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GEOGRAPHY, ENVIRONMENT & DISASTER MANAGEMENT

TOPICS FOR MAINS (GEOGRAPHY)

When the Wells Run Dry: On Water Scarcity in India

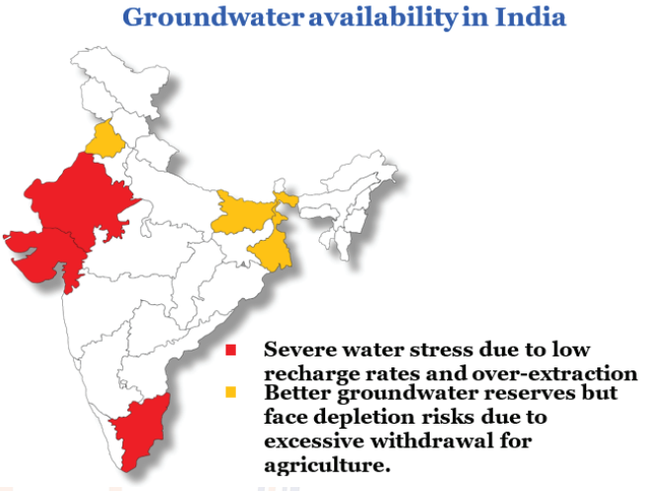
Syllabus Mapping: GS-1 Geography, GS-III Environment

Context

A recent WELL Labs (Chennai) study in the Upper Arkavathy watershed (near Bengaluru) revealed a significant decline in groundwater levels in Aralumallige and Doddathumakuru gram panchayats, attributed to intensive farming.

Status of Water Scarcity in India

- The global urban population facing water scarcity is projected to increase from 933 million in 2016 to 1.7-2.4 billion people in 2050, with India projected to be the most severely affected. (The United Nations World Water Development Report 2023)
- India's per capita water availability is around 1,100 cubic meters (m3), well below the internationally recognized threshold of water stress of 1,700 m3 per person, and dangerously close to the threshold for water scarcity of 1,000 m3 per person. (World Bank).



Causes of Water Scarcity in India

- **Climate Change:** have altered rainfall and caused glacier melt, leading to floods, droughts, and water shortages in regions like the Himalayas.
  - E.g., Erratic monsoons in central India and retreating glaciers in the Himalayas are threatening river systems like the Ganga and Brahmaputra.
- **Water Pollution:** The contamination of water bodies due to untreated industrial effluents, agricultural runoff, and domestic sewage severely affects water quality and availability for human use.
  - Urban areas, which house only 30% of India's population, contribute to 70% of the country's water pollution.
- **Urbanization:** Concrete expansion reduces rainwater infiltration and depletes groundwater; urban growth also leads to the loss of water bodies.
  - E.g., Cities like Bengaluru and Hyderabad have lost a majority of their natural lakes due to real estate development.
- **Demand–Supply Gap:** India's growing population and uneven distribution of water resources have widened the gap between rising demand and limited, poorly managed water supply.
  - While India has 18% of the world's population, it possesses only 4% of the global freshwater resources.
- **Agricultural Practices:** Agriculture in India consumes nearly 85% of the total freshwater, but continues to rely on inefficient flood irrigation methods and water-intensive crops in water-stressed regions.
  - E.g., Sugarcane, a highly water-intensive crop, is widely cultivated in Maharashtra, a state frequently facing drought.
- **Industrial Water Use:** Though industries use only 5–8% of India's water, their concentrated demand in specific regions exacerbates local water stress. Thermal power plants alone consume nearly 88% of this industrial water usage.
  - E.g., Bottled water and beverage plants, like those of Coca-Cola in Uttar Pradesh and Tamil Nadu, have come under criticism for deep groundwater extraction in already water-scarce zones (CSE Report).

Impact of water scarcity

Economic impacts:

- **Economic Cost: agriculture and industry sectors**. E.g., In 2019, water crisis affected over 600 million people and caused an estimated loss of $14 billion to the country's GDP (NITI Aayog, 2018).

- **Increased production costs and loss of business opportunities**. E.g., in 2018, Coca-Cola was forced to shut down its plant in Kerala due to water scarcity, resulting in a loss of $34 million (Reuters, 2018).

Ecological impacts:

- **Environmental degradation**, including the depletion of groundwater resources, reduced water availability for ecosystems, and increased pollution of water sources.
  - E.g., excessive groundwater pumping in the Ganga basin has led to a decline in groundwater levels and the drying up of surface water sources, such as the Ganga River itself (India Water Portal, 2019).
- **Negative impact on biodiversity and ecosystem services**, affecting the survival of wildlife and the provision of essential services such as pollination and nutrient cycling (IUCN, 2019).

Social impacts:

- Disproportionately **affects marginalized communities** such as rural populations, women, and the poor, who are more dependent on agriculture and natural resources for their livelihoods. E.g., 63 million people in rural India lack access to clean water, and 84 million lack access to improved sanitation facilities (WaterAid India, 2020).
- **Conflicts and tensions between different communities**, especially in areas where water resources are scarce.
- **Women** are disproportionally affected by water scarcity. E.g., rural women in Rajasthan walk over 2.5 kilometers to reach a water source (NCW).
- The **per capita water availability** has declined further to 1486 cubic meters in the year 2021 from 1816 cubic meters and 1545 cubic meters in 2001 and 2011 respectively (Ministry of Jal Shakti)

Political impacts:

- Conflicts and disputes between different states and regions.
  - E.g., the sharing of water resources between states like Karnataka, Tamil Nadu, and Andhra Pradesh has been a longstanding issue
- Threat to national security, as it can lead to political instability and social unrest, especially in regions with a history of conflict and insurgency.
  - E.g., , in the state of Jammu and Kashmir, water scarcity has been identified as a key driver of social and political unrest (The Diplomat, 2017).

Measures taken by the Government

- **Atal Bhujal Yojana:** It is a World Bank assisted central sector scheme, with a goal of community-led sustainable groundwater management.
- **Bhu Neer Portal**: An initiative by the Central Ground Water Authority (CGWA), it is a digital platform designed to facilitate efficient and transparent management of groundwater resources in India.
- **National Project on Aquifer Management** aims to map the sub-surface water-bearing geological formations in India for informed decision-making.
  - Region-wise aquifer management plans are prepared and shared with states to facilitate better management of groundwater resources.
- **Jal Shakti Abhiyaan** is a national campaign launched in 2019 by the Ministry of Jal Shakti to address the issue of water scarcity and ensure water conservation, management, and sustainable use.
- **Composite Water Management Index** is a tool developed by the NITI Aayog to assess and improve the performance of states in the efficient management of water resources.
- **Central Groundwater Board** promotes sustainable development and management of Ground Water Resources in India.
- The **Central Ground Water Authority (CGWA)** was constituted under the EPA1986 for the regulation and control of groundwater development and management in the country.
- **Jal Jeevan Mission** is a central government initiative with rural and urban components aimed at ensuring universal access to safe drinking water through Functional Household Tap Connections (FHTCs).
  - The rural mission focuses on community-led water supply in villages, while the urban mission targets tap water for all urban households, water body rejuvenation, and circular water economy.
- **Mission Amrit Sarovar:** Launched in 2022, it aims at developing and rejuvenating 75 water bodies in each district of the country
- **Interlinking of Rivers programme (ILR)** aims to connect disparate rivers through a network of reservoirs and canals, facilitating water transfer from surplus to deficit areas.
  - At present, there are a total of 30 river interlinking projects conceived across the country, with Ken-Beta Link project being the first one.

Challenges in water management

- **Variability in monsoon patterns**, leads to years of excess or deficient rainfall, causing floods or droughts, respectively.
- **Uneven Distribution**: Regions like the Brahmaputra and Ganga basins are water-rich, whereas areas in the west and south, including Rajasthan and Tamil Nadu, face severe water shortages.
- **Wastewater remains an untapped and undervalued** resource in India, with urban centers treating only 28% of the 72,368 million litres of sewage they generate every day.
- **Poor management of water resources**, including inefficient water use and inadequate storage and conservation infrastructure, contribute to water scarcity. **For e.g.,** Chandigarh loses one-third of daily water supply to leakage.
- **Ownership Rights**: Groundwater laws are outdated, linking rights to land ownership under the Indian Easement Act, 1882.

Suggested Measures

- **Policy Reforms:** Water governance must include strict enforcement of groundwater extraction limits and the promotion of water-efficient farming in over-exploited regions.
  - E.g., Implementing region-specific water budgeting in states like Punjab and Rajasthan can prevent overuse.
- **Community Engagement in Water Conservation:** Local communities should be actively involved in conserving water through awareness and behavioral change initiatives.
  - E.g., The **Namma Ooru–Namma Veetu** campaign in Tamil Nadu encourages households to adopt water-saving practices.
- **Sustainable Agricultural Practices**: Farming methods must shift toward sustainability through precision agriculture, micro-irrigation, crop diversification, and conservation techniques.
  - E.g., Haryana's **Mera Paani Meri Virasat** scheme incentivizes farmers to grow less water-intensive crops.
- **Role of Technology:** Smart technologies like sensor-based irrigation, water-efficient appliances, and desalination plants can optimize water use across sectors.
  - E.g., Drip and sprinkler systems have shown 30–50% water savings in agriculture.
- **Wastewater Treatment:** Treated wastewater should be reused safely in agriculture, industry, and landscaping to reduce freshwater demand.
- **Traditional Water Conservation Systems**: Reviving indigenous systems like **Kuls** (Himachal), **Johads** (Rajasthan), and the **Apatani** system (Arunachal Pradesh) can enhance local water resilience.
- **Promotion of Rainwater Harvesting**: Rainwater harvesting must be made mandatory in urban planning to augment groundwater recharge.
  - E.g., The **Catch the Rain** campaign promotes rooftop harvesting and rain capture across cities and towns.
- **Water Neutrality:** Instituting water neutrality norms across industries and infrastructure projects can significantly reduce net water consumption.
  - NITI Aayog estimates that such measures could save 38.23 billion cubic meters of water in the next decade.

Mangroves: Nature's Green Infrastructure for Coastal India

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

Context

As the world marks the International Day for the Conservation of the Mangrove Ecosystem on July 26, there is a need to renew India's commitment to protect these vital coastal ecosystems amid rising climate threats.

Distribution of Mangroves

Global Scenario

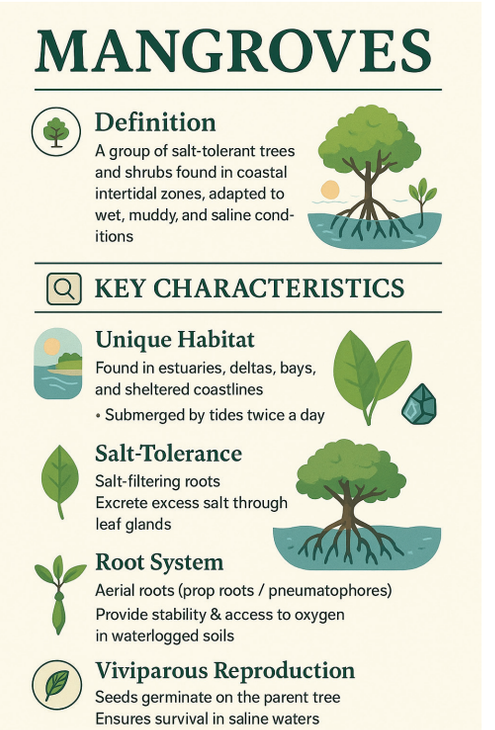
- Mangroves grow only in tropical and subtropical regions, as they cannot tolerate freezing temperatures.
- Globally, mangroves cover approximately 147,000 sq. km.
- Asia hosts the largest mangrove area, followed by Africa and Central and North America.
- Country-wise, **Indonesia** has the highest mangrove cover globally at 19%, followed by **Australia** with 10%.
- **Brazil** and **Nigeria** each account for around 7% of the world's mangrove area.

Indian Scenario

As per the **India State of Forest Report 2023 (ISFR-2023)**,

- India's total mangrove cover stands at **4,991.68 sq. km**, constituting **0.15%** of the nation's geographical area.
- There has been a net increase of **363.68 Sq.km (7.86%)** in Mangrove cover area of the country in 2023 as compared to 2013 and net increase of **509.68 Sq.km (11.4%)** between 2001 and 2023.
- **West Bengal** holds the largest share of the country's mangrove forests, accounting for **42.45%** of the total cover, followed by **Gujarat (23.32%)** and the **Andaman & Nicobar Islands (12.19%).**

Mangrove Forest	Location
Sundarbans Mangroves	Ganga-Brahmaputra Delta, West Bengal (UNESCO World Heritage Site)
Bhitarkanika Mangroves	Deltaic regions of Brahmani and Baitarani rivers, Odisha (Ramsar Site)
Godavari-Krishna Mangroves	Andhra Pradesh, Tamil Nadu, Odisha — formed at major river deltas
Pichavaram Mangroves	Tamil Nadu
Kerala Backwaters	Kerala



Significance of Mangroves

- **Coastal Protection:** Mangroves act as **natural buffers** against cyclones, tsunamis, and erosion.
  - E.g., During the 2004 Indian Ocean Tsunami, areas in Sri Lanka with intact mangroves experienced less damage, as per a Science journal study (2005).
- **Carbon Sequestration:** NASA calls mangroves the **"best carbon scrubbers"**.
  - E.g., UN studies show they **store 4x more carbon** per unit area than tropical rainforests.
- **Biodiversity Hotspots**: Mangroves support diverse flora and fauna due to the **edge effect**.
  - E.g., the Sundarbans supports around 30 plant species of mangroves & houses over 250 species of birds, 120 species of fishes, and reptiles like salt water crocodiles.
- **Water Purification:** Mangroves filter sediments, nutrients, and heavy metals before they reach coral reefs or open sea.
  - E.g., In Ecuador, estuaries were restored using **22,000 mangrove saplings** for phytoremediation.
- **Soil Stabilization**: Complex root systems **bind soil**, preventing erosion and preserving topsoil.
- **Food Security:** Mangroves provide nursery habitats for fish and shellfish, essential for coastal diets.
  - E.g., Indonesian mangroves support **100+ fish species**, crucial for local protein intake (**Fisheries Management & Ecology**).

Threats to Mangroves

- **Deforestation:** Mangrove forests are often cleared for agricultural, industrial, and urban development, resulting in the loss and degradation of these valuable ecosystems.
  - E.g., the Sundarbans mangrove forest has been deforested to create shrimp farms, rice paddies, etc.
- **Extensive Shrimp farming:** The expansion of shrimp aquaculture has resulted in the conversion of extensive mangrove areas into artificial ponds for shrimp farming.
  - E.g., large-scale shrimp farming industry in the Indian state of Andhra Pradesh has led to the destruction of mangrove forests along the coast.
- **Coastal Development:** Development activities such as tourism, ports, and urbanization lead to destruction and degradation of mangrove forests.
  - According to UNESCO's World Heritage Centre, the world has already lost around 50% of its original mangrove cover, and the rate of loss is accelerating at a rate much faster than other types of forests due to infrastructure development, and urbanization.
- **Construction of Dams:** The construction of dams along river courses has adverse effects on mangrove forests, leading to reduced freshwater and sediment inputs and changes in salinity levels.
  - E.g., the building of multiple dams along the Mekong River course has severely impacted the mangroves in the Mekong Delta region by altering the flow of the river and sediment dynamics.

- **Climate Change and Sea Level Rise:** Rising sea levels and increasing temperatures can impact the health and growth of mangrove trees, making them more vulnerable to disease and pests.
  - According to research conducted by the School of Oceanographic Studies at Jadavpur University, rise in sea level has resulted in the loss of approximately 125 sq. km of mangrove forest cover in the Sundarbans region between 1986 and 2012.
- **Pollution:** Industrial and agricultural pollution lead to loss of mangrove forests by damaging their water quality and reducing the amount of sunlight that reaches the forest floor.
  - E.g., the Sundarbans are threatened by the discharge of untreated industrial effluents and agricultural run-off into the rivers located in the region.

Global Initiatives for Mangrove protection

- **Mangroves for the Future Initiative:** It is a multi-country initiative developed by the IUCN and UNDP.
  - It aims to protect the mangroves in a coordinated way using technologies.
  - Members of this initiative include Bangladesh, Cambodia, India, Indonesia, Maldives, Myanmar, Pakistan, Seychelles, Sri Lanka, Thailand, and Vietnam.
- **Mangrove Alliance for Climate (MAC):** It was launched in 2022 at COP27 of the UNFCC by the UAE in partnership with Indonesia.
  - It aims to scale up and accelerate the conservation and restoration of the mangrove forests.
  - The members of the alliance include India, UAE, Indonesia, Australia, Japan, Spain and Sri Lanka.
- **International Society for Mangrove Ecosystems (ISME):** It is a non-governmental organization established in 1990.
  - It aims to promote the study of mangroves with the purpose of enhancing their conservation, rational management, and sustainable utilization.

Indian Initiatives for Mangrove protection

- **National Mangrove Committee**: Formed in 1976, the National Mangrove Committee under the MoEFCC, is responsible for advising the Central Government the planning and implementation of policies for mangrove protection.
- **Conservation and Management of Mangroves and Coral Reefs:** Under this programme, annual Management Action Plan (MAP) for conservation and management of mangroves are formulated and implemented in all the coastal States and Union Territories.
- **UNESCO and Ramsar Sites**: Various Mangroves sites are designated under the UNESCO World Heritage Sites and Ramsar Sites for all-around protection and cooperation. For example, Sundarbans Mangrove Site under the UNESCO World Heritage site and Bhitarkanika Mangrove site under the Ramsar Site.
- **MISHTI:** In Budget 2023, a new mission called Mangrove Initiative for Shoreline Habitats and Tangible Income (MISHTI) was launched.
  - It aims at mangrove preservation and conservation. It seeks to facilitate mangrove plantation along India's coastline and on salt pan lands.
  - It is implemented through the convergence of the job guarantee scheme MGNREGS, the Compensatory Afforestation Fund, and other funding sources.

India's Quest for Critical Minerals

Syllabus Mapping: GS-1 Geography

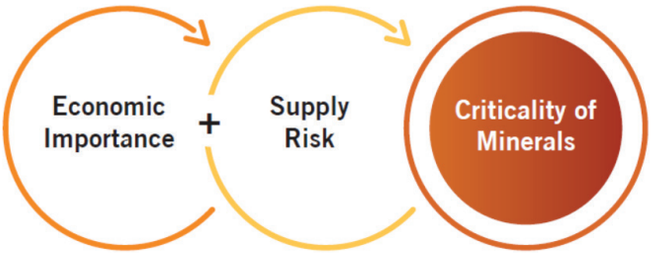
Context

India faces strategic and economic risks in its green transition due to heavy reliance on imports of critical minerals, prompting engagement in international "mineral clubs" for supply security and resilience.

What are Critical Minerals?

- They are mineral resources, **both primary and processed**, that are essential inputs in modern technologies, economies, and national security.
- They are characterised **by risk of supply chain disruption due to non-availability** and **price volatility.**
- Critical minerals have been classified into three categories based on their end-use industries:
  - Traditional — titanium, vanadium
  - Sunrise — lithium
  - Mixed use — cobalt, nickel, graphite, light rare earth elements (LREEs), heavy rare earth elements (HREEs)

Significance of Critical Minerals for India



- **New Technology led Economy:** Cutting edge technologies are based on hardware which requires critical minerals like Lithium for batteries, Titanium and Vanadium for chips.
- **Keeping pace with tech advancements,** especially high-tech consumer products, such as cellular telephones, computer hard drives, electric and hybrid vehicles, and flat-screen monitors and televisions.
- **Tackling climate change:** Critical minerals are irreplaceable in solar panels, wind turbines, electric vehicles & energy efficient lighting. Therefore, necessary for Net Zero Transition.
  - **E.g.** According to the International Energy Association (IEA), the rise of low-carbon power generation is projected to triple mineral demand from this sector by 2040.
- **National security:** In the age of cyber warfare, critical minerals act as the foundation of national security.
- **Reducing Imports:** At present, India relies heavily on imports for most critical minerals. Enhancing exploration and production of these minerals domestically would help lower the country's import dependency and reduce the Current Account Deficit.
  - **E.g.**, India is 100% import dependent for Lithium and Cobalt

Initiatives taken by Indian Government

- **Critical Minerals Mission**
  - It is a strategic initiative announced in the **Union Budget 2024-25** to help India become **self-reliant** in critical minerals.
  - The government has **waived customs duty** on 25 critical minerals and blister copper.
  - **Objectives of the Mission:**
    - Streamline the supply chain of critical minerals by boosting domestic output and recycling of critical minerals like copper and lithium.
    - Reduce India's import dependency on critical minerals, which is currently 100% for some elements
    - Identify critical minerals and plan for their acquisition and preservation.
    - Increase India's capacity for refining and processing critical minerals and find substitutes for critical minerals through R&D.
- **Amendment to Mines and Minerals Act (1957):** The MMDR Amendment Act of 2023 allows the Central Government to auction 30 critical mineral blocks, opening the sector to private players through auctions.
- **FDI Liberalisation:** In 2019, India permitted 100% FDI in mining of critical, reclassifying certain atomic minerals, enabling private-sector mining.
- **GSI Projects:** Geological Survey of India has launched over 250 projects to explore deep-seated critical minerals, and India has introduced startup challenges to develop advanced processing technologies.
- **International Collaboration:** India joined the US-led Mineral Security Partnership involving 13 countries and the EU.
  - Khanij Bidesh India Ltd (KABIL) is collaborating with Argentina on lithium exploration and negotiating lithium and cobalt opportunities in Australia.
  - Critical Minerals Initiative: The Quad (comprising the United States, Japan, India, and Australia) launched the initiative aimed at enhancing collaboration on key areas like ensuring resilient and diversified supply chains, and advancing the recovery and reprocessing of critical minerals from electronic waste (e-waste).

Critical Minerals List for India

- The Indian Government has released a list of **30 critical minerals.**
- These minerals are Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium, and Cadmium

Challenges Associated with Critical Minerals

- **In Acquisition:**
  - **Monopolised supply:** China is world's largest producer of 18 critical minerals. More than 70 % of cobalt is mined in the Democratic Republic of Congo, with China being a majority ownership.
  - **Trade risks:** Mineral-rich countries can impose export restrictions or quotas on critical minerals, impacting global supply. In the past, countries like China and Indonesia have implemented export restrictions on minerals such as rare earth elements and nickel, affecting global supply chains.

- **In Sustainable Utilisation:**
  - **Environmental Impacts of Mining:** Process of extracting lithium consumes significant amounts of water and energy and can pollute the air and water with chemicals and heavy metals.
  - **Low Supply Chain Traceability:** Tracking origin and movement of critical minerals along the supply chain is a challenge, which is necessary to monitor conflict mining. E.g. the prevalence of blood diamonds.

Why India Engages in Minerals Clubs ("Minilaterals")

- **Diversify and Secure Supply Chains:** Reduce dependence on China for critical minerals needed for EVs, solar, batteries, and semiconductors.
- **Collaborative Advantage:** Access to advanced technology, finance, and R&D through joint ventures with countries like Japan, Australia, and the US.
- **Overcome Domestic Gaps:** Indian companies lack extraction technology and face financial constraints; clubs help pool resources and de-risk overseas ventures.
- **Market Influence & ESG Standards:** Shape global environmental, social, and governance (ESG) standards and supply chain rules, presenting the Global South perspective.
- **Championing the Global South:** Leverage ties with Africa/Southeast Asia for fairer mineral trade and as a bridge between North and South.

Way Forward

- **Diversification of Suppliers:** India can reduce its dependence on a limited number of mineral-rich countries by diversifying its sources of critical minerals. For e.g. India's joining of **Minerals Security Partnership (MSP)** whose basic premise is **"friend shoring"**
- **Bilateral and Multilateral Corporations:** India has taken up G2G negotiations to secure mining collaborations and access agreements with African nations such as South Africa, Mozambique, Congo, Tanzania, Zambia.
- **Domestic exploration:** Investment should be done to explore and mine domestic sources of critical minerals. For example, one of the world's largest Lithium reserves has been found in J&K.
- **Overseas Mining**: A joint venture company namely Khanij Bidesh India Ltd. (KABIL) has been set up to identify, acquire, develop, process, and commercialise strategic minerals from overseas locations for supply to India.
- **Sustainable Mining Practices:** By adopting environmentally friendly mining techniques and enforcing strict regulations. For e.g. India is yet to adopt the Extractive Industries Transparency Initiative (EITI), the global standards of good governance ensuring transparency and accountability of the sector.
- **Monitor conflict mining:** Establishing transparent and traceable supply chains can help ensure ethical sourcing, prevent the use of conflict minerals, and promote sustainable practices.
- **Technological Innovation and Substitution:** For e.g. using satellite imagery and LIDAR to detect minerals to ensure efficient and targeted mining.

Climate Migration: The Human face of Climate Change

Syllabus Mapping: GS-III Environment

Context

Climate change is triggering both droughts and floods in regions like Bundelkhand (India), forcing vulnerable communities into distress-driven migration.

What is Climate Migration?

- Climate migration refers to the movement of individuals or communities driven by environmental changes linked to climate change, such as droughts, floods, desertification, cyclones, sea-level rise, and ecosystem collapse.
- It may be internal or cross-border, temporary or permanent, voluntary or forced; but increasingly, it is becoming a survival imperative.

Why is Climate Migration Emerging as a Crisis?

- **Forced and Distress-Driven:** Unlike economic migration, climate migration is involuntary. It is driven by livelihood loss, ecological degradation, and absence of viable adaptation options.
  - E.g., In Bundelkhand, repeated droughts have decimated rainfed agriculture, compelling farmers to migrate to cities like Delhi and Mumbai to work in construction or brick kilns.
- **Exploitation and Debt Bondage:** Migrants, especially landless laborers and Dalit communities, often fall into exploitative informal contracts without social or legal protection.

  - E.g., Thousands of seasonal migrants from Maharashtra work in sugarcane fields under advance-based bonded labor, a system known as "Salu".
- **Unsafe Living and Working Conditions:** Most climate migrants end up in slums or informal settlements with no access to clean water, sanitation, or health facilities.
  - According to the UNDP, over 40 million internal migrants in India live in poor housing conditions and are exposed to health and safety risks.
- **Family Breakdown and Gender Burden:** Men often migrate alone, leaving women behind to manage households, farms, and caregiving with limited support.
  - E.g., In Marathwada, women-headed households are increasingly vulnerable due to prolonged male out-migration.
- **Exclusion from Social Security:** Migrants are often excluded from welfare due to lack of **portability** in ration cards, PDS benefits, healthcare, and school access.
  - NITI Aayog (2022) noted that only 32% of migrant workers in informal urban sectors had access to any form of social protection.
- **Loss of Local Knowledge & Ecosystem Stewardship:** Migration erodes traditional ecological knowledge among pastoralists, fishers, and dryland farmers — weakening local resilience to climate change.

Global Dimensions of Climate Migration

- UNHCR estimates that over 21.5 million people are forcibly displaced every year due to climate-related weather events.
- The World Bank's Groundswell Report (2021) projects that 216 million people globally could become climate migrants by 2050, with India and Bangladesh among the top hotspots.
- Small Island Developing States (SIDS) like Maldives face existential threats from rising seas, creating a new category of "climate refugees".

Policy Challenges in Addressing Climate Migration

- **Absence of Legal Definition for Climate Migrants:** There is currently no legal recognition or definition of "climate migrants" or "environmentally displaced persons" in Indian law or international legal frameworks like the 1951 Refugee Convention, which only covers persecution-based migration
- **Fragmented Institutional Coordination:** Climate migration includes multiple domains like environment, labour, rural development, disaster management, and urban housing.
  - However, there is no integrated governance framework or inter-ministerial coordination to manage climate-induced migration comprehensively.
- **Weak Climate Adaptation Policies:** Most climate adaptation plans in India focus on infrastructure, agriculture, and disaster response, but fail to treat migration as a social consequence of climate vulnerability.
- **Diluted Labour Protections Under New Codes**: India's new labour codes consolidate older laws but do not offer special protection for distressed or seasonal migrants, especially those pushed by climate shocks.
- **Lack of Robust Data Systems:** India lacks granular, disaggregated, and real-time data on internal migration, especially climate-induced migration.

Way Forward

- **Recognise Migration as a Development Challenge:** Integrate it into climate adaptation policies.
- **Invest in Local Adaptation:** Promote drought-resilient crops, water harvesting, and soil conservation.
  - **E.g.,** In **Bundelkhand**, local women's group **Jal Sahelis** are restoring ponds and promoting water harvesting, reducing water scarcity and migration.
- **Ensure Social Protection:** Provide welfare benefits and healthcare access to migrant families.
  - **E.g., Odisha's Rural Urban Migration Portal.**
- **Support Livelihood Diversification:** Create rural job opportunities beyond agriculture.
- **Strengthen Land and Ecosystem Rights:** Empower pastoralists and farmers to sustainably manage ecosystems.
- **Build Safe Migration Pathways:** With legal safeguards, skill training, and housing provisions.

TOPICS FOR PRELIMS (GEOGRAPHY)

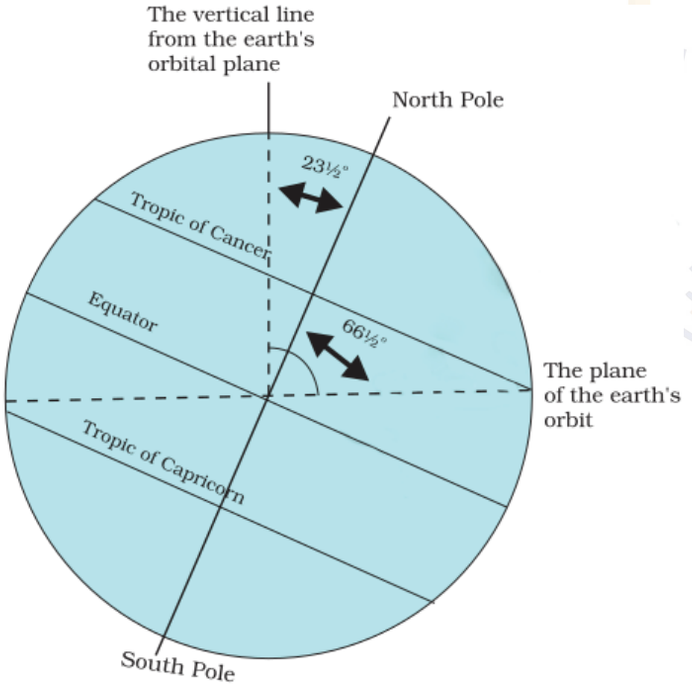
Why is the Earth Spinning Faster?

Context

On July 9, the Earth rotated 1.34 milliseconds faster than its usual speed, as reported by the U.S. Naval Observatory and the International Earth Rotation and Reference Systems Service.

About Earth's Rotation

- The spinning movement of the earth around its axis is called rotation.
- The earth spins counterclockwise.
- The earth takes 23 hours, 56 minutes, and 4 seconds to complete one rotation on its axis.
- **Significance of Earth's Rotation**
- Creates the diurnal cycle of lightness and darkness, temperature and humidity changes
- Drives the movement of water in the oceans.
- Responsible for deflection of tides.
- Responsible for the general circulation in the earth's atmosphere.
- Deflects wind and ocean currents. They are deflected towards the right in the Northern Hemisphere and to the left in the Southern Hemisphere.



Reasons for Earth Spinning Faster Recently

- **Movements in Earth's Core**: Changes in the liquid outer core relative to the mantle can alter the planet's angular momentum.
  - This internal mass redistribution speeds up or slows down Earth's spin.
- **Atmospheric and Oceanic Changes**: Shifts in air pressure, jet streams, and ocean currents redistribute mass across the globe, affecting rotation.
  - These changes often align with seasonal cycles and short-term climate patterns.
- **Moon's Changing Position:** When the Moon is farther from Earth's equator, it exerts less tidal friction, allowing Earth to spin faster.
  - However, over the long term, the Moon actually slows Earth down by gradually moving away (4 cm/year).
- **Glacial Melting and Mass Redistribution**: Melting polar ice due to climate change redistributes mass toward the equator.
  - This increases Earth's oblateness (bulging at the equator), which can slow down rotation, but certain redistributions may also temporarily speed it up.
- **Short-Term Variability:** Earth's rotation has never been perfectly steady→Just like now (fast spin), there have been slow periods in the past (e.g., 1970s, 1990s) when days regularly exceeded 24 hours.

Earth's Axis

It is an imaginary line passing from the North Pole through Earth's center to the South Pole. It is not straight but inclines at an angle of 23.5°, making an angle of 66.5° with its orbital plane (the plane formed by the orbit).

Giant-impact hypothesis: According to this theory, a Mars-sized body (named Theia) collided with the early Earth about 4.5 billion years ago. This impact not only contributed material that formed the Moon but also may have altered both the speed and direction of Earth's rotation and given it its current axial tilt.

Onset of Monsoon

Context

The India Meteorological Department (IMD) declared the monsoon onset over Kerala on Saturday (May 24), eight days ahead of its normal date schedule of June 1.

About Onset of Monsoon in India

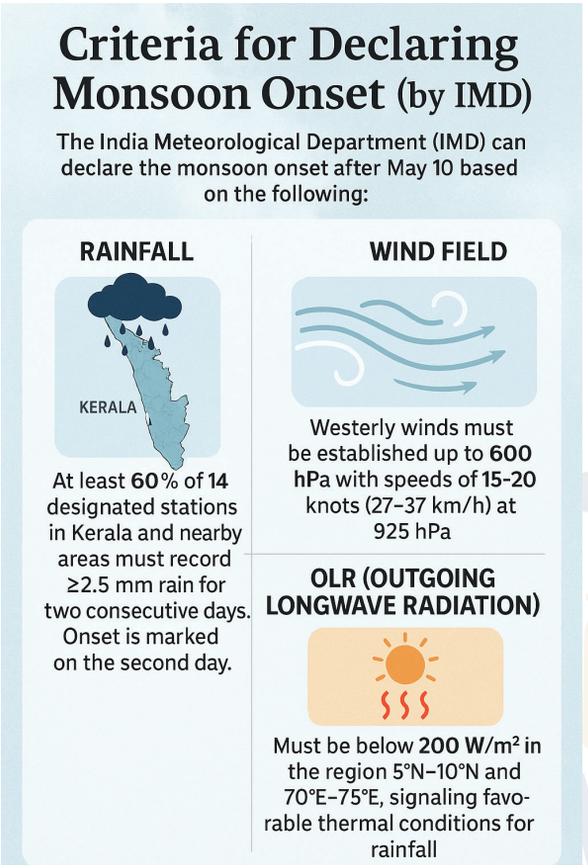
- The onset is marked by the movement of ITCZ to 20-25 ° N latitude and the Subtropical Jet Stream moves completely over the Himalayas.
- The northern and southern branches of the jet stream reunite as a single branch and flow to the north of the Himalayas across the Tibetan plateau→results in the sudden burst of the monsoon around the 1st week of June.
- Southwest monsoon normally sets in over Kerala around 1st June. It advances northwards, usually in surges, and covers the entire country around 15th July.

Factors Causing Early Onset of Monsoon in 2025

- **Madden-Julian Oscillation (MJO):** It is a large-scale movement of clouds, rainfall, winds, and pressure that travels

eastward around the tropical belt of the Earth, mainly over the Indian and Pacific Oceans.

- MJO was in its active phase, enhancing convection and boosting early rainfall over the region.



- **Mascarene High:** It is a high-pressure system located near the Mascarene Islands in the southern Indian Ocean during the monsoon season.
  - Fluctuations in the strength of this high-pressure zone play a key role in determining the intensity of rainfall along India's western coastline.
- **Somali Jet:** This is a low-level, cross-equatorial wind system that flows from the southern hemisphere near Mauritius and northern Madagascar.
  - By May, it crosses the eastern coast of Africa, enters the Arabian Sea, and moves toward India's western coast. A stronger Somali Jet enhances the intensity of monsoon winds over the region.
- **Heat Low:** As the Sun shifts northward, a zone of low pressure develops over regions like the Arabian Sea and Pakistan.
  - This zone functions like a vacuum, drawing in moisture-laden air along the monsoon trough, thereby intensifying monsoon rainfall.
- **Monsoon Trough:** An elongated low-pressure belt stretches from the heat low over northwest India to the northern Bay of Bengal.
  - Its north-south oscillation governs the distribution and intensity of rainfall across the core monsoon zone during the June to September period.
- **Cyclonic Monsoon Vortex (CMV) / Monsoon Onset Vortex (MOV):** It refers to a large-scale cyclonic circulation that typically forms over the Arabian Sea during the monsoon season.
  - These systems can sometimes develop into tropical cyclones and are important in triggering the onset and progression of the southwest monsoon.
- **Pressure Gradients:** It is the rate at which atmospheric pressure changes across a horizontal distance.
  - Steep pressure gradients help sustain the strong monsoonal flow, especially during its onset phase.

Coral Reefs

Context

A 24-year-long study reveals that coral cover in Lakshadweep has declined by nearly 50% since 1998, due to repeated marine heatwaves linked to climate change.

About Corals and Coral Reefs

- Corals are tiny, jelly-like animals that live in colonies in warm, clear, shallow waters close to the coast.
- Reefs are underwater ecosystems made by coral polyps that secrete calcium carbonate, forming hard structures.

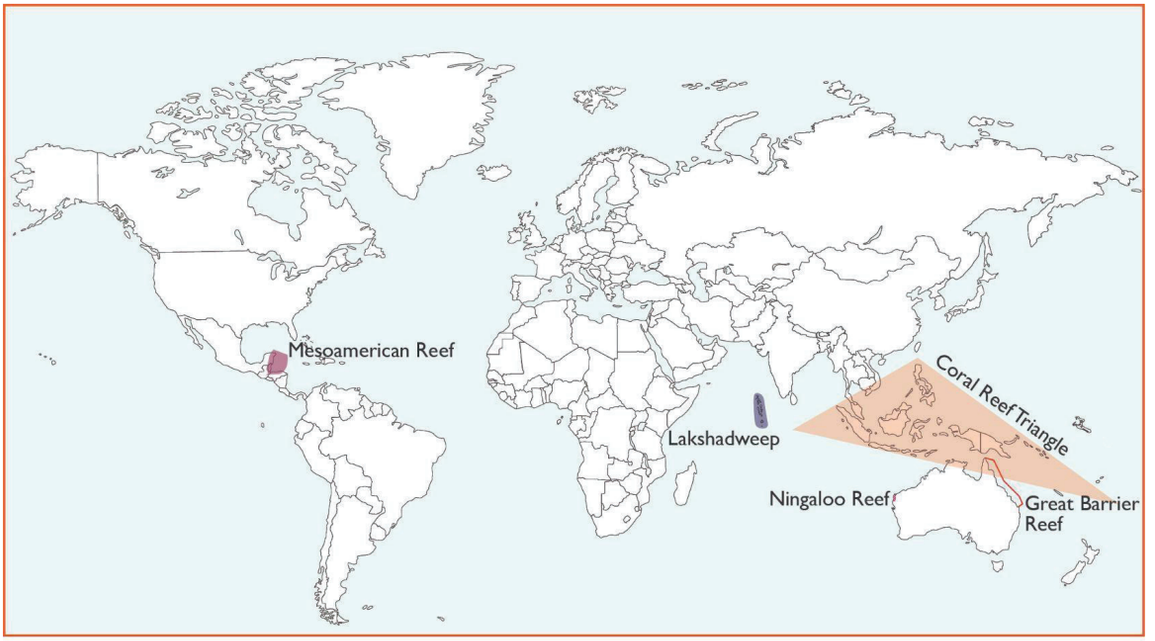
Threats to Coral Reefs

Natural Threats:

- **Predators:** such as parrotfish, barnacles, sea star 'Acanthaster planci', crabs and crown-of-thorns starfish, affect the life of coral reefs.
- **Hurricanes** or **prolonged cold and rainy weather** can harm coral reefs.
- **El Niño** which can result in lower sea level, altered salinity due to increased rainfall, and elevated sea-surface temperatures, damage coral reefs
- **Diseases:** Black band disease and white band disease that affect corals may cause local die-offs.

Anthropogenic Threats

- **Overfishing and Unsustainable Fishing** can damage coral reefs.
  - E.g., blast fishing destroys 64 square feet (5.9 square meters) of reef with a single blast.
- **Coastal Development** results in coastal erosion, and the run-off containing the excess sediment can block the light needed for the growth of zooxanthellae.
- **Pollution** from land, including hot water releases from power plants, pathogens, and trash from marine activities endangers coral reefs.
- **Careless Tourism**: Careless divers often trample on corals or break off pieces as souvenirs.
  - In addition, corals and tropical fish are harvested for the aquarium trade.



Ideal Conditions for Development of Coral Reefs

- Water Temperature range of 23^0-29^0C
- Low Levels of Salinity (30-40 parts per 1000)
- Clear, Shallow & Moving Water
- Semi-hard or hard Surface

Types of Corals

Hard Corals
Stony Corals, primary reef-building corals.

Soft Corals
Ahermatypic; do not form reefs.

Types of Corals Reefs

Fringing Reefs

Barrier Reefs

Atolls

Climate Change

- **Climate Change:** According to a 2019 IPCC report, the average temperature of tropical oceans has increased by 0.1° C over the past century, resulting in extensive coral bleaching around the world.
- **Ocean Acidification:** The biodiversity of coral reefs drops, resulting in the elimination of key species needed for healthy reef formation.
- **Rise in Sea Level:** Corals are predicted to end up in deeper water, which means they will receive less sunlight (vital for their food source) and grow more slowly.

Polavaram Banakacherla Link Project (PBLP)

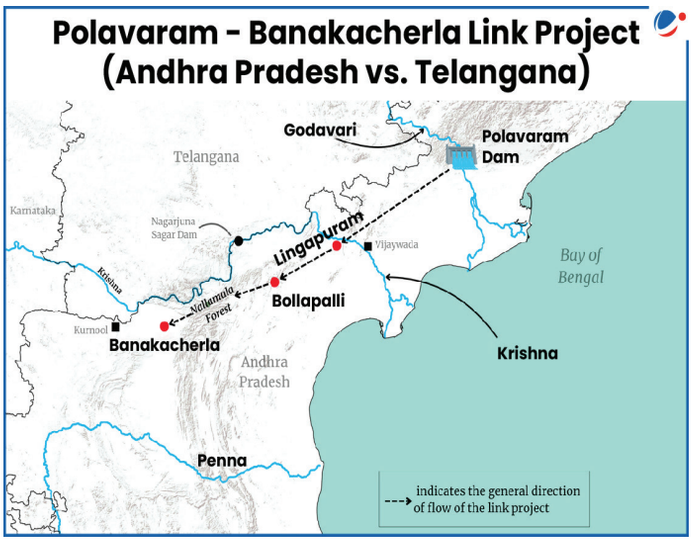
Context

The Centre has announced the formation of a high-level technical committee to examine inter-state water disputes—most notably the Polavaram–Banakacherla link project—between Andhra Pradesh and Telangana.

About the Banakacherla Reservoir Project

- A proposed irrigation project by the Andhra Pradesh government to divert surplus Godavari water to drought-prone Rayalaseema region.

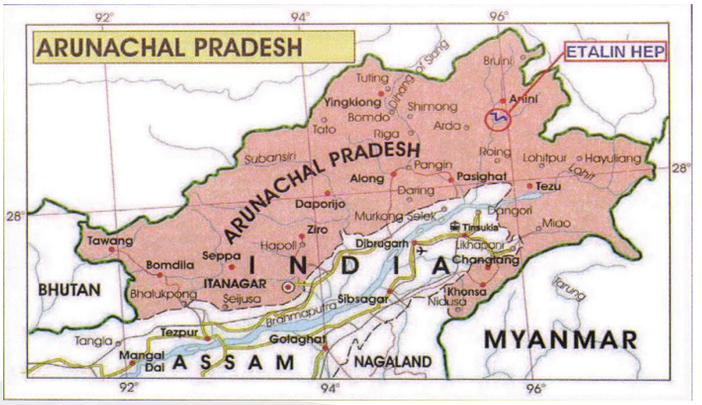
- **Location**: Banakacherla, Nandyal district, Andhra Pradesh.
- Involves water transfer via the Godavari–Krishna–Penna river linkage.
- **States Involved:** Andhra Pradesh: Project implementing state, Telangana: Objecting state, citing legal and environmental concerns.
- **Project Features**
  - **River Diversion Plan**: Polavaram Right Main Canal capacity to be increased from 17,500 to 38,000 cusecs.
    - **Thatipudi Lift Canal** upgraded from **1,400 to 10,000 cusecs**.
    - Construction of a **reservoir at Bollapalli** to lift and transfer water via a tunnel through the **Nallamala forest** to Banakacherla.
  - **Lift Stations**: Five key lift points: **Harischandrapuram, Lingapuram, Vyyandana, Gangireddypalem, Nakirekallu**.
  - **River Linkage**: Connects **Godavari → Krishna → Penna**, facilitating water flow to Rayalaseema.
- **Concerns Raised by Telangana**
  - **Violation of AP Reorganisation Act, 2014**: Telangana argues the project lacks **mandatory approvals** required under the Act for inter-basin transfers.
  - **No Clearance from Regulatory Bodies**: Lacks approvals from:
    - Krishna River Management Board (KRMB)
    - Godavari River Management Board (GRMB)
    - Central Water Commission (CWC)
  - **Godavari Tribunal Allocation Ignored**: Telangana was allocated 968 TMCft out of 1,486 TMCft by the Godavari Water Disputes Tribunal.
    - Claims that surplus water estimation is not formally recognized.
  - **Threat to Telangana Irrigation Projects**: Fears that diversion may negatively impact its reservoirs and irrigation schemes dependent on Godavari waters.



Etalin hydel project

Context

The Union Environment Ministry is set to evaluate the environmental clearance for the 3,087 MW Etalin dam project in Arunachal Pradesh's Dibang Valley.



About Etalin dam project

- **Location & Capacity**: Planned in Dibang Valley, Arunachal Pradesh with an installed capacity of 3,097 MW, making it one of India's largest proposed hydropower projects.
- **Project Structure:**
  - Combines two run-of-the-river schemes, involving the construction of two concrete gravity dams (101.5 m and 80 m high) on the Dri and Tangon rivers (tributaries of Dibang River).
  - Will divert water via gravity dams without major storage.
- **Ecological Sensitivity:**
  - Located in a biodiversity hotspot within the "richest bio-geographical province" of the Himalayan zone.
  - Involves diversion of 1,175 ha Forest land with felling of 2.7 lakh trees
- **Tribal Presence:** The region is home to Idu-Mishmi tribes
- **Executing Body:** The project is managed by Etalin Hydro Electric Power Company Limited, a joint venture between Jindal Power Limited (74% stake) & Hydro Power Development Corporation of Arunachal Pradesh Ltd. (26% stake – a state government undertaking).

Motuo Hydropower Project

- Chinese authorities have begun constructing the Motuo hydropower project.
- **Location**: Yarlung Tsangpo river (The Yarlung Tsangpo becomes the **Siang River** in Arunachal Pradesh and merges into the **Brahmaputra** in Assam.)
- After completion it will overtake the Three Gorges dam as the **world's largest.**
- **Potential Impact on India:** The dam gives China **hydrological control**, raising fears of **water diversion** (reducing flow into India) or **sudden water releases** (termed a "water bomb") during conflict or as coercive diplomacy.

Iron Ore

Context

India's iron ore production rose marginally by 0.60% to 53 MMT in April-May, up from 52.7 MMT in the same period last year.

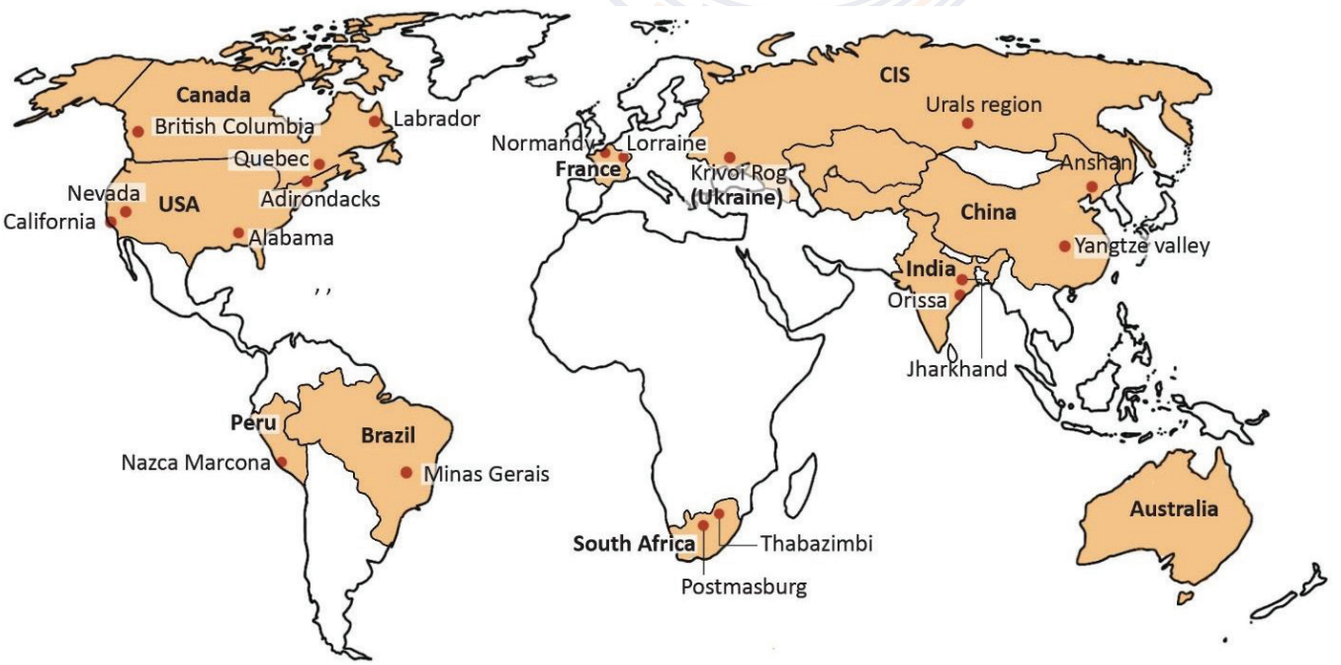
About Iron Ore

Important Characteristics	Uses
It varies in color, ranging from rusty red, deep purple, a striking yellow, and dark grey. Generally rich in iron oxides	• The primary use of iron ore (98%) is to make steel. • The remaining 2% is used in various other applications, such as powdered iron for certain types of steel, auto parts and catalysts; radioactive iron for medicine; and iron blue in paints, inks, cosmetics and plastics.

Distribution	
Australia (largest producer)	Western Australia, Iron knob in South Australia
Brazil	Minas Gerais
China	Manchurian deposits at Anshan, Yangtze valley, Hopei
US	Lake Superior region, Adirondacks, Alabama, Nevada, California.
Canada	Labrador, Quebec, British Columbia.
CIS	Krivoi Rog in Ukraine, Siberia, Urals region, Kursk Magnetic Anomaly (Lipetsk, Donbas)
France	Lorraine, Normandy
South Africa	Postmasburg, Thabazimbi
Peru	Nazca Marcona

Current Status of Iron Ore production in India

- India is **self-sufficient** in iron ore production.
- Contributes around **7% to global iron ore output**.
- **4th largest** iron ore producer in the world.
- **2nd largest** steel producer globally, after China.
- **Major Iron Ore Producing States (Account for 95% of total reserves):**
  - **Odisha**: Hill ranges of Sundergarh, Mayurbhanj, and Kendujhar (e.g., Badampahar, Kiruburu, Bonai).
  - **Jharkhand**: Ancient mines like **Noamundi** and **Gua** in Singhbhum; nearby plants in **Durg**, **Dantewara**, and **Bailadila**.
  - **Karnataka**: Sandur-Hospet (Ballari), **Baba Budan hills**, **Kudremukh**, Shivamogga, Chitradurg, Tumakuru.
  - **Maharashtra**: Chandrapur, Bhandara, Ratnagiri.
  - **Telangana**: Karimnagar, Warangal.
  - **Andhra Pradesh**: Kurnool, Cuddapah, Anantapur.
  - **Tamil Nadu**: Salem, Nilgiris.
  - **Goa**: A significant iron ore producer.



Mud Volcano Eruption in Taiwan

Context

A mud volcano recently erupted in southern Taiwan, drawing attention to these unique geological features.

About Mud Volcano

- **Formation**:
  - Typically found in subduction zones, where one tectonic plate sinks beneath another at convergent boundaries.
  - Can also be man-made, triggered by drilling or mining activities, especially in hydrocarbon-rich regions.
- **Appearance**:
  - Resembles small hills or mounds.
  - Formed by the slow extrusion of mud, water, and gases from underground.
- **Eruption**:
  - Caused by tectonic activity, such as earthquakes or pressure buildup.
  - May also erupt due to sediment compression in river deltas (e.g., Ganges-Brahmaputra, Amazon).
  - Typically releases methane and other hydrocarbons instead of lava or pyroclastic material.
- **Difference from Igneous Volcanoes**:
  - Do not emit lava, ash, or pumice.
  - Their eruptions are colder and less explosive.
  - Mainly involve muddy slurry and gases.

Polar Anticyclone

Context

Chile and Argentina were recently ranked among the coldest places on Earth outside the polar regions due to the influence of a polar anticyclone.

About Polar Anticyclones

- Polar anticyclones are high-pressure wind systems formed over cold regions.
- They originate from the cooling of surface air layers, which increases air density near the ground.
- As this dense air sinks, it draws inflows from upper atmospheric layers, thereby increasing surface pressure.
- The result is a **stable, high-pressure system** with minimal cloud formation and very cold surface temperatures.
- The anticyclonic circulation is: **Clockwise** in the Northern Hemisphere, & **Counterclockwise** in the Southern Hemisphere, due to the Coriolis effect.
- These systems are typically **stationary or slow-moving**, contributing to prolonged cold spells.

Recent Cold in Chile and Argentina

The unusually low temperatures were caused by a **polar anticyclone drifting northward from Antarctica**. This phenomenon trapped cold air over the southern parts of South America, especially over the **Andes and Patagonian regions**, resulting in extreme cold.

TOPICS FOR MAINS (ENVIRONMENT & DISASTER MANAGEMENT)

SACHET

Context

The National Disaster Management Authority (NDMA) has rolled out the Integrated Alert System named SACHET, while also conducting tests on the Cell Broadcast (CB) system to evaluate its effectiveness.

About SACHET

- It is an SMS-based alert system
- Developed by the Centre for Development of Telematics (C-DOT), SACHET is based on the Common Alerting Protocol (CAP) recommended by the International Telecommunication Union (ITU).
- It is operational across all 36 States and Union Territories of India.
- The system delivers geo-targeted SMS alerts during natural disasters such as cyclones, floods, and storms.

About Cell Broadcast (CB) System

- Also being developed by C-DOT, the CB system transmits alerts directly to all mobile devices in a specified area.
- Unlike SMS, it is much faster, making it particularly effective for rapid-onset emergencies like earthquakes, tsunamis, lightning strikes, and gas leaks.

C-FLOOD

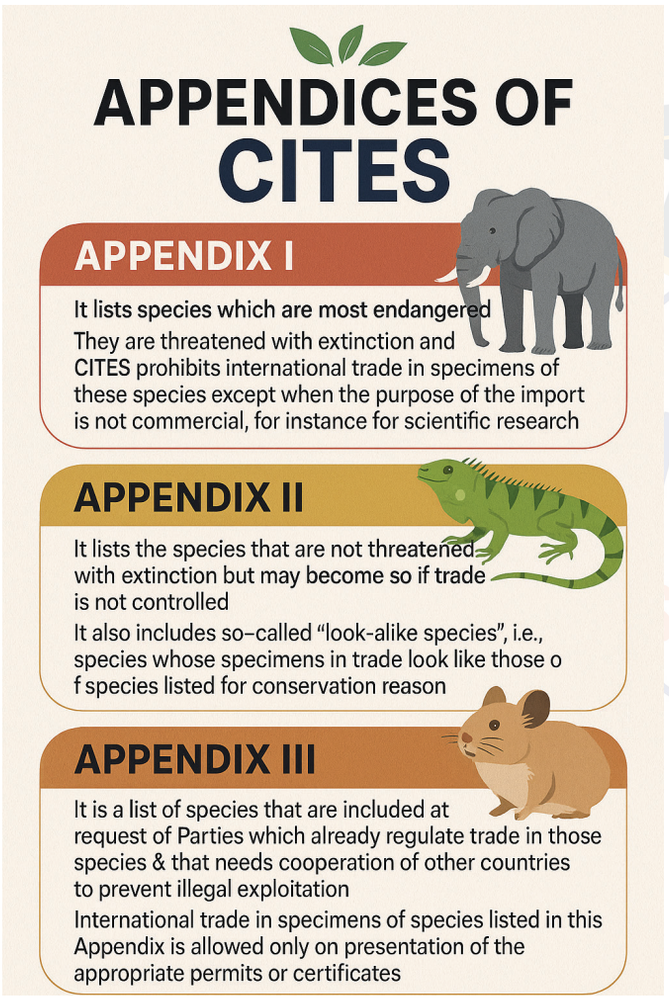
Context

Union Minister of Jal Shakti inaugurated the C-FLOOD platform.

About C-FLOOD Platform- A Unified Inundation Forecasting System

- **Developed By:**
  - **C-DAC Pune** (Centre for Development of Advanced Computing)
  - **Central Water Commission (CWC)**, under the **Ministry of Jal Shakti**.
- **Executed under:** National Supercomputing Mission (NSM), steered by:
  - Ministry of Electronics and Information Technology (MeitY)
  - Department of Science and Technology (DST)
- **Aim:** To improve **flood forecasting**, **management**, and **disaster response** across India.

- **Key Features of C-FLOOD:**
  - **Web-based platform** providing **2-day advance flood forecasts**.
  - Offers **flood inundation maps** and **water level predictions** at the **village level**.
  - Acts as a **unified system**, integrating flood modeling data from various national and regional agencies.
  - Designed as a **decision-support tool** for disaster management authorities.
- **Geographical Coverage:**
  - Currently operational in the **Mahanadi**, **Godavari**, and **Tapi river basins**.
  - Plans to **expand coverage** to more river basins in future phases.



- **Technical Highlights:**
  - Uses **advanced 2D hydrodynamic modeling** to simulate flood scenarios.
  - **Simulations for Mahanadi Basin** are run on **High Performance Computing (HPC)** infrastructure at C-DAC Pune.
  - **Outputs for Godavari and Tapi basins** are developed by the **National Remote Sensing Centre (NRSC)** under the **National Hydrology Project (NHP)**.

Islands Protection Zone (IPZ) Notification

Context

The Union Environment Ministry has extended the validity of infrastructure projects approved under the 2011 IPZ notification.

About IPZ

- Notified in 2011 under the Environment (Protection) Act, 1986.
- Aims to safeguard the ecological integrity of the Andaman & Nicobar and Lakshadweep island groups.
- It is the island counterpart of the Coastal Regulation Zone (CRZ), which applies to mainland coastal areas.
- **Regulatory Mechanisms under IPZ**
  - **Island Coastal Regulation Zone (ICRZ):** Applies to larger islands such as **Middle Andaman, North Andaman, South Andaman, Little Andaman**, etc.
    - Regulates construction, development, and other activities along the coast to minimize ecological damage.
  - **Integrated Islands Management Plans (IIMPs):** Applicable to **all other islands** of the Andaman & Nicobar and **all Lakshadweep islands**.
    - Provides a framework for sustainable development while conserving biodiversity and ecological resources.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Context

In 2025, CITES celebrates 50 years of regulating the world's international wildlife trade.

About CITES

- CITES is an international agreement aimed at regulating and monitoring the trade of endangered species of wild animals and plants.
- **Background:** CITES was signed in 1973, and came into force in 1975.
- **Objectives:**
  - To ensure that international trade in specimens of wild animals and plants does not threaten their survival.
  - To promote the conservation of endangered species by regulating trade and preventing overexploitation.
  - To promote sustainable trade that is ecologically sound and economically viable.
- **Parties to Convention:** 184 parties, including India.
- **Nature:** CITES is legally binding on the parties. However, it does not take the place of national laws.

Commission for Air Quality Management (CAQM)

Context

CAQM is currently reviewing the Delhi government's request to suspend the ban on overage fuel vehicles due to technical issues and public inconvenience.

About CAQM

- Statutory Body established under the Commission for Air Quality Management in NCR and Adjoining Areas Act, 2021.
- Jurisdiction includes Delhi-NCR and adjoining areas of Punjab, Haryana, Rajasthan, and Uttar Pradesh.

Mandate & Functions

- Coordinates efforts to **combat air pollution** across NCR and neighbouring states.
- Focuses on improving the **Air Quality Index (AQI)** in the region.
- Facilitates **inter-governmental coordination**, policy implementation, and **scientific research**.
- Enables **real-time monitoring** and response mechanisms for air pollution control.

Powers & Authority

- Can **restrict polluting activities** and enforce mitigation measures.
- Empowered to:
  - Conduct **investigations and research** on air pollution sources.
  - Frame **policies, codes, and guidelines** for pollution abatement.
  - **Issue binding directions** for inspections, compliance, and enforcement.
- Orders are **legally binding** on individuals, officers, and authorities.
- **Reports directly to Parliament**, ensuring accountability.

Composition

- **Chairperson:** Senior official (Secretary/Chief Secretary rank); tenure: **3 years or until 70 years of age**.
- **Five Ex Officio Members:** Chief/Environment Secretaries from **Delhi, Punjab, Haryana, Rajasthan, Uttar Pradesh**.
- **Three Full-time Technical Members** and **Three NGO Representatives** from environmental fields.
- **Technical experts** drawn from: Central Pollution Control Board (CPCB)
  - Indian Space Research Organisation (ISRO)
  - NITI Aayog

Eased FGD Norms for Thermal Power Plants

Context

The Ministry of Environment has relaxed the norms related to Flue Gas Desulphurisation (FGD) systems for thermal power plants.

Rationale Behind

- **Declining Sulphur Dioxide (SO_2) Levels:** India has witnessed a **decline in ambient SO_2 concentrations**.
  - In a 2023 assessment across **492 cities**, only **two (Dehradun and Kolar)** exceeded the SO_2 limit.
  - India's annual SO_2 standard (**50 µg/m³**) is **stricter than** countries like Japan (66), EU (52.4), and Australia (66).
- **Limited Role of SO_2 in PM2.5 Health Impacts:** Scientific studies indicate that **SO_2 is not a major contributor** to **PM2.5 pollution**, which is more harmful to health.
  - Cities with and without FGD units show **no significant difference in SO_2 levels**, suggesting marginal public health benefits.
- **High Financial and Environmental Costs:** The **cost of installing FGD** is high: **₹1.2 crore per MW**, totaling approximately **₹2.54 lakh crore** for all plants.
  - The Ministry argued this would lead to only **marginal improvements** in PM2.5 levels, making it a **disproportionate investment**.
- **Composition of Indian Coal:** Indian coal has **low sulphur content (0.5%)** but **high ash content**, which naturally results in **lower SO_2 emissions** compared to other countries.
- **Targeted Regulation:** Under the new policy, only **22% of thermal plants** (mostly near cities with historically poor air quality) must install FGDs.
  - This **targeted approach** focuses on **high-impact zones**, improving cost-effectiveness without compromising environmental priorities.

News in Short

Topic	Details
Green Climate Fund	The Green Climate Fund (GCF) has approved over USD 120 million to support climate action initiatives in developing countries. **About Green Climate Fund (GCF)** • World's largest multilateral climate fund. • Aims to help developing countries implement their Nationally Determined Contributions (NDCs) for a low-emission, climate-resilient future. • Created at COP 16 of the UNFCCC held in Cancun, 2010 and became fully operational in 2015, with the launch of initial project funding. • Functions under Article 9 of the Paris Agreement, which emphasizes climate finance to assist developing countries. • Managed by a GCF Board with equal representation from developed and developing countries. • Accountable to and functions under the guidance of the UNFCCC COP (Conference of the Parties). • Headquarters located in Songdo, Incheon City, Republic of Korea.

Topic	Details
Forest Advisory Committee	The Forest Advisory Committee (FAC) has proposed measures to expedite forest clearance for major industry and infrastructure projects near or within forest areas. **About Forest Advisory Committee (FAC)** • It is a statutory body established under the Forest (Conservation) Act, 1980. • Primary Role: – Evaluates proposals seeking diversion of forest land for non-forestry purposes, such as infrastructure, mining, and industrial projects. – Provides recommendations to the Central Government on whether forest clearance should be granted. • Nature of Role: – Its function is recommendatory, not binding. – Final decisions lie with the Ministry of Environment, Forest and Climate Change (MoEFCC).
C-FLOOD Platform	Recently the Union Minister of Jal Shakti inaugurated the C-FLOOD platform. **About C-FLOOD Platform** • **Developed By:** – **C-DAC Pune** (Centre for Development of Advanced Computing) – **Central Water Commission (CWC)**, under the **Ministry of Jal Shakti**. • **Executed under:** National Supercomputing Mission (NSM) • **Aim:** To improve **flood forecasting**, **management**, and **disaster response** across India. • It is a **Web-based platform** providing **2-day advance flood forecasts**. Offers **flood inundation maps** and **water level predictions** at the **village level**. • **Geographical Coverage:** Currently operational in the **Mahanadi**, **Godavari**, and **Tapi river basins**.
Typhoon Wipha	Recently Tropical cyclone Wipha made landfall in northern Vietnam. It impacted Vietnam, China (especially Hainan and Guangdong), and the Philippines. **About Tropical Cyclone** • A **tropical cyclone** is a rapidly rotating storm system originating over **warm tropical oceans**, characterized by: a **low-pressure center** (called the eye), strong rotating winds, heavy rain, thunderstorms. • **Condition for Formation: Warm ocean temperatures** of at least **26–27°C (79–81°F)** – **High moisture content** in the atmosphere – **Low to moderate wind shear** – **Coriolis force** (due to Earth's rotation) to initiate cyclonic spin. • **Regional Names:** – **Willy-willy** (Australia) – **Hurricane** (Northern Atlantic) – **Typhoon** (Western North Pacific).
Climate Change Can Increase Volcano Eruption	• According to a recent study, melting glaciers due to global warming can result in increased volcanic eruptions. • **How Climate Change is Responsible for Volcanic Eruptions:** – **Melting of Glaciers:** – **Reduced Pressure:** Melting glaciers reduce the weight pressing down on underground magma chambers. – **Expansion of Magma & Gases:** Less pressure allows magma and gases to expand, making eruptions more likely. – **Lower Melting Point:** Reduced pressure causes rocks to melt at lower temperatures, increasing magma production. – In places like Iceland and Chile, deglaciation periods saw a sharp rise in volcanic eruptions. • **Increased Precipitation:** – **Water Infiltration:** Higher rainfall (due to climate change) seeps deep into the ground. – **Triggering Eruptions:** Water interacts with underground magma, increasing the risk of eruptions. – **Altered Patterns:** Climate change can intensify precipitation patterns, leading to unpredictable volcanic activity
Karenia mikimotoi-induced toxic algal bloom	• **Karenia mikimotoi** is a toxic dinoflagellate species known for causing harmful algal blooms (HABs) in oceans around the world. **Toxicity and Impact:** • It produces **reactive oxygen species** and **ichthyotoxins** that are **non-toxic to humans**, but **highly lethal to marine life**.

Topic	Details
	• Causes death in **fish, shellfish, echinoderms**, and other invertebrates by **depleting oxygen levels** and damaging gill tissues. **Genus and Relatives:** • Belongs to the Karenia genus, which also includes Karenia brevis, the species behind Florida red tides and producer of brevetoxins. • While **K. mikimotoi** is less harmful to humans, its ecological effects are devastating. **Distinct Characteristics:** • It is athecate—lacks a rigid cellulose wall—making it fragile and prone to disintegration in water. • Its blooms create hypoxic or anoxic conditions as they decay, particularly dangerous during marine heatwaves. • The toxins target fish gills, leading to respiratory stress, loss of orientation, and death. • No direct human illnesses reported from consuming contaminated seafood, but indirect impacts on fisheries and ecosystems are significant.

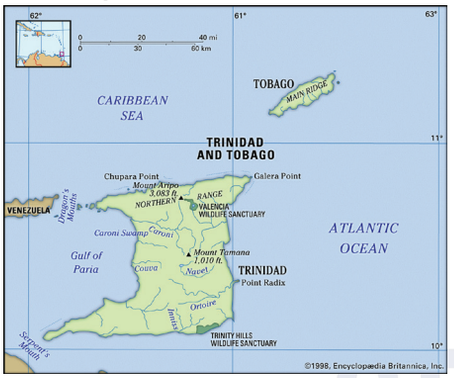
Species in News

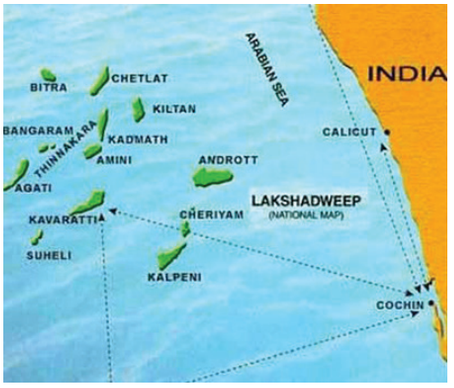
Species	Details
Great Hornbill	• **Distribution** – Found in the **Indian subcontinent** and **Southeast Asia**. – In India, seen in **Western Ghats** and **forests along the Himalayas**. • **Habitat** – Inhabits **wet evergreen** and **deciduous old-growth forests**. – Found at elevations between **600–2000 meters**. – Prefers **tall trees** that rise above the forest canopy for nesting. • **Physical Features** – Size: **95 to 120 cm** in length; wingspan: **151 to 178 cm**. – Weight: Around **3 kg**. – Coloration: ° Black body, head, and wings. ° White neck, abdomen, and tail (tail has a black band). ° Bright **yellow to red hues** due to oil secreted by preen gland. – Notable traits: ° Large **hollow casque** atop the bill, used for combat and courtship. ° Prominent **eyelashes**. ° **Sexual dimorphism**: • Males have **red irises** and larger bills/casques. • Females have **white irises**. • **Diet** – **Primarily frugivorous** (fruit-eating). – Opportunistically eats **small mammals, reptiles, and birds**. • **Conservation Status** – **IUCN Red List: Vulnerable**.
Marlin Fish	• **Family & species** – **Marlins belong to the billfish group** (**Xiphioidea**), within the family **Istiophoridae**. – They are **related to swordfish**, but taxonomically closer to **tuna and mackerels**. – There are **around 10–11 recognized species** of marlin. • **Features:** – A **long spear-like bill** used to slash and stun prey. – Highly streamlined bodies, deep forked tails, and powerful muscles adapted for high-speed bursts. • **Speeds & Hunting** – Among the **fastest fish**: Striped marlin clock 110 km/h, black marlin are comparable – **Hunting method**: They slash through schools of smaller fish (tuna, mackerel, sardines), stunning them before catching

Species	Details
	– The striped marlin exhibits intriguing **fluorescent "glow" behavior** before attacks—likely coordination or confusion tactics • **Distribution & Lifecycle** – Highly **migratory**, crossing entire ocean basins—blue marlin have been tagged moving from the Atlantic to Indian Ocean – **Habitat**: Prefer warm, open-water ("blue-water") pelagic zones above 20 °C – **Reproduction**: Broadcast spawners—one female can release millions of eggs; marlin larvae are pelagic • **Physiology & Adaptations** – Like other billfish, marlins have a **counter-current heat exchanger** to warm their brain and eyes—enhancing hunting focus and vision – **Color-change ability**: Marlins can shift skin patterns rapidly via iridophores and chromatophores—used for camouflage, communication, and the striped marlin's glow • **Status & Conservation** – **Blue and white marlin** are listed as **Vulnerable**, due to intense fishing and bycatch – **Black marlin** status is data-deficient, but concerns arise from overfishing and sports fishing pressure – **Conservation measures**: Legislation like the US Billfish Conservation Act, catch-and-release programs, and tagging initiatives help track and protect them
Greater One-Horned Rhinoceros	• **Conservation Status: Vulnerable** (IUCN Red List) • **Population:** Around 3,700 globally, with the majority in **India and Nepal** • **Habitat:** Primarily found in the **floodplains of the Brahmaputra, Ganges, and their tributaries**, especially in **Assam's Kaziranga National Park** • **Key Features:** – Has a **single black horn** made of keratin (same as human nails). – Primarily **herbivorous**, feeding on grasses, fruits, leaves, and aquatic plants. • **Threats:** – **Poaching** for horns (used in traditional medicine and as status symbols). – **Habitat loss** due to agriculture, encroachment, and flooding. – **Human-wildlife conflict** and **limited genetic diversity** due to isolated populations. • **Conservation Efforts in India:** – Protected under Schedule I of the Wildlife Protection Act, 1972. – Conservation programs like Project Rhino and Indian Rhino Vision 2020. – Ongoing genetic studies (like RhoDIS India) to track DNA profiles for anti-poaching and conservation planning. – Regular census and translocation efforts in national parks such as Kaziranga, Manas, Pobitora, Orang, and others.
Gharial	• **Habitat:** Found in **freshwater rivers**, mainly in: – **Chambal** and **Girwa Rivers** (India) – **Rapti-Naryani River** (Nepal) • **Conservation Status:** – **IUCN:** Critically Endangered – **WPA, 1972:** Schedule I – **CITES:** Appendix I • **Key Characteristics:** – Possesses the **thinnest and longest snout** among crocodilians. – Adult males have a bulb-like structure at the snout's tip, known as the **'ghara'**. – Considered the **most aquatic** crocodilian species.
Sloth Bear	• **Habitat:** Native to **India, Sri Lanka, and Nepal**. – Found in 5 Indian biogeographic zones: ° **Peninsular India, Western Ghats, Deccan Plateau, Gangetic Plain, North East** • **Conservation Status:** – **IUCN:** Vulnerable – **WPA, 1972:** Schedule I – **CITES:** Appendix I

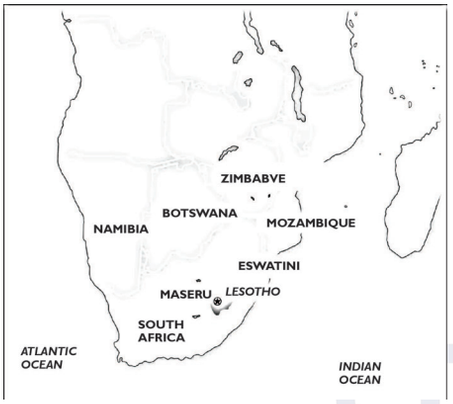
Species	Details
	• **Key Characteristics:** – Small bear species with a **shaggy coat**. – Diet mainly consists of **termites and ants**. – **Solitary** and generally **nocturnal** animals.
Finn Weaver	• Also known as Finn's baya and yellow weaver is a weaver bird species native to the Ganges and Brahmaputra valleys • **Conservation Status: Vulnerable** on the IUCN Red List • **Local name**: **Tukura Chorai** in Assam. • **Habitat:** Terai grasslands of Uttarakhand and Uttar Pradesh. • **Key Features:** Master **nest-builder atop trees**. – Known for complex woven nests.

Places in News

Place	News & Details
Port of Spain 	**News:** Prime Minister Narendra Modi recently visited Port of Spain.marking the first such visit by an Indian PM since 1999. **Details:** • **Location:** Southeastern West Indies (Atlantic Ocean). • Lies close to the **South American coast**, **northeast of Venezuela** and **northwest of Guyana**. • Comprises two main islands: – **Trinidad** (larger and more industrial) – **Tobago** (smaller and more tourism-driven). • **Natural Resource**: **Pitch Lake** (in La Brea, Trinidad) is the **world's largest natural asphalt deposit**.
Namibia 	**News:** The Prime Minister visited Namibia, marking the **first visit by an Indian PM in 27 years**. **Details:** • **Location:** Situated in southwestern Africa. • **Neighboring Countries:** Angola, Zambia, Botswana, and South Africa; western boundary opens to the Atlantic Ocean. • Fish River Canyon is the world's second largest canyon.
Sierra Leonne 	**News:** Sierra Leone's Nyangai Island has lost two-thirds of its land to rising sea levels. **Details:** • **Location:** Tropical country in West Africa, along the Atlantic Ocean. • **Bordering countries:** Guinea, Liberia, Atlantic Ocean (west). • **Minerals:** Rich in minerals like **diamonds**, **gold**, **bauxite**, and **rutile (titanium dioxide)**.

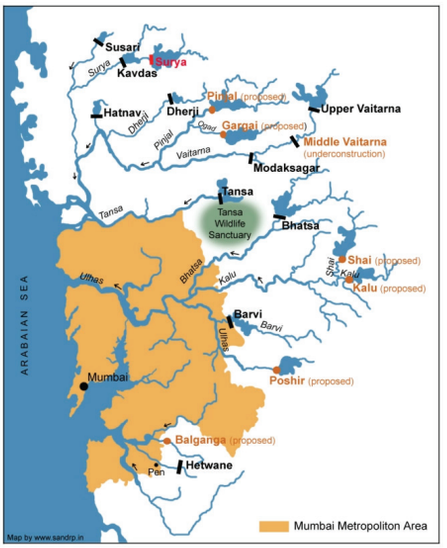
Place	News & Details
Eswatini 	**News:** U.S. deporting individuals to African nations (Eswatini and South Sudan) under a secretive program. **Details** • **Location**: A landlocked country in **Southern Africa**, bordered by South Africa and Mozambique. • **Capital**: Mbabane (administrative), Lobamba (royal and legislative). • **Name Change**: Renamed from **Swaziland to Eswatini** in 2018.
Senegal 	**News:** Former colonial ruler France hands over its last military bases in Senegal. **Details** • **Location:** Western Africa. • **Bordering Countries:** Mauritania, Mali, Guinea, Guinea-Bissau, Gambia. • **Major Cities:** Dakar (Capital and largest), Saint-Louis, Ziguinchor.
Sweida (Suwayda) 	**News:** Israel recently launched strikes on Syrian city Sweida. **Details** • It is a **city in southwestern Syria**, located near the **border with Jordan**. • Bordering Countries (Syria): Turkey, Lebanon, Israel, Iraq & Jordan.
Bitra Island 	**News:** The Lakshadweep administration is exploring the possibility of acquiring Bitra Island. **Details** • **Location**: Situated in the **northern part of Lakshadweep**. • It is the **smallest inhabited island** in the Lakshadweep archipelago. • The **Lakshadweep administration** is considering Bitra for **defence acquisition**. • If approved, Bitra would become the **third island** in Lakshadweep with a **defence establishment**. • **Existing naval bases:** – **INS Dweeprakshak** – located in **Kavaratti** (UT capital). – **INS Jatayu** – located in **Minicoy Island**.

Place	News & Details
Kamchatka Peninsula 	**News:** A series of powerful earthquakes strike Kamchatka Peninsula. **Details** • **Location:** Eastern part of Russia, Between the Sea of Okhotsk (west) and the Pacific Ocean & Bering Sea (east). • It is one of the world's most concentrated areas of geothermal activity • It is part of the **Kamchatka Krai.** It is also known as a land of fire and ice.
Andman Sea 	**News:** Andaman Sea, which falls within Seismic Zone V (highest earthquake risk zone), experienced three earthquakes in a day. **Details** • It is a semi-enclosed marginal sea in the northeastern Indian Ocean. • It is bounded by Myanmar (North), Thailand and Malaysia (East), Indonesia and Strait of Malacca (South), and Andaman and Nicobar Islands (West).
Ghana 	**News:** RecentlyIndian PM visited Ghana on a State Visit. It was the first such visit in the last three decades. **Details** • **Location:** Western Africa, situated on the coast of the Gulf of Guinea. • **Bordering Countries:** Côte d'Ivoire, Burkina Faso, Togo. • It was known as the 'Gold Coast' before its independence in 1957 • **Natural Resources:** One of the world's largest producers of **gold and cocoa.**
Tokara Island 	**News:** Japan has recorded over 1,000 tremors in two weeks near the Tokara Islands. **Details** • **Location:** Between Kyushu and the Amami Islands, in the East China Sea. • It is part of the Ryukyu Arc, a highly seismically active zone.

Place	News & Details
Sudan 	**News:** UN has warned of a worsening humanitarian crisis in El Fasher, capital of North Darfur province in Sudan. **Details** • **Location:** Northeastern Africa. (Capital- Khartoum) • **Bordering Countries:** Egypt, Eritrea, Ethiopia, South Sudan, Central African Republic, Chad and Libya. • Sudan is **Africa's 3 largest** country by area. • **Major rivers:** Blue Nile, White Nile & Arbata. • **Nubian Desert:** Rocky, arid desert in northeastern Sudan. • **Major Ports:** Port Sudan, Osaief Port and Suakin Port. • **Conflict Regions: Darfur & Abyei.**
Lesotho 	**News:** Recently the Union Minister of State for External Affairs visited Lesotho. **Details** • **Location:** It is a landlocked country in Southern Africa. It is **completely surrounded by South Africa**, making it the largest sovereign enclave globally. • It is situated in the **Maloti Mountains.** • **River: Orange River (one of the longest rivers in Africa)** rises in the Lesotho Highlands as **Sinqu River.**
Bitra Island 	**News:** The Lakshadweep administration has notified plans to acquire Bitra Island for defence purposes, leading to strong opposition from locals and political figures. **Details** • **Smallest inhabited island** in Lakshadweep. • Land area: **0.105 sq. km**; Lagoon area: **45.61 sq. km**. • Known for ecological sensitivity and the **shrine of Malik Mulla**, a revered Arab saint. **Administration:** Governed by the **Lakshadweep Administration** under the Union Territory framework. **Geographical & Climatic Features:** • Surrounded by coral reef-protected lagoon — remains calm even during the monsoon. • Tropical, humid climate similar to Kerala. • Average rainfall: 1600 mm/year. • Population (2011): 271 residents across 105 families. **Strategic Importance:** • Lies close to major international shipping lanes in the Arabian Sea. • Offers proximity to Strait of Hormuz and Malacca Strait — critical for maritime surveillance. • Proposed as a naval outpost to enhance India's Maritime Domain Awareness (MDA). • It would complement INS Dweeprakshak (Kavaratti) and INS Jatayu (Minicoy). **Defence Justification:** Authorities cite strategic necessity and logistical challenges of civilian presence on defence-sensitive islands. **Public Opposition and Legal Process:** • "Save Bitra Island" campaign launched; includes protests and social media mobilisation. • Acquisition to follow Land Acquisition, Rehabilitation and Resettlement Act, 2013. • A Social Impact Assessment (SIA) has been ordered; survey to be completed in two months.

Place	News & Details

Kalu river



News: More than 300 trekkers were saved in a 7-hour-long rescue mission near the Kalu River in Maharashtra's Malshej Ghat region

Details:

- The Kalu River is a seasonal, monsoon-fed river that originates in the Kalsubai–Harishchandragad Wildlife Sanctuary and winds through the Sahyadri hills before merging with the Ulhas River.
- **Source**: It begins at Tolar Khind near Harishchandragad Peak, close to the Pimpalgaon Joga Dam in Pune district.
- Flowing westward, it creates the scenic Kalu Falls near Savarne in the Malshej Ghat region and passes through the village of Khireshwar.
- Along its course, it is joined by the Doifodi River at Saralgaon and later by the Bhatsa River near Ambivali.
- **Mouth:** The Kalu River eventually meets the Ulhas River near Atali village, with the combined waters draining into Vasai Bay on the Arabian Sea coast.
- It forms an important part of the west-flowing Konkan drainage system.

INTERNATIONAL RELATIONS & INTERNAL SECURITY

TOPICS FOR MAINS

PM's visit to Maldieves

Syllabus Mapping: GS-2 Neighbourhood of India

Context:

PM Modi was invited as Guest of Honour for the Maldives' 60th Independence Day, symbolising a diplomatic reset.

Transition in Relationship:

The initial phase of President Mohamed Muizzu's term was marked by the "India Out" campaign and strong anti-India rhetoric, leading to a visible strain in bilateral ties. However, both nations have gradually transitioned towards a more **pragmatic, non-partisan, and quality-focused diplomacy**, recognising the strategic and developmental importance of their relationship.

Political strained relationship:

- **"India Out" Campaign:** Led by Mohamed Muizzu's party before the 2023 presidential elections.
  - E.g. Alleged excessive Indian influence in Maldives' internal affairs, especially regarding Indian military presence.
- **Demand for Withdrawal of Indian Personnel:** President Muizzu formally requested the removal of Indian military personnel stationed in the Maldives for operating humanitarian aircraft (e.g., Dornier aircraft, helicopters).
- **Increased Chinese Engagement:** Maldives signed infrastructure deals with China and supported BRI initiatives, triggering strategic concerns in New Delhi.

It was Maldives tilting entirely toward China in the geopolitical competition.

- **Public and Political Rhetoric:** Rising anti-India sentiments were echoed in sections of the Maldivian media and political discourse, straining the people-to-people connection.

Shift Towards Pragmatic Engagement

- **Modi's Visit to Maldives (July 2025):**.India and the Maldives exchanged eight important agreements covering debt repayment, fisheries, digital payment.
- **Continued engagement:** Despite provocations, India continued to engage. It understood domestic compulsions of Muizzu's demands and replaced its 76 troops with technicians in May 2024, overcoming their biggest bilateral hurdle
- **Economic Aid:** India continued developmental aid for the Maldives
  - E.g. PM Modi announced a credit line of $565 million to support development projects in the Maldives.
  - India also rolled over three Treasury Bills worth US$150 million and offered currency swaps worth US$750 million to sustain the Maldivian economy.
  - In Budget 2025, India's aid to Maldives was increased by ₹120 crore compared to last year's allocation.
- **Concerning India's interest:** Maldives shown sensitivity to India's interest
  - E.g. Maldives shifted one of its Chinese agriculture projects, after India expressed concerns about it near the India-funded Uthuru Thila Falhu (UTF) harbour.
- **Infrastructure development:** The focus of relation is finishing the existing major projects to efficiently tap into its source of finance and reduce delay-related costs.
  - E.g. the Hanimadhoo airport project, as well as 4,000 housing units, are expected to be fully operational starting August 2025.
- **Maldives non-partisan policy:** Historically, the Maldivian Democratic Party (MDP) has enjoyed a cordial relationship with India, while the PNC has fostered good relations with China. However, Muizzu replaced his partisan policy with a pragmatic one.
  - E.g. This will be the first time, since its democratic transition in 2008, that an Indian PM will be visiting the Maldives under a non-MDP administration.

Significance of Maldives for India

- **Trade:** In 2021, India became the Maldives' third-largest trading partner.
  - **Eg:** Bilateral trade stands at **US $ 290.27 million.**

- **Maritime:** The strategic location of the Maldives in the Indian Ocean, instils the two countries to regularly conduct **joint naval exercises.**
  - **Eg**: Exercises like **Dosti and Ekatha series**
- **Tourism sector:** In 2019, India was the **2nd largest** source of tourist arrivals in Maldives **(23%** market share)
- **Geographical Location:** Maldives is strategically located in the **gateway between** the choke points of **Western (Gulf of Aden and the Strait ofHormuz) and Eastern (Strait ofMalacca) Indian Ocean.**
- **Economic Significance**: More than **97% of India's total international trade by volume and 75% by value** passes through this region.
- **Strategic Significance**: China is rapidly undertaking naval expansion into the Indian Ocean.
  - **Eg:** Maldives is a party to **(SAARC) and the South Asia Subregional Economic Cooperation (SASEC)**
- **Indian Diaspora**:There are numerous Indians employed in the **Maldives' education and medical care** systems, as well as in the **tourism and hospitality sector**.

BRICS Summit

Syllabus Mapping: GS-2 Global Groupings

Context:

The 17th BRICS Summit convened under Brazil's presidency in Rio de Janeiro on July 6–7, 2025 against the backdrop of accelerating geopolitical realignments.

Key Focus Areas at the Rio de Janeiro Summit (17th BRICS Summit)

- Brazil assumed the BRICS Chairship on 1 January 2025 with the theme as **'Strengthening Global South Cooperation for more Inclusive and Sustainable Governance'**
- At the end of this summit, the **"Rio de Janeiro Declaration"** was adopted.

It discussed following agenda:

- **Multilateralism:** It reaffirmed their commitment to multilateralism and to defending international law, including the UN Charter.
- **Global South:**
  - calls for the increased participation of developing countries, particularly those in Africa, Latin America and the Caribbean, in global decision-making.
  - emphasize the importance of the Global South as a driver of positive change, especially amid significant international challenges—including escalating geopolitical tensions, protectionist measures and migration challenges.
- **Finance:** emphasized the need to increase IMF quotas and World Bank shareholding of emerging and developing countries.
- **Health:** reaffirmed their commitment to strengthening global health governance by enhancing international cooperation and solidarity
- **AI:** For the first time, artificial intelligence (AI) governance plays a prominent role in the BRICS agenda.recognize that AI presents a unique opportunity. However, to achieve this, global AI governance must mitigate potential risks and meet the needs of all countries, including those in the Global South.
- **Climate Change:** recognized the **Tropical Forest Forever Fund (TFFF)** as an innovative mechanism to mobilize long-term financing for tropical forest conservation **three other documents** reflecting the priorities of the Brazilian presidency were approved:
- BRICS Leaders' Framework Declaration on Climate Finance,

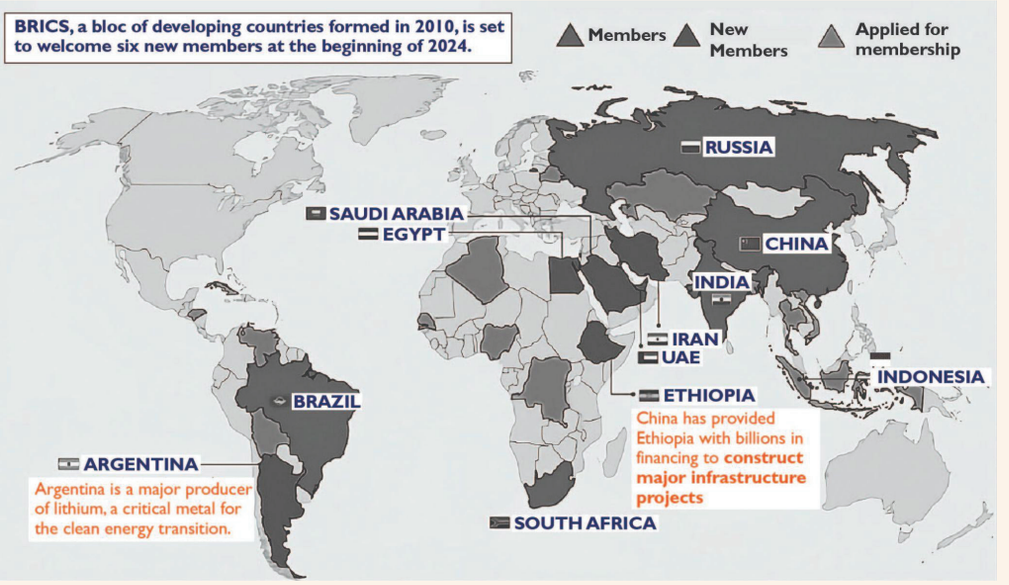
- BRICS Leaders' Declaration on Global Governance of Artificial Intelligence, and
- BRICS Partnership for the Elimination of Socially Determined Diseases

Key Initiatives from the 2025 Summit

- **BRICS Multilateral Guarantee Mechanism (BMG)**: launched under the aegis of the **New Development Bank (NDB)**. This initiative is designed to **mobilize private capital** for critical infrastructure development,
- **BRICS Pay and National Currency Settlement Frameworks:** While the idea of a common BRICS currency was shelved, the bloc, with **India's strong support**, endorsed **bilateral and multilateral trade settlement in local currencies**.

BRICS GROUPING

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



Reason for recent increase in the membership:

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

Bodies created by BRICS

New Development Bank (NDB)

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

Contingent Reserve Arrangement (CRA)

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

India & Global South: Restructuring Modalities of Engagement

Syllabus Mapping: GS-2 South-South Cooperation

Context

India has expanded development partnerships with the Global South, primarily through Line of Credits (LoCs). However, debt crises and shrinking global aid now demand a shift towards balanced, innovative, and cooperative engagement models.

What Has India Been Doing?

- **Rising Development Cooperation**: India's development cooperation with the Global South has expanded rapidly, with total outflows rising from $3 billion in 2010-11 to $7 billion in 2023-24.
  - **Market Access:** Duty-free tariff preference schemes for Least Developed Countries (LDCs).
- **Promoting South-South Solidarity:** Advocacy for Global South issues at forums like G-20, BRICS, and the Voice of Global South Summit (VoGS).
  - Proposal for a **Global Development Compact (GDC)** to balance modalities of engagement.

Global Development Compact (GDC)

- It is a time-tested Indian development cooperation model based on domestic priorities of partner countries. It proposes to alleviate developmental concerns of the Global South in a holistic manner.
- It is based on India's development journey and experiences of development partnership
- **Key Modalities of Engagement**:
  - **Lines of Credit (LoCs):** Main instrument under Indian Development and Economic Assistance Scheme (IDEAS), funding infrastructure, health, education projects.
  - **Capacity Building:** Flagship programmes like Indian Technical and Economic Cooperation (ITEC), e-ITEC, and Pan Africa e-Network to train officials and professionals.
  - **Technology Transfer:** Sharing affordable technologies in health, agriculture, and digital public infrastructure (e.g., UPI, CoWIN platform).
  - **Grants and Concessional Finance:** Direct grants for social sector projects.

Problems and Challenges Faced

- **Sovereign Debt Crisis in Partner Countries:** Many recipient countries face debt distress, making repayment of LoCs uncertain.
  - **E.g.,** Zambia defaulted on its sovereign debt in 2020 and was unable to repay India's Lines of Credit, leading to a debt restructuring agreement with India's Exim Bank in 2024.
- **Red Flags on Lines of Credit:** Ministry of Finance has cautioned against continued over-reliance on LoCs, especially amid global liquidity crises and repayment risks.
- **Declining Global Development Finance:** Shrinking Official Development Assistance (ODA) from traditional donors (from $214 billion in 2023 to a proposed $97 billion), compounded by geopolitical tensions and economic crises.
  - E.g. Trump's administration severely scales back foreign aid with the dismantling of the US Agency for International Development (USAID)
- **Resource Constraints and ODA Politics:** OECD-DAC (Organisation for Economic Co-operation and Development – Development Assistance Committee) dominance in development finance sets restrictive terms, often misaligned with Global South priorities.
  - **E.g.,** Aid from DAC members often comes with "tied aid" conditions—requiring recipient countries to **procure goods and services only from the donor country** or other specified countries.

The Development Assistance Committee is an international forum of 33 members (Australia, U.K., U.S., etc) largest providers of aid.

- **Rising Cost and Unpredictability of Borrowing:** Global capital market volatility has made it harder and costlier for India to borrow and extend concessional finance.

- **Implementation and Impact Issues:** Sometimes, Indian assistance projects face criticism over slow execution or limited alignment with local needs.

What India Needs to Do

- **Rebalance Modalities of Engagement:** Move away from LoC-dominated approach to a **balanced mix**: expand grants, technical cooperation, market access, and technology transfer.
- **Promote Triangular Cooperation (TrC):** Pool resources and expertise with like-minded countries (e.g., Germany, Japan, Brazil) for development in third countries, especially in Africa and Latin America.
  - **E.g.,** India and Germany signed a Joint Declaration in 2022 to implement TrC projects in Africa and Latin America (Cameroon, Ghana, Malawi, and Peru).
- **Strengthen Capacity Building and Technology Sharing:** Scale up programmes like ITEC, digital public infrastructure exports, and knowledge exchanges tailored to partner needs.
- **Leverage Partnerships for Scale and Impact:** Engage with global institutions (G-20, World Bank, African Union) and private sector for co-financing and greater impact.
- **Ensure Debt Sustainability:** Design financing models that prioritize debt sustainability and support for countries in distress.
- **Champion the Voice of the Global South:** Continue to highlight Global South concerns in global forums, and drive collective bargaining for fairer development finance and technology flows.

500% Tariff Bill in US: Impact on India

Syllabus Mapping: GS-2 Bilateral Relations

Context

US Senator Lindsey Graham is set to propose legislation that would impose a 500% tariff on US imports from countries that maintain trade relations with Russia.

More about news

- The legislation is the **Sanctioning Russia Act of 2025 (S. 1241)**, introduced by Graham and co-sponsored largely bipartisan in the Senate
- Under S. 1241, the President **could impose a mandatory 500% tariff** on imports from any country that knowingly purchases Russian energy products, as part of a strategy to pressure Moscow into peace negotiations
- Senator Lindsey Graham warned tariffs will target major Russian oil importers to crush their economies
- Graham claims India, China, Brazil buy 80% of Russia's crude exports sustaining Putin's war effort

Impacts of the Proposed US Bill on India

- **Threat to Indian Exports:** Indian goods exported to the US could become uncompetitive if subjected to a 500% tariff, severely affecting several sectors.

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 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 Kore**a faces a similar tariff rate of 25%.

Disruption of Supply Chains: Indian businesses reliant on exports to the US may face contract losses, reduced orders, and supply chain disruptions.

- **Potential Retaliation:** India might be forced to consider counter-measures or diversify its export markets.
- **Strain Relations:** India's longstanding policy of balancing relations between the US and Russia will be severely tested, possibly leading to friction with either or both countries.
- **Defence & Energy Security:** Since India relies on Russia for critical defense hardware and energy imports, any reduction in ties could impact national security.
- **Internal Divisions:** The issue could fuel debate within India among pro-Russia (Russophiles) and pragmatic (Russoskeptic) camps, impacting policy decisions and public opinion.
- **Economic Costs:** Industries dependent on Russia for cheap oil or defense equipment may lobby to maintain ties, while export-driven sectors may push for realignment with US interests.
- **China Factor:** Weakening ties with Russia could push Moscow closer to China and possibly Pakistan, altering the strategic landscape in Asia to India's disadvantage.
- **Pressure on Strategic Autonomy:** India's pursuit of an independent foreign policy ("strategic autonomy") could come under strain, impacting its global diplomatic leverage.
- **International Perception:** India's stance on the Russia-Ukraine conflict will be under global scrutiny, affecting its reputation as a neutral, balancing power.
- **Risk of Economic Isolation:** If multiple countries join the US in imposing similar measures, India could face broader economic challenges.

Way Forward

- **Intensify Diplomatic Engagements:** Proactively engage with both the US and Russia to explain India's position, seek exemptions, and highlight the need for a pragmatic, multi-aligned foreign policy.
- **Diversify Trade & Energy Sources:** Accelerate efforts to diversify India's export markets and reduce overdependence on any single country for critical imports such as energy and defense equipment.
- **Strategic Policy Balancing:** Maintain a careful balance in relationships, ensuring neither the US nor Russia feels alienated, while safeguarding India's strategic and security interests.
- **Strengthen Domestic Manufacturing:** Invest in domestic capacity-building for defense and energy to reduce vulnerabilities stemming from external pressures or supply chain disruptions.
- **Multilateral Collaboration:** Work with other major economies and multilateral forums to build consensus on avoiding unilateral sanctions, promoting dialogue over punitive economic measures.

China-Pakistan Collusion: Implication for India

Syllabus Mapping: GS-2 Neighbourhood of India

Context

China and Pakistan's deepening strategic ties pose complex security challenges for India.

Deterioration of Relations Between India and China

- **Border Tensions:** Regular standoffs and violent clashes (e.g., Galwan 2020, Doklam 2017) have soured relations, undermining trust and diplomatic engagement.
- **Trade Imbalances & Technology Rivalry:** Persistent trade deficits, bans on Chinese apps, and scrutiny of Chinese investments have added friction.
- **Geopolitical Competition:** India's alignment with Quad (US, Japan, Australia), Indo-Pacific initiatives, and deeper ties with the US have heightened Chinese suspicions.
- **Diplomatic Setbacks:** China's blocking of India's bid to designate Pakistan-based terrorists at the UN, and its stance on Jammu & Kashmir, have created further discord.
- **Recent Developments:** China's support for Pakistan after incidents like Operation Sindoor, and hosting trilateral meetings without India, highlight a hardening of positions.

Deepening China & Pakistan Ties

- **Defence and Military Cooperation:** China is Pakistan's **largest arms supplier**. Over 80% of Pakistan's arms imports are from China

  - Examples: JF-17 fighter jets (co-produced), HQ-9/P air defence system, VT-4 tanks, SH-15 howitzers.
  - Ongoing talks for supply of **J-10C** and potentially **J-35 stealth fighters**.
- **Joint Military Exercises:** Regular drills like **"Warrior"** and **"Sea Guardians"** (Navy) enhance interoperability.
- **Technology Transfers:** Support in **drone warfare**, satellite navigation via **BeiDou**, missile guidance systems, and radar technologies.
  - **E.g.,** Reports of joint development of UAVs and naval platforms.
- **Nuclear and Missile Collaboration:** China's role was key in helping Pakistan develop its **nuclear weapons program** during the 1980s and 1990s.
  - Assistance in missile technologies like the **Shaheen** and **Ghauri** series.
  - China's **nuclear power plants** (e.g., Chashma units, Karachi Nuclear Power Plant) have helped Pakistan's civilian energy program.
- **Strategic and Diplomatic Shielding:** China has repeatedly used its **veto or delay power** in the UNSC to shield Pakistan-based terrorists (e.g., Masood Azhar).
  - Cooperation in **Shanghai Cooperation Organisation (SCO)**, **BRI**, and **G77**.
  - Joint opposition to India's inclusion in groups like **NSG (Nuclear Suppliers Group)**.
- **Economic Cooperation :** Flagship project under the **Belt and Road Initiative (BRI)**.
  - ~$62 billion in Chinese investments in Roads, railways, energy, fiber optic connectivity, and the Gwadar Port.
  - Give China access to the Arabian Sea, bypassing the Strait of Malacca.
  - Built and operated by China, gives Beijing a **logistical hub** near the Strait of Hormuz.
  - Potential dual-use (civilian and military) infrastructure.
- **Economic Support:**; Pakistan owes China $29 billion in loans; CPEC (China-Pakistan Economic Corridor) is a flagship BRI project.
- **Cyber and Digital Infrastructure:** Chinese tech firms like **Huawei** and **ZTE** support Pakistan's **digital infrastructure**, telecom, and surveillance systems.
- **Intelligence and Security Cooperation:** Reports of Chinese personnel monitoring weapons use during Pakistani military operations.
  - Intelligence sharing on Indian deployments and activities, especially around PoK and Ladakh.
- **People-to-People and Institutional Linkages:** Scholarships and cultural exchanges under **Confucius Institutes** and **Belt and Road scholarships**.
  - Military officers from Pakistan trained in **PLA academies**.
- **Trilateral Engagements:** By convening trilateral meetings (with Afghanistan, Bangladesh), China elevates Pakistan's regional relevance and aims to encircle or distract India.
- **Backdoor Influence:** China leverages Pakistan's historical ties with Bangladesh and Afghanistan to foster cross-border terrorism and create security dilemmas for India.

Challenges for India

- **Two-Front Military Pressure:** Risk of simultaneous pressure from **Western (Pakistan)** and **Northern/Eastern (China)** fronts.
  - China's strategic support enables Pakistan to maintain a credible military threat despite economic distress.
- **A China-led trilateral nexus:** China recently hosted the first trilateral meeting with Pakistan and Bangladesh in Kunming, a gathering seen by some as China's effort to make Pakistan a stakeholder in the region.
- **Strategic Encirclement:** Projects like **CPEC**, port development in **Gwadar** and **Djibouti**, and ties with **Nepal, Sri Lanka, and Maldives** increase China's regional influence.
- **Diplomatic Isolation:** Sino-Pak coordination complicates India's efforts at international forums, especially on **terrorism**, **Kashmir**, and **NSG membership**.
- **Proxy and Grey-Zone Threats:** Use of **non-state actors**, **cyber operations**, and **coordinated psychological warfare** make attribution and retaliation difficult.
- **Economic and Technological Competition:** China's technological backing strengthens Pakistan's indigenous capabilities in drones, cyber tech, and surveillance.

How India Can Tackle the China–Pakistan Nexus

- **Military Preparedness & Modernisation:**
  - **Integrated Theatre Commands (ITCs)**: For seamless coordination between services across multiple fronts.
  - **Surveillance and ISR**: Expand indigenous satellite networks, drones, and radar systems.

  - **Border Infrastructure**: Accelerate road and logistics development on both eastern and western borders.
- **Diplomatic and Strategic Outreach:**
  - **Engage the Global South** and major powers (U.S., France, Japan) for support in international forums.
  - **Backchannel Diplomacy with China**: Keep de-escalation channels open to avoid miscalculations.
  - Strengthen ties with **Central Asia, ASEAN, and Africa** to balance Chinese influence.
- **Technology and Cyber Resilience: Indigenise defence production** via DRDO-DPSU-private sector collaboration.
  - Expand capabilities in **cyber warfare**, **AI-enabled command and control**, and **EW systems**.
- **Internal Security and Counter-Proxy Capabilities:** Sharpen intelligence capabilities to counter cross-border terror and misinformation campaigns.
  - Expand cooperation with **Israel, U.S.**, and **EU** on counter-terrorism and cyber defence.
- **Economic Strategy:** Reduce dependency on Chinese supply chains through **PLI schemes** and **critical mineral alliances**.
  - Offer alternatives to Chinese-led infrastructure in South Asia via **India-Middle East-Europe Corridor (IMEC)** and **Act East Policy**.

India's Strategy to diminish China's Regional Hold

- **Robust Military Response:** India's assertive retaliation to Pakistan-sponsored attacks (Uri, Pulwama, Pahalgam) and proactive defence of border areas (Galwan, Doklam) have raised the costs for adversaries.
- **Diplomatic Outreach:** India has used its economic and diplomatic clout to isolate Pakistan and build strategic partnerships (Quad, closer ties with ASEAN, US, Europe).
- **Regional Engagement:** India has strengthened ties with neighbours like Sri Lanka, Maldives, and Nepal by addressing economic needs, respecting political redlines, and providing developmental aid.
- **Limiting Chinese Influence:** Despite China's BRI push, India's pragmatic diplomacy and economic support have made countries like Sri Lanka, Maldives, and Nepal cautious about over-dependence on China.
- **Maintaining Redlines:** India's clear signalling—through trade, diplomatic moves, and military preparedness—has constrained China's manoeuvrability in South Asia.
- **Multi-dimensional Approach:** India combines security, economics, and soft power, offering attractive alternatives to China's approach, especially as regional countries balance ties for their own interests.

India–U.K. Free Trade Agreement (FTA) and Global Capability Centres (GCCs)

Syllabus Mapping: GS-2 Bilateral Relations

Context

The United Kingdom-India Free Trade Agreement could be a catalyst for deeper engagement in the GCCs.

Significance of the India-UK Free Trade Agreement (FTA)

- **Strengthening Bilateral Ties**: The FTA is poised to redefine India-UK economic relations, moving beyond traditional trade to focus on services, innovation, and talent exchange.
- **Post-Brexit Opportunity for the UK**: The FTA offers the UK access to one of the world's fastest-growing digital and services economies—India—helping reinforce its global role in services and tech.
- **Economic Boost for India**: For India, the FTA promises increased UK investment, alignment with digital skilling goals, and expansion of high-value service exports.
- **Enabling Framework**: By addressing double taxation, data localisation issues, and regulatory mismatches, the FTA can remove key barriers faced by businesses.

What are GCC's ?

- It is a strategic outpost/branch set up by multinational corporations (MNCs) to perform specialised functions for their parent organisation.
- **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.

  - **Shaping Future:** GCCs are no longer support centres; they're shaping product roadmaps, driving AI innovation, and redefining digital infrastructure.
- India hosts over 50 percent of the world's GCCs. 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.
- **Geographic representation:** North America headquartered companies account for 70% of GCCs in India followed by Europe (20%).
- **Potential:** By 2030, India's GCC landscape is forecast to support a USD 100+ billion market and employ more than 4.5 million professionals.
- **Nano GCC:** In today's fast-evolving business landscape, Nano GCCs are emerging as the next-generation offshore hubs — compact, highly focused, and strategically designed to tackle niche challenges.

FTA a Catalyst for Global Capability Centres (GCCs)

- India hosts over 1,500 GCCs, employing 1.9+ million professionals. These centers serve as innovation hubs for global corporations in R&D, cybersecurity, analytics, etc.
- British firms increasingly see India not as a cost-cutting hub but as a co-innovation partner for high-end digital solutions.
- The agreement can facilitate smoother movement of professionals and harmonised digital/data governance—key to scaling GCCs serving UK-based firms.
- **Harmonizing Intellectual Property Standards:** FTAs can align India's IP framework with global standards (like UK/EU/US), giving MNCs confidence in IP protection for sensitive R&D, AI models, proprietary tools, etc.
- **Address practical Challenges:** I**ndia–UK FTA** can also help address **practical challenges** faced by **Global Capability Centres (GCCs)**, such as **double taxation, data localisation, and regulatory friction**
- With proper policy backing, Indian GCCs can climb higher up the global value chain and attract more British collaborations.

Government Push for GCCs

- **Central Government Initiatives**:
  - **National GCC Framework (Budget 2025)**: Under MeitY, in collaboration with NASSCOM, KPMG, Zinnov, and Invest India, a framework is being created to guide states on talent, infrastructure, and legal facilitation.
  - **No National Policy Yet**: Despite rapid organic growth, there is no single national policy, prompting debate on whether one is needed.
- **State-Level Momentum**:
  - **Uttar Pradesh Exampl**e: Hosted its first GCC Conclave (with TCS, Microsoft, HCL, etc.) showcasing tier-2 cities (Lucknow, Varanasi) as new GCC destinations.

Likely Impact of the FTA and GCC Growth

- **Boost to Innovation & Employment**: More GCCs mean high-skill job creation and R&D growth, aligning with India's digital transformation goals.
- **Cross-Border Talent Mobility**: Easier professional movement between the UK and India could enhance talent exchange and diversity in both markets.
  - E.g. India's talent pool becomes more globally integrated and future-ready.
- **Knowledge Corridor**: GCCs can help build a robust India-UK knowledge economy corridor, driving global competitiveness.
- **Investor Confidence**: A well-designed FTA addressing real-world business frictions (e.g., taxation, data issues) can send strong positive signals to investors.
- **Increased Foreign Investment in Knowledge-Based Services:** A GCC conducive FTA can lead to inflow of capital into India's knowledge economy. The UK, being a leader in **fintech, AI, pharma, and legal services**, may increasingly set up **GCCs in India** to leverage talent at lower costs.
- **Inclusive development:** As GCC demand rises, companies may **expand beyond Tier-1 cities** (like Bengaluru, Hyderabad) to Tier-2/3 locations (like Pune, Coimbatore, Jaipur)
- **Tech Exports from India:** India may also become a **hub for digital and technological exports** — such as AI models, code libraries, and engineering blueprints.

Challenges:

- **Lack of National policy:** Despite India's emergence as the world's leading destination for GCC, there is no dedicated national policy to guide, support, or scale this sector strategically.

- **Compliance Complexities:** Companies face legal uncertainty and compliance burden.
  - E.g. **Complex tax regime** with overlapping rules on **direct tax, transfer pricing, and withholding taxes**.
- **Intellectual Property Protection Concerns:** It limits trust and restricts high-end R&D work.
  - E.g. Despite progress, concerns remain about **IP co-ownership clarity** between HQ and Indian GCC
- **Skilled Talent Shortages in Niche Areas:** While India has a large tech talent pool, there is a **shortage of specialists** in Deep tech (AI, chip design, blockchain)
- **Cybersecurity & Digital Risk Exposure:** GCCs, handling global operations, are prime targets for **cyberattacks and data breaches**.

How terror networks abuse digital tools

Syllabus Mapping: GS-3 Social Media and Terrorism

Context

The "Comprehensive Update on Terrorist Financing Risks" report from the Financial Action Task Force (FATF) reveals that e-commerce platforms and online payment services are being misused for financing terrorist activities.

Platforms Used by Terrorists for Financing Activities

- **E-commerce Platforms:** Terrorists abuse online marketplaces for **operational procurement** (equipment, weapons, chemicals, 3D-printing materials).
  - Use over/under-invoicing, posing as buyers/sellers to move funds.
  - Trade in low-value goods, wildlife, or stolen artefacts to generate and transfer funds.
- **Online Payment Services:** Use of digital wallets, payment gateways, and platforms like PayPal for pseudo-anonymous transfers.
  - **Eg.** FATF highlights past terror incidents such as the 2019 Pulwama attack and the Gorakhnath Temple attack, where digital payments facilitated critical funding.
- **Social Media & Messaging Applications:** Integration of e-commerce and payment functions allows **direct transactions** without leaving the app.
  - Used for fundraising, propaganda, and selling/buying goods linked to terror finance.
- **Crowdfunding Sites:** Raising funds under false pretenses (e.g., fake charities or causes) that are redirected for terrorism.
- Microfinance Models: Emerging microfinancing models is utilized by lone actors, often through small, legitimate sources of income.
  - E.g Report features a case study by India on use of online payment service and VPNs to fund lone actor terrorist act.
- **Encrypted messaging apps:** It continue to be a regulatory gap and are used to promote donation campaigns and share payment instructions, including wallet addresses
- **Virtual Assets & Blockchain:** Cryptocurrencies and blockchain-based transfers offer **pseudo-anonymity** and global reach. Asset transfers can bypass banks and traditional financial checkpoints.
  - Exploited for fundraising and cross-border transfers.
- **Informal Mechanisms:** Cash couriers, **hawala** networks, and money mules remain widely used, especially in regions with weak financial oversight.
- **Legal Entities:** Shell companies, trusts, and certain non-profit organisations are used to obscure fund flows and bypass scrutiny.
- **Gaming Platforms:** Gaming and gaming-adjacent platforms are also used to generate income from streaming, game sales, and donations – offering both financial and recruitment opportunities.

FATF Recommendations To Stop it

- **Address Transnational Risks:** Promote **international cooperation** to tackle cross-border terror financing, as digital platforms transcend national boundaries.
  - Prioritize **multilateral designation** of terrorist organizations (e.g., under UN Security Council sanctions).
- **Expand Regulatory Oversight:** Bring **social media, messaging platforms, and e-commerce services** under the scope of AML/CFT (Anti-Money Laundering/Countering Financing of Terrorism) standards.
  - E.g. Enforce robust **KYC** norms for digital wallets, crypto exchanges, payment apps like PayPal, and e-commerce platforms.
- **Monitoring of E-Commerce Transactions:** Use tech-Based Transaction Analysis to deal with the dubious transaction.
  - E.g. Use **AI and blockchain analytics tools** to track suspicious patterns in purchases (e.g., 3D-printing materials, chemicals, etc.).
- **Social Media & Messaging Regulation**
  - **Monitor Fundraising on Apps**: Collaborate with tech firms to detect in-app transactions linked to extremist propaganda or illegal fundraising.

  - **Flag and Block Violations:** Create rapid-response mechanisms to block terror-linked content and transactions.
- **Engage the Private Sector:** Foster **public-private partnerships** between governments, financial institutions, tech companies, and e-commerce platforms to share intelligence and best practices.
- **Improve Risk Analysis and Surveillance:** Regularly update **national, sectoral, and emerging risk assessments** to detect and address new terrorist financing schemes.
- Strengthen Regulation of Digital Financial Platforms

What will be the effect of rising military spending?

Syllabus Mapping: GS-3 Armed Forces

Context

The North Atlantic Treaty Organization (NATO) summit in June pledged to increase military spending to **5% of the member nations' GDP** (specifically "core defence requirements as well as defence and security-related spending by 2035").

Historical Trajectory of Military Expenditures

- **Cold War Era (1947-1991):**
  - Military spending peaked, reaching **6.1% of global GDP in 1960**.
  - Driven by arms race between the US and USSR.
  - In the final Cold War year (1991), military spending was **3% of global GDP**.
- **Post-Cold War Decline (1991–1998):**
  - Significant reduction in global tensions led to a steady fall in spending.
  - **Lowest point in 1998: 2.1% of global GDP**, around $1,100 billion.
- **Gradual Increase (2000s-2010s):**
  - Resurgence due to regional conflicts, terrorism, and new security challenges.
  - By **2015, it was 2.3% of global GDP**.
- **Recent Surge (2020s):**
  - Major conflicts (Russia-Ukraine, Israel-Gaza, India-Pakistan, Israel-Iran) triggered rapid increases.
  - **2024: 2.5% of GDP ($2,718 billion), up 9.4% in one year—the sharpest rise since 1988.**

Top 5 Military Spending Countries (2024)

1. **United States:** $997 billion, 3.4% of U.S. GDP.
2. **China:** $314 billion, about 1.7% of GDP.
3. **Russia:** $149 billion, at 7.1% of its GDP.
4. **Germany:** $88.5 billion, ~1.9% of GDP.
5. **India:** $86.1 billion, around 2.3% of GDP

Biggest Spenders as Share of GDP (excluding active war zones)

1. **Saudi Arabia:** 7.3%
2. **Poland:** 4.2%
3. **United States:** 3.4%

Effects of Increased Military Spending

- **Crowding Out of Social & Developmental Expenditure:** Diverts resources from health, education, poverty reduction, and climate mitigation.
  - UN's annual budget ($44 billion) is dwarfed by military spending ($2.7 trillion).
- **Setback to UN and Global Peace Initiatives:** Cuts in foreign aid (e.g., closure of USAID) weaken development, humanitarian, and peacekeeping programs.
- **Undermining Progress on Sustainable Development Goals (SDGs):** Reduced funds slow efforts to end poverty, improve health services, and achieve universal healthcare.
  - **Example:** USAID's withdrawal may result in 14 million additional deaths by 2030.
- **Impact on Climate Change:** Increased defence activity raises greenhouse gas emissions (e.g., a 3.5% NATO GDP target = 200 million extra tonnes annually).
  - Funds diverted from climate mitigation, despite rising climate emergencies.

- **Resource Misallocation:** Scarce public funds are allocated to weapons and military rather than addressing basic needs and public welfare.
  - In 12 days, the U.S. spent $1 billion on missile interceptors (comparable to one-sixth of the UN's half-year receipts).
- **Global Inequality:** Military spending is concentrated in a few countries, exacerbating inequalities in global security and development.
- **Threat to Long-Term Human Well-being:** Peace is not just the absence of war, but requires investment in life-sustaining conditions; increased military budgets undermine this holistic peace.

How is India Affected by Increased Military Spending?

- **Budgetary Trade-offs:** Higher defence allocations reduce fiscal space for essential sectors like health, education, and welfare.
  - Example: In 2023-24, India allocated ₹6.81 lakh crore to defence, while Ayushman Bharat health insurance received only ₹7,200 crore.
- **Low Public Health Spending:** Despite rising defence spending (2.3% of GDP), public health spending remains low (1.84% of GDP), far below both the national target (2.5%) and developed country averages (~10%).
- **Strain from Emergency Expenditure:** Operations like "Operation Sindoor" led to emergency allocations (₹50,000 crore), straining the overall budget further.
- **Regional Security Dilemmas:** Arms build-up fuels security competition with neighbours (China, Pakistan), creating a military spending spiral and perpetuating fiscal stress.
- **Soft Power Erosion:** High defence focus may divert resources from **development assistance** and climate diplomacy, reducing India's influence in the Global South.
- **Border Area Development:** Focus on military hardware may overshadow **infrastructure and socio-economic development** in border regions, fueling local discontent and insurgency (e.g., Northeast).

Maharashtra's 'urban Maoism' Bill

Context

The Maharashtra Legislative Assembly passed by a voice vote the stringent Special Public Security Bill, 2024 that seeks to tackle "unlawful activities of left-wing extremist organisations".

What is Urban Maoism?

- It refers to the influence and activities of left-wing extremist (Naxal/Maoist) groups in urban areas, focusing on **ideological spread, recruitment, logistics, and support for rural armed cadres**.
- **Modus Operandi:** Involves creating front organizations, mobilizing students, intellectuals, and civil society, generating propaganda, and providing urban safe havens ("urban dens") for underground cadres.
- **Objective:** To extend Naxal influence beyond rural strongholds, exploit urban grievances, and destabilize state structures through subversive activities.

Key Provisions in the Special Public Security Bill, 2024

- **Definition of Unlawful Activity:**
  - Interfering with public order or law administration
  - Overawing public servants by criminal force
  - Acts of violence, vandalism, or generating public fear
  - Disrupting communications (road, rail, air, water)
  - Encouraging or practising disobedience to law
- **Powers to Declare Organisations Unlawful:** Government can declare organizations "unlawful"
  - Confirmation required by an Advisory Board (three HC judges/qualified persons)
- **Penal Provisions:** Punishments: 2–7 years' imprisonment and fines for membership, raising funds, managing, or assisting unlawful organisations, or committing "unlawful activity"
- **Nature of Offences:** Cognizable and non-bailable (arrest without warrant possible)
- **Forfeiture of Property:** District Magistrate/Police Commissioner can seize/evict properties used for unlawful activities, with 15 days' notice—even before conviction
  - Special provision for women/children to vacate
- **Appeal Mechanism:** Affected party can appeal forfeiture to High Court within 30 days

Issues Associated with the Bill

- **Overbroad and Vague Definitions:** Terms like "practising disobedience" and "disrupting communication" can criminalize legitimate protests, strikes, or dissent.
- **Potential for Misuse:** Wide discretionary powers to police and administration, risking targeting of activists, journalists, or political opponents.
- **Weak Procedural Safeguards:** Property can be seized before conviction, violating presumption of innocence; reversal of burden of proof on accused.
- **Comparison with Central Laws:** UAPA and PMLA have higher thresholds for what constitutes "terror" or "proceeds of crime" and quasi-judicial checks; this Bill covers a wider net with weaker checks.
- **Impact on Civil Liberties:** Risk of stifling free speech, assembly, and lawful dissent; possibility of infringing on constitutional rights (Articles 19 & 21).
- **Judicial Review Limited:** While appeal is possible, initial property loss or arrest can occur before judicial scrutiny, causing hardship.

TOPICS FOR PRELIMS

Quad

Context

The **Quad Foreign Ministers** have strongly condemned the **Pahalgam terror attack** and called for the **perpetrators to be brought to justice without delay.**

About Quadrilateral Security Dialogue (QUAD)

- It is a strategic forum of four countries: **India, United States, Japan, and Australia.**
- **Purpose:** To promote a free, open, and inclusive Indo-Pacific region, and to ensure rules-based order, maritime security, and regional stability.
- **Origin:** First initiated in 2007 by Japanese Prime Minister Shinzo Abe, but lapsed soon after; revived in 2017 amid growing concerns about China's assertiveness in the Indo-Pacific.
- **Nature of Cooperation:** Not a military alliance, but focuses on cooperation in areas such as maritime security, counterterrorism, cyber security, supply chains, climate change, and health (COVID-19 vaccine distribution).
- **Significance of QUAD for India:**
  - **Strategic leverage** against China's "**String of Pearls**" and aggression.
  - **Economic benefits** through initiatives like, **Blue Dot Network**, and **Supply Chain Resilience Initiative**.
  - Enhances **Indian maritime security** via joint drills and patrols.
  - Boosts **regional stability** and **rules-based order** in the Indo-Pacific.
  - **Post-COVID diplomacy**: Leverage to attract industries exiting China.
- **Key Quad Initiatives:**
  - **QUAD Fellowship** – PhD funding in STEM for Indo-Pacific students.
  - **Vaccine Partnership & Covid-19 Global Action Plan** – Boosting vaccine outreach.
  - **Senior Cyber Group** – Promoting cybersecurity standards.
  - **Climate Working Group** – Supporting resilience and adaptation to climate change.
  - **Maritime Exercises:** All QUAD members participate in the annual **Malabar naval exercise.**

Ottawa Convention

Context

Ukrainian President Volodymyr Zelenskyy initiated the process to withdraw from the Ottawa Convention as the war with Russia shows no sign of conclusion.

About Ottawa Convention

- **Other Name:** "Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction". It is also known as **Ottawa Treaty** or **Mine Ban Treaty**
- **Adopted**: December 1997 in Ottawa, Canada.
  - **Entered into Force**: **March 1, 1999**.

- A **legally binding** international agreement.
- **Genesis of the Ottawa Convention:** humanitarian crisis caused by anti-personnel landmines.By the early 1990s, landmines were killing thousands of innocent civilians every year,
- **Objective**: To **eliminate anti-personnel landmines (APLs)** worldwide, reduce civilian casualties, and promote humanitarian disarmament.
- **Members:** 165 Members
  - **India, US, Russia, China, Pakistan, Israel have not joined the treaty, citing national security.**
  - Although India follows the treaty's rules voluntarily by limiting use of landmines or by not exporting them
- **Implementation Body:** Implementation Support Unit under the **Geneva International Centre for Humanitarian Demining (GICHD)**.
- 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.

Ottawa Convention Provisions

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

CARICOM

Context

Caribbean civil society urges Caricom to impose arms embargo on Israel.

About The Caribbean Community (CARICOM)

- A **political and economic union** of 15 member states and 6 associate members in the Caribbean, Atlantic Ocean and Americas.
- **Established:** through **The Treaty of Chaguaramas in 1973.**
- **Member states:** Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago.
- **Headquarters:** Georgetown, Guyana
- **Chairmanship: Rotated every 6 months** among the member countries' Heads.
- **Main Goals:** Promote economic integration and cooperation, Ensure equitable sharing of the benefits of integration and Coordinate foreign policy.

India-Caricom Relation

- Prime Minster of India co-chaired the 2nd India-CARICOM Summit, along with PM Dickon Mitchell of Grenada, the current chair of CARICOM in November 2024.
- During the summit, Prime Minister Modi proposed **7 key pillars to strengthen ties between India and CARICOM.** Seven pillars listed by Modi also form the acronym **C-A-R-I-C-O-M**. They are
  - Capacity Building
  - Agriculture and Food Security
  - Renewable Energy and Climate Change
  - Innovation, Technology and Trade
  - Cricket and Culture
  - Ocean Economy and
  - Medicine and Healthcare.
- First CARICOM-India Summit took place in **2019** on the sidelines of the 74th Session of the United Nations General Assembly (UNGA).

INS Udaygiri

Context

Recently, Yard 12652, named **Udaygiri**, constructed by **Mazagon Dock Shipbuilders Limited (MDSL)**, was officially handed over to the **Indian Navy**.

About INS Udaygiri

- **Background & Construction:**
  - INS Udaygiri (Yard 12652) is the **second of seven frigates** being built under **Project 17A (P-17A)**.
  - Constructed at **Mazagon Dock Shipbuilders Limited (MDSL), Mumbai**, and **Garden Reach Shipbuilders & Engineers (GRSE), Kolkata**.
- **Lineage:**
  - Project 17A is the **successor to the Shivalik-class (Project 17)** frigates.
  - The current INS Udaygiri revives the legacy of the **erstwhile INS Udaygiri**, a steam-powered ship decommissioned in 2007 after **31 years of service**.
- **Capabilities:**
  - Designed as **multi-mission frigates**, capable of operating in **'Blue Water' naval environments**.
  - Equipped to counter both **conventional and unconventional threats**, especially in India's maritime zones.
- **Key Features of Project 17A Frigates:**
  - Hull design is **4.54% larger** than the Shivalik-class (P-17).
  - Enhanced **stealth and sleekness**, with advanced weapon and sensor suites.
  - Uses **Combined Diesel or Gas (CODOG)** propulsion, including:
    - Diesel engine + Gas turbine.
    - Controllable Pitch Propeller (CPP).
    - **Integrated Platform Management System (IPMS)** for automation and efficiency.
- **Weapons & Sensors:**
  - **Supersonic Surface-to-Surface missiles**.
  - **Medium-Range Surface-to-Air Missile (MRSAM)** system.
  - **76 mm naval gun**, plus **30 mm and 12.7 mm rapid-fire close-in weapon systems**.
  - Most weapon systems and sensors are **sourced from indigenous manufacturers (OEMs)**.

Admiralty (Jurisdiction and Settlement of Maritime Claims) Act, 2017

Context

The Kerala High Court has ordered the conditional arrest of the Liberian container vessel **MSC Akiteta II**, currently docked at **Vizhinjam port**, in response to an **admiralty suit** filed by the **Kerala government**.

Background of the Case

- The **Kerala government filed an admiralty suit** after the **sinking of MSC Elsa III** on **May 25 near Alappuzha**.
- The vessel reportedly carried **600+ containers** with **hazardous materials** such as **plastic pellets and diesel**.
- The spill caused **serious environmental and economic damage** to Kerala's marine ecosystem.
- In response, the **Kerala High Court conditionally arrested MSC Akiteta II**, docked at **Vizhinjam Port**, to secure a compensation claim.
- Kerala alleged **MSC Elsa III** and **MSC Akiteta II** are **"sister ships"** owned by **Mediterranean Shipping Company (MSC)**.
- Though registered under **different shell companies**, both operate from the **same Geneva address**.
- The state claims this structure was a **fraudulent device to evade liability**.

Admiralty (Jurisdiction and Settlement of Maritime Claims) Act, 2017

- **Purpose:** Governs **maritime disputes** including:
  - Ship damage
  - Ownership issues
  - Seafarer wage disputes
  - Environmental damage
  - Loss of life/injuries at sea
- **Replaced** colonial-era laws:
  - Admiralty Court Act, 1861
  - Colonial Courts of Admiralty Act, 1890

Jurisdiction Expansion under 2017 Act

- Earlier: Jurisdiction restricted to Bombay, Calcutta, and Madras High Courts.
- Now: Extended to High Courts of **Kerala, Karnataka, Odisha, Telangana and Andhra Pradesh**
- Jurisdiction covers **12 nautical miles** from the coast, including **seabed, subsoil, and airspace**.

Environmental Damage Provisions

- **Section 4**: Allows maritime claims for **environmental damage** and cleanup costs.
- **Additional Laws Supporting Claims**:
  - **Merchant Shipping Act, 1958**: Holds shipowners liable for **oil spills**.
  - **Environment Protection Act, 1986**: Empowers action against **polluters**.
  - **NGT (National Green Tribunal)**: Handles environmental compensation claims.
    - Example: In 2016, NGT ordered ₹100 crore compensation after **M V Rak** oil spill near Mumbai.

Legal Grounds & Court's Justification

- Under **Section 5 of the Admiralty Act**, the **High Court has power to arrest ships** even under **demise charter (bareboat charter)**.

- A **demise charterer** temporarily assumes full control of a vessel (crew, operations, maintenance), acting as **"owner for the time being."**
- The court accepted Kerala's claims and ordered the ship's arrest until:
  - The owners deposit the claimed amount, **or**
  - Furnish **adequate security**.

MALE Class Drones

Context

The Indian government is **procuring 87 MALE drones** from **local manufacturers** under the **Make in India** initiative. Drone worth 20,000 crore worth will be procured under Make in India.

About MALE-Class Drones (Medium Altitude Long Endurance)

- **MALE-class drones** are **unmanned aerial vehicles (UAVs)** that operate at **medium altitudes** and are capable of **long-endurance missions**.
- They are designed for **real-time surveillance, intelligence gathering, reconnaissance**, and can be equipped for **combat roles**.
- **Altitude:** Operate up to ~35,000 feet.
- **Endurance:** Can fly continuously for **over 30 hours**.
- **Capabilities:**
  - Real-time **intelligence and surveillance**.
  - **Reconnaissance** over land and sea.
  - Can operate in **diverse terrains and weather conditions**.
  - May be armed for **strike missions** (if equipped).
- **Payloads:** High-resolution cameras, sensors, communication equipment, and sometimes precision-guided munitions.
- **Strategic Importance:**
  - Enhance **self-reliance** in defence.
  - **Reduce dependence on foreign suppliers** (previously sourced from Israel).
  - Improve **surveillance over Eastern and Western borders**.

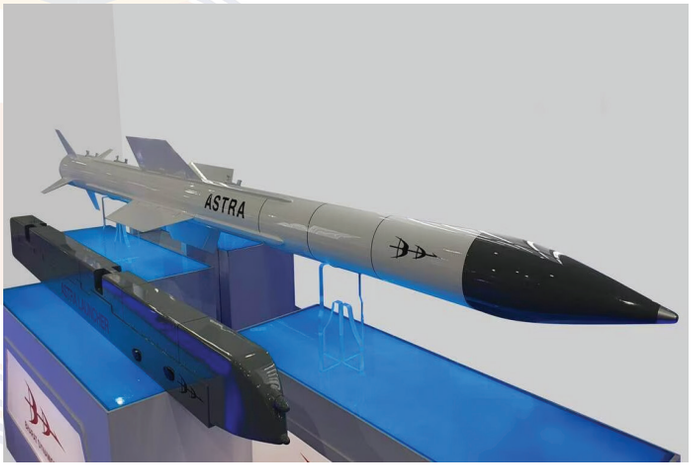
Astra BVR MIssile

Context

Defence Research and Development Organisation (DRDO), in collaboration with the Indian Air Force (IAF), successfully carried out a flight test of the **Astra missile.**

About Astra Missile

- It is an **indigenously developed Beyond Visual Range Air-to-Air Missile (BVRAAM)**.
- It is designed to engage and destroy highly maneuverable aerial targets.
- **Key Features:**
  - Equipped with an **indigenously developed Radio Frequency (RF) seeker**, integrated on the **Su-30 Mk-I** fighter aircraft.
  - Has an operational range of **over 100 km**.
  - Incorporates a **state-of-the-art guidance and navigation system**.
  - Developed through collaboration between various **DRDO labs and over 50 public and private sector industries**, including **Hindustan Aeronautics Limited (HAL)**.



About Astra MK-III

- It is India's most advanced BeyondVisual Range (BVR) air-to-air missile (AAM). It is currently **under development.**
- The missile will be deployed on the IAF's **Sukhoi Su-30MKI jets and the Light Combat Aircraft Tejas.**
- **Long-Range Target Engagement:**
  - Strikes up to 340 km (at 20 km altitude).
  - Hits 190 km range (at 8 km altitude)
- **Strategic Importance:**
  - With this India will have one of the longest-range BVR air-to-air missiles in the world.
  - It will surpass China's PL-15 missile, which has a reported range of 300 kilometers, and the U.S. AIM-174 BVRAAM, which has a confirmed range of 240 kilometers.
  - Support self-reliance in defence and boost defence export

Maratha Military Landscapes'

Context

'Maratha Military Landscapes of India' were added to the UNESCO World Heritage List, making it the **44th site in India** to receive this prestigious recognition.

About Maratha Military Landscapes of India

- The **Maratha Military Landscapes**, spanning from the **17th to 19th centuries CE**, showcase the **military strategy and architectural brilliance** of the Maratha Empire.
- The network comprises **12 forts** located across **Maharashtra and Tamil Nadu**.
- **Fort Types Based on Terrain:**
  - **Hill Forts:** Salher, Shivneri, Lohgad, Raigad, Rajgad, Gingee (It is in Tamil Nadu).
  - **Hill-Forest Fort:** Pratapgad (surrounded by dense forests)
  - **Hill-Plateau Fort:** Panhala (situated on a plateaued hill)
  - **Coastal Fort:** Vijaydurg (located along the shoreline)
  - **Island Forts:** Khanderi, Suvarnadurg, Sindhudurg (surrounded by sea)

Exercise Talisman Sabre

Context

India, along with 18 other countries, is taking part in **Talisman Sabre 2025**, a significant bilateral military exercise spearheaded by Australia, which has recently begun.

About Exercise Talisman Sabre

- It is the largest **bilateral military exercise** between **Australia and the United States**, with participation from multiple countries.
- It has been held **biennially since 2005**, making 2025 its **11th edition**.
- The exercise takes place at **various locations across Australia and offshore**, involving both Defence and civilian training zones.
- Its core objective is to **promote a free and open Indo-Pacific** by enhancing **cooperation and interoperability** among key allies.
- In addition to the **U.S.**, participating nations include:
  - **Canada, Fiji, France, Germany, India, Indonesia, Japan, the Netherlands, New Zealand, Norway, Papua New Guinea, the Philippines, South Korea, Singapore, Thailand, Tonga**, and the **United Kingdom**.
  - **Malaysia and Vietnam** are attending the exercise as **observer nations**.

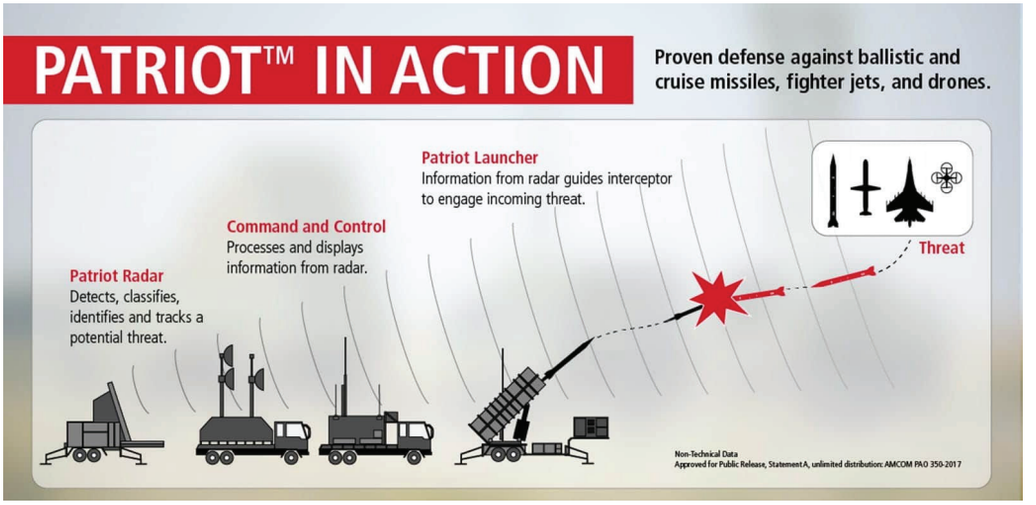
Patriot Missile System

Context

The U.S. President has recently declared that **Washington will provide Patriot air defence systems to Ukraine** in response to **escalating Russian aggression**.

What is the Patriot System?

- **Full form**: Patriot stands for **Phased Array Tracking Radar for Intercept on Target (MIM-104)**.
- It is an **all-weather, all-altitude, surface-to-air missile defense system**.
- Originally designed for **anti-aircraft purposes**, but now upgraded to target:
  - **Ballistic missiles**
  - **Cruise missiles**
  - **Loitering munitions**
  - **Enemy aircraft**
- Equipped with a **Track-Via-Missile (TVM)** guidance system.
- Receives **mid-course correction commands** from a mobile control center.
- Two main interceptor types:
  - **PAC-2**: Uses a **blast-fragmentation warhead**.
  - **PAC-3**: Uses **hit-to-kill technology** for more precise target elimination.



3 Missiles Successfully Tested

Context

India successfully tested the Akash-Prime in Ladakh and Prithvi-2 & Agni-1 from Odisha.

About Akash Prime Missile

- It is an enhanced version of the Akash missile system, specifically optimized for operations in high-altitude regions (above 4,500 metres).

- It is a **medium-range surface-to-air missile** (SAM) system designed to defend mobile, semi-mobile, and static military assets against various aerial threats.
- Major Upgrades:
  - **Indigenous Radio Frequency (RF) seeker**: Enabling it to emit radio signals and accurately track and engage targets during the final phase of its flight.
  - **Performance:** To ensure **reliable performance in low-temperature and high-altitude conditions**.
- The missile can **engage targets within a range of approximately 25 to 30 kilometers**.

About Agni-1 Missile

- It is a **medium-range ballistic missile (MRBM)** with a range of **700 to 900 km**.
- It is a **single-stage, solid-fuel missile**.
- **Recent Upgrades:**
  - An **advanced guidance system** for enhanced accuracy.
  - A **new warhead** to improve its destructive capability.
- **Inducted by the Indian Army's Strategic Forces Command in 2007** for operational deployment.
- Agni-1 is a product of India's **Integrated Guided Missile Development Program (IGMDP)**, which began in **1983**.

About Prithvi-II Missile

- **Prithvi-II** is a **surface-to-surface, nuclear-capable short-range ballistic missile** (SRBM).
- It has a **strike range of 350 km**.
- Powered by **liquid-propelled twin engines**, offering high thrust and flexibility.
- Equipped with an **advanced inertial guidance system** and a **maneuvering trajectory**, ensuring **high-precision targeting**.
- It is a **proven and reliable missile system** of the Indian armed forces.
- **Inducted into service in 2003**, it has since been part of India's strategic arsenal.
- **Prithvi-II was one of the first missiles** developed under the **Integrated Guided Missile Development Programme (IGMDP)** launched by the Government of India.

Nistar

Context

The Indian Navy received the **'Nistar' vessel from Hindustan Shipyard Limited** in Visakhapatnam.

About Nistar

- **'Nistar'** is the **first indigenously designed and built Diving Support Vessel (DSV)** in India.
- The name **'Nistar'** is derived from Sanskrit, meaning **liberation, rescue, or salvation**.
- The vessel has been constructed following the **classification standards of the Indian Register of Shipping (IRS)**.
- It is a **highly specialized ship**, capable of conducting **deep-sea diving and rescue operations**, a rare capability possessed by only a few navies globally.

Key Features of Nistar

- **Dimensions**: Measures **118 meters** in length and weighs around **10,000 tons**.
- Equipped with **advanced diving systems**, allowing **Deep Sea Saturation Diving up to 300 meters** depth.
- Contains a **Side Diving Stage** to facilitate diving operations up to **75 meters**.
- Acts as the **'Mother Ship' for the Deep Submergence Rescue Vessel (DSRV)**, used for **rescue and evacuation of submarine personnel** in emergencies.
- Fitted with **Remotely Operated Vehicles (ROVs)** capable of **diver monitoring and salvage tasks up to 1000 meters** below the surface.
- Built with **approximately 75% indigenous components**, showcasing a major step toward **self-reliance (Aatmanirbhar Bharat)** and supporting the **Make in India** initiative.

INS Sandhayak

Context

INS Sandhayak made its **maiden port call at Port Klang, Malaysia** to boost **hydrographic cooperation** between India and Malaysia.

About INS Sandhayak

- **Class & Commissioning**:
  - First ship of the **indigenously designed Sandhayak-class** hydrographic survey vessels.
  - **Commissioned in February 2024**.
- **Builder**:
  - Constructed by **Garden Reach Shipbuilders & Engineers (GRSE), Kolkata**.
- **Primary Role**:
  - Designed to conduct **coastal and deep-water hydrographic surveys**.
  - Supports **port and harbour development**, and identifies **navigational channels and routes**.
- **Operational Area**:
  - Can operate up to India's **maritime limits**, including the **Exclusive Economic Zone (EEZ)** and **extended continental shelf**.
- **Secondary Roles**:
  - Offers **limited defence capability**.
  - Can function as a **hospital ship** during wartime or humanitarian crises.
  - Capable of **Search and Rescue (SAR)** missions with **onboard helicopter and medical facilities**.
- **Technological Features**:
  - Equipped with:
    - **Data Acquisition and Processing System**
    - **Autonomous Underwater Vehicle (AUV)**
    - **Remotely Operated Vehicle (ROV)**
    - **Digital Side-Scan Sonar**
    - **DGPS Long-Range Positioning Systems**

Comprehensive Economic and Trade Agreement (CETA)

Context

India and the U.K. signed a landmark CETA and unveiled the **India–U.K. Vision 2035** to deepen strategic cooperation across trade, defence, technology, climate, and education, aiming for shared growth, clean energy, and global leadership rooted in democratic values.

India–UK Free Trade Agreement 2025

- **Market Access & Tariff Reductions**
  - **99% of Indian exports** to the UK will now be **duty-free**.
  - The UK will reduce tariffs on **90% of its tariff lines**, with **85% becoming zero-duty within 10 years**.
  - Major gains for **labour-intensive sectors**: marine, textiles, chemicals, processed foods, and base metals.
  - Processed food tariffs cut from **70% to 0%**.
- **Agriculture & Rural Economy**
  - **Over 95% of agricultural items** gain zero-duty access.
  - Boost for exports of: **fruits, vegetables, pulses, spices, millets, jackfruit, organic herbs**.
  - Projected **20% growth in agri-exports** over 3 years.
  - **Sensitive items** like dairy, apples, oats, and edible oils are **excluded** from the deal.
- **Marine Sector Opportunities**
  - **Zero tariffs** on key products: shrimp, tuna, fishmeal.
  - India's current UK share is just **2.25%** — strong growth expected.
  - Significant boost for India's **coastal economies**.
- **Textiles & Apparel**
  - **1,143 textile categories** get **full duty-free access**.
  - Competitive edge gained over **Bangladesh and Cambodia**.
  - Focus on: **ready-made garments, carpets, handicrafts, home textiles**.
  - Potential **5% increase in UK market share**.
- **Engineering & Industrial Goods**
  - India's engineering exports to UK may **double to $7.5B by 2030**.
  - Tariffs up to **18% eliminated**.
  - Currently, India exports $4.28B; UK imports $193.5B globally — large scope.
- **Pharmaceuticals & Medical Devices**
  - Tariff-free access for **generic drugs and devices**.
  - UK pharma imports: **$30B**, but India only supplies $1B.
  - Target products: **X-ray machines, ECGs, surgical instruments**.
- **Chemicals & Plastics**
  - Chemical exports expected to grow **30–40%** to **$650–750M** in FY26.
  - Plastics (films, kitchenware) to see **15% export growth**.
  - Competitive pricing boost.
- **Toys, Sports Goods, Gems & Jewellery**
  - **Toys and sports goods** gain edge over China and Vietnam.
  - Jewellery exports may **double in 2–3 years**, targeting the UK's **$3B market**.
- **Leather & Footwear**
  - **16% tariff removed** on leather goods and shoes.
  - Export target: **$900M+**, benefitting **MSME hubs** like Agra, Kanpur, Kolhapur, Chennai.
- **Services & Labour Mobility**
  - **75,000 Indian workers** exempted from UK social security for 3 years.
  - **36 service sectors** opened with **no Economic Needs Test (ENT)**.
  - Indian professionals can work in **35 UK sectors for 2 years**.
  - **1,800 chefs, yoga trainers, and artists** to be allowed annually.

Impact & Strategic Gains

- **Sectoral Benefits**
  - Boost for India's key exports: **agriculture, processed food, textiles, seafood, gems, jewellery, engineering**.
  - UK exporters gain easier access to Indian markets for **whisky, automobiles, electricals**.
- **Trade Growth Projections**
  - UK exports to India may rise **60%**, adding **£15.7B** by 2040.
  - Total bilateral trade to grow **39%**, adding **£25.5B annually**.
- **Strategic Reorientation Post-RCEP**
  - After exiting RCEP (2019), India shifted focus to **Western economies**.
  - This deal shows India's readiness for **high-standard trade partnerships**.

India's FTA With Other Countries

FTA Partner	Year Signed	Key Highlights
UAE (CEPA)	2022	90% exports duty-free, boost to gems, textiles, pharma, $85B+ trade
Australia (ECTA)	2022	96% exports duty-free, benefits textiles, leather, strategic Indo-Pacific link
South Korea (CEPA)	2010	Tariff cuts on 85% exports, focus on electronics, auto, pharma, under review
Japan (CEPA)	2011	94% traded items duty-free, gains in robotics, IT, rare earths
ASEAN FTA	2009 (goods), 2014 (services)	Covers trade & services, trade deficit concern, under review
Mauritius (CECPA)	2021	First African FTA, 615 items duty-free, includes services like IT, banking
Chile (PTA)	2017 (expanded)	Concessions on 1,000+ items, early step in Latin American engagement
UK (FTA)	2025	99% exports duty-free, major boost to agri, marine, pharma, services, mobility

FTA Partner	Year Signed	Key Highlights
FTAs Under Negotiation	Ongoing	**EU, GCC, Canada, Israel** – focus on services, sustainability, labour mobility
RCEP (Exited)	Exited in 2019	India withdrew over Chinese import concerns; pivot to Western bilateral FTAs

Javelin ATGM

News? India has formally requested the U.S. **for co-production of Javelin anti-tank guided missiles** (ATGMs) within the country.

About Javelin Missile

- **Type:** American man-portable anti-tank guided missile (ATGM).
- **Developed by:** Raytheon and Lockheed Martin.
- **Purpose:** Designed to destroy heavily armored tanks, vehicles, bunkers, and low-flying helicopters.
- **Inducted:** Entered U.S. military service in 1996.

Jaa Mata Exercise

- **News?** Japanese Coast Guard ship (JCGS) Itsukushima arrives at Chennai for the Jaa Mata exercise.
- It is a bilateral exercise between **Japan & Indian** Coast Guards.

Operation Fire Trail: In a major crackdown on smuggling, the **Directorate of Revenue Intelligence (DRI)** seized **banned Chinese firecrackers worth ₹35 crore** during **"Operation Fire Trail"** conducted across various Indian ports.

POLITY & GOVERNANCE

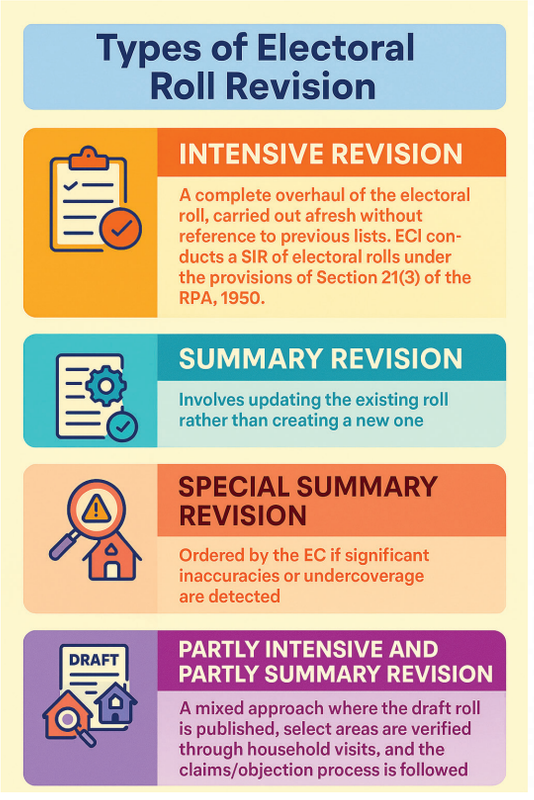
TOPICS FOR MAINS

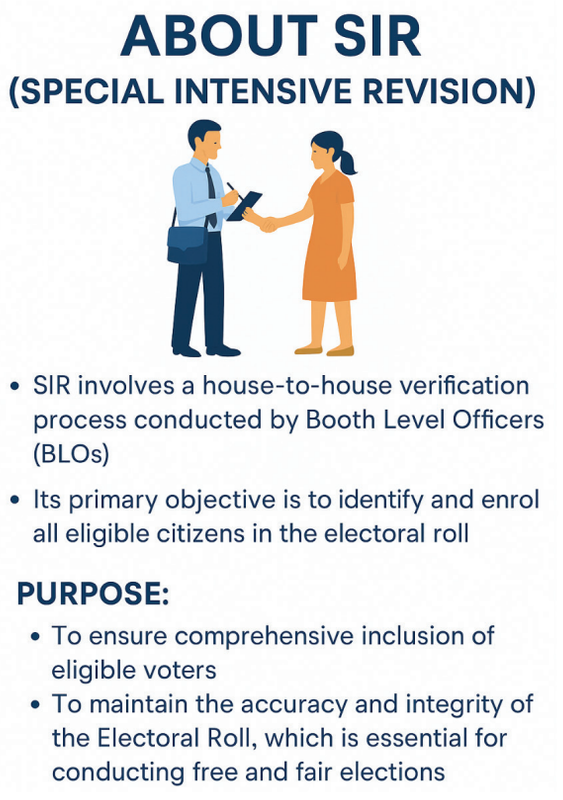
Special Intensive Revision of Electoral Rolls

Syllabus Mapping: GS2: Salient features of RPA

Context

- The Election Commission's Special Intensive Revision (SIR), is legally backed and conducted under Article 324 of the Constitution and Section 21 of the RPA, 1950. It aims to cleanse electoral rolls ahead of Bihar elections. However it risks **disenfranchising marginalized groups** due to inadequate safeguards and impractical timelines, potentially undermining their democratic right to vote.
- The Supreme Court directed the ECI to ensure "mass inclusion, not mass exclusion" in Bihar's Special Intensive Revision, questioning its refusal to accept Aadhaar and EPIC as valid ID proofs.





Controversy surrounding the documents required in Bihar's SIR of electoral rolls

- **Citizenship Proof Requirements**: In the counter-affidavit to the Supreme Court (July 2025), the Election Commission argued it has **constitutional authority under Article 326 and the Representation of the People Act** (1950) to require citizens—even those already on voter lists—to submit proof of citizenship and age during the Bihar SIR process.
  - **ECI specified a list of 11 eligible documents**, explicitly excluding widely held documents such as Aadhaar cards, voter ID (EPIC) and ration cards, reasoning those can be forged and are not conclusive proof of citizenship or age.
- **Legal Pushback by Petitioners**: The Association for Democratic Reforms (ADR) and other petitioners called the exercise a "grave fraud on voters", arguing it improperly shifts the burden of citizenship proof onto existing voters, especially those added since 2003.
  - Further criticized the exclusion of Aadhaar, EPIC and ration cards, given that Aadhaar is accepted for passports, caste certificates among others.
- **Historical Precedent and Timing Issues**: Critics highlighted that previous intensive voter revisions, including in Bihar in 2003, did not require parental or citizenship documents at all. This current exercise marks a significant departure from past practice and is seen as unprecedented
  - The timing and short window for document submission (one month to July 25, 2025) during Bihar's monsoon season was also challenged as impractical especially for migrant workers and marginalized communities, which raised fears of mass voter exclusion.
- **Supreme Court's Direction**: On July 10, 2025, the Court refused to stay the SIR, but strongly urged ECI to consider including Aadhaar, EPIC, and ration cards as acceptable identity proofs and emphasize **"en masse inclusion" rather than exclusion** during the roll revision
  - ECI responded by reaffirming its refusal to accept those documents and maintained citizenship checks are essential.

Challenges faced by marginalized communities in exercising their franchise

- **Documentation Barriers**: Marginalized individuals often lack the documentation needed to prove their citizenship or eligibility to vote.
  - **Eg: India Human Development Survey (IHDS)**: Only 2.8% of Bihar's population born between 2001 and 2005 possess a birth certificate.
- **Exclusion error:** The revision of electoral rolls excludes first time voters who are not in the 2003 electoral rolls. It includes a large number of young voters from rural and lower income backgrounds.
  - **Eg: According to ECI data,** out of the 7.9 crore electors in Bihar, 4.96 crore (≈63%) are not in the 2003 rolls and now must prove eligibility.
- **High Migration**: Bihar has one of the highest rates of out-migration, making it difficult for many to provide documents tied to a fixed location.
  - **Eg: As per Tata Institute of Social Sciences (TISS),** an average of 8.5 lakh people migrate out of Bihar annually.
  - Eg: Migrants often live in informal housing, work in unorganised sectors, and lack stable documents.
- **Disproportionate Impact on Tribals and Dalits**: Marginalized castes and tribes, such as Scheduled Castes (SCs) and Scheduled Tribes (STs), are at greater risk of disenfranchisement.
  - **Eg: SCs and Other Backward Classes (OBCs)** often lack secure tenure, schooling, or formal employment — which limits documentation.
- **Gender Disparities:** Women, particularly from marginalized communities, are less likely to possess personal documents like passports or school certificates.
  - **Eg: National Family Health Survey (NFHS-5):** Only 50.6% of women aged 15–49 in Bihar had completed even primary schooling, reducing chances of documentation.
  - **Eg:** Many women are enrolled in schemes using Aadhaar, which is not accepted as proof of citizenship under the new rules.
- **Risk of Mass Disenfranchisement:** Many may lose voting rights due to procedural lapses, despite being Indian citizens.
  - Eg: Elderly voters, migrants, and tribals who voted previously may now be denied franchise due to failure to prove their status.

Safeguards to ensure inclusivity and prevent voter exclusion

- **Clear Legal Framework** Create a well-defined legal and procedural framework for voter verification while ensuring transparency in eligibility criteria and acceptable documents.
  - **Eg: In Assam's NRC process, lack of clear guidelines led to the exclusion of 19 lakh people** despite many having valid documents.
- **Broader Range of Documents:** Accept Aadhaar, MGNREGA job cards, ration cards, caste certificates, and voter IDs as valid proof of residence and identity. Most marginalized citizens do not have birth certificates, passports, or pre-1987 documents.
  - **Eg: Recently the Supreme Court directed the EC to include Aadhaar, Ration Card and Voter ID in Bihar's electoral roll exercise (2025)**
- **Extended Timeline**: Allow sufficient time (beyond one month) for individuals to gather and submit documents. Implement the process in phases to prevent administrative overload and allow grievance redressal.
  - **Eg: The current Bihar drive requires 4.76 crore people** to prove eligibility in a month, which is administratively and logistically infeasible.
- **Door-to-Door Verification by Trained BLOs**: Use Booth Level Officers (BLOs) for house-to-house visits, especially in rural and tribal areas. Train them to assist citizens rather than merely verify.
  - Eg: Marginalized people may not be able to visit government offices due to work, illness, or illiteracy.
- **Grievance Redressal and Appeal Mechanism**: Set up local-level grievance redressal committees and allow for appeals against exclusion. Ensure the presence of legal aid volunteers to support those without representation.
  - **Eg: In Assam's NRC process, many were wrongly excluded without timely access to legal assistance.**
- **Integration with Welfare Databases:** Use existing welfare databases (Eg: PDS, PM-KISAN, PMJAY, Ujjwala Yojana) to cross-verify identity, reducing documentation burden.
  - Eg: Most poor households are linked to government schemes through the Aadhaar card.

Large-scale voter verification must not become a tool for exclusion. A rights-based, inclusive approach with administrative, legal, and technological safeguards is essential to protect democratic participation, especially for the most vulnerable. Bihar's experience should serve as a warning—and a roadmap—for designing more equitable electoral reforms.

Law Commission Recommendations on Electoral Roll Reforms

- **Common Electoral Roll across Elections:** Consolidate voter lists used for Parliament, State Assemblies, municipal and panchayat polls into a single unified roll, to reduce duplication, administrative burden, and voter confusion.
  - This would require amendments to Articles 325, 243K, and 243ZA of the Constitution.
- **Simplified & Unified Voter Service Forms:** Replace multiple separate forms (Forms 6, 7, 8, 8A, etc.) with a single streamlined application for all electoral services like registration, corrections, transfers, deletions, EPIC replacements, overseas registration.
- **Enhanced Voter Facilitation Infrastructure:** Expand Electoral Service Centres (ESCs) or Voter Facilitation Centres (VFCs)
  - Provide door-step electoral services especially for Persons with Disabilities and senior citizens (80+), with options like household visits for vulnerable groups.
- **Tech-Enabled Booth Level Officer System**: Revamp the BLO system with dedicated, trained personnel equipped with digital devices.
  - Issue standard photo ID cards to BLOs under Section 13B(2) of RPA 1950 to boost field credibility and transparency
- **Introduction of e-EPIC (Electronic Voter ID Cards):** Issue digital versions of the EPIC to citizens for easier access and mobility.
- **Linkage with Aadhaar (Voluntary & Transparent):**Promote voluntary linkage of Aadhaar with EPIC to clean up duplicate or fraudulent entries.
  - Ensure clear legal safeguards so that Aadhaar linkage is not mandatory for voting and to exclude non-citizens from voter lists.

Access to Justice

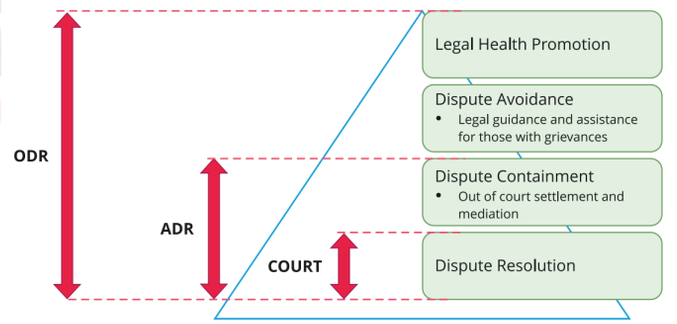
Syllabus Mapping: GS2: Judiciary

Context

Justice Surya Kant launches legal aid service for defence personnel (Veer Parivaar Sahayata Yojana) initiated by NALSA, in collaboration with the High Court of Jammu & Kashmir, Ladakh and Jammu & Kashmir legal services authority.

About Access to justice

Access to Justice signifies a core democratic principle whereby every individual, irrespective of their social or economic background, has the opportunity to seek and secure remedies through formal or informal justice mechanisms for their grievances. In the absence of meaningful access to justice, individuals may find themselves unable to assert their rights, challenge injustices, or obtain redress for the harms they endure.



Four Layer Model for Access to Justice

Legal and Constitutional Provisions Related to the Right to Access to Justice

1. **Constitutional Provisions:**
   - **Article 14 (Equality Before Law):** Guarantees all citizens equality before the law and equal protection of laws. The Supreme Court has expanded this to include the right to access justice, ensuring that every individual can approach the courts without any form of discrimination.
   - **Article 21 (Right to Life and Personal Liberty)**: Recognized as a cornerstone of access to justice, Article 21 protects the right to seek legal remedies for violations of personal liberty and fundamental rights.
   - **Article 39A (Free Legal Aid)**: A Directive Principle aimed at ensuring that no person is denied legal assistance due to economic or other incapacities. It mandates the state to promote justice based on equal opportunity, with special attention to vulnerable and marginalized groups.
   - **Articles 32 and 226 (Constitutional Remedies)**: These provisions empower individuals to directly approach the Supreme Court (Article 32) and High Courts (Article 226) for the enforcement of their rights, thereby facilitating meaningful access to justice.

2. **Statutory and Institutional Framework:**
   - **Legal Services Authorities Act, 1987:** This Act established the National Legal Services Authority (NALSA) to provide free legal services to the weaker sections of society.
     - **Section 12** identifies beneficiaries, including women, children, SCs/STs, persons with disabilities, and those below the poverty line.
     - **Lok Adalats** established under this Act offer low-cost, quick dispute resolution mechanisms.
     - **Tele-Law and E-Lok Adalats** initiatives extend legal advice and dispute resolution to remote and underserved areas using technology.
3. **Public Interest Litigation (PIL):**
   - **Expansion of Locus Standi:** The concept of PIL allows any concerned citizen or organization to approach the courts on behalf of those whose rights are violated, even if they are not directly affected.
     - **Eg: MC Mehta v. Union of India (1987)**—one of the landmark PILs—was filed for addressing environmental pollution in Delhi, leading to key judicial interventions in environmental law.

Elements of the Right to Access to Justice

Element	Meaning	Supporting Data/Examples
Availability of Legal Remedies	Citizens must be able to approach courts and legal institutions to seek redressal for grievances.	• **Vishaka v. State of Rajasthan (1997):** Led to the formulation of guidelines to address sexual harassment at the workplace. • Use of writs like Habeas Corpus allows individuals to challenge unlawful detentions.
Affordability	Legal processes should be financially accessible, especially for economically weaker sections.	• Article 39A mandates free legal aid to prevent denial of justice based on economic constraints. • In 2021–22, over 21 lakh individuals benefitted from free legal aid through NALSA.
Awareness and Information	Citizens must be aware of their rights and the means available for legal redress.	• **NALSA's Know Your Rights campaigns** empower citizens through legal awareness. • The **National Commission for Women** conducts outreach programs to educate women on issues like domestic violence and workplace rights.
Fair and Transparent Procedures	Judicial processes must uphold principles of fairness, equity, and transparency.	• **Maneka Gandhi v. Union of India (1978):** Reinforced that the right to a fair hearing is an essential part of Article 21. • Live-streaming of court proceedings promotes judicial transparency and public trust.
Physical and Legal Accessibility	Courts and legal services should be physically reachable and provide appropriate representation.	• **Gram Nyayalayas** bring the judiciary closer to rural populations; over 400 courts settled 25,000+ cases as of 2023. • Legal aid clinics in law colleges extend legal assistance to underprivileged individuals.

Barriers to Access to Justice

Various Barriers	Nature	Illustration
Social Barriers	Caste-Based Discrimination	Dalits have been historically denied access to shared community resources like village wells.
	Lack of Legal Awareness	Rural populations unaware of provisions under the Legal Services Authorities Act, 1987 offering free legal aid.
	Low Literacy Levels	Illiterate farmers often fail to comprehend rights under land acquisition laws.
	Gender Bias	Social stigma discourages rural women from reporting domestic abuse.
Economic Barriers	High Legal Costs	Many undertrials depend on overburdened legal aid lawyers due to inability to afford private counsel.
	Court-Related Expenses	Daily wage workers are unable to travel long distances to attend court hearings.
	Bribery in Law Enforcement	Citizens are often forced to pay police to file an FIR in theft cases.
	Extended Pre-Trial Detention	NCRB data shows over 75% of undertrials are from economically weaker sections.

Various Barriers	Nature	Illustration
Legal Barriers	Procedural Complexities	Civil dispute proceedings delayed due to slow service of summons under procedural laws.
	Police Inefficiency	Forensic delays occur as evidence is sent to labs in far-off states.
	Institutional Corruption	Bribes demanded for accessing certified copies of court orders.
	Lack of Competent Legal Aid	Inadequate legal representation in cases like Bandhua Mukti Morcha hampers justice for bonded labourers.

Measures to strengthen access to justice

1. **Strengthen Legal Aid Infrastructure**
   - Enhance the reach and effectiveness of existing legal aid services, including the National Legal Services Authority (NALSA)
   - Deploy trained paralegal volunteers at the grassroots level to connect underserved communities with formal legal mechanisms.
2. **Digitize the Justice Ecosystem**
   - Accelerate the implementation of the e-Courts project to streamline case management and improve transparency.
   - Ensure robust access to digital services such as e-filing, virtual hearings, and online grievance redressal, particularly in rural and remote areas.
3. **Build Legal Capacity and Professional Training**
   - Conduct regular training and capacity-building programs for judges, legal aid lawyers, and court staff.
   - Include mandatory modules on case management, digital literacy, and social justice in legal education and professional development.
4. **Promote Legal Awareness and Civic Education**
   - Launch awareness campaigns to educate citizens—especially in rural and marginalized areas—about their legal rights and remedies.
   - Use schools, panchayats, community centers, and social media platforms to promote understanding of legal aid services, Lok Adalats, and complaint redressal systems.
5. **Address Procedural Delays and Judicial Backlogs**
   - Set clear timelines for case disposal and impose penalties for unjustified delays.
   - Expand judicial infrastructure by increasing the number of judges, introducing efficient case tracking systems, and integrating AI for intelligent docket management.

Indian Secularism

Syllabus Mapping: GS2: Significant features of the Constitution

Context

- Recently the Union Law Minister clarified that the GOI has no current plans/ intentions to remove the words "socialism" and "secularism" from the Preamble of the Constitution.

About Secularism

- It is the principle that guides the relationship between the state and religions, ensuring that the state remains neutral in religious matters.
- It restricts the influence of religious institutions in the functioning of the state and guarantees equal treatment and freedom to followers of all religions.

Is secularism anti-religious?

- **Secularism** means the state has no official religion and treats all religions equally.

It **protects religious freedom** for everyone—allowing individuals to practice, profess, and propagate any religion or none at all.

- In the Indian context, **secularism is not against religion**, but rather ensures that no religion is given special preference by the state.
- **Secularism is neutral towards religion**—it is neither pro-religion nor anti-religion.

SECULARISM IN INDIA

KEY DEVELOPMENTS

Year/Period	Event/Case	Development regarding Secularism
1946–1950	Constitution drafting	Secular principles embedded, word not included
1950	Constitution adopted	Preamble omitted the word "secular"
1973	Kesavananda Bharati case	Secularism declared a "basic feature"
1976	42nd Amendment	'Secular' inserted in the Preamble
1994	S.R. Bommai case	Reaffirmed secularism as a "basic feature"
2024	Supreme Court ruling	Challenge to inclusion of "secular" dismissed

Constitutional Provisions Related To Secularism

Article	Provision	Secular Principle
Article 14	Equality before the law and equal protection of the laws	Prohibits discrimination by the state on religious grounds.
Article 15	Prohibits discrimination on grounds of religion, race, caste, sex, or place of birth	Ensures equal access to public spaces and opportunities regardless of religion.
Article 16	Equality of opportunity in public employment	Forbids discrimination on the basis of religion in government jobs.
Article 17	Abolishes untouchability	Promotes social equality, including among different religious groups.
Article 25	Freedom of conscience and right to freely profess, practice, and propagate religion	Guarantees individual religious freedom, subject to public order, morality, and health.
Article 26	Freedom to manage religious affairs	Religious denominations can manage their own affairs in matters of religion.
Article 27	Freedom from taxation for promotion of any particular religion	No person can be compelled to pay taxes for the promotion of a religion.
Article 28	Prohibits religious instruction in state-funded educational institutions	Ensures state neutrality in educational settings.
Article 29	Protection of interests of minorities	Safeguards the right of minorities to conserve their culture and religion.
Article 44	Advocates for a Uniform Civil Code for all citizens	Promote secular governance in matters of personal law, though it is not yet implemented

Secularism against Inter and Intra Religious domination

- **Against Inter-Religious Domination:** Secularism opposes any situation where one religion dominates or discriminates against another.
  - It emphasizes **equal respect and protection for all religions**.
  - **Eg:** The Indian Constitution prohibits discrimination based on religion (Article 15).
- **Against Intra-Religious Domination:** Secularism opposes oppression or domination **within a single religious group**.
  - It allows the state to intervene if practices within a religion infringe on basic human rights, dignity, or equality.
  - **Eg:** Abolishing untouchability and reforming personal laws in India (e.g., Sati abolition, Triple Talaq judgment)

Secularism in India Vs. France

The French Constitution towards Secularism includes strict separation of state from religion and removal of religious symbols from public space as religion is seen as a private matter. On the other hand, the Indian Constitution ensures the Right to freedom of Religion as a fundamental right with reasonable restrictions.

Indian approach towards Secularism

- Based on the **model of principled distance.**
- The Indian state does not have an official religion.
- The state interference in religion is to induce reforms and prohibits religious instructions in public schools.
  - **Eg: Karnataka Hijab issue**
- **Sarva dharma sambhava** philosophy is enshrined in Article 25-28 of the Indian Constitution.

French approach towards Secularism

- **Change in Demography:** Modern France is a more heterogeneous and multi-religious society, hence, becomes prone to religious conflicts.
  - **Eg:** The recent **Charlie Hebdo attacks** in France
- **Violating Freedom of Religion & Civil Liberties:** Strict Separation of State and religion is seen as an infringement on the individual right to religious expression. It curbs the freedom of expression and personal liberty.
- **Encourages Radicalization:** It is often seen by minorities as a threat to their religion. Unwarranted religious expressions have led to the hurting of religious sentiments and ultimately leads to radicalization.
  - **Eg: 2016 Nice truck attack.**

Learning for France from Indian Approach to Secularism:

- **Dharma Nirapekshta:** Indian secularism is similar to the Vedic Idea of 'Dharma nirapekshata' that emphasises the indifference of the state to religion.
- **Sarva Dharma Sambhava:** This ancient concept of India encourages tolerance for each religion and believes that the destination of the paths followed by all religions is the same, but the paths may be different.
- **Constitutional Protection for Religion:**
  - **Article 25** of the Indian Constitution provides the freedom of conscience
  - **Article 26** includes the freedom to establish/maintain religious institutions.
  - **Article 29 and 30** provide protection of minorities by special provisions.
- **Religious endowments:** The state can allow the setting up of religious endowments for social harmony.
  - **Eg: Waqf board**
- **Reasonable restriction:** The ideals of Indian Secularism put reasonable restrictions on one's freedom of expression to avoid unwarranted commentary on religion.

Secularism in India Vs. United States

Comparison

Aspect	India	United States
Constitutional Basis	Secularism is explicitly stated in the Preamble and reflected in various provisions.	Secularism is implied through the First Amendment; the word is not explicitly used.
Definition	Promotes equal treatment and respect for all religions by the state.	Advocates a strict separation between church and state.
Freedom of Religion	Guaranteed under Articles 25 to 28 of the Constitution.	Ensured through the First Amendment of the U.S. Constitution.
State and Religion	Allows limited interaction between state and religion (e.g., reforms).	Strict separation—government cannot support or endorse religious practices.
Judicial Approach	Judiciary permits state intervention in religious practices for social reform.	Courts maintain firm separation, e.g., striking down school-sponsored prayers.

Key Differences

- **Separation vs. Equal Respect**: The U.S. adopts a "wall of separation" model, whereas India upholds equal respect for all religions. This was reiterated by the Indian Prime Minister in 2024 as part of India's inclusive secular ethos.
- **Establishment Clause:** The U.S. Constitution prohibits the establishment of any state religion. India has no such explicit provision, but functions as a secular state.
- **State Intervention**: Indian secularism allows state involvement in religious matters for purposes of social reform.
  - **Eg**: In 2024, the Supreme Court ruled that personal or religious laws cannot override the **Prohibition of Child Marriage Act**, underscoring the state's reformative role.
- **Religious Symbols in Public:** India permits limited display of religious symbols in public institutions.
  - **Eg:** Images of deities are commonly seen alongside portraits of national leaders in government offices.
  - In contrast, the U.S. enforces stricter boundaries regarding religious displays in public spaces.
- **Personal Laws:** India recognizes religion-based personal laws (e.g., marriage, inheritance)
  - The U.S. enforces a uniform civil code, with no legal recognition for religious laws in civil matters.

Challenges Associated with Secularism in India

- **Communalism and Religious Violence:** Many of these riots were triggered during religious festivals or over contested places of worship, resulting in deaths and targeted violence.
  - **Eg:** In 2024, India witnessed an 84% increase in communal riots compared to the previous year.
- **Politicization of Religion:** Religious identity is used as a political tool to influence public opinion and elections.
  - **Eg: The Babri Masjid demolition in 1992** and subsequent political mobilization around the Ram Janmabhoomi movement.
- **Discrimination Against Minorities:** Anti-conversion laws (e.g., MP, UP) and anti-cow slaughter laws are often used to discriminate against Muslims, Christians, and Dalits, affecting their livelihoods and religious freedoms.

- **Educational & Cultural Bias:** Secular values are undermined when educational content favors a single religious narrative.
  - **Eg:** NCERT textbook revisions accused of "saffronisation" skew historical understanding and marginalise minority perspectives.
- **Societal Challenges:** Deep-seated prejudices, myths, and stereotypes about religious groups continue to fuel divisions.

Way Forward

- **Promote Constitutional Values through Education:** Integrate secular and constitutional values in school curricula and textbooks.
  - Encourage critical thinking and respect for diversity among students.
  - **Eg:** Programs like **"Ek Bharat Shreshtha Bharat"** promote cultural understanding.
- **Impartial Enforcement of Laws:** Ensure the law is applied equally to all, regardless of religion or community.
  - State institutions (police, courts, administration) must act without bias, especially during communal tensions.
  - **Eg:** Quick action against hate speech and violence, regardless of the perpetrator's religion.
- **Curb Politicization of Religion:** Strengthen Election Commission's role to monitor and penalize religious appeals in politics.
  - Disallow political parties from seeking votes in the name of religion (as per Supreme Court's 2017 guidelines)
- **Promote Interfaith Dialogue and Social Harmony:** Facilitate platforms for interfaith dialogue at local, regional, and national levels.
  - NGOs, community leaders, and media can play a vital role in dispelling myths and fostering understanding.
- **Reform Personal Laws for Uniformity:** Move towards a Uniform Civil Code in a consultative, gradual manner to ensure equality while respecting diversity.
  - Focus on gender justice and human rights, not on undermining any community's identity.
- **Safeguard Minority Rights:** Actively protect the rights and interests of religious minorities to prevent alienation.
  - Ensure minority educational and cultural institutions are free from discrimination and undue interference.
- **Promote Inclusive Development:** Address economic and social marginalization of any community to reduce grievances that fuel religious divides.
  - **Eg:** Focused government schemes for minority welfare, scholarships, and skill development.
- **Media Responsibility:** Media should report sensitively and avoid sensationalism on religious issues.
  - Encourage media literacy to counter misinformation and hate speech online.

In today's modern and heterogenous world, the State's practice of strict neutrality to religion can be viewed as a **piecemeal approach,** however constant reforms are the need of the hour to truly meet the French principles of liberty, equality and fraternity in letter and spirit.

Vice-President

Syllabus Mapping: GS2: Executive

Context

Vice President Jagdeep Dhankhar has resigned in a letter written to the President to prioritise health care and abide by medical advice.

Constitutional provisions

Articles 63-71 in Part V of the Constitution of India deals with the office of the Vice-President (VP) who serves as the Chairman of the Rajya Sabha and is the **second highest constitutional office** after the President in the order of precedence.

Election process

- **Article 66**: Provides for the indirect election of the Vice President by an electoral college comprising members of both Houses of Parliament (elected as well as nominated)
  - The election is conducted using the system of proportional representation by means of the single transferable vote, and voting is done by secret ballot.
  - VP shall not be a member of either House of Parliament or of a House of the Legislature of any State.
  - If a member of the Parliament or of the State Legislature be elected VP, he shall be deemed to have vacated his seat in that House on the date on which he enters upon his office as VP.
- State legislatures do not participate in this process. The Election Commission oversees the conduct of the election under the **Presidential and Vice-Presidential Elections Act, 1952**.
- **Eligibility Criteria:** Under Article 66(4), a person contesting the Vice-Presidential election must be at least 35 years old.

  - Additionally, as per **Article 84**, the candidate must meet the qualifications required for membership of the Rajya Sabha.
  - The candidate must also not hold any office of profit and must not be disqualified under the provisions of **Article 102.**
- **Article 71**: Confers exclusive jurisdiction to the Supreme Court for resolving matters related to Vice-Presidential elections.
- **Assumption of Office:** According to Article 69, the Vice President takes an oath of office administered by the President.
  - As per **Article 68(2),** the Vice President's five-year term begins from the date of oath-taking.
  - Under **Article 67(c)**, the outgoing Vice President continues in office until the successor assumes charge.

Consequences of the resignation of the Vice President mid-term

Constitutional Provisions

- **Resignation Process:** Under **Article 67(a)** of the Constitution, the Vice President may resign at any time by writing to the President. Once the resignation is accepted, it takes effect immediately.
- **Post Resignation:** In essence there is **no direct provision for an Acting Vice President in the Constitution.** The **Deputy Chairman of the Rajya Sabha assumes the role of Chairperson of the Upper House** in the Vice President's absence, ensuring continuity in parliamentary proceedings.

Filling the Vacancy

- **Timing of the Election:** Unlike the President whose vacancy must be filled within six months, there is **no fixed deadline for a Vice-Presidential election after a mid-term departure.**
  - The Constitution requires that the election be held "as soon as possible" after the post becomes vacant.
- **Conduct of the Election:** The Election Commission of India oversees the process, under the **Presidential and Vice-Presidential Elections Act, 1952.**
  - A **Returning Officer** is appointed (usually the Secretary General of Lok Sabha or Rajya Sabha, on rotation) to handle the election.
- **Term of the New Vice President:** The incoming Vice President serves a full five-year term from the date of assuming office—not just the unexpired portion of the previous term.

Historical Context

- **Rarity of Mid-term Resignations:** Vice President Jagdeep Dhankhar's resignation in July 2025 is the third mid-term resignation in India's history—after V.V. Giri and R. Venkataraman, both of whom later became Presidents.
- **Succession in Presidential Vacancies:** While the Vice President can act as President under Article 65 in the event of a presidential vacancy, this situation doesn't apply when the Vice President resigns. The Constitution does not envisage anyone acting as Vice President.

Role of Vice-President as the chairman of the Rajya Sabha

- **Presiding over the proceedings**: VP presides over the meetings of the Rajya Sabha and ensures that the debates and discussions are conducted in a fair and impartial manner.
- **Maintaining decorum**: Has the power to expel or suspend any member of the Rajya Sabha who engages in disorderly conduct or violates the rules of the house.
  - **Eg: VP Jagdeep Dhankar** has witnessed a large number of walkouts and meetings boycotted by opposition parties.
- **Appointing committees:** Appoints various committees of the Rajya Sabha, including the **Business Advisory Committee, the Rules Committee, and the Committee on Ethics.**
- **Representing India**: Represents India on various international forums and interacts with dignitaries from other countries.
  - **Eg**: **VP Jagdeep Dhankar visited Qatar** to represent India at the **FIFA world cup. (2022)**
- **Disqualification of members:** Deciding authority on the question of disqualification of MP in Rajya Sabha on the ground of defection **(Schedule 10)**
- **Guardian of rights:** Custodian of rights and **parliamentary privileges** of the house and its members.
  - **Eg:** No member of the Parliament (MP) can be arrested in a **civil case** when the house is in session. **(immunity from arrest)**

Inequality as compared to the speaker of Lok Sabha

- **Money bill:** The money bill is only introduced in the Lok Sabha and Rajya Sabha (RS) can only make recommendations which may/may not be approved by Lok Sabha.

- **Council of ministers:** COM is not responsible to the Rajya Sabha and therefore no-confidence motion remains as an exclusive power of the Lok Sabha.
  - **Eg: The Bihar assembly speaker Awadh Bihari Chaudhary** faced the no-confidence motion and removal in the State legislative assembly.
- **Member of RS:** The chairman or VP is not a member of the upper house whereas the deputy chairman of RS is elected from amongst its members.
- **Impeachment:** The VP has no right to vote during his impeachment proceedings.
- **Joint sitting:** The joint session of the two houses are presided over by the speaker of Lok Sabha. **(Article 108)**

A comparison between the Vice President of India Vs. American Vice President

Features	Indian Vice-President	Vice President of USA
Constitutional provision	• India's VP holds office as per the provisions outlined in **Articles 63 to 71** of the Indian Constitution	• The office of the VP of the United States is constituted under Article I, Section 3 and Article II, Section 1 of the U.S. Constitution
Elections	• The position is filled through an indirect election by an electoral college comprising members of both the Lok Sabha and the Rajya Sabha. • The election follows the **system of proportional representation** by means of a **single transferable vote.**	• The VP of USA is **elected directly by the people** through the Electoral College, alongside the President, as part of a **joint ticket.**
Qualifications	To qualify, a candidate must be: • A citizen of India • At least 35 years of age • Eligible to be elected as a member of the Rajya Sabha	To qualify, a candidate must be: • A natural-born citizen of the United States • At least 35 years old • A resident of the U.S. for a minimum of 14 years
Legislative Role	• **Ex-Officio Chairperson of the Rajya Sabha:** VP's chief responsibility is to preside over the Rajya Sabha, ensuring that discussions and proceedings are conducted in an orderly and efficient manner. • **Maintaining Parliamentary Decorum:** As the presiding officer, the VP enforces the rules of procedure and upholds discipline during debates. • **No Regular Voting Power:** The Vice President does not take part in voting, except in the event of a tie, where they exercise a casting vote.	• **President of the Senate**: The American VP formally presides over the Senate, though this role is mostly symbolic and typically delegated. • **Tie-Breaking Vote**: The Vice President does not engage in Senate debates, but can cast a tie-breaking vote when the chamber is evenly divided.
Executive Role	• **Acts as President When Necessary:** In situations where the President is unable to perform their duties—due to illness, resignation, removal, or death—the Vice President assumes the role of Acting President until a new President is elected within six months. • **No Role in Governance or Policy**: The Vice President does not participate in cabinet decisions, policymaking, or governance-related matters.	• **Active Role in Executive Functions:** The VP often serves as a trusted advisor to the President and is involved in executive decisions and administration. • **Immediate Succession to the Presidency**: In the event of the President's death, resignation, or removal, the Vice President automatically becomes the President for the remainder of the term. • **Involvement in Foreign Policy:** The Vice President frequently represents the U.S. on the global stage, participating in diplomatic engagements and international negotiations.
Removal from Office of VP	• **Removal Process**: The Vice President can be removed from office through a resolution passed by a majority of the Rajya Sabha and subsequently agreed to by the Lok Sabha. • **Notice Requirement:** A minimum of 14 days' advance notice must be given before such a resolution is introduced.	• **Impeachment Process:** The Vice President may be impeached and removed for committing "**treason, bribery, or other high crimes and misdemeanors,**" following the same procedure applicable to the President. • **Legislative Procedure:** The House of Representatives initiates the impeachment, while the Senate conducts the trial to determine removal from office.

Conclusion

The former VP Venkaiah Naidu said, "nation first, party next and self last". It implies the active role played by the Chairman of Rajya Sabha who is playing a dual role of executive and a presiding officer for democratic deliberation and decision-making.

Urban Local Bodies and Municipal Finance

Syllabus Mapping: GS2: Powers, Finances, Challenges at local level

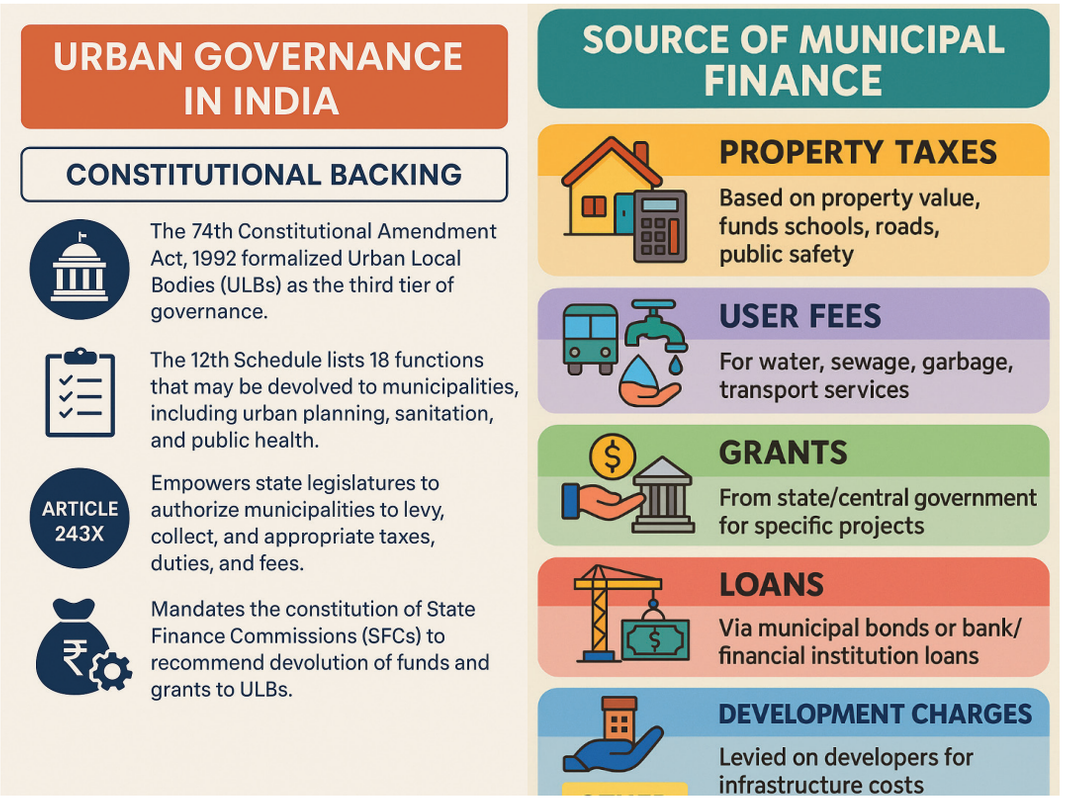
Context

Cities in low- and middle-income countries are growing fast—but their ability to finance the infrastructure and services needed to support people and jobs is lagging behind.

Introduction

The 74th Constitutional Amendment Act of 1992 was enacted to promote democratic decentralisation and strengthen Urban Local Bodies (ULBs), granting constitutional recognition to these institutions. Despite this, ULBs continue to grapple with persistent challenges related to funds, functions, functionaries, and overall functionality.

The **World Bank Group report (2025)**: **"Unlocking Subnational Finance: Overcoming Barriers to Finance for Municipalities in Low- and Middle-Income Countries"**, investment needs in urban infrastructure amount to 2–4% of GDP annually. Yet actual spending is far below this benchmark: in India, for example, urban infrastructure investment is just 0.7% of GDP.



Associated challenges with Urban Local Bodies

Financial Constraints

- **Inadequate Revenue Mobilization**: In 2023–24, urban local bodies (ULBs) contributed only 0.6% of GDP, in contrast to the central government's 9.2% and state governments' 14.6%, reflecting a severe fiscal shortfall for urban development.
  - **Composition of Receipts:**
    - **Tax revenue**: 30% of total receipts
    - **Grants, contributions, and subsidies**: 24.9%
    - **Fees and user charges:** 20.2%
  - **Property Tax Collection Efficiency:** As per CAG data, Municipal Corporations in 18 states collect only 56% of the property tax demand, indicating poor compliance and administrative inefficiency.
- **High Dependence on Fiscal Transfers**: Municipalities remain financially dependent on state and central governments. In 2022–23, grants rose by 24.9% (central) and 20.4% (state), yet delays and unpredictability persist.

- **Rising Debt and Limited Market Access:**
  - **Municipal borrowings increased:** From ₹2,886 crore (2019–20) to ₹13,364 crore (2023–24), now comprising 5.2% of total receipts.
  - **Municipal bonds remain underutilized:** Totaling just ₹4,204 crore (0.09% of corporate bonds), mostly via private placements, restricting wider market participation.
- **Green Bonds**: Though emerging, the green bond ecosystem is still at an early stage. Issuance involves high compliance costs like green audits and ongoing KPI monitoring, limiting scalability
- **Delayed Implementation:** Many states delay or inadequately act on State finance commission (SFC) recommendations, undermining predictable fiscal devolution.
  - **Eg**: Telangana's SFC was announced in 2015 but constituted only in 2018.

Governance Deficiencies

- **Incomplete Devolution of Powers**: Despite the 74th Constitutional Amendment, many state governments retain key functions like urban planning and land-use regulation, stifling local autonomy.
- **Weak State Election Commissions (SECs)**: Delayed and irregular municipal elections due to underpowered SECs erode democratic accountability.
  - **Eg**: Elections to the **Bruhat Bengaluru Mahanagara Palike (BBMP)** have been pending since 2020.
- **Human Resource Shortages:** High vacancy rates and inadequate training hinder effective municipal service delivery.
  - **Eg**: CAG data shows an average 37% vacancy across 18 states, with some ULBs experiencing 30–40% workforce shortages.
- **Ineffective Urban Planning & Service Delivery:** A substantial portion of municipal budgets is spent on non-developmental activities.
  - **Eg**: As per the CAG report, 29% of municipal expenditure is not linked to infrastructure or urban development, hampering long-term city planning
- **Lack of Autonomy:** ULBs across the country lack autonomy in city management and several city-level functions are managed by parastatals (managed by and accountable to the state).
  - **E.g.** in Bengaluru, the Bengaluru Development Authority is responsible for land regulation and the Karnataka Slum Clearance Board is responsible for slum rehabilitation.
- **Marginalization of Mayoral Office:** Mayoral office in India remains largely ceremonial, especially in megacities like Delhi, Mumbai, and Bengaluru. They lack both the authority and visibility they deserve as leaders at the first mile.
  - **E.g.** According to the CAG, urban local governments (ULGs) headed by mayors on average have no control over 75 per cent of the powers constitutionally devolved to them.

RBI Report on Municipal Finances (2024)

The **RBI Report on Municipal Finances** analyzes **201 municipal corporations (MCs)**, highlighting **alternative financing sources** amid **inadequate infrastructure** and **financial constraints**.

Major Findings of the Report:

- **Inadequate Infrastructure**: **Rapid urbanization** outpaces **urban infrastructure** development.
- **Limited Financing**: MCs rely on **bank loans, government loans** due to an **underdeveloped municipal bond market**.
- **Limited Capital Expenditure**: Rising **setup, administrative, interest costs** restrict **capital investments**.
- **Lack of Financial Autonomy**: Budgets lack **balance sheet/cash flow management**, causing inefficiencies.
- **Revenue Stagnation**: Municipal revenues/expenditures at **1% of GDP** (vs **7.4% Brazil, 6% South Africa**

Way Forward for Strengthening Municipal Finances

- **Boost own revenue generation**: Implement valuation-based property tax systems, leverage GIS mapping, and promote digital payment solutions to enhance compliance and reduce revenue leakage.
- **Enhance Non-Tax Income**: Revise user charges for services such as water supply, sanitation, and waste management to reflect actual costs. Leverage technology and awareness campaigns to improve fee collection efficiency.
- **Ensure Timely Fiscal Transfers**: Institutionalize formula-based, inflation-adjusted, and growth-sensitive transfers from State governments to Urban Local Bodies (ULBs)
- **Diversify Funding Sources**: Expand the use of municipal bonds and explore alternative financing mechanisms to fund infrastructure projects.
  - **Eg: financial pooling across** municipalities for large-scale urban development and tap into global climate finance mechanisms to support green infrastructure and sustainable energy initiatives.

- **Strengthen Transparency**: Enforce the adoption of the **National Municipal Accounting Manual (NMAM, 2004)** for uniform and transparent financial reporting.
  - **Eg: Link state-level fiscal support** to compliance with accounting standards and invest in training municipal personnel to enhance financial accountability.
- **Need of coordinated approach:** The **14th Finance Commission** recommended measures to augment the Consolidated Fund of States to supplement the resources of Panchayats and Municipalities, based on the recommendations of State Finance Commissions (SFCs)

Municipal Bonds

- **Definition**: **Debt obligations** issued by MCs for **socioeconomic projects** (bridges, schools, hospitals).
- **Maturity**: **3 years**; returns via **property/professional taxes** or **project revenues**.
- **SEBI 2015 Amendments**: Eased **bond issuance** for ULBs under **AMRUT, Smart Cities Mission**.
- **Cities Issuing Bonds**: **Ahmedabad, Amaravati, Visakhapatnam, Surat, Bhopal, Indore, Pune, Hyderabad, Lucknow**.

Advantages of Municipal Bond

- **Tax-Exempt Interest**: **Income tax-free** returns attract investors.
- **Creditworthiness**: Issued by **stable local governments**.
- **Diversification**: Reduces **investment risk** with **fixed income**.
- **Long-Term Investment**: **3–20 year maturity** suits long-term investors.
- **Liquidity**: Tradable in the secondary **market**.
- **Infrastructure Support**: Funds **community development**.

Challenges in Municipal Bond

- **Limited Awareness**: Low **public demand** for bonds.
- **Limited Supply**: Few issuances due to **financing constraints**.
- **Credit Risk**: **Default risk** tied to MC's **financial health**
- **Lack of Standardization**: Inconsistent **terms/conditions** complicate evaluation.
- **Limited Secondary Market**: Reduces **liquidity**.
- **Regulatory Gaps**: **Unclear regulations** create uncertainty.
- **Political Risks**: **Policy changes/corruption** affect repayment.

Way Forward

- **Enhance Revenue Capacity**: Improve **property taxes, user fees**; explore **grants, PPPs**.
- **Expand Financing**: Access **capital markets, pooled finance**.
- **Credit Rating for ULBs**: Boost **investor confidence** in bonds.
- **Improve Financial Management**: Adopt **sound budgeting/ accounting** practices.
- **Strengthen Regulatory Framework**: Ensure **transparent, fair regulations**.
- **Capacity Building**: Provide **training/technical assistance** for financial management.

2nd ARC recommendation

- setting up **State Finance Commissions to synchronize with the Central Finance Commission**
- **Action Taken Report** on the recommendations of the SFC must compulsorily be placed in the concerned State Legislature within six months of submission

Robust municipal finances will improve service delivery, enhance public trust, transparency, and resilience of cities in the face of rapid urbanization.

E-Governance transforming public service delivery

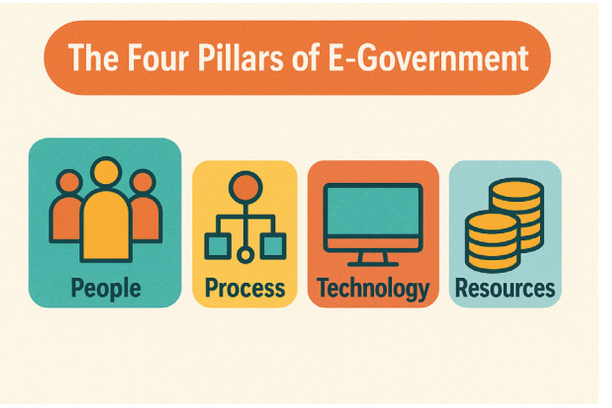
Syllabus Mapping: GS2: E-governance- applications, models, successes, limitations, and potential;

Context

Goa has been at the forefront of digital transformation in public service delivery, driven by its robust e-Governance push, leveraging AI, Data and Interoperability.

About E-governance

E-governance refers to the use of information and communication technologies (ICT) to deliver governmental functions. It helps in real-time incorporation of data into governance enabling evidence-based, transparent, and responsive administration. For example, E-governance systems integrate disparate data streams i.e. taxation, demography to produce actionable insights, thereby improving the design and delivery of policies.



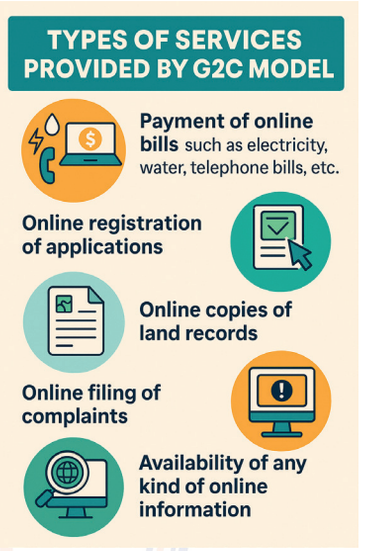
Models of E-governance

Government to Business (G2B)

- **E-Governance tools** are used to **aid the business community** – **providers of goods and services** – to **seamlessly interact with the government**.
- The **objective** is to **cut red tape**, **save time**, **reduce operational costs**, and to **create a more transparent business environment** when **dealing with the government**.
- The **G2B initiatives** can be:
  - **Transactional**, such as in **licensing, permits, procurement, and revenue collection**.
  - **Promotional and facilitative**, such as in **trade, tourism, and investment**.
- These **measures** help to **provide a congenial environment** to **businesses** to **enable them to perform more efficiently**.

Government to Citizens (G2C)

- In this case, an **interface is created** between the **government and citizens** which **enables the citizens** to **benefit from efficient delivery** of a **large range of public services**.
- This **expands the availability and accessibility** of **public services** on the one hand and **improves the quality of services** on the other.
- It gives **citizens the choice** of **when to interact with the government** (e.g., **24 hours a day, 7 days a week**), **from where to interact with the government** (e.g., **service centre, unattended kiosk, or from one's home/workplace**), and **how to interact with the government** (e.g., through **internet, fax, telephone, email, face-to-face**, etc).
- The **primary purpose** is to make the government **citizen-friendly**.



Government to Government (G2G)

- In this case, **Information and Communications Technology** is used not only to **restructure the governmental processes** involved in the **functioning of government entities** but also to **increase the flow of information and services** within and **between different entities**.
- This kind of **interaction** is **only within the sphere of government** and can be:
  - **Horizontal**, i.e., **between different government agencies** as well as **between different functional areas within an organization**.
  - **Vertical**, i.e., **between national, provincial, and local government agencies** as well as **between different levels within an organization**.
- The **primary objective** is to **increase efficiency, performance, and output**.

Government to Employees (G2E)

- **The government** is by far the **biggest employer** and, like any **organization**, it has to **interact with its employees** on a **regular basis**.
- This **interaction** is a **two-way process** between the **organization and the employee**.
- **Use of ICT tools** helps in making these **interactions fast and efficient** on the one hand and **increases satisfaction levels of employees** on the other.

Examples:

- **All kinds of data submission** (e.g., **attendance record, employee record**, etc.) from **various government offices**.
- **Employees can file complaints and dissatisfaction**.
- **Rules, regulations, and information for employees** can be **shared**.
- **Employees can check their payment and working record**.

Ways in which real-time, data-driven e-governance enhances policy effectiveness

- **Performance Monitoring and Dynamic Corrections:** Real-time data enables continuous tracking of progress and immediate intervention.
  - Eg: The Aspirational Districts Programme uses 49 performance indicators, while platforms like PRAGATI aid in real-time project monitoring and grievance redressal.

- **Efficiency and Leak-Proof Delivery Mechanisms:** Data-driven systems streamline policy delivery and reduce corruption.
  - Eg: The JAM Trinity (Jan Dhan, Aadhaar, Mobile) has facilitated targeted DBT, reduced pilferage, and ensured better inclusion.
- **Responsive Disaster Management:** Real-time data accelerates decision-making during emergencies.
  - Eg: Cyclone and flood rescue missions are optimized using live weather and satellite data.
- **Institutional Capacity Building through Tech Platforms:** Digital tools empower institutions and improve outreach.
  - Eg: CoWIN for vaccine management and Arogya Setu for COVID-19 contact tracing.
- **Economic Planning and Resource Mobilization:** Accurate data improves forecasting and financial planning.
  - Eg: GSTN filings serve as high-frequency economic indicators; geo-spatial data aids urban mapping and tax assessments.
- **Cultural Shift in Governance:** Digital monitoring tools foster accountability and time-bound delivery.
  - Eg: Online attendance systems and real-time tracking of services reduce absenteeism and delays.

Challenges in data-driven e-governance

- **Digital Divide and Exclusio**n: Low digital literacy and language barriers marginalize vulnerable groups.
  - Eg: Elderly citizens struggle with platforms like Jeevan Pramaan for pension verification.
- **Infrastructure Gaps:** Power cuts and poor internet connectivity hinder service delivery.
  - Eg: Disruptions during natural disasters impact access to digital services.
- **Privacy and Data Security Risks**: The risk of surveillance, data misuse, and breaches undermines public trust.
  - Eg: Concerns around linking Aadhaar with voter IDs have sparked debates on data rights.
- **Limited Use of Real-Time Data:** Most e-governance relies on historical data, limiting its utility for dynamic governance.
  - E.g. In welfare schemes like **PM Awas Yojana**, outdated socio-economic caste census data may exclude legitimate beneficiaries.
- **Inadequate Legal and Ethical Frameworks:** Inadequate guidelines on data ownership, consent, and accountability.
  - E.g. Although the Digital Personal Data Protection Act, 2023 has been passed, there remain significant gaps in implementation, oversight, and clarity
- **Poor Data Quality and Standardization:** Different departments and states collect and store data in non-standardized formats, making integration difficult.
  - E.g. Health data collected by states under NHM often lacks integration with national databases like Ayushman Bharat.

2nd ARC Recommendations towards E-governance

- **Building a congenial environment**: It is a **sine qua non** for **successful implementation** of **e-Governance initiatives**. This should be **achieved by**:
  - **Creating and displaying a will to change** within the **government**.
  - **Providing political support** at the **highest level**.
  - **Incentivising e-Governance** and **overcoming the resistance to change** within **government**.
  - **Creating awareness** in the **public** with a **view to generating a demand for change**.
- **Capacity Building and Creating Awareness**:
  - **Capacity building efforts** must **attend to both** the **organizational capacity building** as also the **professional and skills upgradation** of **individuals** associated with the **implementation of e-Governance projects**.
  - **Lessons learnt** from **previous successful e-Governance initiatives** should be **incorporated in training programmes**.
  - A **network of training institutions** needs to be **created in the States** with the **Administrative Training Institutes** at the **apex**.
- **Developing Technological Solutions**:
  - There is a **need to develop** a **national e-Governance 'enterprise architecture' framework** as has been **done in some countries**.
- **Implementation of e-Governance projects** would involve a **detailed 'project management' exercise** which would consist of the **following activities**:
  - **Breaking up entire e-Governance projects** into **components/activities**.
  - **Planning each activity** in **detail**.
  - **Allocating resources**, both **human and financial**.

Conclusion

To achieve participatory and inclusive governance, e-governance must be rooted in the principle of public data for public good. As the **Economic Survey 2018–19** articulates, the mantra should be "data of the people, by the people, for the people." Addressing existing challenges will be key to unlocking the full potential of data-driven governance for equitable and effective policy outcomes.

TOPICS FOR PRELIMS

Can the Supreme Court halt an Act passed by a State?

Context

The Supreme Court recently ruled in **Nandini Sundar vs State of Chhattisgarh** that the enactment of the Chhattisgarh Auxiliary Armed Police Forces Act, 2011—passed after its 2011 order—does not amount to contempt of court.

Can the Supreme Court Halt an Act Passed by a State?

- **Yes, but with conditions.**
- The Supreme Court **cannot directly stop** a State from passing a law **unless** the law:
  - **Violates the Constitution** (i.e., is **ultra vires**), or
  - **Exceeds the legislative competence** of the State.
- **Key Legal Principles**
  - **Separation of Powers**: The legislature has the **plenary power to make laws**, while the judiciary can only intervene if a law violates **constitutional provisions** or falls outside the legislative jurisdiction.
  - **Contempt of Court?**
    - Merely passing a law after a Supreme Court ruling **does not constitute contempt**.
    - Contempt applies only when there is **willful disobedience** of a court's order.
  - **What the Court Can Do:** It can **strike down** a State or Central law if it's found to be:
    - **Unconstitutional**, or
    - **Beyond legislative powers** under the Constitution.
  - **Indian Aluminium Co. vs State of Kerala (1996)**: The Court emphasized the need to **respect the balance** between the legislature, executive, and judiciary.

Ladki Bahin Yojana

Context

The **Maharashtra government has removed 2,889 government employees** from the beneficiary list of the Ladki Bahin Yojana after finding them ineligible for the women welfare scheme.

About Ladki Bahin Yojana (Mukhyamantri Majhi Ladki Bahin Yojana)

- **Launched in 2024** by the **Maharashtra government** as a major women-centric welfare initiative.
- **Objective**
  - To provide **financial assistance** to **economically weaker women**.
  - Aims at **rehabilitation**, **economic upliftment**, and **empowerment** of women in the state.
- **Eligibility Criteria**
  - Must be a **permanent resident** of **Maharashtra**.
  - **Age limit**: Women aged between **21 to 65 years**.
  - **Annual family income** should be **₹2.5 lakh or less**.
  - **No family member** should be a registered **income taxpayer**.
  - **Government employees are ineligible**, as per recent beneficiary audits.
- **Benefits**
  - Eligible women receive **₹1,500 per month** via **Direct Benefit Transfer (DBT)** into their bank accounts.
  - The financial support is aimed at covering **basic needs**, improving **quality of life**, and promoting **economic inclusion**.

Recent Developments

- **2,889 ineligible government employees** were removed from the beneficiary list after verification.
- The government is using **income tax data** from CBDT to further identify and eliminate ineligible applicants.
- Cases of **double benefits** in Nashik and other districts are under investigation.

Law on phone-tapping, and two HC rulings

Context

In a landmark ruling with significant constitutional implications, the **Madras High Court has struck down a 2011 phone-tapping order** issued by the Union Ministry of Home Affairs (MHA).

Judgment Overview

- The Court ruled that the surveillance violated **Article 21 – the Right to Privacy**, as it wasn't based on "public emergency" or "public safety."
- The decision strengthens the jurisprudence of **PUCL (1997)** and **Puttaswamy (2017)**.

Legal Framework

1. **Indian Telegraph Act, 1885**
   - **Section 5(2):** Allows interception of messages **only in cases of public emergency or public safety**.
   - Grounds must align with **Article 19(2)**: sovereignty, state security, public order, etc.
2. **Indian Telegraph Rules, 1951**
   - **Rule 419-A:**
     - Authorization by Home Secretary (Centre/State) or an officer not below Joint Secretary in urgent cases.
     - Mandatory review by a **Review Committee** within 2 months.
     - Interception valid up to **60 days**, extendable to **180 days**.

3. **Information Technology Act, 2000:** Governs electronic/digital communications (e.g. emails, WhatsApp)

Landmark Judgments

- **PUCL v. Union of India (1997)**
  - The Supreme Court laid down **procedural safeguards** for phone tapping.
  - Only senior officials can approve.
  - Review Committee oversight is mandatory.
- **K.S. Puttaswamy v. Union of India (2017):** Recognized **Right to Privacy as a Fundamental Right** under Article 21.

Recent High Court Rulings (2025)

Delhi High Court (June 26, 2025)

- Upheld CBI-ordered tapping in ₹2,149 crore ITPO corruption case.
- Held that **large-scale corruption** posed a threat to **public safety**, justifying interception.

2. Madras High Court (July 2, 2025)

- Quashed MHA's 2011 phone-tapping order in ₹50 lakh bribery case.
- Reason:
  - No "public emergency" or "public safety" as per Section 5(2).
  - **Review Committee process not followed**.
- Reaffirmed that **secret surveillance cannot be used for ordinary crime detection**.

Key Safeguards & Procedural Requirements

- Must be **proportional, necessary, and legally justified**.
- The Review Committee must examine each interception order.
- Any evidence from **illegally obtained tapping** is **inadmissible** in court.
- Periodic **data destruction** and accountability measures required.

Enemy Property Act

Context

The **Madhya Pradesh High Court** has directed **Saif Ali Khan** to file an appeal before the appellate authority challenging the Central Government's order.

What is Enemy Property?

- Properties left behind by individuals or their heirs who:
  - Fought wars against India, **or**
  - Acquired **citizenship of enemy nations** (like Pakistan or China).
- These include **both movable and immovable assets** (land, buildings, shares, businesses).
- Such properties are taken over by the Indian government and classified as **"enemy property."**

Background of Enemy Properties in India

- The concept originated after the:
  - **Indo-Pak Wars (1965 & 1971)**
  - **Indo-China War (1962)**
- Citizens who migrated to Pakistan or China left behind properties in India.
- These were seized under the **Defence of India Act, 1962** and **Defence of India Rules**.
- A **Custodian of Enemy Property** is appointed by the government to **manage, control, and dispose of** these assets.

Enemy Property Act, 1968

- Passed to legally **vest enemy properties permanently** with the **Custodian of Enemy Property**.
- Key provisions:
  - Enemy properties **cannot be transferred or inherited**.
  - Only the Custodian has the authority to **manage, lease, or dispose** of them.

Enemy Property (Amendment and Validation) Act, 2017

- Major updates:
  - **Inheritance rights abolished**—no person (even Indian citizens) can claim enemy property.
  - Legal ownership and transfer to **any other party** is **strictly prohibited**.
  - Closed all **loopholes for civil claims or inheritance disputes**.

Process for Disposal of Enemy Property (2018 Guidelines)

- Government laid out procedures for **sale, valuation, and auction**:
  - **Valuation Committees** led by **District Magistrates** assess properties.
  - If occupied, the occupant may buy the property at a set price.
  - **Movable assets** (like shares) sold through public auctions or tenders.

Key Statistics on Enemy Property

- **9,280** enemy properties left behind by **Pakistani nationals**.
- **126** enemy properties left behind by **Chinese nationals**.
- Over **9,400** properties under government custody.
- Estimated total value: **over ₹1 lakh crore**.
- **Auction proceeds** go to the **Consolidated Fund of India**.

Directives for efficient and effective management of litigation

Context

The Centre has issued a **Standard Operating Procedure (SOP)** titled **"Directive for Efficient and Effective**

Management of Litigation by the Government of India" to reduce **unnecessary government litigation** and streamline legal processes as part of its **Viksit Bharat 2047 vision**.

Purpose & Vision

- Establish an **integrated, coordinated litigation management system** across Government of India ministries/ departments.
- Reduce repetitive, resource-heavy litigation by improving internal legal processes.

Underlying Challenges Identified

- **High case load** including service, pension, land acquisition, contractual, and fundamental rights disputes.
- **Lack of legal capacity**: most departments lack dedicated legal cells; officials handling cases often lack legal training.
- **Recurring litigation** due to narrow rule interpretation, improper procedures, ambiguous policies, and failure to implement judgments.

Key Directives Issued

1. **Set up Legal Cells/Litigation Units** in every ministry/ department.
2. **Standardise SOPs** covering litigation handling, periodic review, avoidance of contempt, and compliance with orders.
3. **Mandatory case reviews**, especially on recurring and high-stakes litigation.
4. **Promote legal training** for departmental officials to boost in-house expertise.
5. **Enhance coordination**: inter-departmental monitoring, judgment compliance, and use of feedback loops.
6. **Data-driven approach**: use case-tracking tools like LIMBS to analyse litigation patterns and inform policy reform

New Governors Appointed For Haryana and Goa

Context

The President appointed new Governors and Lt. Governor– Kavinder Gupta as Lt. Governor of Ladakh, Ashok Gajapathi Raju as Governor of Goa, Ashim Kumar Ghosh as Governor of Haryana.

Constitutional Provisions (Governor's Post)

- **Article 153**: There shall be a Governor for each state. However, the same person can be appointed Governor for two or more states.
- **Article 154**: The executive power of the state is vested in the Governor.
- **Article 155**: The Governor is appointed by the President of India.
- **Article 156**: The Governor holds office **at the pleasure of the President**, with no fixed term.
- **Article 157**: Qualifications for appointment as Governor.
- **Article 158**: Conditions of the Governor's office.

Eligibility Criteria for Governor

- Must be a **citizen of India**.
- Must have **completed 35 years** of age.
- **Must not hold any office of profit**.
- Cannot be a member of Parliament or any state legislature.
- Should be eligible for election as a member of the Lok Sabha.

Key Supreme Court Observations

- The post of Governor is not merely ceremonial; the **Governor is a constitutional head** and must act as a link between the Centre and State.
- In **BP Singhal vs Union of India (2010)**, SC ruled:
  - The President can remove a Governor **without giving reasons**, but the power **cannot be exercised arbitrarily**.
  - **Political considerations alone are not valid grounds** for removal.
- SC emphasized the **apolitical and neutral role** of the Governor to maintain **constitutional balance**.

Bypoll Election

Context

The swearing-in of newly elected BJP and AAP MLAs in the Gujarat Assembly highlights the results of the June 2024 bypolls.

About Bypoll (Bye-Election) Elections

- **Bypolls (or bye-elections)** are elections held **to fill vacancies** in the legislature when a seat becomes **vacant before the normal term ends**.
- **Constitutional Provisions**
  - **Article 190(3)** and **Article 101(3)**: These articles deal with **vacancies** in the **State Legislature** and **Parliament**, respectively.
    - A seat becomes vacant if:
- A member **resigns**.
- A member is **disqualified**.
- A member **dies**.
- A member is **absent** for 60 consecutive days without permission.
  - **Representation of the People Act, 1951 (Section 151A)**:
    - Mandates that **by-elections must be held within 6 months** of the vacancy.
    - Exceptions:
- If the remainder of the term is **less than 1 year**, or
- If the **Election Commission (EC)**, in consultation with the **Centre**, certifies that holding the by-election is **not feasible**.
- **Who Conducts Bypolls?:**
  - **Lok Sabha/Rajya Sabha/Vidhan Sabha:** Conducted by the **Election Commission of India (ECI)**.
  - **Local Bodies (Panchayat/Municipal):** Conducted by the **State Election Commission (SEC)**.

Question Hour

Context

Trinamool Congress (TMC) leader Derek O'Brien said that 'Question Hour is one of the few tools still available to the opposition to hold the government accountable'.

Question Hour in Indian Parliament

- Question Hour is the **first hour of a sitting of the Parliament** (when in session) during which **Members of Parliament (MPs) ask questions to ministers** regarding the functioning of their ministries.
- It is a crucial tool for **ensuring government accountability and transparency**.
- The **first question in Parliament was asked in 1893**, during the pre-independence era under British rule.
- **Timing:**
  - **Lok Sabha**: Usually begins with Question Hour each day of sitting.
  - **Rajya Sabha**: Held from **11:00 AM to 12:00 Noon** (since 2014).
  - **Not held** on:
    - The day the **President addresses Parliament**.
    - The day the **Union Budget** is presented.
- **Rules & Procedure:**
  - **Governed by:**
    - **Rules 32–54** of **Rules of Procedure and Conduct of Business in Lok Sabha**.
    - **Directions 10–18** of **Directions by the Speaker, Lok Sabha**.
  - Questions must usually be **submitted 15 days in advance**.
  - **Maximum 5 questions** (including oral and written) can be submitted by an MP per day.
  - Additional notices are deferred to subsequent days of the session.
  - Questions are **submitted either online** (through the Members' Portal) or **in printed forms** from the Parliamentary Notice Office.
  - The **Speaker (Lok Sabha)** or **Chairman (Rajya Sabha)** has final discretion on the admissibility of questions.

Types of Questions

Type	Response	Supplementary Allowed	Submission Time	Daily Limit
Starred	Answered **orally**	Yes	15 days in advance	20 per day
Unstarred	Answered in **written** form	No	15 days in advance	230 per day
Short Notice	Answered **orally**	Yes	Less than 10 days (urgent issues)	No fixed limit
Questions to Private Members	Addressed to MPs who are not Ministers (e.g. on Private Member's Bills)	Depends	Varies	Rarely used

e-Sakshaya

Context

The Tamil Nadu Police will soon launch a mobile app called **e-Sakshya**, developed by the Union Ministry of Home Affairs.

About the e-Sakshya App

- **Purpose**: To help Tamil Nadu police personnel collect **mandatory audio-visual evidence**, upload photos, and generate secure, time-stamped SID packets during investigations.
- **Developed by**: **Union Ministry of Home Affairs**.
- **Implemented through**: **State Crime Records Bureau (SCRB)**, Tamil Nadu.
- **Key Features**:
  - Capture and upload **audio-visual evidence**.
  - Upload **photographs of crime scenes/witnesses**.
  - Generate **SID packets** (Secure, Geo-tagged, Time-stamped evidence with hash verification).
  - Generate **certificates with timestamps**.
- **Objective**:
  - To **strengthen the chain of custody**.
  - Ensure **admissibility of evidence in court**.
- **Usage**:
  - Used by all **investigation officers**.
  - Officers have been **trained** in using the app.
- **Legal Compliance**:
  - **Bharatiya Nagarik Suraksha Sanhita, 2023.**
  - Evidence must be linked with **FIR, GD, and CNR numbers**.
- **Backup Protocol** (when app unavailable):
  - **Part-A Certificate**: Issued by the police or videographer.
  - **Part-B Certificate**: Issued by an expert under **Section 329** of BNSS.
- **Technology Used**:
  - **Blockchain**: To ensure data **integrity and trustworthiness**.
- **Integration**:
  - Evidence is uploaded to the **ICJS/Sakshya portal**.
  - **Courts and magistrates** can access evidence online.

Meri Panchayat App

Context

The mobile app **"Meri Panchayat"** has gained international acclaim by winning the **WSIS Prizes 2025 Champion Award**, a prestigious global recognition under the **World Summit on the Information Society (WSIS)** initiative.

About Meri Panchayat App – WSIS Prizes 2025 Champion

- **Purpose**: A unified digital governance platform designed for rural India, catering to citizens, officials, and stakeholders of the Panchayati Raj system.
- **Functionality**: Integrates multiple government services and portals into one seamless web and mobile interface to enhance **transparency**, **accountability**, and **citizen participation**.
- **Launched By**: Joint initiative of the **Ministry of Panchayati Raj** and **National Informatics Centre (NIC)** under the **Ministry of Electronics and IT**.

Key Features:

- Access to real-time data on **Panchayat budgets**, **receipts**, **payments**, and **development plans**.
- Information on **elected representatives**, **functionaries**, and **local civic services**.
- View **Gram Panchayat Development Plans (GPDPs)** and track project proposals.
- Get **local weather forecasts** at the Gram Panchayat level.
- Tools for **social audits**, **fund utilization tracking**, and **grievance redressal** using **geo-tagging** and **geo-fencing**.
- **Multilingual support**: Offers access in over **12 Indian languages** for greater inclusivity.
- Empowers citizens to:
  - **Propose projects**,
  - **Rate completed works**,
  - **Access Gram Sabha agendas and resolutions**—boosting participatory democracy.

About WSIS Prizes

- Recognizes global initiatives that leverage **ICTs** for **sustainable development**.
- Created under the **World Summit on the Information Society (WSIS)** to evaluate and reward impactful digital solutions worldwide.

What is the legal status of the right to vote?

Context

The Supreme Court is currently hearing petitions challenging the Special Intensive Revision (SIR) of electoral rolls in Bihar. A key issue in the debate is the legal status of the 'right to vote.'

Different Types Right in India

Type of Right	Definition	Examples
Natural Rights	Inherent and inalienable rights, derived from human nature and reason.	Right to life, liberty, and privacy. Not directly enforceable in courts unless codified.
Fundamental Rights	Guaranteed under **Part III** of the Constitution and enforceable by the Supreme Court under Article 32.	Right to equality (Art. 14), freedom of speech (Art. 19), right to life (Art. 21), etc.
Constitutional Rights	Rights provided **elsewhere in the Constitution** (outside Part III).	Right to vote (Art. 326), Right to property (Art. 300A), freedom of trade (Art. 301)
Statutory (Legal) Rights	Rights granted by **ordinary laws passed by Parliament or State legislatures**.	Right to education under RTE Act, right to food under NFSA, MGNREGA employment right

Right to Vote

- 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.
- The right to vote is not absolute—subject to citizenship, age, residence, & legal disqualifications.
  - **Representation of the People Act, 1950:**
    - **Section 62**: Only those listed in the electoral roll can vote.
    - Disqualifies those in **prison** or disqualified by law
    - **Section 16**: Non-citizens cannot vote.
    - **Section 19**: Must be 18+ and **ordinarily resident** in the constituency.

Judicial Interpretation: Is the Right to Vote a Fundamental, Constitutional, or Statutory Right?

Case Name	Year	Court's Ruling
N.P. Ponnuswami v. Returning Officer	1952	**Statutory right** – Voting is created and regulated by statute (RP Acts).
Jyoti Basu v. Debi Ghosal	1982	Reaffirmed voting is **neither a fundamental right nor a common law right**, only **statutory**.
PUCL v. Union of India	2003	Justice P.V. Reddy observed voting may be a **constitutional right**, though not fundamental.
Kuldip Nayar v. Union of India	2006	The Constitution Bench reaffirmed that the **right to vote is a statutory right**.
Rajbala v. State of Haryana	2015	Division Bench held voting is a **constitutional right**, based on PUCL judgment.
Anoop Baranwal v. Union of India	2023	Majority opinion reaffirmed Kuldip Nayar: **right to vote is only a statutory right**.
Justice Ajay Rastogi (Dissent in Anoop Baranwal)	2023	Argued that the right to vote expresses **freedom of choice (Art. 19(1)(a))**, integral to **democracy**.

Article 174 (1)

Context

The Manipur Congress has sought clarification from the Governor on the constitutional status of the State Assembly, which hasn't convened since August 2024, raising concerns about a possible **violation of Article 174(1) of the Constitution.**

About the Issue

- **Background**: President's Rule was imposed in **Manipur on February 13, 2025**, after CM **N. Biren Singh resigned on February 9** amid ethnic violence.
- **Congress Concern**: The **Manipur Congress** asked Governor **Ajay Kumar Bhalla** whether the **60-member Legislative Assembly** is still "alive" or "constitutionally dead," as it hasn't met since **August 2024**.
- **Constitutional Point Raised**: Article **174(1)** of the Constitution states that **no more than six months** should pass between two sittings of a Legislative Assembly.
  - Since the last sitting was on **August 12, 2024**, the next should have been held **by February 11, 2025**.
- **Governor's Action**: The Governor had **summoned the Assembly for February 11**, but later declared it **null and void** due to the CM's resignation.
- **Congress Stand**: Argued that the Assembly **was not dissolved or suspended** at the time of the resignation, so **Article 174(1) remains applicable**.

Article 174(1) – Sessions of the State Legislature

"The Governor shall from time to time summon the House or each House of the Legislature of the State to meet at such time and place as he thinks fit, but six months shall not intervene between its last sitting in one session and the date appointed for its first sitting in the next session."

Key Points

- **Power to Summon State Legislature:**
  - The **Governor** has the constitutional authority to **summon** (call), **prorogue** (suspend without dissolving), or **dissolve** the **State Legislative Assembly**.
- **Governor Acts on Aid & Advice:**
  - Though the article says "as he thinks fit," in practice, the Governor **must act on the advice of the Council of Ministers** headed by the Chief Minister (as per Article 163 and SC judgments like **Shamsher Singh vs State of Punjab**).
- **Mandatory Time Gap:**
  - There must not be a gap of more than **6 months** between two sessions of the State Legislature (as per **Article 174(2)(a)**).
- **Applicable to Unicameral and Bicameral States:**
  - Applies to **both Houses** in bicameral states (Legislative Assembly + Legislative Council) and to the **only House** in unicameral states.

Judicial Interpretation

- In **State of Rajasthan v. Union of India (1977)**, the SC clarified that the Governor **is bound by ministerial advice** in routine matters like summoning the House.
- **Governors cannot act independently** unless under special constitutional provisions like **Article 356 (President's Rule)**

Can Presidential Reference change a judgment?

Context

The Supreme Court has issued notices to the Centre and States on a Presidential Reference asking whether **courts can mandate the President or Governors to act within a fixed time on State Bills**, with detailed hearings set to begin in mid-August.

Background of the Case: SC's April 2025 Verdict Under Scrutiny

- The **Presidential Reference** under Article 143 follows the **Supreme Court's April 2025 judgment** in a case filed by the Tamil Nadu government.
- The Court held that **Governor R.N. Ravi's delay** in assenting to 10 re-passed State Bills was **illegal**.
- For the first time, the Court **imposed judicial timelines** on Governors and the President for processing State Bills.

- The current Reference seeks clarity on **whether courts can compel constitutional authorities** like the President and Governors to act within set time limits.

Article 143: Presidential Reference Power

- **Article 143(1)** of the Indian Constitution allows the **President to seek the Supreme Court's opinion** on legal or factual questions of **public importance**.
- Inspired by the **Government of India Act, 1935**, this provision has been used **at least 14 times** since Independence.
- The Court can **only answer the specific questions** referred and **cannot expand** beyond them.
- Article **145(3)** mandates such matters be heard by a **Constitution Bench of at least five judges**.
- The word **"may"** in Article 143 gives the **Court discretion** to **decline** answering a Reference.
- In the **Special Courts Bill case (1978)**, the Court clarified this discretion and emphasized it must **record reasons** for refusing.
- In **Dr. Ismail Faruqui v. Union of India (1994)**, the Court held that cases involving **expert or political matters** may be declined.
- Notable refusals include:
  - **Ayodhya dispute (1993)** – declined due to an **ongoing civil case**.
  - **Resettlement law in J&K (1982)** – law was enacted before Reference could be addressed.

Nature of SC's Advisory Opinions

- Article **141** binds only "**law declared**" by the Court; advisory opinions are **not binding precedents**.
- In **St. Xavier's College v. State of Gujarat (1974)**, the Court said advisory opinions hold **persuasive value**.
- However, in **R.K. Garg v. Union of India (1981)**, reasoning from an advisory opinion was treated as **binding**.
- In the **Cauvery case (1991)**, advisory opinions were given "**due weight and respect**" but not made binding.
- Any opinion from the current Reference **cannot override** the April 2025 judgment but may **guide future cases** (e.g., Kerala, Punjab).

Scope to Modify April 2025 Verdict via Reference

- Past rulings clarify that **Article 143 cannot overturn** or review an **adjudicated judgment**.
- Only **review or curative petitions** can challenge settled decisions (Cauvery case).
- However, under Article 143(1), the Court **can clarify or restate** legal principles:
  - In the **Natural Resources Allocation case (2012)**, the Court refined legal reasoning without altering the core verdict.
  - In **1998**, a Reference helped refine the **collegium system** without invalidating the 1993 ruling.
- The present Reference may **clarify the scope** of the April ruling through broader constitutional interpretation, not reversal.

National Sports Governance Bill 2025

Context

The Government is preparing to introduce the **National Sports Governance Bill** during the upcoming **Monsoon Session of Parliament**.

Introduction: National Sports Governance Bill 2025

- The **Union Government** plans to introduce the **National Sports Governance Bill 2025** in the **Monsoon Session of Parliament**.
- The Bill aims to **reform the governance of sports bodies** across India.
- It focuses on:
  - **Regulatory transparency**
  - **Athlete-centric policies**
  - **Fair and timely dispute resolution**
  - **Streamlining functioning of National Sports Federations (NSFs)**, including the **BCCI**.
- Marks a shift in the Ministry's role from a **"controller" to a "facilitator"** for improving global competitiveness in Indian sports.
- Intends to **reduce legal disputes and bureaucratic hurdles** in the sports ecosystem.

Key Provisions of the Bill

- A **National Sports Board** will be established to:
  - Recognize or suspend **National Sports Federations (NSFs)**
  - Ensure compliance with **governance standards** and **athlete welfare norms**
  - Oversee **elections of sports bodies**
- The Board will include:
  - A **Chairperson**
  - Members appointed by the **Central Government**
- Functions as a **watchdog** for ethical governance and provides **administrative oversight** to NSFs.
- A **National Sports Tribunal** will be set up to address **sports-related legal disputes**.
- Key features:
  - Headed by a **Supreme Court judge**
  - Handles disputes regarding:
    - **Elections**
    - **Team selections**
    - **Internal administration** of NSFs
  - **Appeals** from the NST will be allowed **only before the Supreme Court**

- The NST **will not cover**:
  - Disputes during **Olympic, Asian, or Commonwealth Games**
  - Cases under **international sports federations**
  - **Anti-doping cases** (These remain under the **National Anti-Doping Agency – NADA**)

Right to Recall

Context

Thousands gathered in Taipei for a **pro-recall rally** where **two dozen Taiwanese opposition lawmakers and a mayor** face **recall elections**.

What is a Recall Election?

- A **recall election** allows voters to remove an elected official from office before the end of their term through a **direct vote**.
- It is initiated when a required number of voters **sign a petition** demanding recall.
- Has historical roots in **ancient Athenian democracy**.
- **Modern usage**: Found in several democracies including **Canada** (since 1995 in British Columbia) and **multiple U.S. states** (on grounds like misconduct).

Recall in Indian Context

- **Not new to Indian philosophy** — the idea of **Rajdharma** during the Vedic era emphasized removing ineffective rulers.
- **M.N. Roy (1944)** advocated for decentralized governance with provisions for **election and recall** of representatives.
- **Representation of the People Act (ROPA), 1951** allows vacation of office only in cases of certain offences, not general incompetence or public dissatisfaction.
- **Somnath Chatterjee**, former Lok Sabha Speaker, once proposed the introduction of Right to Recall for greater accountability.
- **Currently in place** at the **local government level** in states like **Madhya Pradesh, Bihar, and Chhattisgarh**.
- No provision exists at the **state or national level** for citizens to recall MPs or MLAs.

ECONOMY AND AGRICULTURE

TOPICS FOR MAINS (ECONOMY)

Make in China 2025 Plan: Lessons For India

Syllabus Mapping: GS- Paper 3, Economic Growth

Context

Amid Apple's shift from China to India for iPhone manufacturing, China's **'Made in China 2025'** policy and India's 'Make in India' initiative offer contrasting lessons in industrial policy and global supply chains.

About 'Make in India' Initiative

- **Launch:** September 2014.
- **Aim:** Transform India into a global manufacturing hub by boosting investment, innovation, skill development, and manufacturing infrastructure.
- **Key Features:**
  - Promotes ease of doing business and FDI.
  - Focuses on **25 sectors**, including electronics, automobiles, defense, and textiles.
  - Encourages job creation and skill enhancement.
- **Achievements:**
  - Attracted significant FDI inflows.
  - Growth in sectors like mobile phone assembly (e.g., Apple, Samsung).
  - Supported by production-linked incentive (PLI) schemes.

India's initiative to boost manufacturing

- **Make in India:** Make in India, launched in 2014, aims to position India as a global manufacturing hub by fostering both domestic and foreign investment.
  - Despite this, the manufacturing sector's contribution to GDP has remained stagnant at 15–17%, falling short of the **National Manufacturing Policy's target of 25% by 2022.**
- **Atmanirbhar Bharat Abhiyan:** In 2020, the Atmanirbhar Bharat Abhiyan emphasized self-reliance through five core pillars: economy, infrastructure, system, demography, and demand.
- **Production Linked Scheme(PLI):** To strengthen domestic manufacturing, Production Linked Incentive (PLI) schemes were introduced across 14 key sectors including electronics, pharmaceuticals, automobiles, and textiles to drive investment, boost production, and generate employment.
  - The PLI scheme for mobile manufacturing has notably increased domestic output, making India the world's second-largest mobile phone producer.
- **Skill India Mission:** Complementing these efforts, the Skill India Mission focuses on skilling, reskilling, and upskilling the workforce to align with industry needs, while Startup India fosters innovation and entrepreneurship to build indigenous technological capabilities.

Data: Manufacturing

- **GDP Contribution:** 16–17% (₹30 lakh crore, 2022–23); 16% global GDP.
- **Exports:** $447.46 billion (FY23, +6.03%); 42.6% from MSMEs (Apr–Aug 2022).
- **Employment:** 62.4 million (2022–23, up from 57 million in 2017–18).
- **Growth**: 11.6% in FY24; core industries (electricity, steel, cement) +6.5% early FY25.

About 'Made in China 2025'

- **Background:** Launched in **May 2015 by China's State Council, Made in China 2025 (MIC 2025)** marked a significant shift in national policy aimed at modernizing the country's manufacturing capabilities.
  - Inspired by **Germany's Industry 4.0** model, the initiative sought to reduce reliance on foreign technologies and cultivate domestic technological expertise.
  - It outlined **key focus areas** such as robotics, aerospace, new-energy vehicles, and advanced medical equipment—sectors deemed vital for ensuring China's future economic resilience and national security.
  - More than just an industrial reform strategy, MIC 2025 represented **China's strategic ambition** to emerge as a **global leader in innovation-driven manufacturing.**
- **Launch:** 2015.

- **Aim:** Upgrade China's manufacturing from low-cost mass production to high-tech, high-value sectors by 2025.
- **Core Focus Areas:**
  - **10 sectors**: Next-gen IT, high-end numerical control machinery, aerospace, new materials, biotech, green vehicles, power equipment, robotics, railways, and maritime engineering.
- **Approach:**
  - Heavy state support, subsidies, and policy-driven investments.
  - Focus on self-reliance, indigenous innovation, and global market dominance.
- **Achievements:**
  - Global leader in electric vehicles, solar modules, and lithium-ion batteries.
  - World-class high-speed rail, advanced robotics, and integrated supply chains.

What Made "Make in China 2025" Successful & Lessons for India?

Basis	Make in China 2025	Lessons for India
Strategic State Support	China's aggressive, policy-backed support (loans, subsidies, tax relief) accelerated tech adoption and global competitiveness.	India needs a clear, sustained policy push and better coordination between central and state governments.
Focus on High-Value Manufacturing	China moved quickly from labor-intensive goods to advanced manufacturing (AI, robotics, EVs).	India should select high-tech sectors for rapid scaling, beyond low-end assembly.
R&D and Skill Development	China invested heavily in R&D and technical workforce upskilling.	India must boost funding for research and technical education to build a world-class talent pool.
Integrated Supply Chains	China created deep, integrated supply chains, reducing reliance on imports.	India should nurture domestic supplier ecosystems and reduce dependence on foreign intermediates.
Balanced Growth	China's manufacturing focus came at the expense of its services sector and domestic consumption.	India should pursue manufacturing growth without neglecting its strong services sector and domestic demand.
Global Perception & Trade Practices	Aggressive policies led to global backlash and allegations of unfair trade practices against China.	India must ensure its policies are WTO-compliant and foster positive international trade relationships.
IP and Technology Acquisition	China's insistence on technology transfer from foreign firms accelerated local capabilities but caused friction.	India should encourage technology partnerships while respecting IP rights, building trust with global investors.

India's **Make in India** initiative must evolve to meet the demands of a changing global industrial landscape. Lessons from **Made in China 2025** which delivered quick gains through centralization but faced integration challenges—highlight the need for a uniquely Indian path.

Chemical Industry: Powering India's Participation in Global Value Chains

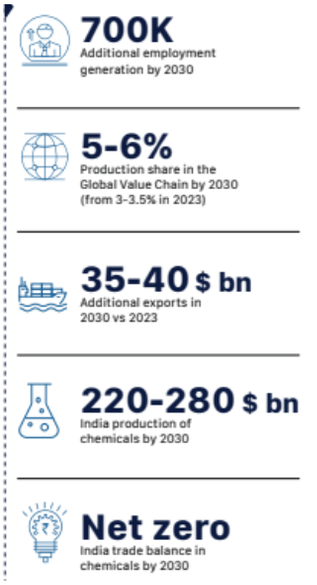
Syllabus Mapping: GS- Paper 3, Manufacturing Sector

Context

NITI Aayog released its report **"Chemical Industry: Powering India's Participation in Global Value Chains."**

Status of Chemical Industry in India

- **Size & Contribution:**
  - India is the **6th largest chemical producer** in the world and **3rd in Asia.**
  - Contributes over 7% to India's GDP; accounts for ~13% of total industrial output.
  - Employs over 2 million people.
  - India's share in the global chemical value chain: ~3.5%.
  - Chemical trade deficit: USD 31 billion (2023) due to high dependence on imports, especially for specialty chemicals and feedstock.
- **Potential:**
  - Rapid growth in demand for specialty and green chemicals.
  - The government targets a $1 trillion chemical sector by 2040, aiming for 12% global value chain share.
  - Expected to generate significant exports and skilled jobs with focused interventions.



- **Vision for 2030:**
  - **Target:** 5-6% share in global chemical value chain, double current production, net-zero trade deficit, USD 35-40 billion extra exports, and 7 lakh new skilled jobs.
  - Modern clusters, advanced tech adoption, regulatory streamlining, robust talent pool.

Challenges Facing the Indian Chemical Sector

- **High Import Dependence:** Heavy reliance on imported feedstock and specialty chemicals; limited domestic backward integration.
- **Infrastructure Gaps:** Outdated chemical clusters, inadequate port and logistics infrastructure leading to higher costs than global competitors.
- **Low R&D Investment:** R&D spending only 0.7% (global average 2.3%), restricting innovation in high-value chemicals.
- **Regulatory Delays:** Lengthy and opaque environmental clearance processes stifle agility and add compliance burden.
- **Talent Shortages:** 30% shortfall in skilled professionals, especially in emerging areas like green chemistry, nanotech, and safety.
- **Fragmented Industry:** Large number of small, fragmented players with low economies of scale.

Solutions / Interventions Proposed by NITI Aayog

- **World-Class Chemical Hubs:** Upgrade and build new clusters; empowered central committee and dedicated chemical fund for shared infrastructure.
- **Strengthen Port & Cluster Infrastructure:** Develop high-potential clusters; improve port infrastructure with advisory chemical committees.
- **Opex Subsidy Scheme:** Incentivize incremental production, import substitution, and export-oriented production through targeted subsidies.
- **Boost R&D and Technology Access:** Allocate more funds for R&D; foster industry-academia partnerships; acquire advanced tech via global tie-ups.
- **Fast-Track Regulatory Approvals:** Simplify and accelerate environmental clearance; enhance transparency and accountability.
- **Strategic FTAs:** Negotiate FTAs with specific provisions for the chemical sector; improve exporter awareness and utilization.
- **Skill Development:** Expand ITIs and specialized institutes; upgrade faculty; promote industry-relevant curriculum and training.

Conclusion

India's chemical sector has the potential to become a **$1 trillion global leader by 2040,** but must overcome import dependence, infrastructure gaps, and low R&D. With targeted reforms in infrastructure, skills, regulation, and trade, it can transform into a competitive, innovation-driven engine for exports, jobs, and sustainable growth.

Limited Fiscal Space

Syllabus Mapping: GS- Paper 3, Public Finance

Context

Assistance by the Centre has played a key role in boosting capital expenditure of states but borrowing space is limited.

Fact

- In FY2025, Rs 1.5 trillion was disbursed as capex loans to all states, up from Rs 1.1 trillion in FY2024.

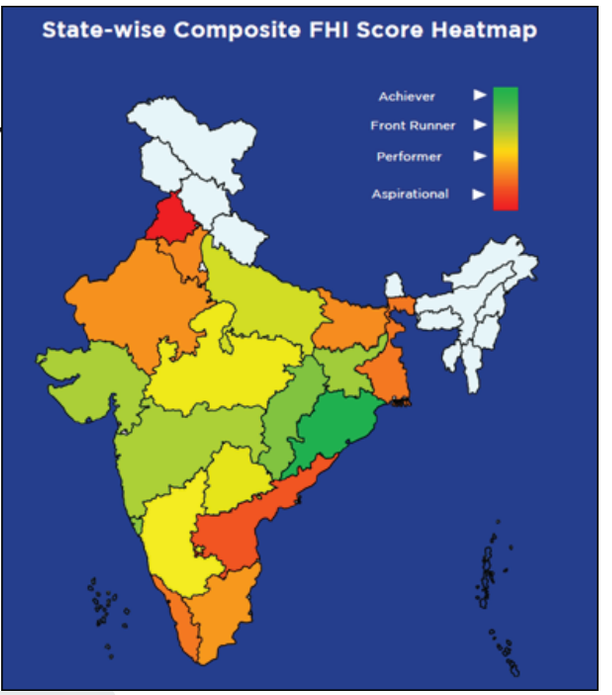
What is meant by fiscal health?

- It refers to the ability of a government—central or state—to manage its revenues, expenditures, and debt in a sustainable and responsible way.
- It indicates whether a government can fund its operations, meet its debt obligations, and invest in development without risking long-term financial instability.

Fiscal Health Index

- **Initiative by:** Niti Aayog
- **Objectives:**
  - Provide a **comparative analysis** of fiscal health across Indian states.
  - Identify **strengths and weaknesses** in fiscal management.
  - Promote **transparency and accountability** in state finances.

  - Help **policymakers** take informed, data-backed decisions.
  - Encourage **fiscal sustainability and resilience**.
- **Evaluation Categories:**
  - **Revenue Generation and Mobilization:** Assessment of states' ov generation.
  - **Expenditure Management and Prioritization:** Assesses capital vs revenue spending, efficiency in expenditure, and fiscal discipline.
  - **Debt Management:** Evaluates debt-to-GSDP ratio, interest payment burden, and debt sustainability.
  - **Fiscal Deficit Management:** Measures **fiscal deficit as % of GSDP** and adherence to **statutory limits** (FRBM norms).
  - **Overall Fiscal Sustainability:** Composite analysis of revenue, expenditure, deficit, and debt indicators to gauge long-term fiscal health.
- **Top States in FHI 2025**
  1. **Odisha**
  2. **Chhattisgarh**
  3. **Goa**
  4. **Jharkhand**
  5. **Gujarat**



Factsheet

- **Tax buoyancy** is a **ratio of change in tax revenue** in relation to change in gross state domestic product or GSDP of a state.
  - It measures how responsive a taxation policy is to growth in economic activities.
- **Debt-to-GDP Ratio**: Total debt to its Gross Domestic Product (GDP) is calculated as (total state debt/state GDP) * 100.
  - A high ratio suggests poor fiscal sustainability.
  - **Odisha** has the **lowest debt-to-GDP ratio (12.7%)**, while **Jammu & Kashmir** has the **highest (51%).**

FY2025 Fiscal Trends Across States

- **Coverage**: Analysis covers 17 major states (≈90% of India's GDP), excluding NE and smaller hill states.
- **Widening Fiscal Deficit**:
  - **FY2025 PA**: ₹9.5 trillion (3.2% of GSDP)
  - **FY2024:** ₹7.8 trillion (2.9% of GSDP)
- **Rise in Revenue Deficit**:
  - FY2025 PA: ₹2.1 trillion (0.7% of GSDP)
  - FY2024: ₹1.1 trillion (0.4% of GSDP)
- **Growth of Revenue Receipts Slowed**: 6.3% growth in FY2025 (vs 7.9% in FY2024)
- **Revenue Expenditure Grew Steadily**: 9% YoY growth (same as previous year)
- **Capital Expenditure Trends**:
  - FY2025 PA: ₹7.4 trillion
  - Increment over FY2024: ₹678 billion (vs ₹910–1,120 billion earlier)
  - Capex was **only 78% of fiscal deficit**, lower than past norm (80–90%)
- **March Capex Surge**:
  - March 2025 alone: ₹2.2 trillion
  - Accounted for **30% of annual capex** (back-ended spending)
- **Capex Loan Scheme Boosted Spending**:
  - ₹1.5 trillion capex loans in FY2025 (vs ₹1.1 trillion in FY2024)
  - 17 states' share: ₹1.13 trillion
  - Covered **~40% of incremental capex**
- **FY2026 Projections**: Capex estimated at ₹9.5 trillion — a **29.2% YoY increase**, appearing **implausible** given past trends.

Current challenges in State Finances

- **Widening Revenue Deficit**: Indicates borrowing is being diverted to revenue expenditure (less productive) rather than capex.
- **Low Revenue Growth**: Pace of increase in revenue receipts has slowed, putting pressure on fiscal balance.
- **Undershooting Capex Targets**: Capex fell short of RE by ₹1.1 trillion — indicating weak implementation capacity or delays.
- **Back-loaded Capex**: One-third of capex incurred in March — leads to poor planning, inefficient spending, and last-minute borrowing pressure.
- **Overdependence on Capex Loans**: States increasingly reliant on GoI loans to meet capital expenditure targets.
- **Ambitious FY2026 Estimates**: The sharp projected jump in capex appears **unrealistic**, risking future underperformance.

Way Forward

- **Enhance Revenue Mobilization Capacity:** Improve **tax compliance**, diversify **non-tax revenue**, and incentivize **digital tracking of local taxes**.
- **Rationalize Revenue Expenditure:** Shift from subsidies and populist schemes to targeted, outcome-linked transfers to **reduce revenue deficit** sustainably.
- **Strengthen Capex Efficiency:** Ensure **mid-year fund releases**, **streamline project clearances**, and **build execution capacity** to avoid year-end rush.
- **Improve Fiscal Transparency and Planning:** States should follow **realistic budgeting**, provide **quarterly updates**, and integrate with **FRBM review mechanisms**.
- **Expand Role of State Finance Commissions (SFCs):** Strengthen SFCs to ensure equitable and efficient resource distribution within states.
- **Coordinated Centre-State Fiscal Policy:** Harmonize fiscal targets, debt limits, and capex planning between Centre and states to achieve **national fiscal resilience**.

Conclusion

While central assistance has boosted states' capital spending, slowing revenues, widening deficits, and overreliance on loans threaten fiscal sustainability. Strengthening revenue mobilization, improving capex efficiency, and adopting realistic, transparent fiscal planning are essential for maintaining healthy state finances and long-term growth.

India needs to diversify its energy sources to keep trade deficit low

Syllabus Mapping: GS- Paper 3, Foreign Trade

Context

India's energy security faces risks due to overdependence on select countries like Russia, prompting diversification efforts through renewables, strategic partnerships, and domestic production to ensure long-term resilience.

India's Dependency on Foreign Countries for Energy Sector

- **Oil**: India imports nearly **85% of its crude oil** needs.
  - **Top suppliers**:
    - **Russia** (~36% of India's imports as of 2025)
    - **Iraq, Saudi Arabia, UAE** (traditional suppliers from West Asia)
  - Shift to Russia was driven by discounted crude post-Ukraine war.
- **Natural Gas (LNG)**: Around **50% of India's gas** needs are met through imports.
  - Key suppliers: **Qatar**, **U.S.**, **Australia**, **Russia**
- **Coal**: Despite being a major coal producer, India imports coal for quality and blending reasons.
  - Main sources: **Indonesia**, **Australia**, **South Africa**
- **Renewables & Uranium**: Uranium imports come from **Kazakhstan**, **Canada**, and **Australia** for nuclear power.

Current Vulnerabilities in Energy Security and Diversification

- **Overdependence on a Few Countries**: Russia has become a dominant supplier of oil — a **single-point risk** if the U.S. imposes secondary sanctions.
- **Geopolitical Volatility**: West Asian instability, Russian sanctions, or U.S. trade policy shifts can disrupt energy flow or increase costs.

- **Transport & Supply Chain Bottlenecks**: Shipping lane tensions (e.g., Red Sea, Strait of Hormuz) can delay or reroute energy supplies.
- **Price Volatility**: Sudden geopolitical escalations can spike global crude prices and strain India's import bill and Current Account Deficit (CAD).
- **Slow Transition to Renewables**: Although installed capacity has grown, actual grid penetration and storage solutions are lagging.

Steps Taken by India to Diversify Energy Sources

- **Strategic and Policy Interventions**
  - **International Energy Partnerships**:
    - Long-term LNG deals with **Qatar** and **U.S.**.
    - Strategic petroleum reserve (SPR) expansion.
    - Indian Oil's diversification into **Guyana**, **Brazil**, **Africa**.
  - **Mission Innovation 2.0**: India co-leads this global alliance for clean energy R&D.
- **Renewable Energy Push**
  - **National Solar Mission**:
    - Target: **500 GW** non-fossil capacity by **2030**.
    - India now ranks among the top 5 countries in solar installation.
  - **Green Hydrogen Mission**: Outlay of ₹19,744 crore to make India a global hub for green hydrogen.
  - **PLI schemes for Solar Modules and Battery Storage**: Encouraging domestic manufacturing to reduce import dependence.
  - **Offshore Wind Policy**, **Bioenergy Program**, **Hydrogen Valley projects** – rolled out to attract investment and scale up clean energy.
- **EV and Energy Efficiency Policies**
  - **FAME II**, **Battery Swapping Policy**, **State EV policies** to reduce oil usage in transport.
  - **Perform Achieve and Trade (PAT)** scheme – improves industrial energy efficiency.

How India Can Further Diversify Its Energy Sources

- **Geographical Diversification:**
  - **Widen oil sourcing**: Strengthen ties with Latin America (Brazil, Venezuela), Africa (Nigeria, Angola), Southeast Asia (Malaysia).
  - **More LNG terminals**: Increase import capacity from Australia, Mozambique.
- **Technological & Infrastructure Investments:** Invest in **energy storage technologies** and **smart grids**.
  - Expand **nuclear power capacity** with safer, modular reactors (SMRs).
- **Decentralized Renewable Projects:** Promote **rooftop solar**, **community-level bioenergy** and **microgrids**, especially in rural areas.
- **Regional Energy Integration:** Tap cross-border energy trade with **Nepal (hydro)**, **Bhutan**, and **Bangladesh**.
  - Build **regional power markets** in South Asia.
- **Strategic Reserves Expansion:** Increase Strategic Petroleum Reserves to buffer against sudden shocks.

Recently in news

- Petroleum Minister Hardeep Singh Puri had held that it is a "matter of time" before India finds a **Guyana-like oil basin in the Andaman regio**n.

China leading the green energy sector

Syllabus Mapping: GS- Paper 3, Infrastructure, Energy Sector

Context

China is leading the global green energy sector race. China has surged ahead as the undisputed leader in the global green energy race. In 2024 alone, it broke records by accounting for roughly **one-third of all clean energy investment worldwide**, with spendings nearly rivaling the combined totals of the U.S. and EU.

Factsheet

- **Installed More Than All Nations Combined (2024):** In 2024, China installed more wind turbines and solar panels than every other country combined.
- **$940 Billion Investment in 2024 Alone:** China's renewable sector saw a record investment of **$940 billion**, compared to **$3.4 billion** in India (2024–25).
- **Supply Chain Control:** Dominates manufacturing and supply chain in **solar panels, wind turbines, and batteries**, along with upstream raw materials like **polysilicon and lithium**.
- **55% of Global Renewable Energy Investment:** Chinese State-Owned Enterprises (SOEs) account for **55% of all global green energy investment**s (Bloomberg).

China's Journey to Green Energy Superpower

- **Crisis as Catalyst:** Severe **air pollution** and **energy insecurity** in the early 2000s sparked a green transition.
  - Reliance on coal made major cities nearly unlivable, triggering public pressure.\
- **Policy & Planning:**
  - **Renewable Energy Law (2005):** Guaranteed grid access and pricing incentives for renewables.
  - **11th Five-Year Plan (2006–10):** Made renewables a national priority.
  - Provinces like **Gansu, Inner Mongolia, and Jiangsu** were used for pilot projects.\
- **Role of SOEs and Banks:** SOEs (State Grid, Huaneng, Genertec) executed mega projects.
  - Public banks provided **low-interest loans** to scale renewables.
- **R&D and Manufacturing Scale:**
  - Massive government subsidies and R&D investment reduced costs.
  - **Vertical integration** enabled scale and global exports (e.g. Belt and Road Initiative).
- **Infrastructure Investment:**
  - Overcame curtailment issues by investing in **ultra-high-voltage transmission**.
  - State Grid's investment doubled from **$33.3 billion (2010)** to **$88.7 billion (2024)**.

Implications of China's Green Energy Leadership

- **Global Energy Power Shift:** China has **set the rules of the game** by dominating not just manufacturing, but innovation and deployment too.
  - It now exports energy infrastructure globally—**61 countries** engaged via BRI.
- **Strategic Control:** China's control over critical materials (lithium, rare earths) and component production (solar wafers, batteries) makes many nations **dependent on Chinese supply chains**.
- **Diplomacy & Statecraft Tool:** Renewable technology has become part of China's **geopolitical toolkit**, used to strengthen relations with Africa, Southeast Asia, and Latin America.
- **Western Reaction:** Countries like the U.S. are now trying to "reshore" green energy through acts like the **Inflation Reduction Act**, but **face higher costs and slower deployment**.

Key Lessons for India & the World

- **Strategic Long-Term Planning Pays Off:** China's two-decade lead came from consistency in planning, starting from small pilot projects to national scaling.
- **SOEs as Enablers:** State-owned enterprises can drive rapid deployment when supported with **mandates, capital, and policy alignment**.
- **Build Infrastructure Alongside Capacity:** Curtailment problems in the mid-2010s show that generation without transmission infrastructure creates inefficiencies.
- **Balance Speed with Oversight:** Over-subsidisation led to wastage and overcapacity; later corrected by better **planning and monitoring**.
- **Global Vision is Key:** China's export-oriented strategy and alignment with global markets (via BRI) helped it **scale and influence** globally.
- **Integration of Innovation:** Future-ready investments in **AI-powered grids**, **green hydrogen**, and **nuclear tech (thorium reactors)** show how China blends R&D with deployment.

Conclusion

While China's model may not be fully replicable, its experience underscores that sustained commitment, technological leadership, and early mover advantage are essential to competing in and benefiting from the clean energy transition.

TOPICS FOR PRELIMS (ECONOMY)

Can a G.I. tag prevents cultural misappropriation?

Context

Italian luxury brand **Prada** showcased footwear inspired by India's **GI-tagged Kolhapuri chappals** at its Spring/Summer 2026 show in Milan, triggering allegations of **cultural misappropriation** and raising questions about the global enforceability of **Geographical Indications (GIs)**.

What is a Geographical Indication (G.I.)?

- A **Geographical Indication** is a type of **intellectual property**.
- It identifies goods as originating from a **specific location**, where:
  - Their **quality, reputation, or characteristics** are essentially linked to that **place of origin**.
- In India, GIs cover products like:
  - **Chanderi sarees** (Madhya Pradesh)
  - **Madhubani paintings** (Bihar)
  - **Pashmina shawls** (J&K)
  - **Kancheepuram sarees** (Tamil Nadu)
  - **Darjeeling tea** (West Bengal)
- GIs are **public property**, owned collectively by producer groups—not individual companies.

Notable Cases of Cultural Misappropriation:

- **2025**: Prada showcased footwear inspired by **Kolhapuri chappals** – sparked cultural misappropriation claims.
- **1997**: USPTO granted patent to RiceTec for Basmati rice lines and grains (revoked after India's protest).
- **1995**: U.S. patent granted for turmeric's healing properties – challenged by India.
- **2000**: European Patent Office revoked U.S. patent on **neem-based** medicine formulations.

How Can Infringement Be Tackled?

- **Registered users or producers** can take legal action if:
  1. An entity misleads consumers about a product's origin.
  2. There is **unfair competition, passing off**, or **false claims** about GI status.
- GIs are **territorial**:
  1. Protection is limited to the **country of registration**.
  2. No automatic **international GI protection** exists.
- **Cross-border protection** can be pursued by:
  1. Getting recognition in the **country of origin**.
  2. Applying for protection in other jurisdictions.
- Based on frameworks like the **Paris Convention** and **TRIPS Agreement**.

Index of Industrial Production (IIP)

Context

India's **Index of Industrial Production (IIP)** growth fell to a **9-month low of 1.2% in May 2025**.

About the Index of Industrial Production (IIP)

The **Index of Industrial Production (IIP)** is a crucial economic indicator that tracks the **short-term changes in the volume of industrial output** across various sectors in India. It helps assess the country's industrial health by capturing **monthly trends in manufacturing, mining, and electricity production**.

- The IIP is **released by the Central Statistics Office (CSO)** under the **Ministry of Statistics and Programme Implementation (MoSPI)**.
- The **current base year is 2011–12**, which was adopted to better reflect the evolving industrial structure and production dynamics.

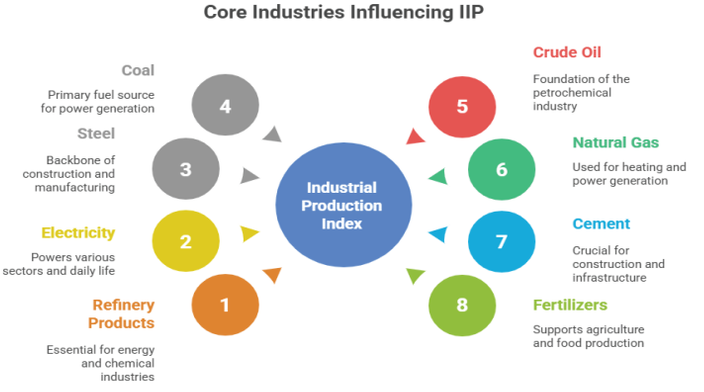
Sectoral Composition of IIP (by weight)

- **Manufacturing** – **77.63%** (covers 809 items)
- **Mining** – **14.37%** (29 items)
- **Electricity** – **7.99%** (1 item)

Latest IIP Update (May 2025)

- IIP **slumped to 1.2%**, the **lowest in 9 months**, mainly due to:
  - **Slowdown in manufacturing growth**, which halved to **2.6%** (from 5.1% in May 2024)
  - **Contraction in mining and electricity output**
- The last time IIP was lower was in **August 2024**, when it grew just **0.1%**.

Eight Core Industries (Weight in IIP: 40.27%)



World of Debt Report 2025

Context

Recently, World of Debt Report 2025 was released by United Nations Conference on Trade And Development (UNCTAD)

Key highlights from UNCTAD's A World of Debt Report 2025

- **Global debt reaches record high:** Total public debt surged to **US $102 trillion** in 2024, up from US $97 trillion in 2023.
- **Developing nations disproportionately burdened:** Low- and middle-income countries now hold **US $31 trillion**, nearly one-third of global debt, and their debt has doubled in growth rate compared to advanced economies since 2010.
- **Sky-high interest payments crowd out development:** Developing countries paid a record **US $921 billion** in net interest in 2024—a 10% increase year-over-year.
  - A total of **61 countries** spent over **10% of government revenue** just servicing interest.
- **Debt servicing exceeds social spending:** Approximately **3.4 billion people** live in countries that spend more on interest payments than on health or education.

Urgent international financial reforms needed

UNCTAD urges a comprehensive reform agenda to address the crisis:

- Strengthen global financial architecture to be more inclusive and development-focused.
- Improve liquidity mechanisms in crises.
- Establish robust debt workout processes.
- Expand concessional finance and technical assistance for debt management

Dynamic Pricing

Context

According to the new Motor Vehicle Aggregator Guidelines (2025), aggregators shall be permitted to **charge a minimum of 50% lower than the base fare** and a **maximum dynamic pricing of two times the base fare.**

What is Meant by Dynamic Pricing?

- It refers to a pricing strategy where the **price** of a product or service **fluctuates in real time based on current market demand**, supply conditions, and other external factors.
- This allows businesses to **maximize revenue and efficiently balance supply** with customer needs.
- This approach is widely used in sectors like ride-hailing, airlines, hotels, e-commerce, and even utilities.
- Prices are not fixed; they adjust automatically **using algorithms.**
- Driven by factors like demand, supply, time of day, weather, or special events.
- **Surge pricing** (higher rates during peak demand) is a type of dynamic pricing.
- Aims to match supply with demand and optimize profits or resource allocation.

Did You Know?

Surge Pricing

- It refers to the **additional fee** demanded from the consumer **during periods of high demand**, such as rush hours, when traffic congestion is at its peak.
- Such fees are **also applied to utilities**, like electricity, and are used to help manage the supply and demand, preventing potential blackouts.

Flexi-fare Scheme

- It is a dynamic pricing model introduced by **Indian Railways in September 2016** for premium trains—Rajdhani, Shatabdi, and Duronto.
- **Key Features:**
  - **Fare Increases with Demand:** Base fare increases by 10% with every 10% of seats/berths booked.
  - **Capping:** Maximum fare is capped at 1.5 times the base fare for AC classes and 1.4 times for sleeper class.
  - **No Impact on Tatkal Quota:** Tatkal (last-minute booking) fares remain unaffected.
  - **Objective:** To increase revenue and better manage demand during peak travel times.

Motor Vehicle Aggregator Guidelines (MVAG), 2025

Aspect	Key Provisions / Details
What It Is	• Regulatory framework for app-based ride-hailing platforms under Motor Vehicles Act, 1988
Issuing Ministry	• Ministry of Road Transport and Highways, Government of India
Driver Welfare & Earnings	• Minimum 80% fare share (driver's own vehicle) • Minimum 60% (aggregator vehicle) • Health insurance ₹5 lakh; term insurance ₹10 lakh • Quarterly training for low-rated drivers
Passenger Protection	• Mandatory ₹5 lakh travel insurance per passenger • Complaints resolved within 3 days • Fares only for pick-up to drop-off

Aspect	Key Provisions / Details
Regulated Fare Structure	• States fix base fare per category • Dynamic pricing: 50% below base to max 2x base fare
Penalties for Cancellations	• 10% penalty on unjustified cancellations (driver/rider, max ₹100) • Valid reasons must be listed
Bike-Taxi Recognition	• Non-transport motorcycles permitted for ride-hailing, subject to state nod
EV Promotion & Accessibility	• States may set EV adoption targets • Inclusion of Divyangjan-accessible vehicles compulsory
Compliance & Penalties	• Fines: ₹1 lakh to ₹1 crore for violations • Repeat violations: 3-month suspension, possible cancellation of licence

Invisible India's Foreign Trade

Context

India's "invisibles" trade is today bigger than the "visible" merchandise trade account in its external balance of payments.

What is Visible and Invisible Trade?

Visible Trade (Goods/Merchandise)

- Involves export and import of **physical goods**.
- Includes items like **textiles, leather, steel, aluminium, machinery, oil, electronics**, etc.

India's Foreign Trade Status (2024–25)

TABLE 1

INDIA'S 'VISIBLE' VERSUS 'INVISIBLE' EXPORTS

	Goods Exports	Invisibles Receipts	Services Exports	Private Transfers
2003-04	66.29	53.51	26.87	22.18
2013-14	318.61	233.57	151.81	69.64
2014-15	316.55	241.65	158.11	69.82
2015-16	266.37	235.04	154.31	65.59
2016-17	280.14	242.05	164.20	61.30
2017-18	308.97	283.41	195.09	69.13
2018-19	337.24	306.48	208.00	76.40
2019-20	320.43	321.71	213.19	83.20
2020-21	296.30	307.25	206.09	80.19
2021-22	429.16	369.6	254.53	89.13
2022-23	456.07	465.8	325.33	112.47
2023-24	441.44	501.42	341.06	118.71
2024-25	441.79	576.54	387.54	135.43

TABLE 2

A DELICATE BALANCE

	Goods Trade Balance	Invisibles Balance	Current Account Balance
2013-14	-147.61	115.31	-32.30
2014-15	-144.94	118.08	-26.86
2015-16	-130.08	107.93	-22.15
2016-17	-112.44	98.03	-14.42
2017-18	-160.04	111.32	-48.72
2018-19	-180.28	123.03	-57.26
2019-20	-157.51	132.85	-24.66
2020-21	-102.15	126.06	23.91
2021-22	-189.46	150.69	-38.77
2022-23	-265.29	198.24	-67.05
2023-24	-244.91	218.8	-26.11
2024-25	-287.21	263.85	-23.37

Amt. in ($ billion) Source: Reserve Bank of India.

Visible Trade (Merchandise Trade)

- **Merchandise Exports**: $441.8 billion
  - Slightly lower than the previous year ($456.1 billion in 2022–23).
- **Merchandise Imports**: $729 billion
  - Driven by imports of crude oil, electronics, gold, machinery, etc.
- **Goods Trade Deficit**: $287.2 billion
  - India's highest-ever merchandise trade deficit.

Invisible Trade (Non-Merchandise)

- **Gross Invisible Receipts**: $576.5 billion
  - Includes services exports and private remittances.

Invisible Trade (Non-Merchandise)

- Comprises transactions that do not involve physical goods.
- **Key components:**
  - **Services exports** – IT/software, business, financial, R&D, consultancy, communication.
  - **Private transfers** – Remittances from Indians working abroad.
  - **Investment flows** (FDI, FPI) – Though not included in gross invisible receipts here.

- **Services Exports**: $387.5 billion
  - Led by software, business, financial, communication, and consultancy services.
- **Remittances (Private Transfers)**: $135.4 billion
  - Money sent by Indian workers and NRIs from abroad.
- **Services Trade Surplus**: $188.8 billion
  - Services exports ($387.5B) minus services imports ($198.7B).
- **Net Invisible Surplus**: $263.8 billion
  - Includes both services and private transfers; helped offset the merchandise trade deficit.
- **Current Account Deficit (CAD)**: $23.4 billion
  - Lower than the **$32.3 billion** CAD recorded in 2013–14 due to strong performance in invisibles.

Comparison with China (2024)

Indicator	India (2024–25)	China (2024)	Insights
Goods Exports	$441.8 billion	$3,409 billion	China is a manufacturing/export powerhouse
Goods Imports	$729 billion	$2,641 billion	India imports more than it exports; China has a strong trade surplus
Merchandise Trade Balance	**- $287.2 billion**	**+ $768 billion**	India has a deficit, China a large surplus
Services Exports	$387.5 billion	$384 billion	India slightly leads
Services Imports	$198.7 billion	$613 billion	China imports far more services
Net Services Trade	**+ $188.8 billion**	**- $229 billion**	India has a significant surplus
Net Invisibles (Total)	**+ $263.8 billion**	**- $344.1 billion**	India earns from invisibles; China spends more
Current Account Balance	**- $23.4 billion (deficit)**	**+ $423.9 billion (surplus)**	China's surplus sustained by goods trade; India cushions deficit via invisibles

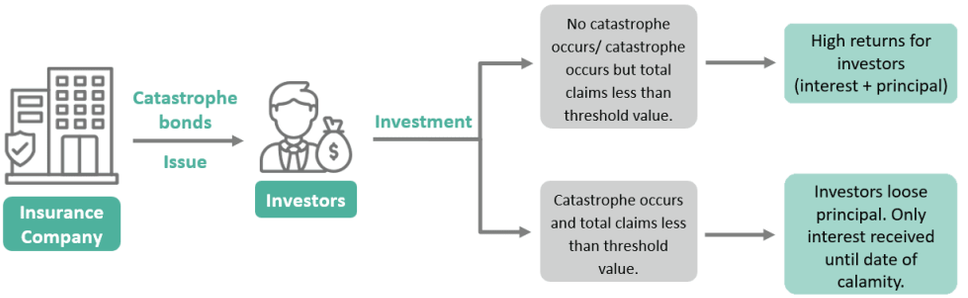
Cat Bonds (Catastrophe Bonds)

Context

In the times of unpredictability and increase in frequency of extreme weather events like cyclones, floods, forest fires and devastating earthquakes in South Asia, highlights the need of cat bonds.

What is Cat Bond?

- They are a type of insurance-linked security that allows risk transfer of large-scale disaster events (like earthquakes, hurricanes, or floods) from the issuer (often a government or insurer) to investors in the financial market.
- **Purpose:** They provide quick post-disaster funds for recovery and reconstruction by converting insurance risk into tradable securities.
- **How is a Cat Bond Issued?**
  - **Sponsorship:** Typically, a sovereign government, insurer, or reinsurer (the "sponsor") identifies specific disaster risks to insure against (e.g., a cyclone of a certain magnitude).
  - **Intermediary:** The sponsor works with an intermediary (e.g., World Bank, Asian Development Bank, or a reinsurance company) to structure and issue the bond.
  - **Investment:** Investors purchase the bonds, providing upfront capital (the "principal").
  - **Terms:** The bond outlines trigger conditions (e.g., earthquake above magnitude 7), duration, and payout mechanisms.
  - **Premiums & Coupons:** The sponsor pays periodic premiums (high coupon rates) to the investors for taking on the risk.



Note:

- Catastrophe bonds **yield high returns**, but the **risk factor is also high.**
- Globally, about **$180 billion** in new cat bonds have been issued, with **$50 billion** outstanding.

Does India Need Cat Bonds?

- Yes, due to the increasing frequency of **climate disasters** (cyclones, floods, heatwaves, forest fires).
- Rising **losses for insurers** make disaster insurance unviable.
- India spends **₹1.8 billion annually** on disaster mitigation.
- Could lead a **South Asian regional cat bo**nd effort for shared threats (e.g., earthquake zones in Bhutan, Nepal, tsunami risks in India, Sri Lanka, Maldives, etc.).

Pros of Cat Bonds	Cons of Cat Bonds
Risk diversification	Trigger risk – if meet pre-defined trigger parameters, no payout.
Rapid payouts	High costs (higher coupon rates)
Portfolio diversification	Structural complexity
Access to global capital	Limited investor interest (market size)
Encourages mitigation	Potential for risk mispricing

Mobile Money

Context

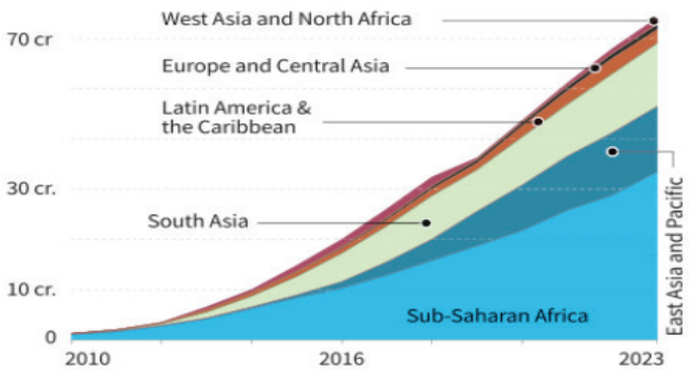
A new report reveals that **over half a billion mobile money accounts now exist globally**, with **most of them in Africa**, where mobile money is rapidly transforming financial inclusion, especially for people without access to traditional banking.

About Mobile Money

- **Mobile money** allows people to send, receive, deposit, and withdraw money using **text messages** on basic mobile phones.
- Unlike standard banking, it doesn't require a **physical bank branch** or an **internet connection**.
- It's especially useful in regions with **limited access to formal banking**, such as **Sub-Saharan Africa**.

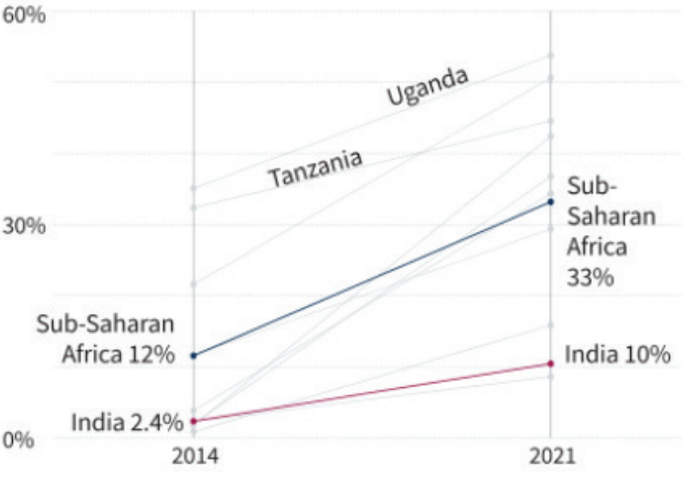
Global Adoption Trends

Chart 1: Number of active mobile money accounts (in crores). These are financial accounts managed via mobile devices.



The number of active mobile money accounts has surged, with Sub-Saharan Africa leading globally

Chart 2: The share of respondents who personally used a mobile money service in the past year (in %)



In Sub-Saharan Africa, the share of people with a mobile money account rose from 12% (2014) to 33% (2021) (Chart 2).

Countries like Uganda, Tanzania, and Kenya have some of the highest usage rates.

Impact on Financial Inclusion

- In 2014, only **one-third** of adults in Sub-Saharan Africa had a bank account; by 2021, that number **more than doubled**.
- A major part of this increase is due to **mobile money**.
- Many users **only have a mobile money account**, not a traditional bank account.

Key Data Insights

- In countries like **Malawi, Cameroon, and Togo**, mobile money has become a major contributor to financial account ownership.
- In **Sub-Saharan Africa**, mobile money usage correlates strongly with **mobile phone ownership**.

Mobile money is **revolutionizing financial access**, particularly in **Africa**, by offering safe, low-cost, and accessible financial services to **unbanked populations**, without the need for traditional banking infrastructure.

Financial Inclusion Index

Context

The Reserve Bank of India has reported an improvement in the Financial Inclusion Index, which has risen to **67% in FY 2025**, up from **64.2% in FY 2024**.

About the Financial Inclusion Index (FI-Index)

- The **FI-Index** is a **composite measure** designed to track the level of **financial inclusion** across India.

- Developed by the **Reserve Bank of India** in consultation with the **Government** and **sectoral regulators** (banking, insurance, pension, etc.).
- It covers **five key sectors**: **Banking**, **Investments**, **Insurance**, **Postal Services**, and **Pensions**.
- **Scoring System:**
  - The index assigns a **score between 0 and 100**:
  - **0** indicates **complete financial exclusion**.
  - **100** represents **full financial inclusion**.
- **Three Core Parameters:**
  - **Access (35%):** Measures availability of financial services (e.g., bank branches, ATMs).
  - **Usage (45%):** Captures the actual use of financial services (e.g., credit, savings, transactions).
  - **Quality (20%):** Reflects **financial literacy**, **consumer protection**, and **service inequalities**.
- **Key Features:**
  - Based on **97 indicators** covering diverse aspects of financial access and behavior.
  - The **Quality parameter** is a **unique feature**, emphasizing the **depth and fairness** of inclusion.
  - The index is **cumulative**, meaning it reflects **progress over time**, and **does not use a base year**.
- **Released:** A**nnually**, every **July**, by the **Reserve Bank of India**.

News in short

Skills Accelerator initiative

Recently, the Ministry of Skill Development and Entrepreneurship (MSDE) has launched the Skills Accelerator Initiative.

About it

- Launched in collaboration with **MSDE & World Economic Forum (WEF).**
- **Aim:** To close these gaps through inclusive upskilling and reskilling (in areas like **AI, robotics, and energy—aligning education with industry needs**), mobilizing investment in lifelong learning, and fostering government-industry collaboration (2 out of 4 co-chairs from the private sector).

TOPICS FOR MAINS (AGRICULTURE)

GM Crops in India

Syllabus Mapping: GS- Paper 3, Inputs to Farming

Context

US negotiators are increasing pressure on India to open its agriculture market to genetically modified (GM) crops.

What are GM Crops?

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

Historical Background of GM Crops in India

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

Concerns Associated with Acceptance of GM Crops

- **Food Safety:** Fears of allergenicity, toxicity, or unforeseen health impacts.
  - Lack of long-term studies on human health effects.
- **Environmental Risks:** Potential for cross-pollination with wild relatives or non-GM crops ("gene flow").
  - Evolution of super-pests and herbicide-resistant weeds.
  - Threat to biodiversity and non-target species (e.g., pollinators).
- **Socio-Economic Issues:** Dependence on a few multinational seed companies.
  - High seed costs for farmers.

  - Risk of illegal and unregulated GM seed circulation.
- **Regulatory and Ethical Issues:** Lack of transparency and public consultation.
  - Insufficient biosafety testing and regulatory capacity.
  - Ethical concerns about tampering with nature and food systems.
- **Trade Concerns:** Potential loss of export markets to countries that ban GM imports.

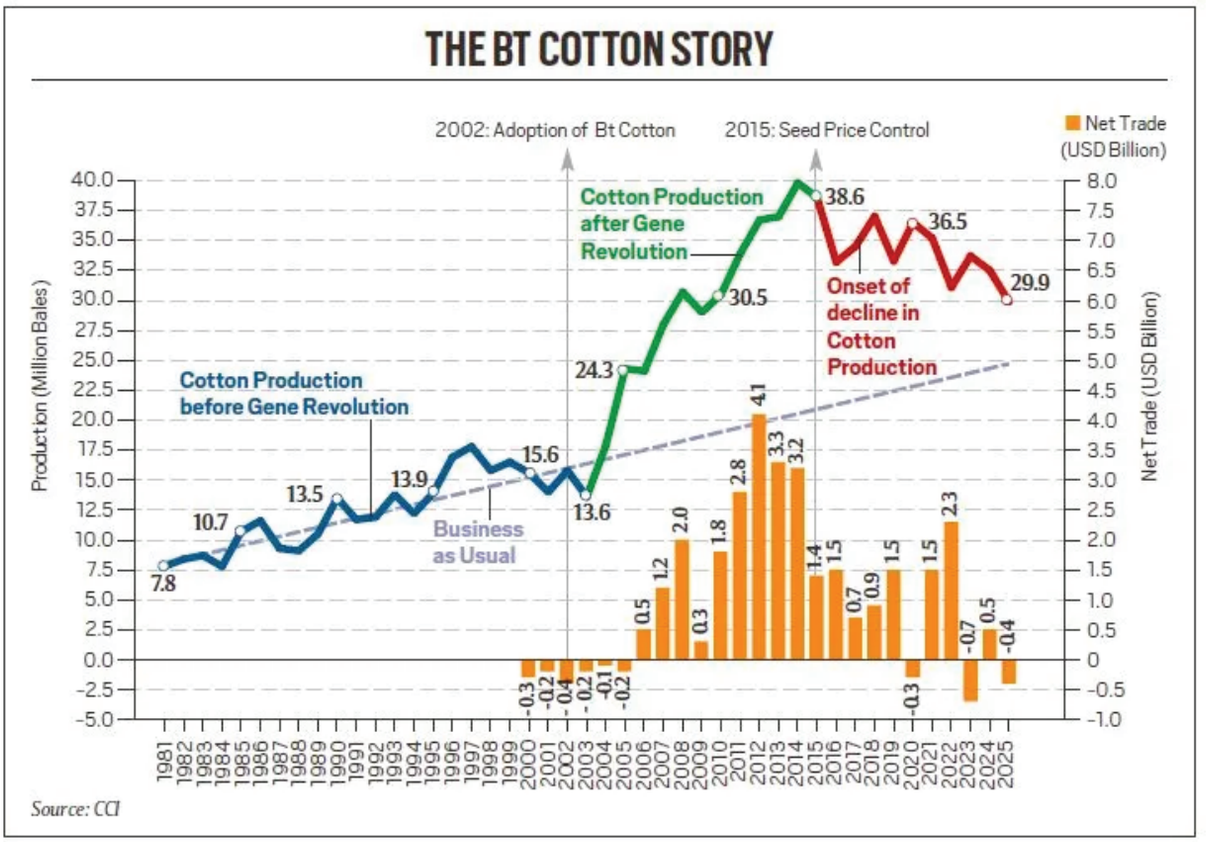
Impact of GM Crops in India

Positive:

- **Higher Productivity:** Bt cotton adoption led to an 87% rise in yield (2002–2014), tripling India's cotton production and making it the second-largest cotton exporter globally.
- **Reduced Pesticide Use:** Targeted resistance to bollworms reduced pesticide sprays by 40–50%, lowering input costs and improving farm safety.
- **Increased Farmer Incomes:** Higher yields and lower pesticide costs increased net returns for cotton farmers by ₹10,000–15,000 per hectare annually (varies by region).
- **Export Competitiveness:** Surplus production boosted India's position in global cotton markets, enhancing rural employment in ginning, textiles, and allied sectors.
- **Environmental Benefits:** Reduced pesticide use lowered chemical load in soils and water bodies, promoting ecological sustainability.

Negative:

- **Yield stagnation and decline:** After initial gains, cotton yields fell from 566 kg/ha in 2013–14 to ~436 kg/ha in 2023–24, driven by pest resistance (e.g., pink bollworm) and lack of newer GM traits.
- **Pest Resistance and new Infestations:** Overreliance on Bt traits led to bollworm adaptation and emergence of secondary pests, increasing pesticide use again.
- **Proliferation of Illegal GM seeds:** Widespread cultivation of unapproved HT-Bt cotton has resulted in unregulated farming practices, inconsistent quality, and greater farmer risk.
- **Regulatory and policy bottlenecks:** Long approval delays and restrictive policies have stalled introduction of advanced GM technologies, limiting adaptation to new pest and climate challenges.
- **Trade setback:** Falling productivity and rising domestic demand turned India from a net exporter to



How Can the Challenges Be Resolved?

- **Strengthen Science-based Regulation:** Ensure robust, transparent, and independent biosafety assessment processes.
  - Regularly update and empower the Genetic Engineering Appraisal Committee (GEAC).
- **Foster Public Engagement:** Increase transparency in approval processes.
  - Educate the public and farmers on GM crops' risks and benefits.
- **Incentivize Innovation:** Rationalize seed pricing and trait fees to attract private investment in R&D.
  - Provide IP protection while ensuring affordable access.
- **Monitor and Manage Risks:** Develop strategies to counter pest resistance and regulate illegal seeds.
  - Promote crop rotation and integrated pest management.
- **Policy Clarity and Political Leadership:** Move towards clear, long-term policies favoring technology adoption.
  - Expedite approval of proven GM crops (HT-Bt cotton, Bt brinjal, GM mustard) after thorough risk assessment.
- **Learn from International Best Practices:** Learn from global experiences (e.g., the US, Brazil, China) in safe GM crop deployment and post-release monitoring.

India Must not trade away its farm

Syllabus Mapping: GS- Paper 3, Agriculture Trade

Context

As the U.S. tariff deadline nears, India is pushing to seal a trade deal. However, U.S. demands on agriculture have sparked concerns in India, especially about farmer livelihoods and market access.

US Approach to the Trade Deal with India

- **One-Sided Concessions: India** may offer tariff elimination on US industrial goods and limited opening of agricultural markets.
  - **US** reciprocation is weak — likely limited to a **non-binding letter** promising tariff treatment, not firm commitments.
- **Forced Purchases:** The deal may include **mandatory multi-billion-dollar purchases** of US goods: LNG, oil, aircraft, defence equipment, and farm commodities.
  - Mirrors US deals with other countries (e.g., UK, Vietnam), where purchasing commitments were made under pressure.
- **Regulatory Demands: Ease of doing business for US firms**:
  - Access to India's government procurement market.
  - Dilution of patent protection.
  - Relaxed e-commerce norms for giants like Amazon and Walmart.
  - Unrestricted data transfer by tech companies.
- **Tariff Threats Despite Deal:** Trump has threatened:
  - **10% tariffs on all BRICS countries**.
  - **500% tariff on nations buying oil from Russia** (India's top supplier).
  - Tariffs based on unrelated issues (e.g., Brazil's tariffs after action on X).
  - **The deal doesn't guarantee tariff protection**.

Country/ Region	US Demands	Partner Country Concerns	Status	Likely Outcome
EU	Guaranteed purchases of US LNG, beef, aircraft; lower tariffs on US autos and steel; broad access to EU agriculture markets	Harm to EU farmers and auto sector; won't drop CBAM; fears Trump may still impose tariffs	Talks ongoing, but tense. Trump has threatened 30% tariffs	**Uncertain**
Japan	Guaranteed buys of meat, LNG, aircraft; access to rice and government contracts; relaxed auto standards	Rice is politically sensitive; risk of domestic backlash; fears deal won't stop future US tariffs	Talks slow due to political resistance	**No comprehensive deal expected; symbolic ties likely**
South Korea	More duty-free access for US meat and LNG; relax food safety and auto rules; support US aviation	Fears of damage to farmers; concerns Trump will demand more post-deal; lack of trust despite existing FTA	Talks continue, but little headway	**Possible MoU or narrow deal**

Country/ Region	US Demands	Partner Country Concerns	Status	Likely Outcome
Australia	Cut tariffs on US drugs, metals, meat; allow more access to agri and rare earths; commit to large US purchases (meat, energy, defence)	Resentment over US tariff hikes; trade deficit; reluctant to lock in quotas	Negotiations active, but unresolved	**Mini-deal likely**
China	Lower tariffs on US goods; commit to buying US energy and aircraft; reforms to SOEs, digital, and subsidies	Strong opposition to political demands; fears of losing strategic autonomy; deep distrust of US	Fragile ceasefire in select sectors	**No broad deal, only standstills**
India	Reduce tariffs on autos, dairy, grains; allow GM feed; remove data localisation; commit to big US buys (oil, gas, defence)	Impact on 700 million farmers; food security; digital sovereignty; fears of new tariffs even after deal	Final-stage talks for limited deal	**Uncertain. Partial deal likely, US may still charge 15% base tariffs**

Potential Impact on Indian Agriculture

- **Exposure to Subsidised Imports:** US demands **zero-duty entry** for:
  - **Dairy products** (cheese, whey, milk powder) – threatens over **80 million small dairy farmers**.
  - **Frozen chicken legs** – impacts **30 million informal poultry workers**.
  - **Wheat and rice** – risks **domestic price collapse**, long-term import reliance.
- **Push for GM Feed and Products:** US pushing for:
  - GM animal feed like **soyameal and DDGS (Distillers' Dried Grains with Solubles)**.
  - GM oils like **soyabean oil**
  - India currently bans GM feed to protect GM-free status and export markets (EU).
  - The US self-certification system makes it hard to verify GM-free imports.
- **Regional Crop Impact:** Duty cuts on **US apples** could hurt apple farmers in **Kashmir and Himachal Pradesh**.
  - Tariff cuts on GM **soy oil** could damage India's **edible oil sector**, affecting **6 million oilseed farmers**.
- **Vulnerability to Global Market Fluctuations:**
  - Historical examples:
    - **2014–16 global price crash**: could have devastated Indian farmers without tariffs.
    - **2005–08 price spike**: countries like Ghana, Nigeria suffered due to import reliance.

India is being pressured into a **"MASALA" deal — Mutually Agreed Settlement Achieved through Leveraged Arm-twisting** — with minimal benefits and **major risks to its farming sector**. With over **700 million Indians** dependent on agriculture, India must avoid hasty concessions that threaten **livelihoods, food security, and rural stability**. Agriculture is not just a trade issue — it's the backbone of the nation.

TOPICS FOR PRELIMS (AGRICULTURE)

Weather Derivatives

Context

The National Commodity and Derivatives Exchange (NCDEX) has collaborated with the India Meteorological Department (IMD) to introduce India's first weather derivatives.

What is Meant by Weather Derivatives?

- They are financial contracts that help businesses hedge against the risk of weather-related losses (e.g., too much/little rain, temperature extremes).
- The payoff depends on measurable weather outcomes, not actual physical damages.
- Settlement is based on indices recorded by agreed sources such as IMD or certified weather stations.
- **Example:** A contract pays out Rs 5,000 for every millimeter of rainfall below 100 mm in June in a particular city. If the actual rainfall is 90 mm, the payout is (100-90) x 5,000 = Rs 50,000.
- **Common Indices Used**:
  - **Heating Degree Days (HDD):** Measures how much (and for how long) outside temperature falls below a base temperature (often 18°C). Used for winter heating needs.
  - **Cooling Degree Days (CDD):** Measures how much the temperature rises above a base level (often 18°C). Used for summer cooling demand.
  - **Total Rainfall:** Cumulative rainfall measured in millimeters over a specific period and location.
  - **Other Indices:** Can include total snowfall, average wind speed, etc.

Insurance Product vs Derivative

- **Insurance:**
  - Covers specific, verifiable asset-based losses (e.g., flood damage).
  - Pays only after actual damage assessment and claim verification.
- **Derivative:**
  - Suited for non-catastrophic, recurring risks (e.g., low rainfall).
  - Pays out based on predefined weather indices, regardless of actual loss to property.

Significance and Prerequisites of a Robust Weather Derivatives Market

- A well-developed weather derivatives market can **improve the credit quality of banks and NBFCs** by reducing defaults linked to weather fluctuations.
- It provides real-time, market-driven insights to policymakers, **enabling government policy to reflect how stakeholders assess and price weather risks**.
- Such a market **enhances India's climate resilience**, shifting the approach from reactive disaster relief to proactive, risk-sharing mechanisms.
- The demand for reliable, granular weather data (e.g., farm-level sensors) and advanced predictive tools (like climate models) will increase, creating new investment opportunities in agritech, weather forecasting, and energy analytics.
- For this system to succeed, agencies like IMD and private weather providers must deliver frequent, region-specific, and trustworthy datasets.
- Additionally, financial institutions, insurers, and agritech companies must develop bundled and accessible products to connect individual users with the broader weather derivatives market.

Agricultural Monitoring and Event Detection (AMED)

Context

Google has launched the Agricultural Monitoring and Event Detection (AMED) API, a tool that offers detailed insights into crop conditions and agricultural activities across India.

Agricultural Monitoring and Event Detection (AMED) API

- **About the API**
  - **AMED** is an **AI-based open-source API** developed by **Google**.
  - Designed to offer **field-level crop monitoring** and detect **agricultural events** across India.
- **Key Features**
  - Provides data on:
    - **Type of crop** on each field
    - **Crop season** and **field size**
    - **Historical agricultural activity** from the **past 3 years**
  - Helps monitor **soil, water, climate conditions**, and **growth patterns** specific to each crop.
- **Technology Used**
  - Combines **satellite imagery** with **artificial intelligence**.
  - Built on Google's earlier **Agricultural Landscape Understanding (ALU) Research API**.
- **Benefits & Applications**
  - Enhances **farm-level decision-making** and crop management.
  - Assists in predicting **crop yield** and planning inputs accordingly.
  - Can address **location-specific crop requirements** for better productivity.
- **Access & Updates**
  - API is being shared with **agriculture startups** to encourage **innovation** in the agri-tech ecosystem.
  - Data is **updated every two weeks**, allowing for **real-time, field-level monitoring**.

International maize and wheat improvement center (CIMMYT)

Context

CIMMYT is reaching out to the **Indian government and private sector** for funding support after the **shutdown of USAID** (United States Agency for International Development) funding from July 1, 2025.

- USAID was CIMMYT's **largest donor** in 2024, contributing **$83 million** of its $211 million total revenue.

Background & Legacy

- Founded by **Norman Borlaug**, CIMMYT led India's **Green Revolution** with high-yielding wheat varieties like **Lerma Rojo 64A, Sonora 63, and Sonora 64**.
- These varieties helped India achieve **food self-sufficiency** in the 1960s and 70s.

India's Contribution & Benefit:

- India has been a **major beneficiary** of CIMMYT's wheat breeding programs.
- Over **50% of wheat cultivated in India now** comes from varieties released **after 2019**—developed through **collaboration between CIMMYT and Indian institutions** like the Indian Council of Agricultural Research (ICAR).

Recent Achievements:

- In 2024, Indian farmers grew wheat on around **32 million hectares**, with **CIMMYT-derived varieties** accounting for more than 60%.
- Example: **DBW 303**, the "fastest wheat variety in South Asia" achieved **over 8 tonnes/hectare** grain yield.

Key Collaborations:

- CIMMYT and India jointly run the **Borlaug Institute for South Asia (BISA)**, formed in 2011.
- CIMMYT works closely with **ICAR institutions** like the Indian Institute of Wheat and Barley Research (Karnal).

Future Focus:

- CIMMYT is seeking **new funding sources** to continue:
  - **Advanced breeding programs**
  - **Climate-resilient crop research**
  - **High-yield, disease-resistant wheat development**
- Emphasizes the need for **Indian support** to ensure continuity in agricultural innovation for global food security.

Locust Infestation

Context

Scientists have identified a **pheromone** that triggers **locust swarming** and discovered a method to **block it**, offering a breakthrough in controlling locust outbreaks.

About Locust Infestation

- **What are Locusts?**

Locusts are grasshoppers that can transform into a **swarming phase**, forming massive groups that migrate and destroy crops.

- **Swarming Trigger:**

Scientists have identified a specific **pheromone called 4-vinylanisole (4VA)** which causes solitary locusts to gather and swarm.

- **Impact of Infestation:**
  - A single locust swarm can consume **as much food as 35,000 people in one day**.
  - Swarms devastate crops, pasture, and vegetation, leading to **food insecurity** and **economic loss**.
  - Countries in Africa, the Middle East, and South Asia are especially vulnerable.
- **Favorable Conditions:**
  - Triggered by **heavy rains**, **cyclones**, and **moist soil**, which promote locust breeding.
  - Climate change may increase the frequency of such conditions.

How to Prevent or Control Locust Infestation

- **Pheromone Blockage (Latest Discovery):**
  - Scientists have found a **molecule that blocks the 4VA pheromone**, potentially preventing the formation of swarms.
  - This opens doors for **targeted, eco-friendly pest control** in the future.
- **Chemical Spraying:**
  - Aerial or ground spraying of **organophosphate pesticides** is commonly used during outbreaks.
  - Effective mainly in the **early hopper stage** before swarming.
- **Biological Control:**
  - Use of biopesticides like **Metarhizium anisopliae**, a fungus that infects and kills locusts.
  - **Environmentally safe** alternative to chemical pesticides.
- **Surveillance & Early Warning:**
  - Real-time monitoring using **satellites, drones, and field patrols**.
  - Systems like **FAO's Desert Locust Watch** issue alerts to affected countries.
- **Egg Site Management:**
  - Destroying or disturbing soil in breeding grounds prevents locusts from maturing.
- **International Coordination:**
  - Since swarms cross borders, effective control needs **regional collaboration** (e.g., between India, Pakistan, and African nations).

97th Foundation Day of ICAR

Context

The **97th Foundation Day of ICAR** was celebrated in New Delhi, with the Union Agriculture Minister addressing both scientists and farmers.

About ICAR – Indian Council of Agricultural Research

- **ICAR** is India's apex autonomous body for agricultural research, education, and extension.
- **Founded:** 16 July 1929 (as the Imperial Council of Agricultural Research).
- **Reconstituted under:** Societies Registration Act, 1860.
- **Headquarters:** New Delhi.
- **Parent Body:** Department of Agricultural Research and Education (DARE).
- **President (Ex-Officio):** Union Minister of Agriculture.
- **Key Functions:**
  - **Research & Education:** Coordinates R&D in agriculture, fisheries, animal husbandry, home science, agroforestry, etc.
  - **Extension Services:** Disseminates innovations via publications, exhibitions, and outreach programs.
  - **Capacity Building:** Conducts exams and recruitment through ASRB; supports agricultural education and skill training.
  - **Collaboration:** Works with CSIR, BARC, and global partners for rural development and post-harvest tech.
  - **Policy Advisory:** Assists government in sustainable agriculture, innovation, and food security planning.

Major Initiatives at ICAR's 97th Foundation Day

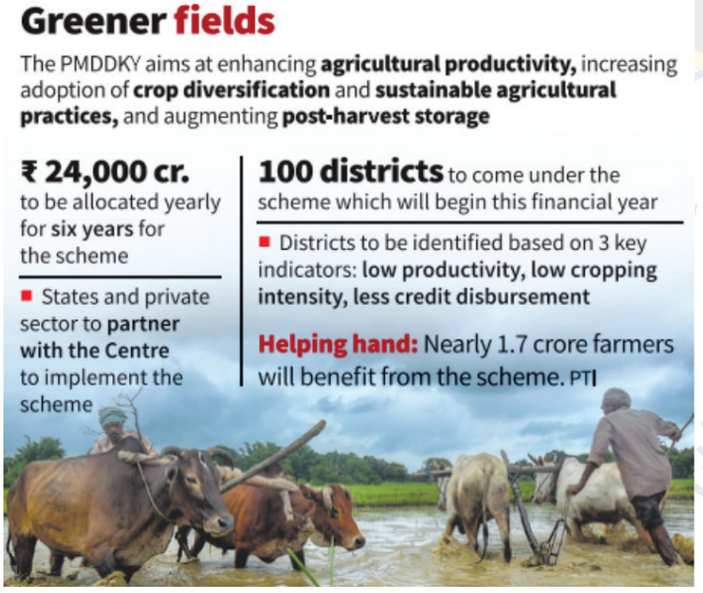
- **Viksit Krishi Sankalp Abhiyan:** India's largest farmer-scientist dialogue.

  - Identified 500 research areas based on regional and crop-specific needs.
- **Field-Guided Research Agenda:** Farmer-priority-based research with a "One Team, One Goal" model.
- **Natural Farming Drive:** Promotes chemical-free, eco-friendly farming practices.
- **Fertilizer Testing Kits:** Portable kits for farmers to check soil and input quality; aims to curb adulteration.
- **Toll-Free Helpline:** For reporting fraud in seeds and fertilizers; targets over 30,000 unregulated bio-stimulants.
- **Ethical MoUs & Pricing Oversight:** Mandates fair pricing in ICAR-industry agreements to safeguard farmer interests.

Govt. merges 36 schemes to float farm plan

Context

The government has launched the **Prime Minister Dhan-Dhaanya Krishi Yojana (PMDDKY)** by merging 36 existing schemes across 11 ministries to boost agricultural productivity and promote sustainable farming practices.



PM Dhan-Dhaanya Krishi Yojana (PMDDKY)

- **Announced in:** Union Budget 2025-26
- **Coverage:** 100 low-performing agricultural districts
- **Main Objectives of PMDDKY**
  - **Boost agricultural productivity** in underperforming districts.
  - **Promote crop diversification** and **sustainable farming** methods.
  - **Expand post-harvest storage** facilities at panchayat and block levels.
  - **Improve irrigation infrastructure** to ensure better water use.
  - **Enhance access to farm credit**, both long-term and short-term.
- **District Selection Criteria:**
  - Based on **3 key indicators**:
    - Low agricultural productivity
    - Moderate cropping intensity
    - Low credit access for farmers
  - **Cropping intensity**: Measures number of crops per year (India avg: 155% in 2021–22).
  - Each state/UT will have **at least one district**.
  - Final district count per state depends on:
    - Share of **net cropped area**
    - Number of **farming households**

Implementation Strategy

- Each district will create a **District Agriculture and Allied Activities Plan**.
- Plan to be prepared by **District Dhan Dhaanya Samiti**:
  - Headed by the District Collector
  - Includes progressive farmers
- Focus areas:
  - Crop diversification
  - Soil and water conservation
  - Organic and natural farming
  - Self-sufficiency in agri-allied sectors
- Plans will be **locally tailored** based on climate and cropping patterns.
- **Expert support** from agriculture universities (central and state).
- **Committees** at district, state, and national levels for planning and monitoring.
- **Central Nodal Officers (CNOs)** to monitor progress on ground.

Performance Monitoring and Ranking

- Modelled on **Aspirational Districts Programme (ADP)**.
- Based on **convergence**, **collaboration**, and **competition**.
- Districts ranked monthly on **117 Key Performance Indicators (KPIs)**.
  - KPIs include: agriculture, irrigation, infrastructure, financial inclusion, and skill development.
- **NITI Aayog** to provide guidance, capacity-building, and technical support.
- A **dedicated portal/dashboard** to monitor and display district-wise progress.

SOCIETY AND SOCIAL JUSTICE

TOPICS FOR MAINS

Five Years of National Education Policy (2020)

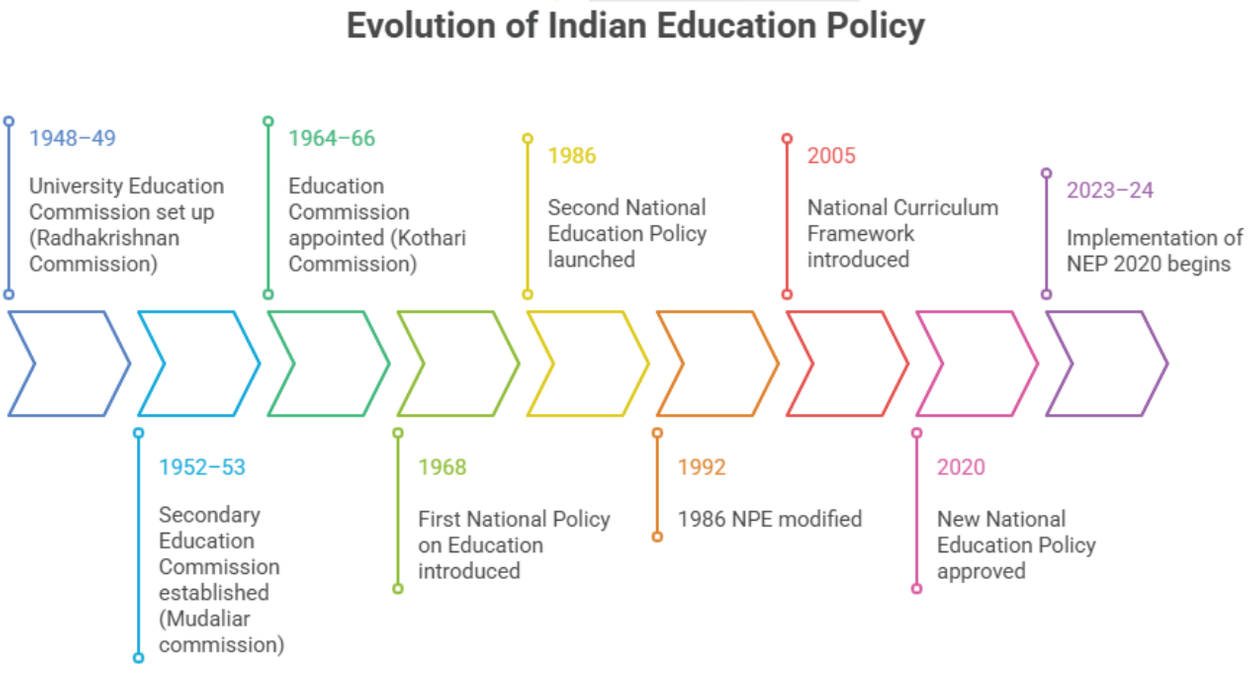
Syllabus Mapping: GS-Paper 2, Social Justice, Education

Context

Recently, the National Education Policy marked 5 years of its implementation.

About National Education Policy (2020)

- It was announced in **July 2020** by the **Ministry of Education** (formerly MHRD).
- First major policy reform in Indian education since **1986** (modified in 1992).
- Aims to transform **school and higher education** to meet the needs of the **21st century**.
- **Objectives:**
  - Make education **more holistic, flexible, multidisciplinary**.
  - Focus on **conceptual understanding**, **critical thinking**, and **creativity**.
  - Promote **equity, inclusion**, and **digital learning**.
  - Improve **teacher training**, **governance**, and **assessment systems**.



Key targets of NEP

- Universalization of education from Early Childhood Care and Education (ECCE) to Secondary Education by 2030, aligning with SDG 4.
- Attaining Foundational Learning & Numeracy Skills through National Mission by 2025.
- 100% GER in Pre-School to Secondary Level by 2030.
- 50% GER in Higher Education by 2035.
- Bring back 2 Crore children to the mainstream through the open schooling system.
- Teachers to be prepared for assessment reforms by 2023
- Inclusive & Equitable Education System by 2030.

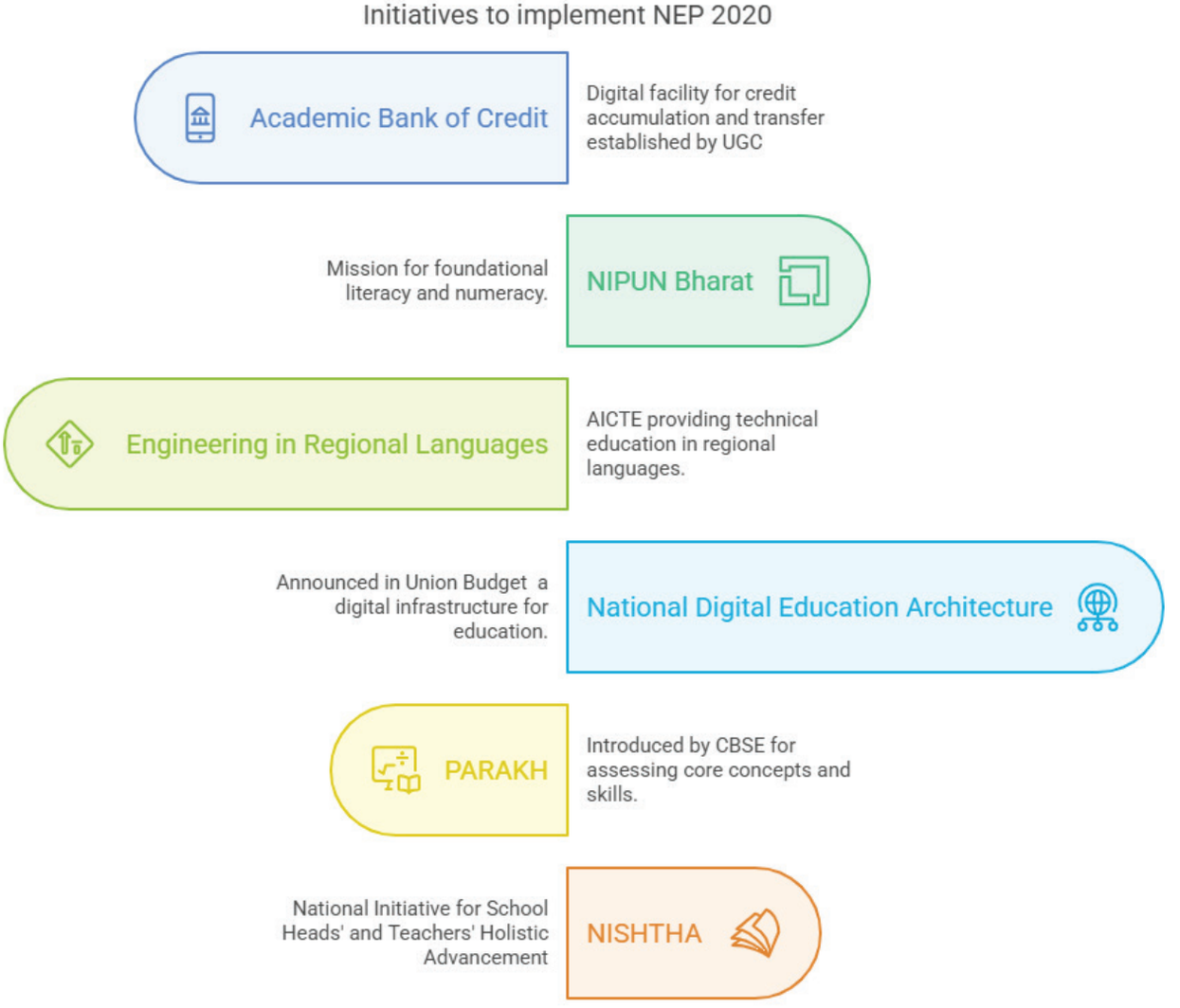
Features of NEP

- **Ensuring Universal Access:** NEP 2020 emphasizes ensuring universal access to school education at all levels, from preschool to secondary.

- **Early Childhood Care & Education**: With emphasis on Early Childhood Care and Education, the 10+2 structure of school curricula will be replaced by a **5+3+3+4** curricular structure.
- **Reforms in school curricula and pedagogy**
  - Students will have increased flexibility and **choice of subjects.**
  - There will be no rigid separations between arts and sciences, between curricular and extracurricular activities, and between vocational and academic streams.
  - **Vocational educatio**n will start in schools from the **6th grade** and include internships.
- **Teacher training and management**
  - The existing B.Ed. programme for teacher training will be replaced by a four-year integrated programme with high-quality content, pedagogy, and practical training.
  - A national curriculum framework for teacher education will be formulated by the **National Council for Teacher Education(NCTE) in consultation with NCERT.**
- **Multilingualism and the power of language:** The policy has emphasized the mother tongue as the medium of instruction until **Grade 5, but preferably till Grade** 8 and beyond.
- **Assessment and Accreditation:** A new National Assessment Centre-Performance Assessment, Review, and Analysis of Knowledge for Holistic Development (**PARAKH**) will be set up as a standard-setting body.

Higher Education

- **Holistic multidisciplinary education:**
  - **An Academic Bank of Credit** is to be established for digitally storing academic credits earned from different HEIs.
  - The **National Research Foundation** will be created as an apex body for fostering a strong research culture and building research capacity across higher education.



- **Regulation:**
  - **Higher Education Commission of India (HECI)** will be an overarching umbrella body for higher education, excluding medical and legal education.
- **Promotion of Indian languages:**
  - NEP recommends setting up an Indian Institute of Translation and Interpretation (IITI), National Institute (or Institutes) for Pali, Persian, and Prakrit, strengthening of Sanskrit and all language departments in HEIs.
- **Internationalization of Higher Education:**
  - High-performing Indian universities will be encouraged to set up campuses in other countries.
  - Similarly, selected top global universities will be permitted to operate in India.

Other Key Features

- **Vocational Education**: To start from **Grade 6** with internships.
- **Coding and experiential learning** introduced early.
- **EdTech and digital education** promoted via **DIKSHA**, **PM eVidya**, etc.
- **National Education Technology Forum (NETF)** to be established.
- Special focus on **disadvantaged groups**, gender inclusion, and **universal access**.

Key Achievements of NEP 2020

- **NIPUN Bharat** and **Vidya Pravesh** initiatives have benefitted over **4.2 crore children** across **8.9 lakh schools**, enhancing foundational literacy and numeracy and school readiness.
- Over **1.15 lakh students** from **Socio-Economically Disadvantaged Groups (SEDGs)** and **7.58 lakh girls** have been enrolled in inclusive residential schools.
- The **PRASHAST App** facilitates early screening for disabilities, in line with the **Rights of Persons with Disabilities (RPwD) Act**.
- **Indian Sign Language (ISL)** has been introduced as a subject, supported by over **1000 ISL videos** and **talking books**.
- More than **4 lakh teachers** have been trained under the **NISHTHA programme**.
- Modules for **FLN** and **ECCE** have been integrated into training via the **DIKSHA platform**.
- **72% of schools** now have access to the internet.
- The launch of **e-Jaadui Pitar**a, an AI-powered, multilingual digital toolkit, is enriching early grade learning.

Challenges Associated With NEP

- **Three-Language Formula Facing Resistance:** NEP mandates three languages in schools (at least two Indian), but Tamil Nadu — which follows a Tamil-English model — sees this as an indirect attempt to impose Hindi and has opposed it.
- **Teacher Education Reform Stalled:** The National Curriculum Framework for Teacher Education (NCF-TE), expected in 2021, hasn't been released.
  - The proposed 4-year Integrated Teacher Education Programme (ITEP) faces opposition from colleges running existing courses like B.El.Ed.
- **Delay in Replacing UGC with HECI:** NEP proposes replacing UGC with the Higher Education Commission of India (HECI) to regulate all higher education (except medical/legal).
  - However, the draft bill for HECI is still under review by the Education Ministry.
- **Midday Meal Enhancement Yet to Happen:** NEP recommends adding breakfast to school meals.
  - But in 2021, the Finance Ministry rejected the proposal for budgetary reasons, so only lunch is currently provided.
- **Centre-State Policy Disagreement:** States like Tamil Nadu, Kerala, and West Bengal have refused to adopt NEP provisions and declined to sign MoUs for PM-SHRI schools.
  - Tamil Nadu opposes both the three-language formula and the four-year undergraduate model.
  - These states argue that education is a **Concurrent List subject**, and the Centre can't impose reforms without state approval.
- **Funding Withheld Over NEP Non-Compliance:** The Centre has withheld Samagra Shiksha funds from non-compliant states, linking funding to NEP implementation.
- **Equity concerns over commercialization**: Central schemes like Higher Education Financing Agency (HEFA) or PM-USHA, which require institutions to repay loans from their own internal revenue, have triggered concerns about rising fees and access for marginalized students.

Way Forward

- **Promote Linguistic Flexibility:** Allow states to adopt the **three-language formula in a flexible manner** respecting regional preferences.
  - Encourage **mother tongue/local language instruction** without mandating specific languages like Hindi.
- **Accelerate Teacher Education Reform:** Expedite the release of the **National Curriculum Framework for Teacher Education (NCF-TE)**.
  - Ensure **consultation with universities and colleges** offering existing teacher education programs like B.El.Ed to avoid disruption and resistance.
- **Legislate HECI Through Consensus:** Finalize and introduce the HECI Bill through extensive stakeholder consultations.
- **Foster Cooperative Federalism in Education:** Create a **National Education Implementation Council** with representation from Centre and states to discuss NEP roll-out collaboratively.
- **Ensure Equitable Funding Mechanisms:** Avoid making NEP compliance a precondition for fund allocation; instead, **incentivize reforms** with performance-linked grants.
- **Guard Against Commercialization:** Introduce **need-based scholarships and fee waivers** to ensure equity, especially for marginalized communities.

Fostering A Commitment to Stop Maternal Deaths

Syllabus Mapping: GS paper-1, Women Issues /GS-Paper 2, Social Justice, Health

Context

India's Maternal Mortality Ratio is going down, but some states still need to work on fixing basic problems in healthcare.

Introduction to Maternal Mortality

- **MMR is defined as the number of maternal deaths per 100,000 live births** during a specific period.
  - **Eg: MMR of India declined from 384 in 2000 to 103 in 2020: UN report, 2020**
- **Maternal mortality** refers to the death of a woman during pregnancy or within 42 days of pregnancy termination, due to pregnancy-related causes, excluding accidental or incidental causes.
- Maternal mortality is a significant public health challenge in India, serving as a key indicator of healthcare quality and accessibility

$$\frac{\text{Number of Resident Maternal Deaths}}{\text{Number of Resident Live Births}} \times 100{,}000$$

- Some states have reduced their MMR below the **SDG target** of **70 per 100,000 live births**, while others still face challenges in reducing maternal deaths.

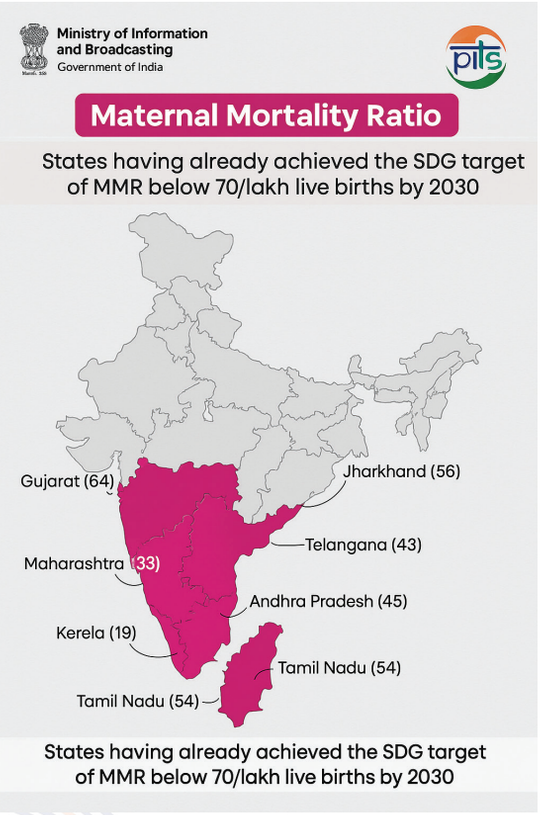
Facts

- **Age group with highest MMR**: 20–29 years, followed by 30–34 years.
- **States with High MMR**: Madhya Pradesh (175), Assam (167), Uttar Pradesh (151), Odisha (135), Chhattisgarh (132), West Bengal (109).
- The **UN Sustainable Development Goals (SDGs)** aim to reduce the global MMR to **below 70 per 100,000 live births**.
- **Global Maternal Mortality (WHO, 2023):**
  - Approximately 700 women die daily due to preventable causes related to pregnancy and childbirth.
  - A maternal death occurs roughly every 2 minutes.
  - Global MMR decreased by about 40% between 2000 and 2023.
  - Over 90% of maternal deaths occur in low- and lower-middle-income countries.

Challenges in Maternal Care in India

- **Three Delays Model: Delay in recognizing complications and seeking care** (due to low awareness, financial issues, social taboos).
  - **Delay in reaching a health facility** (poor roads, remote areas, lack of ambulances).
  - **Delay in receiving adequate care at the facility** (staff shortages, lack of blood banks, delayed referrals).
- **Shortage of Trained Health Professionals:** High vacancy rates for specialists (obstetricians, anaesthetists, paediatricians), especially in Community Health Centres and First Referral Units (FRUs).
  - **E.g., 66% vacancies of specialists** in 5,491 community health centres.

- **Anaemia and Malnutrition:** A large proportion of pregnant women are anaemic or malnourished, increasing the risk of complications and maternal deaths.
  - **E.g.,** According to NFHS-5 (2019-21), **over 50%** of pregnant women in India are anaemic.
- **Home Deliveries and Unsafe Abortions:** Despite progress, a section of deliveries still happen at home by untrained birth attendants, leading to sepsis, trauma, and increased mortality.
- **Socio-cultural and Economic Barriers:** Early marriages, low education levels, poverty, and gender inequality hinder timely and safe maternal care.
- **Ineffective Maternal Death Audits:** Weak implementation of mandatory reporting and audit of maternal deaths in several states limits systemic improvement.
- **Postpartum Hemorrhage (PPH):** Excessive bleeding after childbirth is one of the leading causes of maternal death in India. It often results from inadequate uterine contraction, retained placenta, or trauma during delivery. Limited access to emergency obstetric care and blood transfusion services exacerbates this issue in rural areas.
- **Hypertensive Disorders (Preeclampsia and Eclampsia):** These conditions, characterized by high blood pressure during pregnancy, can lead to seizures, organ failure, or death if not managed properly.
- **Sepsis:** Infections following childbirth, often due to unhygienic delivery practices or untreated infections during pregnancy are prevalent in areas with poor sanitation and limited access to skilled birth attendants



States having already achieved the SDG target of MMR below 70/lakh live births by 2030

Major Government Initiatives Related to Maternal Care

Initiative	Launched	Main Focus	Key Features
Janani Suraksha Yojana (JSY)	2005	Promote institutional delivery	Cash incentives for mothers & ASHAs to deliver at health facilities
Janani Shishu Suraksha Karyakram (JSSK)	2011	Free maternity and newborn care	Free delivery (incl. C-section), drugs, diagnostics, diet, blood, and transport for mother & newborn
PMSMA (Pradhan Mantri Surakshit Matritva Abhiyan)	2016	Quality antenatal care	Free specialist ANC on 9th of every month; focus on early risk detection
LaQshya	2017	Labour room quality improvement	Upgradation of labour rooms, maternity OTs, staff training, quality assurance
SUMAN (Surakshit Matritva Aashwasan)	2019	Dignified, assured maternal-newborn services	Zero expense, respectful, quality care; grievance redressal; covers all public health facilities
Anaemia Mukt Bharat (AMB)	2018	Reduce anaemia in women and children	**6×6×6 strategy**: IFA, deworming, fortified foods, testing, behavior change, address non-nutritional causes

Way Forward

- **Strengthen the Three Delays Model Response:** Increase community awareness on maternal danger signs and the importance of institutional deliveries.
  - Expand financial and transport incentives for timely referral and access.
  - Ensure rapid response and triage at facilities, with a clear protocol for emergencies.
- **Increase Investment in Health Infrastructure:** Fill vacancies of obstetricians, anaesthetists, and staff nurses at all FRUs/CHCs.
  - Upgrade operation theatres, blood banks, and critical care units at district and sub-district levels.
- **Improve Quality of Maternal Death Audits:** Mandatory, confidential reviews of every maternal death (e.g., Kerala Model), with accountability and follow-up actions.

Kerala Model: Compulsory to **report and review every maternal death**, regardless of cause or location (hospital or home). All cases are reported **within 24 hours.**

- **Focus on Nutrition and Anaemia Control:** Strengthen Iron Folic Acid (IFA) supplementation, nutrition counseling, and community-based interventions for adolescent girls and pregnant women.
- **Empower Frontline Workers and Women's Groups:** Continue training and incentivizing ASHAs, ANMs, and SHGs for community mobilization and support.

Conclusion

- India has achieved the **National Health Policy (NHP) 2017** target of reducing MMR to below **100 per 1,00,000 live births** by **2020**.
- Continued efforts are needed to reach the **SDG target** of reducing MMR to below **70 per 1,00,000 live births** by **2030**.
- Strengthening healthcare systems, expanding maternal health programs, and addressing socioeconomic barriers will be key to further reducing maternal mortality.

Palliative care

Syllabus Mapping: GS paper-2, Social Justice, Health Issues

Context

Despite the proven impact of palliative care, it remains critically underfunded and underutilised in India, leaving millions without the support that they desperately need.

What is Palliative Care?

- Palliative care is specialised medical care focused on providing relief from pain, symptoms, and stress of serious illnesses.
- Its goal is to improve quality of life for patients and their families by addressing physical, emotional, social, and spiritual needs, rather than trying to cure the illness.

Need for Palliative Care in India

- **Rising Non-Communicable Diseases:** Increase in cancer, diabetes, heart and respiratory diseases has led to more patients needing long-term symptom management.
- **High Burden of Suffering:** 7–10 million Indians need palliative care every year, but only 1–2% have access.
- **Aging Population:** With more elderly people, the need for end-of-life care is growing.
  - **E.g,** The elderly population in India is growing faster than other age groups, with the number of people aged 80+ projected to increase by **279% between 2022 and 2050 (UNFPA Report)**.
- **Prevent Unnecessary Hospitalisation:** Helps reduce emotional, physical, and financial burden on families.
- **Holistic Support:** Addresses pain, emotional distress, and offers support to families in difficult times.

What are the Challenges Associated?

- **Low Access and Availability:** According to the Worldwide Hospice Palliative Care Alliance (WHPCA, 2020), **only 1–2% of the 7–10 million Indians who need palliative care actually receive it**.
- **Shortage of Trained Professionals:** Few doctors, nurses, and allied health workers are trained in palliative care, limiting service provision.
  - E.g. The **Indian Association of Palliative Care** reported in 2021 that **less than 1% of India's 12 lakh registered doctors** have any formal training in palliative care.
- **Inadequate Funding and Infrastructure:** Palliative care receives little budgetary support, and dedicated facilities are scarce.
  - **E.g.,** Government funding for the **National Programme for Palliative Care (NPPC)** was only ₹15 crore for 2022–23, a fraction compared to other health missions.
- **Lack of Awareness:** Both public and healthcare providers often misunderstand or are unaware of palliative care benefits.
  - **E.g.,** A 2018 **All India Institute of Medical Sciences (AIIMS) survey** found that **over 70% of Indian patients and families were unaware of palliative care as a concept or service**.
- **Integration Issues:** Palliative care is not fully embedded in primary, secondary, or tertiary health care, leading to fragmentation.
  - E.g., Only **4% of medical colleges in India** have integrated palliative care into the undergraduate MBBS curriculum (Lancet Global Health, 2020).
- **Cultural Barriers and Stigma:** Discussions about death, terminal illness, and pain management are often taboo.

– **E.g.**,A 2019 study published in the **Indian Journal of Palliative Care** noted that **over 60% of doctors felt uncomfortable discussing end-of-life care with patients due to cultural taboos**.

Solutions to Strengthen Palliative Care in India

- **Integrate into Medical Education:** Include palliative care as a mandatory subject in the MBBS curriculum and allied health courses.
- **Capacity Building:** Train doctors, nurses, and allied health professionals in palliative care skills, especially in rural areas.
- **Task Shifting:** Empower nurses and allied health workers to provide basic palliative care, bridging the specialist gap.
- **Dedicated Funding and Insurance:** Allocate government funding and expand insurance schemes (e.g., Ayushman Bharat) to cover palliative services.
- **Awareness Campaigns:** Launch public education initiatives to demystify palliative care and encourage early access.
- **Partnerships:** Collaborate with NGOs, private sector, and global organisations to expand reach and share best practices.
- **Infrastructure Strengthening:** Ensure that public and private health facilities are equipped for palliative care delivery.

Best Practices

The Kerala Model

- **Kerala** leads in India with its **community-based palliative care** approach.
- The state's **Neighbourhood Network in Palliative Care (NNPC)** is a globally recognized example.
- It involves training volunteers, decentralizing services to community level, and integrating palliative care with primary health care.
- Over 90% of Kerala's population has access to basic palliative care—a model that can be scaled elsewhere in India.

United States:

- Integrates palliative care with mainstream healthcare; insurance covers hospice and palliative care, and there's strong focus on patient-centered end-of-life care.

Women in STEM Careers

Syllabus Mapping - GS paper-1,Role of Women; GS paper-2, Education

Context

Over the last decades, the presence of women in Science, Technology, Engineering, and Mathematics (STEM) careers has grown steadily but their participation in Industry/Workforce remains low.

Importance of Women's Participation in STEM

- **Demographic Dividend**: Women form nearly half of India's population. Tapping into this talent pool is essential for **sustainable growth**.
- **Boost to GDP**: According to McKinsey Global Institute, enabling **68 million more women to work** could add **$700 billion to India's GDP by 2025**. The World Bank estimates that a **50% female labour force participation rate** could raise GDP growth by **1%**.
- **Innovation & Diversity**: Diverse teams in STEM drive **better problem-solving and innovation**-vital for India's digital and technological aspirations.
- **Social Empowerment**: Economic empowerment leads to **greater decision-making power for women**, impacting households, communities, and policymaking.
- **Aligning with National Goals**: Women's inclusion in STEM aligns with the vision of **Viksit Bharat**, making development **inclusive, equitable, and future-ready**.

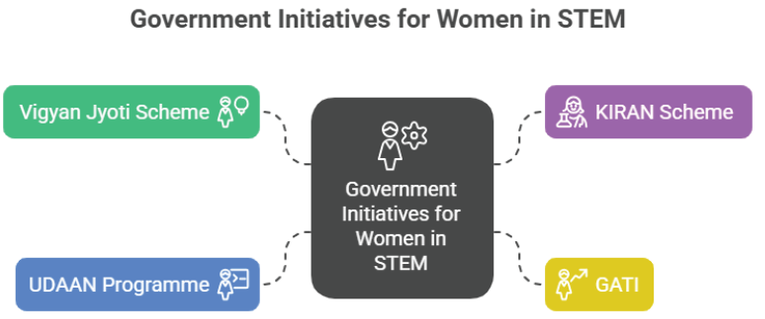
Facts

- In 2024, a record **28.13 lakh Class 12 girls** passed with science subjects—up from 25.58 lakh in 2023 and 23.3 lakh in 2022.
- Although **43% of STEM graduates** are women, only **14% of the STEM workforce** comprises women .
- According to UNESCO globally women form just **35% of STEM graduates**, with minimal change over the past decade.
- Female faculty in STEM across 98 institutions is a mere **13.5%**, with engineering being the lowest at **9.2%**

Key Issues faced by women in STEM Education

- **Sociocultural Barriers and Gender Stereotypes:** Deep-rooted beliefs that science and mathematics are male domains.

- **Underrepresentation in Higher Education and Research:** Though girls constitute ~43% of STEM graduates, their numbers decline sharply at PhD and faculty levels.
  - Women make up **less than 20%** of faculty at IITs and other premier institutes.
- **Work-Life Balance and Career Dropout:** STEM fields are perceived as **demanding and inflexible**, unsuitable for women with family responsibilities.
  - Women often drop out during **early career or post-marriage/childbirth** due to lack of institutional support.
- **Gender Bias in Institutions:** Women face **bias in classroom participation**, project leadership, and research opportunities.
  - Discriminatory practices in recruitment, promotion and performance evaluation.



- **Safety and Infrastructure Concerns:** Inadequate hostels, transport and safe working environments in science labs or field work.
- **Limited Exposure to Technology and Digital Tools:** Digital divide impacts access to e-learning, coding, AI/ML tools, especially in rural areas.
- **Pay Gap:** Women in STEM roles often earn 20–30% less than male counterparts.

Way Forward

- **Early Intervention and Gender-Sensitive Curriculum:** Promote STEM among girls from school-level using **inclusive teaching materials** and female role models.
- **Strengthening Mentorship and Peer Networks:** Create **women-led STEM clubs, alumni networks** etc.
- **Flexible Policies for Women in Research:** Extend **maternity leave, childcare support**, flexible work hours, and career re-entry programs.
- **Addressing Safety and Mobility:** Improve safety in campuses, hostels and transportation to reduce dropout and improve access.
- **Promote Women's Leadership in STEM:** Appoint more women to **faculty, editorial boards, science academies**, and research panels.
- **Community Engagement & Behavioural Change:** Initiatives like **UN Women's WeSTEM Programme** engage families, promote female role models, and conduct workplace safety sessions to change mindsets.
- **Awareness & Mentorship:** Launch **national mentorship networks**, industry bootcamps, and career counselling to improve confidence and visibility of opportunities.

TOPICS FOR PRELIMS

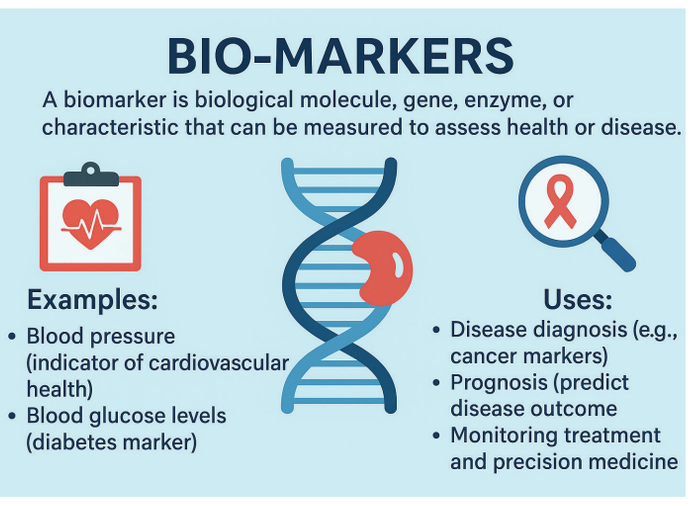
BHARAT Initiative

Context

Recently the Indian Institute of Science (IISc), Bengaluru, launched a large-scale study called BHARAT.

About BHARAT Initiative

- **BHARAT** stands for - Biomarkers of Healthy Aging, Resilience, Adversity, and Transitions.
- **Aim:**
  - To map the physiological, molecular and environmental indicators that drive ageing in the Indian population.
  - To build an **India-specific database** of ageing parameters
- Under this initiative researchers are building India's first comprehensive aging database.



CARA

Context

CARA has directed State Adoption Agencies to intensify structured counselling at all stages of adoption to ensure emotional preparedness and well-being.

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.

About 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.**
- 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.

TALASH Initiative

Context

Recently, the National Education Society for Tribal Students (NESTS) launched the TALASH initiative.

About TALASH Initiative

- **Tribal Aptitude, Life Skills and Self-Esteem Hub (TALASH)** is a national- program to support the all-round development of students in **Eklavya Model Residential Schools (EMRS)**.
- **Launched By:** National Education Society for Tribal Students in collaboration with **UNICEF India**.
- **Significance:**
  - First national-level program **specifically for tribal students** in India.
  - Targets over **1,38,336 students** in EMRSs across **28 States and 8 Union Territories**.
  - Promotes **inclusive and equitable education**.

About National Education Society for Tribal Students (NESTS)

- It is an **autonomous society** established in **2019** under the **Union Ministry of Tribal Affairs**, to manage and oversee **EMRSs**.
- **Key Functions:**
  - **Sets standards** for EMRS curricula, infrastructure, and teacher recruitment.
  - **Oversees infrastructure**, digital learning, and skill development programs.
  - **Conducts training workshops** and capacity-building for staff.
  - **Recognizes achievements** of students and teachers to encourage excellence.

About Eklavya Model Residential Schools (EMRS)

- **Flagship scheme** by Ministry of Tribal Affairs for ST students (Class 6–12).
- Started in **1998**, revamped in **2018–19** for wider reach and better quality.
- To be set up in tribal blocks (50% ST population & 20,000 ST persons).
- **Target: 728 schools** by 2026.
- Managed by **NESTS**, an autonomous body under the ministry.
- **CBSE curriculum**, **free education**, residential & co-ed schools.
- Includes local art, culture, sports & skill development training.
- Full infrastructure: classrooms, labs, hostels, staff quarters, playground.
- Capacity: **480 students** per school, 50:50 gender ratio.
- **10% seats** for non-ST students; **20% sports quota** for ST achievers.

TN-KET Initiative

Context

Tamil Nadu has successfully lowered TB-related deaths through the **TN-KET (TB Death-Free Initiative)**.

About TN-KET

- **TN-KET** (**Kasanoi Erappila Thittam**) is a **state-level initiative** launched by **Tamil Nadu in 2022** to reduce **tuberculosis (TB) mortality**.
- It focuses on **early identification** and **differentiated care** for patients with **severe TB**.
- **Key Features:**
  - **Paper-Based Triage Tool**: Uses 5 quick clinical indicators- **BMI, oxygen level, respiratory rate, leg swelling**, and **ability to stand**-to identify "severely ill" TB patients.

  - **Fast-Track Admissions**: Ensures that **98% of severe cases are admitted within 7 days** of identification.
  - **Severe TB Web App**: A digital tool that estimates **mortality risk** and guides urgent medical decisions.
  - **Simplified Process**: Requires **no laboratory tests** and reduces assessment time by **6–7 days** compared to older 16-parameter tools.
  - **Differentiated Care Model**: Provides **tailored treatment plans** based on factors like **age, BMI, disease severity**, and **existing comorbidities**.
- **Impact: 20% Reduction in Early TB Deaths** - Achieved within just **6 months** of implementation.

Polyandry & Polygamy in India

Context

A woman from Himachal Pradesh belonging to the Hatti tribe married two brothers. This form of polyandry is locally known as **'Jodidaran'.**

Legal Status of Polyandry and Polygamy in India

- **Polyandry** (a woman marrying multiple men) is **not legally recognized** and **not protected** under any Indian law.
- **Polygamy** (a man marrying multiple women) is:
  - **Prohibited for Hindus, Sikhs, Buddhists, and Jains** under the **Hindu Marriage Act, 1955**.
  - **Outlawed for all citizens** under the **Special Marriage Act, 1954**, which governs civil marriages.
  - **Criminalised** under the **Bharatiya Nyaya Sanhita (BNS), 2023**, which replaces the IPC.
- **Customary Laws and Scheduled Tribes (STs):**
  - **Article 342** allows the President to notify STs, granting them special protections.
  - **Section 2(2), Hindu Marriage Act**: The Act does **not apply to STs** unless the Central Government notifies otherwise.
  - Hence, **uncodified customs** like **polyandry among the Hatti tribe** may continue unless explicitly restricted.
- **Validity of Customary Practices (Section 3(a), Hindu Marriage Act) -** A custom must:
  - Be **ancient, continuous, certain**, and **reasonable**;
  - Not violate **public policy**;
  - Be **provable in court**, if contested.

Jodidaran in Hatti Tribe

- It is a traditional practice among the **Hatti tribe**.
- The primary motivation behind this custom is to **prevent the division of ancestral agricultural land** and maintain joint family holdings.
- Supporters argue that the practice helps in **strengthening brotherly bonds** and offers **greater economic and emotional security** to women in the household.

Mahila Aarogyam Kaksh

Context

The Department of Legal Affairs, Ministry of Law and Justice, recently inaugurated Mahila Aarogyam Kaksh.

About Mahila Aarogtam Kaksh

- It is a first-of-its-kind initiative aimed at institutionalising **workplace wellness** for women employees within government offices.
- It serves as a dedicated **health, fitness and wellness space** exclusively for female staff of the Department.

Gender Budgeting Knowledge Hub' portal

Context

The portal was launched recently by the Union Ministry of Women and Child Development at the National Consultation on Gender Budgeting.

About Gender Budgeting Knowledge Hub' portal

- It is a centralized repository of tools intended for use by central and state government ministries/departments and stakeholders.
- The platform serves as a repository for:
  - Policy briefs
  - Best practices and case studies
  - Gender-disaggregated data
  - Training manuals and interactive tools for gender-budget impact analysis.

What is Gender Budgeting ?

- It is the practice of designing and analyzing government budgets and policies **through a gender lens**, to ensure that **both women and men benefit equally** from public spending and services.
- It was introduced in the 2005-**06 Union Budget**, the Ministry of Finance issues a **Gender Budget Statement** every year.
- In **Budget 2024–25**, India allocated **₹4.49 lakh crore** (~6.5% of total expenditure) for gender budgeting.

Pradhan Mantri Virasat Ka Samvardhan (PM-VIKAS) Scheme

Context

Recently PM-VIKAS Skill Development and Women Entrepreneurship Programme was launched at Indian Institute of Information Technology (IIIT) Kottayam.

About PM-VIKAS (Pradhan Mantri Virasat Ka Samvardhan)

- It is a **Central sector scheme** under the **Ministry of Minority Affairs (MoMA)**.
- It aims to empower **minority** and artisan communities through inclusive development.

- PM-VIKAS is an integrated scheme combining (5) existing schemes of MoMA viz. **Seekho aur Kamao, USTTAD, Hamari Dharohar, Nai Roshni and Nai Manzil.**
- **Scheme Components:**
  - **Skilling and Training:** Includes traditional (arts & crafts) and non-traditional (NSQF compliant) skill training.
  - **Leadership and Entrepreneurship:** Focuses on leadership development and entrepreneurship support, particularly for women.
  - **Education:** Provides open schooling opportunities (8th, 10th, and 12th) for school dropouts.
  - **Infrastructure Development:** Development of "Vishwakarma Villages" (hub and spoke model) to promote art, craft, tourism and commerce.

Minorities

- The Constitution of India does not define the term **"Minority".**
- The Central Government has notified **six** communities as minority communities under **Section 2(c) of the National Commission for Minorities Act, 1992.**
  - Muslims, Christians, Sikhs, Buddhists, Zoroastrians (Parsis), and Jains.
  - As per census 2011, the percentage of minorities in India's population is **19.3%.**

Tech to Empower Women And Childrens

Context

To achieve the vision of Viksit Bharat@2047, the Ministry of Women and Child Development has integrated technology into its programmes.

Key Government Interventions Using Technology for Empowerment

Initiative	Objective	Technology Integration	Impact/Outcomes
Saksham Anganwadi & Poshan Tracker	To improve nutrition and early childhood care by modernizing Anganwadis and ensuring effective monitoring of nutrition delivery.	Smart devices, real-time data entry, nationwide integration via **Poshan Tracker**.	10.14 crore+ beneficiaries tracked; improved service delivery; won PM's Award for Excellence (2025).
Digital Training for Anganwadi Workers	To build capacity of Anganwadi workers in delivering quality pre-school education and nutrition services to children.	E-learning modules and digital training via mobile devices.	Enhanced early childhood education and nutrition outreach.
Facial Recognition in Nutrition Delivery	To ensure that only genuine and eligible beneficiaries receive nutritional support, minimizing leakages and fraud.	Biometric (facial) authentication for beneficiary verification.	Reduced duplication; direct benefit to deserving recipients.
SHe-Box Portal	To provide a single-window access for women to lodge complaints of sexual harassment at workplace and ensure their safety and dignity.	Online platform for filing, tracking, and redressal of complaints under PoSH Act.	Fast, accessible, and transparent grievance redressal.
Mission Shakti Dashboard & App	To provide integrated, immediate assistance and support to women facing violence, linking them to one-stop crisis centers and relevant services.	App and dashboard for location-based help and monitoring.	Nationwide coverage; timely support to women in distress.
Pradhan Mantri Matru Vandana Yojana (PMMVY)	To promote safe motherhood by providing partial wage compensation and financial incentives to pregnant and lactating women for adequate rest and nutrition.	Digital registration, Aadhaar-based authentication, direct cash transfer, dashboards.	₹19,000+ crore transferred to 4 crore+ women; transparent, efficient benefit delivery.
CARINGS Portal (Adoption)	To streamline and make the adoption process transparent, efficient, and accountable for all stakeholders.	Online tracking, digital processing of adoption cases and child care institution records.	Greater transparency, efficiency, and monitoring in adoption.
Mission Vatsalya Dashboard	To strengthen child protection and welfare by integrating and coordinating various schemes, services, and data at a single platform.	Real-time monitoring, data convergence, stakeholder coordination.	Improved child protection, monitoring, and program delivery.

SCIENCE & TECHNOLOGY

TOPICS FOR MAINS

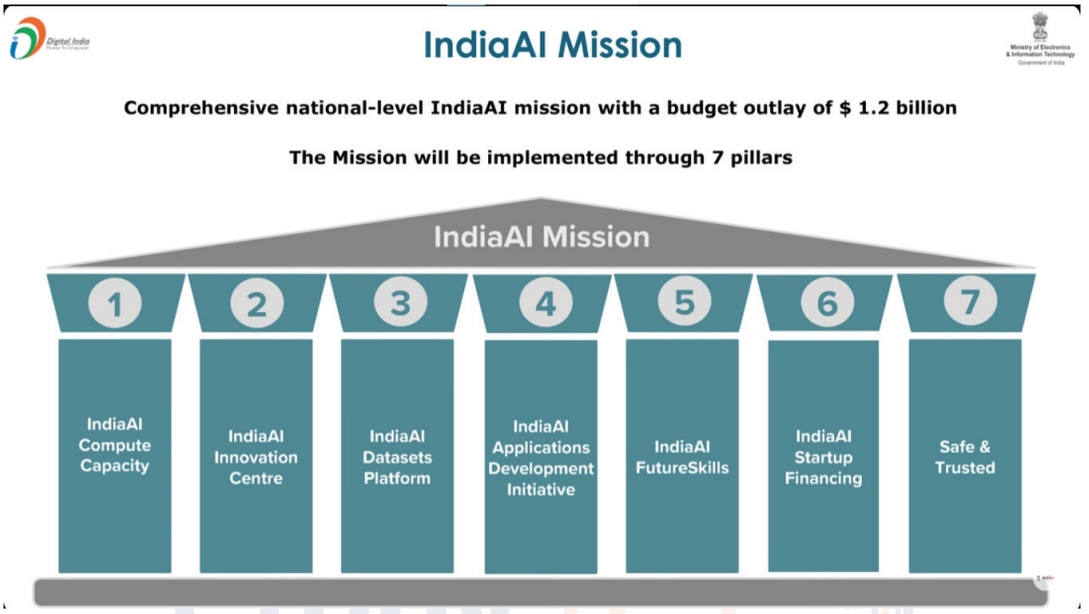
India's AI Mission Without a Mandate

Syllabus Mapping: GS Paper 3, ICT

Context

India aspires to global AI leadership but lacks a comprehensive national strategy, risking lagging behind US, China, and EU advances.

About India's AI Mission



- **Launched: 7 March 2024** with a budget of over ₹**10,300 crore** (~US $1.2 billion) for 2024–29.
- **Purpose & Aim:** Propel India to global leadership in AI and democratize AI benefits across all strata.
  - Foster **technological self-reliance**, **ethical and responsible AI**, and broaden access to AI.
- **Significance:**
  - **Global Leadership**: Positions India as a serious player in the global AI race, championing inclusive, frugal, and multilingual AI solutions.
  - **Digital Sovereignty**: Reduces dependence on foreign AI infrastructure and models, promotes "Make AI in India, for India."
  - **Inclusivity & Equity**: Prioritizes applications serving all sections of society, including rural, academic, and underserved communities.
  - **Ethical and Safe AI**: Investment in safety frameworks and standards aims to build public trust and responsible AI adoption.
  - **Ecosystem Building**: Encourages collaborations among government, startups, research institutions, and international players.
  - **Strategic Autonomy:** Reduces dependence on foreign foundation models and cloud infrastructure, strengthening India's digital sovereignty."
- **Achievements:**
  - **AIRAWAT AI Supercomputer**: AIRAWAT, a 200 AI-Petaflop supercomputer implemented by C-DAC Pune under MeitY, ranked 75th globally in ISC 2023, places India among leading AI supercomputing nations.
  - **Global AI Skill Leadership**: According to Stanford AI Index 2024, India ranks **#1** globally in AI skill penetration (score: 2.8) and talent concentration has grown by **263%** since 2016.
  - **Bhashini Platform**: Developed multilingual AI tools supporting 22 Indian languages for digital inclusion.
  - **Centers of Excellence**: Launched dedicated AI research centers in healthcare, agriculture, and smart citie

Global Partnerships & Forums

- Global Partnership on Artificial Intelligence (GPAI)
- Global IndiaAI Summit
- United States–India Initiative on Critical and Emerging Technology (iCET)
- AI Action Summit (Paris, Feb 2025)
- India–France AI Summit (La French Tech India, 2025)

Issues Associated with India's AI Mission

- **Mission without a Mandate:** India's AI Mission operates as a bureaucrat-led division within a Section 8 company under the Ministry of Electronics and Information Technology, lacking a Cabinet-endorsed national strategy.
- **Governance Gap:** India faces structural deficits impeding its AI ecosystem that incremental approaches cannot overcome.
- **Shallow R&D Base:** Universities underrepresented in global AI rankings →→Loss of top-tier AI talent to global hubs.
  - Limited pipeline of AI-specialized PhDs.
  - Weak collaboration between academia and industry.
- **Private Sector Orientation:** The IT industry remains oriented toward services.
  - Modest research investments relative to international companies.
  - Engagement with AI largely in deployment, downstream of frontier innovation.
  - Lacks AI-first national champions and deep-tech industrial ecosystem.
  - Venture capital funding skewed towards consumer tech, not foundational research.
  - Over 80% of India's IT industry AI activity is in services and downstream applications, not core model research.
- **Democratic Deficit (Lack of Parliamentary Involvement):** Parliament has remained extraneous to shaping national AI governance.
  - Between 2022–24, less than 1% of parliamentary questions addressed AI.
  - No dedicated institutional mechanism for oversight.
  - Important debates (strategic autonomy, public data use, energy demands, national security) have received short shrift.
  - Undermines India's international credibility.
  - Lack of whole of government approach: India's AI initiatives lack a Cabinet-backed national strategy, resulting in fragmented efforts and limited accountability.
  - No standing parliamentary committee on AI or emerging tech.

Way Forward

- **Cabinet-endorsed National AI Strategy:** Must be presented to Parliament.
  - Sets out a vision, an actionable roadmap, and mechanisms for democratic accountability.
- **Empowered Coordinating Authority:**
  - Establish an empowered coordinating authority with a whole-of-government mandate.
  - A Cabinet-approved National AI Policy, debated in Parliament, must set vision, R&D roadmap, and democratic oversight mechanisms.
- **Strategic Alignment:** Align R&D, industrial policy, and security strategy.
- **Frameworks for Engagement and Oversight:** Create frameworks for public engagement and parliamentary oversight.
- **National Strategic Priority:** AI governance must be treated as a national strategic priority, grounded in democratic consensus.
- Establish AI Ethics & Safety Authority to benchmark Indian models against global safety standards.
- Synchronize AI policy with Digital India, National Data Governance Framework, and cyber security strategy.

India can reframe the Artificial Intelligence debate

Context

The 2026 AI Impact Summit in New Delhi offers India a chance to bridge global divides, promote inclusive innovation, and lead efforts in shaping responsible, equitable, and people-centric AI governance. India can use the 2026 AI Impact Summit to bridge regulatory divides—between the EU's binding AI Act (in force since Aug 1, 2024), the US EO-14110/NIST guidance model, and China's safety-first controls—while centering Global South needs.

Shortfalls in Advancements of AI Regulation

- **Geopolitical Fragmentation:** AI cooperation is being derailed by global rivalries—e.g., U.S. and U.K. rejecting the Paris AI Summit's final text while China supported it.
  - This splintering undermines the creation of a unified global AI governance framework.
- **Exclusion of the Global South:** Previous summits lacked adequate representation from developing countries. Half of humanity was "missing" from high-level engagements.
  - This limits the diversity of perspectives and the applicability of AI solutions for global challenges.
- **Lack of Common Safety Protocols:** Despite calls for red-teaming and stress-testing AI models, there's no unified global checklist or safety standards.
  - Fragmented safety institutions reduce trust and increase risk of unsafe AI deployment.
  - Technical gaps include the absence of interoperable **evaluation suites** (red-teaming, bio/critical-risk tests), and **reporting standards** for **energy, water, and carbon** across training and inference.
- **Inequitable AI Resources & Infrastructure:** Access to compute power, datasets, and foundational models is concentrated in tech hubs of the Global North (California, Beijing).
  - Developing nations lack cloud credits, language datasets, and funding to keep pace.
- **Regulatory Confusion:** Nations are either over-regulating (EU), under-regulating (US), or centralizing control (China), creating uncertainty for developers and users in middle-income countries. **EU AI Act** imposes risk-tiered obligations; the **US** combines EO-14110, sectoral rules, and **NIST AI RMF**; the **UK AISI** publishes evals; China mandates safety filings—leaving middle-income countries without templates or tooling.

Opportunities for India

- **Rich AI Skills Pool:** India ranks #1 in AI skill penetration (Stanford AI Index 2024), which can power an open, multilingual safety-first model ecosystem.
- **Bridge Between Divided Powers:** India has diplomatic credibility and strategic neutrality to mediate between polarized blocs (U.S.–China, West–Global South).
- **Digital Public Infrastructure as a Model:** India's Aadhaar, UPI, and MyGov showcase how digital tools can be inclusive, scalable, and transparent.
  - This experience offers a credible framework for global AI deployment in public welfare.
- **Champion of Global South Interests:** India can mobilize developing nations, bring their voices to the table, and push for equity in data access, model development, and AI education.
- **AI for Billions Fund & Language Innovation:** India can push for a development-oriented AI fund and promote indigenous language models (multilingual challenge).
  - This fosters cultural inclusivity and expands AI's global usability.
- **Compute for Development Facility**: pooled **GPU/cloud credits**, open multilingual **datasets**, and benchmark tooling for Global South researchers, anchored in **Bhashini (22+ languages)** and **IndiaAI Mission (₹10,300 cr)**
- **Voluntary, Balanced Regulation:** India can propose a middle-path: a voluntary code of conduct rooted in openness, transparency, and accountability—less intrusive than EU regulation, more structured than US self-regulation.
- **Green-by-Design AI:** mandate lifecycle **energy/water/CO_2 disclosures** for models hosted on Indian public clouds and IndiaAI compute—publishing per-token footprints and training LCAs.

How India Can Lead in the Global AI Discourse?

- **Host the Most Inclusive AI Summit Yet:** Ensure wide participation across continents and stakeholder groups—governments, startups, academia, civil society.
- **Launch an AI Pledge & Scorecard Framework:** Get each country/organization to commit to 1–2 tangible, inclusive AI goals with transparent, trackable report cards after 12 months.
- **Initiate the Global AI Safety Collaborative:** Build a shared safety protocol repository: red-team scripts, bias evaluation tools, compute-disclosure guidelines, and incident reporting templates.
- **Push for Public-Centric AI Innovation:** Encourage open-source models, AI for rural education, health translations in local languages, and small-scale innovations in agriculture and climate resilience.
- **Champion an AI-for-Good Narrative:** Reframe the AI discourse from fear of existential risk and corporate control to opportunity for equitable development, sustainability, and empowerment.

- **Global AI Safety Repository**: open **eval suites**, **red-team scripts**, and **incident reporting** aligned with **UK AISI** and **NIST AI RMF**, localized for low-resource languages.
- **DPI-for-AI Stack**: extend **UPI/Aadhaar/DigiLocker** principles to a **Public AI Stack** (open models, data commons, consent logs, audit APIs) with **Bhashini** at the edge.
- **Standards diplomacy**: propose an **AI Evaluation Charter** at the summit—mutual recognition of tests, **model cards** with energy/water metrics, and **risk registers** for high-risk deployments.
- **Global South Voice**: tie the UN 2024 resolution to a biennial **AI for Development Scorecard** tracking compute access, open datasets, and safety adoption across LMICs.

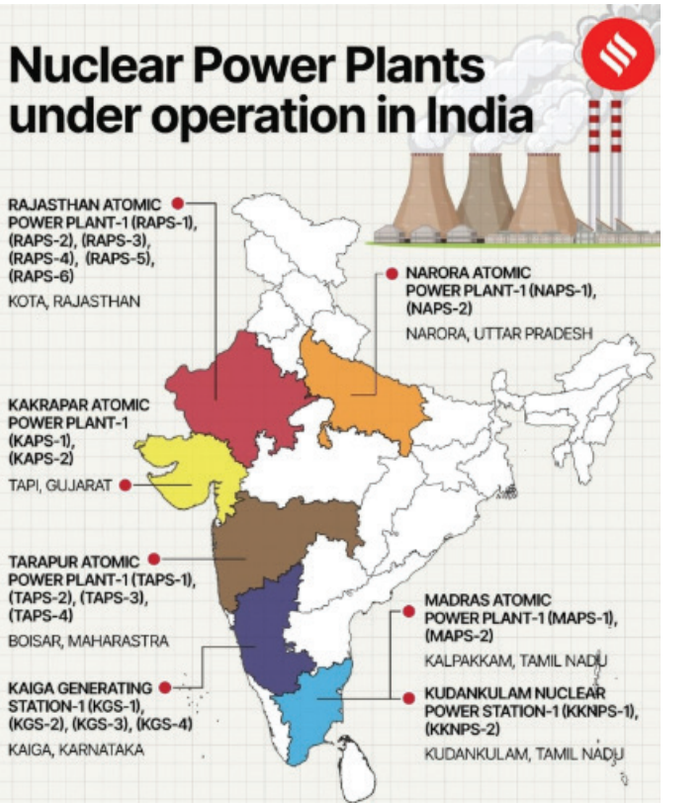
Conclusion

At the 2026 summit, India can shift the AI narrative: pair innovation with safety, operationalize IndiaAI/AIRAWAT, scale Bhashini, lead open evaluation standards, fund Global South compute and datasets, and promote green disclosures—bridging regulatory divides and enabling people-centric, public-good AI globally.

Redeeming India's nuclear power promise

Context

The Union Budget 2025–26 set an ambitious target of **100 GW nuclear power capacity by 2047**, up from the current **8.18 GW**. This aligns with India's twin goals of becoming a **developed nation (Viksit Bharat) by 2047** and achieving **net zero emissions by 2070**. Nuclear power provides a firm, low-carbon baseload with capacity factors typically in the 70–90% range, making it complementary to variable solar and wind.



More in News

- **5 Indigenously Designed Small Modular Reactors (SMRs) by 2033**
  - ₹20,000 crore allocated under the **Nuclear Energy Mission**.
  - Aimed at replacing captive coal-based thermal power plants.
  - Standardization push for **700 MWe PHWR** fleet and an indigenous **SMR** line to replace ageing captive coal plants.

Key Achievements in Nuclear Energy

- **Historical Development:** Asia's first research reactor **Apsara** (1956), and power reactors at **Tarapur** (1963).
  - IIndigenous **PHWR evolution: 220/540/700 MWe**—standardization improves safety, learning rates, and cost control (e.g., Kakrapar 700 MWe units).
- **International Breakthrough:** Post-1998 nuclear tests, India gained a **waiver from Nuclear Suppliers Group (NSG)** and resumed international cooperation.
- **International builds: Kudankulam (VVER-1000)** is the major active foreign-technology project; **other foreign projects** (e.g., Jaitapur/Westinghouse) remain pending.
- **Revival of Joint Ventures (JVs)**
  - **NPCIL–NTPC JV** for 4x700 MW reactors at **Mahi Banswara**, Rajasthan revived in 2024.
  - New JV being planned with **Rural Electrification Corporation (REC)**.

India's Three-Stage Programme (Science Backbone)

- **Stage-I (PHWR, natural uranium)** → produces Pu-239 in spent fuel.
- **Stage-II (Fast Breeder Reactors, MOX fuel)** → breeds more fissile material; thorium blankets can generate U-233. **Stage-III (Thorium cycle, AHWR)** → uses Th-232 → U-233; key challenges: Pa-233 management and thorium fuel fabrication. **Why heavy water?** Superior neutron economy enables natural-uranium operation without enrichment.

Major Challenges Facing India's Nuclear Sector

- **Legislative and Regulatory Hurdles: Atomic Energy Act, 1962** restricts private/foreign participation.
  - **CLNDA, 2010** imposes supplier liability, discouraging international reactor suppliers.
  - **Tariff disputes** and lack of clear regulatory jurisdiction (CERC vs NPCIL).
  - Safety regulation rests with **AERB** under executive authority; a **statutory, independent regulator** (NSRA) is yet to be established.
- **LCOE is finance- and schedule-sensitive:** high capex, long build times, and cost of capital dominate; without standardization and de-risked financing, nuclear can be 2–3× coal/solar on a delivered-kWh basis.
  - Lack of **green financing eligibility** and **renewable energy classification**.
  - Inadequate provision of **Viability Gap Funding (VGF)** and long-term **PPAs**.
- **Technological & Infrastructural Delays: Slow progress in reactor construction**, especially with international partners (U.S. and France).
  - Limited **indigenous supply chain** capacity.
  - Long **construction timelines** (7–10 years for a new unit).
  - Back-end fuel-cycle gap: **HLW is vitrified**, but a **deep geological repository** is pending.
  - Public acceptance hinges on **severe-accident management** (hydrogen control, filtered venting/core-catchers where applicable) and transparent emergency planning.
- **Limited Private and Foreign Participation:** Private sector (e.g., Tata, Adani, Reliance) cannot enter due to legislative restrictions.
  - FDI in nuclear energy remains closed.

Solutions and Recommendations

- **Legislative Reforms:**
  - Amend the **Atomic Energy Act, 1962** to:
    - Allow **private sector participation**. Enable **fleet-standardized EPC** consortia with tightly defined risk-sharing; retain **sovereign control of the nuclear fuel cycle**.
    - Enable **foreign partnerships** under regulated frameworks.
    - Clarify **CLNDA risk allocation** (supplier indemnity + insurance pool) to unlock advanced imports while preserving victim protection. Revise the **CLNDA, 2010** to limit supplier liability and improve confidence among foreign vendors.
- **Institutional Reforms:**
  - Enact a **statutory, independent regulator (NSRA)** with PRA-driven oversight, safety culture audits, and transparent public reporting.
  - Clarify the **tariff jurisdiction** between NPCIL, CERC, and the Supreme Court.
- **Financial Incentives:**
  - Classify nuclear as **eligible under green taxonomy/green bonds**; adopt **Regulated Asset Base (RAB)** or equivalent models to lower WACC; expand **VGF** tied to on-time delivery milestones; secure **long-term PPAs.**
  - Offer **Viability Gap Funding (VGF)** for large nuclear projects.
  - Facilitate **long-term power purchase agreements** (PPAs).
  - Permit **up to 49% FDI** with Indian ownership/control.
- **Strategic Focus Areas:** Standardise **PHWR designs** and build **Bharat SMRs** to replace old coal plants.
  - Expand **NPCIL's 700 MW PHWR program** with fast-track land and license approvals.
  - Accelerate stalled negotiations with **France (Jaitapur)** and **U.S. (Westinghouse)**.
  - Leverage **NSG waiver** and **IAEA safeguards** for diversified fuel and designs;
  - Continue **ITER** participation as a fusion hedge
  - Scale **700 MWe PHWR fleet** via repeat builds and modularization to compress schedules.
  - Commission **PFBR-500** and accelerate the **Stage-II → Stage-III** thorium pathway (**AHWR** demonstration).
  - Develop an **SMR line** (iPWR near-term; HTGR/MSR for industrial heat later) with **factory fabrication** and underground siting options.
  - Integrate nuclear with **high-RE grids** for inertia, frequency support, and **load-following windows** to minimize storage overbuild.

Conclusion

Nuclear power, India's only scalable firm low-carbon source, with a PHWR→FBR→Thorium pathway, can reach 100 GW by 2047 via standardized 700 MWe PHWR fleets, PFBR and AHWR progress, rigorous safety, closed-cycle waste, RAB/green-bond financing, clarified liability, and a statutory regulator, as backbone.

A Roadmap For Strengthening State S&T Councils' Report by NITI Aayog

Context

Recently a report titled "A Roadmap For Strengthening State S&T Councils" was released by Niti Aayog. This roadmap operationalizes State S&T Councils (SSTCs) as execution hubs for state innovation missions, with measurable outcomes and annual public dashboards.

What are State Science & Technology Councils (SSTCs)?

- They are **autonomous bodies** established by Indian states and Union Territories to promote, coordinate, and implement science, technology, and innovation (STI) policies at the state level.
- **Genesis:** Initiated in **1971** under the leadership of **Bharat Ratna C. Subramaniam**.
- **Support:** Supported mainly by the **Department of Science and Technology (DST)**, Government of India, **under the State Science and Technology Programme (SSTP)**, along with variable support from respective state governments.
- **Comprises of:**
  - **Governing Council:** The top decision-making body that sets policies and strategic direction for the State S&T Council.
  - **Executive Committee:** The operational body that implements the Council's policies and oversees day-to-day functioning.
- **Key Functions:**
  - SSTCs will act as **mission managers** for state-priority sectors—agri-tech, renewable energy, disaster resilience, biotech—owning pilots, scale-up, and tech transfer.
  - Develop and promote science-based solutions for local resource management and environmental issues.
  - Enhance scientific awareness and attitudes among all sections of society.
  - Foster scientific research, technology adoption, and capacity building within the state.
  - Each Council will publish an **Annual Work Programme (AWP)** with targets, budgets, and mid-year corrections approved by the Governing Council and executed by the Executive Committee

Challenges Associated with State S&T Councils

- **Weak Governance Structure & Delays:** Irregular meetings and absence of scientific leadership delay decisions, causing slow, fragmented policy execution and missed opportunities.
- **Inadequate Financial Resources:** Heavy reliance on central grants, delayed disbursals, and underutilization of funds limit councils' capacity and expansion.
- **Skilled Manpower Shortage:** Vacant scientific positions and lack of training reduce research output and limit the scale and quality of council activities.
- **Digital capacity is limited**: few councils maintain real-time project dashboards or documented data pipelines, reducing transparency and replication.
- **Poor Institutional Linkages:** Weak collaboration with central and global institutions prevents knowledge exchange and the practical application of research.
- **Lack of Industry Engagement:** Minimal industry connections and no tech-transfer centers hinder commercialization and resource mobilization. Absence of **innovation-friendly procurement** and **challenge grant** mechanisms hampers market pull for research outputs.
- **Regulatory & Administrative Bottlenecks:** Bureaucratic rules, no standard framework, and unclear roles slow down expenditure and effective functioning.

Recommendation by Niti Aayog to Strengthen SSTCs

- **Structural Reforms in Governance:**
  - **Governing Council:** Expand to include state, central, industry, and academic experts for diverse perspectives; meet at least once a year for informed, strategic decisions. Approve the **Annual Work Programme** with KPI targets; publish minutes and decisions on a public dashboard within 30 days.

  - **Executive Committee:** Led by a full-time scientific director; include external S&T experts and government officers; ensure performance-driven, accountable leadership. Establish a **Programme Management Unit (PMU)** with M&E specialists and data engineers to run dashboards, audits, and knowledge repositories
- **Financial Support and Resources:**
  - States will ring-fence 0.5% of GSDP for R&D via a dedicated SSTC Innovation Fund; disbursement will be performance-linked using tiered grants (seed/pilot/scale) and milestone-based tranches.
  - Shift DST support to project-based grants; expand funding sources;
  - Foster industry and university linkages; introduce performance-based grants.
- **Human Resources:** Maintain 70:30 scientific to non-scientific staff; fill all core positions; offer career progression; hire for projects; second faculty and retired experts for expertise and collaboration.
- **State-Focused Role & Sub-Structures:** Identify state-specific S&T needs; establish cells for patents, technology transfer, incubation, etc.; build databases; lead SSR/CSR efforts; connect with similar structures statewide.
- **Redefining Programs and Activities:** Prioritize state-relevant R&D; institute annual awards, fellowships, and travel grants; organize state STI conclaves; expand science popularization; standardize science centers; map resources; promote collaborations.
- **Collaboration and Linkages:** Forge ties with central agencies, industries, PSUs, R&D institutions, and universities to pool resources, enhance knowledge, and accelerate coordinated STI growth in the state.

Conclusion

Implementing the roadmap will transform State S&T Councils into mission managers, catalysing innovation: faster lab-to-market transfers, scaled grassroots solutions, stronger industry–academia linkages, data-driven governance, and inclusive growth—boosting productivity, climate resilience, public-service delivery and high-skill jobs while reducing regional R&D disparities.

TOPICS FOR PRELIMS

Ham Radio

Context

Indian astronaut **Shubhanshu Shukla** recently connected with students across the country via **ham radio communication** from the **International Space Station (ISS).**

About Ham Radio

- **Ham radio**, also known as **amateur radio**, is a licensed communication service that uses **radio waves** to connect people.
- It is commonly used for **educational learning**, **technical experimentation**, and **emergency communication (SOS)**.
- Communication is established using a **dedicated frequency**, a **transceiver**, and an **antenna** by trained and **licensed operators**.
- It enables communication that can be **local**, **global**, or even **space-based** (e.g., with astronauts on the ISS).
- In **India**, any person **above 12 years** of age can apply for a ham radio license.
- Licensing authority is **WPC (Wireless Planning & Coordination Wing), DoT**
- Despite modern communication technologies, ham radio remains a stable and independent medium of communication. Its reliability makes it a crucial backup system during disasters when regular networks fail.
- Serves as a crucial **alternative communication system**, especially during **disasters** when regular networks fail. Played a vital role in India during several emergencies:
  - **Bhuj Earthquake (2001)**
  - **Indian Ocean Tsunami (2004)**
  - **Uttarakhand Floods (2013)**
- And other **natural or man-made calamities**.

Nipah Virus

Context

Nipah virus has **resurfaced in Kerala, with two new cases** reported in Malappuram and Palakkad districts.

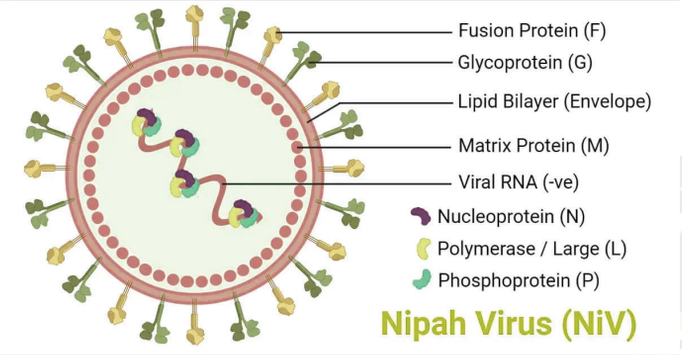
What is Nipah Virus (NiV)?

- Nipah virus is a **zoonotic virus**, meaning it spreads from **animals to humans (**Human-to-human transmission is also possible**).**
- NiV is a **WHO priority pathogen**; strengthening **One-Health surveillance**, **BSL-3/4 lab networks**, and **hospital IPC** is central to outbreak containment
- It belongs to the **Paramyxoviridae family**, under the **Henipavirus genus**.
- Transmission occurs through **direct contact** with infected **bats, pigs**, or **contaminated food**.
  - **Primary reservoir: Pteropus fruit bats**. Known spillovers include **pig-mediated transmission** (Malaysia), **contaminated raw date-palm sap** (Bangladesh), and **nosocomial human-to-human** spread.

- Symptoms often start like the **common flu** and may lead to **severe respiratory and neurological issues**.
- No vaccine currently exists (**Ribavirin** may reduce mortality in encephalitis cases).

Structure of the Virus

- **Negative-sense, single-stranded RNA virus** with an **enclosed structure**.
- Key structural proteins: **N, P, M, F, G, and L**.
- Protected by a **matrix protein** with **glycoproteins and fusion proteins** for cell entry.
- Cytoplasmic structures are often found near the **endoplasmic reticulum**.



Origin and Spread

- First identified in **Malaysia (1999)** among pig farmers.
- Reported in other countries like **Thailand, Cambodia, and Ghana**.
- In India:
  - First outbreak in **Siliguri, West Bengal (2001)**.
  - Repeated outbreaks in **2007, 2018, 2023**, and now again in **2025 (Kerala)**.
  - The 2001 outbreak indicated possible **human-to-human transmission**.

Testing Methods

- **RT-PCR** (Real-Time Polymerase Chain Reaction)
- **ELISA** (Enzyme-Linked Immunosorbent Assay)
- **IHC** (Immunohistochemistry)
- **SNT** (Serum Neutralisation Test)

Symptoms

- Early signs: **Fever, headache, sore throat, muscle pain, nausea**.
- Progression: **Dizziness, drowsiness**, and symptoms of **acute encephalitis**.
- Severe cases: May lead to **seizures, coma**, and even **death** within 24–48 hours. case-fatality is high (often 40–75%)
- Can range from **mild illness** to **fatal brain inflammation**.

Current Trends and Outbreak Patterns

- **Seasonal and regional outbreaks**, particularly in **South and Southeast Asia**.
- Evolution from **bat-to-pig-to-human** to **direct bat-to-human and human-to-human** transmission.
- **Kerala** has seen **multiple outbreaks**, including deadly ones in **2018** (17 deaths) and **2023**.

Solar photovoltaic (PV) cells

Context

India's PV supply chain remains import-dependent (wafers/cells): **PV cell imports from China rose ~141% (specify period & source)**, underscoring the need for domestic manufacturing alongside rapid deployment.

Infrastructural and Climatic Constraints on PV Systems in Tropical & Low-Income Regions

Infrastructural Constraints:

- **Unreliable Grid:** Weak electricity grids can't always absorb or distribute generated solar power efficiently.
- **High Initial Costs:** Although PV module prices have fallen, the cost of supporting infrastructure (mounts, wiring, inverters, installation) remains high.
- **Maintenance:** Lack of trained technicians for installation, cleaning, and repairs.
- **Storage Limitations:** Battery storage for nighttime or cloudy days adds cost and complexity.
- **Climatic Constraints:**
- **High Temperatures:** PV modules operate less efficiently at high temperatures (common in tropics).
- **Air Pollution & Dust:** Pollution and dust reduce sunlight reaching the panels, lowering output (annual losses of 2–11% due to pollution, 3–4% due to soiling).
- **Humidity & Rainfall:** High humidity may affect module durability, and excessive rainfall can cause damage or disrupt connections.
- **Sunlight Variability:** Tropical regions may have intense, but also variable, solar insolation due to cloud cover or monsoons.

What are Solar Photovoltaic (PV) Cells and How Are They Used in Solar Panels?

- PV cells are semiconductor devices (usually made of silicon) that convert sunlight directly into electricity via the photovoltaic effect.
- **Working Principle:** When sunlight (photons) strikes the PV cell, it excites electrons, creating an electric current if the photon energy exceeds the material's band gap.
- Cell Construction: A typical silicon PV cell contains p-type and n-type semiconductor layers forming a p-n junction, which produces electric potential when illuminated.
- **Panel Assembly:** Multiple PV cells are interconnected and encapsulated to form a **solar panel/module**. Several panels can be connected to make an array for higher electricity generation.
- **Use in Panels:** Solar panels are installed on rooftops or open fields to capture sunlight and supply electricity for homes, businesses, or the grid.

- **Performance in the field:** capacity factors vary by site/tilt; expect **annual degradation ~0.3–0.8%/yr**; watch for **LID/PID** and ensure **IEC testing**, proper **earthing**, and **string-level monitoring**.
- **O&M:** cleaning regimes, **iv-curve/thermal scans**, and **inverter uptime** drive actual yield.

What is the Urban Heat Island Effect & How Might PV Installations Contribute?

- PV modules absorb sunlight and convert only a part into electricity; the remainder is released as heat.
- **Rooftop PV** often **reduces roof temperatures** via shading and cuts AC loads;
- **Dense ground-mounted arrays** can warm near-surface air under calm, arid conditions, exacerbating the heat island effect in densely populated urban settings. Need to plan **setbacks, vegetation, and ventilation corridors** to mitigate

New Technology in Solar PV

- **Mono-PERC:** Delivers higher module efficiency and lower LCOE with mature supply chains and predictable long-term performance.
- **TOPCon:** Provides higher field efficiency than PERC, better heat tolerance, and longer lifetime yield, strengthening project bankability.
- **HJT:** Improves energy yield via excellent hot-climate behavior and bifacial response, reducing losses and boosting annual production.
- **Perovskites & Si-perovskite tandems:** Promise step-change efficiencies and lighter modules, potentially cutting BOS costs once durability and scale mature.
- **Bifacial + trackers:** Raise specific yield 5–20% through rear-gain and sun-tracking, improving project IRR where albedo and wind are managed.

End of Life/Sustainability

- **Recycling/E-waste:** plan for **glass,Al frames,Ag, Si** recovery; align with evolving rules to prevent landfill accumulation.
- **Land/agrivoltaics:** prefer **rooftop/canal-top/BIPV** in cities; consider **agrivoltaics** to co-optimize land, crop shade, and irrigation.

Major Solar Adoption Initiatives

Scheme / Mechanism	Focus Area	Incentives/Target
Surya Ghar: Muft Bijli Yojana	Rooftop residential solar	↑1 Cr homes, 300 units/month, ₹78 k subsidy
PM-KUSUM Scheme (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan)	Agricultural solar	Up to 60% subsidy; pumps + solar plants
National Solar Mission	Utility + rooftop solar	100 GW target: 40 GW rooftop, 60 GW utility
PLI, ALMM List, Customs duty	**Domestic Manufacturing Post**	**PLI** for high-efficiency modules (ingot-to-module), **ALMM** quality list, **BCD** on imported modules/cells aim to localize value-chains while deployment scales.

Vera C Rubin Observatory

Context

The **Vera C. Rubin Observatory in Chile has unveiled its first test images**, highlighting its capability to revolutionize astronomy by capturing millions of celestial events, tracking asteroids, and detecting dark matter signals each night.

Vera C. Rubin Observatory

- A cutting-edge astronomical observatory located on **Cerro Pachón mountain**, in the **Chilean Andes** at an elevation of **8,684 ft**.
- Aims to create the **most detailed dynamic map of the universe**.
- Jointly funded by the **U.S. Department of Energy (DOE)** and the **National Science Foundation (NSF)**.
- **Main Objectives**
- **Map the entire southern sky** every 3 days for 10 years.
- Create a **dynamic record of the universe** to monitor cosmic changes.
- **Track near-Earth objects (NEOs)** and identify potential asteroid threats.
- Conduct high-precision studies on **dark matter** and **dark energy**.
- Provide **open-access data** to researchers and the global public.

Key Features

- **Wide Field of View**
  - Captures an area equal to **40 full Moons** in a single image.
  - Offers broader sky coverage than **Hubble** and **James Webb** telescopes.
- **World's Largest Digital Camera**
  - **3,200 Megapixel resolution**.
  - **Weighs 2,800 kg** (size of a small car).

  - Detects objects **100 million times dimmer** than visible light.
  - Uses **six spectral filters** (UV to infrared) for comprehensive analysis.
- **Rapid Movement & Imaging**
  - Telescope slews between targets in just **5 seconds**.
  - Capable of taking **1,000 images per night**.
  - Completes full-sky scans in **72 hours**.
- **Automated Detection Software**
  - Generates up to **10 million alerts per night** by comparing image data.
  - Detected **2,100+ new asteroids in just 10 hours** during testing.
- **Massive Data Output**
  - Produces **20 terabytes of data per day**.
  - Over the next decade, expected to detect and catalogue:
    - **5 million+ asteroids**
    - **100,000+ NEOs**

Scientific Significance

- **Dark Matter & Cosmic Structure: Builds detailed 3D maps of the universe to study gravitational effects and galaxy distribution.**
- **Planetary Defence: Enhances early detection of NEOs, improving Earth's asteroid defense systems.**
- **Astrophysical Discoveries**
  - Supports breakthroughs in understanding:
    - **Galaxy formation**
    - **Cosmic evolution**
    - **Universe's expansion theories**

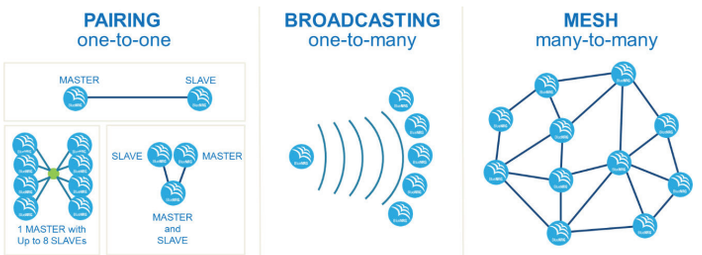
Bluetooth Mesh Networking

Context

Twitter co-founder **Jack Dorsey** has introduced **Bitchat**, a beta-stage messaging app that uses **Bluetooth mesh technology**.

Bluetooth Mesh Networking

- **What is Bluetooth Mesh?**
  - A **many-to-many (m:m)** wireless communication protocol based on **Bluetooth Low Energy (BLE)**.
  - Designed for **large-scale device networks**, such as in **smart buildings**, **industrial automation**, and **IoT ecosystems**.



- **How It Works**
  - Uses a **flooding message system**, where messages are relayed across nodes until they reach their destination.
  - Devices/nodes in the mesh can **send, receive, and relay** messages, ensuring robust connectivity.
- **Key Features**
  - **Scalability**: Supports **thousands of nodes** in a single network.
  - **Reliability**: Message redundancy and multi-path routing make it resilient.
  - **Security**: End-to-end encryption and authentication at the device and network level.
  - **Low Power Consumption**: Built on **BLE**, ensuring energy efficiency.
- **Advantages over Traditional Bluetooth**
  - Traditional Bluetooth is **point-to-point** or **star topology**.
  - Mesh allows for **extended range**, **no single point of failure**, and **better coverage**.
- **Applications**
  - **Smart lighting systems**
  - **Asset tracking**
  - **Environmental monitoring**
  - **Building automation**
  - **Industrial IoT**
- **Standardization**
  - Developed by the **Bluetooth Special Interest Group (SIG)**.
  - Fully compliant with **Bluetooth 4.0 and above**.

Polycyclic aromatic hydrocarbons (PAHs)

Context

Recent research shows that certain PAHs (like the indenyl cation, $C_9H_7^+$) can cool down very quickly after absorbing high-energy light, preventing them from breaking apart. This helps explain why so many PAHs survive in space.

What are PAHs (Polycyclic Aromatic Hydrocarbons)?

- They are molecules made entirely of carbon and hydrogen.
- They have a special structure: their atoms form multiple interconnected rings, like a honeycomb or chain of hexagons.
- **Key Facts About PAHs:**
  - **Found Everywhere:** PAHs are found on Earth (for example, in smoke from fires, grilled food, and fossil fuels), but they're also common in space. Astronomers estimate that PAHs make up about **one-fifth of all carbon in interstellar space**.
  - **Possible Origins of Life:** Some scientists believe that PAHs arrived on Earth via meteors, possibly helping create the first building blocks of life. Their ability to survive harsh space environments adds to this theory.

- **Interstellar Survivors:** In places like the **Taurus Molecular Cloud 1 (TMC1)** — a vast, cold region of gas and dust in space — PAHs are found in larger quantities than expected, even though they are exposed to strong starlight that can break molecules apart.
- **Molecular Structure:** PAHs can be "open-shell" or "closed-shell." This describes how their electrons are arranged. Closed-shell PAHs have electrons paired up, which can affect how they handle energy.
- **Why They Matter in Space:** PAHs are important in space chemistry. Their survival and growth help spread carbon — a key ingredient for life — to planets and comets.

3I/Atlas

Context

On July 1, scientists operating the **ATLAS telescope** in Chile announced the discovery of a celestial object named **3I/ATLAS**, which had been under observation since **June 14**.

About 3I/ATLAS

- **3I/ATLAS** is an **interstellar comet**, possibly the **oldest comet ever observed**, potentially older than the solar system by over **3 billion years**.
- It was identified based on its **highly elliptical, hyperbolic orbit** and **high velocity** of **57–68 km/s** relative to the Sun.
- Its path points back to the **constellation Sagittarius**, indicating an origin **outside the solar system**, possibly from the **Milky Way's thick disk**.
- Because of its **hyperbolic orbit**, it will pass through the solar system **once only** and **never return**.

Closest Approaches

- **Closest approach to Earth: ~270 million km**
- **Closest approach to the Sun: ~210 million km**, expected on **October 29–30, 2025**, just inside Mars's orbit.

Physical Characteristics

- 3I/ATLAS is an **active comet**, displaying a **coma** — a cloud of **dust and ice particles** around its nucleus.
- It is expected to form a **tail** as it nears the Sun due to **solar heating**.
- **Photometric studies** show a **reddish color**, with a **spectral slope of ~1.3% per 100 nm**, suggesting the presence of **complex organic molecules or water ice**.
- The **nucleus is estimated** to be **10–30 km wide**, making it **larger** than previous interstellar visitors:
  - **1I/'Oumuamua (2017)**
  - **2I/Borisov (2019)**

Ongoing Research

- Its **composition and rotation period** are currently under **active investigation** using **ground-based telescopes** across the globe.

GLP-1 Drugs

Context

Lotte Bjerre Knudsen won the **Lasker Award** for co-inventing **GLP-1 drugs**, which revolutionized treatment for **diabetes and obesity**.

What are GLP-1 Drugs?

- **GLP-1 (Glucagon-Like Peptide-1)** is a natural hormone (incretin) released after eating.
- Helps **regulate blood sugar, fat metabolism**, and **control appetite**.
- **Clinical benefits (class):** Low hypoglycaemia risk (when not combined with sulfonylurea/insulin), **weight loss**, and **cardiometabolic risk reduction** in several agents.
- **GLP-1 receptor agonists** are synthetic drugs that mimic GLP-1, activating similar responses in the body.
- Mostly administered through **injections**, though **oral forms** are being developed.
- **Popular GLP-1 drugs** include:
  - **Semaglutide** (by Novo Nordisk)
  - **Tirzepatide** (by Eli Lilly)
- Both are now available in **India** and are significantly improving diabetes and obesity treatment.

How Do GLP-1 Drugs Work?

- Stimulate **insulin release** when blood sugar is high.
- Inhibit **glucagon secretion**, lowering liver glucose output.
- **Slow down gastric emptying**, preventing sugar spikes.
- **Suppress appetite**, leading to reduced food intake.
- **Tirzepatide** also mimics **GIP hormone** for a **dual-action effect**.

Genesis and Development

- **Incretins** were first mentioned in **1906**, but gained attention post-**insulin discovery in 1921**.
- **GLP-1 hormone** was isolated in **1986**.
- Early research in the **1990s** showed potential, but the hormone was **unstable**.
- **Novo Nordisk** developed:
  - **Liraglutide** (daily injectable)
  - **Semaglutide** (weekly dose), offering better **weight loss** and **fewer side effects** with dose control.

Denmark Proposed Bill Against Deepfake

Context

Denmark has introduced a **bill to amend its copyright law** to combat the **rising threat of deepfakes**.

About the Bill

- **Purpose**: To curb the misuse of deepfake technology by giving individuals copyright-like control over their **facial features, voice, and appearance**.
- **Approach**: Introduces **consent-based protection**, making it illegal to share deepfake content without the individual's permission.
- **Provisions:**
  - Bars public sharing of **realistic digital recreations** of a person's **face, voice, or physical traits**.
  - **Covers non-verbal and improvised artistic performances** that may not qualify under traditional copyright rules.
  - Applies not only to celebrities but **extends rights to every individual**, even **50 years after their death**.
  - Targets **digital mimicry** of artists such as **musicians, actors, and performers**.

Indian Context

- No specific law against deepfakes in India.
- Courts rely on **privacy**, **defamation**, and **publicity rights**.
- Delhi High Court granted protection to celebrities like **Amitabh Bachchan (2022)** and **Anil Kapoor (2023)**.
- However, such protections are **not extended to common citizens** — unlike Denmark's proposed approach.

Anusandhan National Research Foundation (ANRF)

Context

The **Anusandhan National Research Foundation (ANRF)** has launched the **Prime Minister Professorships** to boost research in State universities by offering a **₹30 lakh annual fellowship**, also allowing participation from overseas scientists and retired experts.

About ANRF (Anusandhan National Research Foundation)

- **Formation:** In 2023 (**Statutory** Body under ANRF Act 2023)
- **Organisational Structure:**
  - **Governing Board**
    - **Chairman:** Prime Minister
    - **Vice Chairperson:** Union Minister of Science and Technology and the Union Minister of Education are the ex-officio vice-presidents.
    - **Members:** 15–25 distinguished researchers and professionals.
  - **Executive Council**
    - **Chairman:** Principal Scientific Adviser
    - **Members:** include the secretaries of various central government departments
- **Budget:**
  - ANRF is working with a budget of Rs 50,000 crore over five years.
  - Government Contribution: Rs. 14000 Cr.
  - Mobilisation through Private Sources: Rs. 36000 Cr.
- **Functions:**
  - To encourage research and development (R&D) and innovation in India's universities, colleges, research institutions, and R&D laboratories.
  - Collaborating with industry, academia, and government
  - Develop a regulatory framework to encourage collaboration and increase industry spending on R&D.
  - Preparing a research and development roadmap for short, medium, and long-term research and development.
- **Other Major Initiatives by ANRF:**
  - **Prime Minister Early Career Research Grant (PMECRG)**: It offers early-career researchers up to ₹60 lakh over three years, with flexible funding, overheads, and international travel allowed).
  - **Mission for Advancement in High-Impact Areas -Electric Vehicle (MAHA- EV) Mission:** It is focused on building domestic capabilities in key EV technologies such as Battery Cells, Power Electronics, Machines and Drives (PEMD) and Charging Infrastructure.

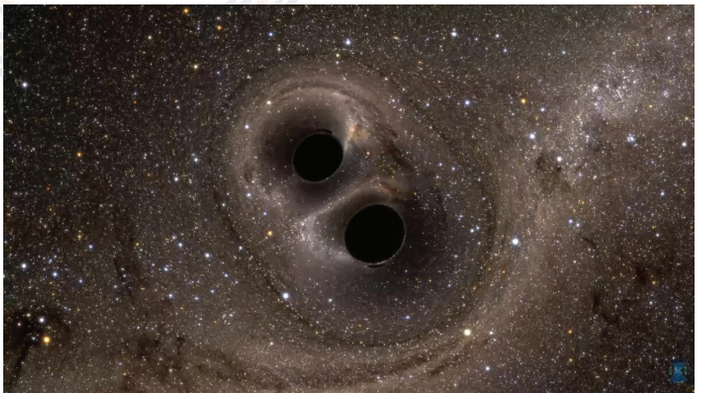
Blackhole Merger

Context

The **LIGO-Virgo-KAGRA (LVK)** network reported an unusually massive black-hole merger event.

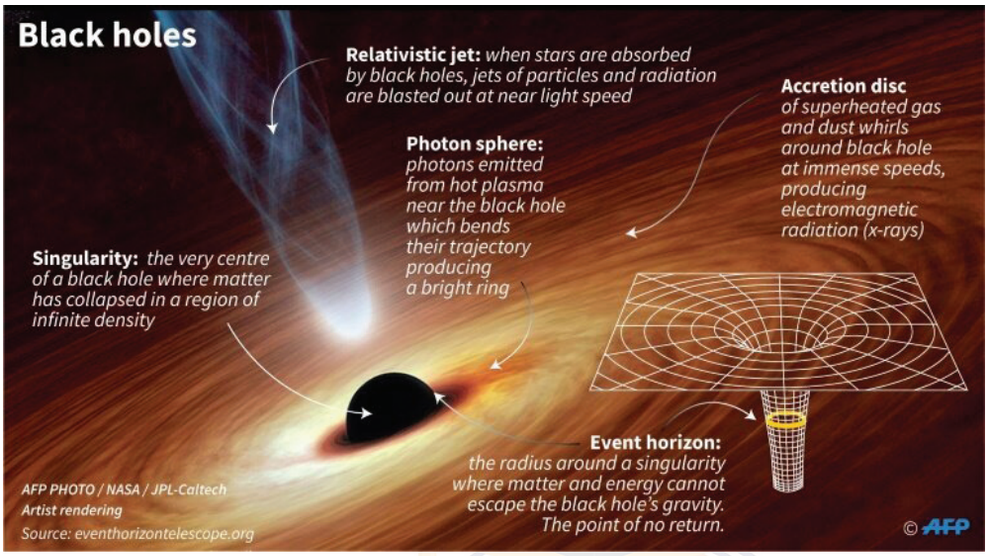
About Black Hole Merger

- **Definition**: A **black hole merger** occurs when two black holes—extremely dense objects with immense gravity—spiral towards each other and eventually combine into a single, larger black hole.



- **Process**:
  - As black holes orbit each other, they emit **gravitational waves** (ripples in spacetime).
  - This emission causes them to **lose energy**, bringing them closer.
  - Eventually, they **collide and merge**, releasing a burst of gravitational waves.

- **Recent Discovery (GW231123)**:
  - Detected on **November 23, 2023**
  - Involved two massive black holes:
    - One ~137 times the Sun's mass
    - One ~103 times the Sun's mass
  - The result was an **even larger black hole**.
- **Significance**:
  - This event was **unusual** due to the large size of the original black holes, which are typically rare in this mass range.
  - Shows that **massive black holes can form by merging smaller ones**, not just from dying stars.



About Blackholes

- **Definition:** Regions where gravity is so intense that light cannot escape; boundary is the **event horizon** (Schwarzschild radius rs=2GM/c2r_s = 2GM/c^2rs=2GM/c2).
- **Types: Stellar-mass**, **Intermediate-mass** (evidence growing), and **Supermassive** at galactic centres.
- **Formation pathways:** Collapse of massive stars; **hierarchical mergers** of black holes; long-term **accretion** of matter.
- **Detection (EM): X-rays/AGN** emissions from hot accretion disks; **stellar orbits** (e.g., **Sagittarius A***).
- **Detection (GW): LIGO–Virgo** observe inspiral–merger–ringdown; **LIGO-India** will enhance detections and localization.
- **Imaging: Event Horizon Telescope** "shadows" of **M87*** and **Sgr A*** provide horizon-scale evidence.

RDI Scheme

Context

The Indian government approved the **Research Development and Innovation (RDI) Scheme** to bolster India's research and innovation ecosystem. It finances **late-stage, high-TRL R&D and commercialization** through loans/equity/FoF, aiming to bridge India's '**valley of death**' between lab success and market scale.

About RDI Scheme

- **Corpus**: ₹1 Lakh Crore
- **Nodal Ministry**: Department of Science and Technology (DST)
- **Objectives:**
  - **Boost Private Sector RDI**: Encourage investments in **sunrise sectors**, strategic technologies, and sectors relevant to **self-reliance** and **economic security**.
  - **Finance High-TRL Projects**: Support R&D projects at higher **Technology Readiness Levels (TRL)**.
  - **Acquire Critical Technologies**: Enable acquisition of **strategic technologies** important for national interests.
  - **Establish Deep-Tech FoF**: Facilitate a **Deep-Tech Fund of Funds** for startups and innovation-led enterprises.
- **Two-tiered system Funding Mechanism:**
  - **Special Purpose Fund (SPF)** under ANRF → custodian of funds.
  - **2nd-Level Fund Managers** → disburse funds via:
    - **Long-term concessional loans**
    - **Equity investments** (esp. for startups)
    - **FoF contributions** (e.g. Deep-Tech FoF)
- **Significance:**
  - Bridges the **funding gap in private R&D**.
  - Promotes **technology-led economic growth**.
  - Aims to make India **globally competitive** in innovation.
  - Accelerates India vision to achieve 500 GW of non-fossil fuel capacity by 2030 and net-zero emissions by 2070.

Global Comparison of R&D Spending (as % of GDP)

- **United States:** Spends approximately **3.5% of its GDP** on Research and Development.
- **China:** Allocates around **2.4% of GDP** to R&D.
- **India:** Spends only about **0.65% to 0.7% of GDP** on R&D.

Chronic Venous Insufficiency

Context

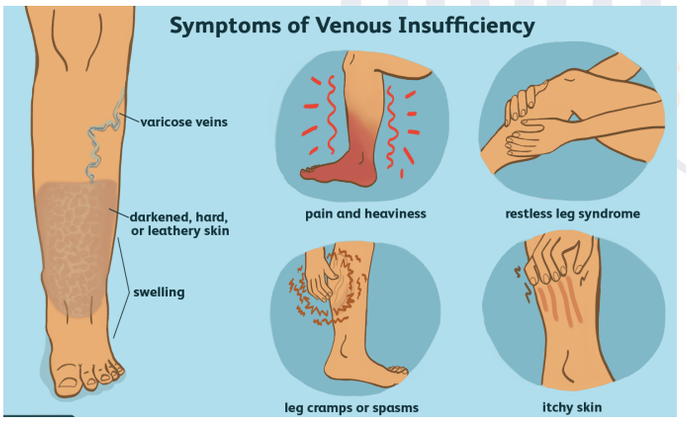
U.S. President Donald Trump was recently diagnosed with **Chronic Venous Insufficiency (CVI)**, a medical condition that affects blood flow in the veins.

What is Chronic Venous Insufficiency (CVI)?

- **CVI** occurs when the **veins in the legs fail to return blood efficiently to the heart**.
- Normally, **valves in the veins** ensure one-way blood flow toward the heart.
- In CVI, **faulty or weakened valves** allow blood to **flow backward and pool** in the legs.
- Though not typically life-threatening, CVI can cause **pain, swelling, leg cramps, skin discoloration, varicose veins, and leg ulcers**.

Who is at Risk?

- Individuals are more likely to develop CVI if they are:
  - **Overweight**
  - **Pregnant**
  - Have a **family history** of venous issues
- The risk also increases in people who have:
  - Suffered **leg injuries**
  - Undergone **leg surgeries**
  - Experienced **blood clots**
- CVI is **common in older adults**, affecting approximately **1 in 20 adults**.



Treatment Options for CVI

- **Lifestyle changes** are the first line of treatment:
  - **Regular physical activity**
  - **Elevating the legs**
  - **Weight control**
- **Medical therapies** include:
  - **Medications** that improve blood flow
  - **Compression therapy**, using tight **stockings or bandages** to support veins
- In severe cases, **surgical procedures** may be considered.

BioEmu AI

Context

A new deep learning model named **BioEmu** can accurately predict the complete range of shapes a protein adopts under natural biological conditions.

BioEmu: A New Breakthrough in Protein Structure Prediction

- **What is BioEmu?**
  - **BioEmu** stands for **Biomolecular Emulator**, a **generative deep learning model** for proteins.
  - It predicts the **entire range of shapes** a protein can adopt under **biological conditions**.
  - Developed by **Microsoft**, **Rice University (USA)**, and **Freie Universität (Germany)**.
- **Key Features**
  - Generates **thousands of protein structure samples per hour** using just a **single GPU**.
  - Works from the **amino acid sequence** of a protein to sample from its **equilibrium distribution**.
  - Enables **high-resolution modeling of protein flexibility** at scale.
- **How it Works**
  - **Faster and cheaper** than traditional **molecular dynamics (MD)** simulations.
  - Captures **large structural changes**, **local unfolding**, and **cryptic pockets**—key to understanding drug docking sites (e.g., in **Ras protein**).
- **Accurately predicts:**
  - **83% of large shape shifts**
  - **70–81% of smaller conformational changes**, including both **open and closed** enzyme forms (like **adenylate kinase**).
- Can handle **disordered proteins** (those lacking a fixed 3D structure) and assess how **mutations affect stability**.
- Can generate **all stable shapes** of a protein in just **minutes to hours**.
- **Limitations**
  - Cannot model:
    - **Cell membranes**
    - **Drug molecules**
    - **Temperature or pH variations**
    - **Prediction reliability** like **AlphaFold**
  - Focused on **protein monomers**, not complex biological environments.

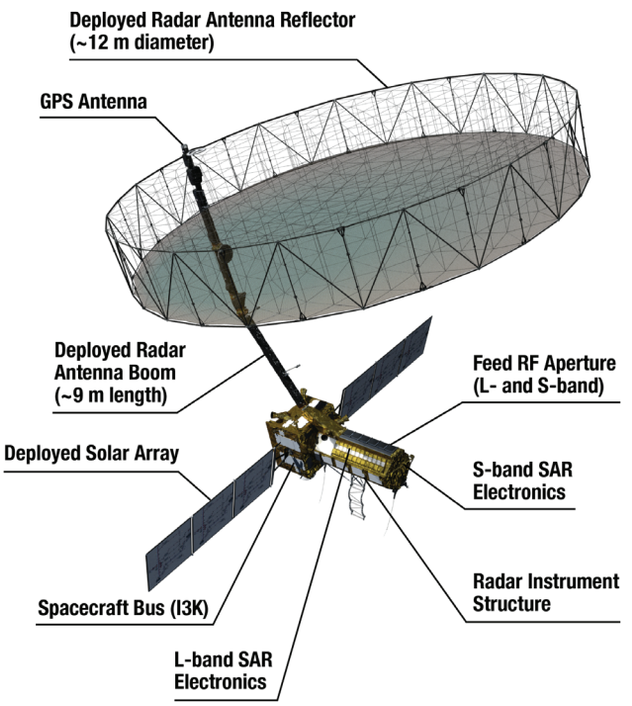
NISAR Satellite

Context

NISAR is set to be launched from Satish Dhawan Space Centre (Sriharikota) on July 30.

NASA-ISRO Synthetic Aperture Radar (NISAR)

- **Development:** It is a satellite jointly developed by NASA and ISRO for Low Earth Orbit (LEO) observation.
- **Size and Weight**: It is an SUV-sized satellite, weighing around 2,800 kilograms.
- **Objective:** To monitor tectonic movements, water bodies, water stress, vegetation cover, snow cover, and more.
  - **Earth Surface Monitoring**: Tracks subtle changes in the Earth's surface.
  - **Volcanic Eruptions:** Spots warning signs of imminent volcanic eruptions.
  - **Groundwater Monitoring**: Helps monitor groundwater supplies.
  - **Ice Sheet Tracking**: Tracks the rate at which ice sheets are melting.
- **Duration**: 3 years.
- **Function:** Can fully cover Earth in 14-15 days.
  - **Imaging Frequency**: Captures images of Earth's land, ice sheets, and sea ice every 12 days.
  - **Surface Movement Detection**: Detects the earth's surface movement as small as 0.4 inches over an area.
- **Features:**
- **Dual Frequency**: Equipped with **L-band and S-band radars**.
  - **NASA Contribution:** L-band radar, GPS, solid-state recorder, and payload data subsystem.
  - **ISRO Contribution:** S-band radar, GSLV launch system, and spacecraft.
- **Antenna Reflector**: Features a large 39-foot fixed antenna reflector to focus radar signals emitted and received by the upward-facing feed on the instrument structure.



Other Missions by ISRO

Chandrayaan-4:

- Conceptual stage, aims to bring back samples from the moon.
- Part of a series of missions leading to a manned lunar landing by 2040.
- Requires a new rocket and innovative methods for sample collection and return.

Spadex (Space Docking Experiment):

- Involves two satellites docking in space.
- Satellites have been built and are undergoing testing.
- Targets a launch by the end of the year.
- Precursor to the ISRO building a space station.

Gaganyaan Mission:

- Helicopter airdrop tests of the crew module are ongoing.
- Preparing for the unmanned mission (G-1) and abort test.
- Four astronauts will be sent to the U.S. for training.
- One astronaut will fly to the International Space Station.

Sukhrayaan Mission:

- Aims to send a probe to Venus.
- Designs and configurations are complete.
- Awaiting government approval.

New Application Areas for Satellites

- **Bharatiya Antariksha Station**: Planned space station with the first module launch targeted by 2028.
- **New Generation Launch Vehicle (NGLV)**: Named Surya, under development.
- **Quantum Key Distribution Satellite**: Aimed at secure communication.
- **Software-Defined Radio Satellite:** A communication satellite in development.
- **Aircraft Monitoring Constellation (ADS)**: A satellite constellation to monitor all aircraft in Indian airspace and assist airport authorities in managing air traffic.

Artemis Accord

Context

Senegal became the 56th nation to sign the accords at NASA Headquarters in Washington.

About Artemis Accords

- **Meaning & Origin**:
  - Named after **Artemis**, the Greek goddess of the Moon.
  - Launched on **October 13, 2020**, by **NASA** and the **U.S. Department of State**.
  - Aims to unite countries with a shared vision for **peaceful civil space exploration**.
- **Legal Foundation**:
  - Builds upon the principles of the **Outer Space Treaty of 1967**.
  - Acts as a **non-binding framework** for cooperation in space activities.

- **Signatory Countries**:
  - Initially signed by 8 countries including **Canada, Italy, Japan, Luxembourg, UAE, UK**.
  - Current have 56 signatories including Senegal.

Core Principles of the Artemis Accords

- **Peaceful use** of outer space.
- **Transparency** in activities and public sharing of scientific data.
- **Interoperability** of systems to improve safety and efficiency.
- **Emergency assistance** to astronauts in distress.
- **Preservation of outer space heritage sites** (e.g., landing sites).
- **Responsible use of space resources** within Outer Space Treaty limits.
- **Safe disposal** of orbital debris to ensure sustainability.

About the Artemis Programme

- Plans include:
  - A **permanent lunar base**.
  - **Spacecraft** to carry humans and cargo.
  - An **orbiting lunar space station** (Gateway).
  - A network of **navigation and communication satellites**.
- The **first crewed Artemis mission to the Moon** is expected by **2026**.
- NASA aims to land the **first woman** and the **first person of colour** on the lunar surface.

India's Participation & Benefits

- **ISRO's gains**:
  - Access to **cutting-edge technology** and **scientific collaborations**.
  - Enhanced **knowledge-sharing** and **technology transfer** through NASA partnerships.
- Upcoming cooperation includes:
  - A **joint mission to the ISS in 2024**.
  - Support for **India's Gaganyaan human spaceflight** programme.
- Positions India to play a **greater role in global space exploration**.

Bio Stimulants

Context

The **Agriculture Ministry** has ordered states to **stop the forced sale of biostimulants** with subsidized fertilizers and tightened scrutiny over their safety, efficacy, and regulation under the FCO following farmer complaints.

About Biostimulants

- **Definition**: Substances or microorganisms applied to plants or soil to **stimulate natural biological processes** and boost plant performance.
- **Primary Function**:
  - Enhance the plant's own **physiological functions**.
  - **Reduce reliance on chemical fertilizers** while improving plant growth and resilience.
- **Key Benefits**:
  - Improve **root development**, **nutrient use efficiency**, and **stress tolerance** (e.g., drought, salinity, heat).
  - Boost **soil microbial activity** and overall plant **health and productivity**.
  - Increase **resistance to abiotic stresses** like extreme temperatures and water scarcity.
  - Enhance **plant quality traits** irrespective of their direct nutrient content.
- **Common Types**:
  - **Humic and fulvic acids**
  - **Seaweed extracts**
  - **Beneficial fungi and bacteria** (e.g., mycorrhizae, rhizobacteria)
- **Regulatory Framework in India**: Biostimulants are regulated under the **Fertiliser (Control) Order, 1985 (FCO)**.

Advantages of Biostimulants

- Improve plant **tolerance to abiotic stress** (drought, heat, frost, salinity).
- Enhance **nutrient uptake and utilization** from soil and applied sources.
- Promote **soil health** by boosting beneficial soil microorganisms.
- Increase **crop quality** through improved plant vigor and health.
- Help in achieving **higher harvestable yields** with reduced chemical input.

Researchers sequence whole genome of ancient Egyptian for the first time

Context: Researchers have successfully sequenced the complete genome of an ancient Egyptian individual who lived between 4,500 and 4,800 years ago.

About Genome

- It is the complete set of genetic material (DNA or RNA) in an organism, containing all hereditary instructions for growth, maintenance, and reproduction.
- **Human Genome**:
  - Composed of **DNA** (deoxyribonucleic acid), including **nuclear** and **mitochondrial DNA**.
  - RNA viruses, in contrast, have **RNA** as their genetic material.
- Determining the **order of nucleotides** (A, T, G, C) in the genome is called **genome sequencing**.

Coding and Non-Coding DNA

Coding vs Non-Coding DNA

Aspect	Coding DNA	Non-Coding DNA
Definition	DNA sequences that **code for proteins**	DNA sequences that **do not code for proteins**
Genome share (Human)	~1–2% of genome	~98–99% of genome
Main Components	**Exons** – retained in mature mRNA and translated into proteins	**Introns** (within genes, removed during splicing), regulatory elements, ncRNAs, telomeres, centromeres, repeats
Exons	Protein-coding parts of genes	Not applicable (exons are always coding)
Introns	Present inside genes but **non-coding** → transcribed but spliced out	Form a large part of non-coding DNA; may have regulatory roles
Function	Provide **blueprint for proteins** → structure, enzymes, hormones, etc.	Regulate gene expression, chromosome stability, RNA processing, evolutionary functions
Examples	Exons of insulin gene, β-globin gene	Promoters & enhancers of p53, telomeric DNA, miRNA, lncRNA, satellite DNA
Significance	Directly determines phenotype by producing proteins	Controls how, when, and how much proteins are made; ensures genome integrity

Where is the Genome Found?

- In **eukaryotes** (humans, animals, plants, fungi):
  - Genomes are mainly located in the **nucleus**.
  - Also present in **mitochondria**.
  - Found in almost every cell **except red blood cells** (no nucleus or mitochondria).
- In **reproductive cells** (sperm and egg):
  - Each contains **half the genome**.
  - Combine during fertilisation to form a full genome.
- In **prokaryotes** (bacteria and archaea):
  - Genome is stored in the **nucleoid**, an area within the cytoplasm (no true nucleus).

Whole Genome Sequencing

- **Whole Genome Sequencing (WGS)** is a laboratory technique to determine the **entire DNA sequence** of an organism's genome in a single process.
- Unlike targeted sequencing (exome, gene panels), WGS captures **both coding (genes)** and **non-coding regions** of DNA.

Methods of WGS

First-Generation Sequencing

- **Sanger Sequencing (1977)** – chain termination method.
  - Accurate but low-throughput → used for Human Genome Project (1990–2003).

Next-Generation Sequencing (NGS) – High Throughput

- Uses **massively parallel sequencing** (millions of fragments at once).
- Platforms: Illumina, Ion Torrent, SOLiD.
- Produces **short reads** (50–300 bp).

Third-Generation Sequencing (TGS) – Single Molecule

- **Nanopore Sequencing (Oxford Nanopore)** and **SMRT (PacBio)**.
- Reads very long sequences (10,000+ bp) directly, even in real time.
- Useful for detecting **structural variations, methylation, epigenetic changes**.

Moondust

Context: According to a study published recently in Life Sciences in Space Research, moondust is less harmful than the particulate matter.

About Moondust

- Moondust is made of fine, **statically charged particles that stick to surfaces**, as experienced by Apollo astronauts.
- Both lunar dust and Earth's urban dust (PM2.5) **can damage lung cells,** especially **alveolar cells** responsible for oxygen exchange.
- Laboratory **moondust simulants** (used as substitutes for lunar soil) have been found to be less toxic to bronchial cells than Earth's PM2.5. However, at very high concentrations, both can cause inflammation and lung damage.

Vitamin D Deficiency

Context: Vitamin D deficiency has reached epidemic proportions in India, due to changing lifestyle patterns and reduced sun exposure

About Vitamin D

Nature: A fat-soluble vitamin, also considered a prohormone because it is synthesized in the skin under sunlight (UV-B rays).

Types:

- **Vitamin D_2 (Ergocalciferol – from plant sources)**
- **Vitamin D_3 (Cholecalciferol – from animal sources and skin synthesis)**

Sources:

- **Natural:** Sunlight (primary), fish liver oil, egg yolk, fortified foods, dairy products.
- **Supplements:** Used widely to combat deficiency.
- Vitamin D synthesis occurs in the **skin from 7-dehydrocholesterol under UV-B radiation** → producing cholecalciferol (Vitamin D_3).

Significance of Vitamin D:

- Supports **calcium absorption** for healthy bones and teeth.
- Strengthens immune system.
- **Improves muscle function** and reduces fall risk.
- **Lowers inflammation** and risk of autoimmune diseases.
- Benefits **heart health**.
- Helps regulate mood and cognitive functions.

Deficiency of Vitamin D Leads to:

- **Rickets:** Soft, weak bones and deformities in children.
- **Osteomalacia:** Bone pain and muscle weakness in adults due to soft bones.
- **Osteoporosis:** Increased risk of bone fractures in older adults.

Zimislecel

Context: In a study published in the New England Journal of Medicine, Zimislecel enabled insulin production and improved blood sugar in 12 Type 1 diabetes patients within one year.

What is Zimislecel?

It is an **experimental therapy** for **Type 1 diabetes** that involves **infusing stem cell-derived islet cells into the liver** to restore the body's natural insulin production.

How It Works?

- **Type 1 diabetes** destroys the body's islet cells (in the pancreas), which produce insulin.
- Zimislecel uses **pluripotent stem cells**, grown in a lab and matured into **functioning insulin-producing islet cells**.
- These cells are then **infused into the hepatic portal vein**, aiming to settle in the liver and **resume insulin production**.

What are Stem Cells?

- Stem cells are unique cells in the body that have two key properties:
  - **Self-renewal:** They can divide and make more copies of themselves over long periods.
  - **Differentiation:** They are unspecialized cells that have the potential to develop into many different types of specialized cells in the body, such as muscle cells, blood cells, brain cells, and more.
- **Types of Stem Cells:**
  - **Embryonic Stem Cells** – Pluripotent; can become any cell type.
  - **Adult Stem Cells** – Limited types; found in tissues like bone marrow.
  - **Induced Pluripotent Stem Cells (iPSCs)** – Adult cells reprogrammed to behave like embryonic stem cells.

India's first tribal genome project

Context: Gujarat launched India's first Tribal Genome Sequencing Project.

About India's Tribal Genome Project

- **Implemented by:** Gujarat Biotechnology Research Centre (GBRC).
- **Objective:** Sequence genomes of 2,000 tribal individuals across 17 districts.
- **Focus:** Detect genetic markers for diseases like sickle cell anaemia, thalassemia, and cancer.

HISTORY, ART & CULTURE

TOPICS FOR PRELIMS

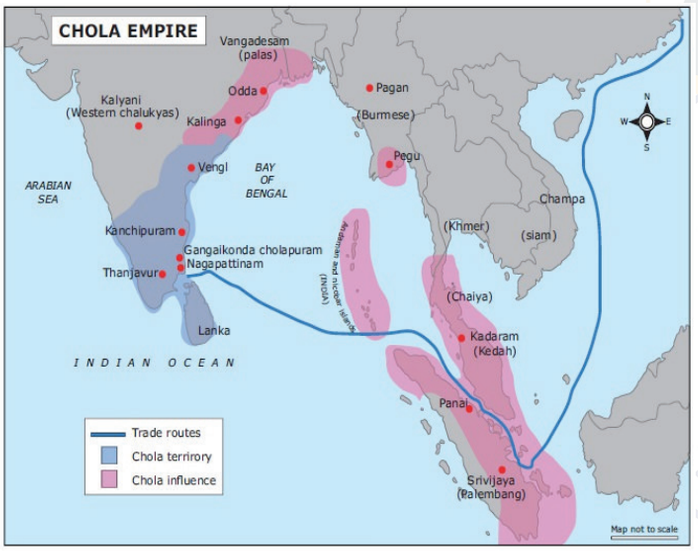
Chola Gangam Lake

Context

Recently the Tamil Nadu government has announced the **development of the historic Chola Gangam lake, dug by Rajendra Chola I**, to honour his birth anniversary.

About Chola Gangam (Ponneri Tank)

- **Chola Gangam, also called Ponneri**, was constructed by **Rajendra Chola I** to commemorate his victorious northern campaign.
- Rajendra built a "liquid pillar of victory" (Ganga-jalamayam Jayastambham) in the form of this tank at his capital.
- Historically, Kollidam River water filled a chain of tanks before reaching Veeranam Lake, with surplus flowing to rivers - showcasing a sophisticated hydrological network.



- Once a stopover for migratory birds en route to Kodiakkarai Bird Sanctuary, its degradation has disrupted bird migration and caused groundwater depletion in the region.

The Chola Dynasty (9th – 13th Century)

- It rose to power in the 9th century after defeating the Pallavas and ruled until the 13th century.
- Cholas were known for a centralized administration, military prowess, and cultural development.
- Renowned for grand temple architecture, including the **Brihadeeswarar Temple built by Rajaraja I in 1010 CE.**

About Rajendra Chola I (1014–1044 CE)

- Extended Chola control over **Sri Lanka**, the **Maldives**, and parts of **Southeast Asia**.
- Famous for his **naval expedition to the Srivijaya Empire (modern Indonesia/Malaysia)** in 1025 CE, demonstrating India's early naval strength.
- **Battle of Maski (1019-1020 CE):** A significant victory over the **Western Chalukya ruler Jayasimha II.**
- **Contributions:**
  - Established a new capital named **Gangaikonda Cholapuram** after his victorious campaign to the **Ganga region**.
  - Built the majestic **Brihadisvara Temple** at Gangaikonda Cholapuram, a **UNESCO World Heritage Site.**

Aadi Thiruvathirai Festival

- The Union Ministry of Culture recently celebrated the birth anniversary of Rajendra Chola I, with the **Aadi Thiruvathirai Festival** in Gangaikonda Cholapuram, Tamil Nadu..
- The **Aadi Thiruvathirai** (also known as **Aadi Pooram** or **Aadi Pirappu** depending on region and context) is a **Tamil Shaivite festival** observed in the **Tamil month of Aadi (July–August)**.
- It celebrates **Lord Shiva in his cosmic dance form-Nataraja**.

Paika Rebellion

Context

Former Odisha CM Naveen Patnaik **condemned the exclusion of the 1817 Paika Rebellion from NCERT's new Class VIII history textbook.**

About Paikas: Odisha's Warrior Farmers

- The **Paikas** were traditional foot soldiers in Odisha, serving the **Gajapati kings** since the 16th century.
- In return for their military service, they were granted **hereditary rent-free lands** called **nish-kar jagirs**.
- British policies eroded these privileges, causing deep **resentment and unrest**.

British Betrayal and Fall of Khurda (1803–1806)

- In **1803**, British forces under **Colonel Harcourt** captured **Puri and Cuttack**.
- A deal was made with **Mukunda Deva II** of Khurda: ₹1 lakh and four **parganas** in exchange for cooperation.
- The British **partially fulfilled** the deal, giving ₹40,000 but **withholding land**.
- **Jayee Rajguru**, royal custodian, led 2,000 Paikas in protest but was arrested and **executed in 1806**.
- The British **dethroned the king**, demolished Barunei Fort, seized lands, and **exiled the king** to Puri.

Causes of Growing Resentment

- **Loss of jagirs** and royal support left Paikas economically vulnerable.
- British **land revenue reforms** displaced Odia landowners, favoring **absentee Bengali landlords**.
- Introduction of **silver rupee taxation** burdened tribals and poor peasants.
- British control over **salt trad**e (since 1814) worsened rural distress, especially in hilly regions.

The Paika Rebellion of 1817

- In **March 1817**, about **400 Kondhs** from Ghumusar joined forces with Paikas.
- Led by **Bakshi Jagabandhu Bidyadhar**, ex-commander of Khurda, the rebels launched an armed uprising.
- The rebellion spread across Odisha but was eventually **crushed by the British**.
- **Jagabandhu evaded capture** for years and **surrendered in 1825** under negotiated terms.

Legacy and Modern Political Significance

- The **Paika Rebellion** is seen as a symbol of **Odia pride and resistance**.
- In **2017**, Odisha demanded it be recognised as **India's first war of independence** (decades before 1857).
- The **Centre did not grant** this recognition, but acknowledged it as a **major early uprising**.
- In 2021, the **Union Culture Minister** confirmed its inclusion in **Class VIII textbooks**.

Sheesh Mahal

Context

The historic **Sheesh Mahal** (Palace of Mirrors) in Delhi has been **restored and reopened to the public** after years of conservation work by the Archaeological Survey of India (ASI).

About Sheesh Mahal

- It was built by **Shah Jahan in memory of Aizzun-Nisha Begum** (also called Akbarabadi Begum), around **1653.**
- It served as a summer retreat and pleasure pavilion for the emperor during his stay in Delhi.
- **It is** known for its intricate use of **mirror work and stucco decoration**.
- **Special Features:** Arched ceilings, ornamental stucco work, and reflective mirror embellishments that illuminated the interior with natural light.
- It's believed to be the site where **Aurangzeb crowned himself emperor** on July 31, 1658.

Nagari Pracharini Sabha

Context

As language debates rise in Maharashtra and Tamil Nadu, the historic Nagari Pracharini Sabha, has quietly resumed its work after decades.

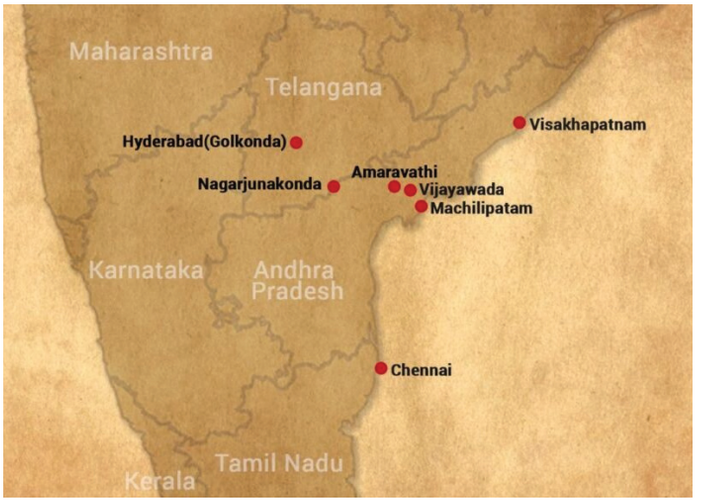
About it

- **It was established** in January 1893 in **Varanasi (Banaras)**.
- **Founders**: Hindi scholars **Shyam Sunder Das**, **Pandit Ramnarayan Mishra**, and **Thakur Shivkumar Singh**.
- **Purpose**:To promote **Hindi in the Devanagari script** and ensure its recognition in official and literary domains.
- **Background:**
  - During the **Mughal period**, **Persian** was the official language.
  - By the **British era**, official language use shifted to **English, Persian, and Urdu**, sidelining Hindi.
  - In **1888**, Maharaja Lakshmeshwar Singh of Darbhanga introduced Hindi as an official language in his region, influenced by the slogan **"Hindi, Hindu, Hindustan."**
- **Major Initiatives:**
  - Advocated for **Hindi as the language of administration and courts**.
  - Took the initiative to create a **standardised Hindi dictionary**.
  - Sent language surveyors across India (from **1908–1929**) to collect regional Hindi words and meanings.
- **Key Publications:** Shabd Sagar, Hindi Sahitya ka Itihaas, **Nagari Pracharini Patrika** (One of the oldest research journals in Hindi), Saraswati Magazine.

Machilipatnam Port

Context

Famous Ancient port, Machlipatnam is undergoing a significant revamp with the construction of a Greenfield port, expected to become operational by the end of 2026



About Machilipatnam (Masulipatnam/Bandar)

- It is a coastal city in Krishna district, Andhra Pradesh, located at the mouth of the River Krishna along the Bay of Bengal.

Prominence in History

- Machlipatnam port flourished during the **Satavahana era** (1st century AD).
- **During the Golconda Sultanate Era** it gained prominence for **muslin and textile exports** to Persia, Europe, and Southeast Asia.
- **European Trading Posts**: **Dutch**, **British**, and **French** established factories here in the 17th century.
- It lost prominence in the 18th century when British colonial focus shifted to Madras (Chennai).

Prasat Preah Vihear Temple

Context

Recently, Thailand and Cambodian engaged in a military conflict along their disputed border near the Khmer Hindu temple and Prasat Ta Muen Thom.

About Preah Vihear Temple

- It is a Hindu temple located in the Dangrek Mountains (Northern Cambodia) dedicated to Lord Shiva.
- It was constructed during the **Khmer Empire,** Initially built by **King Suryavarman I (1002–1050) and later expanded by Suryavarman II (1113–1150).**
- It is recognized as a UNESCO World Heritage Site.

Prasat Ta Muen Thom

- It is a 12th-century ancient Khmer temple originally dedicated to Lord Shiva, later used for Buddhist purposes.
- Part of the **Prasat Ta Muen group**, which includes:
  - **Prasat Ta Muen Thom** (Hindu temple).
  - **Prasat Ta Muen** (Dharma Sala or rest house)
  - **Prasat Ta Muen Tot** (Hospital Shrine)
- **It was constructed** during the reign of Khmer Empire under **King Udayadityavarman II** and later expanded by **King Jayavarman VII** (13th century).

PERSONALITY IN NEWS

Dalai Lama

Context

The 14th Dalai Lama, **Tenzin Gyatso**, has recently turned 90.

About Dalai Lama

- Born in **1935 in Taktser, Tibet**, he was identified as the 14th Dalai Lama at age two.
- Fled to India in **March 1959** after the Chinese invasion and established an exile government in Dharamshala by 1960.
- Tibetan Buddhism uses a **tulku system**, where spiritual leaders reincarnate to continue their work.
- The Dalai Lama embodies **Avalokiteshvara, the Bodhisattva of compassion**.
- The Dalai Lama belongs to the **Gelug school of Tibetan Buddhism (one of the four major schools of Tibetan Buddhism).**
- At around age 90, the Dalai Lama said he'll decide whether **the institution should continue** and, if so, **how the 15th incarnation will be chosen**.
- He intends to leave **written guidelines** for the Gaden Phodrang Trust and other senior monastic authorities.

Succession Controversy Over the Next Dalai Lama

- The Dalai Lama insists that **only Tibetans and their religious institutions** should recognize his successor, with **oversight from the Gaden Phodrang Trust.**
- Beijing claims authority over the reincarnation process, citing historical procedures and enforcing 2007 regulations mandating state oversight.

Gaden Phodrang Trust

- Gaden Phodrang was originally founded in 1518 by the 2nd Dalai Lama as the administrative office for his estate.
- The Trust is dedicated to preserving and upholding the institution of the Dalai Lama and his spiritual work, while advancing his humanitarian vision.

Sarvepalli Radhakrishnan

Context

Recently Andhra Pradesh has launched 'Sarvepalli Radhakrishnan Vidyarthi Mitra Kits' scheme to provide kits to school children.

About Sarvepalli Radhakrishnan (1888-1975)

- He was a renowned Indian Philosopher born on **5 September, 1888**. His birthday is celebrated as **"Teachers Day".**
- He was India's Ambassador to the Soviet Union (1949–1952).
- In 1952, he became **First Vice-President** of India and was later elected President in 1962.
- **Academic Roles:**
  - Professor at Mysore and Calcutta universities.
  - Vice-Chancellor of Andhra University and Banaras Hindu University.
  - Spalding Professor at Oxford University.
- **Major Works:** Indian Philosophy, The Hindu View of Life, Eastern Religions and Western Thought.

Mangal Pandey

Context

The Prime Minister, Shri Narendra Modi paid tribute to **Mangal Pandey on his birth anniversary.**

About Mangal Pandey

- Mangal Pandey is regarded as a **pioneer of India's First War of Independence** in 1857, also called the **Sepoy Mutiny**.
- He is remembered as a **symbol of resistance** against British colonial rule.
- Born on **July 19, 1827**, near **Faizabad** in present-day **Uttar Pradesh**.
- Joined the **British East India Company's army** in **1849**.
- Served as a **sepoy in the 6th Company** of the **34th Bengal Native Infantry** stationed at **Barrackpore**.
- He rebelled against the introduction of **cartridges greased with cow and pig fat**, which violated the **religious beliefs of Hindu and Muslim soldiers**.
- On **March 29, 1857**, he attacked and fired upon his **Senior Sergeant Major**.
- His actions sparked outrage and inspired other soldiers and civilians to **rise in rebellion** across India.
- Mangal Pandey was **arrested, tried in a court-martial**, and **executed by hanging on April 8, 1857** at **Lal Bagan, Barrackpore**.

Bal Gangadhar Tilak

Context

The 169th birth anniversary of Bal Gangadhar Tilak was celebrated recently at Parliament's Central Hall.

About Lokmanya Bal Gangadhar Tilak

- He was a leading **nationalist**, **freedom fighter**, **social reformer**, and **political thinker** of the Indian independence movement.
- Famously declared: **"Swaraj is my birthright, and I shall have it."**
- **Political Contributions & Role in Freedom Movement:**
  - Regarded as a **radical nationalist** and termed by the British as the **"Father of Indian Unrest."**
  - Joined the **Indian National Congress** in **1890**.
  - Co-founded the **All India Home Rule League** (1916–18) with **Annie Besant** and **G.S. Khaparde**.
  - Advocated for **self-rule** and mass political awareness.
  - Played a key role in the **Lucknow Pact (1916)** with **Mohammad Ali Jinnah**, promoting **Hindu-Muslim unity**.
- **Newspapers: "Kesari"** (Marathi) and **"Maratha"** (English) to spread nationalist ideas.
- **Literary Works:** The Arctic Home in the Vedas, Shrimad Bhagavad Gita Rahasya.
- **Lal-Bal-Pal Triumvirate:**
  - Formed a powerful nationalist trio with: **Lala Lajpat Rai & Bipin Chandra Pal**
  - Together, they were known as the **Lal-Bal-Pal** group, instrumental in the **Swadeshi Movement** and **Extremist phase of INC**.

Chandra Shekhar Azad

Context

PM Modi paid tribute to **Chandra Shekhar Azad on his birth anniversary**, praising his courage and legacy.

About Chandrashekhar Azad

- He was born on **July 23, 1906**, in **Bhavra**, Madhya Pradesh.
- He joined **Gandhi's Non-Cooperation Movement** at the age of **15**.
- After arrest during protests, he told the court his name was **"Azad"** (meaning 'Free') - a name he kept for life.
- **Disillusionment with Gandhi**: Became disillusioned after Gandhi **suspended the Non-Cooperation Movement** in 1922 following the **Chauri Chaura incident**.
- Joined the **Hindustan Republican Association (HRA)**, later helping transform it into the **Hindustan Socialist Republican Association (HSRA)** in **1928**.
- Worked closely with **Bhagat Singh** and other revolutionaries to promote armed struggle against British rule.
- **Major Revolutionary Activities**:
  - **Kakori Train Robbery** (1926)
  - **Attempt to blow up Viceroy's train** (1926)
  - **Killing of British officer Saunders** in **Lahore** (1928), to avenge **Lala Lajpat Rai's death**
- **Death**: On **February 27, 1931**, during an encounter in **Alfred Park, Allahabad**, he was surrounded by British police. Refusing to be captured, **he shot himself with his last bullet**.

Savitri Bai Phule

Context

The National Institute of Public Cooperation and Child Development (NIPCCD) has been officially renamed the Savitribai Phule National Institute of Women and Child Development.

About Savitribai Phule

- Born on **January 3, 1831**, in a small village in **Satara district, Maharashtra**.
- She was a pioneering **social reformer, poet**, and **freedom fighter** & became the **first female teacher in India**.
  - In **1852**, the **British government recognized her** as the **best teacher**.
- Along with her husband **Jyotirao Phule** (he **established Satyasodhak Samaj in 1873)**, she opened **India's first girls' school** in **Pune in 1848**.
- She founded **Mahila Seva Mandal (1852)** to raise awareness about **women's rights** and social justice across all castes.
- In **1863**, started **Balhatya Pratibandhak Griha**, India's **first home to prevent female infanticide**, offering shelter to widows and victims of sexual violence.
- **Literary Contributions:** Kavya Phule (1854) & Bavan Kashi Subodh Ratnakar (1892).