disaster-affected or migrating families.
- **Higher Risk of Violence:** Studies show that rising temperatures lead to more **domestic and sexual violence**.
 - For every 1°C increase, **physical violence increases by 8%**, and **sexual violence by 7.3%** in India.
- **Distress Migration & Exploitation:** Climate disasters force families to migrate.
 - Women face unsafe living conditions, loss of support systems, and higher chances of trafficking or exploitation.

Measures to ensure Climate change rights of citizens

- **Protect the protector:** Environment protectors need to be protected through Constitutionally guaranteed provisions such as protection of biodiversity, forests and other natural resources.
 - **Eg: Maldhari community protecting lions of Gir** would be relocated alongside the State's plan to relocate lions. Such provisions help uphold rights of protectors.
- **Remediation funds:** The amendments can contribute to improving water quality fit for human consumption through remediation funds which can compensate the affected parties and further be used for the restoration of the damaged environment.
 - **Eg: Establishment of a water pollution remediation fund to collect penalties from the violators.**
- **Institutional strengthening of local bodies:** Constitutionally guaranteed Rural and Urban local bodies need to be provided with adequate funds to ensure measures such as water management, forestry and environment protection in order to ensure climate change rights of citizens are upheld.
 - **Eg: Mumbai's Lower Parel** area's mills and chawls are replaced by high-rise buildings which pushes residents to peripheral areas.
- **Increase autonomy of environment boards:** A recent report by **Centre for Policy Research** states that the **Pollution control board (PCB)** lacks autonomy in decisions regarding expenditure which requires an amendment to ensure clarity in utilisation of funds.
- **Synchronised global vision:** Human rights necessitate states to establish effective laws, amendments to reduce GHG emissions. (**UN Special Rapporteur on human rights and environment, 2018**)

Way Forward

- **Policy & Planning:** Include women's needs and roles in climate plans like the **National Action Plan on Climate Change (NAPCC)** and **State Plans (SAPCC)**, and local-level planning.
 - Focus on **livelihood diversification** for women to adapt to climate impact on agriculture.
 - Develop **gender-responsive climate budgets** and **audit mechanisms**.
 - Create **climate support hubs** offering disaster relief, health, safety, and migration-related assistance.
- **Data & Research:** Use **gender-specific data and indicators** to track the impact of climate change on women.
- **Participation & Empowerment:** Facilitate **inclusive community climate consultations** with women's leadership.
 - Promote **education and skilling** for women in climate-related fields.
 - Recognize and scale up **best practices** from women-led climate initiatives.
- **Private Sector & Finance:** Invest in **women-led green enterprises** and climate-resilient technologies.
 - Direct **green funds** toward women-centric innovation and adaptation efforts.
 - Ensure **private sector participation** in fostering gender-inclusive climate solutions.
- **Collaboration:** Build **multi-stakeholder partnerships** involving government, civil society, private sector, and international organizations.
 - Emphasize **capacity exchange, knowledge sharing, and collective advocacy** for women's climate leadership.

Conclusion

Article 21 and its interpretations by the judiciary is in light of the **transformative character** of the Indian Constitution. The **balanced approach** of SC while dealing with the issue of burning crackers shows the commitment to uphold liberty of individuals along with the **right to clean environment for all**.

India's research infrastructure

Syllabus Mapping: GS Paper 2, Education

Context

There is a **declining trend** in the number of students, particularly **Indian students, going to the U.S. for higher education**.

Recent Trends in Students Going Abroad for Studies

- **Decline in U.S. Popularity:** The U.S. is becoming less attractive due to:
 - Visa revocations tied to foreign policy protests.
 - Cancellation of programs like **Optional Practical Training (OPT)**.
 - Increasing xenophobia and tightening immigration policies, especially during and after the Trump era.
 - Defunding of research and pressures on universities, reducing academic freedom.
- **Rising Interest in Europe:** Countries like **Germany** are gaining popularity due to:
 - Lower tuition fees.
 - More flexible work-study options.
 - Welcoming policies toward foreign students and researchers.
- **Return to India:** Some Indian professionals and researchers are coming back, driven by a desire to contribute to the homeland.
 - However, **systemic challenges in India** often discourage them from staying or thriving.

Systemic Challenges in India

- **Bureaucracy & Red Tape:** Navigating administrative processes in academia, government, and industry is often **slow and inefficient**.
 - Delays in project approvals, grant disbursements, and institutional permissions can stall research and innovation.
- **Lack of Merit-Based Systems: Nepotism and favoritism** often outweigh merit in hiring, promotions, and funding.
 - Talented individuals may find it hard to progress unless they have the right connections.
- **Poor Research Ecosystem: Limited access to funding,** modern laboratories, and academic resources compared to Western countries.
 - Many institutions are **teaching-centric**, with little emphasis on cutting-edge research or innovation.
- **Rigid Institutional Hierarchies:** Indian academic institutions often follow a **strict seniority system**.
 - Young researchers or faculty members may find it hard to challenge outdated practices or propose bold new ideas.
- **Inadequate Collaboration Culture:** There is a **lack of collaboration** across disciplines or institutions.
 - Silos and competitiveness over cooperation can limit the impact of research efforts.
- **Social Constraints & Work Culture:** A **conservative work environment**, gender bias, and outdated norms can be jarring for returnees used to a liberal, inclusive atmosphere abroad.
 - Workplaces may not always encourage **independent thinking or dissent**.
- **Limited Industry-Academia Interface:** Collaboration between **universities and industries** is weak, which limits practical applications of research.
 - The startup and innovation ecosystem, while growing, is still developing compared to global standards.
- **Urban Infrastructure and Quality of Life:** **Traffic, pollution, power outages**, and unreliable public services in many cities impact quality of life.
 - These factors can make daily life frustrating, especially for those accustomed to more efficient systems abroad.
- **Academic Freedom & Political Interference:** Increasing concerns over **freedom of speech, censorship, and ideological control** in academic spaces.
 - Scholars may feel restricted in what they can research or teach.

Way forward

- **Boost Research Funding:** The government needs to **increase investment in research**, both directly and by incentivizing private institutions.
 - Establish grant systems and fellowships comparable to those in top global universities.
- **Strengthen Academic Collaboration:** Encourage **interdisciplinary work** and **collaboration across institutions**.
 - Create platforms and incentives for joint research and innovation.
- **Tackle Social and Institutional Rigidities:** Reform the **hierarchical and bureaucratic** academic structure.
 - Encourage **meritocracy, openness, and innovation**.

- **Protect Academic Freedom:** Ensure **freedom of thought and expression** in academic institutions.
 - Distance educational governance from political influence.
- **Support Student Mobility and Exchange:** Expand scholarship programs for Indian students going abroad and incentivize them to return.
 - Create **joint degree programs** with international universities.
- **Improve Infrastructure and Facilities:** Upgrade labs, libraries, and other research infrastructure to global standards.
 - Digitize learning environments and integrate modern teaching tools.
- **Rebrand India as a Knowledge Hub:** Promote Indian universities globally.
 - Invite foreign students and faculty through open and fair visa policies — reversing the “Trumpian” trend.



SCIENCE & TECHNOLOGY

TOPICS FOR MAINS

The Other Space Race– The Geopolitics of Satellite Net

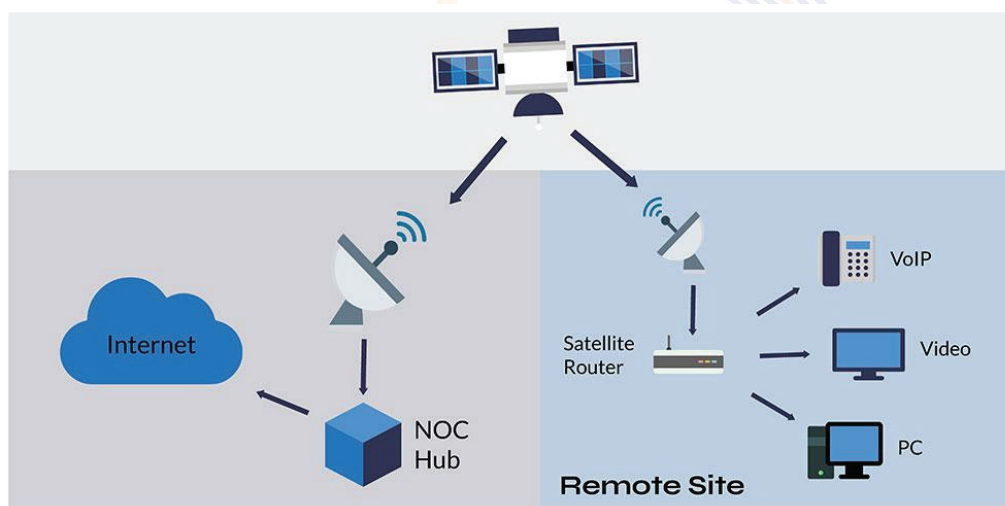
Syllabus Mapping- GS-3, Science and Technology

Context

SpaceX partnered with Airtel and Jio to expand Starlink services across India.

About Satellite Internet

- Satellite internet refers to a broadband internet service delivered through satellites orbiting the Earth, rather than traditional fiber optic cables or mobile towers.
- Unlike terrestrial internet networks, satellite internet can reach geographically isolated regions, bypassing physical barriers like mountains, forests, or deserts.
- **How Does Satellite Internet Work?**
 - The user's device sends signals to a satellite in space.
 - **Satellite to Ground Station:** The satellite transmits the signal to a ground station, which is connected to the Internet.
 - **Data Retrieval and Transmission:** The ground station retrieves requested data and sends it back via the satellite to the user's dish.



Need for Satellite Internet in India

- **Bridge the Digital Divide:** It can provide high-speed internet to India's underserved rural and remote populations, where fiber deployment is economically unfeasible or technically challenging.
- **Support Critical Services:** It enables digital education, telemedicine, and e-governance in isolated regions, improving access to basic services.
- **Disaster Resilience:** Satellite internet remains operational during natural disasters, unlike ground-based networks. It is already being used effectively in crisis zones like Ukraine to support both civilians and military operations.
- **Enable Digital Inclusion:** Connectivity can boost rural entrepreneurship, enable financial inclusion, and integrate millions into the formal digital economy.
- **Fast Deployment:** Compared to laying fiber or building towers, satellite internet can be rolled out swiftly, especially in high-priority zones like borders, tribal areas, or forested regions.

Significance of the SpaceX–India Partnership

- **Expanding Connectivity:** Starlink's collaboration with Airtel and Jio enables broadband access in remote and hilly regions, including the northeast, Ladakh, and tribal areas.
 - E.g., India is the world's second-largest Internet market, yet 670 million people (out of 1.4 billion) lack Internet access (as per a 2024 GSMA report).
- **Boost to Rural Economy:** Connectivity will support e-commerce, agri-tech, and remote work, unlocking growth in low-income regions.
- **Emergency Preparedness:** During disasters, satellite internet offers a resilient communication backbone, critical for relief efforts.
 - E.g., It provides crucial internet connectivity to war-torn Ukraine and its military.
- **Technological Leap:** Indian users and institutions gain access to advanced LEO satellite infrastructure, enhancing the country's digital capabilities.
- **Job Creation:** The deployment and servicing of satellite-based systems will generate employment opportunities in technical support, hardware setup, and logistics.

Challenges of Relying on Foreign Satellite Providers

- **Geopolitical Dependency:** Relying on Starlink, a U.S.-based private firm, for national infrastructure compromises digital sovereignty. In wartime or geopolitical tension, foreign control over strategic communications poses a real threat—as seen in the Ukraine conflict, where Starlink's availability became a bargaining chip.
- **Monopoly Risk:** With its head-start, SpaceX could dominate the LEO market, leading to pricing control and stifled competition. Emerging Indian initiatives like OneWeb India or Tata-Telesat must be nurtured to avoid a monopoly scenario.
- **Exclusion of Public Sector:** The absence of BSNL, India's state-owned telecom company with deep rural penetration, reduces public oversight and weakens national control over digital infrastructure.
- **Affordability Concerns:** Without tiered pricing or subsidies, satellite internet may remain unaffordable for the rural poor, perpetuating a "digital divide in orbit."
- **Security and Regulatory Gaps:** Issues of data sovereignty, encryption, surveillance, and cybersecurity arise when critical data is routed through foreign-controlled systems
 - Further, international laws on space traffic and orbital debris are underdeveloped, risking long-term sustainability.

Way Forward

- **Strengthen Indigenous Capabilities:** ISRO and private Indian space startups should be encouraged to build a homegrown satellite constellation for true Digital Sovereignty.
- **Public-Private Partnerships (PPP):** Include BSNL and other public sector units to balance strategic oversight with private efficiency.
- **Enforce Strategic Conditions:** Mandate local data storage, tech transfer, and regulatory compliance to ensure national interests are protected.
- **Promote Competitive Environment:** Create a level playing field for new entrants like OneWeb India, Tata-Telesat, etc., to avoid a Starlink monopoly.
- **Affordable Access Models:** Design tiered pricing, rural packages, and promote innovation at the bottom of the pyramid to ensure inclusivity.
- **Push for International Frameworks:** Lead global efforts for satellite internet governance, orbital debris management, and fair spectrum allocation under platforms like UN COPUOS.

Genome Study in India: Unlocking the Genetic Blueprint

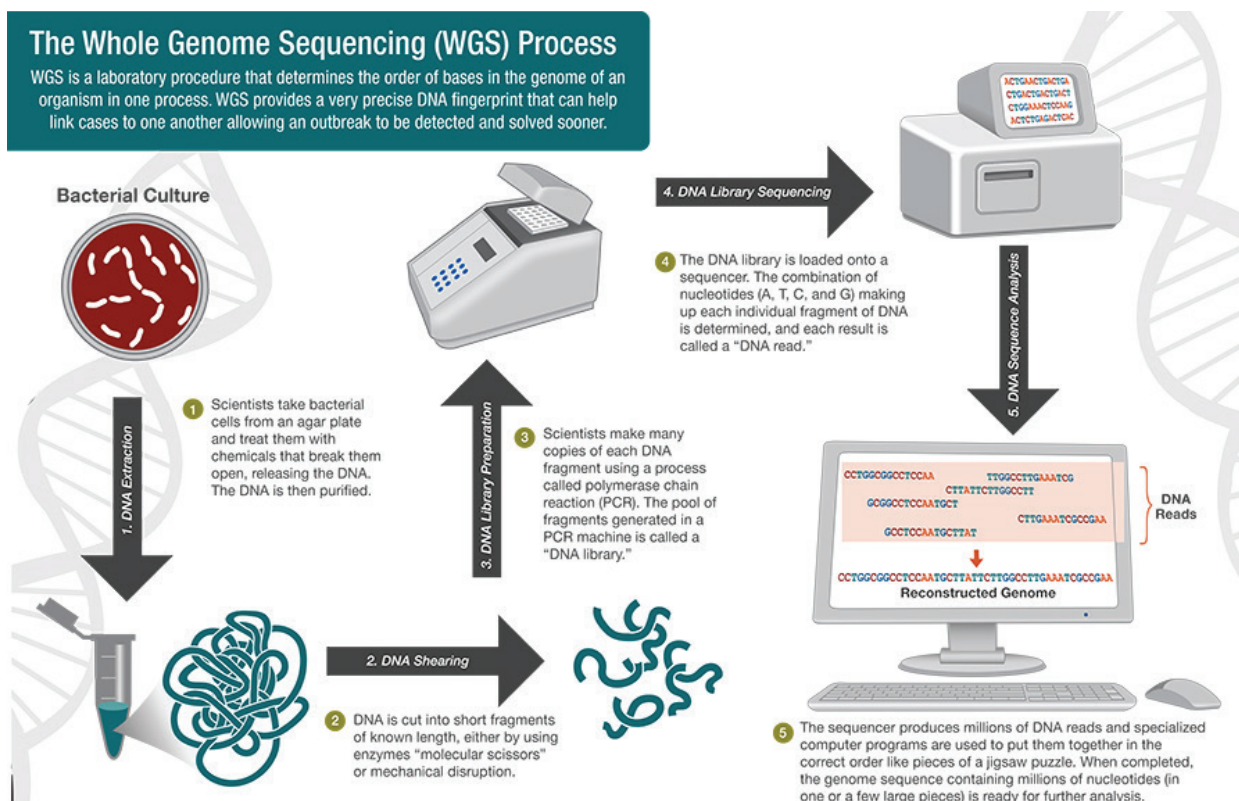
Syllabus Mapping- GS-3, Science and Technology

Context

The preliminary findings of the GenomeIndia project were published in the journal Nature Genetics.

About Genetic Studies

- A genetic study, also known as genetic analysis, is the process of examining DNA (and related genetic material) to understand how genes and traits are passed down from one generation to the next.
- **Genome sequencing** is the process of determining the order of the four chemical building blocks (bases) in an organism's DNA.
 - Genome sequencing typically involves collecting biological samples like blood or saliva.
 - DNA is extracted and sequenced using high-throughput technologies such as Next-Generation Sequencing (NGS).
 - The resulting data is then compared against a reference genome to detect mutations, polymorphisms, or other variations.



About GenomeIndia project

- Government of India launched the GenomeIndia Project in January 2020. It is funded by the Department of Biotechnology.
- The project is a collaborative effort involving 20 scientific institutions, including the Centre for Brain Research at IISc Bengaluru, CCMB in Hyderabad, IGIB in Delhi, NIBMG in Kolkata, and GBRC in Gandhinagar.
- It aims to sequence the whole genomes of 10,000 healthy and unrelated Indians from across the country.
- **Phase I:** Sequencing of 10,000 genomes from 99 ethnic populations.
- **Future Goal:** Expand to sequence up to 1 million genomes.
- **Genome India Database:**
 - It will be housed at the Indian Biological Data Centre (IBDC) in Faridabad, Haryana.
 - It will be open to global researchers adhering to data-sharing and privacy policies.
- **Privacy Measures:** Data is anonymized with numeric codes and access requires proposals vetted by an independent panel.

Global Genome Sequencing Projects

- **Human Genome Project (2003):** First complete human genome by an international consortium funded by the US National Institutes of Health.
- **1,000 Genome Project (2012):** It is an international collaboration between research groups in US, UK, China and Germany
- **European 1+ Million Genome Project:** Ongoing effort across 24 countries to sequence over 1 million genomes.

Key Takeaways from the GenomeIndia Project

- **Discovery of Genetic Variants:** The sequencing revealed over 180 million mutations—130 million in autosomes (non-sex chromosomes) and 50 million in sex chromosomes.
- **High Endogamy:** The study reveals extensive endogamy (marriage within groups) across Indian populations.
 - This has resulted in the amplification of population-specific genetic traits and mutations, including disease-causing ones.
- **Focus on Non-Coding DNA:** Around 98% of the human genome does not directly code for proteins.
 - The study identified many variants in these non-coding regions, which play crucial roles in gene regulation and evolutionary biology.
- **Evolutionary Significance:** Many of the mutations found are evolutionarily conserved and help trace ancestral lineages, supporting the theory that all modern humans trace their roots back to Africa.
- **Addressed Global Underrepresentation:** While the global genomic landscape is Eurocentric, GenomeIndia offers a vital corrective by documenting the rich and underrepresented diversity of Indian populations.

Significance of Genome Studies

- **Precision Medicine:** By understanding population-specific mutations, doctors can design treatment strategies tailored to an individual's genetic makeup.
 - E.g. A South Indian Vaishya community lacks the gene to process common anaesthetics, leading to prolonged effects or death.
- **Public Health Policy:** Data from genome studies can help identify disease-prone groups and develop targeted interventions, screening, and awareness campaigns.
- **Drug Development and Testing:** Pharmaceutical companies can use genomic data to identify biomarkers, test drug efficacy, and avoid adverse drug reactions in specific genetic populations.
- **Understanding Human History:** Genomics helps decode migration patterns, interbreeding, and isolation events in human history, revealing how populations evolved and adapted to their environments.
- **Predictive and Preventive Healthcare:** Early detection of hereditary diseases can be made possible through genetic markers, allowing preventive action long before symptoms arise.

Challenges in implementation and utilization of genomic research in India

- **Data Privacy and Ethics:** Managing sensitive genetic information while ensuring the privacy of individuals and communities remains a concern.
- **Limited Open Access:** Currently, the FASTQ files are withheld from public access, limiting collaborative research.
 - Restrictive data sharing slows the progress of medical innovation and global collaboration.
- **Underrepresentation in Global Databases:** Most global genome databases are dominated by Caucasian genomes.
 - Without India's full integration, genomic medicine will remain less effective for its population.
- **Need for Legal Frameworks:** India lacks a comprehensive legal and regulatory structure governing genomics, data sharing, bioethics, and commercial use, raising concerns about misuse and inequality.
- **Technological and Infrastructure Gaps:** Limited availability of high-throughput sequencing infrastructure and trained personnel is a constrain for large-scale implementation and follow-up research.

Suggested Measures to Strengthen Genome Studies in India

- **Global Data-Sharing Standards:** The consortium should open its data to the broader research community, in line with benchmarks like the UK Biobank, while maintaining privacy through anonymization and secure protocols.
- **Legal and Ethical Framework:** The government should frame dedicated genomics legislation addressing consent, data use, biobanking, commercialization, and population-level implications.
- **Expand Indigenous Research Capacity:** Investments should be made in building genomic labs, training researchers, and expanding partnerships between public and private institutions.
- **Integrate with Healthcare:** Establish genetic diagnostic centers within primary health systems and develop affordable testing kits for disease markers prevalent in specific communities.
- **Include Underrepresented Populations:** Future phases should expand to include ancient populations, ensuring a truly comprehensive national genomic atlas.

TOPICS FOR PRELIMS

Detect Radioactive Materials

Context

A team of US physicists has developed a new method to detect radioactive materials remotely using carbon-dioxide lasers.

About Avalanche Breakdown

- Some materials naturally **release energy and particles**—this is called **radioactive decay**.

These released particles move through the air and **knock electrons off atoms**, creating a type of energy-filled air called **plasma** (like the glowing part of a flame or lightning).

- The process of more and more electrons getting knocked off and spreading is called **avalanche breakdown** (like a small snowball rolling down a hill and getting bigger).
- Key findings of the experiment: Detected radiation from 10 meters away** – This is **10 times farther** than previous methods.

Role of Lasers in Detecting Radiation

- Scientists used a special type of laser (carbon-dioxide laser) that gives off infrared light (like the heat from a TV remote).
- This laser helps accelerate electrons, making it easier to see the plasma caused by radioactive particles.
- When the laser shines through the air, the plasma **bounces the light back** in a way that can be measured.

Silicon-Carbon (Si-C) Batteries

Context

Several top Android smartphone brands have incorporated Si-C batteries into their flagship devices

About: Silicon-Carbon (Si-C) Batteries

- Silicon-carbon batteries are an **advancement over lithium-ion batteries**, maintaining the same **lithium-based cathode** while replacing the conventional graphite anode with a silicon-carbon composite.
- Key Difference from Lithium-Ion Batteries:**
 - Higher Energy Density** → Holds more charge per gram, improving battery life.
 - Smaller & Lighter** → Can be made thinner while storing more energy.
 - Faster Charging** → Allows quicker power replenishment.

Challenges of Silicon-Carbon Batteries

- Silicon Swelling Issue:** Silicon expands by up to **300%** during charging, which can lead to: Structural damage and

cracking, Reduced battery lifespan, Faster performance degradation compared to lithium-ion batteries.

- Higher Manufacturing Costs:** Silicon-carbon anodes are **more expensive** to produce than graphite anodes.
- Practical Energy Density Variations:** Although theoretical energy capacity is higher, real-world performance varies based on device and usage.

Under Sea Cables

Context

India is expanding its internet infrastructure with new undersea cable systems. The latest addition is Airtel's 2Africa Pearls system, adding 100 terabits per second of capacity to India's international bandwidth.

INTERNATIONAL ADVISORY BODY FOR SUBMARINE CABLE RESILIENCE

A partnership between ITU and the International Cable Protection Committee (ICPC) to improve the resilience of submarine cables.



The body is made up of 40 members from around the world, including ministers, heads of regulatory authorities and senior telecommunications experts.

India's telecom secretary is also part of the body

About Under sea cables/Submarine cables

- Submarine cables are fiber-optic cables that run along the ocean floor, carrying data between continents.
- They are the backbone of the global internet, responsible for the majority of international communications, including video calls, email and webpages.
- Significance of Under Sea Cables:** 90% of data, 80% of world trade and \$10 trillion in financial transactions depend on these cables.
- Major cable landing hubs:**
 - Mumbai and Chennai are the two key locations for subsea cable landings.
 - Versova, Mumbai**, alone hosts **95% of India's subsea cables** within a **6-km stretch**.
 - 17 international subsea cables** land in the country.

Under Sea Cables vs Satellite Internet

Component	Under Sea Cables	Satellite Internet
Latency	Offer Ultra low Latency (milliseconds)	Higher latency (especially for high-orbit satellites)
Reliability	Longer Lifespans (~25 years)	Exposed to space weather conditions (space debris, solar storms etc.)
Cost Considerations	Cheap and stable bandwidth per user	Higher costs per user (especially for high-speed data transmission)

3D Printed Train Station

Context

Recently Japan built a 3D printed train station in six hours.

About 3D Printing

- It is a process of creating three-dimensional objects from digital models by adding material layer by layer. It is also known as **additive manufacturing**.
- It is an additive process, in which layers of a material like plastic, composites or bio-materials are built up to construct objects that range in shape, size, rigidity and colour.
- It allows the **creation of complex shapes and structures with high precision**.

How 3D Printing is done?

- The basic principle of 3D printing involves building an object layer by layer.
- It starts with a digital model or a **computer-aided design (CAD)** file, which is sliced into thin cross-sectional layers.
- The 3D printer then reads these slices and deposits or **solidifies material one layer at a time**, gradually building up the final object.
- Various 3D Printing Technologies:** Fused Deposition Modeling (FDM), Stereolithography (SLA), Selective Laser Sintering (SLS), Binder Jetting etc.

Biomass Satellite

Context

The European Space Agency (ESA) will launch its Biomass mission on April 29, 2025, aboard the Vega C rocket.

About Biomass Satellite

- Biomass** is a **European Space Agency (ESA)** Earth observation satellite.
- Key Objectives of the Biomass Mission:**
 - Estimate Above-Ground Forest Biomass.
 - Provide **detailed 3D forest structure maps**.
 - Understand forest role in **carbon storage**.
 - Improve **climate change predictions** using accurate biomass data.
 - Observe **ice sheet movement** in Antarctica.

Satellite Payload:

- Synthetic Aperture Radar (SAR)** for mapping Earth's surface.
- It is fitted with a **large 12-meter antenna**.
- It is the First satellite** to use **P-band SAR** (long-wave radar):
 - Longer wavelengths can penetrate dense forest canopies enabling detection of biomass **from canopy to roots**.
 - P-band SAR** can "see through" dense foliage. It can measure **carbon stored in branches, trunks and ground biomass**.
- Biomass is the **seventh mission under ESA's Earth Explorer programme**.

Earth Explorers programme consists of a series of satellites that share the common goal of advancing Earth science by helping answer principal scientific questions through observation of Earth's key systems.

Silicon Photonics

Context

Recently scientists have created the first miniaturised laser directly on a silicon chip, marking a significant breakthrough in silicon photonics.

About Silicon Photonics

- Silicon photonics is a technology that uses **light (photons)** instead of **electricity (electrons)** to carry and process information on **silicon-based microchips**.
- It combines **optical components** with traditional **silicon electronics**, allowing faster and more energy-efficient communication between and within chips.
- Advantage of Photons over Electrons:**
 - Photons move faster and can carry much more data at once (high bandwidth).
 - They generate less heat and lose less energy during transmission.
 - This makes photonic chips ideal for high-speed data transmission, especially over short distances like between servers or chips.

Challenge in using Photons

- A key challenge was integrating a light source (laser) directly into the silicon chip, as **silicon does not naturally emit light**.
- Silicon has an indirect bandgap, meaning electrons in silicon need assistance (like vibration energy) to drop energy levels and emit light.
- The ideal solution is to build the laser directly on the silicon chip, but this is difficult because:
 - Materials like **gallium arsenide** and **silicon** have **different crystal structures**
 - This causes **defects** when one is grown on the other, reducing efficiency.
- **Recently researchers solved this integration problem:**
 - They used **nanometre-wide trenches** in a 300 mm silicon wafer & grew **gallium arsenide** at the bottom of these trenches, trapping defects there.
 - This allowed **high-quality laser** material to grow on top.
 - Direct integration **reduces costs**, making the technology scalable for mass production.

Vehicle to Grid (V2G) technology

Context

Recently Kerala State Electricity Board (KSEB) and IIT Bombay have initiated a pilot project to explore the implementation of Vehicle-to-Grid (V2G) technology in Kerala.

About V2G Technology

- It is a system where electric vehicles (EVs) can not only consume electricity from the grid but also send it back when needed.
- EVs act as decentralized mobile energy storage units.
- V2G enables **two-way energy flow: G2V (Grid to Vehicle)** – charging the EV and **V2G (Vehicle to Grid)** – discharging electricity from the EV back to the grid.

Advantages of V2G Technology

- **Grid Stability:** It helps to balance supply and demand, especially with intermittent renewable energy sources.
- **Enhanced Use of Renewable Energy:** It stores excess solar/wind energy during low demand & Discharges it when renewable generation is low or demand is high.
- **Reduced Peak Load Stress:** EVs can supply energy during peak demand hours, reducing stress on generation and distribution systems.

- **Emergency Backup Power:** EVs can serve as emergency power sources during outages or disasters.
- **Economic Benefits for EV Owners:** EV owners can earn money or credits by selling power back to the grid.

India's Fight Against Anemia

Context

According to NHFS-5, 67.1% of children and 59.1% of adolescent girls in India are anemic.

Groups	Anaemia Rate (%)
Men (15–49 years)	25%
Women (15–49 years)	57%
Adolescent boys (15–19 years)	31.1%
Adolescent girls (15–19 years)	59.1%
Pregnant women (15–49 years)	52.2%
Children (6–59 months)	67.1%

About Anaemia

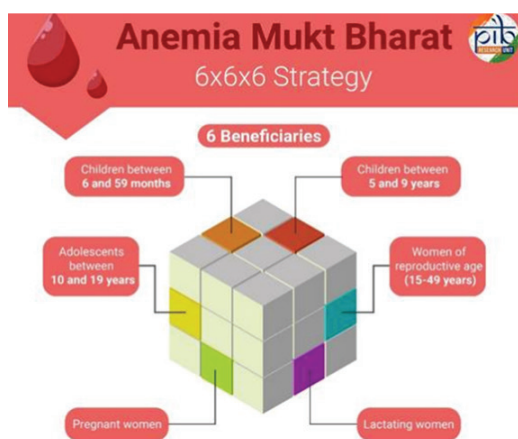
- It is a blood disorder that occurs when the body doesn't have enough healthy red blood cells or hemoglobin.
- This prevents the body from delivering enough oxygen to organs and tissues.
- **Vulnerable Population:** Children under 5 years of age, menstruating adolescent girls, women and pregnant and postpartum women.

Causes of Anaemia

- **Iron-Deficiency Anaemia:** Only 9% of anaemic cases could be attributed to iron deficiency.
- **Unknown Causes:** 22% of cases were linked to unmeasured or unknown factors, which could include: Deficiencies in **Vitamin B12** or **folate**, **Hemoglobinopathies** (genetic disorders affecting haemoglobin), **Undetected blood loss** and **Unhygienic environments** or **air pollution**.

Anemia Mukht Bharat

- It was launched in **2018 with a 6x6x6 strategy** under which there are six interventions to reduce the prevalence of anemia (nutritional and non-nutritional) in six age groups.



6 Interventions
Prophylactic Iron Folic Acid Supplementation
Periodic de-worming
Intensified year-round behaviour change communication campaign
Testing of anemia using digital invasive hemoglobinometer and point of care treatment
Mandatory provision of Iron Folic Acid fortified foods in public health programs
Addressing non-nutritional causes of anemia in endemic pockets

Perovskite Solar Cells

Context

Researchers have developed a water-based recycling method for perovskite solar cells.

About Perovskite solar cells (PSCs)

- PSCs are a type of photovoltaic (PV) cell, they utilize perovskite materials in their structure, which differs from traditional silicon-based PV cells.
- They are made using **perovskite crystals**. They offer a cheaper and more efficient alternative than Silicon solar panels.
- They can be manufactured using **simpler, low-cost processes**.
- Structure of Perovskite Solar Cells:** It is composed of **multiple layers of** - Perovskite crystal layer, Conductive charge transport materials, Metal electrodes & Glass sheets.
- Researchers have developed a **water-based recycling method** for perovskite solar cells that ensures:
 - Efficient degradation and recycling of used perovskite material.
 - Recovery of high-quality perovskite crystals**, reusable for new solar cells.
 - It avoids organic solvents**, making the process **greener** and more **sustainable**.

Challenges with Perovskite Solar Cells:

- Toxicity concerns:** It contains **lead**, a hazardous element which must be carefully managed during **manufacturing and disposal**.
- Recycling issues:** Traditional recycling methods rely on **toxic organic solvents** like **dimethylformamide (DMF)**. These solvents are **harmful** and **unsuitable** for a circular economy approach.

Currently Silicon-based solar panels dominate the market but they have certain drawbacks:

- High **energy cost** of manufacturing.
- End-of-life **disposal problem** due to non-biodegradable silicon.

Solar Capacity in India:

- Installed Solar Capacity:** As of now, India has installed **92 GW** of solar capacity.
- Manufacturing Capacity:** India's solar-module manufacturing capacity stands at 63 GW, while the solar-cell manufacturing capacity is about 5.8 GW.
- India's biggest solar power plant:** Bhadla Solar Plant (Rajasthan) - 2,245 megawatts

Antiviral for Deadly Agricultural Virus

Context

According to the U.N. Food and Agriculture Organization (FAO), plant pests and diseases destroy nearly 40% of the world's annual crops, costing the global agricultural economy more than \$220 billion.

About Cucumber mosaic virus (CMV)

- CMV is one of the most destructive plant viruses, affecting over 1,200 plant species, including food crops like cucumbers, squash, cereals and medicinal plants.
- It is responsible for significant yield losses, particularly in banana plantations (25-30%) and pumpkins, cucumbers and melons (up to **70%**).
- Impact of CMV on Crops
- In India, CMV is a major cause of yield losses in banana plantations and several other crops.

RNA-Based Technology for Crop Protection

- RNA Silencing and Plant Immunity:**
 - Plants have an **immune response** known as RNA silencing, which is activated when a virus introduces double-stranded RNA (dsRNA) into the plant.

- The plant uses **Dicer-like enzymes (DCLs)** to process dsRNA into small interfering RNAs (siRNAs).
- These siRNAs guide the plant's immune system to recognize and destroy viral RNA, preventing the spread of infection.
- **Problem with Plant's Natural Defense:** Sometimes, the plant's natural defense doesn't work perfectly and some viruses, like the **CMV**, change quickly and can escape the plant's defense.

Techniques invented by scientists to boost plant's natural defence

- **Host-Induced Gene Silencing (HIGS):** Scientists modify plants so they make special RNA inside their cells. This RNA protects the plant from viruses. However, this method requires genetic modification and can be expensive.
- **Spray-Induced Gene Silencing (SIGS):** In this method, farmers spray RNA directly onto the leaves of plants. The RNA helps the plant fight the virus without changing the plant's genes. It's cheaper and easier than genetic modification.
- **Latest Innovation:**
 - Researchers have created a **better RNA** called **"effective dsRNA"**. This is **specially designed** RNA that works better at protecting plants.
 - Instead of just using random RNA, they use highly effective RNA that targets the virus more precisely. This means the plant can fight off the virus stronger and more effectively.

Key Differences Between CPU, GPU and TPU

Feature	Central Processing Unit	Graphic Processing Unit	Tensor Processing Unit
Purpose	General Computing	Graphics & parallel computing	AI & ML-specific tasks
Processing Type	Sequential	Parallel	Tensor-based, parallel
Efficiency in AI	Low	High	Very High

Saturn's Moon Count Reaches 274

Context

Recently astronomers have discovered 128 new moons orbiting Saturn, bringing its total moon count to 274.

About Saturn

- Saturn is the **6th planet from the Sun** and the **2nd largest planet in our solar system**.
- It is a gas giant planet made up of hydrogen and helium.
- It is the least dense planet in our solar system.
- Saturn has the highest number of moons in our solar system (**146**)

- It is more Targeted & has Stronger Defense.

Tensor Processing Unit

Context

Google has recently launched Ironwood, its seventh-generation Tensor Processing Unit (TPU).

About TPU

- TPUs are **application-specific integrated circuits (ASICs)** designed exclusively for accelerating machine learning (ML) tasks, like deep learning.
- They are built specifically to handle operations involving tensors (multi-dimensional arrays used in ML models).

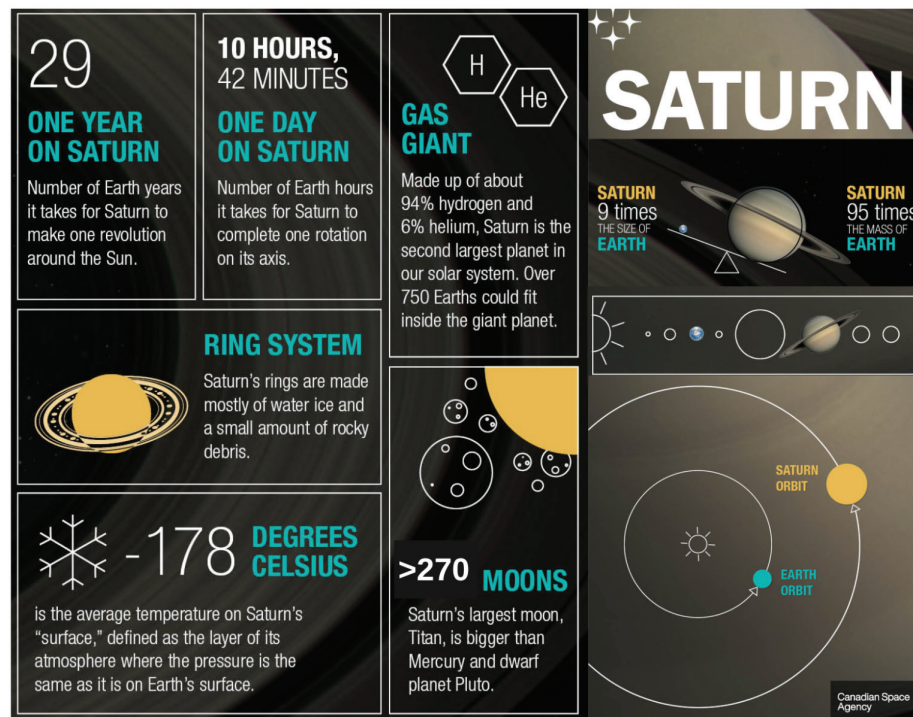
Key Features of TPUs

- **Designed for Machine Learning:** Optimized for **tensor operations**, which are the foundation of neural networks.
- **High Performance:** TPUs offer significantly **faster computation** compared to CPUs and GPUs for ML tasks. **Training that takes weeks** on GPUs can be completed in **hours** using TPUs.
- **Parallelism:** Like GPUs, TPUs also use parallel processing but are even more specialized. They can handle millions of tensor operations simultaneously.
- **Energy Efficiency:** More energy-efficient than GPUs and CPUs when running AI workloads.

- Its moon, **Titan**, is the second largest moon in our solar system after **Ganymede of Jupiter**.
- Saturn's rapid rotation gives it an **oblate shape**. It is flattened at the poles and bulging at the equator.

Discovery Process & Techniques Used

- The discovery was based on revisiting earlier observations from the **Canada-France-Hawaii Telescope**.
- **Technique Used: "Shift and Stack" Method**
 - Sequential images of the sky were taken to track the movement of each moon.
 - These images were combined to increase brightness, making the moons visible.



Parker Solar Probe

Context

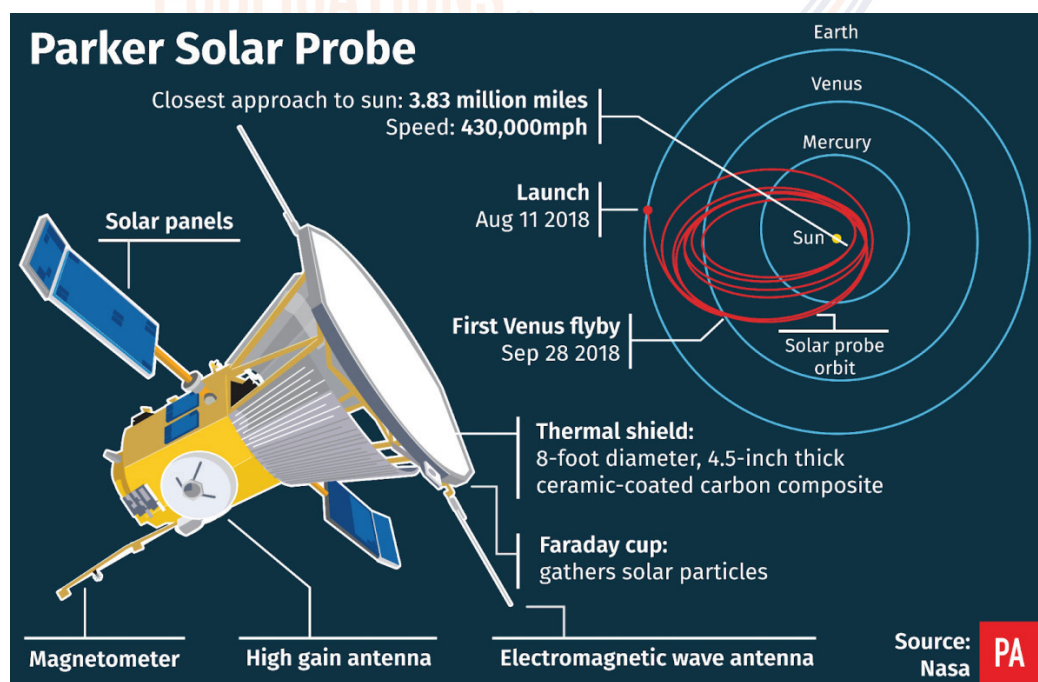
NASA's Parker Solar Probe is making significant strides in solar exploration, it has recently completed its 23rd close approach to the Sun.

About Parker Probe

- Parker Probe is part of **NASA's Living With a Star program**.

- Scientific objectives of the Mission:** Uncovering Solar Mysteries

- Corona's Temperature:** Investigating why the Sun's corona is hotter (1–2 million °C) than its surface (~5,500°C).
- Solar Wind Origins:** Understanding how the continuous flow of charged particles forms and evolves.
- Coronal Mass Ejections (CMEs):** Studying the formation of plasma clouds that influence space weather.



- **Mission Timeline:**
 - **Launched:** August 12, 2018, aboard a Delta IV Heavy rocket.
 - **Duration:** Seven years, with progressively closer orbits to the Sun.
- The spacecraft has become the **closest ever artificial object to the Sun**. It has circled gradually closer to the sun, flying past Venus in order to use the planet's gravity to move it into a tighter orbit.
- **Key Specifications:**
 - **Speed:** Up to 6,90,000 km/h (fast enough to travel from New Delhi to Chennai in about 10 seconds).
 - **Heat Shield:** A 4.5-inch-thick carbon-composite shield protects its instruments from temperatures exceeding **1,377°C, keeping them at a stable 29°C**. The solar shield is placed on the **Sun-facing side of the spacecraft**.
 - **Cooling System:** Circulates a gallon of water to absorb and radiate heat.
- **Toxic Components in Martian Dust:**
 - **Silica Dust:** Known to cause **silicosis**, a lung disease common in coal miners.
 - **Iron Dust:** Can lead to oxidative stress and lung damage.
 - **Perchlorates:** Highly toxic chemicals that **affect thyroid function**.
 - **Gypsum:** A calcium sulfate mineral that can cause respiratory irritation.
 - **Heavy Metals:**
 - **Chromium (Cr):** Can lead to lung diseases and toxicity.
 - **Arsenic (As):** Known to cause poisoning and organ damage.
- **Radiation Exposure:** Mars has **no protective magnetic field**, increasing radiation exposure.
- **Frequent Dust Storms:** Mars experiences **regional dust storms every Martian year** (which lasts **686.98 Earth days**).

Martian dust

Context

A recent study has highlighted the health risks posed by Martian dust to astronauts, as NASA and Chinese Manned Space Agency (CMS) prepare for Mars missions in the next decade.



Characteristics and Risks

- **Size of Martian Dust Particles:**
 - Extremely fine, **only 4% the width of a human hair**.
 - Small enough to **penetrate deep into the lungs and enter the bloodstream**, making it **more hazardous** than larger particles.
 - Dust particles on Mars are **smaller than the minimum size that human lung mucus can expel**, increasing the risk of **lung diseases**.

Dark Energy

Context

Recent data from the **Dark Energy Spectroscopic Instrument (DESI)** and the **Dark Energy Survey (DES)** suggests that dark energy may be weakening over time.

About Dark Energy

- Dark energy is an invisible, mysterious force that makes up about **70% of the universe's energy** content.
- It was first identified in the late 1990s when astronomers observed that galaxies were moving away from each other at an accelerating rate, something that contradicted predictions based on gravity.
- To explain this acceleration, scientists proposed the existence of a **"cosmological constant"**, a fixed, unchanging energy embedded in the fabric of space itself.

New Discovery: Dark Energy Might Be Changing

- **A New Type of Particle:** There might be an unknown force or particle affecting dark energy, which could be altering its strength over time.
- **Revisiting Einstein's Theory of Gravity:** If gravity operates differently than previously thought, it could explain the changes in dark energy.
- **A Completely New Theory of Physics:** This discovery might indicate the need for a new framework in physics that goes beyond our current understanding of the universe.

Possible Outcomes for the Universe:

- **Slowing Expansion:** If dark energy continues to weaken, the universe's accelerated expansion could slow down.

- **Stop or Reversal:** A dramatic weakening could cause the expansion to halt, and in the most extreme scenario, the universe could eventually collapse in a “**Big Crunch.**”
- **Unpredictable Scenarios:** Fluctuations in dark energy could also lead to other unforeseen outcomes, such as a sudden end to the universe.

World's Largest Telescope

Context

In Chile's Atacama Desert, the **European Southern Observatory (ESO)** is building the **Extremely Large Telescope (ELT)**.

About the Telescope

- The ELT will be the largest **optical telescope** ever built.
- Its **80-meter-high** dome rivals the height of Big Ben.
- Designed to collect more light than any current telescope on Earth.
- Constructed in the **Atacama Desert**, renowned for its clear skies.
- The telescope's dome will house sensitive optics shielded from dust and wind.
- Will help explore the birth of galaxies and the atmospheres of distant exoplanets.
- Enables discoveries previously beyond human reach.
- Blends ancient stargazing with **cutting-edge technology**.
- Reflects humanity's enduring curiosity about the cosmos.
- Serves as a bridge between our past questions and future answers.

Black Hole Bomb

Context

Scientists at the **University of Southampton** have successfully simulated the decades-old “Black Hole Bomb” theory in the lab.

Black Hole Bomb' Theory

- Proposed in the 1970s, based on the rotational energy of spinning black holes.
- Suggested that energy could build up by extracting it repeatedly, potentially leading to a massive explosion hence the name “bomb.”

Experimental Setup

- Used a rotating **aluminum cylinder** confined within rotating magnetic fields.
- Simulated the energy conditions around a black hole's event horizon.

Observations

- When the cylinder spun faster than the magnetic field energy levels increased.

- When the magnetic field spun faster than the cylinder energy levels dropped significantly.
- Confirmed **energy transfer mechanisms** similar to what happens in spinning black holes.

Frame Dragging

- A spinning black hole **warps space-time**, pulling nearby particles along its direction of spin. This effect is called frame dragging and increases the energy of particles near the black hole.

From Theory to Evidence

- Before this, the theory had **never been experimentally proven**.
- The successful lab experiment moved it from theoretical physics into the real world.

Implications of the Research

- Marks a major breakthrough in black hole and **astrophysics** research.
- Allows researchers to study black hole behavior without needing to observe real black holes.
- Helps simulate conditions around the ergosphere, the region just outside a black hole's event horizon.
- Enhances our understanding of **space-time, energy dynamics**, and black hole physics.
- Does not imply black holes can be used as weapons or energy sources for technology.

Galaxy Zoo

Context

NASA's Galaxy Zoo project invites volunteers to classify James Webb Space Telescope images, aiding scientists in understanding galaxy evolution.

About Galaxy Zoo

- Galaxy Zoo is a **citizen science project** started in 2007.
- It allows the public to help classify galaxies using telescope images.
- Has used data from major telescopes like:
 - Sloan Digital Sky Survey
 - NASA's **Hubble Space Telescope**
 - **James Webb Space Telescope (JWST)**

James Webb Space Telescope

- It has produced over 500,000 images of distant galaxies.
- These images show galaxies that are billions of years old, offering insights into the early universe.
- Scientists use galaxy shapes and features to understand:
 - Galaxy formation and evolution
 - Star creation
 - Interaction between galaxies

Combining Human and AI

Galaxy Zoo uses **ZooBot**, an AI system that:

- Automatically reviews and classifies easy images.
- Passes complex or unclear images to human volunteers.
- This AI-human partnership helps handle the huge data influx efficiently.

Nuclear Powered Rocket

Context

British company **Pulsar Fusion** is developing **Sunbird**, a nuclear fusion-powered rocket, which aims to significantly reduce space travel time, including halving the journey to Mars.

About Sunbird

- A nuclear fusion-based rocket designed by British firm Pulsar Fusion.
- Uses **Dual Direct Fusion Drive (DDFD)** technology. Unlike traditional fusion, DDFD emits charged particles directly for propulsion no conversion needed.
- Powered by **helium-3** and **deuterium** fusion.
- Aims to achieve space-ready **nuclear fusion propulsion** by 2027.

Launch and Operations Strategy

- Too powerful to launch from Earth directly.
- Will be deployed in **low-Earth orbit**, then used to propel missions further into space.

Impact on Space Missions

- Could reduce travel time to **Pluto** to **4 years**.
- Could cut **Mars** journey by **50%**.
- Supports long-duration human space missions.
- Cargo transport satellites for faster logistics in space.
- Claims are still theoretical, pending real-world testing.

Next-Gen Collider in the Alps

Context

CERN proposes the **Future Circular Collider (FCC)**—a 70-year project to further probe the mysteries of the universe.

About FCC

- Proposed by: **CERN (European Organization for Nuclear Research)**.
- Location: Geneva Basin, between the Jura mountains and the Alps.
- Size: 91 km circumference (vs. 27 km of LHC).
- Timeline: Multi-stage project extending to 2100.

- Estimated Cost: CHF 15 billion (1st phase), CHF 19 billion (2nd phase).

Structure:

- Stage 1: **Electron-Positron Collider** – for precision study of the Higgs boson.
- Stage 2: **Proton-Proton Collider** – 7× higher energy than LHC, enabling potential discovery of new particles.

Scientific Significance:

- Investigate mass of lighter particles and whether Higgs gives mass to itself.
- Explore matter-antimatter asymmetry via heavy quark interactions.
- Search for dark matter candidates and forces beyond the Standard Model.
- May help answer why the universe is dominated by matter and not antimatter.

Global Context

- Competing projects:
- CEPC (China) – 100 km collider
- International Linear Collider (Japan) – 20 km
- U.S. focus on detectors and international collaborations

Beyond Physics:

- Spin-offs in medical imaging, material science, and computing.
- Strengthens global scientific collaboration and high-end engineering innovation.

India's Role in Tackling AMR"

Context

India is well-positioned to lead the global fight against **antimicrobial resistance (AMR)** through enhanced surveillance, R&D, and effective public communication.

Introduction

- AMR is a growing global health crisis, causing an estimated 39 million deaths between 2025 and 2050.
- India faces a particularly high burden due to high population density, prevalence of infectious diseases, and easy access to over-the-counter antibiotics.

India's National Action Plan (NAP) on AMR

- Launched in 2017, India's NAP aims to combat AMR with a six-pronged approach:
 1. Improving awareness
 2. Reducing infections
 3. Optimizing antimicrobial use
 4. Strengthening surveillance
 5. Increasing investment

6. Enhancing leadership in AMR

Genomic Surveillance and Innovation

- Genomic sequencing plays a crucial role in tracking the evolution of AMR pathogens.
- **Indian Council of Medical Research (ICMR)**, National Centre for Disease Control (NCDC), and Indian Council of Agricultural Research (ICAR) lead genomic surveillance efforts.
- Example: Salmonella enterica research has led to the development of targeted molecular diagnostics, improving detection and treatment of resistant strains.

Need for New Antibiotics

- Development of new drugs is urgent, as the antibiotic pipeline is drying up.
- India's biotech ecosystem is playing a key role in developing novel antibiotics, such as cefepime-enmetazobactam and **nafithromycin**, targeting multidrug-resistant pathogens..

S8 Tension in Cosmology: Clumpiness Discrepancy

Context

Cosmologists are puzzled by differing S8 values from CMB and galaxy surveys, sparking debates over new physics or measurement errors in understanding the universe's clumpiness.

Introduction

- The universe, after the Big Bang, was initially smooth and homogeneous.
- Over billions of years, this uniformity gave rise to galaxies, clusters, and dark matter.
- Cosmologists use the parameter S8 to measure the “**clumpiness**” of matter in the universe, which quantifies the degree of clustering.
- S8 is a parameter that indicates the degree of matter clustering in the universe.
- A higher S8 value suggests more clustering of matter, while a lower value indicates a more uniform distribution of matter.

The S8 Tension

- **Cosmic Microwave Background (CMB) data:** Provides a value of 0.8 for S8, suggesting a relatively uniform distribution of matter in the early universe.
- **Cosmic Shear Surveys:** Measure galaxy distributions using gravitational lensing and yield a lower value of 0.747 for S8, implying more clustering of matter.

Possible Causes of the S8 Tension

- **Measurement Discrepancies:** Differences in the methods used to measure S8 may be responsible for the tension.
- **Λ CDM Model:** The ongoing discrepancy raises questions about the adequacy of the standard cosmological model (Λ CDM), which includes dark matter and dark energy.

- **Dark Matter and Dark Energy:** The tension could reflect gaps in understanding the roles of dark matter and dark energy in shaping the universe.

Implications for Cosmology

- **Revisiting the Λ CDM Model:** The S8 tension challenges the Λ CDM model, which describes the evolution of the universe.
- **Future Research:** Ongoing surveys like the Rubin Legacy Survey of Space and Time (LSST) and advancements in gravitational lensing techniques are expected to help resolve this discrepancy and provide a clearer picture of the universe's structure.

Potential Signs of Life on K2-18b

Context

Recent research suggests the exoplanet **K2-18b** may harbor conditions conducive to life, but uncertainties remain about its true habitability.

Introduction: K2-18b, an exoplanet 124 light-years away in the Leo constellation, has sparked interest due to its potential habitability. Discovered in 2015, it is much larger than Earth and may possess a hydrogen-rich atmosphere, raising hopes for life-supporting conditions.

Planetary Characteristics

- **Size and Atmosphere:** K2-18b's massive size suggests it could be a “Hycean” world with an ocean under a hydrogen-rich atmosphere.
- **Climate:** Its surface conditions may be close to a runaway greenhouse effect, similar to Venus.
- **Dimethyl Sulphide (DMS):** Detection of DMS or its variant dimethyl disulphide (DMDS) in K2-18b's atmosphere is noteworthy. On Earth, DMS is primarily produced by marine life, making it a possible biomarker for life.
- **Previous Discoveries:** The Hubble and JWST have detected water vapour, methane, and carbon dioxide, further suggesting habitability.

Challenges and Limitations

- **Abiotic Sources:** DMS could also come from non-biological sources, complicating the interpretation.
- **Detection Limits:** Current instruments may miss some compounds, and alternative explanations for the data exist, such as K2-18b being a gas-rich mini-Neptune.

Safety of Stem Cell Therapy for Parkinson's Disease

Context

Recent trials confirm the safety of stem cell-based treatments for Parkinson's disease with promising but variable motor improvements.

Introduction: Two types of stem cells used: **Human induced pluripotent stem cells (iPSCs)** and human embryonic stem cells.

Parkinson's Disease and Stem Cell Therapy

- **Parkinson's Disease:** Progressive neurodegenerative disorder characterized by the loss of dopamine-producing neurons.
- **Stem Cell Therapy:** Aims to replace lost dopaminergic neurons, offering a potential long-term solution with fewer side effects compared to traditional treatments.

Trial 1: Human Induced Pluripotent Stem Cells (iPSCs)

- **Study:** Phase I/II trial by Kyoto University, Japan.
- **Participants:** Seven patients received dopaminergic progenitor cells from iPSCs.
- **Findings:**
 - No serious adverse events.
 - Cells produced dopamine without causing overgrowth or tumors.

- Variable motor function improvements in some patients.

Trial 2: Human Embryonic Stem Cells

- **Study:** Phase I trial by Memorial Sloan Kettering Cancer Center, New York.
- **Participants:** Twelve patients received dopaminergic progenitor cells (bemdaneprocet).
- **Findings:**
 - No severe adverse events during 18 months of follow-up.
 - Motor function improvements observed in both low-dose and high-dose groups.
 - The degree of improvement varied across patients.

Conclusions

- Both trials confirmed the safety of stem cell therapies for Parkinson's disease.
- Some motor improvements were observed, though results were variable.
- Further research needed to assess long-term efficacy.

News in Short

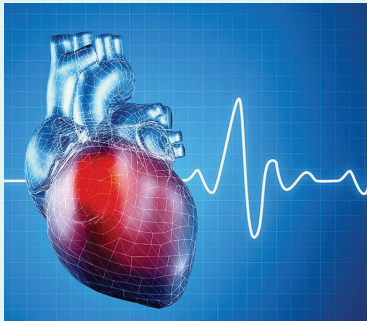
Topic	Details
BhashaNet Portal	• Many Union government websites have started using a Hindi Web address. • It is a global movement aimed at making the Internet more accessible in languages other than English. • It advocates for: – Internationalised Domain Names (IDNs) – Web addresses in non-English scripts. – Internationalised email addresses – Email addresses in regional languages. • The Domain Name System (DNS) historically supported only ASCII (English-based character set). • It is a government initiative focused on promoting the use of Indian language domain names and email addresses, aligning with the principles of Universal Acceptance (UA) and multilingual internet access. • It aims to create a multilingual internet environment where users can easily access and interact with online content in their local languages. • It is operated by: MeitY & National Internet Exchange of India (NIXI).
Signet Ring Cell Carcinoma (SRCC)	• SRCC is a rare and aggressive subtype of colorectal cancer (CRC). • Key characteristics: – Highly aggressive and rapidly spreading, especially to the peritoneum (lining of the abdominal cavity). – Resistant to conventional chemotherapy. – Poor prognosis, usually diagnosed at an advanced stage. • It is named after its unique microscopic appearance resembling a signet ring. • Prevalence in India: – SRCC accounts for ~1% of all colorectal cancer (CRC) cases worldwide. – It is 10 times more common in India than global averages, affecting younger individuals disproportionately. – Central and Northern India report the highest number of SRCC cases.
Cyber Slavery	• Recently over 60 Indian nationals forced into 'cyber slavery' were rescued from Myanmar by Maharashtra Cyber Police. • Cyber slavery refers to the forced or coerced involvement of individuals in cybercrime activities, under deceptive or exploitative conditions, such as: – Human trafficking. – Detention under threat. – Denial of freedom of movement. – No legal employment status.

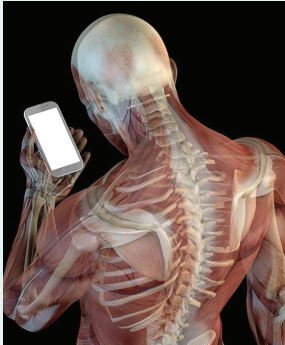
Topic	Details
	• It is an emerging form of modern day trafficking. • Victims are lured with fake job offers. Upon arrival, their travel documents are confiscated and they are forced to work under threat. • E.g. Digital arrest scam, Crypto scams and phishing etc.
India's First Full-Stack Quantum Computer	• Recently a Bengaluru-based startup QpiAI has launched a full-stack quantum computer with 25 qubits. • It is India's first full-stack quantum system, integrating quantum hardware, software and AI-enhanced hybrid computing. • Technical Specifications: – Qubit Count: 25 superconducting qubits. – Architecture: Full-stack quantum system integrating: ◦ Advanced quantum hardware ◦ Scalable control systems ◦ Optimized software stack – It supports hybrid computing (quantum + classical). – It uses Superconducting quantum processor.
Type-5 Diabetes	• The International Diabetes Federation (IDF) has recognised Type 5 diabetes as a form driven by malnutrition rather than excess sugar. • It is a malnutrition-related diabetes, generally affecting lean and malnourished teenagers and young adults in low- and middle-income countries. • It starts from the womb itself, leading to poor development of the pancreas. • Effect on Pancreas: The pancreatic beta cells produce very little insulin — not due to autoimmunity (as in Type 1) or insulin resistance (as in Type 2), but because the pancreas never developed fully due to chronic undernutrition. • It was first identified in Jamaica (1955) as J-type diabetes.
rt-LAMP Assay	• Indian Researchers have developed an indigenous, cost-effective and real-time LAMP (rt-LAMP) assay for early diagnosis of Tuberculosis. • rt-LAMP assay is a molecular diagnostic test for tuberculosis (TB). – rt-LAMP stands for real-time Loop-Mediated Isothermal Amplification. • It can be used to detect the bacteria Mycobacterium tuberculosis (MTB). • Advantages: – Rapid results: It can provide results within an hour. – High sensitivity and specificity: Studies have shown that rt-LAMP has high sensitivity and specificity, when compared to traditional methods like smear microscopy. – Cost-effectiveness: rt-LAMP is less expensive than other molecular tests like GeneXpert and it doesn't require sophisticated equipment, making it suitable for resource-limited settings.
STELLAR Model	• Recently the Central Electricity Authority launched STELLAR model for bringing efficiency in the power transmission sector. • It is a next-generation indigenously developed resource adequacy model for integrated planning of power generation, transmission, storage and demand response. – STELLAR - State of the art Totally indigenously developed Resource adequacy model. • Developed by: Central Electricity Authority (CEA) in collaboration with The Lantau Group (TLG) and supported by the Asian Development Bank (ADB). • Purpose: To help states and power distribution companies (Discoms) to prepare annual dynamic resource adequacy plans, ensuring uninterrupted power supply. • It will be distributed free of cost to all States, DISCOMs and Load Despatchers.
Q-Shield Platform	• Recently QNu Labs has launched the world's first unified platform for quantum-safe cryptography management. • Q-Shield is the world's first unique platform designed to secure critical infrastructure using quantum-safe cybersecurity solutions. • It was launched by QNu Labs, a startup supported by the Department of Science and Technology (DST) under the National Quantum Mission (NQM).

Topic	Details
	• Qosmos – Quantum Key Generation: – It generates quantum-random keys & Ensures unpredictable and secure encryption foundations. • QConnect – Secured Connectivity: – It provides quantum-secured communication links & Protects data in transit across networks and systems. • QVerse – Secured Collaboration: – It enables secure digital collaboration and data exchange.
Vibe Coding	• Vibe coding” is a new approach to coding where users rely entirely on Large Language Models (LLMs) to generate code, without deeply engaging with its structure or technical details. • Users give a text prompt describing the kind of code they need. • The AI generates the required code. • Users copy, paste and run the code without focusing on its underlying logic. • Errors can be fixed by feeding them back into the AI.
Future Circular Collider (FCC)	• FCC is a proposed next-generation particle accelerator by CERN. It is a planned 91 km circular tunnel beneath the Swiss-French border. • FCC is expected to be completed in 2035 and will have a significantly higher energy than previous colliders. • It will succeed the Large Hadron Collider which discovered the Higgs boson in 2012. • Scientific Objectives: – Understand the Higgs Boson in greater detail. – Study fundamental forces and the nature of matter. – Explore mysteries like dark matter and antimatter asymmetry. – Go beyond the discoveries of the LHC, which found the Higgs boson in 2012.
Phenome India Project	• Phenome India-CSIR Health Cohort Knowledgebase (PI-CheCK) project was launched by the Council of Scientific and Industrial Research (CSIR) in December, 2023. • Aim: Develop India-specific risk prediction models for cardio-metabolic diseases, acknowledging the unique genetic, lifestyle and dietary patterns of the Indian population. • Sample Size: Approximately 10,000 participants, including CSIR employees, pensioners, and their spouses. • Council of Scientific and Industrial Research (CSIR) • It is India’s largest research and development (R&D) organization, established in September 1942. (HQ - New Delhi). • It operates as an autonomous body under the Ministry of Science and Technology. • The Prime Minister of India is the Ex-officio chairman of the Council of Scientific and Industrial Research.
Bharat Small Modular Reactor (BSMR)	• India has completed the concept design of Bharat Small Modular Reactor (BSMR-200 MWe). • It is jointly developed by Bhabha Atomic Research Centre (BARC) and Nuclear Power Corporation of India Limited (NPCIL). • Technical Specifications: – Type: Pressurized Water Reactor (PWR). – Power output: 200 MWe. – Fuel: Slightly enriched uranium. • It aims to deploy indigenously designed small modular reactors for energy-intensive industries and remote locations.
Technology and Innovation Report 2025	• Recently UNCTAD (United Nations Conference on Trade and Development) has released Technology and Innovation Report 2025. • It evaluates how countries are prepared for and investing in frontier technologies, including AI, robotics, IoT etc. • About India’s Performance • India has ranked 10th worldwide in private Artificial Intelligence investments. • It received \$1.4 billion in AI funding in 2023. • India & China are only developing countries with significant AI investments. • Frontier Technologies Readiness Index (2024): India has ranked 36th out of 170 countries, improving from 48th in 2022.

Topic	Details
Wet Bulb Temperature (WBT)	- The widely accepted wet-bulb temperature survival threshold of 35°C is now being reconsidered, as recent physiological studies indicate that the actual limit may be closer to 31°C. About WBT - WBT is the lowest temperature to which air can be cooled by evaporating water into it at constant pressure. - It is measured by covering a thermometer bulb with a wet cloth and letting the water evaporate. - As the water evaporates, it cools the thermometer, showing the wet bulb temperature. - This temperature helps measure humidity and understand how much water can evaporate into the air, affecting things like comfort, farming and weather patterns.
Topological Materials	- Topological materials are special materials that act like an insulator inside but like a metal on the outside. i.e. – Inside: Electricity can't flow (just like plastic or rubber). – On the surface or edges: Electricity can flow easily (like in a metal wire). - This unusual behavior is due to their “topological” properties—which means their electrical behavior is protected by the material's geometric and quantum properties, not just by its chemical composition. - These materials have surface states that are protected by topological invariants—meaning they are stable even if the material is slightly changed or has some impurities. Applications: Used in quantum computing to build more stable and error-resistant quantum bits (qubits). – Recently Microsoft has used topological materials in its quantum chip - Majorana 1.
Uranium Enrichment Using Centrifuges	- Centrifuge enrichment is a process used to increase the amount of uranium-235 (U-235) in natural uranium. - U-235 is the type of uranium needed for nuclear power plants and nuclear weapons because it can undergo fission (splitting of atoms to release energy). Working of Centrifuge - A centrifuge is a spinning machine that separates materials based on their weight. - It works on the same principle as a washing machine's spin cycle, which pushes heavier water outward and leaves lighter clothes in the center. Procedure:: Convert Uranium to Gas: Uranium is turned into a gas called uranium hexafluoride (UF₆) so it can be easily separated. Spin the Gas in a Centrifuge: The centrifuge spins at very high speeds (up to 50,000 revolutions per minute). – Heavier U-238 moves outward, while lighter U-235 stays closer to the center. Collect and Repeat the Process: The gas with more U-235 is transferred to another centrifuge for further separation. – This process is repeated many times to gradually increase the U-235 concentration.
China's Deep Sea Station	China is building the world's first permanent undersea research station in the South China Sea (SCS) to study gas hydrates. - SCS is a disputed area between China, Taiwan, Philippines, Vietnam, Malaysia and Brunei. Gas hydrates (or methane hydrates) are crystalline solids where methane gas is trapped inside a cage of water molecules. - They are found under seabeds in cold, high-pressure environments like continental slopes and permafrost. - When extracted and decomposed, they release methane, a clean-burning natural gas. - They are classified as unconventional hydrocarbons because extracting them requires advanced and non-traditional technologies. Potential Methane Hydrates reserves in India: Krishna-Godavari (KG) Basin, A&N islands.
Active Mobility	- Active mobility refers to using human-powered modes of transportation, like walking, cycling, and skateboarding, for regular travel, rather than just for recreation. - Its importance is growing due to: Increasing traffic congestion. Air pollution. Health concerns. - Rising pedestrian deaths in metro cities.

Topic	Details
CAPTCHA	• CAPTCHA stands for Completely Automated Public Turing test to tell Computers and Humans Apart. • Its purpose is to distinguish between real users and bots on the internet. CAPTCHA Working • It presents challenges easy for humans but hard for bots, such as: – Recognizing distorted text or characters. – Selecting images with objects (e.g., traffic lights, buses). • It is based on the Turing Test: A test designed to determine if a machine can mimic human intelligence.
Metallo-Nanozymes	• Recently scientists from CSIR-Central Leather Research Institute (CLRI), Chennai have developed a new metallo-nanozyme called Cu-Phen. • Metallo-nanozymes are a type of nanozyme that use metal ions (like copper, iron, etc.) to perform enzyme-like activities. – Nanozymes are artificial enzymes made from nanomaterials that display enzyme-like characteristics. – Enzymes are proteins that speed up chemical reactions in living organisms. • These artificial catalysts are used in energy, medical, and environmental applications because they are more stable, cost-effective and tunable than natural enzymes.
Vitamin D Deficiency	• According to a recent report by Indian Council for Research on International Economic Relations (ICRIER), 1 in 5 Indians suffer from Vitamin D deficiency. About Vitamin-D • It is a fat-soluble vitamin that plays a crucial role in maintaining health. It is also known as calciferol. • It helps the body absorb calcium, which is essential for building and maintaining strong bones. Sources of Vitamin-D: – Natural: It's naturally produced in the body when skin is exposed to sunlight. – Food: Oily fish (salmon, sardines, herring), red meat, egg yolks, mushrooms (especially those exposed to UV light), fortified plant-based milks etc. Vitamin D deficiency can lead to: – Rickets in children & Osteomalacia in adults. – Bone pain and increased risk of fractures. – Muscle weakness and pain.
Gestational Diabetes Mellitus	• It is a condition where high blood sugar (glucose) develops during pregnancy, in a woman who was not previously diabetic. • It is usually diagnosed between 24–28 weeks of pregnancy. • Cause: – During pregnancy, hormones from the placenta interfere with the mother's insulin usage, leading to insulin resistance. – When the body can't produce enough insulin to manage this, blood sugar levels rise, causing GDM. • Risks: – Increases chance of type 2 diabetes in the mother later in life. – Leads to metabolic disorders in the child. • Delhi Declaration on Diabetes • It provides a prevention strategy for GDM. • It was unveiled at the 18th Annual DIPSI (Diabetes in Pregnancy Study Group India) Conference held in March 2024. • It advocates screening women at eight weeks of pregnancy for glucose intolerance.
Three Gorges Antarctic Eye	• It is a 3.2-metre aperture radio and millimetre-wave telescope recently installed at Zhongshan Station, China's scientific base in Antarctica. • It's designed to observe space phenomena in radio and low-frequency millimetre wavelengths. • Neutral hydrogen spectral lines (which trace interstellar gas) • Ammonia molecular lines (important for studying star formation) • Why Antarctica - Antarctica offers near-perfect conditions for radio/millimeter astronomy:

Topic	Details
	• Extremely dry air (almost no water vapour to interfere with signals). • Clean atmosphere (very low pollution and human interference). • Stable cold temperatures (reduces noise in instruments). • But building and operating a telescope in Antarctica is a huge technical and logistical challenge due to freezing temperatures (well below -50°C) & Hurricane-force winds.
Heald Initiative	• HEALD stands for Healthy Liver Education and Alcohol-associated Liver Disease Prevention • It is a first-of-its-kind nationwide initiative aimed at tackling liver disease. • It is a multi-sectoral program combining public education, early screening, psychological and medical treatment of alcohol use disorder and liver disease management.
Ultra-Tiny Pacemaker	• Recently scientists have engineered a pacemaker smaller than a grain of rice. About Pacemaker • A pacemaker is a small medical device that helps the heart beat at a normal rate. • It sends electrical signals to the heart muscles when the heartbeat is too slow, irregular or has stopped. • Pacemakers are used in people with heart conditions such as bradycardia (slow heart rate), especially after surgery or in infants with congenital (from birth) heart disease.  About Newly discovered Pacemaker • It is smaller than a grain of rice. • It is 2.5 times smaller than the previous smallest pacemaker created by Oklahoma University. • It can be injected directly into the heart using a needle — no surgery is needed. • Traditional temporary pacemakers require open-heart or endovascular surgery to put in and later remove the device. Key Features: • It is made of Bioresorbable Materials, it naturally dissolves in the body after a certain time. So, there is no need to remove it after use. • No Battery or External Power Source (Self powered): • The pacemaker has two electrodes at the bottom. • These electrodes interact with the body's fluids (like blood) to produce electricity — similar to a small chemical battery. • It is controlled by an external patch. The patient wears a small patch on the chest (outside the body) which monitors the heart rate.
DSLIG evaporator	• Scientists at IIT Bombay have created a new material to clean salty water called DSLIG (Dual-Sided Superhydrophobic Laser-Induced Graphene). • DSLIG is made from two polymer layers: – PVDF (Polyvinylidene fluoride) – hydrophobic. – PES (Polyether sulfone) – provides mechanical stability. • Graphene layer is engraved on PVDF using laser-induced technology. • This makes the surface superhydrophobic (like a lotus leaf). It repels water on both sides. • Lotus Effect (Superhydrophobicity): It is inspired by lotus leaves. – Prevents water droplets from spreading—droplets roll off the surface. – It helps prevent salt crystal deposition, which is a major issue in traditional desalination. • Working Principle: Interfacial Evaporation: Evaporator is placed on the water surface. It heats a thin layer of water at the interface → reduces heat loss vs heating full water volume. – Dual Heating Mode: ◦ It uses solar energy (low carbon footprint) and also supports electric heating via Joule effect. ◦ This ensures consistent performance on cloudy days or at night. • Thermal Desalination Technique: Saline water is heated and the resulting water vapor is condensed to produce freshwater. These techniques mimic the natural water cycle. • Membrane-Based Desalination Techniques: In this method semi-permeable membrane is used to filter out dissolved salts and impurities from saline or brackish water by applying pressure or electric potential.

Topic	Details
Text Neck	- According to a recent study 79% of individuals aged 18 to 44 have their phones with them almost constantly, spending only 2 hours per day without them. About Text Neck Text neck is a repeated stress injury and pain syndrome resulting from excessive use of handheld devices (like smartphones or tablets) in a head-down position for prolonged periods. - It is common among people who frequently use mobile devices without proper posture or breaks. Symptoms of Text Neck: Headaches, Neck stiffness, Shoulder pain, Reduced muscle strength, endurance and cervical mobility. 
Lipids	According to a new study from the CSIR-Centre for Cellular and Molecular Biology (Hyderabad) lipids—fats in cells—also guide evolution by interacting closely with proteins, especially in cell membranes. Lipids are fats that make up a major part of cell membranes. - They form the outer layer of cells, known as the cell membrane, along with proteins. - They are essential for various functions in living organisms, including energy storage, insulation etc. - Lipids are insoluble in water but soluble in non-polar solvents. Types of Lipids: – Triglycerides (Fats and Oils): Major form of stored energy. – Phospholipids: Form the main structural component of cell membranes. – Steroids: Include cholesterol, which is a precursor to hormones. – Waxes: Found in plant cuticles and animal skin Lipids differ in plants and animals: – Plant lipids have kinkier tails due to polyunsaturated fatty acids → offer more flexibility. – Animal lipids are straighter → more rigid structure.
Mayonnaise	- The Tamil Nadu government has banned the manufacture, storage, distribution and sale of mayonnaise made using raw eggs, citing public health risks. - It is a semi-solid emulsion made of: Egg yolk, Vegetable oil, Vinegar & Other seasonings Egg yolk protein acts as an emulsifier, blending oil and water. - It is widely used in fast foods. Risk of Bacterial Contamination: – Raw eggs are not heat-treated, so pathogens remain inside. – It is a High-risk food due to potential microbial contamination, especially in hot and humid climates like India. Main Pathogens of Concern: Salmonella & E. coli.
Quantum Gravity Gradiometer	- NASA scientists have proposed deploying a Quantum Gravity Gradiometer (QGG) onboard a satellite in low-Earth orbit to detect minute gravitational variations on Earth. About QGG - It is a highly-sensitive instrument that can detect minute variations in Earth's gravitational field by using the principles of quantum mechanics. Key Components of QGG: - Ultra-cold atoms (usually rubidium or cesium). - Laser optics to manipulate atoms. - Vacuum chambers. - Atomic clocks for timing and synchronization. Potential Applications: - Subsurface exploration (minerals, groundwater). - Tectonic movement and fault detection. - Climate science (ice melt, water redistribution). - Aquifer Mapping.

Topic	Details
ISRO's Next-Generation Launch Vehicle (NGLV) Soorya	- ISRO has initiated the design process for its Next-Generation Launch Vehicle (NGLV) Soorya. - ISRO plans to develop two versions of NGLV Soorya: – Low Earth Orbit (LEO) version. – Geosynchronous Transfer Orbit (GTO) version. Specifications of NGLV: - NGLV is a three-stage partially reusable Heavy-lift launch vehicle. - It will have a reusable first stage, which would be utilised 15 to 20 times, to make the launches more affordable. (Remember - Not Fully Reusable). - NGLV will have semi-cryogenic propulsion (refined kerosene as fuel with liquid oxygen (LOX) as oxidiser) for the booster stages. Payload capacity: - Low Earth Orbit (LEO) - 23.4 tonnes & Geosynchronous Transfer Orbit (GTO) - 9.6 tonnes. - Recoverable payload capacity of 14.8 tonnes to LEO and 5.5 tonnes for GTO.
Soyuz Aircraft	- Recently Soyuz spacecraft safely delivered an American astronaut and two Russian cosmonauts to the International Space Station (ISS). About Soyuz Aircraft - It is a Russian spacecraft that has been used since the 1960s to transport astronauts and cosmonauts to and from space. - The Soyuz programme is the longest operational human spacecraft programme in the history of space exploration. - Its first crewed flight into space was on 23 April 1967. - It can carry up to three astronauts. - It is made up of 3 modules: Orbital Module, Service Module & Descent Module. 
K218b Exoplanet	- Recently scientists have detected dimethyl sulphide (DMS) and dimethyl disulphide (DMDS) in the atmosphere of the exoplanet K2-18b. - The detection was made by a research team from the University of Cambridge using data from the James Webb Space Telescope (JWST). - These gases are potential biosignatures — substances that (on Earth) are linked to biological activity. - On Earth these gases are produced through: – Metabolic processes of microorganisms. – Decay of small plant-like organisms in the oceans (e.g., phytoplankton). - This is the first time these gases have been detected outside our solar system. - It is located around 120 light years from Earth. Host Star: It orbits a red dwarf star that is smaller and cooler than the Sun. - It lies within the “habitable zone” — the region around a star where liquid water can exist. Past Observations: – 2019 (Hubble): Detected water vapour in the atmosphere. – Previous JWST Data: Detected methane and carbon dioxide — both also linked to potential biological processes.

HISTORY, ART & CULTURE

TOPICS FOR MAINS

Rock and Pillar Edicts of Ashoka: Messages that Shaped a Civilization

Syllabus Mapping: GS-I- History, Art & Culture

Context

The Ashokan Edicts have been included in UNESCO's Tentative Heritage List.

Ashokan Edicts

- The Edicts of Ashoka are a collection of more than thirty inscriptions on the pillars, as well as boulders and cave walls, attributed to Emperor Ashoka (268 BCE to 232 BCE) of the Mauryan Empire.
- They are categorized into four groups based on their dimensions (Minor or Major) and the medium of their inscription (Rock or Pillar).
- There are 14 Major Rock Edicts, 7 Pillar Edicts and numerous minor rock inscriptions.



Characteristic Features of Ashokan Edicts

- **Authorship:** Most of Ashoka's edicts do not explicitly mention his name; instead, titles like "Devanampriya" (Beloved of the Gods) and "Priyadasi" (He who looks with kindness) are used.
 - The connection between these titles and Emperor Ashoka was later established through textual sources like the Dipavamsa.
- **Family References:** Among his family members, only Queen Kuruwaki and his son Teevar are directly named in the inscriptions.
- **Language:** The edicts are written in the Prakrit language and Brahmi script, and occasionally in the Kharosthi script (in the northwestern parts of the subcontinent).

- **Geographical Spread:** They are dispersed across contemporary India, Afghanistan, Nepal, and Pakistan.
 - Ashoka's earliest known inscription was at Shar-iKuna near Kandahar Bilingual Rock Inscription, dated to 260 BC and inscribed in both Greek and Aramaic.
- **Moral Messaging:** A significant feature of the edicts is their focus on "Dhamma," a concept rooted in moral and ethical conduct, compassion, non-violence, and respect for all life.
- **Administrative Instructions:** The edicts also contain orders to officers, guidelines for public welfare, and mechanisms for justice and equity.
- **Chronological Development:** Chronologically, the minor inscriptions tend to precede the larger ones, while rock inscriptions generally seem to have been started earlier than the pillar inscriptions.

Major Rock Edicts of Ashoka

- The 14 Major Rock Edicts are spread across various parts of India and were inscribed primarily on large natural rock surfaces, with the Kandahar Edict being the only one written on a stone plaque.
- These edicts were deliberately placed along the borders of the Mauryan Empire rather than in its central capital, indicating Ashoka's intent to communicate with distant provincial populations.
- The edicts were composed in three languages—Prakrit, Aramaic, and Greek, and employed two scripts—Brahmi and Kharosthi, reflecting the empire's vast cultural and linguistic diversity.
- Ashoka's major rock edicts are found in sets of 14 at ten locations.

Rock Edict	Details
Kandahar (Afghanistan)	• Talks about Ashoka's Dhamma • Bilingual-inscribed in Aramaic and Greek Languages • Considered to be the earliest of Ashoka's major rock inscriptions. • Presently only portions of rock edicts 12 and 13 are left which talk about Kalinga war and how it change Ashoka
Shahbaz Garhi (Pakistan)	• Written in Kharosthi script, from the right to the left. • All 14 edicts written on 2 large rocks
Mansehra (Pakistan)	• Engraved on three large boulders. • Written from right to left in Kharosthi script • Talks about expansion of Buddhism & Ashoka's Dhamma.
Kalsi (Uttarakhand)	• Located in Dehradun district, at the confluence of Yamuna and Tons rivers. • Only site in north India with all 14 edicts • Names of 5 Greek kings mentioned • Engraving of a royal elephant is present • Kalsi is associated with Buddhism's spread to Tibet
Girnar / Junagarh (Gujarat)	• Site also has inscriptions of Rudradaman I & Skandagupta • 14 edicts of Ashoka are written in Brahmi script, Pali language • Considered the oldest among multiple inscriptions at site
Sopara (Maharashtra)	• Sopara used to be an ancient port city known as Shurparaka. • In the mid third century BCE, Emperor Ashoka sent one of his missionaries, Dhammarakshita, to Sopara to spread Buddhism in Western India. • The Ashoka's edict at Sopara is in Brahmi script.
Dhauili (Odisha)	• Situated in Puri district, Odisha, the site once belonged to the ancient kingdom of Kalinga • The Ashokan inscription is carved high up on a rock, which also features a prominent rock-cut elephant sculpture. • At this location, Separate Rock Edicts I and II appear in place of Major Rock Edicts 11 to 13. • The site is believed to be Tosali, an important city referenced by Ptolemy as a major urban center. • Located close to the Kosala Ganga, a sacred water body, the area also evolved into a significant religious hub over time.

Rock Edict	Details
Jaugada (Odisha)	- Located on the northern bank of the Rishikulya River in Ganjam district, Jaugada was part of the ancient Kalinga kingdom, as confirmed by Separate Rock Edicts I and II - These edicts are specifically addressed to the Mahamattas (officials) of Samapa, believed to be a Mauryan-era town - The remains of a fortified settlement suggest Jaugada was a significant urban and military center. - Its proximity to the sea also indicates that it likely served as a regional trade hub.
Yerragudi (Andhra Pradesh)	- The inscriptions are in Prakrit language and Brahmi script, with Ashoka referred to as “Piyadasi” and “Devanampriya” (Beloved of the Gods). - Carved across nine rock surfaces, these edicts emphasize moral values such as: – Obedience to parents and elders – Kindness to all living beings – Truthfulness – Promotion of dharma – Prohibition of animal sacrifice - They also record welfare measures, like planting trees and digging wells for the benefit of both humans and animals.
Sannati (Karnataka)	- Located on the banks of the Bhima River, Sannati gained prominence with the discovery of a Buddhist stupa and the first inscribed portrait of Ashoka, referred to as “Raya Ashoka.” - The site contains Major Rock Edicts, including Separate Edicts I and II, and fragments of Edicts XIII and XIV - The edicts are all in Prakrit language and Brahmi script. - Sannati is identified with Suvarnagiri, one of the four provincial capitals of the Mauryan Empire. - It is also home to the Chandralamba Temple

Minor Rock Edicts

- Minor Rock Edicts are found at smaller, less prominent sites and generally present messages similar to the Major Rock Edicts, but in a more concise format.
- In the eastern regions, the edicts are written in Magadhi Prakrit using the Brahmi script.
- In the northwest, they appear in Prakrit with the Kharosthi script, and a few are also found in Greek and Aramaic.
- Ashoka refers to himself as “Devanampiya” (Beloved of the Gods) in only four locations: Maski and Brahmagiri, Gujjara, and Nettur.
- These early inscriptions emphasize Ashoka’s personal dedication to promoting Dhamma and ethical governance.

Site	Location	Site	Location
Sasaram	Bihar	Paligunda	Karnataka
Rupnath	Madhya Pradesh	Rajula Mandagiri	Andhra Pradesh
Bairat	Rajasthan	Gujjara	Madhya Pradesh
Brahmagiri	Karnataka	Bahapur	Delhi
Siddapura	Karnataka	Panguraria	Madhya Pradesh
Jatinga-Rameshwara	Karnataka	Nittur	Karnataka
Maski	Karnataka	Udaegolam	Karnataka
Erragudi	Andhra Pradesh	Ratanpurwa	Uttar Pradesh
Gavimath	Karnataka	Ahaura	Uttar Pradesh

Pillar Edicts

- Ashoka’s pillar edicts are engraved on highly polished sandstone pillars, often with beautiful animal capitals, such as the lion capital at Sarnath

- These inscriptions are brief and focused, highlighting Ashoka's embrace of Buddhism and his efforts to spread the principles of Dhamma.
- There are seven major pillar edicts, composed in Prakrit
- These edicts were issued toward the latter part of Ashoka's reign.
- Except for two fragmented inscriptions discovered in Afghanistan, all of Ashoka's Major Pillar Edicts are situated in the Gangetic plains region of India. The locations include:
 - Allahabad - Kosam Pillar Edict – Located in Uttar Pradesh
 - Queen's Edict (also at Allahabad) – Located in Uttar Pradesh
 - Lauriya-Araraj Pillar Edict – Located in Bihar
 - Lauriya-Nandangarh Pillar Edict – Located in Bihar
 - Delhi-Meerut Pillar Edict – Located in Delhi
 - Delhi-Topra Pillar Edict – Located in Delhi
 - Sanchi Pillar Edict – Located in Madhya Pradesh
 - Rampurva Pillar Edict – Located in Bihar

7 Pillar Edicts of Ashoka

Edict	Description
Pillar Edict I	Stresses Ashoka's responsibility to protect and support his subjects.
Pillar Edict II	Defines Dhamma through values like virtue, kindness, generosity, truthfulness, and inner purity.
Pillar Edict III	Urges avoidance of negative traits such as cruelty, arrogance, and anger.
Pillar Edict IV	Details the role of Rajukas (officials) sent every five years to promote Dhamma across regions.
Pillar Edict V	Specifies animals and birds not to be harmed on certain days and mentions freeing 25 prisoners.
Pillar Edict VI	Outlines the state's Dhamma policy focused on the well-being of the population.
Pillar Edict VII	Summarizes Dhamma efforts and promotes self-discipline and mental purity; only on Delhi-Topra pillar.

Significance of Ashokan Edicts

- **Historical Significance:** Ashokan edicts are recognized as the earliest written records in India after the fall of the Harappan civilization.
 - The decipherment of the Brahmi script used in most of the edicts was a crucial milestone in understanding ancient Indian history.
- **Source of Studying Ashoka's Reign:** The edicts confirm the identity of Emperor Ashoka, establish the timeline of his reign.
 - They also provide tangible evidence of the Mauryan Empire's extent, its administrative practices, and the early spread of Buddhist ideas.
- **Proclamation of Dhamma:** They articulate Ashoka's concept of Dhamma→ through these, Ashoka encouraged moral practices such as compassion, generosity, non-violence, truthfulness, and tolerance among his subjects.
- **Testimony of Good Governance:** Ashoka's attempt to communicate directly with his people through inscriptions carved in public spaces and along trade routes was a revolutionary method of governance in ancient times.
- **Architectural value:** The pillars and inscriptions also reflect the advanced craftsmanship of the Mauryan period, especially the finely carved animal capitals that crown several of the pillars.
- **Diplomacy:** The edicts demonstrate Ashoka's involvement in international diplomacy. The Edict XIII, mentions diplomatic missions sent to Hellenistic rulers like Antiochus and Ptolemy.
- **Archaeological and Epigraphic Importance:** The edicts help historians in reconstructing ancient history and validating the content of traditional literary sources.

TOPICS FOR PRELIMS

UNESCO's Memory of the World Register

Context

The Shrimad Bhagavad Gita and Bharat Muni's Natyashastra have been inscribed in UNESCO's Memory of the World Register.

About Memory of the World Register

- The Memory of the World Programme was established by UNESCO in 1992.
- It is a list of documents that hold global significance in terms of history, culture or social impact.
- **Aim:** Preservation and accessibility of the documentary heritage of humanity (manuscripts, oral traditions, audio-visual materials, library and archive holdings, etc.).
- **Total number of inscribed collections - 570.**
- With the inclusion of the Gita and Natyashastra, India now has 14 entries in Unesco's Memory of the World Register.

About Shrimad Bhagavad Gita

- It is a philosophical discourse that occurs on the battlefield of Kurukshetra, where Arjuna faces moral and emotional conflict before a war.
- It contains 700 verses in 18 chapters, and is embedded within the Bhīshmaparva (adhyāya 23-40) of the epic Mahabharata.
- It was written by Maharishi Vedvyas Ji.

About Natyashastra

- It is a foundational guide to Indian theatre, poetics, aesthetics, dance and music.
- It lays down an elaborate framework for various art forms, covering nāṭya (drama), abhinaya (performance), rasa (aesthetic essence), bhāva (emotion), and saṅgīta (music).
- It was written by **Bharat Muni**.
- It is also known as Nāṭyaveda or Gāndharvaveda, and the fifth veda.
- It comprises 36,000 verses, believed to be derived from an oral tradition.

Ramakien Murals

Context

Thailand has issued a special stamp based on 18th-century Ramayan mural paintings during Prime Minister Narendra Modi's recent visit.

About Ramakien Murals

- Ramakien Murals are an iconic artistic representation of Thailand's national epic, the Ramakien, which is derived from the Indian Ramayana.

- They depict the legendary battle between Raam & Ravana (Totsakan).



- The murals are located at the Temple of the Emerald Buddha (Wat Phra Kaew) within the Grand Palace, Bangkok, Thailand.
- They are considered one of the most extensive mural paintings in the world, covering the inner walls of the cloister surrounding the temple.
- The murals were originally painted during the reign of King Rama I (1782-1809), when the Grand Palace was constructed.



Kannadippaya

Context

Kannadippaya (Mirror Mat), a unique tribal handicraft from Kerala, has received the Geographical Indication (GI) tag.

About Kannadippaya

- It is the first tribal handicraft product from Kerala to receive the GI tag.
- It is made from the soft inner layers of reed bamboo.
- Unique Properties of Kannadippaya:
 - Acts as a natural insulator:
 - Keeps warm in winter.
 - Provides a cooling effect in summer.
- Eco-friendly and sustainable, aligning with global demand for natural products.

Tipitaka

Context

The Prime Minister of Thailand has gifted a copy of Tipitak in Pali language to the Indian Prime Minister during his recent visit.

About Tipitaka/ Tripitaka

- It is the canonical scripture of Theravāda Buddhism, containing the teachings of Lord Buddha.
- **Structure of the Tripitaka (Three Baskets):**
 - **Vinaya Pitaka:** It contains rules and conduct for monks and nuns.
 - **Patimokkha** – a code of monastic discipline, is part of Vinaya Pitaka.
 - **Sutta Pitaka:** It contains the teachings and sermons of the Buddha.
 - Divided into 5 Nikayas (collections): Digha Nikaya, Majjhima Nikaya, Samyutta Nikaya, Anguttara Nikaya, Khuddaka Nikaya.
 - **Abhidhamma Pitaka:** It contains philosophical and psychological analysis of Buddha's teachings.

Theravāda Buddhism

- Also known as the “Way of the Elders” or “Doctrine of Elders”, Theravada is the oldest surviving Buddhist tradition.
- Theravada Buddhism is strongest in Sri Lanka, Cambodia, Thailand, Laos and Burma (Myanmar). It is sometimes called ‘Southern Buddhism’.
- **Characteristics**
 - Theravāda Buddhism follows a conservative path, upholding orthodox teachings (pariyatti) and strict monastic discipline (Vinaya).
 - The goal is nirvāna, or liberation from suffering (samsāra) and mental afflictions (kleshas), through the Noble Eightfold Path, which includes:
 - Samatha (calming the mind)
 - Vipassanā (insight into impermanence, suffering, and non-self)

– Its core principles include:

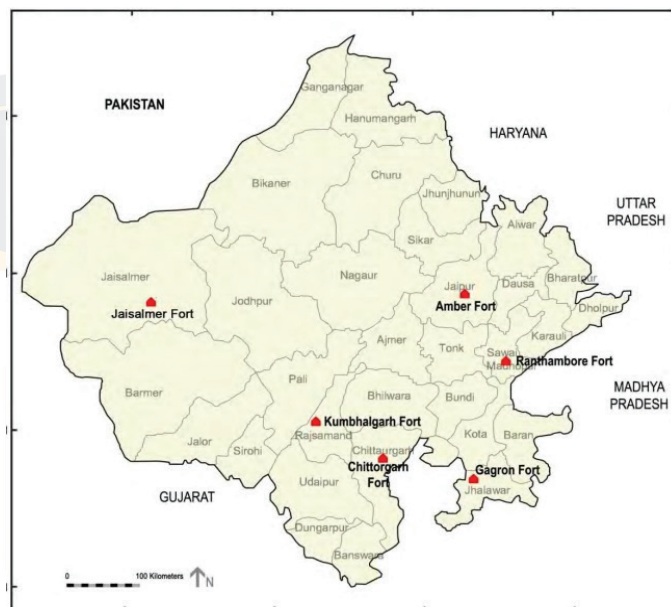
- Vibhajjavāda – emphasis on analytical reasoning and personal experience
- Visuddhimagga – a key text by Buddhaghosa detailing the seven stages of purification (satta-visuddhi)

– In Theravāda, an Arhat is one who has attained full enlightenment and nirvāna, unlike Mahāyāna, where the Arhat is seen as still progressing on the path.

Chittorgarh Fort

Context

Rajasthan Govt. is considering a complete mining ban within 10 km of Chittorgarh Fort.



About Chittorgarh Fort

- It is located in Chittorgarh city, Rajasthan. It is one of India's largest forts.
- It was built by local Mori Rajput ruler - Chitrangada Mori in 7th century A.D.
- It was captured by the Mewar rulers in 728 CE. It later served as their capital.
- It has witnessed numerous sieges and battles, including those against Alauddin Khilji (1303), Bahadur Shah (1533) and Akbar (1567-1568).
- The fort is associated with the legendary figure of Rani Padmini and the concept of Jauhar.
- It is one of the Hill Forts of Rajasthan that was declared a UNESCO World Heritage Site in 2013.
- Notable monuments inside:
 - Vijay Stambh (Tower of Victory).
 - Kirti Stambh (Tower of Fame).

Hill Forts of Rajasthan

- Hill Forts of Rajasthan includes six majestic forts in Chittorgarh, Kumbhalgarh, Sawai Madhopur, Jhalawar, Jaipur and Jaisalmer.
- They reflect the elaborate, fortified seats of power of Rajput princely states that flourished between the 8th and 18th centuries and their relative political independence.

Fort	Details
Kumbhalgarh Fort	- Located in the district of Rajsamand. - It controlled the key border crossing between the Mewar and the Marwar territories. - The initial walls were constructed in the 13th century AD. - Their current planning reflects the ideas of the Rana Kumbha (1433-1468), the ruler of Mewar state
Jaisalmer Fort	- It is also known as sonar quila. - It was built in 1156 by rawal ruler Jaisal. - The extensive township contained within it from the outset, still inhabited today.
Amber Fort	- It sits atop the Cheel ka Teela (Hill of Eagles) of Aravalli range. - Amer was the capital city of Rajput clan Kachwaha, which rose to power during the middle ages. - It was first occupied as their fortified citadel in the eleventh century. - The town of Amer and the Amber Fort were originally built by Raja Man Singh and additions were, later, made by Sawai Jai Singh
Ranthambore Fort	- Ranthambore Fort lies within the Ranthambore National Park, near the city of Sawai Madhopur. - It is widely believed that the construction of the Ranthambore Fort was started during the reign of the Chauhan rajput King Sapaldaksha in 944 AD and came into existence when Chauhans came here and made it their capital. - But the actual fame of Ranthambore came when the most known ruler of this period Raja Hammir Dev was crowned in 1283 AD.
Gagron Fort	- It is a hill and water fort and is situated in Jhalawar district. - The fort was built by Bijaldev Singh (a Rajput king) of the Parmar Empire in the twelfth century. - The fort is constructed on the confluence of Ahu River and Kali Sindh River.

Palmyra City, Syria

Context

The Syrian civil war has severely impacted Palmyra, resulting in the destruction of several important historical monuments.



About Palmyra City

- Palmyra is an ancient city in south-central Syria situated in an oasis within the Syrian desert.
- It contains the monumental ruins of a great city that was one of the most important cultural centres of the ancient world.
- It is an important center of trade and culture, blending Greco-Roman architectural styles with local traditions and Persian influences.
- It was designated as a UNESCO World Heritage Site in 1980.
- Important Architecture of the city: Temple of Bel, Grand Colonnade & Roman Theater.

UNESCO World Heritage Site Status

The 1972 Convention concerning the Protection of the World Cultural and Natural Heritage maintains a list of the preservation of both, the natural sites and cultural heritage sites.

Criteria for Selection of UNESCO World Heritage Sites

General Requirement

- Sites must have “outstanding universal value” and meet at least one of the ten criteria.

Cultural Sites

1. Masterpiece of human creative genius.
2. Important interchange of human values (architecture, arts, town-planning, etc.).
3. Unique or exceptional testimony to a cultural tradition or civilization.
4. Outstanding example of historical building/architecture/landscape.
5. Examples of traditional human settlement or land/sea use under threat.
6. Associated with events, traditions, ideas, or artistic/literary works of universal significance.

Natural Sites

1. Superlative natural phenomena or exceptional natural beauty.
2. Outstanding example of **Earth's history or geological features**.
3. Outstanding example of ecological and biological processes.
4. Important **habitats for biodiversity conservation**, including threatened species.

Additional Considerations

- Must meet **authenticity, integrity, and management** requirements.
- Since 1992, **cultural landscapes** recognize people-nature interactions.

Mahabodhi Temple Complex

Context

Buddhists across the country joined protests after monks at the Mahabodhi Temple were forcibly removed by police.

About Mahabodhi Temple Complex

- The Mahabodhi Temple in Bodhi Gaya, Bihar, is one of the most sacred sites in Buddhism, marking the place where Gautam Buddha attained enlightenment.
- It is a UNESCO World Heritage Site.
- It was originally built by Emperor Ashoka (3rd century BCE) & Later expanded by the Gupta rulers (4th–6th century CE).
- It is located on the banks of the Niranjana River, also known as Phalgu River.
- Other Shrines in the Complex:
 - Bodhi Tree: The descendant of the original Bodhi tree under which Buddha meditated.
 - Vajrasana (Diamond Throne): A stone platform where Buddha meditated for seven days after enlightenment. It was built by Emperor Ashoka.
 - Chankramana Path (Buddha's walking path).
 - Animesh Lochana Chaitya (where Buddha spent a week in deep contemplation).
 - Sacred Lotus Pond

Mahatma Jyotiba Phule

Context

Indian Prime Minister paid tribute to social reformer Mahatma Jyotirao Phule on his birth anniversary.

About Mahatma Jyotiba Phule

- He was born on 11th April, 1827 in Satara District, Maharashtra in a Hindu Mali caste family.
- He was a prominent social reformer, thinker and activist in 19th-century India.
- He dedicated his life to fighting against caste-based discrimination and advocating for the rights of marginalized communities.
- Social reformer Vithalrao Krishnaji Vandekar honoured Jyotirao Phule with the title "Mahatma".
- First Girls' School in India (1848): Founded with wife Savitribai Phule.
 - He also opened night schools for Workers and Farmers.
- **Satyashodhak Samaj:**
 - On 24 September 1873, Phule formed Satyashodhak Samaj to focus on rights of depressed groups such as women, the Shudra and the Dalit.
 - Through this samaj, he opposed idolatry and denounced the caste system.
 - Samaj also campaigned for the spread of rational thinking and rejected the need for priests.
- **Important Literature by Jyotiba Phule:**
 - Gulamgiri - Critiqued the caste system and the exploitation of lower castes.
 - Shetkaryacha Aasud - It highlighted the plight of farmers and advocated for land reforms.
 - Tritiya Ratna (Drama), Satsaar (Journal).

Sir Shankaran Nair

Context

On the 106th anniversary of the Jallianwala Bagh massacre (13 April 1919), the Indian Prime Minister highlighted Shankaran Nair's bold legal resistance against the British Empire.

About Sir Shankaran Nair

- **Sir Chettur Sankaran Nair (1857–1934)** was a prominent: Judge, Nationalist leader & Social reformer.
- He was born in 1857 in Mankara village, Palakkad district (Kerala) in an aristocratic family.
- In 1897, he became the youngest president of the Indian National Congress. (Youngest at that time)

- In 1908, he was appointed as a permanent judge of Madras High Court.
 - His famous judgments:
 - Budasna v Fatima (1914), he ruled that those who converted to Hinduism could not be treated as outcastes.
- He played a key role in the Montagu-Chelmsford Reforms (1919), which increased Indian participation in administration.
- He resigned from the Viceroy's Council in protest after the Jallianwala Bagh massacre.
- In his book "Gandhi and Anarchy" (1922), he criticized Gandhi's methods of non-violence and civil disobedience.
- He is most remembered for:
 - His strong stand against British colonial atrocities, especially after the Jallianwala Bagh massacre (1919).
 - His landmark legal battle against British official Michael O'Dwyer in a defamation case in England.

News in short

Topic	Details
Wat Pho temple	• During his recent visit to Thailand, Prime Minister Narendra Modi visited Wat Pho Temple. • Wat Phra Chetuphon Wimon Mangkhalaram Rajwaramahawihan, popularly known as Wat Pho, is a buddhist temple located in Rattanakosin Island, Bangkok. • It was built in the 16th century as a monastery and was restored in 1788 by King Rama-I, who established Bangkok as the capital of Thailand. • The temple is famous for the gigantic Reclining Buddha statue which depicts Buddha entering Parinirvana. • It has the largest collection of Buddha images in Thailand and is the country's oldest centre for public learning.
Sarhul Festival	• Sarhul is one of the most important festivals celebrated by Adivasi communities in Jharkhand and the larger Chhotanagpur region. – Sarhul means "worship of the Sal tree." • It marks the arrival of the new year and the spring season. It also symbolizes the union of the Sun and the Earth. • The festival is observed for three days in Sarna Sthals, sacred groves found in Adivasi villages across Jharkhand, Chhattisgarh, Odisha and Bihar. • Tribes that Celebrate Sarhul: Oraon, Munda, Santal, Khadia and Ho tribes.
Bihu Dance	• Bihu is a traditional folk dance of Assam. • It is performed during the Rongali Bihu festival (also called Bohag Bihu), which marks the Assamese New Year and the arrival of spring. • Bihu festivals are celebrated three times a year: Bohag Bihu (Spring), Magh Bihu (Winter) and Kongali Bihu (Autumn). • It is performed by young men and women. • Currently Bihu is not a part of "UNESCO List of Intangible Cultural Heritage".
Cradle of Humankind	• Recently Cradle of Humankind caves were reopened to the public after being closed for three years due to flooding. • It is a UNESCO World Heritage Site (declared in 1999), located in Johannesburg, South Africa. • It is called the "Cradle of Humankind" because it provides critical evidence about human evolution. It has provided some of the oldest hominin fossils. • There are over a dozen limestone cave sites within this region. • Important Sites: • Sterkfontein, Swartkrans, Kromdraai, Makapan Valley and Rising Star Cave (location of the Homo naledi).