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GEOGRAPHY, ENVIRONMENT & DISASTER MANAGEMENT

TOPICS FOR MAINS

Palm Oil in the Crosshairs: Balancing Economy and Ecology

Syllabus Mapping: GS-1- Geography

Context

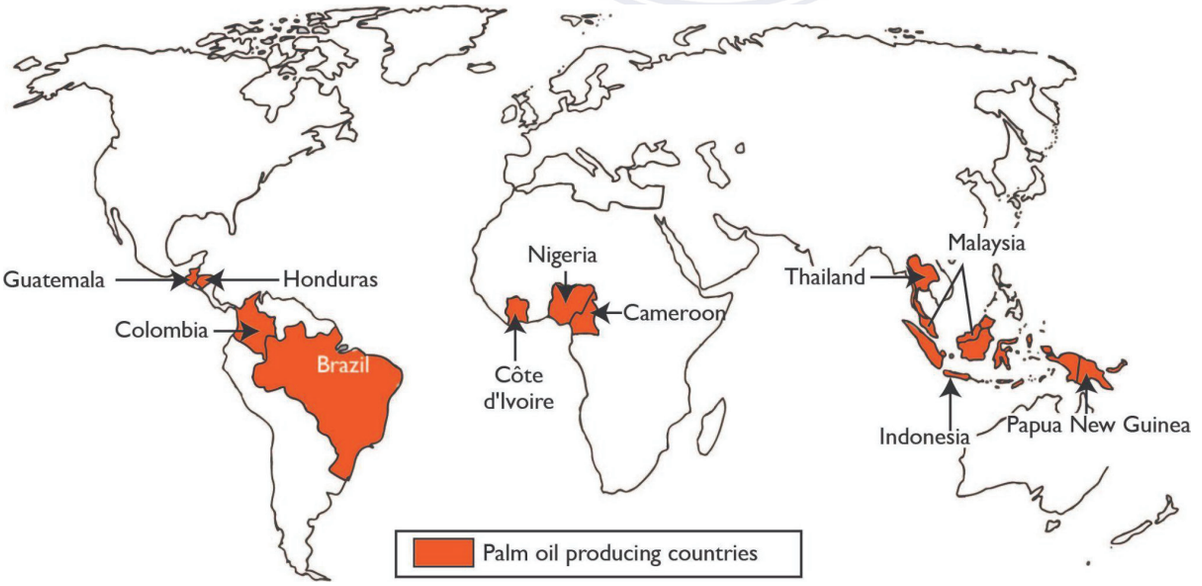
Indonesia's biodiesel push and stagnant production are driving up palm oil prices, impacting global vegetable oil markets and inflation.

About Palm Oil

- Palm oil is derived from the fruit of the oil palm tree (Elaeis guineensis).
- **Conditions Suitable for Plantation:**
  - Climate: Requires a hot and humid tropical climate (temperature between 30°C to 32°C).
  - Rainfall: Annual rainfall of 250 cm to 400 cm.
  - Soil: Deep, well-drained, fertile loamy soil with a pH between 4.0 to 7.0.
  - Altitude: Low altitudes, usually below 500 meters.
  - Sunlight: Requires 5–7 hours of direct sunlight daily for optimal growth.
  - Humidity: High humidity levels (at least 80%).

Distribution and production of palm oil

- **Global**
  - The majority of global palm oil production occurs in the equatorial regions, particularly in Southeast Asia, due to the favourable warm and wet climate.
  - Indonesia and Malaysia are the top producers, collectively accounting for over 85% of the world's production.
  - Other major producers of palm oil include Thailand, Colombia, and Nigeria.
  - In 2024, global palm oil production was estimated at around 77 million metric tons.
  - Global production growth slowed to 1% annually over the past four years due to limited land and ageing plantations.



- **India**
  - India produces about 0.35 million metric tons of palm oil annually.
  - Major Producing States: Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, and Kerala.
  - India is the world's largest importer of palm oil, importing over 9 million metric tons annually, primarily from Indonesia and Malaysia.

India's Push for Self Reliance in palm oil

National Mission on Edible Oils – Oil Palm (NMEO-OP)

- The Government of India launched the National Mission for Edible Oils - Oil Palm (NMEO-OP) in August 2021.
- **Aim:** To reduce India's dependence on edible oil imports.
- **Objective:** To increase edible oil production by expanding the area under oil palm cultivation and improving productivity.
- **Target:** Escalating oil palm cultivation and elevating Crude Palm Oil production to 11.20 lakh tonnes by 2025-26.
- **Funding Pattern:** 80% funded by the central government and 20% by state governments.
- **Focus Regions**: Special emphasis on Northeast India and Andaman & Nicobar Islands.
- **Implementation:** Being implemented in 15 states, including Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, and Tripura.
- **Key Features:**
  - Financial aid for procuring quality planting material.
  - Assistance for intercropping costs during the 4-year gestation period.
  - Financial assistance for the upkeep of plantations.
  - Mechanism to ensure a minimum price to farmers.
  - Financial support for projects that are economically beneficial but financially unviable.

Challenges Associated with Palm Oil Cultivation

- **Environmental Challenges**
  - **Deforestation**: Palm oil cultivation is a major driver of tropical deforestation, especially in Southeast Asia (Indonesia and Malaysia).
    - E.g., Since the 1960s, 60% of Borneo's forests have been lost due to palm oil plantations.
  - **Loss of critical habitat for wildlife**: Large-scale conversion of tropical forests to oil palm plantations has a devastating impact on wildlife.
    - E.g., Forty-three percent of Tesso Nilo National Park in Sumatra has been overrun with illegal palm oil plantings.
  - **Human-Wildlife Conflict:** Habitat destruction forces animals to enter plantations in search of food.
    - Orangutans, elephants, and other animals are often killed or injured by plantation workers trying to protect crops.
  - **Climate Change Contribution**: Deforestation for palm oil contributes 2–4% of annual global greenhouse gas emissions.
    - Peatland clearing for palm oil releases about 438 million tonnes of CO2 annually, equal to the emissions from EU vehicle traffic.
  - **Soil Degradation and Water Scarcity:** Palm oil requires large quantities of fertilizers and pesticides, leading to soil nutrient depletion.
    - It is water-intensive (needs 250–300 litres per plant per day), straining local water resources.
  - **Air pollution:** Burning is a common method for clearing vegetation in natural forests, which releases smoke and carbon dioxide into the atmosphere,
  - **Water pollution:** A palm oil mill generates 2.5 metric tons of effluent for every metric ton of palm oil it produces. Direct release of these effluents leads to water pollution.
- **Economic and Social Challenges**
  - **Complex and Unregulated Supply Chains:** Over 1,500 registered palm oil firms in Indonesia alone create a complex network of producers, processors, and distributors.
    - Major corporations like Nestlé, PepsiCo, and Unilever have No Deforestation, No Peat, and No Exploitation (NDPE) commitments but struggle to enforce them.

    - Illegal operations and weak enforcement undermine sustainability efforts.
  - **Hidden Use in Products:** Palm oil is present in over 200 derivative forms in everyday products (e.g., food, cosmetics, and cleaning supplies).
    - The widespread and disguised presence of palm oil makes consumer awareness and accountability difficult.
  - **Loss of Indigenous Land and Community Rights:** Large-scale plantations shift land control from indigenous communities to corporations.
    - Local communities lose access to traditional lands and resources, impacting their livelihoods and food security.

Palm Oil Cultivation in Northeast India-Learnings from Mizoram

The National Mission on Edible Oils—Oil Palm aims to expand oil palm cultivation in India's north-eastern states and the Andaman and Nicobar Islands. However, this initiative poses significant ecological and cultural risks. The experience in Mizoram since 2004 has been particularly problematic:

- **Unsuitable Terrain:** Over 90% of North Eastern land is hilly, which is unsuitable for palm oil cultivation as per Food and Agriculture Organization (FAO) guidelines.
  - Oil palm plantations are more suitable for plains and foothill areas, not steep and rugged terrains.
- **Water Scarcity:** Oil palm is a water-intensive crop, needing **250–300 litres per plant per day**.
  - The region receives rainfall for only 4 months, leading to water shortages and groundwater depletion.
- **Soil Fertility Loss:** Palm oil cultivation requires large amounts of **chemical fertilizers and pesticides**, which degrade soil quality over time.
  - Mizoram's plantations have already resulted in soil infertility, making crop replacement difficult.
- **Lack of Infrastructure:** Palm oil fruits need to be processed within **48 hours** of harvest.
  - The region lacks adequate transport and milling infrastructure, causing harvested crops to rot and financial losses for farmers.
- **Threat to Food Security:** Traditional jhum cultivation (slash-and-burn) is discouraged, affecting the availability of food crops and medicinal plants.
  - Groundwater depletion and loss of natural forests further threaten food security.
- **Shift in Land Tenure:** Oil palm cultivation transfers land control from local communities to private companies.
  - Gram panchayats and community-based councils lose power over land management, making farmers dependent on companies and vulnerable to exploitation.
- **Loss of Livelihood:** Farmers face financial losses due to crop failure and poor soil health.
  - No sustainable alternative livelihoods have been provided, leaving farmers in economic distress.

Sustainable Practices for Palm Oil Cultivation

- **No Deforestation, No Peat, No Exploitation (NDPE) Policies**: Ensure that palm oil is grown without deforestation, peatland destruction, or exploitation of communities.
- **Use of Degraded Land**: Plantations should be established on degraded or previously cultivated lands rather than primary forests.
- **Water Management:**
  - **Efficient Water Use:** Implement systems to minimize water consumption and collect gray water for reuse.
  - **Protect Water Sources:** Maintain riparian reserves to protect water quality and wildlife habitats.
  - **Waste Utilization:** Reuse palm leaves and cuttings as mulch or compost.
- **Optimized Fertilizer Use:** Employ organic and bio-fertilizers based on soil tests to enhance fertility and reduce chemical dependency.
- **Biodiversity Conservation**
  - **Multi-Cropping**: Intercrop with other plants to enhance biodiversity and provide additional income streams for farmers.
  - **Wildlife Corridors**: Establish corridors within plantations to support local wildlife.
- **Community Engagement:** Obtain consent from local communities before establishing new plantations.
- **Certification and Transparency**: Adhere to Roundtable on Sustainable Palm Oil (RSPO) standards for transparency and accountability.

India's Deep Sea Challenge

Syllabus Mapping: GS-1 Geography, GS-3- Environment

Context

India completed wet testing of the Matsya-6000 submersible. Its launch later this year will place India among the few nations capable of manned deep-sea exploration.

Why Do We Explore the Deep Ocean?

- **Research:** Deep sea explorations are essential for gathering baseline data on the shape of the seafloor, characterizing the diverse habitats of the deep sea, and capturing valuable video and imagery of the life that thrives in these environments.
- **Energy:** Deep-sea exploration has the potential to reveal new sources of energy, including both non-renewable resources like oil and gas, and renewable sources like offshore wind, waves, and ocean currents.
- **Mineral Resources:** Nickel, cobalt, gold, manganese and other metals and rare earth minerals are found on the seafloor, embedded in three types of mineral forms: cobalt-rich crust, polymetallic sulphides and polymetallic nodules.
  - Deep-sea mining taps into vast reserves of essential minerals and rare earth elements, which are critical for modern technologies such as batteries, electronics, and renewable energy systems. According to studies, the global demand for some critical minerals could rise by 400%-600% in the coming decades.
- **Human Health:** Deep-sea exploration is particularly important because it can lead to the discovery of new organisms that hold promise for the development of novel medicines.
- **Ocean Health:** Ocean exploration helps us to monitor and assess the impacts of various stressors, such as pollution, overfishing, rising water temperatures, and ocean acidification, enabling us to manage marine resources sustainably.
- **Climate Change:** Deep-sea exploration provides essential knowledge about the interactions between the ocean and the atmosphere, which is crucial for our ability to understand, predict, and respond to the impacts of climate change.
- **Innovation:** The inherent challenges of exploring the deep ocean, one of the most remote and difficult-to-reach environments on Earth, serve as a powerful driver for technological innovation.

Why is India focusing on Deep Sea Technology?

- **Enhancing National Security:** Amid rising geopolitical competition in the deep sea—such as China's development of deep-sea cable-cutting devices—India recognizes the critical need to strengthen its underwater defence capabilities.
  - Developing indigenous deep-sea surveillance technologies is essential for securing maritime borders and protecting vital underwater infrastructure.
  - Maintaining Underwater Domain Awareness (UDA) is increasingly viewed as a cornerstone of national security and strategic maritime dominance.
- **Strengthening Communication and Digital Infrastructure:** With over 95% of global internet traffic transmitted through undersea cables, ensuring their safety and maintenance is vital.
  - India aims to build self-reliance in laying, securing, and maintaining these cables to safeguard digital sovereignty, enhance data security, and protect against potential sabotage or disruptions that could impact global connectivity and financial systems.
- **Supporting the Blue Economy:**

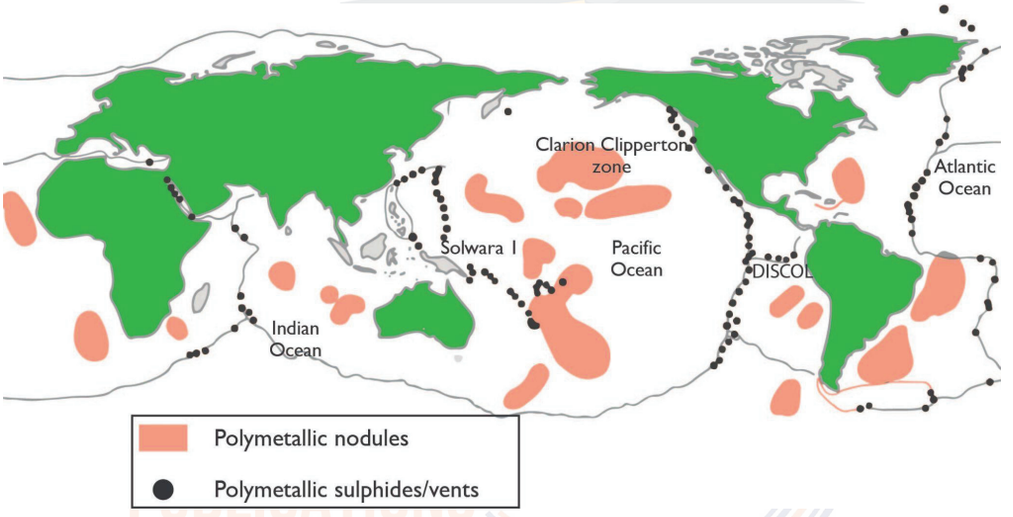
India's Exclusive Economic Zone (EEZ), covering approximately 2.37 million sq. km, holds immense untapped economic potential. Deep-sea technologies can unlock growth in key sectors such as: Deep-sea fishing, Aquaculture, Marine biotechnology and Eco-tourism.

- **Gaining Technological and Strategic Edge:** Mastering deep-sea technology positions India among global leaders like the US, China, Japan, France, and Russia.
  - This technological advancement not only boosts India's capabilities in ocean exploration but also strengthens its influence in international maritime governance and geopolitical negotiations.

Initiatives taken by India to Explore Deep Sea

- **Deep Ocean Mission:** It is a flagship initiative by the Ministry of Earth Sciences (MoES), aimed at advancing India's capabilities in deep-sea exploration through the development of cutting-edge technologies. It is among the nine strategic missions recommended by the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC).
- Core Components of the Mission:
  - Development of technologies for deep-sea mining and human-operated submersibles

  - Ocean climate change advisory services
  - Innovations for exploring and conserving deep-sea biodiversity
  - Exploration and survey of mineral resources in the deep ocean
  - Generating energy and freshwater from ocean sources
  - Establishing a state-of-the-art Marine Biological Research Station
- **Samudrayaan and Matsya6000:** Launched in 2021, Samudrayaan is India's pioneering manned mission to explore the deep ocean. The mission will send a three-member crew in Matsya6000, an advanced deep-sea submersible, to depths of up to 6,000 meters in the Central Indian Ocean.
- **Varaha:** Developed by the National Institute of Ocean Technology (NIOT), Varaha is an indigenously designed deep-sea mining system.
- **Draft Blue Economy policy:** Prepared by the Ministry of Earth Sciences, the draft policy outlines the vision and strategy that the Government of India can adapt to utilize the plethora of oceanic resources available in the country.
- **Marine Spatial Planning (MSP):** It is a tool for Integrated Ocean Management for Sustainable Development.
  - India and Norway signed an MoU in January 2019 to launch the India-Norway Ocean Dialogue, focusing on integrated and ecosystem-based management of ocean resources. Both nations identified Integrated Ocean Management as a key area for future collaboration.



Challenges associated with Deep Sea Exploration

- **Extreme Pressure and Conditions:** Pressure increases by approximately **1 atm for every 10 metres** of depth.
  - Pressure at the ocean bed in the Indian EEZ is around **380 atm** – demanding specialized materials and engineering for submersibles.
  - The **OceanGate Titan submersible disaster (June 2023)** highlights the risks of operating in high-pressure environments.
- **Technological Limitations:** Lack of cutting-edge deep-sea technology like **Very Low Frequency (VLF)** and **Extremely Low Frequency (ELF)** sound technology for communication and navigation.
  - Limited domestic capability for undersea mining, infrastructure building, and submarine rescue.
- **Inadequate Infrastructure and Human Capital:** Absence of specialized institutions for deep sea research and limited expertise in underwater engineering.
  - Lack of skilled human capital for complex underwater missions and infrastructure projects.
- **Geopolitical and Security Risks:** China's dominance in deep sea technology and the recent unveiling of a **deep-sea cable-cutting device** poses a strategic threat to undersea communication lines.
  - Vulnerability of **undersea cables** to sabotage, which carry over **95% of intercontinental internet traffic**.
- **Limited Financial and Policy Support:** India's **Deep Ocean Mission (2018)** is underfunded compared to nations like China, the US, and Japan.
  - Lack of a streamlined policy and administrative framework for deep-sea exploration.

- **Environmental Challenges:** There is a lack of proper frameworks to balance deep-sea resource exploitation with ecological preservation.

Environmental Concerns Associated with Deep Sea Mining

- **Habitat Removal:** The digging and gauging of the ocean floor by machines can alter or destroy deep-sea habitats.
  - **E.g.,** sessile animals (those which attach themselves to rocks) would not be able to recover from the removal of sea-bed.
- **Sediment and plume disturbances:** The dispersion of fine sediments creates similar effects to air pollution on land, such as barriers to mobility and visualization for organisms.
- **Toxic Water discharges:** Discharged dredging spoils, marine litter and ballast waters carried by marine vessels associated with mining negatively impact ocean ecosystems.
  - **E.g.,** zooplanktonic species are destroyed due to discharge of toxic compounds.
- **Noise pollution:** Marine vessels generate noise on the ocean surface, while mining vehicles and related equipment generate noise at the deep-sea level.
  - **E.g.,** Anthropogenic Noise disrupts communication between marine mammals like bottlenose dolphins
- **Light Pollution:** The artificial light used to control mining vehicles' cameras and monitor mining sites disturbs organisms with highly sensitive vision.

What India Must do

- **Enhance Financial and Policy Support:** Upgrade the Department of Ocean Development to a full-fledged ministry with a cabinet-rank minister.
  - Ensure generous funding and launch time-bound, mission-mode projects with high stakeholder accountability.
  - Develop a 10-year strategic plan for deep-sea exploration and infrastructure development.
- **Invest in Advanced Technology:** Develop indigenous technologies for submersibles, VLF/ELF communication, and undersea infrastructure.
  - Establish specialized research centres for deep sea technology, similar to China's deep-sea science and engineering centres.
- **Strengthen Human Capital and Research:** Create institutes of excellence in deep-sea research and exploration.
  - Train and develop highly skilled personnel for deep-sea diving, mining, and rescue operations.
- **Build Strategic and Defensive Capabilities:** Develop response mechanisms to counter threats like China's deep-sea cable-cutting device.
  - Deploy underwater sensors and monitoring equipment to safeguard India's maritime interests.
- **Enhance Infrastructure for Exploration and Security:** Expand deep-sea fishing and exploration capabilities.
  - Develop capability for undersea cable laying, maintenance, and protection.
  - Invest in infrastructure for **oil and gas extraction** and **underwater mining**.
- **Ensure Environmental Sustainability:** Establish guidelines and frameworks for sustainable deep-sea mining and exploration.
  - Promote eco-friendly technologies to minimize environmental impact.

"Vanishing Wetlands: Why Their Survival Matters for Our Future"

Syllabus Mapping: GS-3- Environment

Context

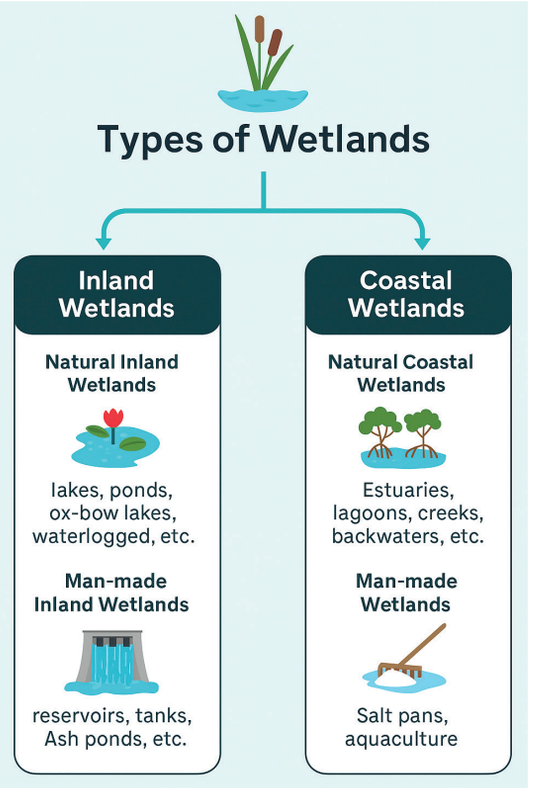
The recent suo motu public interest litigation initiated by the Meghalaya High Court to oversee the conservation of wetlands in the state has brought renewed attention to the importance of this vital ecosystem.

About Wetlands

- Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year.
- They encompass various types of areas such as marshes, fens, peatlands, and bodies of water, whether natural or man-made, that can be permanent or temporary, with water that can be stagnant or flowing.

Distribution of Wetlands

- Globally, wetlands cover approximately 12.1 million square kilometres, accounting for about 6% of the Earth's surface, and contribute around 40.6% of the world's ecosystem services.
- In India, as per the National Wetland Decadal Change Atlas (2017–18) published by the Space Applications Centre (SAC), ISRO, wetlands span an area of 15.98 million hectares.
  - Of this, 66.6% are natural wetlands—comprising 43.9% inland and 22.7% coastal wetlands—while the remaining 33.4% are man-made.



Significance of Wetlands

- **Biodiversity and Habitat:**
  - Wetlands are biodiversity hotspots, supporting rare and endangered species.
  - They serve as breeding and feeding grounds for various aquatic and terrestrial organisms.
  - Migratory species use wetlands as stopovers during their journeys.
- **Water Regulation and Quality:**
  - Wetlands act as sponges, absorbing excess water and reducing floods.
  - They filter pollutants, improving downstream water quality.
  - They recharge groundwater, enhancing freshwater resources.
- **Climate Regulation:**
  - Wetlands store carbon, mitigating climate change.
  - Managed wetlands can help reduce methane emissions.
- **Ecosystem Services and Human Well-being:**
  - Wetlands support fisheries, contributing to food security and local economies.
  - They offer recreational and tourism opportunities like birdwatching and fishing.
  - Wetlands have cultural significance, preserving indigenous traditions and heritage.
- **Resilience and Disaster Risk Reduction:**
  - Coastal wetlands protect against storm surges and erosion.
  - Healthy wetlands enhance resilience to climate change impacts.

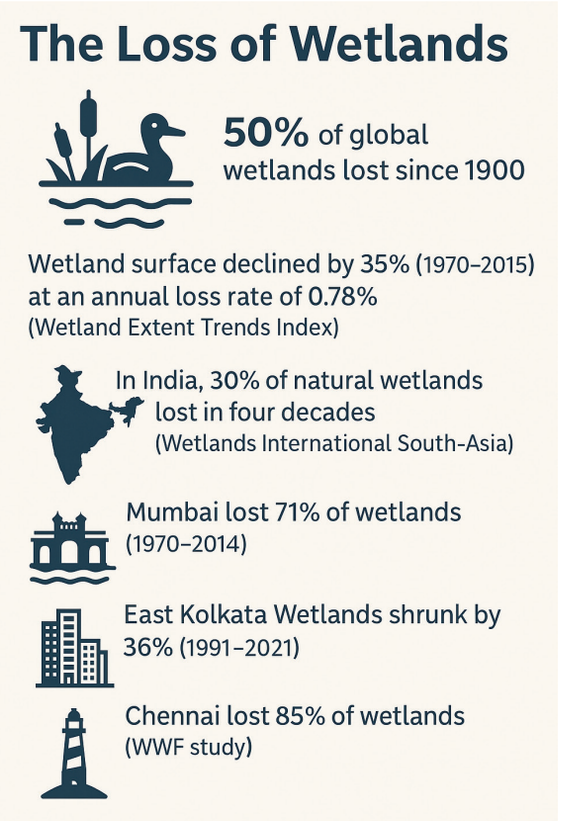
Threats to Wetlands

- **Habitat Loss and Degradation**
  - Wetlands are often **converted for agricultural purposes**, leading to habitat loss. In India, the conversion of wetlands for rice cultivation has been a major concern
  - **Rapid urbanization and infrastructure development** result in the loss of wetland habitats
- **Pollution and Contamination**
  - Discharge of untreated or poorly treated **industrial effluents and sewage** into wetlands leads to water pollution and degradation of water quality.
  - Excessive use of fertilizers and pesticides in agricultural practices results in **nutrient runoff**, leading to eutrophication and harmful algal blooms in wetlands.
- **Invasive alien species**, such as water hyacinth (Eichhornia crassipes) and the water lettuce (Pistia stratiotes), can outcompete native vegetation, alter the hydrology, and disrupt the ecological balance of wetlands.
- **Climate Change Impacts:**
  - **Rising sea levels** due to climate change pose a threat to coastal wetlands, including mangroves and salt marshes. E.g., Sundarbans
  - **Changes in rainfall patterns** can affect wetland hydrology, leading to water scarcity or flooding.

- **Unsustainable Resource Use**
  - **Unsustainable fishing practices** can deplete fish stocks and disrupt the ecological balance in wetlands.
  - **Unregulated sand mining** in wetland areas can alter the hydrology, degrade habitats, and disrupt ecosystem functioning.

Impact of Wetland Degradation

- **Increased Flood Risk:** Wetlands act as natural buffers by absorbing excess rainwater, and their degradation can significantly increase the risk of urban flooding.
  - **E.g.,** The degradation of the Mithi River wetlands in Mumbai has contributed to severe flooding during heavy rains.
- **Water Insecurity:** Wetlands play a critical role in replenishing groundwater by allowing water to percolate through the soil.
  - **E.g.,** Chennai lost 90 per cent of its wetlands to unplanned urbanization, leaving the city to grapple with issues of water security.
- **Water Contamination:** Wetlands naturally filter and clean water by trapping pollutants and sediments, and their degradation leads to poorer water quality in urban rivers and lakes.
  - **E.g.**, the degradation of East Kolkata wetlands has led to water pollution issues in Kolkata.
- **Increase in Urban Heat Island Effect (UHI):** Wetland degradation can reduce heat absorption and local climate regulation, contributing to the urban heat island (UHI) effect
  - **E.g.,** Destruction of wetlands in Delhi has increased UHI effect in the city.



- **Loss of Biodiversity:** When wetlands are destroyed, many species lose their habitat, leading to a significant reduction in biodiversity. Since 1970, 81% of inland wetland species and 36% of coastal & marine species have declined.
  - **E.g.**, Rapid decline in waterbirds population in m Perur-Sundakamuthur Lake, Tamil Nadu
- **Loss of Carbon Sequestration:** Wetlands store large amounts of carbon in vegetation and soil. When degraded, they release carbon dioxide and methane, contributing to climate change.
- **Economic Impact:**
  - Degradation of wetlands leads to a decline in fish catch, affecting food security and livelihoods. E.g., Degradation of Vembanad Lake in Kerala has reduced fish productivity, affecting local fishermen.
  - Farmers depending on wetland systems for irrigation and fertile soil suffer when wetlands degrade. E.g., Encroachment of wetlands in Assam has led to irregular water supply for paddy fields.

Global Initiatives to Conserve Wetlands

- **Ramsar Convention:** It is an international treaty that aims to promote the conservation and sustainable use of wetlands. It has been ratified by 170 countries (including India), making it one of the most successful international environmental treaties.
  - **Ramsar Sites:** It is a wetland site designated to be of international importance. These wetlands are protected under strict guidelines of the Ramsar Convention on Wetlands.
- **Montreux Record:** It is a register which lists wetland sites that are facing or have the potential to face significant environmental changes. Wetlands included in the Montreux Record receive international attention and assistance to ensure their conservation and sustainable use.
- **World Wetlands Day:** It is celebrated on the 2nd of February every year to mark the date of the adoption of the Ramsar Convention.

Initiatives taken by India

- **Legal Protection:** Wetlands are protected under various national laws, including the Indian Forest Act (1927), the Forest (Conservation) Act (1980), Indian Wildlife (Protection) Act (1972) and Wetlands (Conservation and Management) Rules, 2017.

  - The government released the Wetland Wise-Use Framework in 2024, to facilitate the implementation of the 2017 rules.
- **National Plan for Conservation of Aquatic Ecosystems:** In 2013, the National Wetlands Conservation Programme and the National Lake Conservation Plan were combined to create the National Plan for Conservation of Aquatic Ecosystems. It aims at holistic conservation and restoration of wetlands.
  - It recommends that the management of each wetland is guided by an Integrated Management Plan (IMP), which describes strategies and actions for achieving wise use
- **Wetlands of India Portal**: Launched on October 2, 2021, by the MoEFCC, the portal provides comprehensive information on India's wetlands.
- **National Wetland Decadal Change Atlas**: Prepared by the Space Applications Centre (SAC), Ahmedabad, the atlas highlights the changes in wetlands across the country over the past decade.
- **Centre for Wetland Conservation and Management (CWCM)**: Established on World Wetland Day 2021, the centre focuses on addressing research needs and knowledge gaps in wetland conservation.
- **Wetlands Rejuvenation Programme**: Initiated by MoEFCC in 2020, the program aims to rejuvenate over 500 wetlands across India.
- **Amrit Dharohar Scheme:** Launched with the Union Budget 2023-24, its goals include enhancing biodiversity, increasing carbon stock, boosting ecotourism, and generating income for local communities.
- **Designation of Wetland sites under Ramsar Convention:** There are 89 wetland sites in India (Highest in Asia, 3rd Globally) under the Ramsar Convention for their sustainable use and coordinated protection.

Wetlands (Conservation and Management) Rules, 2017

The Wetlands (Conservation and Management) Rules, 2017 were notified under the Environment Protection Act, 1986 to protect and manage wetlands in India through a decentralized approach.

Key Features:

- **State Wetland Authorities (SWAs)**: Responsible for wetland identification, notification, and management.
- **Prohibited Activities**: Wetland conversion, waste dumping, encroachment, and altering the natural water regime.
- **Regulated Activities**: Sustainable fishing, agriculture, and ecotourism allowed with oversight.

Monitoring & Enforcement: SWAs and a **National Wetlands Committee (NWC)** oversee conservation efforts.

Challenges in wetland conservation in India

- **Fragmented Policies and Overlapping Jurisdiction:** Wetland conservation efforts are hindered by fragmented legal frameworks and unclear division of responsibilities among various government agencies.
- **Lack of Inter-agency Coordination:** Effective wetland management requires coordination between the Centre, State, and local bodies—which is often lacking, leading to delays in implementation and monitoring.
- **Low Notification of Wetlands:** Out of over 2.31 lakh wetlands, only 102 have been notified, despite the legal obligation this status carries. This shows the neglect in officially protecting these ecologically critical areas.
- **Administrative Inertia**: States appear reluctant or slow in acting on wetland conservation, possibly to avoid restrictions on alternate land use once wetlands are officially notified.
- **Ambiguity in Policy Frameworks:** The "Wetland Wise Use" framework intended to promote local governance has introduced ambiguity, giving states room to ignore conservation under the guise of flexibility.
- **Low Community Participation:** Local communities are not actively involved in wetland conservation efforts, despite depending heavily on them for livelihoods such as fishing and farming.

Suggested Measures for wetlands conservation

- **Holistic Conservation Approach:** Wetlands should be factored into land use policies, infrastructure development, and climate action plans to ensure long-term ecological balance.
- **Adopting an Ecosystem-Based Approach:** the Ramsar COP14-recommendation of ecosystem-based approach to manage wetlands as interconnected natural systems should be emphasized. This involves conserving biodiversity while meeting human needs sustainably.
- **Strengthening Legal Protection:** Enforce and implement the Wetlands (Conservation and Management) Rules, 2017 more effectively by enhancing compliance, improving notification processes, and empowering state-level wetland authorities to designate protected sites.

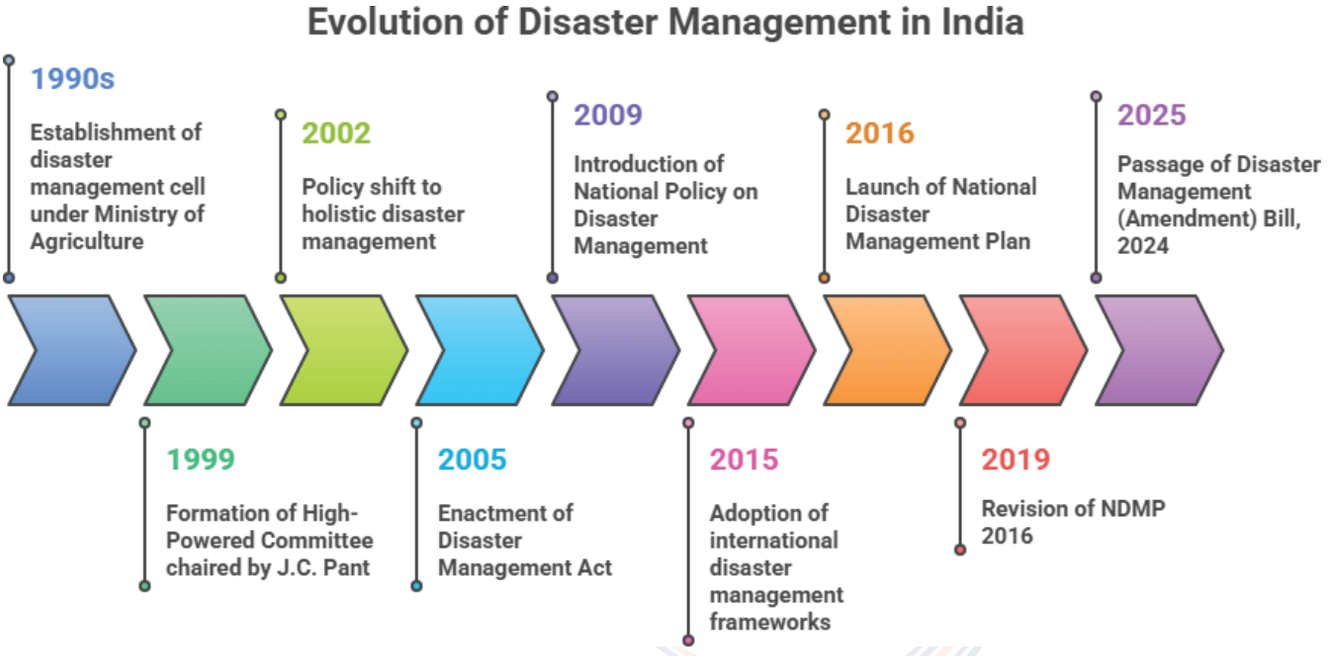
- **Community Participation:** It is important to empower and involve local communities in wetland governance, ensuring their knowledge and interests are part of conservation efforts.
  - E.g., Initiatives like the Loktak Lake Protection Act have created frameworks for community-led wetland management.
- **Scientific Monitoring & Restoration:** It is necessary to conduct regular assessments using advanced tools like remote sensing and GIS to help track the health and extent of wetlands across India.
- **Mainstreaming Wetlands in Development Plans:** Wetland conservation should be aligned with the Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water), SDG 13 (Climate Action), and SDG 15 (Life on Land).

"Disaster Management 2.0: Analysing the Disaster Management (Amendment) Act, 2024"

Syllabus Mapping: Gs 3- Environment

Context

The Disaster Management (Amendment) Bill, 2024 was passed by the Rajya Sabha and comes into force from April 9.



Disaster Management Act, 2005

- **Aim:** To strengthen India's disaster management capabilities, enhance preparedness, and respond effectively to various natural and human-made disasters.
- **Key Provisions:**
  - **National Disaster Management Authority (NDMA):** Establishes the NDMA as the apex body responsible for formulating policies, plans, and guidelines for disaster management at the national level.
  - **State Disaster Management Authorities (SDMAs):** Mandates the formation of SDMAs in each state to coordinate disaster management activities at the state level and implement national policies and guidelines within their respective states.
  - **District Disaster Management Authorities (DDMAs):** Requires the establishment of DDMAs in every district to ensure effective disaster response and coordination at the local level.
  - **National Disaster Response Force (NDRF):** Provides for the creation of the NDRF, a specialized force responsible for disaster response, rescue, and relief operations across the country.
  - **National Institute of Disaster Management:** Provides for the establishment of a National Institute of Disaster Management for training and capacity building in the field of disaster management.
  - **National Plan:** Mandates the formulation of a national plan for disaster management, which serves as a comprehensive framework for disaster management.
    - The NDMA is responsible for preparing and implementing the national plan.

  - **Funding for Disaster Management Initiatives:** Provides for the establishment of a National Disaster Response Fund, National Disaster Mitigation Fund and State Disaster Response Funds to support projects and initiatives aimed at reducing disaster risks and vulnerabilities.

Significance of the Disaster Management (DM) Act, 2005

- **Disaster Prevention and Mitigation:** The institutional framework established by the DM Act has played a crucial role in saving thousands of lives and facilitating relief, rescue, and rehabilitation efforts**.**
- **Creation of specialized Institutions**: Key institutions established by the Act have contributed to disaster mitigation by advancing research, providing training, raising awareness, and enhancing capacity-building efforts related to disaster management.
- **Focus on Disaster Risk Reduction (DRR):** The Act highlights the significance of DRR by encouraging the integration of disaster management into development planning. E.g., the National Disaster Management Policy (2009) and the National Disaster Management Plan (2016) both emphasize disaster risk reduction.
- **Financing Disaster Management Efforts**: NDRF and SDRF established under the Act has helped to ensure the timely allocation of financial resources for disaster response and relief operations.
- **Encouraging Community Participation:** The Act underscores the significance of community involvement in disaster management, and has enhanced the role of local authorities and community groups in disaster response and recovery efforts.
- **DM Act during COVID-19**: The lockdown in May 2020 during COVID-19 pandemic was imposed under the 2005 Act and was instrumental to tackle the pandemic.

Challenges with the Disaster Management Act 2005

- **Limited Financial Autonomy:** The NDMA lacks direct administrative and financial control, relying heavily on the Home Ministry for decisions→often cause delays and inefficiencies in disaster management.
- **Human Resource Shortages:** Key positions including the vice-chairperson have been vacant for extended periods.
  - Further, lack of staffing undermines the NDMA's effectiveness.
- **Coordination Difficulties:** The complex coordination required between central and state agencies often involves multiple bureaucratic layers, leading to delays in response and recovery efforts.
- **Inconsistent Local Implementation:** Variability in resources and training at the district and state levels affects the effectiveness of disaster management practices, leaving some areas inadequately prepared for disaster response.
- **Insufficient Focus on Man-made Hazards and Climate Change Risks**: The Act has not adequately addressed the interconnected and escalating nature of climate change-related and man-made disasters.

Key Provisions of The Disaster Management Amendment Act 2024

- **Urban Disaster Management Authority (UDMA)**: It proposes establishing an Urban Disaster Management Authority for state capitals and large cities with Municipal Corporations, excluding Delhi and Chandigarh.
- **Expanded NDMA Responsibilities:** The NDMA's role is set to expand significantly including periodic assessments of all disaster risks including emerging threats.
- **Disaster Database:** It aims to create a comprehensive disaster database at both national and state levels which will include disaster assessments, fund allocation details, preparedness and mitigation plans & risk registers as defined by the Central government.
- **Decentralized Disaster Plans**: It empowers the NDMA and SDMA to develop disaster plans at the national and state levels, respectively.
  - Previously, these plans were managed by the National Executive Committee and State Executive Committees.
- **Legal Status to bodies:** Certain pre-existing organizations such as the National Crisis Management Committee and the High-Level Committee will be granted statutory status.
- **State Disaster Response Force:** It seeks to require every state to establish and maintain an SDRF.
- **Section 60A:** This section authorizes the Central and State governments to direct individuals to take or avoid actions to mitigate disaster impacts and impose penalties up to ₹10,000 for non-compliance.
- **Man-Made Disasters:** It clarifies that "man-made causes" in the disaster definition exclude law-and-order situations.
  - Therefore, events like riots causing loss, suffering or damage will not activate the law's provisions.

Significance of the Key Amendments

- **Clarification of Roles:** The proposed amendments can help streamline coordination by clearly defining the roles and responsibilities of various authorities and committees involved in disaster management.
- **Strengthened Local Management:** The proposed Urban Disaster Management Authorities can help empower local bodies, ensuring that disaster management plans are tailored to regional needs and challenges.
- **Integration with Development Plans:** The proposal of incorporating disaster management into broader development plans, aligning with recommendations from the 15th Finance Commission, can help ensure that disaster risk reduction is integrated into overall governance strategies.

Concerns related with the proposed amendments:

- **Constitutional Scrutiny:** It falls under Entry 23 of the Concurrent List in the Seventh Schedule which covers "social security and social insurance, employment and unemployment" rather than "Disaster Management" which is not listed in the Seventh Schedule.
- **Overlapping Authorities:** The Act introduces additional authorities, which could create confusion and bureaucratic delays that might impede effective rescue and relief operations.
  - E.g., the Kerala Chief Minister and Home Minister had clashed over early warning systems related to the Wayanad tragedy due to overlapping authorities.
- **Violation of State Jurisdiction:** The Act grants excessive rulemaking powers to the Central government through delegated legislation, potentially infringing on the legislative powers reserved for States and overlapping with State jurisdiction.
- **Hierarchical Language Used:** The act adopts a centralized, command-driven approach by using terms like "monitor" and "guidelines", rather than more collaborative language such as "supervision" and "direction", suggesting a lack of participatory intent.
- **Limited Emphasis on Community Involvement:** Critics highlight that the legislation sidelines grassroots communities, despite global best practices—like the Yokohama Strategy and Sendai Framework—which emphasize the critical role of local populations as frontline responders during disasters.
- **Inattention to Social Vulnerabilities:** The legislation falls short in recognizing how overlapping vulnerabilities—based on gender, disability, caste, and sexual orientation—can worsen disaster impacts. It neglects the creation of inclusive datasets essential for nuanced, equitable response planning.
- **No Mechanism for Accountability:** There is an absence of clear provisions to assess or audit district-level disaster preparedness, raising concerns about the lack of accountability in disaster governance structures.
- **Elimination of Relief Provisions:** Key safeguards from the 2005 Act—such as guaranteed minimum relief, loan repayment support (Sections 12 & 13), and special provisions for widows, orphans, and livelihoods (Section 19)—have been omitted, weakening the framework for post-disaster recovery.
- **Weaker Enforcement Tools:** Provisions like Sections 35(2b) and 35 (2d), which obligated central authorities to ensure disaster preparedness, have been dropped, thereby reducing the enforceability of national disaster readiness.
- **Missed Opportunities for Regional Cooperation** It disregards existing frameworks like the SAARC 2011 Agreement and fails to tap into platforms such as SAARC, BIMSTEC, or BRICS for coordinated disaster response.

Way Forward

- **Updating Key Definitions:** Section 2 of the Act should be revised to explicitly define terms like 'hazards,' 'prevention,' and 'mitigation,' ensuring clarity and consistency across the Act.
- **Increasing Autonomy and Authority:** Enhancing the NDMA's efficiency requires granting it greater financial and administrative powers. Elevating NDMA to a government department or ministry could significantly boost its effectiveness.
- **Include Disaster Management in Concurrent List:** The Administrative Reforms Commission's 3rd Report- "Crisis Management: From Despair to Hope" suggested adding a new entry "Management of Disasters and Emergencies, natural or man-made" to List III (Concurrent List) of the Seventh Schedule.
- **Capacity Building:** This should include:
  - Developing a Comprehensive Training and Capacity-Building Program
  - Developing Human Resources to boost Operational Capacity

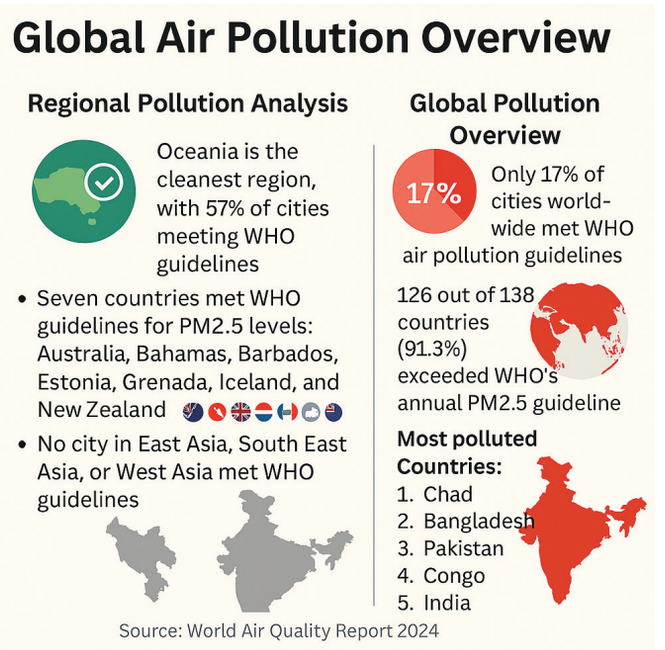
  - Building Local Capacity with regular training and adequate resource allocation
- **Advancing Disaster Management Research:** Invest in research for disaster risk management, emphasizing cutting-edge technologies like AI, remote sensing, and big data analytics.
- **Develop National Rapid Response Frameworks** to ensure swift and coordinated action during crises, with a well-defined command structure and effective resource allocation.
  - E.g., Adopt a 72-hour critical response plan inspired by Japan's model to ensure prompt rescue operations and effective coordination.

"Breathless Nation: The Alarming Rise of Air Pollution in India"

Syllabus Mapping: GS-3- Environment

Context

The 2024 World Air Quality Report, released by Swiss air quality tracking company IQAir, highlights severe air pollution levels worldwide.



India's Air Pollution Crisis

- India ranks as the 5th most polluted country, with an average PM 2.5 level of 50.6 µg/m³.
- India saw a 7% decline in PM 2.5 levels in 2024 (50.6 µg/m³) compared to 2023 (54.4 µg/m³), but still remains heavily polluted.
- Six of the world's 10 most polluted cities are in India.
- 13 of the world's 20 most polluted cities are in India.
- Most Polluted Indian Cities (Annual PM 2.5 levels): Byrnihat (Meghalaya), Mullanpur (Punjab), Faridabad, Gurgaon (Haryana)
- New Delhi remains the most polluted capital in the world with an annual PM 2.5 concentration of 91.8 µg/m³.

Causes of Air Pollution

- **Emissions from vehicles and transportation**, such as cars, trucks, and aeroplanes, which release carbon monoxide, nitrogen oxides, and particulate matter into the air.
- **Industrial activities**, including factories and power plants, that emit large amounts of toxic chemicals and greenhouse gases into the atmosphere
- **Agricultural practices**, such as the use of pesticides and fertilizers, which can release harmful **chemicals into the air.**
- **Waste management practices**, such as landfills and open burning of waste that emits harmful substances into the air.
- **Energy production,** particularly the use of fossil fuels, which releases large amounts of carbon dioxide and other pollutants into the air.
- **Natural events,** such as wildfires and dust storms, which can release large amounts of particulate matter into the atmosphere.

Major Air Pollutants

Air Pollutant	Source	Effect on Health and Environment
Particulate Matter (PM)	Pollen, Sea spray, Windblown dust from: Construction, Agriculture, Transport, Mining, Soil erosion	PM is capable of penetrating deep into the lung and enter the bloodstream causing Cardiovascular disease, Cerebrovascular stroke, Respiratory impacts.
Nitrogen dioxide	Combustion of fossil fuels, crop residue, woods, Vehicular emissions, Industrial processes, Chemical productions	Coughing, Wheezing, Shortness of breath, Strokes and heart attacks, Reduced lung function
Ground level Ozone	Vehicular emissions, Factories, Paints, solvents and cleaning agents emit volatile organic compounds (VOCs)	Damages the DNA, Impaired cellular function, Shortness of breath, Asthma

Air Pollutant	Source	Effect on Health and Environment
Carbon monoxide (CO)	Vehicular emission, home heating (natural gas, fuels), Industrial processes, Wildfires, Tobacco smoke, Power plants	Heart disease, respiratory diseases Upon entering the bloodstream, carbon monoxide inhibits the body's ability to carry oxygen to organs and tissues.
Sulphur dioxide (SO2)	Residential heating, Transportations, Industrial processes, Power plants	Respiratory irritation, Bronchitis, Bronchospasm
Lead	Lead based paint, Consumer products, Industrial emissions, Petrol, Batteries	Behaviour and learning problems, Lower IQ, Hyperactivity, slowed growth, Hearing problems, Anaemia
Benzene	Motor vehicle exhaust, Industrial processes, Cigarette smoke, Glues, Adhesives, Cleaning products	Anaemia, Immune system damage, Reproductive problems, Cancer, Leukaemia, Carcinogen
Asbestos	Rocks and soil, Building materials, Insulators, Cement, Industries, Automotive parts	Lung cancer, Mesothelioma (a cancer of the lining of the lungs and other organs), Asbestosis (a chronic lung condition)

Impact of air pollution

- **Effects of Air Pollution on Human Health**: According to the World Health Organization, an estimated seven million people die each year from air pollution.
- **Effects of Air Pollution on Animals and Plants:**
  - Health impact on animals include damage to respiratory systems, neurological problems and skin irritations.
  - Plants and crops grow less when exposed to long-term air pollution. Ozone pollution harms plants by called stomata.
- **Increase in Nitrogen levels in soil:** Gaseous ammonia (NH3) from agriculture and nitrogen dioxide (NO2) from car, truck, and aeroplane emissions increase the amount of nitrogen in soils. Excess nitrogen can limit the growth of some plants and increase the growth of others, disrupting the balance of species within an ecosystem.
- **Ozone Layer Depletion:** Chemicals used as refrigerants, such as chlorofluorocarbons (CFCs), contain chlorine atoms. Releasing chlorine atoms into the atmosphere destroys ozone.
- **Acid Rain:** also known as acid deposition, it refers to any form of precipitation that contains acidic substances, such as sulphuric or nitric acid, and falls to the ground in wet or dry forms.
  - It is caused by the emission of sulphur dioxide (SO2) and nitrogen oxides (NOX) into the atmosphere from sources such as the burning of fossil fuels, vehicles and heavy equipment, and industries.
- **Smog:** It is a type of air pollution, which is caused by the burning of coal, petroleum, natural gas, etc. It consists of various pollutants such as soot, sulphur dioxide, nitrogen dioxide, etc.
- **Haze:** It is an atmospheric phenomenon, which is characterized by the presence of fine dust, smoke, and other dry particles that obscure the clarity of the air, making distant objects appear blurry or hazy.
- **Climate Change**: Greenhouse gas emissions causing climate change is leading to loss of species and ecosystem imbalance. Ocean acidification, due to carbon dioxide in the atmosphere, is harming marine species.

WHO limits on Air pollution

- **Particulate matter (PM2.5):** The annual mean concentration should not exceed 5 µg/m3.
- **Nitrogen dioxide (NO2):** The annual mean concentration should not exceed 10 µg/m3.
- **Ozone (O3):** The peak season mean 8-hour concentration should not exceed 60 µg/m3.
- **PM10:** The annual mean concentration should not exceed 15 µg/m3, and the 24-hour mean concentration should not exceed 45 µg/m3.
- **Sulphur dioxide (SO2):** The 24-hour mean concentration should not exceed 40 µg/m3.
- **Carbon monoxide (CO):** The 24-hour mean concentration should not exceed 7 µg/m3.

Initiatives to Combat Air Pollution in India

- **The Air (Prevention and Control of Pollution) Act, 1981:** It aims at the prevention, control, and abatement of air pollution. The act provides for establishment of standards for emissions from industrial and vehicular sources, and sets penalties for non-compliance with these standards.
- **National Clean Air Programme (NCAP):** The national framework is first of its kind for air quality management with a time bound reduction target. It is implemented in 132 cities. **Target to reduce:**

  - PM10 by 40% with 2017 as the base year by 2026.
  - PM2.5 by 20% with 2017 as the base year by 2026.
- **SAFAR (System of Air Quality and Weather Forecasting and Research):** Introduced by **Ministry of Earth Sciences,** it aims to measure the air quality of metropolitan cities.
  - Pollutants monitored: PM2.5, PM10, Ozone, Carbon Monoxide, Nitrogen Oxides, Sulphur Dioxide, Benzene, Toluene, Xylene and Mercury
- **AQI (Air Quality Index):** Launched in 2014, AQI is a used to communicate the air quality to people in a layman term.
  - Eight pollutants are taken into considered developing AQI: PM2.5, PM10, Ammonia, Lead, Nitrogen Oxides, Sulphur Dioxides, Ground level Ozone, and Carbon Monoxide
- **National Ambient Air Quality Standards (NAAQS):** These are the standards for ambient air quality with reference to various identified pollutants notified by the CPCB under the Air Act, 1981.
  - List of pollutants under NAAQS are: PM10, PM2.5, Sulphur Dioxide, Nitrogen Dioxide, Carbon Monoxide, Ammonia, Ozone, Lead, Benzene, Benzo-Pyrene, Arsenic and Nickel
- **National Air Monitoring Programme (NAMP):** Central Pollution Control Board initiated National Ambient Air Quality Monitoring (NAAQM) programme in the year 1984. It was subsequently renamed as National Air Monitoring Programme.
  - Four air pollutants viz., Sulphur Dioxide (SO2), Oxides of Nitrogen as NO2 and Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM/PM10) are monitored at different locations.
- **National Air Quality Resource Framework of India (NARFI)**: It is an initiative under the Office of the Principal Scientific Advisor (PSA) to the Government of India.
  - It was launched by NIAS (National Institute of Advanced Studies) to create a scientific framework for air quality management across India.
  - The framework helps in mapping pollution sources, identifying airsheds, and implementing data-driven policies. Key Objectives of NARFI:
    - Air shed-Based Approach – Moves beyond state boundaries to address air pollution at a regional level.
    - Data-Driven Decision-Making – Uses satellite imagery, ground-based sensors, and AI models to track pollution.
    - Policy Integration – Aligns national and regional pollution control strategies.
    - Public Awareness & Collaboration – Engages multiple stakeholders like government bodies, researchers, and industries.

Global Initiatives for air pollution control

The Gothenburg Protocol

- Also known as the Multi-effect Protocol, it is an integral part of the Convention on Long-Range Transboundary Air Pollution.
- Its primary aim is to reduce the environmental issues of acidification and eutrophication, as well as the formation of ground-level ozone.
- It establishes limits on the emissions of several key air pollutants, including sulphur dioxide, nitrogen oxide, ammonia, and volatile organic compounds,

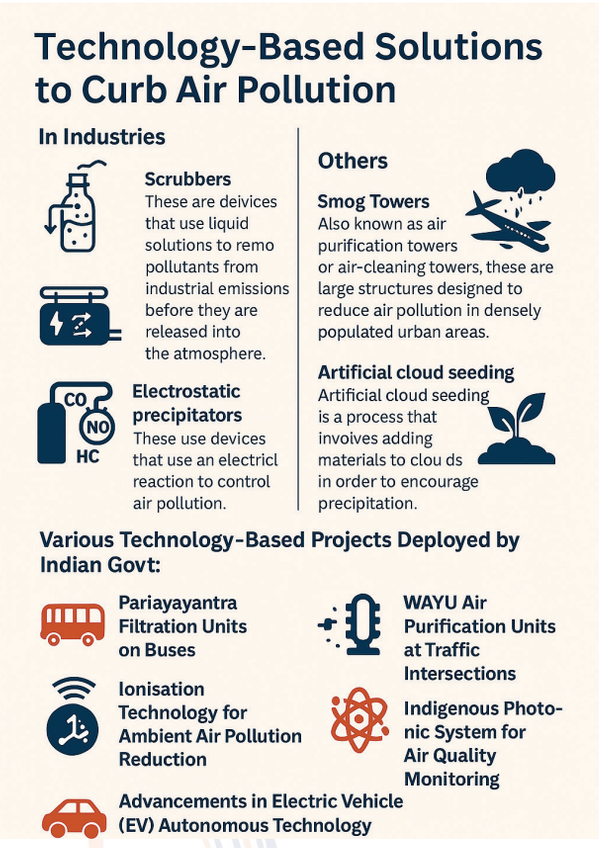
The Convention on Long-Range Transboundary Air Pollution

- It seeks to safeguard the human environment from air pollution and to progressively decrease and prevent air pollution, specifically addressing the challenge of pollution that travels across national borders.
- It is implemented by the European Monitoring and Evaluation Programme (EMEP), which operates under the direction of the United Nations Economic Commission for Europe (UNECE).

Challenges in Combating Air Pollution in India

- **Policy gaps:** The NCAP's implementation is complicated by multiple metrics and a system that incentivizes reduction of coarser PM10 particles such as dust.
- **Weak Regulatory Enforcement**: Industrial emissions continue largely unchecked due to minimal reporting and weak compliance with environmental regulations.
  - According to the CSE report, industries operate under a "business-as-usual" approach, often benefitting from lax enforcement. E.g., thermal power plants received three deadline extensions between 2017 and 2022 to meet mandated emission norms, highlighting the lack of accountability in the sector.
- **Poor Utilization of Funds:** A report by CSE revealed that funds under the National Clean Air Programme were overwhelmingly spent on actions amounting to dust management: paving roads, covering potholes, and deploying mechanical sweepers and water sprinklers.

  - Less than one percent was spent on controlling toxic emissions from industry, and around 40% of funds out of Rs. 10,566.47 crores are unused.
- **Lack of Public Awareness:** Public understanding of the health impacts of air pollution is still low, reducing civic pressure on governments and industries to act decisively.
- **Limited Air Quality Monitoring:** Many parts of India lack comprehensive air quality monitoring infrastructure, especially in rural and smaller urban areas, making it difficult to measure and respond to pollution levels effectively.
- **Geographical Challenges:** Geographic and meteorological factors play a significant role in worsening air pollution levels, especially in northern India.
  - Cities like Delhi face acute challenges due to their landlocked geography, low wind speeds, and temperature inversions during winter.



Suggested Measures

- **Shift towards clean and renewable energy:** Transitioning from coal-based power generation to solar, wind, and hydroelectric energy sources is essential.
  - E.g., solar microgrid initiatives in states like Bihar have successfully reduced dependency on polluting diesel generators.
- **Enforcement of existing emission norms:** Industries and thermal power plants must be held accountable through continuous emissions monitoring and transparent public reporting.
- **Overhauling Urban Transport Systems:** Investing in clean public transport, such as electric buses, expanding metro networks, and developing infrastructure for cycling and walking, can significantly reduce vehicular emissions.
- **Addressing agricultural sources of pollution:** Farmers should be incentivized to adopt sustainable alternatives like the use of Happy Seeder machines.
  - Moreover, the promotion of biomass energy production from agricultural residue could offer a dual benefit of energy generation and pollution reduction.
- **Customized air quality action plans:** Such plans must be developed at the local and regional levels. Instead of relying on a uniform approach, cities should design strategies based on real-time air quality data, seasonal trends, and specific pollution sources.
- **Adopting the air shed model:** Traditional state-wise policies fail because pollution travels beyond state borders. The air shed model ensures a coordinated effort between multiple states for effective pollution control.
  - An air shed is a geographic region where air pollutants circulate and mix due to meteorological and topographical factors. E.g., Indo-Gangetic Plain Air shed (Delhi, UP, Bihar, West Bengal, Punjab)

TOPICS FOR PRELIMS (GEOGRAPHY)

Copper

Context:

The Indian Government has secured a 9,000 sq. km block in Zambia to explore copper and cobalt.

About Copper

- **Characteristics:**
  - Copper is a soft brown metal found in igneous and metamorphic rocks.
  - There are three primary copper ores, viz. Chalcopyrite, copper sulphide, and basic carbonates.
  - During the extraction of copper from ores, a few other minerals and metals, such as gold, silver, lead, zinc, etc., are also extracted.
  - Copper is resistant to corrosion and does not rust.
  - Copper is a good conductor of heat and electricity.

- **Uses:**
  - It is widely used in electrical works for making wires, generators, transformers, electronics, etc.
  - Due to its high malleability, copper is commonly used in the metallurgical industry. It is used to make cables, fittings, and parts for automobiles.
  - It is used to make many alloys.
    - When combined with tin, it produces bronze.
    - When it is mixed with gold, it produces guinea gold.
    - With zinc, it produces brass, and with nickel, it produces Monel metal.
    - When copper is mixed with aluminium, it produces duralumin.

Distribution of Copper

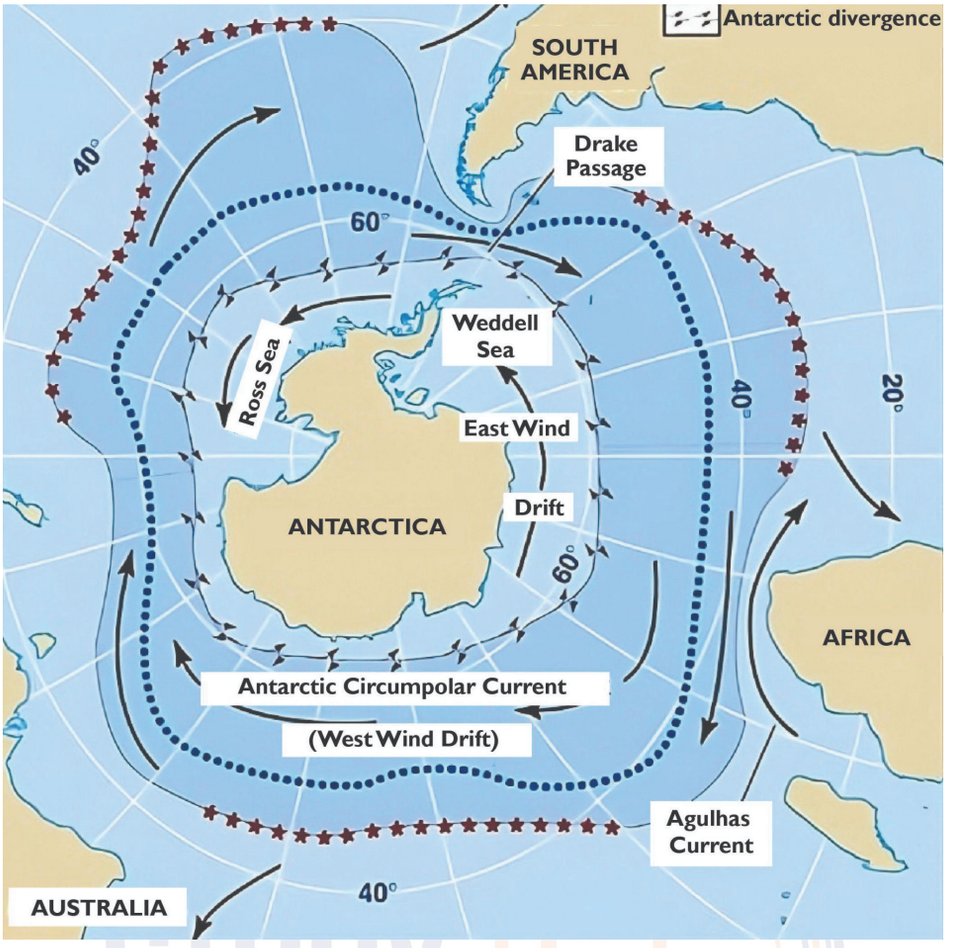
Country	Regions
Chile (Largest Producer)	Copper Mountain of Chuquicamata, El Teniente, Rio Blanco, Braden
Peru	Moquegua region
USA	Arizona, Globe, Miami, Nevada, New Mexico
Canada	Sudbury, Lynn Lake, Sheridon
Sweden	Falun Mine
Germany	Mansfield
CIS	Degtyarsk, Kazakhstan
Australia	Mt Isa, Mt. Morgan
India	• Madhya Pradesh (Highest producer): Balaghat • Rajasthan: Jhunjhunu and Alwar districts • Jharkhand: Singhbhum district

Copper Production in India

- Domestic Copper Production Decline: 2023-24 production: 3.78 million tonnes (mt) (↓ 8% from 2018-19).
- Hindustan Copper Ltd (HCL) – India's sole domestic copper miner – reported a 6% decline in ore production from April 2023 to January 2024 (year-on-year).
- Imports doubled: India's copper concentrate imports: ₹26,000 crore in 2023-24 (compared to 2018-19).

Africa's Rising Share in Mineral Production

- Africa is becoming a **major producer** of critical minerals:
  - Cobalt: 70% of global production (mostly from DRC).
  - Copper: 16% of global production.
  - DRC is expected to be the world's second-largest copper producer by 2030.
  - Zambia is the 7th largest copper producer globally



Antarctic Circumpolar Current

Context:

A study by the University of Melbourne has predicted that the Antarctic Circumpolar Current may weaken by 20% by 2050 under a high carbon emissions scenario.

About Antarctic Circumpolar Current (ACC)

- It is the world's strongest ocean current, moving in a clockwise direction around Antarctica.
- It connects the Atlantic, Indian, and Pacific Oceans.
- It is four times stronger than the Gulf Stream, transporting about 165 million cubic meters of water per second.
- **Significance:**
  - Regulates heat and carbon dioxide uptake in the ocean.
  - Prevents warmer waters from reaching Antarctica, thus preserving ice sheets.
  - Blocks invasive species (e.g., bull kelp, shrimp, molluscs) from other continents reaching Antarctica.

Reasons for weakening of ACC

- **Changes in Ocean Salinity:** Due to accelerated melting of ice shelves (from global warming) around Antarctica has resulted in weakening of Antarctic Bottom Water (AABW).
  - AABW is a sinking process and a critical component of global ocean circulation tied to circulation of ACC.
- **Rising Global Temperatures:** Warmer temperatures alter wind patterns that drive the ACC.

Potential Impacts of a Weaker ACC

- **More Extreme Weather & Climate Instability:** A weaker ACC can lead to stronger storms, heatwaves, and extreme climate events worldwide.
- **Increased Global Warming:** If the ACC weakens, the ocean's ability to absorb heat and carbon dioxide declines, accelerating global warming.
- **Rising Sea Levels & Ice Sheet Melting:** The ACC prevents warm waters from reaching Antarctica.
  - If it weakens, warmer ocean currents will erode Antarctic ice shelves, leading to faster sea level rise.
- **Disruption of Ocean Circulation:** The ACC is connected to global ocean currents, including the Atlantic Meridional Overturning Circulation (AMOC).
  - A slowdown can weaken major ocean currents, disrupting rainfall, monsoons, and agricultural patterns.

White Hydrogen

Context:

France has discovered 46 million tons of natural hydrogen beneath the soil of Folschviller, Moselle region.

About White Hydrogen

- White hydrogen (also called natural hydrogen) is a naturally occurring form of hydrogen found in the Earth's crust.
- Unlike grey, blue, brown or green hydrogen, it does not require industrial production or carbon-emitting processes.
- It is considered the most environmentally friendly form of hydrogen.
- **Advantages:**
  - Unlike other forms of Hydrogen, it does not require industrial production.
  - It does not emit Carbon.

Different types of Hydrogen

Type	Description
Green Hydrogen	• Produced by splitting water into hydrogen and oxygen using renewable energy sources like solar or wind power. • It is climate neutral and a clean energy source.
Grey Hydrogen	• Produced from fossil fuels (natural gas, coal, etc.), releasing carbon dioxide into the atmosphere. • It accounts for about 95% of the world's hydrogen supply.
Blue Hydrogen	• Produced using fossil fuels, but carbon emissions are captured and stored, making it more environmentally friendly than grey hydrogen.
Pink Hydrogen	• Produced by splitting water into hydrogen and oxygen using nuclear energy-powered electrolysis. • It is also known as purple or crimson hydrogen.
Turquoise Hydrogen	• Produced from natural gas through methane pyrolysis, generating solid carbon instead of CO2, making it a cleaner alternative to grey hydrogen.

Dark Oxygen

Context:

A study published in Nature Geoscience has ignited a debate among scientists about the potential production of oxygen in the deep sea without the need for sunlight.

About the study

- The research was conducted in the Clarion-Clipperton Zone, an underwater area between Mexico and Hawaii, known for its rich mineral deposits and growing interest in deep-sea mining.
- It challenges the long-standing theory that oxygen first appeared on Earth around 2.7 billion years ago solely through sunlight-driven photosynthesis.

About Dark Oxygen

- It refers to the production of molecular oxygen (O_2) in the deep ocean, specifically at depths where sunlight cannot penetrate, (thus making photosynthesis impossible).
- Oxygen on Earth is commonly believed to have originated through photosynthesis, a process in which plants, algae, and certain bacteria use sunlight to convert carbon dioxide into oxygen.
- However, recent research on polymetallic nodules—metal-rich, potato-sized rocks found in the deep sea—suggests they may generate electrical currents.
- These currents have the potential to split seawater into hydrogen and oxygen through electrolysis, a process that does not require sunlight.

Heat Action Plans

Context:

A new study has found that most Indian cities' Heat Action Plans (HAPs) lack long-term strategies to tackle extreme heat, and even when strategies exist, they are not effectively implemented.

About Heat Waves

- In India, a heatwave is typically defined as a period when the maximum temperature in a particular area reaches or exceeds 40 degrees Celsius for the Plains region, and at least 30 degrees Celsius for Hilly regions.
- Heat Dome is a weather phenomenon that occurs when a high-pressure area in the atmosphere traps hot air beneath it, creating a dome-shaped mass of extreme heat.
- Omega block is created when two low-pressure systems become cut off from the main flow of the jet stream, and a high-pressure system is sandwiched in between them.

About Heat Action Plan (HAP)

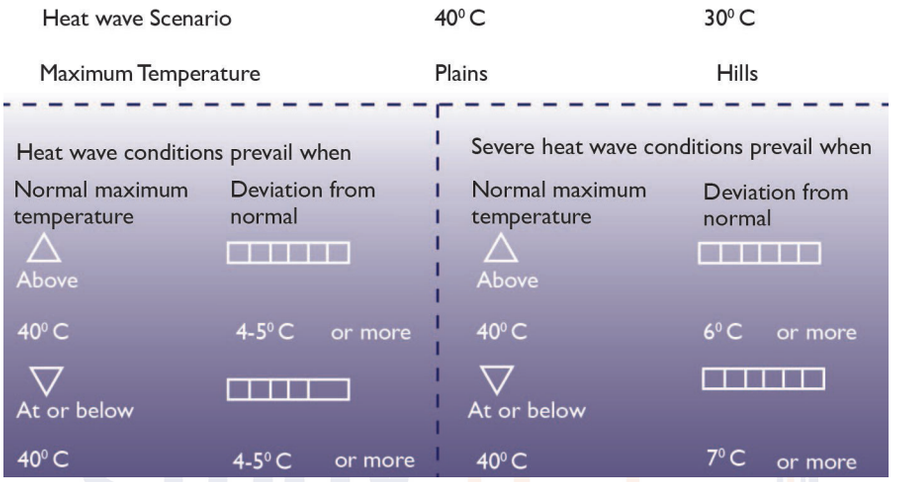
- A Heat Action Plan is an early warning system and preparedness plan for extreme heat events. HAPs include:
  - Immediate as well as long-term actions to increase preparedness.
  - Information-sharing and response coordination.

  - Reducing health impacts of extreme heat, especially on vulnerable populations.

- Ahmedabad is the first city in the country to have its own heat action plan. It implemented a comprehensive HAP in 2013.

IMD's colour codes for heatwave warning

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



Cosmic Particle Acceleration Near Earth

Context:

A recent study published in Nature Communications reveals how tiny space particles, like electrons, gain extreme energy near Earth. Scientists found that shock waves in space may act like natural particle accelerators.

Key Discovery

- In 2017, three NASA missions (MMS, THEMIS, and ARTEMIS) recorded electrons in the **foreshock region** (ahead of Earth's magnetic shield) suddenly gaining energy up to **500 keV**, moving at **86% the speed of light**—far above the usual 1 keV observed in that region
  - Researchers believe that a combination of the following helped accelerate these electrons: **Plasma waves, Magnetic structures** in the bow shock and **Electromagnetic forces** driving particles forward
- This event sheds light on the **Electron Injection Problem**—the mystery of how electrons get their initial energy boost before undergoing full acceleration.
  - It's crucial because **diffusive shock acceleration** (a key cosmic process) only works once electrons are already moving at high speeds.

Important Concepts:

- **Plasma**: A charged state of matter found in space, where particles interact via electromagnetic forces instead of collisions.
- **Shock Waves**: Sudden, high-energy disturbances in plasma—like sonic booms in space.
- **Solar Wind**: A constant stream of charged particles from the Sun interacting with planetary magnetic fields.
- **Earth's Magnetosphere**: A magnetic shield that protects Earth from solar wind and cosmic rays.
- **Bow Shock & Foreshock**: Regions where solar wind collides with Earth's magnetosphere, forming shock waves and turbulent zones where electrons can be accelerated.

TOPICS FOR PRELIMS (ENVIRONMENT)

Cali Fund

Context:

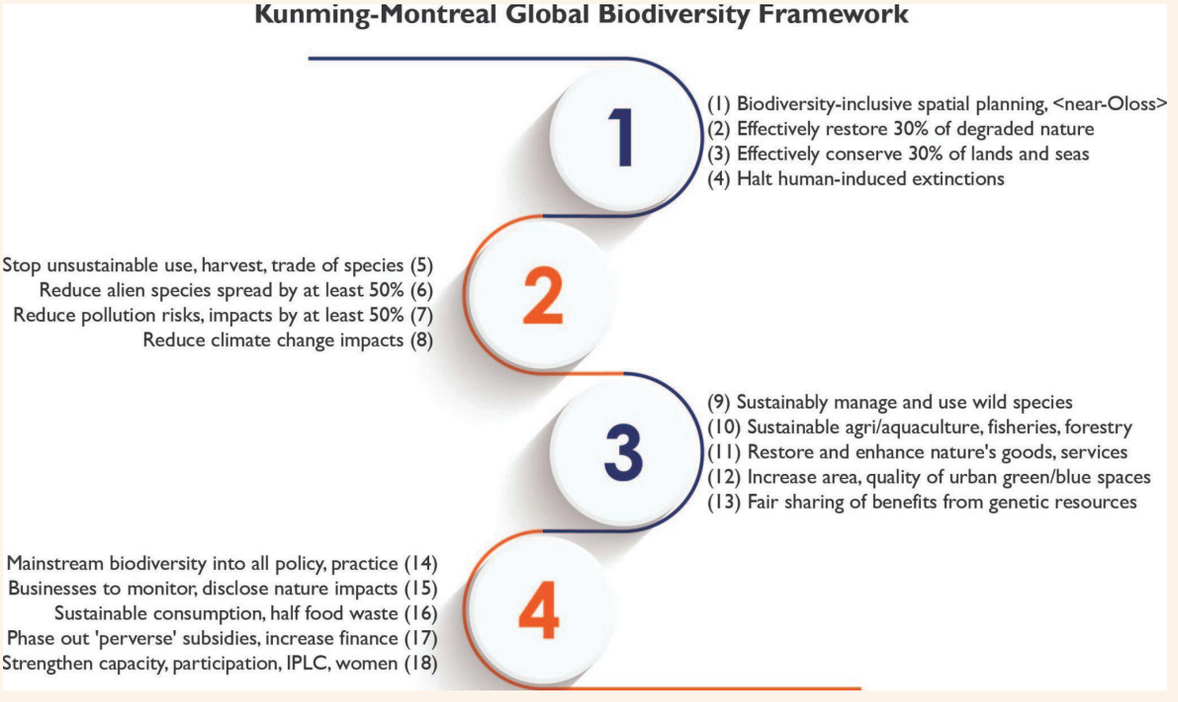
Cali Fund was launched at the COP16 to the United Nations Convention on Biological Diversity (CBD)

About Cali Fund

- It is a global financial mechanism designed to ensure equitable benefit-sharing from digital genetic resources.
- **Hosted by:** It will be hosted by Multi-Partner Trust Fund Office (MPTFO) in a partnership between UNDP, UNEP, CBD Secretariat.
- **Funding:** It will receive contributions from private sector entities making commercial use of Digital Sequence Information on Genetic Resources (DSI).
  - At least 50% of the fund's resources will be allocated to indigenous peoples and local communities.
  - It will aid implementation of the Kunming- Montreal Global Biodiversity Framework (KMGBF).
- It is the first global biodiversity fund under the UN to receive direct contributions from businesses that benefit from biodiversity.

Kunming-Montreal Global Biodiversity Framework (GBF)

- It consists of four long-term goals for 2050 and 23 targets to be achieved by 2030 to halt and reverse global biodiversity loss.
- Its cornerstone is the target to conserve 30% of the world's land and 30% of the world's oceans by 2030, widely known as the **30×30 pledge.**
- It is **non-legally binding.**



Cities Coalition for Circularity (C-3)

Context:

India has launched the C-3 initiative at the 12th Regional 3R and Circular Economy Forum in Asia and the Pacific that was held in Jaipur.

About Cities Coalition for Circularity (C-3)

- It is a multi-nation alliance focused on: City-to-city collaboration, Knowledge-sharing & Private sector partnerships.
- Its goal is to promote sustainable urban development through waste management and resource efficiency in the Asia-Pacific region.
- C-3 will function as a digital platform for knowledge exchange, enabling cities, technical institutions, and technology providers to collaborate effectively.
- **Objectives of C-3:**
  - **Promote Circular Economy:** Encourage the adoption of the **3R principles—Reduce, Reuse, Recycle**—to minimize waste and optimize resource utilization.

  - **Enhance Knowledge Sharing:** Facilitate the exchange of technical expertise and best practices among member cities and stakeholders.

Regional 3R and Circular Economy Forum in Asia & the Pacific

- This forum promotes **3R principles (Reduce, Reuse, Recycle)** and **Circular Economy** in the **Asia-Pacific region**.
- It was launched in **2009**, under the aegis of the **United Nations.**
- It provides a **platform for policy dialogue, knowledge exchange, and capacity building** on sustainable waste management.

Jaipur Declaration

- It is a non-political, non-binding commitment to guide sustainable urban development in the next decade.
- It focuses on resource efficiency, circular economy and waste management.
- It was announced by, Union Minister of Housing & Urban Affairs, during the 12th Regional 3R and Circular Economy Forum in Asia & the Pacific.

7th Meeting of the National Board for Wildlife

Context:

The Indian Prime Minister chaired his first NBWL meeting at Gir National Park, Junagadh, Gujarat.

Key announcements made:

- **Expansion of Project Cheetah:** New locations for cheetah introduction: **Gandhisagar Sanctuary**, Madhya Pradesh, **Banni Grasslands**, Gujarat
- **Project Lion – ₹2,900 Crore Allocation:** Aims to increase the range of Asiatic Lions across the Saurashtra region.
  - Next population estimation of Asiatic Lions to begin in **May 2025 (done every 5 years, last in 2020).**
- **New Wildlife Conservation Initiatives:**
  - **Project for Gharial Conservation** launched to protect India's **dwindling gharial population**.
  - National **Great Indian Bustard (GIB)** Conservation Plan.
  - New scheme for **conservation of tigers outside tiger reserves.**
- Establishment of Centre for **Human-Wildlife Conflict Management-** To be set up at **Salim Ali Centre for Ornithology and Natural History, Coimbatore**.
- Foundation Stone for **National Referral Centre for Wildlife (Junagadh, Gujarat)-** It will act as **India's hub for wildlife health and disease management**.
- Use of **AI, Remote Sensing, and Geospatial Mapping** for Conservation for forest fire prevention and human-animal conflict management.

About National Board for Wildlife

- **Formation:** In 2003 (Statutory Body under Wildlife Protection Act,1972)
- **Composition:**
  - **Chairperson:** The Prime Minister of India
  - **Vice-Chairperson:** The Union Minister of Environment, Forests and Climate Change
  - **Members - 47**
    - **Members of Parliament (3):** 2 (Lok Sabha) + 1 (Rajya Sabha)
    - **5** representatives from NGOs.
    - **10** eminent ecologists, conservationists and environmentalists.
    - Other Members including **Chief of Army Staff, Secretaries** of key ministries: Information & Broadcasting, Defence, Tribal Affairs etc.

Standing Committee of NBWL:

- **It is a sub-body of NBWL delegated with key decision-making powers.** It is responsible for evaluating development projects affecting protected areas or forest lands within 10 km of national parks and wildlife sanctuaries.
- **Chairman:** The Union Minister of Environment, Forests and Climate Change
- **Members:** Up to **10** members nominated by the Vice-Chairperson from the NBWL's members
- It meets every **3** months.
- The standing committee's decisions are **recommendatory**, which the environment ministry can **overrule**.

Note: No Alteration of boundaries in national parks and wildlife sanctuaries can be done without the approval of the National Board for Wildlife.

First Estimate of Gangetic Dolphins in India

Context:

India has conducted its first-ever detailed population survey of Gangetic dolphins, the only riverine dolphins in the country.

Key Findings of the Population Survey

- Total population estimate: 6,234
  - Ganga basin population: 5,689
  - Brahmaputra basin population: 635
  - Beas River: 3 (Indus River Dolphins).
- State-wise Dolphin Population:
  - Uttar Pradesh: 2,397 (highest)
  - Bihar: 2,220
  - West Bengal: 815

  - Assam: 635
- Bihar: Most dolphin-friendly state due to ideal river morphology and higher water depth.
  - Hausa-Manihari stretch (590 km): 1,297 dolphins, making it one of the densest populations in India.

Note: The study was conducted by the Wildlife Institute of India (WII) along with state forest departments and non-profit organizations like Aaranyak, WWF, Turtle Survival Alliance and Wildlife Trust of India.

About Gangetic Dolphins

- **Habitat:** Found in the Ganges and tributaries of the river Brahmaputra. (In India and Bangladesh. In India, they are found in the states of UP, MP, Rajasthan, Bihar, and Assam, Jharkhand and West Bengal.

- **Characteristics:**
  - They only live in freshwater
  - Act as an indicator species, indicating the health of the river.
  - They are blind and hunt using ultrasonic sound.
  - It is also known as susu. Susu refers to the noise made by the dolphin when it breathes.
- **Major Threats**
  - Accidental entanglement in fishing nets.
  - Pollution (chemical waste, sewage, industrial effluents).
  - Habitat destruction due to river modifications like dams and barrages.
  - Some dolphins are opportunistically killed for their blubber oil, used as bait for catfish fishing in India and Bangladesh.
- **Conservation Status**
  - IUCN: Endangered
  - CITES: Appendix I
  - WPA: Schedule I
- **Conservation Initiatives for the Gangetic Dolphin**
  - **Dolphin Sanctuary:** Vikramshila Ganges Dolphin Sanctuary was established in Bihar in 1991 under the Wildlife Protection Act, of 1972.
  - **Conservation Action Plan for the Ganges River Dolphin 2010-2020:** It identified the major threats to Gangetic Dolphins and aimed to mitigate the issues.
  - **National Aquatic Animal**: In 2009, the Gangetic River dolphin was declared as the national aquatic animal of India.
  - **National Ganga River Dolphin Day**: Celebrated on 5th October.
  - The first **National Dolphin Research Centre** has been established on the premises of Patna University in Bihar.
  - **Project Dolphin**: It is a project under Arth Ganga, to be designed and implemented on the lines of Project Tiger.
    - It is a 10-year-long project that seeks to conserve both riverine and oceanic dolphin species.

Types of River Dolphins

- **Facultative River Dolphins** (Found in Both Freshwater & Marine Environments)
  - Irrawaddy dolphins: Found in Chilika Lake (India) and the Sundarbans.
    - Estimated population in Chilika Lake: 155.
  - Other facultative dolphins worldwide:
    - Tucuxi (Amazon and Orinoco rivers).
    - Yangtze finless porpoise (China).
- **Obligate River Dolphins** (Only Found in Freshwater Bodies)
  - **Yangtze River Dolphin (China):** Presumed extinct, last seen in 2007.
  - **Amazon River Dolphin:** Over 2.5 meters long, distinctive pink colour.
  - **Ganges River Dolphin:** Found in the Ganges and Brahmaputra rivers and some tributaries.
    - One of the largest river dolphins (over 2.5 meters).
  - **Indus River Dolphin:** Closely related to the Ganges dolphin.
    - State aquatic animal of Punjab.
    - Found in River Beas and Harike wetlands (Tarn Taran district, Punjab).
    - Only 3 dolphins were found in the study.
    - Pakistan's Indus River has ~1,800 dolphins.

World Sustainable Development Summit, 2025

Context:

Recently the World Sustainable Development Summit, 2025 was organized by TERI. The theme for this year was "Partnerships for Accelerating Sustainable Development and Climate Solutions."

About World Sustainable Development Summit (WSDS)

- WSDS is a premier international conference focusing on sustainability, climate action, and environmental policies.
- It is organized annually by The Energy and Resources Institute (TERI).

- The summit brings together global leaders, policymakers, scientists, industry experts, and civil society to discuss and develop solutions for pressing environmental challenges.
- Key Objectives of WSDS:
  - Promoting Sustainable Development – Encouraging policies and actions that balance economic growth with environmental responsibility.
  - Climate Action & Policy Discussions – Addressing global climate challenges through partnerships and policy recommendations.
  - Bridging the North-South Divide – Ensuring that developing nations (Global South) have a strong voice in climate negotiations.

The Energy and Resources Institute (TERI)

- TERI is a research and policy think tank in India that works to create a sustainable future.
- It was established in **1974 by the Tata Group.**
- **Focus Areas:** Sustainable development, climate change, energy efficiency, environmental conservation and green technologies.

Key Initiatives by TERI:

- **WSDS (World Sustainable Development Summit)** – Annual global event on sustainability.
- **TERI School of Advanced Studies (TERI SAS)** – Academic institution focused on environmental and sustainability studies.
- **Lighting a Billion Lives (LaBL)** – Initiative to promote solar lighting in rural India.
- **Griha (Green Rating for Integrated Habitat Assessment)** – A green building certification system to promote sustainable architecture.

Solar Fencing/ Ele Fence

Context:

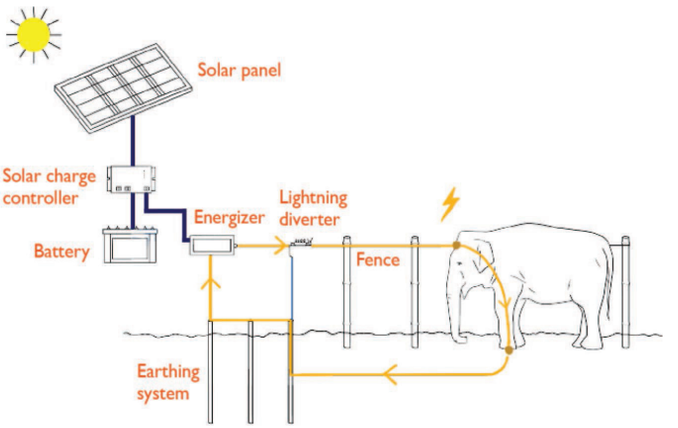
The Kerala Forest department has initiated the construction of a solar fence in Kannur district to prevent wild elephants from straying into human settlements.

About Ele- Fence

- Ele-Fencing (Electric Fencing) refers to the use of electrified barriers to prevent animals, especially elephants, from entering human habitations or agricultural fields.
- It is also called Solar Fencing when powered by solar energy.
- Elephants (and other animals) receive a non-lethal shock when they stand on the ground and touch the fence.

How does a power fence work ?

- Electricity needs to travel in a complete loop for a circuit to work. In an incomplete circuit, the flow of electricity will stop.
- Similarly, in a single-strand fence, an electric shock will be received only when the circuit is complete.
- When an elephant touches the live wire, the current can flow from the fence, through the body of the elephant, into the ground, and back to the energizer, completing the circuit and giving a non-lethal shock to the elephant.



Alternative Methods for Conflict Mitigation

- **Bio-fencing**: Using thorny plants or chili-based fences as a natural barrier.
- **Early Warning Systems**: SMS alerts, drones, and AI-based tracking of elephant movements.
- **Community Participation**: Involving local communities in monitoring and maintenance of fences.

State of the Cryosphere, 2024

Context:

According to the UNESCO report State of the Cryosphere 2024, glaciers are melting at an unprecedented rate, contributing to rising sea levels.

Key Findings of the Report

- Glaciers worldwide are disappearing faster than ever. The last three years have seen the largest glacial mass loss on record.
- Total ice loss since 1975: 9 trillion tonnes. Equivalent to an ice block the size of Germany with a thickness of 25 metres.
- 2024 glacier loss: 450 billion tonnes.
- **Major Consequences of Glacier Melt**
  - **Contribution to Sea Level Rise:** Mountain glaciers are now one of the largest contributors to rising sea levels.
    - Between 2000-2023, melting glaciers contributed 18 mm to global sea level rise (~1 mm per year).
    - Each millimetre of sea level rise exposes up to 300,000 people to annual flooding.
  - **Threats to Water Security:** Presently, 275,000 glaciers remain worldwide.
    - Glaciers, along with Antarctic and Greenland ice sheets, store about 70% of the world's freshwater.
    - 1.1 billion people live in mountain communities that depend on glaciers for water.

- Increased glacier loss leads to unreliable water sources, affecting: Drinking water supplies & Agriculture and hydroelectric power production.

– **Increased Natural Disasters:** Rising temperatures are causing more frequent and severe natural hazards, including:
  - Droughts in regions that depend on snowmelt for freshwater.
  - Avalanches and landslides.
  - Flash floods and Glacial Lake Outburst Floods (GLOFs).

Offshore Mining and the Protests in Kerala

Context:

The Kerala government and fishing communities are strongly opposing the Centre's offshore mining plan due to its potential environmental and economic impacts.

About Offshore Mining

- Offshore mining refers to the extraction of minerals and resources from underwater areas such as the continental shelf, exclusive economic zone (EEZ), and other maritime zones. These resources include:
  – Polymetallic nodules (rich in manganese, nickel, cobalt and copper).
  – Lime-mud & Construction-grade sand.
- **Offshore Areas Mineral (Development and Regulation) Act, 2002 (OAMDR Act):**
  – Regulates mining activities in India's maritime zones.
  – Earlier, offshore excavation was controlled by government bodies like: Geological Survey of India (GSI), Indian Bureau of Mining & Atomic Minerals Directorate
  – **2023 Amendment:**
    - Allowed private sector participation through competitive auction.
    - Opened offshore mining for minerals like polymetallic nodules, lime-mud and sand.

Legal Framework and Jurisdiction Issues

- The OMDR Act defines "offshore areas" as territorial waters, continental shelf, EEZ and other maritime zones.
- Mining rights in offshore areas belong to the Union Government.
- Fishing rights up to 12 nautical miles are under state jurisdiction (as per the Seventh Schedule of the Indian Constitution).
- Union Mining Ministry's Stand:
  – The 3 proposed blocks off the Kollam coast are beyond 12 nautical miles, meaning they fall under Central jurisdiction and not under Kerala's control.

Key Offshore Mining Blocks and Reserves

- **First tranche of e-auction (November 2023)** → 13 offshore blocks for mining:
  – 3 off the Kerala coast
  – 3 off Gujarat
  – 7 in Andaman & Nicobar Islands
- **Mining lease:** 50 years
- **Kerala Offshore Sand Deposits:**
  – **Study by GSI:** Kerala offshore has **745 million tonnes of construction-grade sand**.
  – **Kollam Coast Blocks:**

° **300 million tonnes of sand** deposits found in 3 proposed blocks.

° Located at a depth of **48 meters to 62 meters** in the sea.

Concerns Raised by the Fishing Community & Environmentalists

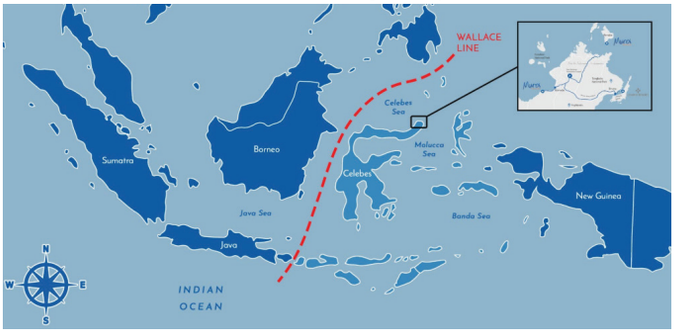
- **Impact on Marine Ecosystem and Fisheries:** The **Kollam Parappu (Quilon Bank)**, located off the south-west coast of India, is one of the most productive fishing grounds in the region.
  – Any mining activity in this area poses a serious threat to marine biodiversity and could significantly reduce the marine fish catch.
- **Effects of Seabed Mining** include:
  – **Clouding of water**, which reduces light penetration and shrinks the **euphotic zone**, thereby limiting photosynthesis.
  – **Sediment plumes** generated by mining can spread over thousands of square kilometres, disturbing marine habitats and organisms.
  – The **release of toxic substances** during mining may poison marine life and severely disrupt aquatic ecosystems.
- **Impact on Fishermen's Livelihoods:** Fishing is the primary source of livelihood for nearly 11 lakh fishermen living in 222 fishing villages across Kerala.
  – Seabed mining could decrease fish populations, while the introduction of large mining vessels may interfere with traditional fishing routes, endanger smaller boats, and compromise the safety of local fishermen.
- **Economic Concerns:** Despite these local impacts, all mining royalties are allocated to the Central government, leaving no direct economic benefit for the state of Kerala or its coastal communities.

Species in news

Species	Details
Olive Ridley Sea Turtles 	• They are the 2nd smallest and most abundant of all sea turtles found in the world. – Smallest sea turtle in the world: Kemp's ridley sea turtle. – Largest Sea turtle: Leatherback Turtle • It gets its name from the olive green colouration of its carapace (shell). • **Features:** – They are known for unique arribadas (synchronized mass nestings). – Males and females grow to the same size, but females have a slightly more rounded carapace. – They are omnivorous, meaning they feed on both plants and animals. • **Distribution:** Mainly found in warm waters of the Pacific, Atlantic and Indian oceans. • **Conservation Status:** – IUCN Red List: Vulnerable – Wildlife Protection Act, 1972: Schedule I – CITES: Appendix I • **Arribada (Spanish for 'arrival')** refers to the synchronised mass nesting of thousands of female turtles. • Unique to the genus Lepidochelys, which includes Olive Ridley and Kemp's Ridley turtles. • **Global Arribada Sites:** – Largest: Odisha, India – Rushikulya & Gahirmatha rookeries. – Other major sites: Mexico and Costa Rica. 
Marbled Cat 	• It is a small, elusive wild cat species found in the forests of South and Southeast Asia. • **Characteristics:** – It has **dense, soft fur** with a **marbled pattern** of dark blotches and stripes. – They are **excellent climbers**. – It has a **Long tail**, often **equal to or longer than its body length**, aiding in balance on trees. – The species is **territorial** and marks its territory with **urine and scent marking.** – **Social Behavior:** Solitary and elusive, rarely seen in the wild. • **Distribution:** Native to **South and Southeast Asia** – In India, it is generally found in the forests of **Northeastern states,** including Arunachal Pradesh, Assam, Meghalaya and Nagaland. • **Conservation Status:** – **IUCN:** Near Threatened – **CITES:** Appendix-I – **WPA:** Schedule-I

Species	Details
Caracal 	• Caracals are **medium-sized wild cats** native to **Africa, the Middle East, Central Asia, and South Asia**. • They are primarily **nocturnal** and known for their **distinct, pointed black ears**. • Its name is derived from the **Turkish word 'karakulak'**, meaning **black ears**. • Caracals are mentioned in medieval Indian texts like: **Khamsa-e-Nizami, Shahnameh & Tutinama.** – They were used by Indian royalty for **hunting birds**. • **Conservation Status:** – **WPA -** Schedule I. – **IUCN -** Least Concern. – It is listed in **Critically Endangered** category by the **National Board for** – **Wildlife in India.** • **Sharp Population Decline:** – Historically caracals were found in **13 Indian states**. – By **2000** → Population reduced **by 50%**. – From **2001 to 2020** → Further **95% decline**. – Now restricted to an area of **16,709 sq km** (less than **5%** of its historical range). – Currently, only **50 caracals** remain in India, found in only 2 states-Rajasthan **and Gujarat.**
Long Billed Vulture 	• **Habitat:** Open grasslands, savannas, and forested regions, found in various states including Rajasthan, Madhya Pradesh, and others • It is distinguished by its long and slender bill, ideal for tearing flesh and accessing the bone marrow. • **Conservation status:** – **IUCN:** Critically Endangered – **CITES:** Appendix II – **Wildlife Protection Act 1972:** Schedule I – **Convention on Migratory Species (CMS):** Appendix I

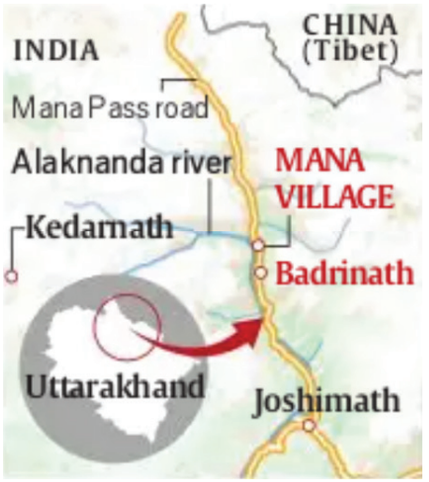
News in Short

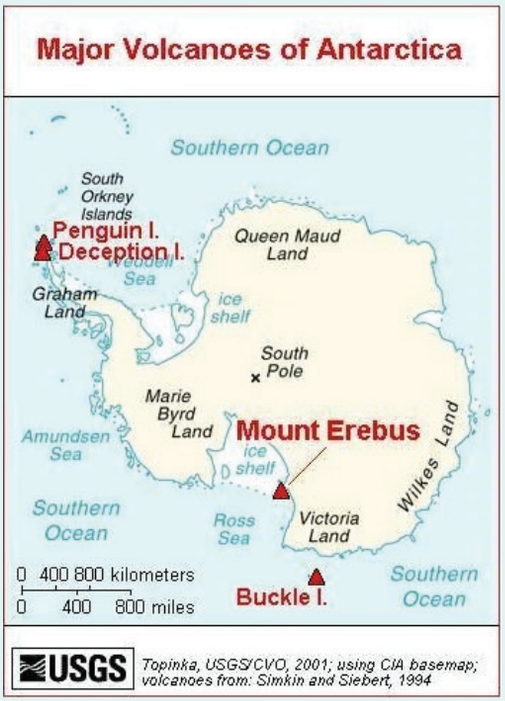
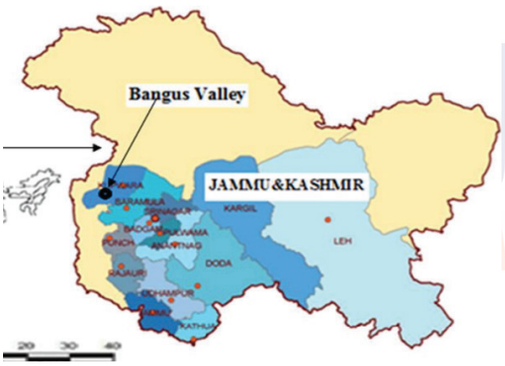
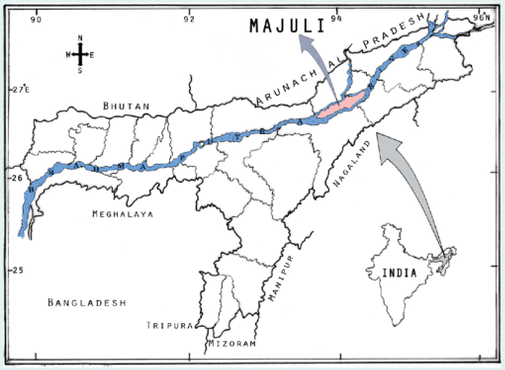
Topic	Details
Wallace Line	• Wallace Line is an invisible biogeographical boundary that separates the unique faunas of Asia and Australia. • It was first proposed by Alfred Russel Wallace, an English naturalist, in the late 19th century after observing a dramatic shift in species composition as he moved through the Malay Archipelago. **Importance of the Wallace Line Today** • **Ecological and Conservation Significance:** – The Indo-Malayan archipelago has one of the highest rates of habitat destruction in the world. – **Understanding biogeography can help:** ° Predict how species will respond to habitat loss. ° Develop better conservation strategies to protect biodiversity. 

Topic	Details
Uplink Initiative	• UpLink is a World Economic Forum (WEF) initiative launched in January 2020 to support early-stage sustainability-focused innovators. • It serves as a digital crowdsourcing platform connecting entrepreneurs, investors and industry leaders to scale innovative solutions that address global environmental and social challenges. • UpLink primarily targets four major sustainability challenges: – Climate Action & Carbon Reduction. – Nature & Biodiversity Conservation. – Water & Waste Management. – Circular Economy & Sustainable Supply Chains.
Meliodosis	• Meliodosis is an emerging tropical disease caused by the bacterium Burkholderia pseudomallei. • Though curable, it kills 10%–50% of those affected, mainly due to missed detection, misidentification, delayed identification, and antibiotic resistance. • Mapping the occurrence of meliodosis in Odisha shows that infections are seasonal and tend to be highest during heavy rainfall, high humidity, high cloud cover, and low sunlight conditions, at temperatures of 23 to 29 degrees Celsius, and in coastal areas with high population densities. • Despite India being endemic for melioidosis, the disease is not on the notifiable list in India; its occurrence does not need to be reported to the government like rabies or cholera.
Orans	**News:** In T.N. Godavarman Thirumulpad v. Union of India, the Supreme Court recognized the socio-ecological and cultural importance of orans and ordered their protection. **Details** • Orans are sacred groves in Rajasthan, preserved by local communities since ancient times. • They are dedicated to local deities and have strong religious, ecological, and socio-economic significance. • These forests contribute to groundwater conservation by trapping surface runoff, supporting traditional water sources, and enhancing biodiversity.
World Water Day, 2025	**News:** The Ministry of Jal Shakti inaugurated the 6th edition of the Jal Shakti Abhiyan: Catch the Rain campaign 2025 on March 22, 2025, coinciding with World Water Day. **Details** • Jal Shakti Abhiyan: Catch the Rain campaign 2025: The campaign is centred around the theme: • "People's Action for Water Conservation – Towards Intensified Community Connect" (Jal Sanchay Jan Bhagidari: Jan Jagrukta Ki Or), emphasizing greater public involvement and awareness in water conservation efforts. – The "Jal-Jangal-Jan" Abhiyan was also launched with the objective of reviving the ecological interdependence between forests, rivers, and springs. • **World Water Day:** The day is dedicated to raising awareness about water conservation and promoting its sustainable use. – It was proposed during the 1992 Rio Earth Summit, it was officially adopted by the United Nations General Assembly in 1993. – The theme for 2025 is Glacial Preservation.
Life Discovered Under Antarctic Ice Shelf	**News**: A team of scientists discovered dozens of new species, including giant sea spiders, octopi and corals, in an unexplored underwater world beneath the Antarctic ice shelf. **Details:** • This discovery was made possible after the A-84 iceberg, which measured 510 sq km (about 2.5 times the size of Kolkata), broke away from the George VI Ice Shelf. • This discovery is part of Challenger 150, a UNESCO-endorsed global initiative for deep-sea research. • New Species Found: Giant sea spiders, octopi, corals, jellyfish and sponges.

Topic	Details
Miller-Urey Hypothesis	**News:** A new study suggests that water sprays from crashing waves and waterfalls, rather than lightning, may have triggered the formation of organic compounds essential for life on Earth. **Details:** • The Miller-Urey experiment (1952) showed that organic molecules like amino acids could form on early Earth when electricity (lightning) interacted with gases like methane, ammonia, hydrogen, and water. • These organic molecules with carbon-nitrogen bonds are essential for forming life's basic components—proteins, enzymes, and nucleic acids. • A 2024 study challenges the need for lightning, proposing that charged water droplets (like from waves or waterfalls) could generate tiny sparks (microlightning) capable of starting organic reactions. • As water droplets split, they carry opposite charges; their interactions may have created the electrical energy needed to kickstart life—no lightning storms required.
Mission Amrit Sarovar	**News**: Indian Railways will desilt, excavate and construct new water bodies near railway lines as part of Mission Amrit Sarovar. **Details** • It was launched on 24th April 2022 by the Government of India to develop and rejuvenate 75 water bodies in each district of the country. • It aims to promote water conservation and improve groundwater recharge. • Target: Construct or rejuvenate 50,000 Amrit Sarovars across India. – As of October 2024, over 68,000 ponds have been completed across the country. • Size: Each water body will have an approximate area of one acre and hold around 10,000 cubic meters of water. • The initiative is being implemented through convergence of various government schemes- MGNREGA, Pradhan Mantri Krishi Sinchayee Yojana, AMRUT Mission, Jal Shakti Abhiyan etc. • Objectives of Mission Amrit Sarovar: – Water Conservation and Rainwater Harvesting. – Increase Groundwater Recharge. – Sustainable Development & Rural Employment – Promote Community Participation.
Taj Trapezium Zone	**News:** The Supreme Court has directed the Forest Research Institute (FRI) to carry out a tree census in the Taj Trapezium Zone (TTZ) **Details** • TTZ is a defined area of 10,400 sq km around the Taj Mahal to protect the monument from pollution. • It comprises monuments including three World Heritage Sites: Taj Mahal, Agra Fort and Fatehpur Sikri. • It spreads across Agra, Firozabad, Mathura, Hathras and Etah districts in Uttar Pradesh and Bharatpur district in Rajasthan. • Objective: To control pollution and preserve the Taj Mahal from environmental degradation. • The Union government has constituted "Taj Trapezium Zone Pollution (Prevention and Control) Authority" under Environment Protection Act, 1986. • TTZ has four zones named , Green, Orange and White.
Biodiversity leakage	**News**: In wealthy nations, local restoration of agricultural landscapes to meet biodiversity targets can cause 'net harm' due to biodiversity leak. **Details** • Biodiversity leakage happens when efforts to protect nature in one place unintentionally lead to environmental harm in another place. • This occurs when conservation efforts reduce farming, logging, or other production activities in one country, causing those activities to shift to another country—often one with more biodiversity.

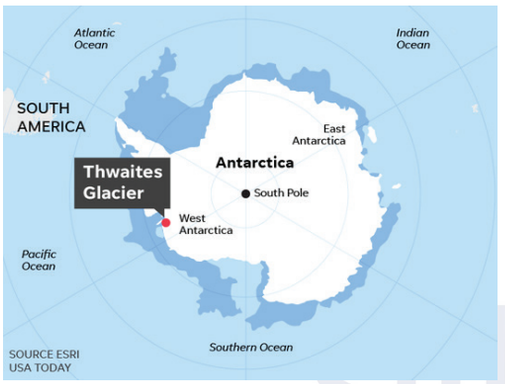
Places in News

Place	Details
Mana, Uttarakhand 	**News:** An avalanche struck a Border Roads Organization (BRO) project site near Mana village in Uttarakhand's Chamoli district. • The site is located between Mana village and Mana Pass, near the Indo-Tibetan border. • It is Located at **10,500 feet above sea level,** along the Alaknanda River. • It was previously called the **"last village of India",** now officially termed the **"first Indian village"** before the China border. • **Seasonal Migration:** – November to April: Villagers migrate to lower altitudes, primarily Gopeshwar (100 km away), to escape extreme winter. – April-May: Residents return when the Char Dham Yatra begins.
Torkham border Crossing 	**News:** A member of the Afghan forces died in a firing incident between Pakistani and Afghan forces at the Torkham border. • **Torkham** is a **major border crossing** between **Pakistan's Khyber Pakhtunkhwa province** and **Afghanistan's Nangarhar province**. • It is part of the **historic Khyber Pass**, a crucial trade and military route for centuries. • It is a key route for the movement of **goods, people, and aid** between the two countries. • Afghanistan relies on it for access to **Pakistan's seaports and global markets**.
Lake Tanganyika 	**News:** Recently, the countries bordering Lake Tanganyika Basin have launched a five-year project to assess and address transboundary threats to the biodiversity of this lake basin. • **Location:** Central Africa • **Bordering Countries:** Burundi, Democratic Republic of the Congo (DRC), Tanzania and Zambia. • It is the **second-largest freshwater lake in the world by volume** and the **second-deepest lake globally**, after Lake Baikal. • Also It is the **longest freshwater lake in the world.** • **Main Inflows: Ruzizi River** (from Lake Kivu), **Malagarasi River** (from Tanzania), **Kavuu and Lufubu Rivers** (from Zambia).

Place	Details
Mount Erebus 	**News**: Scientists exploring Erebus's ice caves have found a thriving microbial ecosystem. These bacteria and fungi are flourishing in complete darkness, far from any source of sunlight. • **Location:** Ross Island, Antarctica. • It is the **southernmost active volcano on Earth.** • It was discovered in **1841** by British explorer Sir James Clark Ross, named after his ship HMS Erebus. • It has an **active lava lake.** • It is part of the **Ring of Fire** that encircles the Pacific Ocean basin. • It is one of only two volcanoes on the continent that are considered to be active; **Deception Island** is the other.
Bangus Valley 	**News:** The Jammu and Kashmir government has announced new ecotourism policies for Bangus Valley. • **Location:** Kupwara, Jammu & Kashmir,in the Pir Panjal range, close to the Line of Control (LoC). • It has **Two bowl-shaped meadows** surrounded by dense forests and snow-capped mountains. • **Biodiversity:** Home to 50+ animal species and 10+ bird species. • The valley is surrounded by Rajwar and Mawar in the east, Shamasbury and Dajlungun Mountains in the west and Chowkibal and Karnah Guli in the north.
Majuli Island 	**News:** Increasing human-wildlife conflicts on Assam's Majuli River Island are endangering the livelihoods of the local farming community. • **World's largest river island**, located on the **Brahmaputra River** in Assam. • **Declared a district in 2016** (India's first island district). • Rich in **wetlands, forests, and diverse wildlife**. • It was formed due to course changes by the river **Brahmaputra** and its tributaries, mainly the **Lohit**. • It is home to **Vaishnavite monasteries (Satras)**, founded by **Srimanta Sankardeva** in the 15th century.

Place	Details
Barbados 	**News**: Recently Barbados has conferred the **'Honorary Order of Freedom of Barbados'** on **Prime Minister Narendra Modi** for India's crucial assistance to Barbados during the COVID-19 pandemic. • **Location:** An island country in the **southeastern Caribbean Sea.** • Barbados is **not part** of the nearby archipelago of the **Lesser Antilles**, although it is usually grouped with it. • **Lesser Antilles** is a long arc of small islands in the Caribbean Sea extending in a north-south direction from the **Virgin Islands to Grenada.** • **Independence:** Gained independence from the **United Kingdom in 1966**. • **Republic Status:** Became a **republic on November 30, 2021**, replacing the British monarchy with a **President as Head of State**.
Latakia (Syria) 	**News:** According to the Syrian Observatory for Human Rights (SOHR), Syrian security forces have executed dozens of Alawite civilians in the coastal province of Latakia. • **Location:** A **coastal province** in northwestern **Syria**, bordering the **Mediterranean Sea**. • **Historical Significance:** – Stronghold of the **Alawite minority** and the **Assad family**. • **Strategic Importance:** – Home to **Russia's Hmeimim Air Base**, a **crucial military installation**. – Major **port city** and economic hub. • **Syria Bordering Countries:** Turkey, Iraq, Jordan, Israel and Lebanon. • **Syria Population:** Around 22 million people before the war, now significantly reduced due to displacement. • **Religious Composition:** Majority Sunni Muslim – **Alawites (10% of the population)**, an offshoot of **Shia Islam**. – Other minorities include **Christians, Druze, and Kurds**.
Dnipro/Dnieper River 	**News**: Russian forces are making repeated high-casualty attempts to cross the Dnipro River in Ukraine's Kherson region. • It is the **longest river in Ukraine** and the **fourth longest in Europe**. (2200 km) • **Origin:** Valdai Hills, Russia. • **Flows through: Russia, Belarus, and Ukraine**, before emptying into the **Black Sea**. • **Divides Ukraine into east and west**, making it a **natural military barrier**. • **Role in the War:** – **Kherson region** is located at the **mouth of the Dnipro**, making it a **critical zone** in the conflict.

Place	Details
Darvaza Gas Crater 	• **Location:** Karakum Desert, Turkmenistan, near the village of Darvaza (Derweze). • It is also known as the **"Door to Hell"**. • It has been burning for over **five decades**, emitting flames and heat • The crater is **one of Turkmenistan's most famous landmarks**. • Tourists visit the site for **camping and photography**, especially at night. • **How Did It Form?** – In **1971**, **Soviet geologists** were conducting **drilling operations** in search of **natural gas reserves**. – The ground beneath their drilling rig **collapsed**, creating a **huge sinkhole** about **69 meters.** – To prevent the release of **poisonous methane gas**, scientists **set the crater on fire**, expecting it to burn out in a few weeks. – However, **it has continued burning for over 50 years** due to **abundant natural gas reserves** underground.
North Sea 	**News:** Recently, a massive fire broke out in the North Sea due to a collision between a U.S. military-chartered tanker and a cargo ship. • **Location:** between the British Isles and the mainland of northwestern Europe. It is an **arm** of the **Atlantic Ocean.** • **Bordering Countries:** Norway, Scotland, England, France, Belgium, Netherlands, Germany and Denmark. • It connects to the Atlantic Ocean via the English Channel and to the Baltic Sea through the **Kattegat and Skagerrak Straits.** • **Major Rivers draining in North Sea:** Forth, Elbe, Scheldt, Thames, Humber. • **Major Ports: Rotterdam** (busiest port in Europe), Antwerp, Hamburg etc.
Fuego Volcano 	**News:** A powerful eruption of Guatemala□s Volcán de Fuego recently triggered strong explosions, pyroclastic flows, endangering nearby communities. • **Location:** It is a stratovolcano located in **Guatemala**, southwest of Guatemala City. • It is one of Central America's most active volcanoes. • **Guatemala lies on the Pacific "Ring of Fire"** and experiences frequent seismic and volcanic activity. • **Guatemala Bordering Countries:** Mexico, Belize, Honduras and El Salvador.
Yemen - Sadaa City 	**News:** Recently the United States launched large-scale airstrikes on Houthi rebels in Yemen. Strikes targeted **Sanaa (Yemen's capital) and Saada (Houthi stronghold on the Saudi border)**. • The Houthis are an armed political and religious group representing Yemen's Shia Muslim minority, the **Zaidis**. • The group originated in the **1990s** and derives its name from its late founder, **Hussein al-Houthi.** • Houthis control Yemen's capital, Sana'a, and the northwest of the country, including the strategic Red Sea coastline. • The **internationally-recognised government of Yemen** is based in the southern port of **Aden**. • **Yemen Bordering Countries:** Saudi Arabia & Oman

Place	Details
Mount Lewotobi Laki-Laki 	**News:** Recently Lewotobi Laki-Laki volcano erupted, spewing ash clouds over 8 km high, prompting the highest alert level and flight disruptions. • **Location:** Flores Island, southeastern Indonesia. • It is part of the **Lewotobi twin volcano complex**, comprising Lewotobi Laki-Laki (Male) and Lewotobi Perempuan (Female) stratovolcanoes. • **Strato volcano:** It is a large, steep-sided volcano that's formed by layers of hardened lava, ash, and other volcanic debris. They are known for their steep sides, **explosive eruptions and high viscosity magma.** • **Facts** – Indonesia has the most volcanoes in the world, including 120 active volcanoes and 126 total volcanoes, including six submarine volcanoes. – Most of Indonesia's volcanoes are located on the **Sunda Arc, a 3,000 km long chain.** – The volcanoes were created by the **subduction of the Indian Ocean crust under the Asian Plate**
Thwaites Glacier 	**News:** Researchers found that the glacier is melting rapidly and may be on an irreversible path to collapse, which could lead to a rise in global sea levels. • **Location**: West Antarctica, Part of the **West Antarctic Ice Sheet.** • **Nickname**: **Doomsday Glacier** (due to its potential to significantly raise sea levels) • It acts as a **natural barrier**, preventing inland glaciers from rapidly flowing into the ocean. • It **holds enough ice to raise global sea levels by ~3-5 meters** if fully melted. • It covers an area roughly the **size of Great Britain.**
Madhav National Park	**News:** The Central Government has officially declared Madhav National Park in Madhya Pradesh as India's 58th Tiger Reserve. • **Location:** Situated in Shivpuri district of Madhya Pradesh, in the Chambal region. • It lies within the Bundelkhand region, covering both plateaus and forests. • Madhav NP has a long history of being used as a **royal hunting ground** before its designation as a **national park in 1958**. – The **Scindia dynasty**, particularly the **Maharajas of Gwalior**, used the park as their **hunting preserve**. – It was named after **Madho Rao Scindia**, a prominent ruler of Gwalior. • **Rivers flowing:** Manihar. • **Wildlife and Biodiversity:** – **Tigers:** Currently, **five tigers** are present, including **two cubs**. – **Other Mammals:** Includes **leopards, hyenas, jackals, sambar deer, chital (spotted deer), nilgai (blue bull), chinkara (Indian gazelle), and wild boars**. – **Birdlife:** Painted storks, peafowls, white-breasted kingfishers and various migratory birds. – **Lakes:** Sakhya Sagar Lake. **(Wetland under Ramsar Convention) &** Madhav Sagar Lake.

Place	Details
Sikhna Jwhwlao National Park	**News:** Recently, Sikhna Jwhwlao National Park has been declared Assam's eighth national park**.** • **Location:** Chirang and Kokrajhar districts, Bodoland Territorial Region (BTR). – It lies along the **Indo-Bhutan border** & is part of **Chirang and Manas Reserve Forests.** • **Major Rivers**: Saralbhanga, Samukha, Champabati, Bhur, Laopani, Dholpani. • **Flora:** – **12 forest types**, including Moist Sal forests, Evergreen forests, Riparian forests, Savannah, and Khair-Sissoo forests. • **Fauna:** – Major population center for the endangered **Golden Langur.** It is found only in select parts of **India and Bhutan.** – **Other Wildlife**: Elephants, Tigers, Leopards, Spotted Deer, Hog Deer, Wild Pigs, Bison, Wild Buffalo, Monitor Lizards, Pythons, Porcupines, Tortoises, and various birds. • **Ecological Role:** – **Elephant Corridor**: Part of **Chirang-Ripu Elephant Reserve** (declared MIKE Site in 2003). – **Wildlife corridor** connecting **Manas and Raimona National Parks**. **Cultural & Historical Significance** • It is named after **Sikhna Jwhwlao**, a revered **Bodo warrior**. • Sikhna Jwhwlao fought in the **1866-68 battle between Bhutan and the British**. • His capital **Sikhanajhar** was in **Ultapani Reserve Forest**, now inside the National Park. • **Bathou Kherai Puja**, a major **Bodo religious festival**, is performed here annually.
Ramadevara Betta Vulture Sanctuary	**News:** The Ramadevara Betta Vulture Sanctuary has recorded its fourth consecutive year of successful breeding for the endangered long-billed vultures. • **Location**: It is located in **Ramanagara, Karnataka.** It is India's first and only vulture sanctuary. • It was established in **2012** to protect endangered vulture species. • The sanctuary is part of the **Ramadevara Betta hill range.** The hill is adorned with ancient temples, ruins and inscriptions. • **Vulture Species Found in the sanctuary:** – **Long-billed Vulture** – Critically Endangered – **Egyptian Vulture** – Endangered – **White-backed Vulture** – Critically Endangered
Shendurny Wildlife Sanctuary	**News:** Recently, two new species of jumping spiders have been discovered from Shendurney Wildlife Sanctuary. • **Location:** Western Ghat, Kerala (Kollam District). • It is part of **Agasthyamala Biosphere Reserve,** and shares boundary with **Kalakkad Mundanthurai Tiger Reserve and Nellai Wildlife Sanctuary of Tamil Nadu.** • **Rivers flowing:** Kallada River, Shendurney River • **Flora:** – It features **dense evergreen and semi-evergreen forests**. – **Important Plant Species**: Mishmi Teak, Cullenia exarillata, Myristica swamps (rare wetland ecosystems). • **Fauna:** – Elephant, Gaur, Sambar, Wild bear, Malabar giant squirrel, Nilgiri langur, Lion-Tailed macaque. • **Thenmala Eco-Tourism Project**: India's **first planned eco-tourism destination**. It is located inside **Shendurny WLS.**

INTERNATIONAL RELATIONS & INTERNAL SECURITY

TOPICS FOR MAINS

Evolving US and Russia Relation

Syllabus Mapping: GS-2- Policies of Developed Countries and Its Impact

Context

There has been a sudden thaw in relations between Russia and the United States with the return to office of President Donald Trump.

Historical Evolution U.S.-Russia Relations

US-Soviet Alliance during 2nd World War

- The United States and the Soviet Union, despite their ideological differences, formed a crucial alliance, primarily driven by the shared need to defeat Nazi Germany.
- This alliance, along with Great Britain, became known as the "Grand Alliance" and was crucial for defeating the Axis powers.
- The US provided significant military and economic aid to the Soviet Union through the Lend-Lease program, which supplied the Soviet Union with vital goods like tanks, airplanes, and food.
- Despite the alliance, tensions and ideological differences persisted between the US and the Soviet Union.

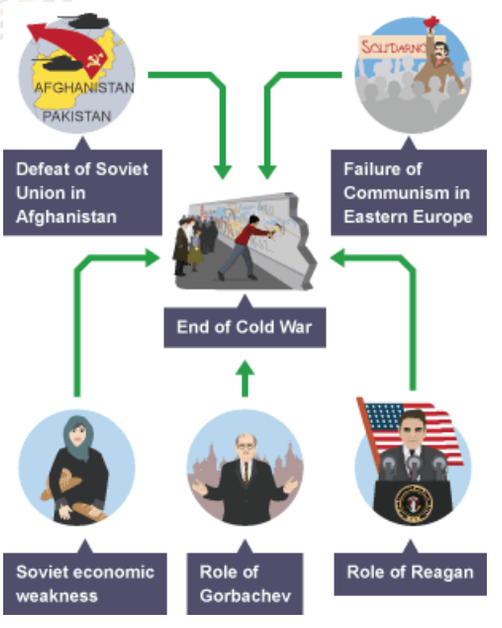
Cold War Era (1947-1991)

- After World War II, the U.S. and the Soviet Union (USSR) became geopolitical rivals, leading to the Cold War.

Cold war

- It is an ideological war between Capitalism and liberal ideology led by the USA and Communism led by the USSR.
- **Arena of Cold War:** The rivalry was marked by ideological opposition (capitalism vs. communism), nuclear arms race, proxy wars (Korea, Vietnam, Afghanistan), and political standoffs (Cuban Missile Crisis, Berlin Blockade), Space race.
- **Why this is called Cold war:** As there was no direct war between the USSR and the USA but indirectly through proxies, mostly in third-world countries.
- **Formation of the military Bloc:** US formed NATO and Southeast Asia Treaty Organization (SEATO), whereas Russia formed the WARSAW pact

- The 1970s saw détente, with arms control agreements like **SALT I & II, strengthening of trade** and cultural exchanges.
- However, the 1980s saw renewed tensions, particularly with the Soviet invasion of Afghanistan (1979) and Reagan's Strategic Defense Initiative (SDI).
- The Cold War ended with the **dissolution of the Soviet Union in 1991**, leading to improved U.S.-Russia ties.



Post-Cold War (1991-2014)

- In the 1990s, U.S.-Russia relations were marked by cooperation but also tensions.
- Russia transitioned to capitalism with Western aid, but the economic crisis and NATO's expansion eastward (including Poland, Hungary, and Czech Republic in 1999) created resentment.
- The 2000s saw fluctuating ties, with cooperation on counterterrorism post-9/11 but tensions over NATO expansion, U.S. withdrawal from the **Anti-Ballistic Missile (ABM) Treaty**, and the 2008 Russia-Georgia War.
- Relations worsened with the **2014 annexation of Crimea**, leading to Western sanctions on Russia and deep distrust.

2014-Present: Deterioration and Possible Reset

- **Obama years (2014-2016)**: Sanctions on Russia after Crimea, increased NATO presence in Eastern Europe, and diplomatic isolation of Moscow.
- **Trump years (2017-2020)**: Attempted rapprochement with Russia but constrained by allegations of Russian interference in U.S. elections.
- **Biden years (2021-2024)**: Further deterioration due to **Russia's invasion of Ukraine in 2022**, leading to massive U.S.-led sanctions, military aid to Ukraine, and NATO expansion (Finland & Sweden).
- **Trump's return (2025)**: Potential thaw in U.S.-Russia ties, including diplomatic engagement, possible easing of sanctions, and a shift in U.S. policy from confrontation to strategic accommodation.

Instances of thaw in US-Russia Relation in Trump Era

- **Meetings for Ukraine:** Talks between the U.S. and Russia about peace in Ukraine are ongoing to find the common ground to end the conflict.
- **Nuclear Arsenal Reduction:** Trumps's Call for nuclear warhead reduction is welcomed by Russia
- **G7:** President Trump expressed a desire for Russia's return to the G7, calling its exclusion a 'mistake.'

Geopolitical Implications of Evolving U.S.-Russia Relations

- **Global Power Balance:** If U.S.-Russia ties improve, it could weaken the **China-Russia strategic partnership** and create a more multipolar world.
  - A Russian-American rapprochement might force China to recalibrate its foreign policy.
- **Impact on Ukraine & NATO:** Trump's potential disengagement from Ukraine could shift the war's dynamics in Russia's favour.
  - European allies may need to take greater responsibility for Ukraine's defense.
  - NATO's internal cohesion may be tested, particularly if Trump questions U.S. commitments.
- **Energy & Economic Implications** Lifting U.S. sanctions could revive Russia's economy, particularly in **oil, gas, and minerals**.
  - It may also impact global energy markets, reducing volatility in oil prices.
- **Arms Control and Security:** A new arms control agreement could emerge, reducing nuclear risks.
  - Russia may push for **a reduction in NATO military buildup in Eastern Europe**.
- **Shift in Global Alliances:** A U.S.-Russia thaw could impact existing alliances, including **BRICS and the Shanghai Cooperation Organisation (SCO)**, where Russia plays a key role.
  - It could also alter **U.S.-China competition**, leading to new geopolitical dynamics.

Implication For India:

- India could benefit from reduced U.S.-Russia tensions, allowing it to **maintain strong ties with both powers**.
  - It may also gain diplomatic flexibility in balancing relations with China, Russia, and the U.S.
- **Relaxation on sanction** i.e. on oil tankers and payments etc will benefit India in energy security and International trade.
  - Indian companies doing business with critical Russian defense suppliers like Rosoboronexport, United Shipbuilding can get relaxation from the dollar-based global financial system controlled by the U.S.
- **Arms diversification:** India can diversify its defence arsenal with procurement from both.
- **Alliance against China:** Global Political Shift in favour of Russia-China alliance can be broken down and Anti-China alliance can be formed which will benefit India.
- **Indo-Pacific Region:** Russia fears about emerging Indo-Pacific strategic concept as a counter to maintain its strategic position in Asia,will be ceased. It will help in countering the concern of Russia in initiatives like QUAD.

India And Mauritius

Syllabus Mapping: GS-2- Bilateral Relation

Context

Indian Prime Minister Narendra Modi visited Mauritius as the chief guest for the country's National Day celebrations.

Key highlights of the visit:

- Prime Minister was conferred with Mauritius' highest civilian award(Grand Commander of the Order of the Star and Key of the Indian Ocean)
- PM offered prayers at the sacred Ganga Talao
- PM inaugurated the Atal Bihari Vajpayee Institute of Public Service and Innovation.
- PM called Mauritius as 'Mini India and a bridge connecting India to the wider Global South.

India and Mauritius Ties

- **Historical and Cultural Ties**
  - **Indian Diaspora:** Nearly **70% of Mauritius' population** is of Indian origin, mainly descendants of indentured laborers brought by the British.
  - **French and British Rule:**
    - French rule (1700s): Indians from Puducherry were brought as artisans and masons.
    - British rule (1834–early 1900s): Around **500,000 Indian indentured laborers** arrived; two-thirds settled in Mauritius.
  - **Gandhi's Influence:** Mahatma Gandhi's visit in **1901** inspired political awareness and the importance of education and empowerment.
  - **Seewoosagur Ramgoolam:** Led the freedom struggle and became the first PM of independent Mauritius; had close ties with Indian leaders like Gandhi, Nehru, and Subhash Chandra Bose.
- **Political and Diplomatic Ties**
  - **Diplomatic Relations:** Established in **1948** after India's independence.
  - **Chagos Archipelago Dispute:** India supports Mauritius' territorial claim over the Chagos Islands.
  - **Political Influence:** Mauritius has been ruled mainly by two political families — the **Ramgoolams** and the **Jugnauths** — both maintaining strong ties with India.
- **Economic and Trade Cooperation**
  - **CECPA (Comprehensive Economic Cooperation and Partnership Agreement):**
    - Signed in **2021**, the first trade agreement between India and an African country.
    - Facilitates preferential access to each other's markets.
  - **FDI:**
    - Mauritius is the **second-largest source of FDI** into India after Singapore in FY 2023–24.
    - **Double Taxation Avoidance Agreement (DTAA)** signed in **1983** boosted Mauritius' position as an investment hub for Indian businesses.
  - **Indian PSUs in Mauritius:**
    - Bank of Baroda, Life Insurance Corporation (LIC), and NBCC operate in Mauritius.
  - **Development Assistance:**
    - India's assistance in the last decade = **$1.1 billion** ($729 million as lines of credit and $427 million as grants).
    - Key projects include the **Metro Express** and **96 small development projects** (51 inaugurated).
- **Defence and Maritime Security**
  - **Agaléga Island:**
    - Infrastructure developed for sea and air connectivity under the **2015 MoU**.
    - Facilities aid maritime surveillance and patrolling of Mauritius' **Exclusive Economic Zone (EEZ)**.
    - India mobilized assets to assist during **Cyclone Chido** in 2023.
  - **White Shipping Agreement:** Likely to be signed to enhance real-time data sharing between the Indian Navy and Mauritius authorities.
  - **First Responder:** India has provided rapid assistance during the **Covid-19 pandemic**, **Wakashio oil spill (2020)**, and **cyclones**.
- **Space and Technological Cooperation**
  - In **2022**, India assisted Mauritius in launching its first satellite under ISRO collaboration.

  - MoU signed in **2023** for joint satellite development with the **Mauritius Research and Innovation Council (MRIC)**.
  - **Telemetry, Tracking, and Telecommand (TTC) Station:** Established under the **1986 agreement** for satellite and launch vehicle monitoring.
- **Capacity Building and Education**
  - **Indian Technical and Economic Cooperation (ITEC):**
    - Over **4,940 Mauritians** trained since **2002** in civilian and defence sectors.
    - About **2,300 Indian students** currently studying in Mauritius in fields like medicine, business, and hotel management.
  - **Cultural Ties:**
    - Mahatma Gandhi Institute and Indian Cultural Centre foster shared heritage.
    - **Maha Shivratri** and the **Ganga Talao pilgrimage** reflect strong cultural bonds.
- **Strategic Significance:**
  - **Indian Ocean Region:** Mauritius is critical for India's **SAGAR (Security and Growth for All in the Region)** strategy to counter China's growing influence.
  - **Blue Economy:** India is supporting Mauritius in developing its blue economy to strengthen maritime security and sustainable ocean resource management.

Challenges in India-Mauritius Relations

- **Declining FDI from Mauritius:** The 2016 amendment of the DTAA reduced Mauritius' appeal as an FDI conduit to India.
  - **E.g.**, FDI from Mauritius dropped from $15.72 billion in 2016-17 to $6.13 billion in 2022-23, making it the third-largest FDI source after Singapore and the USA.
- **Maritime and Security Challenges:** The Indian Ocean Region (IOR) faces growing threats like drug trafficking and illegal fishing.
- **Delays in Infrastructure Projects:** India-backed projects in Mauritius face delays due to bureaucratic and implementation issues.
  - **E.g.,** The Metro Express Project under India's $500 million Line of Credit faced significant delays initially.
- **Trade Imbalance and Limited Diversification:** India's exports to Mauritius significantly exceed Mauritius' exports to India.
  - **E.g.,** In 2023-24, India's exports to Mauritius were $778 million, while Mauritius' exports to India were only $73 million.
- **Growing Chinese Influence:** China constructed the Mauritius Supreme Court and provided infrastructure loans, raising debt dependency concerns.

Way Forward

- **Enhancing Maritime Security and Strategic Cooperation:** Establish a White Shipping Agreement with Mauritius, similar to the one with France.
- **Countering China's Influence through Strategic Diplomacy:** Increase infrastructure grants, technology partnerships, and soft power initiatives.
- **Long-Term Strategic Vision**: Follow the India-UAE Vision 2030 and India-Singapore Smart City Collaboration models.
- **Strengthening Economic and Trade Ties:** Revise the DTAA to boost FDI and expand CECPA to cover sectors like IT, fintech, and renewable energy.
- **Cultural and Diaspora Engagement:** Strengthen institutions like the Mahatma Gandhi Institute and the World Hindi Secretariat.
- **Innovation and Skill Development:** Boost youth and skill-building programs, and promote fintech and digital payment integration such as India's UPI model to Mauritius.

Resolving the vexatious fishing dispute

Syllabus Mapping: GS-2- Neighbourhood of India and Bilateral Issues

Context

Leader of the House in the Sri Lankan Parliament, Bimal Rathnayake, called upon the Indian and Tamil Nadu governments to take "decisive action" against " illegal fishing in Sri Lankan waters".

Historical Context

India and Sri Lanka have defined their maritime boundary through two agreements:

- **1974 Agreement:** Indo-Sri Lankan Maritime Boundary Agreement of 1974, which drew an international maritime boundary between the two nations and ceded Katchatheevu Island to Colombo. However, Indian fishermen were still allowed to access Katchatheevu.
- **1976 Agreement:** It extended the maritime boundary and restricted fishing rights to the respective countries. It ended the Indian fishermen's visits to the island.

Maritime issues between India-SriLanka

- **Claim of Historical Rights:** Indian fishermen claim Katchatheevu as their traditional fishing ground and used the island to dry their nets.
- **Violation of the International Maritime boundary line (IMBL):** Indian fishermen often cross the International Maritime Boundary Line (IMBL) in search of better catches
- **Arrest by Srilankan Navy:** In the last 20 years, 6,184 Indian fishermen have been detained by Sri Lanka and 1,175 Indian fishing vessels have been seized, detained or apprehended by Sri Lanka.
- **Geopolitical Implication:** There is threat that China could gain a foothold closer to India because of Katchatheevu and and the entire Palk Strait.
- **Pernicious Practice**
  - **Illegal Fishing and Bottom Trawling:** The primary concern is **bottom trawling**, a fishing method where heavy nets are dragged along the seafloor, which:
    - Destroys marine ecosystems and breeding grounds.
    - Results in high levels of bycatch (unintended marine species).
    - Depletes fish stocks, harming the livelihoods of Sri Lankan fishermen.
  - **Asymmetric Economic Relationship:** Indian fishermen from Tamil Nadu are economically stronger and equipped with better vessels and technology.
    - Northern Sri Lankan fishermen, still recovering from the civil war, rely on traditional and less invasive fishing methods.
    - This economic disparity fuels resentment and complicates diplomatic efforts.
  - **Limited Fishing Grounds for Indian Fishermen:** Indian waters in the Palk Bay are rocky and have coral reefs, limiting fishing opportunities.
    - The **Tamil Nadu Marine Fishing Regulation Act, 1983** restricts fishing along the coastline.
    - Deep-sea fishing as an alternative is costly and requires longer voyages (~3 weeks), making it economically challenging.

Future Outlook and Way Forward

- **Diplomatic Engagement and Dialogue:** Resumption of bilateral talks between Indian and Sri Lankan fishermen is essential.
  - India and Tamil Nadu governments have supported talks; Sri Lanka's NPP government needs to facilitate them.
  - The last dialogue was held in November 2016, highlighting the need for renewed engagement.
- **Alternative Livelihood Promotion:** Governments need to promote **alternative livelihoods** to reduce dependence on bottom trawling:
  - **Seaweed cultivation**
  - **Open sea cage cultivation**
  - **Sea/ocean ranching**
- **Deep-Sea Fishing Promotion:** The ₹1,600-crore **Palk Bay deep-sea fishing scheme** could be merged with the ₹20,050-crore **Pradhan Mantri Matsya Sampada Yojana**.

  - Higher subsidies and support for deep-sea fishing vessels can encourage Indian fishermen to transition away from bottom trawling.
- **Policy Reforms and Resource Sharing:** Establish a **Joint Fisheries Management Mechanism** to allow shared fishing rights under regulated conditions.
  - Introduce **seasonal fishing bans** to enable marine stock regeneration.
  - Promote sustainable fishing practices through training and incentives.
- **Ecological Restoration and Monitoring:** Strict enforcement against illegal bottom trawling.
  - Ecological restoration efforts to revive marine biodiversity in the Palk Bay region.
  - Enhanced maritime surveillance to prevent illegal fishing.
- **Political and Economic Support:** Both governments should provide compensation and incentives to fishermen transitioning to sustainable practices.
  - Establish a fund for fishermen affected by changing fishing regulations and environmental shifts.

Conclusion

The Palk Bay fisheries dispute requires a balanced approach that addresses both environmental and economic concerns. While Sri Lanka seeks protection for its fisherfolk, India needs to provide viable alternatives to its fishermen. Dialogue, policy reforms, and sustainable fishing practices hold the key to resolving this long-standing issue.

Shift in the US policy toward Ukraine

Syllabus Mapping: GS-2- Global Politics

Context

U.S. President **Donald Trump** has made a **180-degree shift** in America's approach to the Ukraine war.

More in News

- A **public disagreement** between **Ukraine's President Volodymyr Zelenskyy and Trump** occurred in the **Oval Office**, leading the U.S. to **pause all military aid** to Ukraine.
- Within a day, **Zelenskyy** announced Kyiv's willingness for a **partial truce** and cooperation with Trump to achieve lasting peace.

History of the Russia-Ukraine war

Origins of the War

- **February 24, 2022**: **Russian President Vladimir Putin launched the invasion of Ukraine**, expecting a **quick victory**.
- **Western countries, including the U.S., initially anticipated Ukraine's fall**, evacuating their embassies from Kyiv.
- However, **Ukraine's resistance**, backed by **U.S.-supplied weapons**, prevented an early Russian victory.

Strategy against Russia: The **Biden administration** adopted a **two-pronged strategy**:

- **Sanctions on Russia** to weaken its war economy.
- **Massive military aid to Ukraine** to fight the Russians.

Result: **Russian setbacks**:

- **September 2022**: Russia withdrew from **Kharkiv Oblast** in the northeast.
- **November 2022**: Russian forces pulled back from **Kherson city** and parts of **Mykolaiv** in the south.

Russia's counterstrategy:

- **Partial mobilization of troops** to prepare for a prolonged war.
- **Economic pivot to Asia**, leveraging markets in **China and India** to bypass Western sanctions.

Result:

- **Annexed four Ukrainian oblasts** (Donetsk, Luhansk, Zaporizhzhia, Kherson).
- **2023**: Russia began **regaining lost ground**, securing key locations of **Soledar (January 2023) and Bakhmut (May 2023)**
- **2024**: Russian forces captured: **Avdiivka Krasnohorivka and Vuhledar. By 2024**, Russia had captured **4,168 sq. km** in both Ukraine and Russia's Kursk region.

Ukraine's strategy:

- Intensified **drone and missile attacks** deep inside Russia and in the Black Sea.

- **Despite these advances Ukraine remained on the backfoot militarily for over two years.**
- **Ukrainian counteroffensive launched** with **advanced Western weapons** but **failed** against Russia's strong defenses

Current Status of the War:

- **January 2025**: Russian troops seized **Velyka Novosilka and Parts of Toretsk**
  - Attempted **encirclement of Pokrovsk**

Situation in Ukraine

- **Massive losses**:
  - Lost over 20% of its territory.
  - Tens of thousands of soldiers killed.
  - Millions of Ukrainians displaced.
- **Economic collapse**:
  - Infrastructure and energy sector severely damaged by Russian bombings.
  - Dependent on external military supplies (artillery, ammunition, weapons).
  - Facing a manpower shortage on the battlefield.
- **Bleak future**:
  - U.S. withdrawal of support makes a Ukrainian victory nearly impossible.
  - No NATO membership or security guarantees.
  - Continuing the war risks more territorial losses.
  - Stopping the war means accepting a deal shaped by Russia and the U.S.

There have been different perspectives of European and USA regarding the Ukraine war. That will be discussed as follows:

Aspect	European Perspective	U.S. Perspective
Initial Response to the War	Supported Ukraine but was hesitant about escalation; economic concerns over energy dependence on Russia.	Adopted a two-pronged approach: sanctions on Russia and military aid to Ukraine.
Military Support	European countries provided military aid but lacked the capacity for long-term independent support.	Supplied advanced weapons, intelligence, and financial assistance.
Economic Costs & Challenges	Faced economic hardships due to loss of Russian gas (Nord Stream pipeline sabotage), leading to a cost-of-living crisis and deindustrialization.	The U.S. economy remained largely unaffected by the war, allowing it to sustain military aid.
NATO Membership for Ukraine	Initially hesitant in 2008 (France & Germany opposed it). Now, seeks security guarantees but lacks consensus on how to provide them.	Initially supported NATO membership for Ukraine but under Trump, abandoned it and ruled out security guarantees.

Aspect	European Perspective	U.S. Perspective
Security Concerns	Fears Russia's expansionism but lacks a unified defense strategy without U.S. leadership in NATO.	Prioritizes a strategic shift, seeing China as a bigger threat rather than Russia.
Policy Shift Under Trump	Caught off guard by the sudden U.S. reversal, now scrambling to reassess its role in the conflict.	Under Trump, shifted towards realignment with Russia, focusing on great power politics over Ukraine's interests.
Long-Term Strategy	Wants continued deterrence against Russia but lacks independent military strength.	Aims to reconfigure global strategy by ending the war and preventing a China-Russia alliance.
Key Challenges	Economic downturn, rise of far-right movements, uncertainty over NATO's future.	Managing relations with both Russia and China while ensuring a controlled exit from the war.

Why Trump is shifting the Ukraine Policy

- **Enforce Peace:** Trump is trying to force Ukraine into negotiating a peace deal with Russia without committing to providing security guarantees for Ukraine.
- **Shift in Geopolitics:** There is a shift in US foreign policy in which it treats China as its main adversary not Russia.
- **Break the Sino- Russian Alliance:** US wants to break the Sino-Russian alliance which got strengthened in this war. Anti-West stands of Russia forceed Sino-Russia to come together.
- **Questioning NATO:** Trump questioned the effectiveness and purpose of NATO, pushing for European members to spend more on defense and at times undermining NATO's unity.
- **Transactional Approach:** Trump emphasized a more transactional approach to foreign policy, including seeking to engage Russia in ways that might reduce tensions, often at the expense of NATO and traditional alliances.
- **America First approach:** "America First" doctrine, which prioritized reducing U.S. involvement in international conflicts and focused on domestic issues.

Implication of Change in the US policy of Ukraine:

- **Sovereignty of Ukraine:** It will have a direct impact on Ukraine's ability to defend itself against Russia's unprovoked aggression as US military aid accounts for around 30% of the Ukraine's military need.
- **NATO membership:** US promised NATO membership to Ukraine. However, Trump accepted Russian demand of ruling out Ukraine's NATO membership.
- **Loss of Territory:** US Secretary of State Marco Rubio told that Ukraine would have to make concessions over land that Russia had taken since 2014 as part of any agreement to end the war.
- **Uncertainty in NATO:** Trump's rhetoric on NATO often left European allies uncertain about U.S. commitment to mutual defense against Russia.
  - Europe must have to increase their military aid to the Ukraine.
- **Bolster China:** A deal with Russia may bolster the aggressor to use force to acquire the territory. For example, China has always talked about using the force to acquire Taiwan.
- **Rift in US-EU:** There is growing rift over the Russia between EU and America. For example, disagreement surfaced for the reducing low impact Russia sanctions.

On perceptions about Europe: Job prospects

Syllabus Mapping: GS-2- Indian Diaspora

Context

The perception of Europe as a land of better job opportunities has been growing among Indians, particularly among the younger and more educated population.

Indian Diaspora in Europe

- Indian emigration to Europe has been limited because of strict immigration policies.
- Some West European countries relaxed their immigration laws for Asians due to labour shortages created by economic boom in 50-60s.

- Desire in EU to overtake USA as the most competitive and knowledge-based has opened new opportunities for India's skilled human resources and especially its IT experts.
- Demographic factors, i.e., the aging population of West Europe, have also increased their dependence on young workers from developing countries.
- Computer experts and other professionals such as engineers, nurses, business managers, teachers, scientists etc., are therefore permitted to immigrate in restricted numbers.
- There has been a growing interest in EU member States in attracting Indian IT experts, who have already made a mark in the US.
- Size of Indian community in East/Central Europe is very limited, comprising of students, businessmen & professionals. Since 1990, however, number of Indian students in higher educational institutions of these countries has declined.

Why Europe is Becoming a Land of Opportunities for Indians

- **Better Job Opportunities:** Many Indians believe Europe offers better employment opportunities than India, especially in smaller towns where job prospects are limited.
  - Structured career growth, professional development programs, and access to high-skilled jobs in countries like Germany, the UK, and France attract Indian job seekers.
- **Higher Wages:** Many believe that workers in Europe earn more for the same work compared to India.
  - Those with family in Europe are more likely to perceive a substantial wage difference.
- **Career Growth and Professional Value:** Indian professionals feel their skills are better valued in European markets, with higher salaries, social security, and better working conditions.
- **Lifestyle Advantages:** Many believe life in Europe is more comfortable than in India due to better healthcare, infrastructure, and social welfare.
  - Younger and educated Indians are more attracted to the European lifestyle.
- **Educational Pathway:** Many Indian students pursue higher education in Europe, which often leads to post-study work opportunities.
  - This creates a pipeline for long-term career benefits.
- **Influence of Indian Diaspora and Social Media:** Success stories from the Indian diaspora, social media influence, and word-of-mouth recommendations reinforce the perception of Europe as a land of opportunity.

Role played by Indian Diaspora

Role in the Politics:

In European politics, Indians, particularly the large Indian diaspora, play a significant role through political representation, lobbying efforts, and influencing policy discussions.

- **Political Representation:** Indian-origin individuals hold positions in European parliaments and government at various levels, allowing them to directly advocate for Indian interests.
- **Lobbying Activities:** The Indian diaspora actively engages in lobbying efforts to influence policies concerning immigration, trade agreements, and cultural exchange between India and Europe.
- **Economic Influence:** India's growing economic power, especially in the tech sector, makes it an attractive partner for European nations, further bolstering the Indian diaspora's political influence.

Role in Economy:

- There are over 2 lakh Indians in Italy playing a part in dairy, agricultural and domestic service sectors.
- Indian diaspora is instrumental in public healthcare delivery in the EU.
- Indian Diaspora plays an important role in the Information Technology sector in Netherland, UK etc.
- There are around 2.46 lakh (December 2023) Indian Diaspora in Germany. It mainly consists of professionals, researchers and scientists, businessmen, nurses and students. There has been a significant increase in the last few years in the number of qualified Indian professionals in the fields of IT, banking and finance.

The Five Eyes Fracture

Syllabus Mapping: GS-2- Global Events and Its impact on India

Context

The Five Eyes alliance now faces an unprecedented internal crisis.

Background and Formation of the Five Eyes Alliance

- **Formation During World War II:**
  - The Five Eyes alliance was formed during World War II, initially between the **US** and **UK** to intercept and decode enemy communications.
  - The intelligence-sharing agreement was formalized in **1946** between the US and UK.
- **Expansion of Membership:**
  - Canada joined in **1948** and Australia and New Zealand in **1956**.
  - The alliance focused on **Signals Intelligence (SIGINT)** of common interest among the Anglosphere (English-speaking nations with shared political, legal, and cultural traditions).
- **Cold War and Post-9/11 Role:**
  - During the Cold War, the alliance monitored **Soviet and Warsaw Pact communications**.
  - After **9/11**, it expanded to cover **counterterrorism and cybersecurity**.
  - Recently, it shifted focus to China, warning against risks from **Huawei** in **5G networks** (2018).
  - Encouraged both Western and non-Western nations to exclude Huawei from infrastructure.

Growing Political Crisis in the Five Eyes

- **Trump's Radical Foreign Policy Shifts:** In Donald Trump's second term, US foreign policy has shifted dramatically:
  - Seeking rapprochement with **Russia**.
  - Pushing for a **ceasefire in Ukraine**.
  - Weakening the **EU** and **NATO**.
  - Dismantling the post-war **US-Europe strategic consensus**.
  - These moves have strained Washington's relationship with European allies and the broader Western alliance.
- **Disputes with Canada:** Reports emerged that Trump's aides were considering expelling **Canada** from the Five Eyes due to trade and border tensions. The White House denied these reports.
  - Trump launched an **aggressive trade war** against Canada, a key trading partner.
  - Suggested that Canada should become the **"51st state"** of the US.
  - Claimed the US-Canada border is arbitrary.
- **Territorial Disputes:** Trump proposed annexing **Greenland** (a territory of Denmark) — seen as a direct challenge to Anglo-American allies.
- **Tensions with Britain:** At a conservative gathering, US Senator **J.D.Vance** described Britain as the **"first Islamist country"** to have nuclear weapons, comparing it to **Iran** and **Pakistan**.
  - Trump's "Make America Great Again (MAGA)" movement sees Britain as a failing state dominated by excessive regulation and liberal politics.
    - American right-wing resents the global liberal establishment, including European and Anglosphere elites.

Opportunities for India Amid the Five Eyes Crisis

- **Enhanced Intelligence Cooperation:** With growing instability within the Five Eyes, India can position itself as a reliable intelligence partner.
  - India's experience in counterterrorism, cybersecurity, and regional intelligence (especially concerning China and Pakistan) makes it a valuable ally.
  - India can negotiate intelligence-sharing agreements with Five Eyes members on a bilateral or multilateral basis.
- **Strategic Partnerships in the Indo-Pacific:** The Five Eyes' increasing focus on the Indo-Pacific aligns with India's strategic interests (e.g., QUAD and AUKUS).
  - India can deepen defense and intelligence ties with the US, Australia, and Japan to counter China's influence.
  - Expanding naval cooperation and joint exercises (like **Malabar**) can strengthen India's position in the region.
- **Military-Industrial Collaboration:** India can explore deeper defense collaboration with the Five Eyes nations, especially in advanced technology (e.g., drones, cybersecurity, AI).
  - India's defense industry can benefit from technology transfers and joint ventures with Five Eyes members, particularly in naval and aerospace sectors.

- **Diplomatic Leverage:** India's balanced ties with both Western and non-Western nations position it as a bridge between the Five Eyes and the Global South.
  - India's independent foreign policy and non-alignment stance allow it to mediate between Western and Eastern powers.
- **Cybersecurity and Technology Sharing:** India can propose joint initiatives with the Five Eyes on cybersecurity and digital infrastructure protection.
  - India's growing expertise in IT and digital infrastructure can make it a key partner in securing global communication networks.

India and New Zealand Relation

Syllabus Mapping: GS-2- Bilateral Relation

Context

Prime Minister of New Zealand, Rt Hon Christopher Luxon made an official visit to India.

More on News:

- PM Luxon as the Chief Guest of the Raisina Dialogue delivered the Inaugural Keynote Address.
- Launch of Free Trade Agreement (FTA) negotiations was announced to enhance economic ties.
- Authorized Economic Operators Mutual Recognition Arrangement (AEO-MRA) was signed to facilitate trade.
- A Memorandum of Understanding (MoU) for Defence Cooperation was signed.
- India-NZ reaffirmed their commitment to further strengthen and deepen the bilateral partnership for the benefit of the Indo-Pacific Region.

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

Areas of Cooperation

Historical Relation

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

Political, Defence, and Security Cooperation

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

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

- New Zealand's interest in joining the **Indo-Pacific Oceans Initiative (IPOI)**. PM Modi welcomed New Zealand into this partnership with like-minded countries.
  - Discussions on maritime cooperation at the **National Maritime Heritage Complex (NMHC)** at Lothal.
- **Capacity Building**: Regular officer training exchanges at Defence Colleges.

Trade, Investment, and Financial Cooperation

- **Trade:** In the year 2023-24, NZ exported US$ 0.84 billion of total goods and services to India and imported US$ 0.91 billion and a total trade value of US$ 1.75 billion.
- **FTA Negotiations**: Agreement to launch negotiations for a balanced, comprehensive trade agreement.
- **Digital Payments**: Discussions on early cooperation in the digital payments sector.
- **Customs Cooperation**:
  - **Authorized Economic Operators Mutual Recognition Arrangement (AEO-MRA)**: It facilitates smoother trade by easing movement of goods between trusted traders.
  - **Customs Cooperative Arrangement:** In August 2024, New Zealand and India signed it to enhance trade ties and intensifying collaboration against transnational organized crime
- **Sectoral Cooperation in Horticulture and Forestry: Memorandum of Cooperation on Horticulture** to promote knowledge sharing and research exchanges.
  - Development of **post-harvest and marketing infrastructure**.
  - **Letter of Intent on Forestry Cooperation** for policy dialogues and technical exchanges.
- **Tourism and Air Connectivity:** Recognition of tourism's role in enhancing economic ties and mutual understanding.
  - Update to the **India-New Zealand Air Services Agreement** to support direct flights.
  - Encouragement for airlines to commence **non-stop flights** between India and New Zealand.

Science, Technology, and Disaster Management

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

Education, Mobility, and People-to-People Ties

- **Education**: India is the 2nd largest source of international students in NZ.
  - Signing of a **refreshed Education Cooperation Arrangement**.
  - Expansion of Indian student access to New Zealand education institutions.
- **Skilled Migration**: Agreement to negotiate skilled worker mobility under trade agreement.
  - Addressing irregular migration issues.
- **Sports**: MoU on Sports Cooperation in cricket, hockey, and Olympic sports.
  - **Sporting Unity events** in 2026 to celebrate 100 years of sporting ties.
- **Traditional Medicine**: Expert discussions on knowledge exchange and collaboration.
- **Cultural Ties**: Growing New Zealand interest in **yoga**, Indian **music**, **dance**, and **festivals**.
  - Promotion of bilateral cultural exchange.

Issues in the Relationship:

- **Trade Negotiation Barriers:** FTA negotiations, initiated in **2009**, face delays due to India's **protectionist policies**.
  - High tariffs on **agriculture** and **dairy products** remain a sticking point.
  - India's focus on **domestic food security** complicates trade liberalization.
  - **E.g.**, New Zealand, a major exporter of dairy products, has been keen to access the Indian market for selling milk powder and dairy products.
    - However, India has opposed this due to concerns within its domestic dairy industry.
- **China's Growing Influence:** China's strategic agreements in the Pacific (e.g., with the **Cook Islands**) create pressure on New Zealand.
  - New Zealand's economic reliance on China complicates its foreign policy balancing act.

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

Way Forward

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

India must act as unifier in the IOR

Syllabus Mapping: GS-2- Indian Ocean

Context

India must act as a unifier in the Indian Ocean Region (IOR) to ensure maritime security, counter China's influence, safeguard trade routes, and promote regional stability through strategic leadership.

Indian Ocean Region

The Indian Ocean Region (IOR) is a vast theater, stretching from the Strait of Malacca and western coast of Australia in the East to the Mozambique Channel in the West. It encompasses the Persian Gulf and the Arabian Sea in the North, all the way down to the southern Indian Ocean.

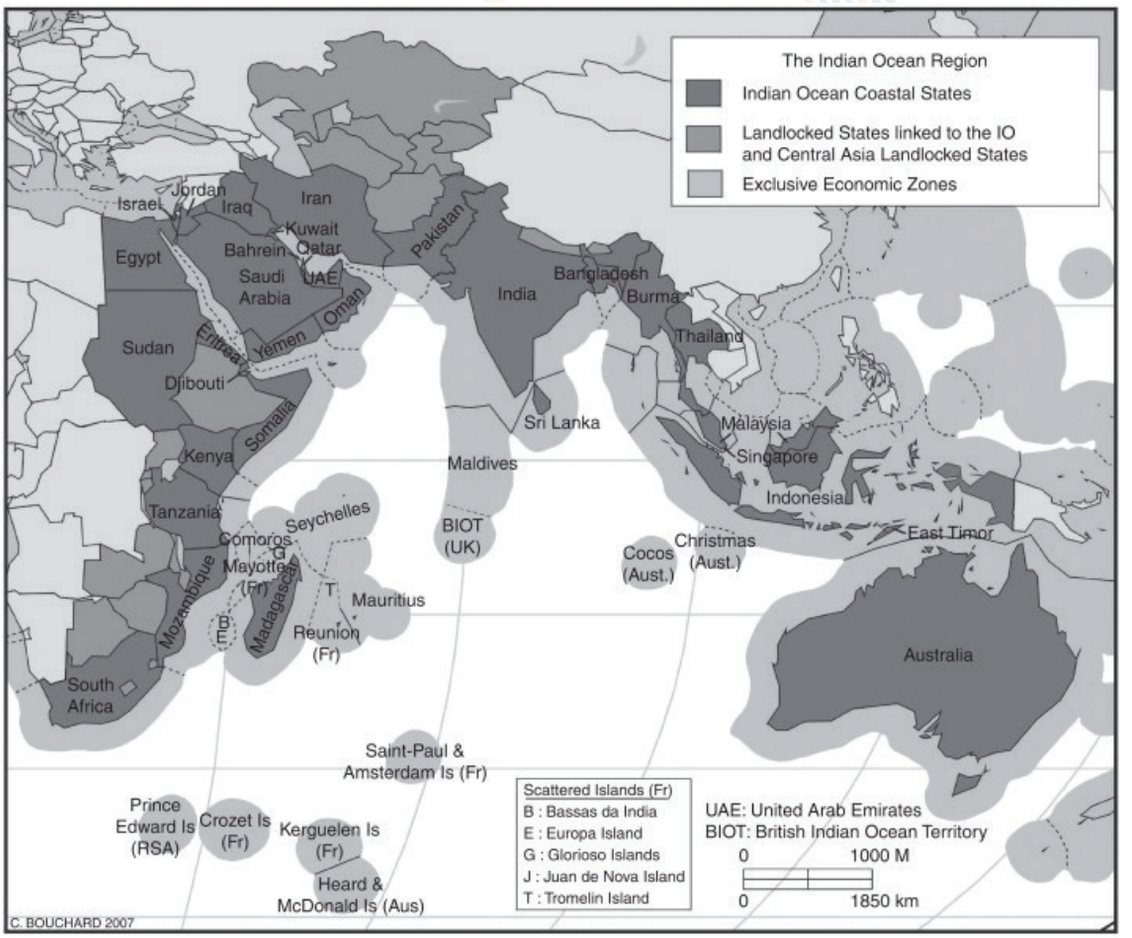
Importance of the IOR for India

- **Geostrategic Importance:** It is vital sea lane with choke points such the Strait of Hormuz, Strait of Malacca, Bab-el Mandeb etc.
  - Key theatre for major powers like the US, France and China.
- **India's Regional Importance:** India geostrategic ambition can be achieved with the preeminence in the IOR
  - India is centrally located, shares civilization ties, and has strong diasporas in many of the countries across the IOR.

  - As China increases its investments in the Indo-Pacific, it's an opportune moment for India to expand its presence in the IOR and maintain its leadership position.
- **Economic Importance:** The Indian Ocean is a critical global trade route as it is the main trading artery for many countries in the world.
  - It handles 70% of the world's container traffic.
  - It facilitates 80% of India's external trade and 90% of its energy trade.
  - It is rich in hydrocarbon resources like oil and natural gas, fertile fishing grounds along the coastlines, and rare earth materials like polymetallic nodules.

Challenges Facing the Indian Ocean

- **Security Issues:** Piracy, terrorism, and trafficking (human, drugs, arms).
  - Growing influence of external powers like China and the U.S.
  - Maritime boundary disputes.
- **Environmental and Climate Challenges:** Rising sea levels and coastal erosion.
  - Marine pollution and degradation of coral reefs.
  - Increasing frequency of cyclones and tsunamis.
- **Economic and Development Issues:** Poor infrastructure in developing coastal states.
  - Lack of resources for sustainable fisheries and marine governance.
  - Dependency on external funding for regional projects.
- **Institutional Weakness:** IORA's budget is dependent on member states (mainly developing economies).
  - Lack of coordination among member states and limited institutional capacity.
  - Small Secretariat based in **Mauritius** with limited staff.



Why India Must Act as a Unifier in the IOR

- **Trade Importance:** Dependence of world trade on the IOR provides India the opportunity to develop a consensus between the countries in the IOR against unilateral action.
- **Geostrategic Importance**: India's central location in the IOR provides opportunity to act as unifier in the IOR.
- **Counterbalance to China's Expanding Presence:** China's growing influence through projects like the **String of Pearls** and **military bases** in the IOR threatens regional stability.
  - India must lead regional cooperation to counter China's strategic dominance.
- **Ensuring Maritime Security:** Piracy, smuggling, and maritime terrorism pose direct threats to India's trade and security (**e.g., Golden Crescent and the Golden Triangle)**.
  - A unified regional framework can strengthen maritime surveillance and collective response mechanisms.

What is the Golden Crescent?

- The Golden Crescent comprises Afghanistan, Iran, and Pakistan
- The region is infamous for organised crime activities like the flow of illegal drugs, which aids other illicit activities.
- India's proximity to the golden crescent has made it vulnerable to the trafficking of drugs and narcotics.
- **Comprises Of 2 Routes**:
  - **Northern Route**: Opium and heroin are trafficked to the Russian Federation by way of Tajikistan and Kyrgyzstan.
  - **Southern Route:** Heroin travels from Afghanistan through Pakistan and Iran by sea to South Asia, Africa and Oceania region.

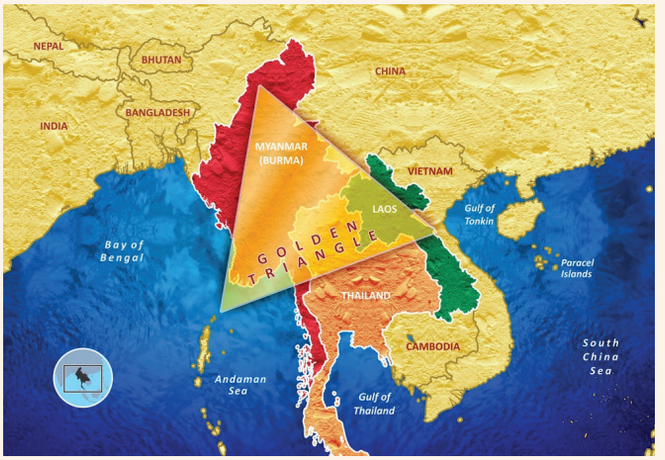
Golden Triangle

- The area where the borders of **Thailand, Laos, and Myanmar** meet at the confluence of the **Ruak and Mekong rivers**.

Facts:

The United Nations Office on Drugs and Crime (UNODC) estimates that 80 percent of the world's opium and heroin supplies are trafficked from Afghanistan.

Myanmar is the world's second-largest illicit supplier of morphine and heroin.



- **Leveraging SAGAR for Regional Leadership:** India's SAGAR (Security and Growth for All in the Region) doctrine positions India as a security provider and development partner.
  - Leading initiatives on maritime security, trade, and disaster relief can enhance India's influence and credibility.
- **Economic and Energy Security:** IOR nations are key trade and energy partners for India, especially in oil and gas imports.
  - Ensuring secure and stable sea lanes is critical for India's economic growth and energy security.
- **Diplomatic and Strategic Autonomy:** Acting as a unifier will position India as a reliable and independent power in the region.
  - A balanced and cooperative approach will allow India to engage with both regional and extra-regional powers without compromising its strategic interest.

How India Can Act as a Unifier in the IOR

- **Strengthening Institutional Frameworks:** Revitalize regional groupings like **IORA** and **BIMSTEC** to improve dialogue and cooperation.
  - Expand the scope and influence of the **Indian Ocean Naval Symposium (IONS)** for greater security coordination.
- **Enhancing Maritime Security and Surveillance:** Develop a stronger **Maritime Domain Awareness (MDA)** network with real-time intelligence sharing.
  - Increase joint naval exercises and patrols with IOR nations to improve maritime security.
- **Leading Disaster Response and Humanitarian Assistance:** Establish a dedicated **HADR (Humanitarian Assistance and Disaster Relief)** fund and response team.
  - Deploy **hospital ships** and amphibious heavy-lift capability for rapid response to natural disasters.
- **Economic and Infrastructure Cooperation:** Invest in port development and maritime connectivity projects in IOR countries.
  - Leverage platforms like **SAGAR (Security and Growth for All in the Region)** to foster inclusive development.
- **Soft Power and Diplomatic Engagement:** Use India's historical and cultural ties to foster goodwill and unity in the IOR.
  - Promote educational, technological, and cultural exchanges with IOR nations.
- **Strategic Autonomy and Balanced Engagement:** Maintain strategic independence while balancing partnerships with regional and extra-regional powers.
  - Position India as a credible mediator and stabilizer in regional disputes.

Indian prepares to chair Indian Ocean Rim Association (IORA) from November 2025

About IORA

- Established in **1997** to promote regional cooperation among Indian Ocean countries.
- Comprises **23 member states** and **11 dialogue partners** (including the U.S., China, and the EU).
  - **India is currently vice chair IORA.**
- **Focus areas include:**
  - Maritime safety and security
  - Trade and investment facilitation
  - Disaster risk management
  - Fisheries management
  - Academic and cultural exchanges
  - Blue economy development

Issues faced by IORA

- **Issue of funding:** IORA's annual budget is member-dependent whereas most of the member-states are developing Asian and African economies.
- **Lack of Private participation:** Lack of private participation i.e. maritime domain restrict the funding and capacity building
- **Lack of Human resource:** The IORA has a small Secretariat with limited staff based in Mauritius.
- **Limited use of Technology:** Government-based structures and institutions have limited bandwidth for data processing.

Way Froward For India

- **Expand IORA's Funding:** Encourage private sector involvement (shipping companies, oil and gas, marine tourism).
  - Establish a dedicated IORA fund for targeted maritime projects.
- **Leverage Technology:** Introduce **digitized record-keeping** for better data management and policy analysis.
  - Use data-driven insights to improve governance and decision-making.

- **Enhance Regional Collaboration:** Align IORA's goals with India's **SAGAR (Security and Growth for All in the Region)** vision.
  - Encourage research collaboration with leading IORA members like **Australia** and **France**.
  - Mainstream **traditional coastal knowledge** from nations like **Sri Lanka**, **Mauritius**, and **Seychelles**.
- **Develop Maritime-Focused Education:** Create **maritime-ready courses** in collaboration with industrial leaders and academic institutions.
  - Introduce **marine accounting** and interdisciplinary blue economy programs.
- **Strengthen Institutional Capacity:** Increase staffing and operational capacity of the IORA Secretariat.
  - Establish a dedicated **Parliamentary Budget Office** (PBO)-style body within IORA to monitor financial and strategic decisions.
- **Promote Security Cooperation:** Enhance joint maritime exercises and information-sharing among IORA member states.
  - Support capacity building for smaller coastal nations to strengthen maritime security.

Opportunity for India and Canada in Mark Carney's Leadership

Syllabus Mapping: GS-2- Bilateral Relation

Context

Mark Carney's rise as Canada's new leader marks a shift from Justin Trudeau's tenure, offering India a chance to reset diplomatic ties and strengthen trade, security, and strategic cooperation.

India-Canada Relations Over the Years

- **Early Diplomatic Ties (1947–1974)**
  - India and Canada established diplomatic relations in 1947, shortly after India's independence.
  - Canadian PM Louis St. Laurent visited India in 1954, strengthening bilateral ties.
  - Relations were positive, focusing on development cooperation and Commonwealth ties.
- **Strain Over Nuclear Issues (1974–1998)**
  - Canada halted nuclear cooperation after India's nuclear test in 1974 (Pokhran-I).
  - Tensions increased further after India's nuclear tests in 1998 (Pokhran-II).
- **Renewed Engagement (2000–2010)**
  - Relations improved with growing trade and investment ties.
  - The India-Canada Nuclear Cooperation Agreement (2010) allowed uranium exports to India for civilian use.
- **Strengthening Strategic Ties (2010–2018)**
  - PM Stephen Harper (2012) and PM Narendra Modi (2015) visited each other's countries.
  - Bilateral trade and defense cooperation grew.
  - Canada recognised India as a strategic partner in the Indo-Pacific region.
- **Challenges Under Trudeau (2018–2023)**
  - Tensions over Khalistani separatism affected diplomatic relations.

    - India expressed concern that Canada is not doing enough to curb the activities of Khalistani extremists.
  - The killing of Hardeep Singh Nijjar (2023) strained ties, leading to a diplomatic fallout.
    - India and Canada have expelled each other's diplomats over the allegation of India's involvement in the murder.
  - **Terrorism and National Security:** India has also raised concerns about the presence of terrorist organizations operating from within Canada, particularly those linked to Pakistan.

Convergence Between India-Canada

- **Economic Relations:**
  - Bilateral Trade: In 2023, India's exports to Canada were worth $4.08 billion, while imports from Canada were $3.88 billion, resulting in a total bilateral trade of $7.96 billion.
  - Investment: Steady Growth in FDI from Canada: It reached US$4.16 billion between April 2000 and December 2024.
    - Indian companies have invested approximately CA$6.6 billion in Canada, generating nearly 17,000 jobs across the country.
    - Canadian Pension Funds have cumulatively invested around US$ 55 billion in India and are increasingly viewing India as a favourable destination for investments.
  - FTA: Negotiations for a Comprehensive Economic Partnership Agreement (CEPA) between India and Canada, aiming for a free trade agreement, have been ongoing since 2010.
- **Energy Cooperation:**
  - Energy has been a primary area of focus of India-Canada bilateral relations.
  - India Oil Corporation has a 10% participating interest in a Liquid Natural Gas project in British Columbia.
  - Canada has also expressed strong interest in working with India in the renewable energy sector in India.
- **People to People Relations:** With 1.6 million PIOs and an additional 700,000 NRIs, Canada hosts one of the largest Indian Diaspora in the world, which accounts for more than 4% of its total population.
- **Track 1.5 Dialogue:** India-Canada has established a Track 1.5 Dialogue on involving experts, government officials and business leaders from both sides
- **Civil Nuclear Cooperation:** A Nuclear Cooperation Agreement (NCA) with Canada was signed in June 2010 and came into force in September 2013.
- **Space Cooperation:** India and Canada have been pursuing successful cooperative and commercial relations in the field of Space since the 1990s mainly on space science, earth observation, satellite launch services and ground support for space missions.
- **Defence Cooperation:** An MoU between DRDO and Canadian Commercial Corporation (CCC) for development of military and defence related technology, infrastructure, training and services was signed in October 2016 which was renewed in 2021.
- **Security Cooperation:** For the Security Cooperation India and Canada signed:
- Mutual Legal Assistance Treaty in 1994 (operationalised in 1998)
- Extradition Treaty in 1987.
- The Joint Working Group on Counter Terrorism was set up in 1997.
- Framework for Cooperation between India and Canada on Countering Terrorism and Violent Extremism in 2018.
- **S&T Cooperation:**
  - MoUs has been signed for the cooperation in industrial research, Development & Innovation, exchange of knowledge and scientific research on Cold Climate (Arctic) Studies.
  - Under "Mission Innovation" program, India is collaborating with Canada in various activities in the areas of Sustainable Biofuels (IC4).
- **Education:** Education is a key area of mutual interest. India is the largest source country of foreign students with an estimated 230,000 Indian students studying in Canada.

Opportunities for India After Trudeau's Exit

- **Restoration of Diplomatic Ties:** India can reappoint its High Commissioner to Canada, signaling a normalization of diplomatic relations.
  - The removal of Trudeau, who was seen as influenced by Khalistani elements, opens the door for more pragmatic engagement.
- **Trade and Economic Cooperation:** Resumption of stalled **Comprehensive Economic Partnership Agreement (CEPA)** negotiations can boost bilateral trade.
  - Canada's focus on clean energy, agri-tech, and pharma presents new trade opportunities for India.
  - India can leverage its growing market and skilled workforce to attract Canadian investments.
- **Strategic and Security Collaboration:** Both countries can deepen cooperation on Indo-Pacific security, maritime domain awareness, and counterterrorism.

  - India and Canada share a common stance on ensuring a free and open Indo-Pacific, especially in light of China's growing influence.
- **Diaspora Engagement and Immigration:** Improved political climate can strengthen the role of the Indian diaspora in Canada as a bridge for deeper ties.
  - India can push for easier work and student visas to facilitate people-to-people exchanges.
- **Energy and Climate Cooperation:** India and Canada can collaborate on green energy transitions, including clean hydrogen and renewable energy.
  - Shifting the carbon tax burden from consumers to corporations can create business opportunities for Indian firms.
- **Reduced Khalistani Influence:** With Trudeau's departure, the influence of Khalistani elements in Canadian politics may decline.
  - A less hostile political environment will allow India to address its security concerns more effectively.
- **Multilateral Cooperation:** India and Canada can align their strategies at international platforms like the **UN, WTO, and G20** on issues like global trade, climate action, and geopolitical stability.
  - Canada's recognition of India as a key partner in its Indo-Pacific policy enhances India's strategic importance.

Multilateralism and International Law in Trump 2.0

Syllabus Mapping: GS-2- Policies of Developed Countries and Global Politics

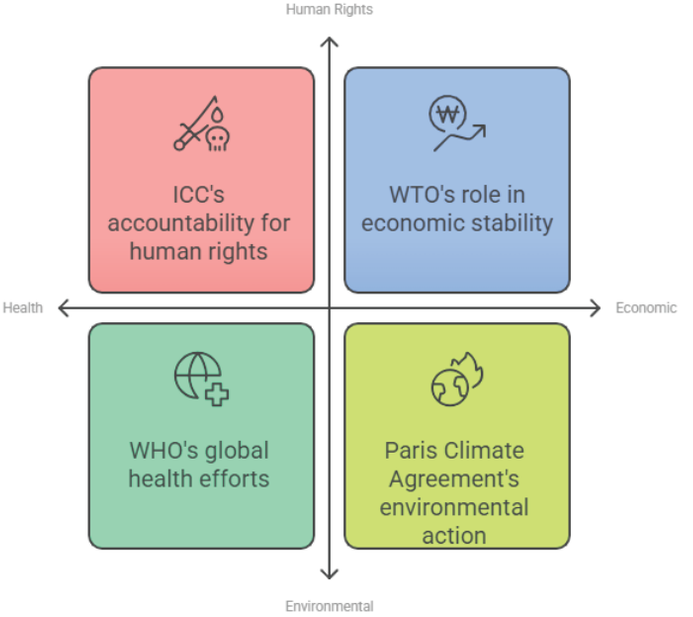
Context

The 'America First' mantra is defining U.S. President Donald Trump's administration, signaling a major shift for multilateralism and international law.

UNilateral Action of America

- **DEFUND Act and Political Isolationism:** The **Disengaging Entirely from the United Nations Debacle (DEFUND) Act** was introduced.
- Since the beginning of Trump's second term, the U.S. has withdrawn from key multilateral institutions and agreements it once helped establish, including:
  - World Health Organization (WHO)
  - United Nations Human Rights Council (UNHRC)
  - Paris Climate Agreement
  - Sanctions imposed on the International Criminal Court (ICC) and its officials.
  - Unilateral imposing Tariffs

Impact of Weakening International Institutions



Consequences of U.S. Unilateralism

- **If DEFUND Act is passed, It would:**
  - Repeal the **United Nations Participation Act of 1945** and the **United Nations Headquarters Agreement of 1947**.
  - Stop all U.S. financial contributions to the UN.
  - End U.S. participation in UN peacekeeping operations.
  - Revoke the functional immunity of UN officials in the U.S., hampering UN activities related to peacekeeping and human rights protection.

This would weaken multilateral cooperation and undermine the rules-based international order established post-World War II.

- **Undermining the credibility of ICC:** After World War II, the U.S. played a key role in setting up the **Nuremberg Tribunal** to hold individuals accountable for war crimes. However Trump signed an **Executive Order** imposing sanctions on the ICC which is first permanent court for punishing individuals for crimes like Genocide, Crimes against humanity and War crimes
  - The Executive Order accused the ICC of "illegitimate and baseless actions" against the U.S. and **Israel**, undermining the court's credibility.
- **Weakening of International Order:** Growing U.S. opposition to multilateralism threatens global political and economic cooperation. It accelerates the weakening of the authority of multilateral institutions.
- **Economic Nationalism and Trade Protectionism:** The Trump administration's economic policies reflect a revival of economic nationalism, with aggressive tariffs imposed under the guise of national security.

Current Crisis:

  - The U.S. has blocked appointments to the WTO Appellate Body—crippling the WTO's dispute resolution function.
  - The threat of U.S. withdrawal from the WTO looms large.
- **Double edge sword:** Unilateral action is a double edge sword. It would lead to retaliation from other states that could isolate the U.S. and weaken its global influence.
- **Disruption in Supply Chain:** USA's America First Trade Policy with the use of tariffs and potential import restrictions disrupts global supply chains.
- The "Make America Great Again" (MAGA) vision could falter without multilateral cooperation.

Global Effects of "Make America Great Again" (MAGA) policies outside US

- **India: Reversal of Trade Barriers**
  - India had increased protectionism since 2016 by raising tariffs on over **500 item categories**.
  - However, Trump's push for **trade parity and tariff reciprocity** forced India to rethink its stance:
    - Basic customs duty cut on over **two dozen items** (e.g., bourbon, high-end cars).
    - Average customs duty reduced to **10.66%** from **11.66%**.
    - India is now trying to shed its image as a **high-tariff economy**.
- **China: Shift Toward Consumption-Led Growth:**
  - US tariffs hurt China's export sector, leading to a shift from an **export-driven** to a **consumption-driven** model.
  - China's 30-point action plan includes:
    - Raising workers' incomes.
    - Addressing property market issues and improving annual leave policies.
    - China aims to boost domestic confidence and stabilize growth at around **5%**.
- **Europe: Increased Defence Spending:**
  - Trump's threat to withdraw US defence guarantees pushed Europe to enhance its security.
  - Germany bypassed its **"debt brake"** to increase defence and infrastructure spending:
    - Proposed €500 billion investment fund for infrastructure.
    - European Commission termed it a **"watershed moment"** in European security policy.
    - Boost to growth expected, but fiscal constraints remain in countries like France and Italy.
- **Canada: Potential Pivot Toward the EU:**
  - Trump's unpredictability led Canada to explore stronger ties with Europe:
    - 44% of Canadians support joining the EU.
    - Increased trade between Canada and the EU could be mutually beneficial.

    A potential shift in North American trade alliances.

- **US Dollar's Reserve Currency Status Under Threat**
  - Trade wars and tariffs risk stoking **US inflation** and undermining foreign confidence in US debt.
  - Central banks, including the **RBI**, have started buying physical gold instead of US dollar-linked assets.
  - Threat to the dominance of the US dollar as the global reserve currency.

Global Trade Uncertainty

- Trump's unilateral actions (e.g., violating USMCA terms) raised doubts about US commitment to trade deals.
- Retaliatory tariffs by China and the EU on American farm goods increased pressure on Washington.
- Increased volatility and reduced global trust in US trade agreements.

Role of Non-Western Nations (India's Opportunity)

- The weakening of U.S. leadership creates an opportunity for emerging powers like **India** to take on a more prominent role in global governance.
- India's consistent support for multilateralism and international law reflects its readiness for leadership.
- At the **G-20 Foreign Ministers' Meeting** in **Johannesburg (February 2025)**, Indian External Affairs Minister **S. Jaishankar** called for:
  - An inclusive and multilateral approach to global challenges.
  - Reform of the **United Nations Security Council (UNSC)** to reflect contemporary global realities.

Should the free movement regime between India and Myanmar remain?

Syllabus Mapping: GS-3- Border Management and Security Issues

Context

In February 2024, Union Home Minister Amit Shah announced the **scrapping of the Free Movement Regime (FMR**) along the Myanmar border. However, **no official notification** has been issued by the Ministry of External Affairs, **nor has any bilateral agreement been reached** with Myanmar yet.

About Free Movement Regime (FMR) with Myanmar

- FMR is a bilateral agreement between India and Myanmar established in **1968**, allowing residents within a certain distance of the border to cross freely due to familial and ethnic ties.
  - The **Mizo, Kuki and Chins,** collectively known as **Zo people** (on either side of the border) share a common ancestry and strong ethnic ties.
- Indian & Myanmar share a boundary of **1643 Km. (largely unfenced)** which passes through **4 Indian States - Arunachal Pradesh, Nagaland, Manipur and Mizoram**
- **Concerns Related to FMR:**
  - **Security Risks**: Unrestricted movement exploited by insurgents and terrorists to cross the border undetected.
  - **Illegal Activities**: smuggling goods, drug trafficking and arms across the border.
  - **Challenges in Monitoring:** Free movement makes it difficult for border security forces to monitor and differentiate between regular community members and those engaging in illegal activities.

Arguments in Favour of Scrapping the Free Movement Regime (FMR)

- **Security Concerns:** Unregulated cross-border movement is linked to **ethnic conflicts** and insurgencies, especially in **Manipur**.
  - Increased smuggling of **drugs (from the Golden Triangle)**, **gold**, and **contraband goods** through the porous border.
- **Illegal Migration and Demographic Changes:** Fear that unchecked migration from Myanmar could lead to demographic shifts and social tensions.
  - Potential for infiltrators to exploit the FMR for subversive activities.
- **National Sovereignty and Border Control:** Scrapping the FMR would strengthen India's control over its borders, reinforcing territorial integrity.
  - Enhanced border security would help prevent illegal activities and maintain law and order.
- **Political and Strategic Stability:** Better control over cross-border movements could prevent destabilization in conflict-prone areas like **Manipur** and **Nagaland**.
  - Reduced influence of armed groups and insurgents operating from across the border.
- **Legal and Administrative Clarity:** Removing the FMR would bring consistency in border regulations and align them with broader national security policies.

Arguments Against Scrapping the Free Movement Regime (FMR)

- **Historical and Cultural Ties:** Communities on both sides of the border have **shared ancestry**, familial bonds, and social ties.
  - FMR enables preservation of traditional links and cultural exchange.
- **Humanitarian Concerns:** Refugees from Myanmar's civil conflict have sought shelter in **Mizoram** and **Manipur** on humanitarian grounds.
  - Scrapping the FMR could violate human rights and strain local communities' ability to provide aid.
- **Economic Impact:** Local economies along the border rely on cross-border trade for livelihood.
  - Increased border restrictions could disrupt trade, affecting income sources for border communities.
- **Political Fallout:** Scrapping the FMR without consulting local communities could fuel demands for a **unified homeland** (like Frontier Nagaland).
  - Risk of increased resistance and political instability in the Northeast.
- **Practical Challenges of Fencing:** Difficult terrain along the 1,653 km border makes fencing costly and impractical.
  - Fencing could lead to displacement and protests from border communities.
- **Alternative Solutions Available:** Strengthening customs and law enforcement along the border could be more effective than scrapping the FMR.

Way Forward:

- **Confidence of the People:** Before taking any decision on the FMR, people in the border areas should be taken into confidence.
  - Gaining local civilian confidence and support through consultations and incorporating their point of view can mitigate potential resistance from the tribal groups
- **Interstate coordination:** Ensuring a comprehensive and coordinated approach with the consent of each bordering state is crucial to maintaining a stable and peaceful Northeast.
- **Strengthen Surveillance along the Border:** Hybrid Surveillance System can be employed by using multiple types of surveillance technologies like video cameras, radar sensors, fibre optic sensors and thermal imaging, to monitor border perimeter effectively
- **Improved Trade Regulation:** Better monitoring and control over trade would ensure fair taxation and reduce illegal trading practices.
- **Proper monitoring of the Border**
  - **Regulate the movement of people:** Effectively regulating the cross border movement of people across borders will help deal with border management.
  - **Custom offices:** Legalizing certain trade items and improving infrastructure could address smuggling without disturbing social harmony.
- **Diplomatic efforts:** Diplomatically engaging with the junta government to tackle internal security issues along the India-Myanmar Border will help in eliminating the need of abolishing the FMR.

TOPICS FOR PRELIMS (INTERNATIONAL RELATIONS)

India's Strong Response to Pakistan in United Nation

Context

India strongly countered Pakistan's remarks on Jammu and Kashmir at the **58th Regular Session of the UN Human Rights Council (UNHRC)** in Geneva as well as in UN debate.

More on News:

Session of UNHRC

- Pakistan alleged violation of Human Rights In J&K , However India called these as "baseless and malicious".
- India cited the progress and development in the region, reiterating its sovereignty over Kashmir.

UN debate

- In the UN debate on the Peacekeeping Missions, Pakistan again resorted to unwarranted remarks on the Indian Union Territory of Jammu and Kashmir.
- India advised Pakistan not to try to divert the attention of the forum to drive their parochial and divisive agenda. India replied to Pakistan that J&K was, is and will always be an integral part of India.

About UNHRC

- It was established in **2006** by the **United Nations General Assembly (UNGA)**, replacing the former **United Nations Commission on Human Rights**.
- **HQ - Geneva, Switzerland**
- It works under the United Nations Office of the High Commissioner for Human Rights (OHCHR).
- **Functions:**
  - The UNHRC is responsible for **promoting and protecting human rights globally**.
  - It investigates **human rights violations**, including **genocide, war crimes, and racial discrimination**.
  - The **Universal Periodic Review (UPR)** mechanism allows the council to assess **human rights records of all UN member states**.

Structure and Working

- The **UNHRC consists of 47 member states**, elected by the **United Nations General Assembly (UNGA)** for a three-year **term**.
- Seats are distributed based on regional representation:
  - **African Group** – 13 seats
  - **Asia-Pacific Group** – 13 seats
  - **Latin American & Caribbean Group** – 8 seats
  - **Western European & Others Group** – 7 seats
  - **Eastern European Group** – 6 seats
- Elections take place every year, and a country **is not eligible for immediate re-election after serving two consecutive terms.**
- India has been a member of UNHRC for **6 times (latest was in 2022-24).**

Kurdistan Worker's Party (PKK)

Context

Abdullah Ocalan, the founder of the PKK, urged Kurdish fighters to lay down their arms.

About PKK

- The **PKK (Kurdistan Workers' Party)** is a militant group that has been fighting the **Turkish government** since the **1980s**.
- Kurds make up approximately **15% or more** of Turkey's population.

Who Are the Kurds?

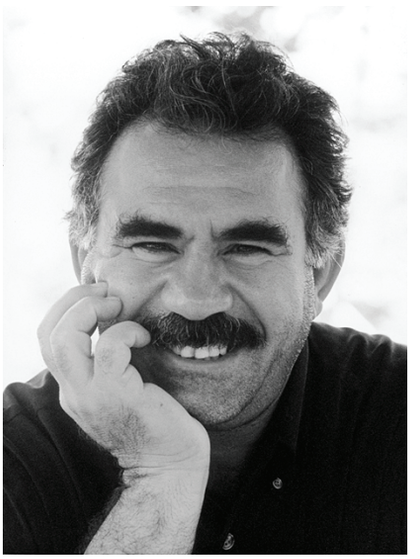
- The **Kurds** are an ethnic group of about **40 million people**, mainly in **Turkey, Syria, Iraq and Iran**.
- They have their **own language and culture**, which has often been suppressed by governments.
- The majority of Kurds are **Sunni Muslims**.
- After **World War I**, they were promised their own country, but that never happened.

Kurdish Influence in Other Countries:

- In **Syria**, the **Syrian Democratic Forces (SDF)**, which has PKK ties, controls the **northeast**.
- In **Iraq**, the Kurdish region has been **semi-autonomous since 1991**.

Kurdistan

- Kurdistan is a roughly defined geo-cultural region in West Asia wherein the Kurds form a prominent majority population.
- **Mountains:** It includes the mountain systems of the Zagros and the eastern extension of the Taurus.
- **Rivers:** Tigris and Greater Zab Rivers flows through this region and support agriculture and settlements.
- **Capital:** Erbil



- Initially, Kurds wanted **independence** for the **Kurdish people**, but later focused on **Kurdish rights** within Turkey.

Abdullah Ocalan's Role:

- **Abdullah Ocalan**, the PKK's founder, was captured in **1999** and sentenced to **life in prison**.
- From jail, he shifted the PKK's focus from **independence** to **Kurdish rights**.
- Recently, he has asked PKK fighters to stop fighting, but it's unclear if they will listen.

Previous Peace Efforts:

- There have been multiple **ceasefires** and **peace talks** since **1993**, but all failed.
- The last attempt in **2015** collapsed, and violence restarted.

Egyptian alternative to Trump's Gaza plan

Context

An Emergency Summit was held in **Cairo, Egypt** by the **Arab League** to address the **humanitarian crisis in Gaza** following Israeli military actions.

Cairo Declaration on Gaza - The $53-Billion Reconstruction Plan

- The Cairo declaration adopted an **Egyptian-led $53-billion reconstruction plan** for Gaza.
- It includes **political, financial, and material support** from Arab nations
- It is the **First major Arab proposal** for Gaza's **reconstruction and governance post-war**, contingent on a **full ceasefire**.

Key Elements of the Cairo Declaration

- **Governance & Political Structure for Gaza:**
  - The declaration calls for a **"Gaza administration committee"** comprising **qualified Gazans for a transitional period**.
  - This interim administration is meant to **prepare for the return of the Palestinian Authority (PA)** to govern Gaza and **hold elections**.
  - The declaration **does not explicitly mention Hamas** or its removal, which was criticized by **Israel and the US**.
- **UN Peacekeeping & Security in Gaza and the West Bank:**
  - It reiterates the **Bahrain Declaration (May 2024)** which called for: **Deployment of UN peacekeeping forces** in both Gaza and the West Bank.
- **Two-State Solution & Palestinian Sovereignty:**
  - It reaffirms commitment to the **Arab Peace Initiative of 2002** and the **two-state solution**.
  - Calls for a **sovereign Palestinian state within pre-1967 borders**, with **East Jerusalem as its capital**.
  - It stresses that **Arab recognition of Israeli sovereignty** is **contingent** on the establishment of a Palestinian state.
- **Trust Fund for Reconstruction:**
  - Establishment of a **"Trust Fund"** to finance Gaza's recovery and reconstruction projects.
- **Palestinian Political Unity:**
  - The declaration calls for **all Palestinian factions** to unite under the **Palestine Liberation Organization (PLO)** after essential reforms.
  - **PLO (which includes Fatah)** is recognized as the **"sole legitimate representative"** of the Palestinian people.
    - **Hamas is not part of the PLO.**

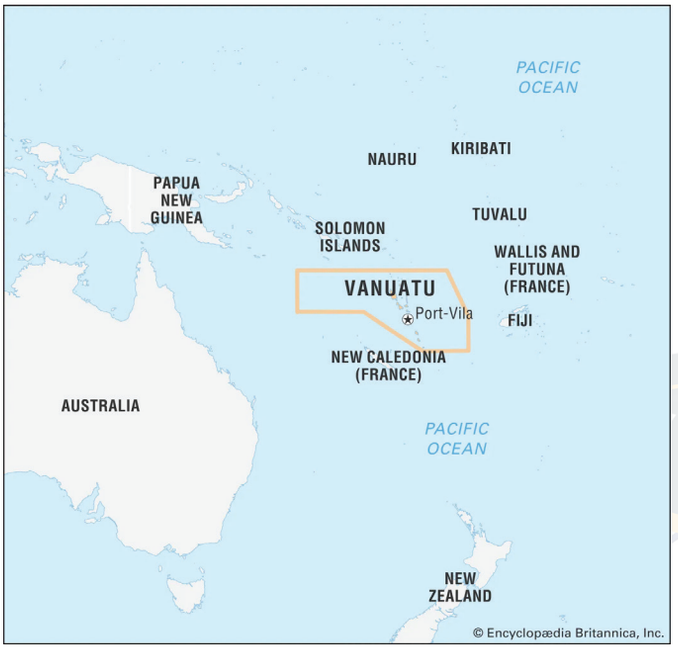
Arab League

- It is a regional organization of Arabic-speaking countries in the Middle East and North Africa.
- **Formation:** In Cairo in 1945
- **HQ:** Cairo
- **Purpose:** Strengthen relations, coordinate policies, and safeguard member states' sovereignty
- **Membership:** 22 countries, including Egypt, Syria, Saudi Arabia, Libya, and Tunisia, Jordan and Yemen as founding members.

Vanuatu's Citizenship by Investment Program

Context

Former IPL chief **Lalit Modi** has **surrendered his Indian passport** at the Indian High Commission in London and has **acquired citizenship of Vanuatu.**



- **Vanuatu** is **an archipelago of 83 islands**, spread over **1,300 km**. located in Southwestern Pacific Ocean.

About Citizenship by Investment (CBI)

- **CBI allows individuals to acquire citizenship in a country by making significant financial contributions** to its economy.
- This scheme is popular among wealthy individuals looking for **easier global mobility, tax benefits, and offshore financial services**.
- According to the **Global Residence Index**,Vanuatu offers the **fastest and simplest** CBI program.
- **Cost**: Citizenship for an individual costs between **$135,500 and $155,500 (₹1.18 crore to ₹1.35 crore)**.
  - In **2019**, the BBC reported that **passport sales account for nearly 30% of Vanuatu's revenue**.
- Countries such as **Malta, Turkey, Montenegro, Antigua and Barbuda, Dominica, and Egypt** also offer similar programs.

Advantages of Vanuatu Citizenship:

- **Visa-Free Travel:** As of 2025, a Vanuatu passport grants visa-free access to **113 countries.**
- **Tax Haven Status:** Vanuatu is considered a zero-tax jurisdiction, meaning it has no: Personal income tax, Capital gains tax, Inheritance tax, Wealth tax etc.

India-US Extradition Treaty

Context

The **United States Supreme Court** rejected **Tahawwur Hussain Rana's** plea against his extradition to India.

About India-US Extradition Treaty (1997)

- It was **signed in 1997** to facilitate extradition between **India and the United States**.
- An offense is **extraditable** if it is **punishable by imprisonment of more than one year** in **both countries** (**dual criminality principle**).
- **Political offenses** are **not extraditable**. However, some crimes **are not considered political offenses**, such as: Murder of a Head of State, hijacking, terrorism, and crimes against internationally protected persons.
- **Extradition may be refused** if:
  - The person **risks persecution based on race, religion, nationality, or political beliefs**.
  - The offense is of a **military nature**.
  - The offense carries **capital punishment**, unless the requesting country gives assurances that the death penalty will not be carried out.

Challenges in Extradition under India-US Treaty:

- **Slow process**: Extradition cases often take years due to **legal challenges**.
  - **65 Indian fugitives** are awaiting extradition from the US.
  - **Only 11 extraditions** between **2002 and 2018**.
- **US reluctance**: Several key Indian requests have been **denied**. **E.g.,**
  - David Headley - 26/11 Mumbai attacks conspirator,
  - Warren Anderson - Union Carbide CEO, Bhopal Gas Tragedy.
- **Different legal systems**: Some Indian charges don't meet **US legal standards** for extradition.

Extradition Treaties vs. Extradition Arrangements

- **Extradition Treaty**:A **formal legal agreement** between two countries for extradition.
  - India has signed **extradition treaties with 48 countries**.

° **Major countries**: USA, UK, Canada, France, Germany, UAE, Russia, Australia.

- **Extradition Arrangement**: A **mutual understanding** for extradition, even without a formal treaty. (Presently with **12** countries).
  - **Major Countries:** Hong Kong, Saudi Arabia, Papua New Guinea, Fiji, Italy, Switzerland, Sweden.

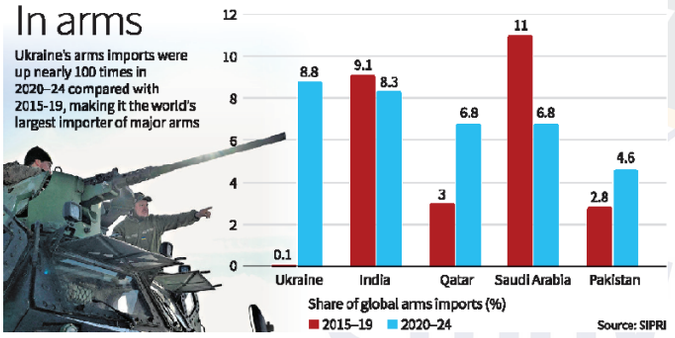
SIPRI Report on Global Arms Transfers (2020-24)

Context

Recently Stockholm International Peace Research Institute (SIPRI) has released new data on international arms transfers.

Global Arms Import Trends

- **Ukraine** became the **largest arms importer** globally in **2020-24**, witnessing a **nearly 100-fold increase** in imports compared to **2015-19**, primarily due to its ongoing war with Russia.
- **India** ranked as the **second-largest arms importer**, though its imports declined **by 9.3%** compared to **2015-19**.
- **China** dropped out of the **top 10 arms importers** for the first time since **1990-94**, reflecting its strengthened domestic defense industry.



- **Pakistan's** arms imports increased by **61%** from **2015-19 to 2020-24**.
  - **China** dominated as Pakistan's main supplier, contributing **81%** of total imports.
- **European arms imports grew by 155%**, driven by concerns over Russian aggression.

Global Arms Export Trends

- **Russia's Declining Arms Exports:** Russia's **global arms exports fell by 64%**, now making up just **7.8%** of the global market.
- **France's Rising Arms Exports:** France overtook Russia as the **second-largest arms exporter** in **2020-24**, accounting for **9.6% of global exports**.
  - **Major buyers of French arms:** India (28%) (largest recipient) & Qatar (9.7%).
- **U.S.A. has expanded its dominance**, increasing its share to **43% of global arms exports**.

India's Arms Imports

- India's **largest supplier** remained **Russia**, but its share **declined to 36%** (from **55% in 2015-19** and **72% in 2010-14**).
- India was the **biggest export destination** for both **Russia and France** in 2020-24.
- **France** emerged as a key supplier, with **India accounting for 28% of French arms exports**.
- **Major Indian arms deals with France**:
  - 36 Rafale fighter jets
  - 6 Scorpene-class submarines
  - Upcoming deals: 26 Rafale-M jets and 3 more submarines.

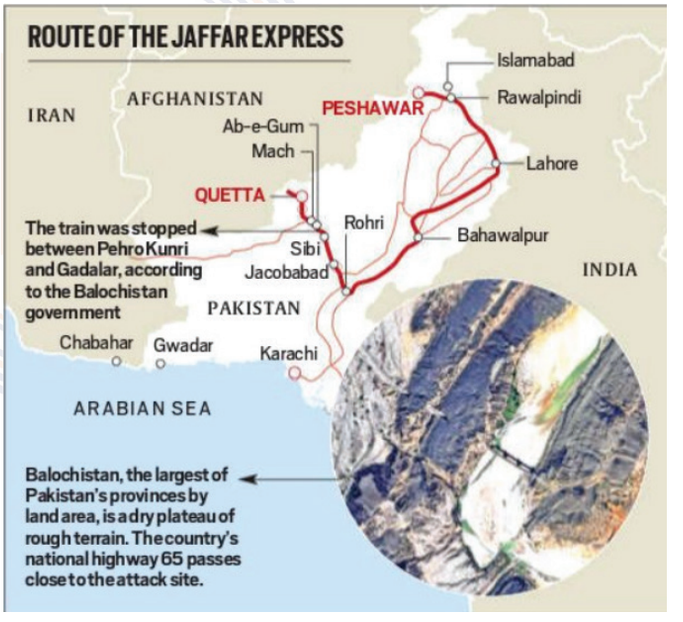
Stockholm International Peace Research Institute (SIPRI)

- It is a globally renowned institute dedicated to research on conflict, armaments, arms control and disarmament.
- It was founded in **1966**. It is based in **Stockholm.**
- SIPRI provides critical data and analysis on global security issues, particularly related to military expenditures and the arms trade in its **Yearly Book.**

Balochistan Liberation Army

Context

Recently the **Balochistan Liberation Army** carried out a **major attack on the Jaffar Express**, a passenger train traveling from **Quetta to Peshawar.**



About Balochistan Liberation Army (BLA)

- BLA is a **Baloch nationalist militant group** that has been active in **Pakistan's Balochistan province** since the early 2000s.
- It is one of the **most prominent separatist groups** fighting for **Baloch independence.**
- It is designated as a **terrorist organization** by **Pakistan, UK and USA**.

- BLA wants to establish an **independent Balochistan**, separate from **Pakistan**.
- Baloch insurgents oppose **China-Pakistan Economic Corridor (CPEC)**, claiming it exploits local resources without benefiting the Baloch people.

Balochistan: Pakistan's Largest but Least Developed Province

- Balochistan is **Pakistan's largest province** by area but has **low population density**.
- It is rich in natural resources: **Oil, gas, gold, and copper.**
- **Economic inequality:** Despite its resource wealth, Balochistan remains economically backward compared to Punjab, Sindh, and Khyber Pakhtunkhwa.
- **Punjabis dominate the military, bureaucracy, and industries**, leading to **ethnic resentment** among Baloch people.

Historical Background of Baloch Separatism

- Balochistan remained **independent from Pakistan until March 1948**.
- **The Khan of Kalat**, a key regional leader, controlled **Kalat, Makran, Las Bela, and Kharan**.
- He initially sought **independence for Balochistan** but faced **political pressure to join Pakistan**.
- **British geopolitical concerns (fear of Russian influence) and internal demands from Kharan, Las Bela, and Makran** contributed to Balochistan's accession.
- Baloch separatist movements have persisted ever since.

Former Philippines President arrested on ICC warrant

Context

Former Philippine President **Rodrigo Duterte** was arrested recently, following an arrest warrant issued by ICC for alleged crimes against humanity committed during his war on drugs.

About International Criminal Court (ICC)

- ICC is a permanent judicial institution **established in 2002** under the **Rome Statute of 1998.**
  - It is headquartered in **Hague, Netherlands.**
- **Mandate:** To investigate, prosecute, and adjudicate individuals accused of committing genocide, war crimes, crimes against humanity and the crime of aggression.
- **Members:** 125 **(Important non-member countries: India, US, China & Russia)**
- **Composition:** The Court has **18** judges, each from a different member country, elected for a **nine-year term**.
- **Jurisdiction:**
  - Crimes committed in **Rome Statute signatory states**.
  - Crimes committed by **nationals of signatory states**.
  - Cases referred by the **UN Security Council**.
- After **issuing an arrest warrant ICC relies on countries to make arrests and transfer suspects to the ICC**.
- Unlike the International Court of Justice (ICJ) it is **not an organ of the United Nations.**
- **Challenges in Enforcement:**
  - **No police force of its own.**
  - Relies on member states to arrest suspects.
  - Needs international cooperation for enforcement, asset freezing, and extraditions.

Difference between ICC & ICJ

Parameter	ICC (International Criminal Court)	ICJ (International Court of Justice)
Establishment & HQ	2002, Hague (Netherlands)	1946, Hague (Netherlands)
UN Relation	Independent- may receive case referrals from UN Security Council	Official court of the UN, known as the World Court
Case types	Criminal prosecution of individuals	Contentious between parties, and advisory opinions

Parameter	ICC (International Criminal Court)	ICJ (International Court of Justice)
Subject matter	Genocide, crimes against humanity, war crimes, crimes of aggression	Maritime disputes, sovereignty, natural resources, trade, treaty violations and treaty interpretations, human rights, etc.
Funding	Contributions from parties to Rome Statute, voluntary contributions from UN, governments, corporations, organisations, etc.	UN

Five Eyes Alliance

Context

Recently Intelligence chiefs of Five Eyes Alliance countries attended the Security Conclave organised by the National Security Council Secretariat.

About Five Eyes Alliance (FVEY)

- It is an intelligence-sharing network comprising **5 English-speaking countries.**
  - USA, United Kingdom, Canada, Australia and New Zealand.
- It was established in the aftermath of World War II, its roots trace back to the UKUSA Agreement signed in 1946, which aimed to facilitate cooperation in signals intelligence (SIGINT) among these nations.

Objectives of the Five Eyes Alliance

- **Intelligence Sharing:** The primary objective is to collect, analyse and share intelligence on global threats, including terrorism, cybercrime and other security challenges.
- **National Security Enhancement:** By pooling resources and intelligence, the Five Eyes nations aim to bolster their national security capabilities and respond more effectively to emerging threats.
- **Signals Intelligence (SIGINT):** FVEY focuses heavily on SIGINT, which involves intercepting and analysing electronic communications. This includes monitoring phone calls, emails, and internet activities.

Facts

- Beyond the core Five Eyes members, there are extended groups known as:
- **Nine Eyes** (adding Denmark, France, Netherlands and Norway)
- **Fourteen Eyes** (including Germany, Belgium, Italy, Spain and Sweden), which enhance global surveillance capabilities.

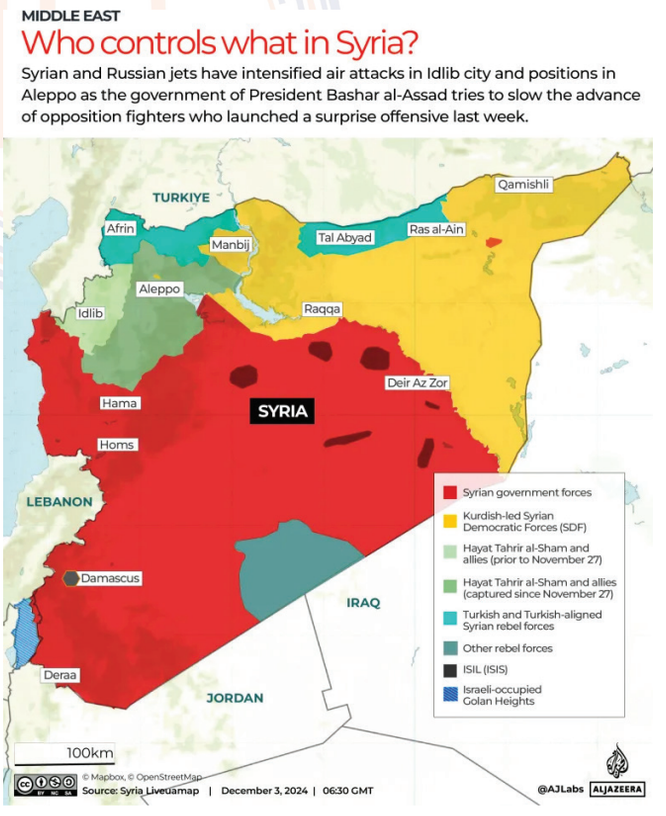
Chaos in Syria, after fall of Assad Regime

Context

After the fall of Bashar al-Assad's regime in December 2024, Syria has experienced three months of instability.

Who is Fighting Whom, and Why?

- **Bashar al-Assad**, Syria's former president, belonged to the **Alawite community** (a Shia sect).
- Under his rule, **Alawites dominated government positions** and remained loyal to his regime.
- After Assad's **fall in December 2024**, power shifted to **Hay'at Tahrir al-Sham (HTS)**, a **Sunni militant group** with **al-Qaeda origins**.
- **Syrian minorities** (Alawites, Christians, Druze) **fear persecution** under the new hardline **Sunni** government.
- **Territorial Control**:
  - The new government **does not fully control Syria**.
  - **Assad loyalists** remain active in **Latakia (coastal region)**.
  - U.S.-backed Kurdish Syrian Democratic Forces (**SDF**) operates semi-independently in **Rojava (northeast Syria)**.



Historical Context: Why Has Syria Been in Civil War?

- **Assad's Rule and the 2011 Arab Spring:**
  - **Hafez al-Assad** ruled Syria from **1971 to 2000** as a **dictator**.
  - His son, **Bashar al-Assad**, took over in **2000**.
  - The **2011 Arab Spring** triggered **protests against Assad**, similar to uprisings in Tunisia, Egypt, and Libya.
  - Protests started over **economic hardship, corruption, and unemployment**, but quickly turned into a **civil war**.
- **Foreign Involvement in the Syrian Conflict:**
  - **U.S., Israel, and Turkey** backed various rebel groups.
  - **Russia and Iran** supported **Assad and Shia militias**.
  - **Kurds** established an autonomous region in **northeast Syria**.
  - **Israel's Role:** Since **Assad's fall**, Israel has **intensified airstrikes**, claiming it wants to **prevent advanced weapons from falling into the wrong hands**.
  - **Russia's Role:** Russia operates a major military base in **Hmeimim, Latakia**, where **minorities are taking refuge** amid the renewed violence.

India-EU Trade and Technology Council

Context:

India and the EU held the second ministerial meeting of the Trade and Technology Council (TTC), focusing on strategic technologies, clean energy, and trade resilience.

Key Outcome of the meeting:

Strategic technologies, digital governance and digital connectivity

- work towards the interoperability of their respective Digital Public Infrastructures (DPIs)
- emphasised the need for e-signatures to be mutually recognised for cross-border digital transactions
- explore joint research and development in the field of chip design: for resilience of semiconductor supply chains
- deepening the cooperation between the European AI Office and India AI Mission
- Financial Support for GANANA Project

About GANANA Project

- It aims to establish a long-term collaboration between Europe and India in the field of HPC(High Performance Computing) applications.
- The massive computational power of the largest supercomputers in the EU and India will be leveraged by designing schemes for shared access to the machines.
- It aims to unite top European and Indian institutions to advance HPC applications in biomedical sciences, weather modeling, and geohazards.
- It will also help towards common efforts in building capacities for AI applications.
- **Duration from:** 01/02/2025 to 31/01/2028

Green and clean energy technologies

- An "Ideathon" on marine plastic pollution, where Indian and EU partners will create practical solutions.
- Joint research cooperation under the Horizon Europe program focusing on key areas such as marine plastic litter and waste-to-renewable hydrogen.

Trade, investment and resilient value chains

- Made progress on a number of market access issues
- Exchanged best practices on the screening of Foreign Direct Investments
- Reaffirmed their commitment to the multilateral trading system, while recognising the need to reform the WTO.
- Held in-depth discussions on trade and decarbonisation, especially on the implementation of the EU's Carbon Border Adjustment Mechanism (CBAM).

About EU-India Trade and Technology Council(EU-India TTC)

- It was announced by the European Commission in April 2022, and launched in February 2023.
- Aim: The TTC is a key forum to deepen the strategic partnership on trade and technology between the two partners. The TTC will help foster EU-India bilateral trade.
- It is the first such TTC for India with any country while it is second for EU after US
- Its first ministerial meeting was held in May 2023, white the second meeting was held in New Delhi on 28 February 2025.

World Happiness Report 2025

Context

The **World Happiness Report 2025** was recently published by the **Wellbeing Research Centre at the University of Oxford.**

About World Happiness Report 2025

- It is an annual report published by the **University of Oxford's Wellbeing Research Centre in partnership with the UN Sustainable Development Solutions Network and Gallup**.
- For the **eighth consecutive year, Finland** has been named the **happiest country in the world**.
- **Top 10 Happiest Countries in 2025:** Finland, Denmark, Iceland, Sweden, Netherlands, Costa Rica, Norway, Israel, Luxembourg, Mexico.
  - **Costa Rica (6th) and Mexico (10th)** entered the **top 10 for the first time**.
- **India's Rank: 118** (Last time India's position was 126th).
  - Countries such as **Pakistan, Nepal, Palestine and Ukraine are ranked above India.**
- **Bottom Five Unhappiest Countries in 2025:** (143) Zimbabwe (144) Malawi (145) Lebanon (146) Sierra Leone **(147) Afghanistan** (Ranked as the unhappiest country for the fourth consecutive year)

Indo-Pacific Oceans Initiative (IPOI)

- PM Modi welcomed New Zealand's decision to join the Indo-Pacific Oceans Initiative (IPOI), underscoring the shared vision for a free, open, and secure Indo-Pacific.

About IPOI

- It is a non-treaty-based voluntary arrangement that promotes cooperation for a free and open Indo-Pacific and the rules-based regional order.
- **Formation: By India in 2019 at the East Asia Summit (EAS) in Bangkok (Thailand).**
- **Aim:** To ensure a free, open, and inclusive Indo-Pacific, fostering peace, stability, and prosperity for all participating countries.
- It builds upon the **"Security and Growth for All in the Region" (SAGAR) initiative** announced by the Prime Minister in 2015.
- **Key Pillars of IPOI:**
  - The IPOI identified seven key pillars, with the possibility of one or two countries leading each pillar while others could participate voluntarily.

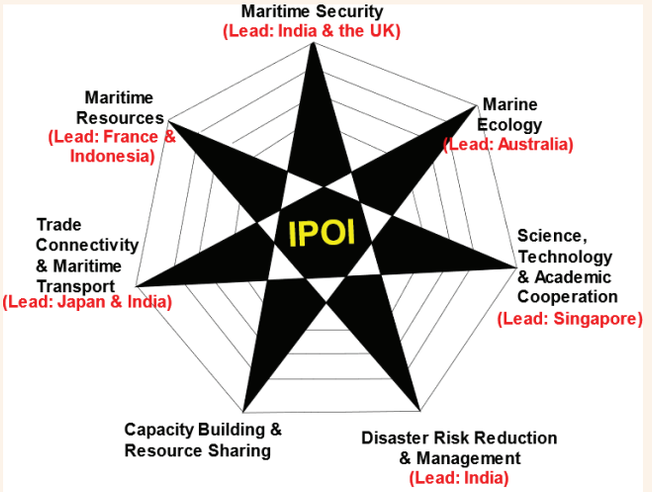


Figure 1: Schematic Summary of the IPOI
(Source: National Maritime Foundation)

SQUAD Grouping

- The **Philippines and its allies** are working on **expanding the Squad**, an informal multilateral security grouping, to include **India and South Korea**.

About SQUAD

- It is an informal military grouping **(Members - USA, Australia, Japan and Philippines).**
- It aims to exchange intelligence and hold joint military exercises and operations to counter China's dominance in the Indo-Pacific region.
- It will counter China's claim on almost all of the strategic waterway — a conduit for $3 trillion in commerce annually.
- **Joint Military Activities**:
  - Since **2023**, the defence forces of these four countries have conducted **joint maritime operations** in the **Philippines' exclusive economic zone (EEZ)** in the **South China Se**a.

14th ADMM-Plus Experts Working Group Meeting on Counter-Terrorism

- The **14th meeting of the ASEAN Defence Ministers' Meeting-Plus (ADMM-Plus) Experts Working Group (EWG) on Counter-Terrorism** was held in **New Delhi from March 19 to 20, 2025**.
- **India and Malaysia** will **co-chair** the meeting.

About ADMM-Plus and its Expert Working Groups (EWGs)

- **ADMM-Plus** serves as a **platform for practical cooperation** among the defence establishments of participating countries.

- It currently focuses on **seven key areas of practical cooperation:**
  - Counter-Terrorism, Maritime Security, Humanitarian Assistance and Disaster Management (HADR), Peacekeeping Operations, Military Medicine, Humanitarian Mine Action & Cyber Security.
- **EWGs (Experts Working Groups)** have been set up for each of these areas to **facilitate cooperation**.
- **Participants:**
  - **ASEAN Members:** Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Vietnam, Singapore and Thailand.
  - **Dialogue Partners:** India, Australia, New Zealand, South Korea, Japan, China, USA and Russia.
  - **Other Participants:** Timor Leste & ASEAN Secretariat

Role of EWG Co-Chairs

- Each **EWG is co-chaired by an ASEAN member and a dialogue partner** for a **three-year cycle**.
- Responsibilities of co-chairs include:
  - **Setting objectives, policy guidelines, and strategic directions** for the three-year cycle.
  - Conducting **regular meetings (at least two per year)**.
  - Organizing an **exercise (Table-Top/Field Training/Staff/ Communication, etc.)** in the **third y**ear to evaluate progress in practical cooperation.

United Nations Relief and Works Agency for Palestine Refugees

- UNRWA chief Philippe Lazzarini acknowledges that it has been "stressful" leading the embattled UN agency for Palestinian refugees

About URWA

- It was established in **1949 by the UN general Assembly** to provide aid to about 700,000 Palestinians who were forced to leave their homes during the **1948 Arab-Israeli war.**
- It operates in **Gaza, West Bank, Lebanon, Syria and Jordan. (HQ - Gaza)**
- It runs education, health, relief, social services, microfinance and emergency assistance programmes inside and outside refugee camps in these areas.
- In the absence of a solution to the Palestine refugee problem, the General Assembly has repeatedly renewed UNRWA's mandate, most recently extending it until 30 June **2026.**

UN80 Initiative

- UN Secretary-General Antonio Guterres has announced a new initiative aimed at improving efficiencies at the 80-year-old world organisation and making it more cost-effective.

About UN80

Mandate:

- It will come up with proposals in areas of rapidly identifying efficiencies and improvements in the way the UN works.
- It will review the implementation of all mandates given to the UN by member states
- **Led by Internal task Force:** headed by Under-Secretary-General Guy Ryder, with representatives from all UN bodies.

Reasons Behind the Initiative

- Shrinking financial resources.
- Liquidity crisis due to delayed and partial payments by member states.
- Rising global challenges and the need for better program alignment.

Raisina Dialogue

- The 10th edition of the Raisina Dialogue was held from 17-19 March, 2025.
- **Theme:** "Kālachakra - People, Peace and Planet"
- **Chief Guest:**PM of New Zealand Christopher Luxon joined the inaugural session as the Chief Guest

Key Highlights:

- S Jaishankar expressed concern over weaponisation of tariffs and export controls.
- He pointed to several ways of dealing with it: finding more trustworthy partners that present fewer risks.
- He emphasised the need for regulations for big data for trade deals and the evolution of artificial intelligence (AI).
- Speakers expressed concern over dominance of China in the Maritime economy and called for India's role in rebalancing it.

About Raisina Dialogue

- The Raisina Dialogue is India's flagship conference on geopolitics and geo-economics, committed to addressing the most challenging issues facing the international community.
- It is India's policy dialogue at the Munich Security Conference and Singapore's Shangri-La Dialogue
- **Origin:** Launched in 2016 by the Ministry of External Affairs (MEA) and named after Raisina Hills in New Delhi
- **Organised:** Observer Research Foundation in partnership with the Ministry of External Affairs, GOI
- **Structure:** multi-stakeholder, cross-sectoral discussion, involving heads of state, cabinet ministers, local government officials, private sector, media and academia.

TOPICS FOR PRELIMS (INTERNAL SECURITY)

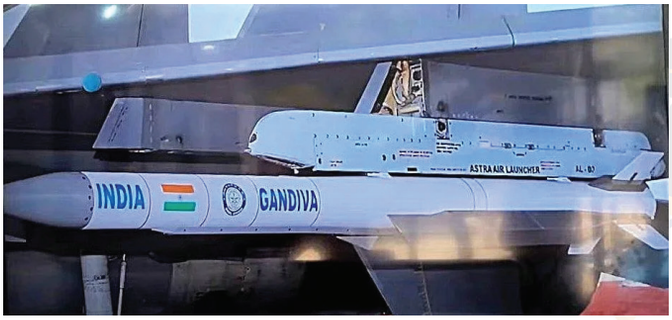
ASTRA MK-III/ Gandiva

Context

India's latest and most advanced air-to-air missile, **Astra MK-III**, has been officially renamed **Gandiva**.

About Astra MK-III

- It is India's most advanced Beyond Visual Range (BVR) air-to-air missile (AAM). It is currently **under development.**
- **Developed by:** Defence Research and Development Organisation (DRDO).
- The missile will be deployed on the IAF's **Sukhoi Su-30MKI jets and the Light Combat Aircraft Tejas.**



Features & Capabilities

- **Long-Range Target Engagement:**
  - Strikes up to 340 km (at 20 km altitude).
  - Hits 190 km range (at 8 km altitude).
- **Advanced Propulsion:**
  - Dual-pulse solid-fuel ducted ramjet engine for extended range and sustained speed.
- **High Speed & Maneuverability:**
  - **Launch speed:** 0.8 to 2.2 Mach.
  - **Target engagement speed:** 2.0 to 3.6 Mach.
  - Engages highly maneuverable aircraft with **20° angle of attack**.
- **Advanced Guidance & Targeting:**
  - **Active Radar Seeker** for precise target tracking & **Electronic Counter - Countermeasures (ECCM)** to resist jamming.

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

Sonic Weapons

Context

Serbia's President Aleksandar Vucic has denied allegations that his police forces used a banned 'sonic weapon' to disperse protesters in Belgrade.

What Are Sonic Weapons?

- It **emit loud or low-frequency sound waves** over long distances.
- They can be used for **non-lethal deterrence** and cause **severe pain and injury**.
- They are also called **Acoustic Weapons**, which emit **very loud sounds** over **long distances**.
- They can produce both **audible and inaudible** sound waves.
- **How Do Sonic Weapons Work?**
  - Sonic weapons rely on **transducers** – electronic devices that convert **energy into sound waves**.

Types of Sonic Weapons

- **Long-Range Acoustic Device (LRAD):**
  - **Range**: Can transmit **intelligible speech up to 8,900 meters (8.9 km)**.
  - **Sound Intensity**: Up to **160 decibels (dB)**.
  - **Uses**:
    - **Crowd control** (protests, riots).
    - **Maritime security** (anti-piracy).
    - **Military operations** (battlefield communication, psychological warfare).
- **Mosquito Device:**
  - **Designed to target young people** (teenagers, early 20s).

  - Produces **high-frequency sound** that is **only audible to younger individuals**.
  - **Older adults (30+) cannot hear it** due to **age-related hearing loss**.
  - **Uses**:
    - **Preventing vandalism**.
    - **Dispersing youth gatherings** in public spaces.
- **Infrasonic Weapons:**
  - Uses **very low-frequency sounds** (below 20 Hz), which are **inaudible to humans**, still it can cause **discomfort, disorientation, and even pain**.

Health Effects of Sonic Weapons

Short Term	Severe Effects
• Tinnitus (ringing in ears) – lasts minutes to days. • Temporary hearing loss. • Nausea, dizziness, sweating. • Headaches, vertigo, loss of balance.	• **Vomiting** • **Bleeding from ears** (indicating inner ear damage). • **Permanent hearing loss (**especially with exposure above 120 dB).

Pratibimb Module

- The Union Home Ministry's Indian Cyber Crime Coordination Centre (I4C) launched the 'Pratibimb' module to track the locations of criminals and map crime infrastructure.

About Pratibimb

- **Pratibimb'** is a **cybercrime tracking and mapping platform** launched by the Indian Cyber Crime Coordination Centre (I4C) under the **Union Home Ministry**.
- Designed to **track criminals' locations**, **map crime infrastructure**, and **support cybercrime investigations** across India.
- Enhances coordination among **Law Enforcement Agencies (LEAs)** for **faster and more efficient cybercrime resolution**.

About Indian Cyber Crime Coordination Centre (I4C)

- **I4C** was set up to **combat cybercrime in a coordinated manner**.
- Other I4C initiatives include:
  - **Samanvaya** – Data-sharing & analytics platform.
  - **National Cyber Forensic Laboratory (Investigation)** – Provides forensic support to law enforcement.
  - **Cyber Crime Reporting Portal** – Public platform for cybercrime complaints.

NIDAAN Portal

- The **National Integrated Database on Arrested Narco-offenders (NIDAAN)** is a specialized portal developed by India's **Narcotics Control Bureau (NCB).**
- It serves as a comprehensive repository of data on individuals arrested for narcotics-related offenses.
- It was launched in **July, 2022.**
- NIDAAN platform sources its data from the **ICJS** (inter-operable criminal justice system) & **e-Prisons** (a cloud-based application).
  - **Presently NIDAAN portal** is **partially integrated** with the **Crime and Criminal Tracking Network System (CCTNS)**. Full integration with CCTNS is planned for the future.
- It has helped Law enforcement agencies in connecting dots, previous involvements, fingerprint search, working inter-linkages, monitoring habitual offenders, financial investigation etc.
- It also helps in monitoring status of current cases, bail, parole, handlers, etc.

Exercise Desert Hunt - 2025

- It is an integrated Tri-Service Special Forces exercise conducted by the Indian Air Force at **Jodhpur Air Force Station.**
- The exercise involved elite **Para (Special Forces)** from the Indian Army, the **Marine Commandos** from the Indian Navy along with the **Garud (Special Forces)** from the Indian Air Force.
- **Objective:** enhance interoperability, coordination, and synergy among the three Special Forces units.

Exercise Khanjar-XII

- It is a joint special forces training exercise between **India and Kyrgyzstan.**
- It is held annually since **2011,** alternately in both countries.
- Its **12th edition** was scheduled from 10 March to 23 March 2025 in **Kyrgyzstan**.
- The exercise aims to improve counter-terrorism and special forces operations in urban and high-altitude mountainous terrain.
- It will foster peace stability, and security in the region.
- Beyond rigorous exercise, this exercise featured vibrant cultural exchanges, including celebration of the Kyrgyz festival Nowruz.

IOS SAGAR & AIKEYME

- The Indian Navy has recently launched two key maritime initiatives: **Indian Ocean Ship (IOS) Sagar & Africa India Key Maritime Engagement (AIKEYME).**

About Indian Ocean Ship (IOS) SAGAR

- It is an initiative towards continued cooperation with Indian Ocean Region **(IOR) nations.**
- **INS Sunayna** is being deployed to the Southwest IOR with a combined crew of India and **nine Friendly Foreign Countries (FFC)**
  - Comoros, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, Sri Lanka & South Africa.
  - **INS Sunayna** will undertake port calls at **Dar-es-Salaam, Nacala, Port Louis, Port Victoria and Male.**
- **Objective:** Strengthen maritime cooperation with IOR nations through a joint deployment of naval forces.

About Africa-India Key Maritime Engagement (AIKEYME)

- It is **India's first-ever multilateral naval exercise with 10 African nations**.
- **Objective:** Strengthen India-Africa maritime cooperation, enhance interoperability, and counter maritime security threats.
- AIKEYME' means 'Unity' in Sanskrit.
- **Co-Hosts:** Indian Navy & Tanzania Peoples' Defence Force (TPDF).
- **Other participating countries:** Comoros, Djibouti, Eritrea, Kenya, Madagascar, Mauritius, Mozambique, Seychelles and South Africa.
- **Location**: Dar-es-Salaam, Tanzania, from April 13 to 18, 2025.

VARUNA 2025

- It is an **annual Bilateral Naval Exercise** between **India and France.**
- Varuna started in **2001**, this one is the **23rd** edition.
- The exercise will witness the participation of **major naval assets** from both countries, including: **INS Vikrant** (India), **Charles de Gaulle** (France), **Rafale-M** & **MiG-29K**.
- **Aim:** Enhanced Jointmanship and reinforced the shared commitment to upholding the principles of a rules-based maritime order and promoting stability in the Indo-Pacific.
- **Other Bilateral exercises between India & France:** Garuda (Air Force), Shakti (Army).

Exercise Bono Sagar

- India-Bangladesh Naval Exercise Bongosagar 2025 was conducted in Bay of Bengal in the First week of March.
- It is a **Bilateral Naval Exercise.** The first edition of Bongosagar was held in **2019.**
- **Aim:** Strengthening maritime security, tactical planning and operational coordination.
- It enhanced interoperability between the two navies, facilitating collaborative responses to shared maritime security challenges.
- It is aligned with the Security And Growth for All in the Region (SAGAR) initiative of India.
- **Other Bilateral Exercise:** Sampriti.

T-72 Tanks

The Ministry of Defence has signed a contract with. Rosoboronexport (RoE), Russian Federation worth $ 248 million for procurement of 1000 HP Engines for T-72 Tanks.

- **Technology Transfer(ToT):** The deal also includes ToT from M/s RoE to M/s Armoured Vehicles Nigam Limited (Heavy Vehicle Factory), Avadi, Chennai.
- The Engine procured will be in fully formed, completely knocked down and semi knocked down conditions.
- **Benefit:** Equipping the existing fleet of T-72 Tanks with 1000 HP Engine will enhance the battlefield mobility and offensive capability of the Indian Army.

About T-72 Tanks

- The T-72 is a Soviet-designed main battle tank (MBT)
- The T-72 is a mainstay of the Indian Army's tank fleet, with India operating over 2,400 T-72 tanks.
- Maximum Road Speed: 60 km per hour
- Main Gun: 125 mm smoothbore gun
- Ammunition: 44 rounds of 125 mm ammunition

POLITY & GOVERNANCE

TOPICS FOR MAINS

Appointment of judges

Syllabus Mapping: GS2: Judiciary

Context

The discovery of bundles of currency notes at the residence of Delhi High Court judge Justice Yashwant Varma has reignited the debate on judicial appointments.

Constitutional framework for judicial appointments

Article 124

Appointment of Supreme court judges by the President after consulting the CJI

Article 217

Appointment of High court judges after consulting CJI, Governor and Chief justice of High court

Collegium system

- The Collegium system is a **judicial innovation** evolved through SC judgements in the Second and Third Judges Cases.
- The Collegium for appointing judges in the SC includes **CJI and the four senior most judges**.
- For appointing judges in the High courts, it includes the **CJI and the two most senior judges.**

Arguments in favour of the Collegium system

- **Protects Independence of Judiciary:** The Collegium system **helps preserve judicial independence such as appointment and removal of SC judges under Article 124** by reducing the influence of the executive and legislature in judicial appointments/ removal.
- **Expertise and Experience-based Appointments:** The Collegium system ensures that judges with extensive expertise and experience are appointed to the higher judiciary.
- **Protection against Political Interference:** It acts as a safeguard against political interference in the appointment of judges.
  - **Eg: Appointing CJI by superseding** the senior most SC Judge during Emergency.
- **Flexibility for Reforms and Improvements:** Over time the Supreme Court has acknowledged and ensured greater transparency in the appointment process, indicating that the system can be further improved over time.
  - **Eg: Reforms in Memorandum of Procedure,** Bringing office of CJI under RTI

Evolution of the Collegium System

- **1950:** Initially, the President appointed the Chief Justice of India (CJI) and other Supreme Court judges after consulting the CJI.
- **Early Practice:** Senior-most Supreme Court justices were typically chosen as the next CJI, although notable exceptions, such as Justice AN Ray's appointment in 1973 led to conflicts.

JUDGEMENT

- **First Judges Case (1981)- S.P. Gupta vs. Union of India:** Defined "consultation" as not requiring the government's concurrence making CJI's advice non-binding.
- **Second Judges Case (1993)- Advocates-on-Record Association vs. Union of India:** Changed the interpretation to "concurrence" making the CJI's advice binding, with the advice formulated through a collegium of senior judges.
- **Third Judges Case (1998):** Established the collegium structure for SC and HCs
  - Supreme Court: CJI and 4 senior-most judges
  - High Court: CJI and 2 senior-most judges with consultation from other senior Supreme Court judges experienced in the High Court.
- **Fourth Judges Case (2015)- Supreme Court Advocates on Record Association Case:** Declared NJAC unconstitutional emphasising the judiciary's primacy in appointments.
  - The 99th Constitutional Amendment aimed to replace the Collegium with the NJAC including the Union Law Minister, eminent individuals, the CJI and two senior Supreme Court judges.

Flaws with Collegium System

- **Lack of Transparency:** The decisions made by the Collegium are not subject to public scrutiny, and there are **no clear guidelines or criteria for the selection of judges**.
  - **Uncle-Judge Syndrome** is highly prevalent in Indian Judiciary due to concerns of favouritism and nepotism in the appointment process.
- **Absence of Accountability**:
  - **Eg:** Right To Information Act **is not applicable to discussions** of the collegium.
  - **Dr. B.R. Ambedkar** was against the idea of Judges appointing Judges as it would create an **'imperium in imperio'** (Sovereignty within Sovereignty).
- **Lack of Diversity:** The Collegium system has faced a lot of criticism for **its limited representation of diverse perspectives.**
  - **Eg:** Collegium got its first woman member **(Justice R Bhanumathi)** in 2019 after a gap of 13 years.
- **Potential for Judicial Collusion**: Various critics argue that the absence of external voices in the decision-making process can create an environment where judges are hesitant to challenge the status quo, potentially stifling the growth and evolution of the judiciary.
  - **Eg: Master of Roster issue** highlighted by SC judges in a **rare press conference.**

National Judicial Appointments Commission (NJAC)

- **Aim:** To reform the judicial appointment process, the **Constitution (99th Amendment) Act, 2014** and the **National Judicial Appointments Commission (NJAC) Act, 2014** were passed by Parliament in **August 2014**.
- The NJAC aimed to **replace the collegium system** with a more balanced and transparent mechanism involving the government and civil society.
- However in 2015, the Constitution bench of the **Supreme court (SC) struck down the NJAC as unconstitutional.**

NJAC as an alternate model for judges appointment

- **Judicial Independence vs Executive Oversight:**
  - **Article 124** originally vested the power of appointing Supreme Court judges in the **President**, acting on the advice of the **Council of Ministers** after consultation with the **Chief Justice of India (CJI)**
  - The shift from "**consultation**" to **"concurrence"** (through the Second and Third Judges Cases) gave the **judiciary dominance over judicial appointments**, sidelining the executive.
  - NJAC was an attempt to restore balance by introducing a **multi-stakeholder mechanism** in appointment of judges involving the government and eminent persons.
- **Lack of Accountability in Collegium System:**
  - **Decision making behind closed doors**: No clear criteria exists for selection or rejection of judges.
  - **Lack of public accountability**: No formal records of deliberations or reasons for appointments/rejections are published.
  - **Allegations of favoritism**: Judges being appointed based on personal connections rather than merit.
    - The Collegium system is infamous for the **Uncle-Judge syndrome.**
- **Judicial overreach over NJAC:** NJAC was passed and approved in **Parliament** and ratified by 16 state legislatures with only one dissenting vote (Advocate Ram Jethmalani)
  - Striking down such a widely supported constitutional amendment raised concerns about the **judiciary overstepping its authority.**
- **Stakeholder approach:** NJAC included a mix of stakeholders:
    - Chief Justice of India + two senior-most Supreme Court judges → **ensured judicial independence.**
    - Union Law Minister → **represented the government's role** in appointments.
    - Two eminent persons → brought in non-political perspectives with technical qualifications.
  - The system aimed to balance the independence of the judiciary with democratic accountability — a more holistic and transparent process.
- **Dissatisfaction within Judiciary:** Justice Kurian Joseph later regretted his role in striking down NJAC, acknowledging that the collegium system's continued failings justified revisiting the decision.

All India Judicial Service (AIJS)

- The President of India on Constitution day (26 November 2023) called for an **"All-India judicial service"** to recruit judges.
  - **Aim**: To make the judiciary diverse by increasing representation from marginalised social groups.
- **Inclusivity:** The judiciary is controlled by a small group of elite families, with minimal representation from marginalized groups and women. Implementing a nationwide examination would create opportunities for qualified candidates from diverse backgrounds.
- **Merit-Based Selection:** A well-defined, competitive recruitment system would prioritize judges' knowledge, skills, and ethical standards, shifting the focus from personal networks to individual merit.
- **Transparent Selection Process:** In contrast to the opaque Collegium discussions, the AIJS recruitment would operate openly and accountably, curbing favoritism.
- **Standardized Training:** Newly selected judges could receive comprehensive training across legal domains, promoting consistent judicial expertise throughout the court system.
- **Insulation from Executive Interference:** Judicial independence can be preserved by setting selection criteria internally while delegating the recruitment process to an impartial external entity, such as the UPSC.

Global best practices for Judges Appointment

- **Canada**: Federal Minister of Justice initiates appointments, evaluated by the Canadian Bar Association.
- **Germany**: Collaborative appointment process between executive and legislative branches.
- **USA**: Presidential nominations are confirmed by the Senate.
- **France**: Judicial appointments involve the High Council of the Judiciary and the Minister of Justice.
- **UK**: Appointments made by a commission including Supreme Court representatives.

Way forward

- To uphold public faith in the judicial system, transparency in the selection process of the Judiciary requires reforms.
- The Collegium system on one hand upholds the independence of judiciary, but its lack of transparency raises concerns of favouritism.
- NJAC, though struck down, can be re-considered with certain safeguards to prevent executive overreach.
- On the other hand, establishment of an All India Judicial Service could further ensure fairness, merit-based judicial appointments and above all uphold public faith in the judiciary.

National Human Rights Commission (NHRC)

Syllabus Mapping: GS2: Statutory bodies

Context

The National Human Rights Commission (NHRC) has taken suo motu cognisance of a media report regarding the detention of a digital news portal journalist from Assam.

Introduction to NHRC

National Human Rights Commission is a watchdog organisation set up to investigate, promote or protect human rights under the Protection of Human Rights Act, of 1993. The NHRC has recommended building of a **nationwide database and a national policy for protection and rehabilitation of individuals engaged in begging;** it brings to light the mandate of NHRC.

About NHRC

- **Act**: Protection of Human Rights Act, 1993
- **Composition**: Chairperson & 5 Other Members + Ex-Officio Member (7) - Chairpersons of NCSC, NCST, NCBC, NCW, NCPCR, NCM and Chief Commissioner for PwD
- **Appointment**: President (On the recommendation of Committee consisting PM, Speaker of LS, Deputy Chairperson of RS, Leader of Opposition in Both Houses & Union Home Minister)
- **Term**: Upto 3 years or 70 years of age (Conditions of service determined by Central government)
- **Qualifications**: Chairman - Must be retired Chief Justice of India (CJI) or SC Judge
  - Members - 2 (Must be serving or retired SC Judge) + 3 (Having knowledge or practical experience with regards to Human Rights with at least 1 woman)

- **Removal**: Similar to members of UPSC
- **Resignation**: To President
- **Reappointment**: Allowed
- **Further employment**: Not allowed
- **Ministry**: Ministry of Home Affairs
- **Powers**: Empowered to utilise the service of any officer or investigating agency of Central or State Government;
  - Possesses powers of a civil court during its proceedings;
  - It can only look into matters within one year of their occurrence.

Efficiency of NHRC in fulfilling its mandate

- **Upholding public faith:** Resorting to arms is not the only way to tackle terrorism, Security Forces need to win the confidence of people: **(P.C. Sharma - member NHRC)**
- **NHRC case disposal:** The cases disposed of by the commission and its compensation is granted in **90% cases.**
  - **Eg**: In the last 25 years, NHRC has disposed of about **17 Lakh cases** and paid more than **Rs 1 billion to victims of human rights violations in India.**
- **Recognising refugee rights:** NHRC has held discussions on the protection of Rohingyas, Chakmas and other refugees and asylum seekers in the country. They have focused on policy frameworks, legal safeguards to protect their right to life and dignity.
- **Action during COVID-19:** The NHRC recommended the inclusion of sex workers under the informal worker category to avail benefits. The Ministry even suggested the issue of temporary documents.

Challenges faced by NHRC in fulfilling its mandate

- **Limited enforcement:** NHRC makes only recommendations without the power to enforce decisions.
  - **Eg**: Various recommendations are partially implemented by the government.
- **Dependency**: NHRC lags behind in having its own investigation mechanism and relies upon state and central government agencies for investigations.
  - **Eg**: It leads to delays and biases in investigations
- **Resource crunch:** Inadequate funding and staff limits NHRC's capacity to address human rights violations in its true spirit.
  - **Eg**: Limited financial and human resource
- **Bureaucratic style of functioning:** Human rights commissions primarily draw their staff from government departments where strict hierarchies are maintained which makes it difficult to obtain information on the case.
  - **Eg**: It also creates a post retirement haven for judges and bureaucrats with political affiliations
- **Delayed response:** NHRC does not investigate complaints registered beyond one year of the incident, it leads to various grievances remaining unaddressed.
- **State commission limitations**: State Human Rights Commissions do not call for information from the national government which limits their overall effectiveness.
  - **Eg**: Jurisdictional gap hinders comprehensive human rights protection.

Measures to improve the efficiency of NHRC

- **Enforcement agency**: In order to improve the efficiency of NHRC, it needs to be granted powers to enforce its decisions to ensure compliance with its recommendations.
  - **Eg**: Increased capacity building by issuing binding orders and fines.
- **Independent investigation wing:** By a dedicated cadre of investigators within the NHRC to conduct timely and impartial probes.
- **Independent investigation:** NHRC should have its independent investigating staff with appropriate experience recruited by itself, rather than the present **practice of deputation.**
- **Expanding jurisdiction:** The jurisdiction of human rights commissions should be expanded to cover the entire country so that they can address human rights violations that occur anywhere in India.
  - **Eg: Bringing armed forces under its ambit.**

Conclusion

The Supreme Court called the NHRC a toothless tiger which needs to change by strengthening the commission, indulging in best practices and to provide speedy justice to human rights violations of bonded labourers, persons with disabilities, women and children and other marginalised sections of the society.

Delimitation commission

Syllabus Mapping: GS2: Elections, Statutory bodies

Context

There has been a renewed debate about delimitation after the issue was raised by the Chief Minister of Tamil Nadu.

About Delimitation exercise

- **Delimitation** is the process of **redrawing boundaries of Parliamentary and Assembly constituencies** to ensure **equal representation** based on population changes.
- It also involves **fixing the number of seats** allocated to each state in **Lok Sabha and State Assemblies**.
- The process is carried out by an independent body called the **Delimitation or Boundary Commission.**

Legal and Constitutional Basis for Delimitation Commission

- **Article 82**: Requires Parliament to **revise the allocation of Lok Sabha seats** among states **after every Census**.
- **Article 170**: States that the **number of seats in State Legislative Assemblies** must also be readjusted.
- **Delimitation Act**: Passed **whenever delimitation is needed**, and a **Delimitation Commission is set up**.
- Till date **4 Delimitation Commissions** have been formed in **1952, 1963, 1973 & 2004. (UPSC Prelims 2024)**

Related Constitutional Amendments

- **42nd Amendment (1976)**: **Froze the number of Lok Sabha and Assembly seats** until the **2001 Census** to encourage **population control**.
- **84th Amendment (2002)**: Extended the freeze on Lok Sabha and Assembly seats until 2026.

Composition of Delimitation Commission

Appointment	The delimitation commission is appointed by the President of India and works in collaboration with the Election Commission of India
Members	• A retired/working Supreme Court judge (Chairperson) • Chief Election Commissioner. • State Election Commissioners of the concerned states

Significance of the Delimitation Exercise

- **Proportional Representation:** The delimitation process ensures that each segment of the population is represented fairly. The Delimitation Commission redraws constituencies based on latest Census data so that each seat represents an equal number of people.
- **Prevents Political Imbalance:** Without delimitation, some areas may have **more MPs per voter**, leading to **under-representation** elsewhere.
- **Reservation for SCs and STs:** The exercise also designates constituencies to be reserved for Scheduled Castes (SCs) and Scheduled Tribes (STs) in regions with significant populations from these communities, ensuring their political inclusion.
- **Neutral and Independent Process**: Although established through legislation, the Delimitation Commission functions autonomously, free from political influence. Its decisions are final and cannot be challenged in Parliament or courts, safeguarding its impartiality.
- **"One Vote, One Value"**: The process reinforces the democratic ideal of equal weight for every vote by ensuring uniformity in population distribution across constituencies.

Issues with Delimitation exercise

- **Uneven Population Growth**: Northern states like UP, Bihar, MP, and Rajasthan have seen higher population growth compared to southern and smaller northern states, leading to potential disparities in seat allocation.
  - **Eg**: Population control efforts by Southern states may feel being penalized for their efforts.
- **Threat to Federalism**: A decline in proportional representation for some states could undermine the federal structure and create regional imbalances.
  - **Eg**: It can fuel separatist regional movements such as **Dravida Nadu**
- **Uncertainty in Seat Distribution Formula**: Lack of clarity on whether seat allocation will be based on existing share or projected population raises concerns about fairness in representation.
- **Implementation delay:** The Nari Shakti Vandana Abhiniyam has been linked with the delimitation process. As delimitation in itself is a contentious task, it can further delay implementation of Women reservation.

Solutions for Balanced Delimitation

- **Capping Lok Sabha Seats**: Keeping the number of MPs fixed, as done in the U.S., would **maintain the status quo** in state-wise representation and uphold the federal principle.
  - **Eg: It can help build national consensus**
- **Increasing State Assembly Seats**: To address democratic representation needs, the number of MLAs in State Legislative Assemblies can be increased based on population growth.
- **Weighted Representation Model**: A formula ensuring fair weightage for states with lower population growth can be considered to maintain regional balance.
- **Incentivizing Population Control**: States that have effectively managed their population growth should not be disadvantaged in seat allocation; a mechanism to reward them should be explored.
- **Consensus-Based Decision**: Engaging political leaders across regions to reach a balanced and widely acceptable solution can help prevent regional tensions.
- **Parliamentary Debate & Review**: A thorough discussion in Parliament, considering both numerical representation and federal equity, is essential before finalizing the new seat distribution.

NITI Aayog

Syllabus Mapping: GS2: Federalism, Non-Constitutional, Executive body

Context

NITI Aayog's initiative of State Support Mission is said to be the dawn of new planning in States

About NITI Aayog

NITI Aayog is an executive body and a think tank of the government of India which replaced the erstwhile planning commission in 2015. The body helps in **balancing the wheel of cooperative and competitive federalism in India.**

State Support Mission (SSM)

- **Launch**: In July, NITI Aayog launched the State Support Mission to assist states in designing tailored development strategies.
- **Strategic Institutions**: As part of the State support mission, NITI Aayog will support states in setting up Strategic Institutions Teams (SITs) or revamping their planning departments.
- **Initial Rollout:** The mission initially targets the creation of such bodies in 8–10 states, with plans to extend support to all states by March 2023.
- **Establishment of Mitra**: Reflecting this approach, the Maharashtra Institution for Transformation (Mitra) was established under the initiative.
- **Acknowledging States' Role in GDP Growth**: Recognizing that national GDP growth largely depends on the economic performance of individual states—except in select sectors—the initiative underscores the importance of state-level growth.
- **Lateral Entry of Experts**: To boost analytical capabilities and foster innovative policy development, the initiative advocates for the lateral entry of professionals into SITs, ensuring high-quality outputs and forward-thinking solutions.

NITI Aayog as a quintessential platform for India

- **Cooperative federalism:** : One of its most important mandates of NITI Aayog is to foster **cooperative federalism**, which further enables good governance in India.
  - **Eg**: Sustainable action for transforming human capital **(SATH) programme**
  - **Eg: Aspirational districts programme** has helped bridge regional imbalances
- **Competitive federalism:** States compete with one another to attract investment from the Central government to foster development activities.
  - **Eg: NITI Aayog** publishes reports and indexes to rank states progress on water, education and health.
- **Policy evaluation:** To ensure efficient and effective use of public resources, NITI Aayog ensures the evaluation of Centrally Sponsored Schemes (CSS) and Central Sector (CS) schemes.
  - **Eg**: **The Development Monitoring and Evaluation Office (DMEO)**, an attached office of NITI Aayog, helps in timely course correction in the implementation of policies.
- **Innovation:** The Government has set up **Atal Innovation Mission (AIM)** in NITI Aayog with a view to strengthen the country's innovation and entrepreneurship ecosystem.
  - **Eg: Setting up of Atal Tinkering Labs fosters scientific temper in students.**

Challenges faced by NITI Aayog

- **Difficulty in consensus building:** NITI Aayog has a diverse membership from experts to ministers of states which makes it difficult to come to a conclusion incorporating demands of all.
- **Constitutional status:** The think tank is a non-constitutional body which is not responsible to the Parliament of India. It is only a recommendatory body.
- **Allocation of funds:** The power to allocate funds remains with the Finance Ministry, whereas the erstwhile Planning commission had the power to allocate funds to state and central government ministries.
- **Functional Challenges:** Its performance is affected by inconsistent cooperation from states, wide-ranging socio-economic disparities, bureaucratic inefficiencies, unreliable data, and a lack of control over investment decisions—hindering consistent policy execution and economic influence across regions.
- **Concerns over Effectiveness:** Often perceived merely as a "recommendatory body," NITI Aayog struggles with limited influence. **Risks of politicization and the absence of accountability** or enforcement mechanisms weaken its ability to ensure the adoption and execution of its recommendations.

Way forward

- **Accountability Frameworks**: Introduce robust mechanisms to hold NITI Aayog accountable for its policy recommendations and outcomes, promoting greater transparency and responsibility.
- **Enhanced State Collaboration**: Encourage stronger engagement with state governments through consistent consultations and collaborative decision-making, ensuring policies are tailored to local priorities and conditions.
- **Improved Data Systems**: Upgrade data collection and management systems to ensure access to accurate, timely, and reliable data, enabling more evidence-based policymaking.
- **Sufficient Funding**: Allocate adequate financial resources to empower NITI Aayog in fulfilling its core functions, including research, strategic planning, and policy monitoring.
- **Skilled Workforce**: Strengthen human resource capacity by attracting and retaining talented professionals, enhancing the institution's ability to tackle complex policy issues effectively.

Conclusion

In the spirit of cooperative federalism and to foster the objectives of NITI Aayog, more stakeholder involvement, allocation of funds is required. The achievements of NITI Aayog are further aligned with the vision of a Viksit Bharat by 2047.

Parliament's budgetary process

Syllabus Mapping: GS2: Parliament

Context

In India, the executive-driven budget process limits parliamentary influence, leaving legislators with minimal opportunity to shape or scrutinize financial policies.

Introduction to Budget

- **Essential tool**: The national budget is vital in shaping a country's economic and social agenda. As a blueprint for resource allocation, it reflects the government's priorities and direction.
- **Checks arbitrary control**: Historically, legislative control over public finances has been fundamental to democratic governance, serving as a check on executive power.
- **Budget as a pillar of democracy**: Globally, democratic systems differ in the extent of legislative involvement in budget-making. In some countries, parliaments play an active role in drafting and amending budget proposals. In others, they simply approve the executive's proposals with limited scrutiny. Yet greater parliamentary engagement in budgeting correlates with better economic governance and social outcomes.

Constitutional Provisions regarding Union Budget

Article	Description
Article 112	The President is required to present an annual financial statement to both Houses of Parliament, detailing the estimated receipts and expenditures of the Government of India for the financial year.
Article 113	No demand for a grant can be made without the recommendation of the President.
Article 114	Withdrawals from the Consolidated Fund of India (CFI) are not permitted without Parliamentary authorization.
Article 266	All government revenues are to be credited to the Consolidated Fund of India, while other public funds, like provident funds and postal insurance, are to be credited to the Public Account of India.
Article 267	Parliament has the authority to establish a Contingency Fund of India through legislation, intended to address unexpected or unforeseen expenditures.

Budget at a glance

Regular Budget	Interim Budget
Presented under normal circumstances as part of the annual financial planning process	Introduced when presenting a full-fledged budget isn't feasible—typically during election periods or disruptions in the budget cycle.
Provides a detailed overview of the government's finances, including estimated revenues and expenditures for the entire upcoming fiscal year.	Functions as a temporary financial arrangement or 'Vote-on-Account' to cover essential government expenditures for a limited period.
Often includes major policy declarations and outlines the government's long-term priorities.	Generally refrains from introducing significant policy changes or announcements.

Shortcomings in India's Budgetary process

- **Executive control:** Unlike other legislative matters, the Union Budget in India is formulated almost entirely by the Department of Economic Affairs, Finance Ministry with minimal involvement from Parliament.
  - Unlike legislative bills, which require thorough cabinet discussions and parliamentary debate, the Budget is prepared behind closed door
- **Limited Debate-Deliberation and Discussion:** Parliament's role in budgetary matters is largely symbolic.
  - Once the Budget is presented in the Lok Sabha, parliamentarians can discuss it but lack the authority to amend or significantly alter proposals.
- **Marginal Role of the Rajya Sabha:** It can only make non-binding recommendations for changes, and it does not have the power to veto it.

  - Under **Article 110** of the Indian Constitution, **the Budget (Finance Bill and Appropriation Bill) is classified as a Money Bill,** which must be passed by the Lok Sabha (Lower House)
  - The Rajya Sabha may discuss the Budget but cannot amend or reject it, further reducing the scope for checks and balances.
- **Absence of Independent Research Support:** Indian legislators lack access to an independent, non-partisan body like a Parliamentary Budget Office (PBO) to provide data-driven analysis and expert insights.
  - This limits their capacity to scrutinize budgetary proposals and offer informed recommendations.
- **Lack of Pre-Budget Consultations:** India does not have a structured mechanism for legislators to provide input before the Budget is finalized.
  - This prevents Parliament from influencing the government's economic and social priorities at the drafting stage.
- **No Provision for Budget Amendments:** While Members of Parliament (MPs) can propose suggestions or voice objections, they cannot directly alter tax rates or expenditure plans.

Global Best Practices

- **United States:** Congressional committees engage in extensive pre-Budget debates, and the President's budget proposal undergoes rigorous scrutiny.
- **Germany and Sweden**: Parliamentary committees review budget drafts well in advance, allowing lawmakers meaningful influence in shaping fiscal policy.
- **Canada, Australia, and the UK:** The countries empower their legislative committees with dedicated budget offices, providing them with independent data and analysis. This enables substantive oversight and greater policy input.

Ways to Strengthen Parliamentary Budget process

- **Pre-Budget Discussions:** Institutionalize pre-Budget debates during the **monsoon session** for 5 to 7 days.
  - Allowing legislators to assess the fiscal health of the nation, outline budgetary priorities, and suggest resource allocation strategies.
- **Parliamentary Budget Office (PBO):** To create an independent, non-partisan body to provide expert analysis on budgetary matters.
  - Modelled on institutions like the **U.S. Congressional Budget Office (CBO)**
- **Role of Parliamentary Committees:** Strengthen the involvement of departmental standing committees (DSCs) in budget scrutiny.
  - By ensuring that DSCs have adequate time and resources to debate and discuss budget proposals in detail.
  - Additionally making committee recommendations binding on the government.
- **Public Engagement:** Publish detailed budget documents and economic forecasts to improve transparency.
  - Encourage public consultations and stakeholder feedback before finalizing the Budget.

Conclusion

A democratic budgetary process requires more than executive expertise—it demands active legislative participation, scrutiny, and transparency. India's current system, which centralizes power in the executive, urgently needs reform.

By institutionalizing pre-Budget debates and establishing a Parliamentary Budget Office, India can empower its legislature to play a more meaningful role in shaping the nation's financial future.

NEP 2020: Three Language formula

Syllabus Mapping: GS2: Language, Multilingual Education

Context

National Education Policy (NEP-2020) and its three-language language formula have reignited a longstanding debate, particularly between the Centre and Tamil Nadu.

Evolution of the three language formula

- **Article 351**: Union to promote the spread of Hindi language.
- **Kothari Commission** (National Education Commission, 1964-66) was the first to propose the **Three-Language Formula**.
  - In **1968,** the Three-Language Formula was formally adopted.

- **National education policy, 1968**: Observed the use of regional languages at primary and secondary stages and recommended the adoption of the same at the university level.
- **1992 Programme of Action:** Mother tongue/regional language shall be the medium of communication at pre-school level.
- **Right to education Act, 2009:** Contained provisions for the medium of instruction in school to be the child's mother tongue.
- **NEP 2020:** Advocates for the Three-Language Formula but with **flexibility**:
  - States to decide **which three languages to teach**.
  - No language will be imposed, but students must learn **at least two Indian languages**.
  - **Structure:**
- **Hindi-speaking States:** Hindi + English + a modern Indian language (preferably a south Indian language).
- **Non-Hindi-speaking States:** Regional language + Hindi + English.

Significance of the Three language formula

According to **UNESCO's report, 'Global Guidance on Multilingual Education'**

Multilingual education is necessary as -

- **Focus on Inclusion:** Provides wider educational access by enabling children to learn in familiar language.
  - Increases parental involvement through native-language instruction.
  - Fosters **inclusion of marginalized communities** by respecting linguistic and cultural diversity.
- **Improved Learning Outcomes:** Supports socio-emotional development by helping children express themselves and understand others.
  - Boosts academic performance through cognitive benefits linked to multilingualism.
- **Fosters economic growth:** Multilingual education offers economic advantages.
  - **Eg: In Switzerland, multilingualism contributes to 10% of GDP**
- **Promotes social cohesion**: By encouraging tolerance and mutual understanding. Language and traditions are preserved for future generations.
- **Facilitates National Integration:** Enhances communication across different regions and linguistic groups.
  - Strengthens unity by promoting respect for cultural and language diversity.

Issues associated with the Three Language Formula

- **Burden on Public School Students**: Those who lack access to supplementary education (like coaching and tuition), will struggle with an additional language, widening the gap between them and private school students.
- **Questionable Cognitive Benefits**: While bilingualism is linked to cognitive development, there is no strong evidence that learning three languages proportionally enhances cognitive ability.
- **Weak Foundation of Primary education**: According to **ASER Report 2024**, 88% of Class 3 students in Tamil Nadu lack basic literacy skills. **A third language would divert focus** from improving foundational learning.
- **Shortage of qualified teachers** Public schools already struggle to find enough competent teachers for existing subjects.
  - **Eg**: Despite Tamil Nadu having one of the **highest per-child education budgets** in India, **80-90% of the education budget** is spent on **teacher salaries** and other essential infrastructure remains **underfunded**.
- **Language as a choice:** Adults learn languages based on their procession and other requirements, making compulsory school language policies might not continue to be utilised in the long run.
- **Threat to English Proficiency**: A focus on Hindi might dilute efforts to strengthen English proficiency, which is essential for competing globally.

Measures to promote multilingualism

- **ASMITA Initiative** (Augmenting study materials in Indian languages through translation and academic writing): It aims to produce about 22,000 books in scheduled languages over five years.
- **Bahubhasha Shabdkosh**: It aims to create a multilingual dictionary repository.

- **Bharatiya Bhasha Pustak Scheme:** It provides digital textbooks in multiple Indian languages.
- **Bhashini**: It is an AI-powered language translation platform by **MeitY**.
- **Sansad Bhashini**: AI-driven tools to **translate parliamentary content** (debates, committee meetings, agenda files) into **multiple Indian languages** in **real time**.

Way Forward

- **Optional Third Language:** Instead of **compulsory three-language learning**, Hindi could be introduced as an **optional subject in middle school** (district headquarters first, then expanded based on demand)
- **Focus on learning outcomes:** The time available in schools is **finite**, and with AI-driven learning tools, education should **prioritize critical thinking, creativity, and problem-solving** rather than rote language learning.
- **Teacher Training: Training existing teachers** to be fluent in both mother tongue and the official language to improve literacy rates.
- **Monitoring National Language Policy Trends:** If Hindi begins **replacing English at the national level**, Tamil Nadu must **adapt its policies accordingly** to prevent students from being disadvantaged.

Foreign funding and NGOs

Syllabus Mapping: GS2: Governance, Role of NGOs

Context

Recently the Union Home Ministry warned NGOs of penal action if they receive foreign funds without registration under the Foreigners Contribution Regulation Act, 2010 (FCRA). FCRA registration is mandatory to receive foreign donations.

About NGOs

The **World Bank defines NGOs** as "private organisations that pursue activities to relieve suffering, promote the interests of the. poor, protect the environment, provide basic social services, or undertake community development". NGOs in India play a complementary role along with government agencies for better policy implementation.

NGOs providing an alternative model of public service delivery

- **Ready pool of volunteers**: NGOs and civil society organisations have a large pool of volunteers who are passionate about making a difference in their communities.
  - **Eg: Akshay Patra foundation relief during COVID-19.**
- **More responsive**: Able to respond rapidly to community needs by identifying emerging issues and service delivery gaps of which government agencies may be unaware.
  - **Eg:** Organisations like **PRADAN and SEWA** work closely with the rural poor, providing them with access to various government schemes and programs.
- **Last mile delivery**: Unlike the government, which often has to cater to the needs of the entire population, NGOs can have a more focused approach.
  - **Eg: CRY and Save the Children** focus on child rights and child welfare, providing services like education and health.
- **Social welfare and research: India** invests in less than **2% of GDP** on research work which provides a window for alternate research to foster social welfare.
  - **Eg: NGO Pratham and the ASER Report.**
- **Policy influence**: By identifying policy gaps and advocating for policies that benefit the common citizen.
  - **Eg: NGO Pratham and Oxfam India** work towards advocating for policies that promote access to education and healthcare for all.

Challenges faced by NGOs

- **Misappropriation of funds:** There are issues where civil society or an NGO is accused of using foreign funds for provoking protests and stalling governmental projects**.**
  - **Eg**: **As per CBI, less than 10% NGOs** have filed their statement of finance under the **Societies Registration Act.**

- **Front organisations**: Some NGOs are suspected of working as front organisations for banned groups or funding illegal activities.
  - **Eg:** The **ED had zeroed in on NGOs** working as front organisations and were suspected to have funded **Naxal operatives.**
- **Overlap and duplication of services**: Since NGOs and civil society organisations often operate independently, there may be overlap and duplication of services, which can be inefficient and wasteful.
  - **Eg: Narmada Bachao Andolan**
- **Big brother attitude:** Government's attitude towards NGOs, as well as their mindset of viewing NGOs solely as contractors filling staffing needs, may not be conducive to effective collaboration.

Transparency and accountability, along with effective collaboration and coordination between NGOs and the government, can help overcome these obstacles and create a more efficient **last mile delivery.**

About FCRA

The Foreign Contribution Regulation Act regulates the acceptance and utilisation of foreign funds by NGOs in India. About 50,000 entitled had cumulatively obtained registration under FCRA in 2019. But the NGOs actually **registered under the Act** constitute **less than 1%** of the total NGOs in India, this called for regulatory guidelines.

Foreign funding rules of NGOs under FCRA (Amendment) Act, 2020

- **Mandatory documents**: The Amendment Act made it mandatory for all office bearers, and members of NGOs receiving foreign contributions to provide their Aadhaar and PAN details.
  - **Significance:** Help **increase transparency and accountability** in the utilisation of foreign funds.
- **Reduction in administrative expenses**: The Amendment Act reduced the limit of utilisation of foreign funds for administrative expenses from **50% to 20%.**
  - **Significance:** NGOs to focus more on **core activities**.
- **Public servant:** It prohibits any public servant from receiving foreign contributions.
  - **Significance**: **Prevent misuse** of foreign contribution.
- **Suspension of FCRA registration:** For an NGO over a period of **180 days**, if the NGO is found to have violated any of the provisions of the Act.
  - **Significance:** Enabling the government to take swift action against violating NGOs.
- **Single bank account:** The funds are to be accepted only in a single branch of a scheduled bank specified.
  - **Significance:** To prevent money laundering and terrorism.

Impact of FCRA

- **Increased regulatory oversight:** With the FCRA, the government introduced stricter regulations on foreign funding to NGOs, leading to increased regulatory oversight.
  - **Eg: In 2019, over 13,000 NGOs lost their FCRA licences** for failing to file annual returns, highlighting the burden of compliance faced by NGOs.
- **Restrictions on foreign funding:** FCRA placed limitations and regulations on the receipt of foreign contributions by NGOs.
  - **Eg:** The **Act decreases administrative expenses** through foreign funds by an organisation to **20% from 50%** earlier.
- **Stringent compliance requirements:** FCRA introduced stringent compliance requirements for NGOs receiving foreign funds, including reporting and auditing procedures.
  - **Eg:** The Act states that foreign contributions must be received only in an **FCRA account** opened in the **State Bank of India, New Delhi Branch.**

Issues with FCRA Amendment Act, 2020

For NGOs

- **Bureaucratic red-tapism**: Difficult for Indian NGOs to seek foreign investors.
- **Geographical issues:** New FCRA rules and a demand for a single bank account open in SBI around Delhi.
  - **Eg: 93% of FCRA NGOs are registered outside Delhi.**
- **Reduction in funding:** Deterring foreign contributions with strict regulations.
  - **Eg: 40% funds have been declined** since the amendment of 2020.

For Beneficiaries

- **Inhibiting humanitarian aid:** It can discourage foreign donors from funding and reduce volume of foreign aid inflow.
- **Impeding welfare approach:** NGOs fill the gaps left by the state in social welfare, strict regulations leave the public vulnerable.

Way Forward

- **CSR collaboration:** Working in collaboration with corporates help foster other sectors.
- **National Accreditation Council:** Provide the fabric for expertise in NGOs consisting of activists, academicians, retired bureaucrats.
- **Surveillance:** Malpractices such as indoctrination and spread of misleading information in the name of education must also be regulated alongside foreign credit for NGOs.
- **Strengthen domestic capacity:** Techniques like crowdfunding and collaboration can help reduce dependency on foreign donors.

Conclusion

Soumya Swaminathan, chairperson of the M.S.Swaminathan Research Foundation rightly said that 'no country can make progress without a robust and vigorous civil society' Additionally, **NITI Aayog's NGO Darpan portal** facilitates the creation of a repository of information about NGOs in India can further help regulate NGOs and their functioning.

TOPICS FOR PRELIMS

E-Courts Mission Mode Project (Phase III)

Context

Cabinet approved the Phase III of the e-courts mission mode project.

About e-courts project

- As a part of the National e-governance plan, the E-courts project has been under implementation since 2007.
- Phase I in 2011-15 and Phase II was implemented in 2015-23

About e-courts (Phase III)

- **Aim**: To provide ease of justice by making a shift towards digital and paperless courts through digitization of court records.
  - To provide a seamless and paperless interface between courts, litigants and other stakeholders.
- **Implementation of Phase III**
  - **Department of Justice** (Ministry of law) would release funds to **High courts** on recommendation of e-committee (Supreme Court)
  - **E-committee**: Responsible for policy planning, guidance for implementation of e-courts project.

Draft Digital Personal Data Protection Rules, 2025

Context

The draft Digital Personal Data Protection Rules, 2025, released by MeitY in January under the Digital Personal Data Protection Act, 2023, have faced several criticisms.

Criticisms of the Draft Digital Personal Data Protection Rules, 2025

- **Appointment of DPB Members:** The Union government has the discretion to appoint members to the Data Protection Board (DPB), raising concerns over the separation of powers and the independence of the DPB since it performs **quasi-judicial functions**.
- **Dispute Resolution Mechanism:** Appeals from the DPB's decisions will be filed before the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) within 6 months, which is seen as unrealistic given the TDSAT's current workload and capacity constraints.

Demands for Institutional Reforms

- **Specialist Appointment:** A **technical member with expertise in data protection** should be appointed to the TDSAT since data protection issues are distinct from telecom matters.
  - **Amendment to Section 14C of the TRAI Act** is required to accommodate this change.

Section 14C of the TRAI Act outlines the qualifications and eligibility criteria for the appointment of members to the TDSAT.

- **Increased Capacity:** TDSAT is **already overburdened**, with over 3,448 pending cases as of February 2025.
  - More **budget allocations and additional benches** are needed to handle the increased workload from data protection cases.
- **Technological Infrastructure:** TDSAT's **website and digital filing systems** need significant **upgrades** to handle data protection appeals efficiently.

  - **Improved access** to case information and **smoother digital navigation** are necessary.
- **Accountability:** TDSAT should **publish annual reports** detailing the number of appeals filed, disposed of, and pending, along with key issues involved in each type of matter.

Automated Permanent Academic Account Registry (APAAR) ID for school students

Context

Parents and activists fear that opting out of the Education Ministry's APAAR ID for school students could become nearly impossible, despite **enrolment being officially voluntary**.

About APAAR ID

- **Initiative By**: Ministry of Education.
- **Introduced Under:** National Education Policy (NEP) 2020.
- **Key Features:**
  - **Lifelong Academic Identity:** Each student gets a unique 12-digit ID.
  - **Centralized System**: Manages academic records in one place.
  - **Credit Transfer**: Facilitates the transfer of credits between institutions
  - **Lifelong Identity:** Stays with the student throughout their educational and professional career
  - Additionally it has features to; Preserving student achievements, Streamlines credit recognition, Enhance educational flexibility & Credit transfer across institutions.
- **Registration Process:**
  - **Parental Consent:** Due to the sensitive nature of personal data involved, parental consent is required for students below 18 years of age.
    - Parents can obtain and submit the consent form through their child's school or the official APAAR website.
  - **Student Registration:** Students need to register on the Academic Bank of Credit (ABC) portal by creating an account on DigiLocker, providing their Aadhaar number and other necessary details.
  - **APAAR ID Generation:** Upon successful registration and verification, the system generates the unique 12-digit APAAR ID, which is then linked to the student's DigiLocker account for secure access.

In-House Removal Procedure for HC Judge

Context

Chief Justice of India (CJI) Sanjiv Khanna has initiated an unprecedented **three-member in-house inquiry** against **Justice Yashwant Varma** of the Delhi High Court.

About In-House Removal Process

- **Initiation of Complaint:** Complaints can be received by-
  - **President,**
  - **Chief Justice of India (CJI),**
  - **Chief Justice of a HC,**
  - The CJI decides whether to proceed or dismiss it.
- **Preliminary Examination:** If needed, the CJI seeks a preliminary report from the concerned HC Chief Justice.
- **Formation of Inquiry Committee:** If the preliminary report recommends further action, the CJI forms a **three-member inquiry panel**, consisting of **two HC Chief Justices and one HC Judge**.
- **Committee's Powers & Procedure:** The inquiry panel can devise its own process, ensuring **natural justice** (e.g., giving the accused judge a chance to defend himself).
- **Submission of Report to CJI:** The report must answer two key questions:
  - **Are the allegations substantive?**
  - **If yes, do they warrant removal proceedings?**
- **Possible Outcomes:**
  - If allegations are **not serious enough for removal**, the CJI can **"advise"** the judge or **place the report on record**.
  - If allegations **are serious enough for removal**, the CJI will **advise the judge to resign or retire voluntarily**.
- **Final Steps If Judge Refuses to Resign:**
  - The CJI will **instruct the concerned HC Chief Justice not to assign any judicial work** to the judge.
  - The **President & Prime Minister will be informed for impeachment proceedings**.
  - In **Justice Yashwant Varma's case**, **CJI** has already directed the Delhi HC Chief Justice **not to assign** him any work.

Repeal of the Dramatic Performances Act, 1876

Context

Recently Prime Minister Narendra Modi highlighted the importance of repealing obsolete colonial laws, mentioning the Dramatic Performances Act, which was officially abolished in 2018.

Provisions of the Dramatic Performances Act, 1876

- The law gave the British government powers to **prohibit public dramatic performances** that were: **Scandalous, Defamatory, Seditious & Obscene.**
- It allowed authorities to **ban any play, pantomime or drama** that was deemed to:
  - **Excite disaffection against the government.**

  - **Deprave and corrupt the audience.**
- Any **Magistrate** had the power to:
  - **Issue search and seizure warrants** for places suspected of violating the Act.
  - **Arrest** individuals performing prohibited acts.
- **Punishment**: The Act prescribed a **jail term of up to three months, a fine, or both**.
- **Why Was This Law Enacted?**
  - The British enacted this law **after the visit of the Prince of Wales, Albert Edward to India (1875-76).**
  - It was part of a series of colonial laws aimed at **suppressing nationalist activities**.
- **Repeal of the Dramatic Performances Act, 1876:**
  - The present government has launched a **flagship initiative** to **repeal obsolete laws** to improve the **Ease of Doing Business Index**.
  - Since **2014**, over **2,000 obsolete laws** have been removed.
  - Though declared **invalid by courts earlier**, this act was formally repealed by **Parliament under the Repealing and Amending (Second) Act, 2017**.

Why Do Colonial Laws Continue to Exist in India?

- **Article 372 of the Constitution** states that **laws in force at the time of Independence would continue** unless repealed or modified.
- However, **colonial-era laws do not enjoy the presumption of constitutionality**:
  - When challenged, the **government must justify their validity**.
  - In contrast, **laws enacted by independent India are assumed to be constitutional unless proven otherwise**.

Advocates (Amendment) Bill, 2025

Context

The **Advocates (Amendment) Bill, 2025** was withdrawn recently after facing opposition from legal bodies.

Objectives of Advocates (Amendment) Bill, 2025

- The **Law Ministry** sought to amend the **Advocates Act, 1961** to address "contemporary challenges" in the legal profession.
- It aimed to **align Indian legal practices with global standards** and accommodate changes in the legal sector.

About Advocates Act, 1961

- It is the primary law that governs the **legal profession in India**.
- It provides for the **regulation of advocates**, the **formation of the Bar Council of India (BCI) and State Bar Councils**, and the **conduct of advocates**.
- **Section 4** of the Act established the **Bar Council of India (BCI)**, which regulates the **legal profession and legal educatio**n.

Key Controversies Surrounding the Bill

- **Ban on Lawyer Strikes and Boycotts:**
  - The Bill introduced **Section 35-A**, which **prohibited lawyers from going on strike** or boycotting courts.
  - It defined such actions as **"misconduct"**, making lawyers subject to **disciplinary action** under the 1961 Act and BCI Rules, 1975.
  - **Concern:** Many **bar associations protested**, arguing that strikes are a **legitimate tool for lawyers to voice grievances**.

Concerns Over Executive Control:

  - The Bill proposed **expanding the government's role in the Bar Council of India (BCI)** by allowing the Centre to **nominate up to three members**.
  - These nominees would join existing members like the **Attorney General, Solicitor General, and representatives from State Bar Councils**.
  - The **BCI strongly opposed** this, calling it **"draconian"** and an attempt to **reduce its independence**.
  - **Key Provisions Affecting the BCI's Autonomy:**
    - **Section 49B**: Allowed the **Centre to issue binding directions** to the BCI.
    - **Section 45B**: Enabled the **BCI to hear complaints against advocates nationwide** and **suspend lawyers at its discretion**.
    - **Section 48B**: Empowered the **BCI to dissolve State Bar Councils** and replace them with a committee if found ineffective.
- **Impact on Corporate Lawyers and Foreign Law Firms:**
  - The Bill **expanded the definition of "legal practitioner"** to include **corporate lawyers, in-house counsel and lawyers from foreign firms**.
  - It aimed to **formally recognize corporate lawyers** and **regulate the entry of foreign law firms into India**.
  - The **BCI opposed** this, arguing that it could **blur the distinction between advocates and legal practitioners**.

UGC's Draft Regulations

Context

The University Grants Commission (UGC) has issued draft regulations aimed at redefining discrimination and explicitly introducing the term **"caste-based discrimination"** on university campuses.

About Draft Regulations

- The **UGC (Promotion of Equity in Higher Education Institutions) Regulations, 2025** include:
  - New definitions of discrimination.
  - Proposal for an "equity committee" to handle complaints.
  - Punishments for false complaints.
- **Revised Definition of "Discrimination":**
  - Defined as "any unfair, differential, or biased treatment" against any stakeholder on the basis of: Religion, Race, Caste, Sex, Place of birth, Or any combination of these factors.
  - The **2025 regulations apply to all stakeholders**, not just students. This could include faculty, staff and administrators.
  - **Issue: Only SCs and STs** are covered under the new definition, **excluding OBCs and other marginalized groups**. This **narrow definition** has raised concerns.
- **Establishment of "Equity Committee":**
  - The new regulations propose the formation of an **Equity Committee** under the **Equal Opportunity Centres** in universities.
- **UGC's New Power to Derecognize Institutions:**
  - If institutions fail to comply with these regulations, the UGC can de-recognize them.
- **Punishment for False Complaints:**
  - **Disciplinary actions and fines** can be imposed on individuals found making false complaints.
  - **Issue:** The draft does not clearly define what qualifies as a **"false complaint"**, leading to concerns about **misuse of this provision to silence genuine complaints**.

EPIC in Electoral Rolls

Context

Recently West Bengal Chief Minister has raised concerns over duplicate Electors Photo Identity Card numbers in the electoral rolls.

What Are EPICs?

- **EPIC (Electors Photo Identity Card)** is an identification document for voters.
- It was introduced under the **Registration of Electors Rules, 1960**, and issuance began in **1993** to prevent **voter impersonation**.
- **Important Facts About EPICs:**
  - Issued only to registered electors.
  - **Does not grant the right to vote** unless the holder's name appears in the electoral roll.
  - Contains **name, age, address, voter particulars, a photograph**, and the **signature of the registration officer**.

How Are EPICs Issued?

- Each EPIC has a **unique number** consisting of:
  - **Three alphabetical codes** followed by a **seven-digit number**.
  - It includes a **Functional Unique Serial Number (FUSN)** for each **Assembly constituency**.
- Since **2017**, EPICs have been issued using the **ERONET portal** of the EC.
- **Rules for EPIC Allotment:**
  - A **unique EPIC number is assigned** when an elector receives their first EPIC.
  - If an **EPIC is replaced,** the same number is retained.

Clarification by election commission

- **Reason for Duplication:**
  - Before the **ERONET system**, different states used **the same alphanumeric series** for EPIC numbers.
  - This resulted in some voters having the same EPIC numbers across states, though other details like name, address, constituency, and polling booth remained different.
- **Duplicate EPICs do not allow cross-voting -** A voter can only cast their ballot in the **designated polling station** in their **registered state or Union Territory**.

SAHYOG Portal

Context

X Corp sued the Indian government, challenging content regulation under Section 79 of the IT Act and the Sahyog portal for bypassing legal safeguards.

About SAHYOG Portal

- **Developed by:** Ministry of Home Affairs (MHA) under the Indian Cyber Crime Coordination Centre (I4C).
- **Objective**: To enhance collaboration between government agencies and social media intermediaries to create a safer cyberspace.
- **Working**: The portal streamlines the reporting and removal of unlawful content and facilitates data requests from law

enforcement agencies under the Information Technology (IT) Act, 2000.

Online Assurance Monitoring System

Context

Recently, the Parliamentary Affairs Minister informed that 99% of the Parliamentary Assurances have been fulfilled and OAMS has helped in ensuring that these assurances get fulfilled.

About Online Assurance Monitoring System (OAMS)

- It is a **digital platform** implemented by the **Ministry of Parliamentary Affairs** in collaboration with the **Lok Sabha and Rajya Sabha Secretariats**.
- It was launched in **2018.**
- It aims to **track, monitor, and ensure the fulfilment of assurances** given by Union Ministers in Parliament.

Key Features:

- **Digital Repository**:
  - Stores all parliamentary assurances in a **centralized database**.
  - Eliminates the **risk of losing or overlooking commitments**.
- **Automated Alerts & Notifications**:
  - Sends **timely reminders** to relevant ministries and departments.
  - Helps maintain **adherence to deadlines** for fulfilling assurances.
- **Real-time Progress Updates**:
  - Ministries can **log updates** on the status of assurances.
  - Ensures **accurate and up-to-date** information for stakeholders.
- **Efficiency and Transparency**:
  - Streamlines the **tracking process**, reducing delays.
  - Strengthens **government accountability** by ensuring commitments are fulfilled.

About Ministerial Assurances

- During the course of answers to Questions or during debates, various assurances in the form of promises, undertakings or other such forms of expressions are given by Ministers on the floor of the House.
  - Such assurances are given **due to non-availability of information**, at that point of time, to meet the queries or points raised by the Members.
  - An assurance given to the **Lok Sabha /Rajya Sabha is required to be fulfilled within a period of three months from the date of assurance.**
  - With the approval of the Minister, the Ministry may seek extension of time from the **Committee on Government Assurances,** Lok Sabha/Rajya Sabha for fulfilling the assurance.

The Committee on Government Assurances consists of **15 members in the Lok Sabha and 10 members in Rajya Sabha.**

Section 79(3)(b) of the IT Act, 2000

Context

Elon Musk-owned **X (formerly Twitter)** has challenged the Indian government's use of **Section 79(3)(b) of the IT Act, 2000** to moderate and remove content on social media.

What is Section 79?

- **Section 79 of the Information Technology (IT) Act, 2000** provides **"safe harbour" protection** to intermediaries (such as social media platforms, search engines, and internet service providers).
- **Safe-Harbour Protection:**
  - It is a legal framework that shields intermediaries (such as social media platforms, online marketplaces or hosting services) from being held liable for the content uploaded by their users, as long as they comply with certain conditions.
  - **E.g.** Wikipedia, Google, Facebook etc.
- **Key Provisions of Section 79:**
  - **79(1): Exemption from Liability:** Intermediaries **shall not be held liable** for content posted by **users** unless they are involved in modifying or creating the content.
  - **79(2): Conditions for Safe Harbour Protection:** The intermediary **must act as a passive conduit** (i.e., not modify or curate content). It should follow the provisions of **laws and IT rules**.
  - **79(3): Exceptions to Safe Harbour Protection:** Safe harbour **does not apply** if:
    - **(3)(a)** The intermediary is actively involved in publishing, modifying, or selecting the content.
    - **(3)(b)** The intermediary fails to remove content **after receiving actual knowledge or a government/ court order**.

SC directive in Shreya Singhal on Section 79(3)(b)

- The **Supreme Court limited the scope** of Section 79(3)(b), ruling that: Content removal orders must come **from a court or government notification** based on **Article 19(2) grounds**.

Government's October 2023 Directive & Sahyog Portal

- **In October 2023**, the **Ministry of Electronics and IT (MeitY)** issued a directive to:

  - All **ministries, state governments, and police authorities**, stating that they **could issue blocking orders under Section 79(3)(b)**.
- **In October 2024**, MeitY launched **"Sahyog"**, a portal where **blocking orders can be issued and uploaded** by these authorities.

Hague Convention, 1965

Context

The U.S. Securities and Exchange Commission (SEC) has sought assistance from the Indian government under the Hague Service Convention to serve summons on Gautam Adani in a securities and wire fraud case.

About Hague Service Convention (1965)

- It is a **legal treaty signed by 84 countries**, including India and U.S.A.
- It is formally known as the Convention on the Service Abroad of Judicial and Extrajudicial Documents in Civil or Commercial Matters.
- The treaty **ensures that people in one country can be served legal documents properly when they are involved in court cases in another country**.
- The main goal is to ensure that people receive **timely and fair notice of legal proceedings** against them.
- **How Does it Work?**
  - Each country in the treaty **appoints a central authority** to handle legal document requests.
  - The country requesting legal service **must follow the rules of the receiving country**.
  - Legal documents can be sent through **designated authorities, postal services, diplomatic channels, or other approved methods**.

India's Stand on the Hague Convention

- **India joined the Hague Service Convention in 2006** but has **placed restrictions** on how legal notices can be served.
- **India does not allow alternative methods like postal service or direct communication between lawyers or courts** (which some countries permit).
- All legal notices from foreign countries **must go through the Ministry of Law and Justice**.
- **India can reject requests** if they **threaten its sovereignty or security**.
- **How Does it Work in India?**
  - The **Ministry of Law and Justice** receives the legal documents from the foreign country.
  - If there are no objections, it **forwards them to Indian authorities to serve the person**.
  - The process takes **6 to 8 months**. If India rejects the request, it must **provide a valid reason**.

What Happens if India Does Not Cooperate? (Default Judgment)

- A **default judgment** is when a court **issues a decision against someone who does not respond** to legal proceedings.
- Under the Hague Convention, if a country **fails to serve legal documents** properly, the foreign court can **still proceed with the case**.
- **Conditions for a Default Judgment:**
  - The **legal documents must have been sent using proper methods** under the treaty.
  - **At least six months** should have passed after sending the documents.
  - The country (India, in this case) **must have failed to provide proof that the notice was served**.

National e-Vidhan Application (NeVA) Platform

- Recently Delhi Becomes **28th Legislature** to Join National e-Vidhan Application (NeVA) Platform.

What is e-Vidhan?

- **e-Vidhan is a digital platform** designed to transform **India's legislative assemblies into paperless institutions**.
- It is developed under the **National e-Governance Plan (NeGP)** by the **Ministry of Parliamentary Affairs (MoPA)**.
- It is aimed at **digitizing the entire legislative process** to improve efficiency, transparency and accountability.

NeVA (National e-Vidhan Application)

- **NeVA is a cloud-based platform** for managing legislative operations **paperlessly**.
- **It is developed by MoPA**, it integrates **various legislative functions** into a single digital interface.
- It supports **real-time access to bills, debates, question lists, reports and other legislative documents**.

Rule 267 of Rajya Sabha

- It allows a member to request the suspension of the day's listed business to discuss a matter of **urgent public importance**.
- A member submits a notice under Rule 267 to the Chairman of the Rajya Sabha. If the Chairman approves **(discretion)**, the normal business is suspended, and the urgent matter is taken up for discussion.

- The last time it was accepted was in November **2016,** when the Upper House invoked Rule 267 to discuss **demonetisation.**
- **Similar Rule in the Lok Sabha**
  - **Rule 184:** Allows for a debate on a matter of urgent public importance, with the provision for voting at the end.
  - **Rule 193:** Also permits discussion on urgent matters, but without a vote.

Sashakt Panchayat-Netri Abhiyan

- It is a **nationwide capacity-building initiative** to **empower Women Elected Representatives (WERs) in PRIs** by:
  - Strengthening leadership and decision-making skills.
  - Enhancing their participation in grassroots governance.
  - Encouraging their active involvement in policy and governance at the rural level
- It is launched by the **Ministry of Panchayati Raj.**
- **Significance of the Initiative:**
  - **First-ever national gathering of women representatives from all three tiers of PRIs** (Gram Panchayats, Block Panchayats, and Zilla Panchayats).

Dakshin Bharat Hindi Prachar Samiti (DBHPS)

- **DBHPS** is an institution dedicated to promoting **Hindi education in South India**. (HQ - Chennai)
- It was formally created in **1927**, but **June 17, 1918**, is considered its founding day when the first Hindi classes started in Madras (now Chennai).
- **Gandhi ji** was its **founding President** and remained at the position till his last breath.
- **States Covered:** Tamil Nadu, Karnataka, Kerala, Andhra Pradesh & Telangana.
  - It also has **affiliated centers in Puducherry, Lakshadweep, and Andaman & Nicobar Islands**.
- **Recognition as an Institution of National Importance (1964):**
  - **Parliament passed the Dakshina Bharat Hindi Prachar Sabha Act in 1964**, giving it the status of an **institution of national importance**.
  - This prevented DBHPS from being **dissolved or merged** without the **approval of the Indian government**.

Model Women-Friendly Gram Panchayats Initiative

- The **Ministry of Panchayati Raj** has launched the 'Model Women-Friendly Gram Panchayat' (MWFGP) initiative recently.

About the Initiative

- It is a **gender-inclusive governance initiative** designed to enhance women's participation, safety, and leadership at the grassroots level.

Key Highlights of the Initiative

- **Launch of Model Women-Friendly Gram Panchayats:**
  - **770 Model Women-Friendly Gram Panchayats** to be developed (one per district).
  - These panchayats will serve as **role models** for promoting **women's participation and leadership in rural governance**.
- **Real-Time Monitoring Dashboard Launched:**
  - A **digital platform** for tracking the progress of Model Women-Friendly Gram Panchayats.
  - It will provide **real-time insights, data analysis, and intervention strategies** to improve women's participation at the grassroots level.
- **Virtual Training Program for Gram Panchayats:**
  - Designed to equip panchayat representatives, particularly **women leaders**, with **skills and knowledge** required for effective governance and women-centric policymaking.

Amrit Gyaan Kosh Portal

- It serves as a centralized platform for governance case studies, highlighting **real-life, solution-oriented approaches** to administrative challenges.
- It aims to promote India-centric, scalable governance models to enhance public service delivery across various government departments and institutions.
- The Amrit Gyaan Kosh Portal is integrated with iGOT to ensure that Government officials can access governance case studies as part of their training curriculum.
- It is jointly developed by the **Capacity Building Commission and Karmayogi Bharat.**

Sansad Bhashini Initiative

- The **Lok Sabha Secretariat** and the **Ministry of Electronics and Information Technology (MeitY)** have signed a **Memorandum of Understanding (MoU)** to develop the **Sansad Bhashini** initiative.

About Sansad Bhashini

- It aims to **modernize parliamentary operations** by leveraging **Artificial Intelligence (AI) and multilingual support** (through Bhashini) to streamline parliamentary operations.
  - **Bhashini** is an AI-powered language translation platform by **MeitY**.

Key Features of the Sansad Bhashini Initiative

- AI-driven tools will **translate parliamentary content** (debates, committee meetings, agenda files) into **multiple Indian languages** in **real time**.
- An **AI chatbot** will be developed to help MPs and officials **retrieve parliamentary rules, procedures, and documents** quickly.
- **Real-time transcription** of **parliamentary debates** into written text.
- **AI-Based Automatic Summarization** for lengthy **parliamentary debates**.

Tribes of the Himalayan Region

Region	Tribes
Himachal Pradesh	Gaddi
	Kinnaura
Sikkim	Lepcha
Sikkim and Ladakh	Bhutiya
	Mon
Arunachal Pradesh	Abor
	Aka
	Apatani
	Mishmi
Afghanistan, Pakistan, Nepal	Khas
Pakistan	Kalash

ECONOMY AND AGRICULTURE

TOPICS FOR MAINS

Textile and Apparel Industry

(Syllabus Mapping: GS- Paper 3, Indian Economy, Growth and Development)

Context

The textile and apparel industry, as **India's second-largest employer** after agriculture, holds immense potential to drive large-scale job creation and support the vision of Viksit Bharat **by 2047**.

Current Status of India's Textile Industry

- **Global Standing & Production:** India is the **second-largest producer of cotton** (24% of global production).
  - The country is also the **second-largest producer of man-made fibres (MMF)**, with key players like Reliance Industries (polyester) and Grasim Industries (viscose).
  - The textile sector employs **over 4.5 crore people**, with **60 lakh farmers** engaged in cotton cultivation.
- **Contribution to Economy & Trade:** The textile industry contributes **13% to industrial production**, **12% to exports**, and **2% to GDP**.
  - In **FY24, textile and apparel exports stood at $34.1 billion**, with the US and EU being major markets.
- **Regional Specialization:** MSME clusters dominate, with hubs like **Bhiwandi (fabric production), Tiruppur (t-shirts, undergarments), Surat (polyester, nylon), and Ludhiana (woolen garments)** playing key roles.
- **Declining Growth:** Textile manufacturing contracted by **1.8% annually between FY20-FY24**, while apparel manufacturing declined **8.2% per year** due to the pandemic and global downturn.

Sector-wise Export Trends

- **Garment and Apparel Exports:** Dropped from $15.5 billion in FY20 to $14.5 billion in FY24.
- **Cotton Textiles and Home Textiles:** Increased from $10.2 billion in FY20 to $12.3 billion in FY24, driven by major companies such as Welspun Living and Trident Ltd.

Opportunities for Job Creation in India's Textile & Apparel Industry

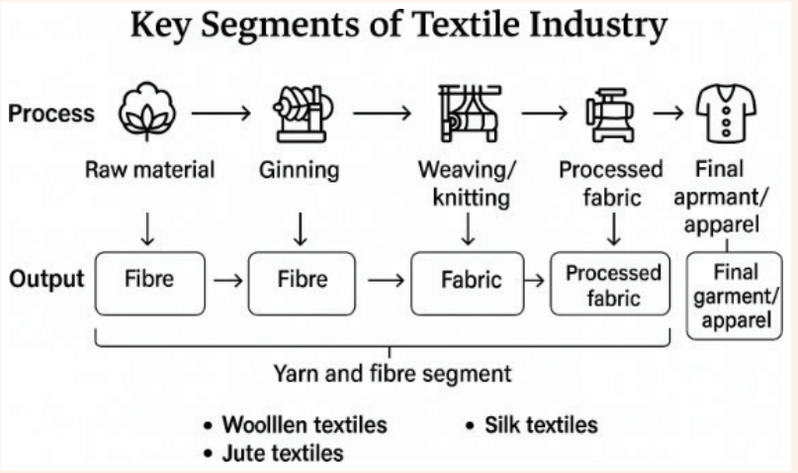
- **Rising Global Demand**: Shifts in supply chains due to geopolitics favor India over China, Vietnam, and Bangladesh.
- **Expanding Domestic Market**: A growing middle class, e-commerce penetration, and Gen Z consumption trends are driving demand.
- **Government Support**: Policies like PM MITRA Parks, PLI Scheme, and RoSCTL incentivize investment and expansion.
- **Export Potential**: If textile exports grow from $45 billion to $100 billion, India can generate 1 million jobs annually until 2030.
- **Regional Job Creation**: Establishing textile hubs in states like UP, Bihar, Odisha, and MP can boost employment where it is needed most.
- **Sustainable Manufacturing**: India's growing focus on textile recycling and circular economy can create green jobs.

Challenges Facing India's Textile Industry

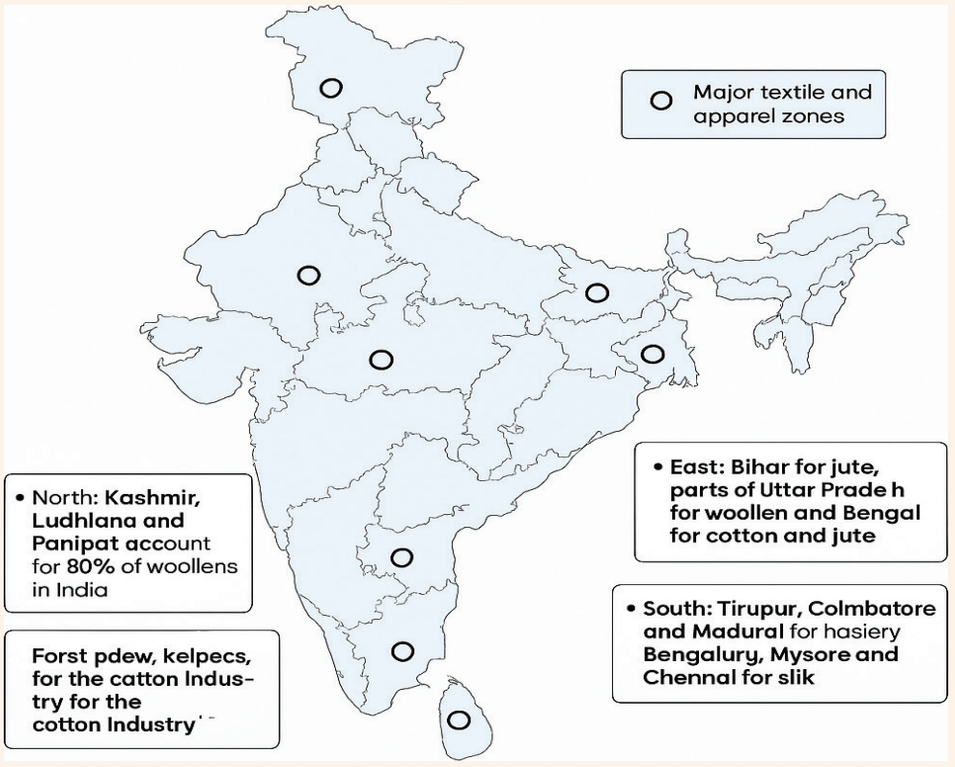
- **Low Export Competitiveness:** India lags behind **China, Vietnam, and Bangladesh** due to **higher production costs, fragmented supply chains, and lack of vertical integration**.
  - Vietnam exported **$40 billion worth of apparel in 2023**, surpassing India.
- **Supply Chain & Cost Issues:** India's **fragmented cotton supply chain** increases logistical costs, reducing competitiveness.
  - **High raw material costs** in MMF: For example:
    - **Polyester in India is 33-36% costlier than in China.**
    - **Viscose fibre is 14-16% more expensive than in China.**
- **Complex Regulations & Trade Barriers: Cumbersome export procedures** (e.g., excessive documentation on fabric, buttons, zippers).

  - India lacks **free trade agreements (FTAs)** with major consumer markets, unlike competitors like Vietnam.
- **Impact of Sustainability Norms:** Global brands now demand **sustainable sourcing, renewable energy use, and material recycling**.
  - The **EU's strict environmental regulations** (covering 20% of India's textile exports) pose challenges for MSMEs adapting to green standards.
- **Slow Post-Pandemic Recovery:** The pandemic disrupted production and exports, with MSME textile hubs in **Tamil Nadu, Maharashtra, and Gujarat** suffering the most.
  - Despite export growth in cotton textiles, apparel exports fell from **$15.5 billion in FY20 to $14.5 billion in FY24**.
- **Threat of Fast Fashion & Textile Waste: Fast fashion waste** is rising globally, expected to reach **148 million tonnes by 2030**.
  - India's textile recycling market is projected to grow to **$400 million**, but remains small compared to global trends.

Key Segments of Textile Industry



Major Textiles and Apparel Zone



Challenges in Realizing Growth Potential

- **Cost Disadvantages:** India faces a **15-20% cost disadvantage** compared to Bangladesh and Vietnam due to lower labor efficiency and higher production costs.
  - **Fragmented cotton supply chains** and high raw material costs increase logistical expenses.
- **Labor Issues:** High attrition rates (~10%) and **migrant worker issues** create workforce instability.
  - Labor-intensive hubs like Tiruppur face shortages, while states like UP, Bihar, and Odisha have surplus labor but lack textile industries.
- **Lack of Vertical Integration:** Unlike China and Vietnam, India's textile supply chain is **not fully integrated**, leading to inefficiencies and higher costs.
- **Export Challenges:** Textile exports are stagnating ($34.1 billion in FY24), with India lagging behind Vietnam and Bangladesh.
  - Complex customs procedures and lack of Free Trade Agreements (FTAs) make Indian textiles less competitive in global markets.
  - **E.g., Pending India-UK FTA** could unlock **$3 billion in exports, 300,000 jobs** if resolved.
- **Sustainability Compliance Costs:** Global regulations (like EU sustainability laws) demand stricter environmental and labor standards, increasing production costs.
  - **Water, energy, and waste management challenges** need to be addressed for sustainable growth.

Strategic Interventions for Growth

- **Vertical Integration & Cluster Modernization**
  - Developing **10–12 mega clusters** could **reduce lead times from 60 to 30 days**.
  - **Surat Mega Textile Park** (₹3,000 crore investment) aims to house **100 dyeing units, 500 garment factories**, creating **150,000 jobs by 2026**.
  - **Solar parks** (e.g., Gujarat's 500 MW facility) could **cut textile energy costs by 25%**.
- **Policy Reforms & FTA Expansion**
  - **Fast-tracking EU & Canada FTAs** could lower input costs and **boost export competitiveness**.
  - **Expanding the RoSCTL scheme** to cover **GST on freight & packaging** would help exporters.
  - **Labor law reforms** (fixed-term contracts, overtime flexibility) could increase **female workforce participation by 15%**.

IndiaTex

- The initiative titled **'Accelerating the Transition of the Indian Textile Sector towards Circularity'** (IndiaTex) is a **four-year project by UNEP,** supported financially by Denmark's Ministry of Foreign Affairs and executed in partnership with India's Ministry of Textiles. IndiaTex seeks to hasten the shift of the Indian textile industry toward a circular economy model.
- **Project duration:** December 2023 to December 2027.

- **Sustainability & Circular Economy Innovations**
  - **₹1,000 crore R&D push** for **recycled textiles** (e.g., Reliance's **RECRON PET-to-polyester project**).
  - **50% capital subsidies** for MSMEs adopting **zero-liquid discharge systems** to meet EU standards.

Government Policies for the Textile Sector

- **PM MITRA (Pradhan Mantri Mega Integrated Textile Region and Apparel):** Aims to establish Mega Integrated Textile and Apparel Parks across India to drive investment, innovation, and sectoral growth.
- **Production-Linked Incentive (PLI) Scheme:** Designed to boost domestic manufacturing and reduce textile imports by offering incentives based on cumulative sales of locally produced MMF apparel, MMF fabrics, and technical textiles.
- **Samarth Initiative:** A skill development program by the Ministry of Textiles, focused on training individuals across the textile value chain (excluding spinning and weaving). The scheme, active from 2017 to 2020, aimed to train 10 lakh people with an emphasis on employability.
- **National Technical Textiles Mission (NTTM):** Launched in 2020, this initiative promotes technical education, research, innovation, and market expansion in the technical textiles sector over a four-year period.
- **Bharat Tex 2025:** India's largest global textile event, serving as a platform to advance the "**Farm to Fibre, Fabric, Fashion, and Foreign Markets"** vision, strengthening India's position in the global textile industry.
- **Foreign Direct Investment (FDI):** The textile and apparel sector in India permits **100% FDI** through the automatic route.
  - Between April 2000 and December 2023, the textiles segment (including dyed and printed categories) has drawn more than **$4.42 billion in FDI**.

Conclusion

The Indian textile industry has the potential to emerge as a global frontrunner if it addresses its existing obstacles through smart strategies and creative approaches. By prioritizing technological innovation, sustainability, and international competitiveness, India can meet its lofty goals while generating substantial economic and social benefits.

India and USA: Trade Dynamics and Opportunities

(Syllabus Mapping: GS Paper 3, Indian Economy, Agriculture)

Context

The recent announcement of President Trump related to reciprocal tariff could be a chance for India to transition from protectionism to a productivity-driven agri-export strategy.

India and USA: Evolution of Relations

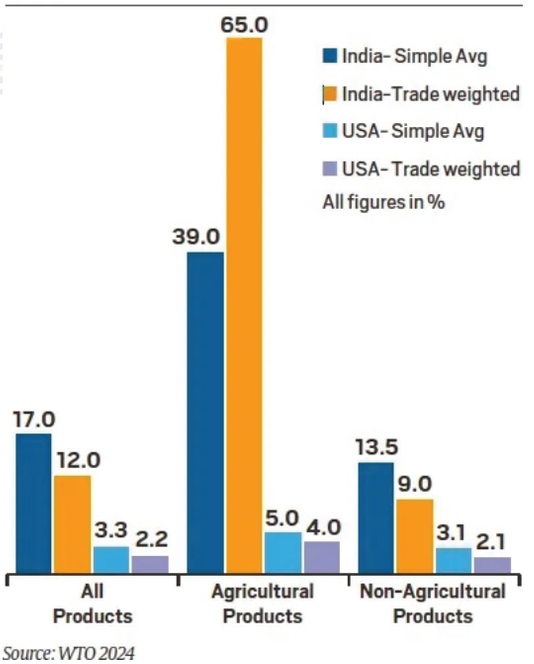
- **Cold War:** During the Cold War, India pursued a policy of non-alignment, while the United States fostered a closer relationship with Pakistan.
- **Post-Cold war**: Following the end of the Cold War, India and the US started to strengthen their diplomatic relations.
  - A significant turning point in their strategic partnership was the US-India Civil Nuclear Agreement signed in 2005.
  - Key agreements such as LEMOA, COMCASA, BECA, and GSOMIA have further solidified this collaboration.

Significance of India-USA relations

- **Economic Growth:** Robust economic connections boost trade and investment between the two countries, driving job opportunities and economic progress. In 2023, the U.S. ranks as India's second-largest trading partner, with bilateral trade surging by 72% from 2017-18 to 2022-23.
- **Quad Alliance:** The Quadrilateral Security Dialogue (Quad) reinforces regional security efforts, tackling Indo-Pacific challenges and advancing democratic principles. Examples include the Quad's work on vaccine distribution and maritime security.
- **Defense Collaboration:** Key defense pacts like LEMOA and COMCASA strengthen military coordination and compatibility. For instance, joint exercises such as Yudh Abhyas exemplify this partnership.
- **Technological Partnership:** Cooperation in cutting-edge technologies bolsters innovation and competitiveness. A prime example is the India–U.S. Initiative on Critical and Emerging Technology (ICET).
- **Cultural Exchange:** A dynamic Indian diaspora and educational programs deepen cultural bonds and mutual understanding. Notably, more than 200,000 Indian students are enrolled in U.S. institutions.

Challenges for India in Trade with the USA

- **High Tariff Disparities:** India imposes an average tariff of **17% on all goods** compared to **3.3% in the US**.
  - Agriculture tariffs are especially high in India (**39% simple average, 65% trade-weighted**) compared to the US (**5% and 4%, respectively**).
  - The US may introduce **reciprocal tariffs** that could hurt India's exports, especially **shrimp, basmati rice, processed foods, and honey**.
- **Agricultural Trade Imbalance:** India enjoys a trade surplus of **$3.46 billion** in agricultural trade with the US.
  - US exports to India include **almonds, cotton, ethanol, and soybean oil**, but **high tariffs (100-150%) on whiskey, walnuts, chicken legs, and skimmed milk powder** are major points of contention.
- **Genetically Modified (GM) Crop Restrictions:** India **bans GM soy and maize**, despite rising demand for **animal feed and ethanol**.
  - The US, a global leader in GM crops, wants India to **ease restrictions**.
- **Non-Tariff Barriers:** Stringent **quality standards, lengthy approval processes, and bureaucratic hurdles** impact trade.



  - **Limited market access** for Indian agri-exports in the US due to high import duties on certain products (**butter, bovine meat cuts, fruits & vegetables**).
- **Weak Agricultural Infrastructure:** India lacks **cold storage, efficient logistics, and export-focused processing units**.
  - Quality certification and traceability issues hinder global competitiveness.

Way Forward

- **Strategic Trade Negotiations:** Leverage negotiations under **Mission 500** (targeting **$500 billion bilateral trade by 2030**).
  - Seek **lower duties** for high-value agri-exports (**bananas, okra, mango pulp**).
  - Offer **phased tariff reductions** on **walnuts, cranberries, cheese, skimmed milk powder** to facilitate trade.
- **R&D Investments for Agri-Competitiveness:** Increase **agri-R&D spending** from **<0.5% to at least 1% of agri-GDP**.
  - Encourage **high-yielding crops, sustainable farming practices, and export-driven varieties**.
- **Modernize Agricultural Value Chains:** Expand **cold storage, logistics, and supply chain infrastructure**.
  - Improve **quality certification and food safety standards** for easier global market access.
  - Develop **agri-export hubs** in key production clusters.
- **Selective Trade Concessions:** Reduce tariffs on **low-impact imports like walnuts, blueberries**.
  - Gradual tariff reductions on **poultry, dairy, and ethanol** to balance trade interests.
- **Policy Shift from Protectionism to Productivity:** Move away from **subsidy-heavy agriculture (fertilizers, free power)** towards **efficiency-driven growth**.
  - Focus on **export-oriented policies** rather than heavy tariff barriers.

Conclusion

Therefore, the strategic negotiations, R&D, and modernized value chains can drive mutual growth toward a $500 billion trade goal by 2030. This alliance promises global stability and prosperity through collaboration and innovation.

India's Business Sector

(Syllabus Mapping: GS-Paper 3, Indian Economy, Growth and Development)

Context

A recent "**India Business Corruption Survey 2024**" highlighted 66% of business entities admitting to paying bribes, with 54% stating they were coerced to expedite government processes, obtain permits, ensure compliance, or acquire duplicate licences.

Compliance Reforms Initiated by the Government

- **Jan Vishwas (Amendment of Provisions) Act, 2023:** Decriminalised **180 provisions** related to imprisonment clauses that were burdensome for businesses and entrepreneurs.
  - Aimed at improving the ease of doing business by reducing legal complexities.
- **Jan Vishwas 2.0** (Announced in Budget 2025): Proposes to decriminalise around **100 additional provisions**.
  - Seeks to streamline business compliance and reduce regulatory friction.
- **Labour Code Reforms:** Consolidated **29 colonial-era labour laws** into **4 labour codes** (the Code on Wages, the Industrial Relations Code, the Occupational Safety, Health and Working Conditions Code, and the Social Security Code – yet to be implemented).
  - Intended to simplify and modernise labour regulations.
- **Digitalisation Efforts:** Introduction of **Digi Locker** for verified document storage to simplify regulatory approvals.
  - Proposed **'One Nation, One Business' Identity System** to reduce the need for multiple identifiers and improve compliance efficiency.

Issues and Challenges

- **Persistent Red-Tapism and Bribery:** Regulatory officials exploit compliance provisions to extract bribes.
- **Complex and Frequent Regulatory Changes:** Over **9,420 compliance updates** in the past year (~36 daily).

  - Creates confusion, increases compliance costs, and fosters corruption opportunities.
- **Implementation Gap in Labour Reforms:** Despite consolidating **29 labour laws into 4 labour codes**, they remain unimplemented.
  - Delays in state-level adoption undermine the effectiveness of reforms.
- **Lack of Accountability Among Inspectors:** Inspectors have excessive discretionary powers to threaten businesses with penalties or shutdowns.
  - No clear grievance redressal mechanism for businesses facing unjust action.
- **Fragmented Business Identity System:** Businesses must maintain **23+ identifiers** (e.g., PAN, GSTIN, CIN) from different authorities.
  - Periodic renewals and varying requirements create inefficiencies and increase operational costs.

Implications

- **Deterrent to Foreign Investment:** 80% of respondents in the EY-FICCI survey believe corruption hinders FDI inflows.
  - Loss of competitiveness in the global investment landscape.
- **Increased Cost of Doing Business:** Bribery and unofficial payments increase business costs.
  - Slows down business growth and profitability.
- **Loss of Entrepreneurial Confidence:** Entrepreneurs face hurdles in setting up and expanding businesses.
  - Regulatory uncertainty discourages innovation and expansion.
- **Global Competitive Disadvantage:** Countries like the US are streamlining business operations through governance reforms.
  - India risks losing investment and talent to more business-friendly economies.

Way Forward

- **Strengthen Jan Vishwas Reforms:** Expand decriminalisation beyond 100 provisions under Jan Vishwas 2.0.
  - Establish clear timelines for implementing reforms.
- **Limit Compliance Changes:** Follow FSSAI's model of announcing regulatory updates only once a year.
  - Create a predictable compliance environment.
- **Digital-First Approach:** Introduce a **'One Nation, One Business' Identity System** to unify business identifiers.
  - Simplify approvals and reduce administrative burdens through digital platforms.
- **Accountability for Regulatory Officials:** Establish oversight mechanisms to curb discretionary powers of inspectors.
  - Introduce penalties for officials engaging in corrupt practices.
- **Implement Labour Codes:** Fast-track implementation of the labour codes across all states.
  - Ensure consistency and clarity in labour regulations.
- **Transparent and Fair Regulatory Environment:** Simplify the licensing process with a single-window clearance system.
  - Enhance grievance redressal mechanisms to protect businesses from undue harassment.

Conclusion

Therefore, **digital-first approach**, **streamlined compliance**, and **accountability measures** can curb bribery and enhance competitiveness. Swift **implementation and transparency** are key to fostering a business-friendly ecosystem.

The Barriers Faced By Construction Workers

(Syllabus Mapping: GS- Paper 3, Indian Economy, Mobilization of resources and Growth and Development)

Context

- **Larsen and Toubro Chairman and Managing Director, N. Subrahmanyan,** stated that construction workers are hesitant to relocate for work because welfare schemes provide them with financial security.
  - However, this view overlooks the deeper structural challenges faced by construction labourers.

Challenges Faced by Construction Workers

- **Fragmented Employment and Job Insecurity:** Frequent relocations and seasonal work create instability.
  - High job insecurity due to lack of long-term contracts.
- **Difficulties in Accessing Welfare Benefits:** Despite ₹70,000 crore collected under the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) (BOCW) Act, 1996, 75% remains unutilised.
  - Lack of proper documentation (e.g., birth certificates, residence proof) limits access to benefits.
  - Complex registration and verification protocols vary across States.
- **Challenges in Employment Certification:** Requirement for a 90-day employment certificate is difficult to fulfill.
  - Contractors often refuse to provide necessary certificates.
  - Some States allow self-certification or trade union certificates, but employer verification is still required.

Under the **Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (BOCW Act)**, workers are required to provide evidence that they have worked for at least **90 days in a year** to register for welfare benefits such as:

- Financial assistance during unemployment
- Health and maternity benefits
- Education assistance for children
- Compensation for injuries or death at work

- **Lack of Inter-State Portability of Benefits:** Migrant workers lose welfare benefits when they relocate to a different State.
  - No interoperable system exists for transferring benefits across States.
- **Seasonal Employment Disruptions:** Loss of income due to construction bans during events like air pollution or heatwaves.
  - Delays and administrative hurdles in securing financial relief.
- **Absence of Digital Public Infrastructure:** No centralised system for tracking worker data and disbursing benefits.
  - Lack of real-time monitoring and automated verification systems.

Proposed Solutions

- **Unified National Labour Identification System:** Create a system similar to One Nation One Ration Card for inter-State portability of benefits.
  - Link BOCW registrations to UAN on the e-Shram portal to enable access across States.

UAN stands for **Universal Account Number**, a 12-digit unique identifier **assigned by the Employees' Provident Fund Organisation (EPFO)** to all employees contributing to the EPF.

- **Digital Platforms for Welfare Schemes:** Develop a centralised, open-source digital portal for uniform registration and disbursement.
  - Use Aadhaar seeding and real-time tracking to reduce delays and improve transparency.
- **Simplified Documentation and Verification:** Accept alternative proofs like self-declaration or trade union certificates.
  - Conduct bulk registration through on-site camps to ease the process.
- **Skill Development and Training:** Establish skilling programs tailored to industry demands.
  - Promote medium-term skilling initiatives to improve worker retention and productivity.
- **Improved Working Conditions:** Ensure safe and dignified work environments to improve worker health and efficiency.
  - Encourage construction firms to invest in better workplace standards.
- **Consistent Welfare Delivery Across States:** Enable portability of benefits through integrated worker databases.
  - Ensure that benefits registered in one State are accessible in another.

Conclusion

India's construction industry must address systemic barriers like fragmented employment and poor welfare portability to resolve labour shortages. A unified welfare system, digital tools, simplified documentation, and skill development can boost workforce efficiency and inclusivity. These steps are essential for sustainable growth and worker well-being.

Food Wastage

(Syllabus Mapping: GS- Paper 3, Indian Economy, Food Security)

Context

The UNEP Food Waste Index Report 2024 highlights that 1.05 billion tonnes of food were wasted globally in 2022 (nearly **20% of all food available to consumers)**.

Recent Trends in Food Wastage

- India ranks among the top contributors to food waste, with **78 million tonnes** of food discarded annually — second only to China.
- While India's per capita food waste is **55 kg annually**, lower than some developed nations like the US (73 kg), the sheer population size makes the total wastage volume significant.
- Approximately **61% of global food waste** occurs at the household level due to over-purchasing, poor storage, and improper meal planning.

What is meant by Food Wastage?

- Food wastage is a **broader term** that includes both **food loss** and **food waste** — covering the entire food supply chain from production to consumer disposal.
- **Example**: Spoiled grains due to poor storage (food loss) and uneaten cooked meals (food waste).

Food Loss

- Food loss refers to the **decrease in edible food mass** that occurs **before it reaches the consumer** during production, post-harvest handling, storage, processing, and distribution.
- **Example**: Crops spoiled due to poor storage or transportation.

Food Waste

- Food waste refers to the **discarding of food** that is still fit for consumption at the **retail and consumer levels** due to spoilage, over-purchasing, or improper storage.
- **Example**: Throwing away edible fruits or leftovers at home or in restaurants.

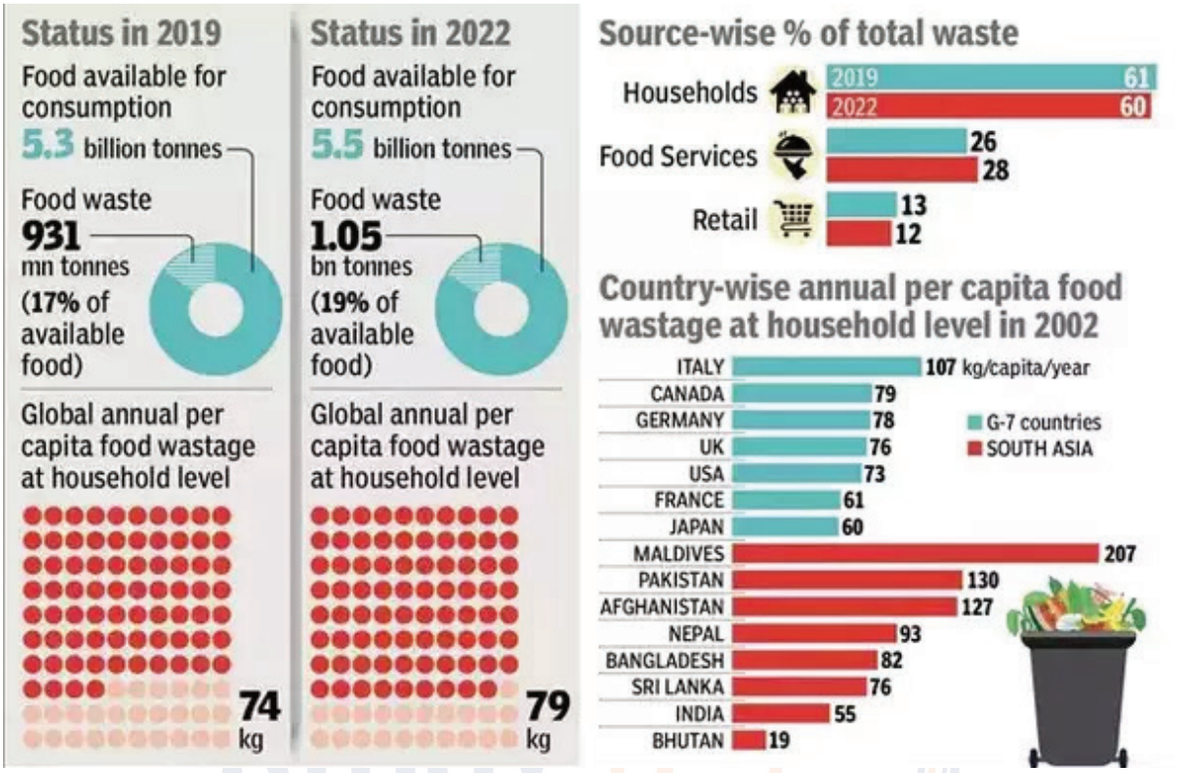
Issues and Challenges

- **Supply Chain Inefficiencies**: Poor storage facilities, lack of cold chains, and inadequate transport infrastructure lead to high food loss at the production and distribution stages.
- **Consumer Behaviour**: Over-purchasing, lack of meal planning, and excessive food preparation at household levels result in avoidable wastage.
- **Policy and Infrastructure Gaps**: Limited investment in cold storage, poor market linkages, and lack of effective redistribution networks exacerbate the problem.

Implications of Food Wastage

- **Environmental Impact:** Food wastage increases **greenhouse gas emissions** (8%–10% of annual global emissions), primarily from methane released in landfills.
  - Wasted food also leads to **overuse of resources** like water, land, and energy during production and distribution.
- **Economic Loss:** Globally, food wastage costs around **$1 trillion annually** in terms of lost production, transportation, and storage costs.
  - Businesses and households face **higher expenses** due to inefficient food management.
- **Food Insecurity:** Despite surplus production, millions face hunger due to inefficient food distribution and wastage.
  - In India, over **20 crore people** face hunger, while **78 million tonnes** of food are discarded annually.
- **Social Injustice:** Wastage reflects unequal access to food — surplus food in some areas contrasts with hunger and malnutrition in others.
  - It widens the gap between food availability and accessibility.

- **Pressure on Natural Resources:** Food production requires significant amounts of **water, land, and energy**; wastage puts additional strain on these limited resources.
  - Increased demand for food production leads to **deforestation** and **biodiversity loss**.
- **Challenge to Sustainable Development:** Food wastage hinders progress toward **SDG 2 (Zero Hunger)** and **SDG 12.3 (Reducing food waste at retail and consumer levels)**.
  - Higher food wastage increases the environmental footprint, slowing down global sustainability efforts.



Government Initiative to reduce Food Wastage

- **Save Food, Share Food:** Launched by the **Food Safety and Standards Authority of India (FSSAI)** to encourage donation of surplus food to the needy through food banks and NGOs.
- **Indian Food Sharing Alliance (IFSA):** A network of food recovery agencies under FSSAI that facilitates food redistribution from businesses and households to reduce waste.
- **Operation Greens:** Launched in **2018** to stabilize the supply of perishable crops (like tomatoes, onions, and potatoes) by improving storage, transportation, and market linkages.
- **Mega Food Parks Scheme:** Establishes food processing infrastructure with cold storage, packaging, and logistics to reduce food loss during production and distribution.
- **Food Processing Incentives:** The **Production-Linked Incentive (PLI) Scheme** for the food sector encourages investment in food processing and better storage infrastructure.
- **Mid-Day Meal Scheme:** Reduces food wastage in schools by ensuring planned meal preparation and effective distribution to students, minimizing excess food disposal.

International Models Addressing Food Waste

- **US Incentive Model**: The **Protecting Americans from Tax Hikes (PATH) Act, 2015** provides enhanced tax deductions for food donations, encouraging businesses to donate surplus food.
- **Italy's Incentive Model**: Italy allocates around **USD 10 million annually** to reduce **one million tonnes** of food waste by offering incentives to businesses for donating food to charities.
- **UN Global Food Loss and Waste Protocol**: This global standard helps measure food loss and waste (FLW) at **processing, retail, and consumer levels**. It supports both countries and companies in tracking FLW within their borders and supply chains, aligning with **SDG target 12.3**.

India's Case Study

- **Food Bank (Royapettah)**: A charitable organization gathering surplus food from weddings, events, and hotels within a 5-6 km area to provide for the underprivileged.
- **Ayyamittu Unn (The Public Foundation)**: An initiative placing community fridges throughout Chennai, enabling donations of leftover food for those in need.
- **RYA Madras Metro – Chennai Food B**ank: Gathers food grains from contributors and delivers them to disadvantaged groups, ensuring access to essential nutrition.

From Waste to Warming: How Food Waste Fuels Climate Change

- **Greenhouse Gas Emissions from Food Waste:** Food loss and waste account for 8%–10% of global GHG emissions. (UN Climate Change, 2024)
  - **Landfill Methane Release:** Decomposing food in landfills emits methane (CH☐), a greenhouse gas 25 times more effective at heat retention than CO☐.
- **Resource Waste and Environmental Harm:** With agriculture using 70% of the world's freshwater, discarded food equates to squandered water resources.
  - **Land and Biodiversity Loss:** Clearing land for food production, only to waste one-third of it, accelerates deforestation and harms ecosystems.

What Needs to Be Done

- **Enhance Storage and Distribution**: Improve cold chain infrastructure and modernise transportation to reduce food loss at the production stage.
- **Consumer Education**: Promote awareness about meal planning, proper food storage, and creative reuse of leftovers to reduce household waste.
- **Redistribution Networks**: Scale up initiatives like **"Save Food Share Food"** to connect surplus food with those in need.
- **Policy Reforms**: Introduce incentives and subsidies for businesses and farmers to adopt sustainable practices and improve food storage.
- **Promote Composting and Recycling**: Encourage household and community-level composting to reduce landfill waste and generate organic manure.
- **Support Sustainable Consumption**: Encourage plant-based diets, reduce overproduction, and optimise food supply chains to minimise resource use and emissions.

Conclusion

Tackling food waste demands a **blend of personal accountability** and **structural changes to minimize** environmental harm and bolster **food security.** By integrating individual efforts with systemic solutions, we can effectively reduce waste and its climate impact. This dual strategy promises a **sustainable future** with improved resource use and **access to food for all.**

Bilateral Investment Treaty

(Syllabus Mapping: GS- Paper 3, Indian Economy, Investment)

Context

An announcement on revising the **Model Bilateral Investment Treaty (BIT)** text was made in the **Union Budget 2025** to make it more **investor-friendly**.

More in News

- The last revision of the Model BIT was in **2015**, aimed at balancing investors' rights and obligations.
- The revised BIT aims to reflect **current economic realities** and create a favourable environment for foreign investments.

Purpose and Role of BITs

- BITs, also called **International Investment Agreements (IIAs)**, are legally binding treaties that protect foreign investments from adverse government actions.

- BITs provide rights to investors through two dispute settlement mechanisms:
  - **Investor-State Dispute Settlement (ISDS)**: Allows investors to bring claims against the host state.
  - **State-State Dispute Settlement**: Allows home states to raise disputes against the host state.
- BITs encourage foreign investments by assuring protection but do not guarantee investments from foreign investors.

Global Landscape of BITs

- According to **UNCTAD** data:
  - A total of **3,291 IIAs** (including **2,831 BITs**) have been signed globally.
  - Many BITs are currently under negotiation.
- Countries regularly revise their Model BIT texts:
  - **US** developed a Model BIT in **1994** and revised it in **1998, 2004, and 2012**.

Historical Evolution of BITs

- **Early Phase (Mid-20th Century):** Early BITs were signed between **developed capital-exporting** and **developing capital-importing** countries.
  - Two major factors influenced early BITs:
    - **Decolonisation** and rise in **economic nationalism** – Aimed at protecting foreign-owned private property.
    - **FDI trends** in the 1950s and 1960s focused on **resource extraction** and **import-substitution manufacturing**, requiring minimum investment protection standards.
- **Expansion of BITs:** The first BITs did not include **ISDS** (investor-state dispute settlement).
  - **NAFTA (1990s)** introduced:
    - **Pre-establishment commitments**: Liberalised foreign investment regimes during the establishment and operation of investments.
    - This shifted BITs from pure protection to a combination of **protection** and **liberalisation**.

India's Recent Developments in BITs

- **EFTA Free Trade Agreement (FTA) – March 2024:** India signed an FTA with the **European Free Trade Association (EFTA)** in March 2024.
  - Key innovations in the FTA's investment chapter:
    - **Quantifiable commitment** on investment and direct employment by EFTA in India — a first for India.
    - **Dispute settlement** mechanism shifted from arbitration to **Government-to-Government (G-to-G) consultations**.
- **Shifting Role of India in BITs:** India has transitioned from being a capital-importing country to a significant **capital-exporting** nation:
  - **Inward FDI** grew from **$16 billion** in 2000 to **$537 billion** in 2023.
  - **Outward FDI** grew from **$1.7 billion** in 2000 to **$236 billion** in 2023.
  - India now needs to secure its own investors' interests through updated BITs.

Key Issues

- **Single vs Multiple Model BIT Texts:** India's dual position as both a capital-importing and capital-exporting country raises the question:
  - Should India have a **single model text** for all partners or tailor BITs based on the nature of the partner country?
- **Most Favoured Nation (MFN) Clause:** MFN clause originated in **multilateral trade agreements** and was adapted to BITs.
  - MFN ensures that foreign investors receive the same treatment as the most favoured treaty partner.
  - India's 2015 Model BIT excluded the MFN clause due to potential issues like:
    - **Treaty shopping**: Exploiting the most favourable terms from different agreements.
    - Disruption of carefully negotiated bilateral agreements.
  - Alternative approaches to MFN:
    - **Consultative MFN**

- **Forward-looking provisions**
- **Checks to prevent treaty shopping**

Strategic Opportunity for India

- The decision to revise the Model BIT after a decade provides India an opportunity to:
  - Reflect its new role as both a capital importer and exporter.
  - Develop a more nuanced approach to BITs tailored to individual partner countries.
  - Introduce innovative mechanisms for **investment protection** and **liberalisation**.
  - Strengthen India's position as a key player in the **global investment landscape** during **Amrit Kaa**l.

Conclusion

Therefore, India's 2025 Model BIT revision aims to create an investor-friendly framework, reflecting its dual role as a capital-importing and exporting nation.

Covid 19 Impact on Global Economy 5 Years later

(Syllabus Mapping: GS- Paper 3, Indian Economy, Growth and Development)

Context

Five years after the World Health Organization declared the COVID-19 outbreak a pandemic, its impact on the global economy remains significant.

Impacts of COVID-19 Pandemic 5 Years Later

- **Debt and Inflation:**
  - Global government debt increased by **12 percentage points** since 2020, with larger rises in emerging markets.
  - Inflation spiked due to post-lockdown spending, government stimulus, and supply chain disruptions, peaking in 2022.
  - Central banks raised interest rates to control inflation, but financial conditions tightened.
  - Average global sovereign credit scores remain **a quarter of a notch lower** than pre-pandemic levels, while emerging market ratings remain **half a notch lower**.
- **Labour Market and Travel Shifts:**
  - Millions of job losses, with women and poorer households worst affected.
  - Shift in employment towards sectors like hospitality and logistics.
  - Women's workforce participation initially declined but the gender employment gap has slightly narrowed.
  - Airline sector suffered **$175 billion in losses** in 2020 but is expected to post a **$36.6 billion net profit** in 2025 with a record **5.2 billion passengers**.
  - Hotel prices remain above 2019 levels, especially in Oceania, North America, Latin America, and Europe.
  - Remote work has led to record-high office vacancy rates.
- **Digital Transformation:**
  - Online shopping increased significantly during lockdowns, stabilising at higher levels post-pandemic.
  - Physical retail space in Europe increased by **1% from 2022 to 2023** and is projected to grow by **2.7% by 2028**.
  - Shares in delivery and digital firms surged during the pandemic, with some retaining long-term gains.
  - Retail investment increased, with **27% of total U.S. equity trading** coming from retail investors in December 2020.
  - Platforms like Robinhood gained prominence during the retail trading boom.

TOPICS FOR PRELIMS (ECONOMY)

IRCTC and IRFC Attain 'Navratna' Status

Context

Recently IRCTC and IRFC have been awarded 'Navratna' status by the Government of India.

About IRCTC and IRFC

- **IRCTC (Indian Railway Catering and Tourism Corporation):**
  - A **Ministry of Railways CPSE**, responsible for **railway catering, tourism and online ticketing services**.
- **IRFC (Indian Railway Finance Corporation):**
  - A **Ministry of Railways CPSE**, functioning as the **financial arm of Indian Railways**, responsible for **funding infrastructure projects**.

Classification of CPSEs in India

- The **Government of India** classifies **Central Public Sector Enterprises (CPSEs)** into three categories based on their financial strength and autonomy:
  - **Miniratna** – Entry-level PSUs with limited autonomy.
  - **Navratna** – Mid-level PSUs with significant operational and financial independence. **(Currently - 21).**
  - **Maharatna** – The highest category, with the greatest financial and operational autonomy. **(Currently - 14)**.

What is 'Navratna' Status?

- **Navratna status** is given to **high-performing Public Sector Undertakings (PSUs)** for their **exceptional financial and market performance**.
- It provides **financial and operational independence** to companies.

Benefits of Navratna Status

- **Financial Autonomy:** PSUs can **invest up to ₹1,000 crore or 15% of their net worth (whichever is lower) on a single project** without requiring **Central Government approval**.
- **Operational Freedom:** They can form joint ventures, alliances, and subsidiaries independently.
- **Recognition & Growth Potential:** Companies gain higher market credibility and opportunities for expansion and diversification.

RBI's Liquidity Injection Measures

Context

The **Reserve Bank of India (RBI)** has announced liquidity injection measures worth **₹1.87 lakh crore** to ease the expected liquidity tightness in the banking system during the second half of March 2025.

Key Measures Announced

- **Open Market Operation (OMO) Purchase of Government Securities (G-Secs)**
  - RBI will conduct **two tranches** of OMO purchases of **₹50,000 crore each**.
- **USD/INR Buy/Sell Swap Auction:**
  - RBI will conduct a **USD/INR Buy/Sell Swap auction** worth **$10 billion**
  - **Tenor: Three years**

Rationale Behind the Liquidity Injection

- **Upcoming outflows from the banking system:**
  - Due to **advance tax** and **Goods and Services Tax (GST) payments**, liquidity tightness of about **₹2.50 lakh crore** is expected from **mid-March 2025**.
- **To stabilize forex reserves** and manage fluctuations in the rupee-dollar exchange rate.
- **Continuation of RBI's liquidity support measures**, following previous interventions in **January-February 2025**.

About Open Market Operations (OMO)

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

US Strategic Bitcoin Reserve

Context

US President Donald Trump has signed an executive order establishing a Strategic Bitcoin Reserve and a **US Digital Asset Stockpile**.

About US Strategic Bitcoin Reserve (SBR)

- **SBR** is a newly established **national reserve of Bitcoin.**
- It is the **first official Bitcoin reserve** held by a government as a **strategic asset**.
- The reserve will **not be used for sale or trading**, but instead will function as a **store of value** for the US government.
- **Purpose of the Strategic Bitcoin Reserve:**
  - To strengthen **US financial resilience** by holding **decentralized digital assets**.
  - Position the US as a **leader in the global crypto economy**.
  - Prevent **premature selling of Bitcoin** that has cost taxpayers **over $17 billion** in lost value.
  - Ensure **proper management and security** of **forfeited Bitcoin holdings.**
- President Trump has also mentioned **four** other coins apart from Bitcoin which would be part of the digital asset stockpile – **Ethereum, XRP, Solana and Cardano.**

How Will the US Strategic Bitcoin Reserve Function?

- **Source of Bitcoin Holdings:** The reserve will **not purchase Bitcoin** but will be capitalized with Bitcoin that has been:
  - **Seized in criminal or civil asset forfeiture cases** by agencies like the **US Department of Treasury** and the **Department of Justice**.
  - **Transferred from other US government agencies** that own Bitcoin.
  - It is estimated that the **US government currently holds 200,000 BTC**.
- **Management of the Reserve:** The **US Treasury Department** will oversee the reserve.
- **Policy on Selling Bitcoin:**
  - **US will NOT sell Bitcoin from the reserve**.
  - Bitcoin will be maintained as a **long-term reserve asset**, similar to **gold reserves**.
  - The **US Digital Asset Stockpile**, separate from the SBR, will contain **other cryptocurrencies** that **can be sold**.

What is Strategic Reserve ?

- A strategic reserve is a **stock of a critical resource** which can be released at times of crisis or supply disruptions.
- **E.g. U.S. Strategic Petroleum Reserve,** the world's largest supply of emergency crude oil, which was created by an act of Congress in 1975 after a 1973-74 Arab oil embargo throttled the U.S. economy.

Strategic reserves of Other Countries

- **India's Strategic Petroleum Reserves (SPRs):** Collection of oil stockpiles which the government can use to respond to supply disruptions in the **global oil market.**
  - India's SPRs have a total capacity of **5.33 million** metric tonnes (MMT) of crude oil.
  - **Locations:** Visakhapatnam, Mangalore and Padur.
  - **Under Construction:** Chandikhol (Odisha) & Padur-II (Karnataka)
- **Canada:** It has the **world's only strategic reserve of maple syrup.**
- **China**: It also has strategic reserves of petroleum, metals, grains and even pork products.

Trump's Tariff Rollback and Its Impact

Context

Recently US President Donald Trump imposed high import taxes (tariffs) on Canada and Mexico but rolled them back within **48** hours.

Structural Issues with the US Economy

- **US Economy Relies on Imports:**
  - The **US consumes more than it produces** domestically, leading to a **trade deficit**.
  - The **US has a trade deficit because it imports more than it exports**.
- **Why does this happen?**
  - **High labor costs** in the US make **domestic production of certain goods inefficient**.
  - Countries with **cheaper labor** (e.g., China, Mexico, Vietnam) have a **comparative advantage**.
  - The **US dollar as a reserve currency** allows **high import consumption**.
- **Tariffs won't solve this issue** because the **US will always need to import more goods** to meet demand.
- **USMCA (North American Free Trade Pact)** signed by Trump in his **first term** governs trade between the US, Canada, and Mexico.
  - USMCA was signed in **November, 2018** during Donald Trump's first term. It **replaced NAFTA** (North American Free Trade Agreement).
  - The current imposition of tariffs on Canada and Mexico is violating this free trade pact. This poses a question mark on US's trade deals.

Misconception About Who Pays Tariffs

- Trump claims tariffs are paid by foreign countries → **FALSE**.

- **Reality**:
  - **US importers (American companies) pay the tariffs** when goods arrive.
  - **Higher costs** are passed to **consumers as increased prices**.
- **Why did tariffs fall out of favor post-WWII?**
  - Because **they ultimately increase consumer costs** without boosting domestic employment.

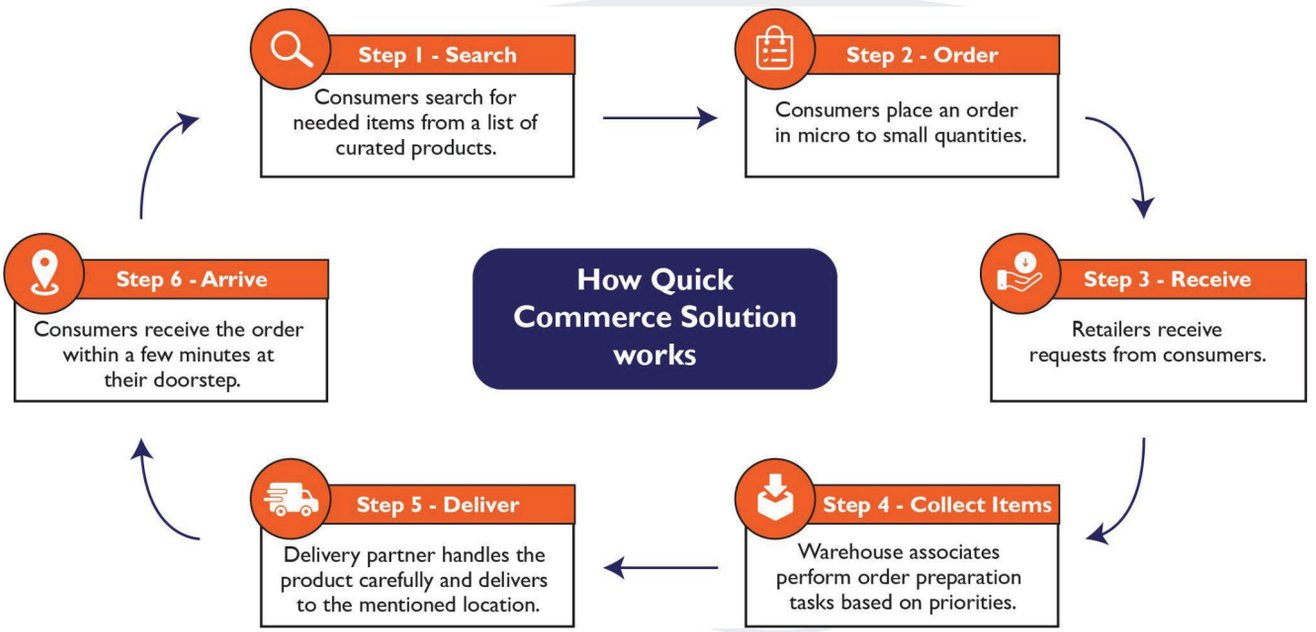
Rise of Quick Commerce

Context

According to a recent report by Bernstein, Quick commerce in India is set to grow at an impressive rate of 75-100 per cent year-on-year, significantly outpacing traditional retail.

What is Quick- Commerce?

- It is a unique business model where the **delivery of goods and services is done within 10-30 minutes of ordering.**
  - **E.g.** Blinkit, Zepto, Swiggy Instamart etc.
- **Components of Q-Commerce:**
  - **Technology:** Uses **AI** and **machine learning** for predicting demand, real-time inventory tracking, and route optimization for fast deliveries.
  - **Logistics:** Requires Dark stores and a network of couriers for speedy delivery.
  - **Supply Chain Management:** Needs reliable suppliers, efficient inventory restocking, and smooth coordination to prevent delays.
  - **Customer Interface:** User-friendly apps and websites which allows customers to place orders quickly and track their deliveries in real-time.



What Are Dark Stores?

- **Dark stores** are **small, local warehouses** used **exclusively for online orders**—customers cannot physically shop there.
- Their **primary goal** is to **reduce delivery time** by being **closer to residential and commercial areas**.
- **How Dark Stores Work ?**
  - **Stock Selection**: Each dark store stocks **high-demand, fast-moving products** like groceries, snacks, dairy, beverages, personal care, and household essentials.
  - **Order Processing**:The moment a customer places an order on an app, the system **assigns it to the nearest dark store** for **fast picking and packing**.
  - **Delivery Logistics**:A **delivery partner (rider)** picks up the order and delivers it **within minutes**, typically **traveling 1-3 km** from the dark store.

Related Terms

- **E-commerce:** It refers to the online purchase or sale of a good or service, which can take 3-4 or longer days to deliver.
- **Dark factory:** A fully automated manufacturing facility that operates with minimal or no human intervention. It uses AI, Robotics, Automation and IoT to handle production processes.

Parandur Airport Project

Context

Parandur airport project is facing **continuous opposition** from **villagers, farmers and environmentalists** over the past three years.

About Parandur Airport Project

- The **Parandur Greenfield Airport** is proposed as **Chennai's second airport** to **decongest Chennai International Airport (Meenambakkam)**.
- **Parandur** is located in **Kanchipuram district, Tamil Nadu**, approximately **70 km west of Chennai city**.
- **Nearby water bodies:** The site has **wetlands, lakes, and ponds**, including the **Kamban Canal**.
- The idea of a second airport for Chennai was **first proposed in 1998**.
- **Why is Chennai Getting a Second Airport?**
  - **Overcrowding at Meenambakkam Airport**: Chennai International Airport has reached its **maximum capacity**.
  - **Growing Air Traffic**: Passenger traffic is expected to **surpass 50 million by 2035**, requiring additional infrastructure.

Issues in the Implementation of Parandur Airport

- **Land Acquisition & Displacement of People:**
  - **13 villages will be affected**, including **Ekanapuram, Nelvoy, and Nagapattu**.
  - Farmers fear **losing agricultural land and livelihoods**.
  - Residents of Ekanapuram village have been **protesting daily for over 950 days**.
- **Environmental Concerns:**
  - **26.54% of the site comprises wetlands**, raising risks of **flooding and ecological damage**.
  - The **Kamban Canal**, which connects several water bodies, could be disturbed, leading to **water scarcity** and **flooding issues** in Chennai.

Lack of Transparency & Public Opposition:

  - The **hydrogeological study report** on flooding risks has **not been made public**, raising suspicions.
  - Local communities demand **better compensation and relocation plans**.
- **Infrastructure & Connectivity Challenges:**
  - New **road and rail connectivity** will be required for passenger and cargo movement.

Appointment process of IRDAI chairman

Context

The Union Government has recently issued an advertisement for the post of Chairman of the Insurance Regulatory and Development Authority of India.

Appointment Process & Eligibility Criteria

- The **Financial Sector Regulatory Appointment Search Committee (FSRASC)**, headed by the **Cabinet Secretary**, is responsible for selecting regulatory body heads.
  - It consists of Cabinet Secretary, current RBI Governor, Financial Services Secretary and two independent members.
- The **FSRASC can recommend candidates** based on merit, including those who have not applied.
- For exceptional candidates, the committee **can relax eligibility criteria**.
- No chairman can hold office **beyond 65 years of age**.
- **Eligibility Criteria for Applicants:**
  - Must have **at least two years of residual service** as of **March 14, 2025**.
  - Should not be older than **63 years** on the date of vacancy.
  - Should have a **minimum of 30 years of relevant work experience**.
  - Must have served as **Secretary to the Government of India** or at an **equivalent level** in government or large institutions.
  - Private sector applicants must have been a **CEO or equivalent of a large financial institution**.

Insurance Regulatory and Development Authority of India (IRDAI)

- It is a **statutory body** under IRDA Act, 1999 that regulates the insurance industry in India.
- **Composition:** Chairman and a maximum of 10 members. All are appointed by the Central Government.
- **Nodal Ministry:** Union Ministry of Finance.
- Its main function is to regulate and supervise the Insurance Industry. **(HQ - Hyderabad)**

Major Initiatives by IRDAI

- **Bima Sugam** – A **one-stop digital insurance platform** for buying, comparing, and claiming policies.
- **Bima Trinity** – A plan to **simplify insurance products and increase penetration**.
- **Increasing FDI in Insurance to 100%** – Encouraging foreign investment and boosting competition.
- **Sandbox Regulations** – Allowing insurers to test **new insurance products and technology** in a controlled environment.

Income Tax Bill, 2025 – Search and Seizure Provisions

Context

The **Income Tax Bill, 2025**, has introduced a **controversial provision** regarding **search and seizure powers** of tax authorities.

Changes in Search and Seizure Provisions

- **Powers Extended to Virtual Digital Spaces:**

  - The new bill gives power to **override any access codes** (passwords, passcodes, encryption keys) protecting an individual's digital communication or accounts.
- **Existing Powers Under Income Tax Act, 1961:**
  - Tax authorities could **enter and search premises** and **forcibly open locks** to seize financial records.
  - Officials were already examining **electronic records** like emails, hard disks, and desktops.
- **New Powers Under Proposed Income Tax Bill, 2025:** Authorities can now **access "virtual digital spaces"** such as:
  - **Email servers, Social media accounts** (Facebook, Twitter, Instagram, etc.)
  - **Online banking and investment accounts**
  - Websites storing asset ownership details
  - Cloud storage and remote servers, Digital application platforms, Any other similar digital space.
- This means tax officials can **use password-breaking software** or **request tech companies (e.g., Apple, Google, Meta) to bypass login credentials.**

Key Provision of new Income Tax Bill

- **Introduction of the 'Tax Year' Concept:**
  - The **'assessment year'** has been removed, and the **'tax year'** now aligns with the financial year **(April 1 – March 31).**
  - For businesses or newly set up professions, the tax year begins from their establishment date.
- **Expanded Definition of Income:**
  - Virtual digital assets (VDAs) like cryptocurrency and NFTs are now considered capital assets, similar to land and shares affecting tax calculations.
- **Simplified and Concise Drafting:**
  - The Bill reduces the number of provisos and cross-references, making it easier to interpret without relying on multiple sections and rules.
- **Consolidation of Tax Compliance Requirements**
  - Provisions related to TDS, assessment timelines, dispute resolution, and deductions have been tabulated for easier access.
- **Removal of Outdated Exemptions:**
  - Provisions like Section 54E (capital gains exemption for pre-1992 asset transfers) and redundant sections from past amendments have been eliminated.
- **Detailed Deductions from Salary**:
  - Deductions related to salary, including standard deductions, gratuity, and leave encashment, are now detailed in tabular form, providing taxpayers with clear guidance.

India imposes anti-dumping duty on Chinese goods

Context

To protect domestic manufacturers from cheap imports, India has imposed **anti-dumping duties** on five products imported from China.

What is Anti-Dumping Duty?

- Anti-dumping duty is a protectionist tariff imposed by a country on foreign imports that are priced below fair market value.
- It prevents **unfair trade practices** and **protects domestic industries** from economic harm caused by cheaper imported goods.
- In India, anti-dumping measures are implemented by the **Directorate General of Trade Remedies (DGTR) under the Ministry of Commerce & Industry.**
- **What is Dumping?**
  - **Dumping** occurs when a foreign company **exports a product at a price lower than its domestic market price or production cost**.
- **Most Favored Nation (MFN) Status:** It is a trade principle under WTO agreements requiring countries to offer equal trade terms to all WTO members .
  - India grants **MFN status** to China, but can still impose anti-dumping duties under WTO rules.

Countervailing Duty (CVD)

- It is imposed on imports that receive **subsidies from their home government**.
- It ensures a **level playing field** for domestic producers.

Customs Duty

- It is a tax imposed on the transportation of goods across international borders.
- India's tariff system is based on the **Harmonised System of Nomenclature (HSN)** of the **Customs Co-operation Council.**
- Custom duty in India is defined under the **Customs Act, 1962**, and all matters related to it fall under the **Central Board of Indirect tax & Customs (CBIC)**
  - **CBIC** operates under **the Department of Revenue, Ministry of Finance, Government of Indi**a.

Electronics Components Incentive Policy

Context

The Ministry of Electronics and Information Technology (MeitY) has finalized an **incentive policy for electronic components manufacturing** with a total outlay of **₹22,919 crore** over **six years**.

Key Features of the Scheme

- **Targeted Electronic Components:** The scheme will focus on encouraging the production of key components that are currently imported, including:
  - Display modules, Sub-assembly camera modules, Printed circuit board assemblies (PCBAs), Lithium cell enclosures, Resistors, capacitors etc.
- **Employment Creation:**
  - **Total Direct Jobs Target**: **91,600 direct jobs** over six years
- **Increasing local value addition:**
  - The **Production-Linked Incentive (PLI) scheme** for **smartphone manufacturing** has been successful in attracting major companies like **Apple and Samsung**.
  - However, despite the rise in domestic assembly, local value addition remains at **15-20%**, and the government aims to **increase it to at least 30-40%**.
- **Structure of Incentives:** The scheme will offer **three types of incentives**:
  - **Operational Incentives** – Based on **net incremental sales**, similar to the PLI model.
  - **Capital Expenditure (Capex) Incentives** – Based on **eligible capital investments**.
  - **Hybrid Model** – A combination of **operational and capex incentives**.
- **Eligibility Criteria:**
  - **Both Greenfield and Brownfield investments** are eligible.
  - **Foreign companies** can participate by:
    - **Transferring technology** to an Indian company, OR
    - **Forming a joint venture** with a domestic firm.

Key challenges faced in electronic components manufacturing

- **Lack of Domestic Scale** – India's current capacity is only **10%** of total electronics production.
- **High Investment-to-Turnover Ratio** –
  - In **smartphone production**, every ₹1 invested generates ₹20 in revenue.
  - In **electronic components**, every ₹1 invested generates **only ₹2-4**.
- **Heavy Import Dependency** –
  - Electronics imports are **India's second-largest import category after oil**.
  - **75%** of India's electronics production relies on imported components.
- The demand-supply gap in the electronic components sector is **huge**:
  - **Current domestic production** (2022-23): **$10.75 billion.**
  - **Domestic consumption gap:** $100 billion.
  - **Potential export demand:** $140 billion.

RBI's has slashed Risk Weights on Bank Loans to NBFCs

Context

The **Reserve Bank of India (RBI)** has announced a **25 percentage point reduction in risk weights** on bank loans to **non-banking financial companies (NBFCs).**

What are Risk Weights?

- Risk weights are a regulatory measure used by banks to assess the capital required to cover the risk of their loan exposures.
- The **higher the risk weight**, the **more capital** a bank needs to set aside, making lending more expensive.
- The **lower the risk weight**, the **less capital** a bank needs to hold, making loans cheaper and increasing credit flow.
- **Risk Weights on NBFC Loans:**
  - **RBI has reduced the risk weights on bank loans to NBFCs by 25 percentage points**, depending on their credit ratings.
- This move is expected to **boost credit flow to NBFCs,** enabling them to lend more to retail borrowers and small businesses.

What Are NBFCs (Non Banking Financial Companies)?

- NBFCs are **financial institutions** that provide **bank-like services** but **do not hold a banking license**.
- They **do not accept demand deposits** (like savings accounts) but offer **loans, asset financing, and investment services**.
- **Types of NBFCs:**
  - **Based on Asset-Liability Structures:** Deposit-taking NBFCs (NBFCs-D) and non-deposit-taking NBFCs (NBFCs-ND).
  - **Based on Systemic Importance:** Among non-deposit taking NBFCs, those with asset size of **Rs 500 crore or more are classified as non-deposit taking systemically important NBFCs (NBFCs-ND-SI).**

Difference between Banks & NBFCs

Aspect	Bank	NBFC
Deposits	Accepts all types of deposits	Cannot accept demand deposits
Deposit insurance of DICGC	Applicable **(up to Rs. 5 lakh)**	Non-Applicable
Payment and Settlement system of the RBI	Supports RTGS, NEFT etc.	Not supported. **Cannot issue cheques.**
Foreign investment (FDI)	Up to 74%	Up to 100% **(Under Automatic Route)**
Cash Reserve Requirement (CRR)	Applicable	Not Applicable
Capital Adequacy Norms	Applicable	Applicable only to Deposit-taking NBFCs and **Systematically Important NBFCs (CRAR - 15%)**
Statutory Liquidity Ratio (SLR)	Applicable	Applicable only to Deposit-taking NBFCs (SLR - 15%)
Established under	Banking Regulation Act, 1949	Established under **Companies Act** and regulated by various bodies depending on category.

One Nation- One Port Process

Context

Union Minister of Ports, Sarbananda Sonowal launched the One Nation-One Port initiative to standardize and streamline port operations across India.

About One Nation-One Port initiative (ONOP)

- ONOP is an initiative launched by the Union **Ministry of Ports, Shipping and Waterways (MoPSW)** to standardize and streamline operations across the country's major ports.
- It aims to enhance efficiency, reduce costs and strengthen India's position in global trade.

Key Features of ONOP

- **Reduction in Documentation:**
  - Container operation documents reduced by 33% (from 143 to 96)
  - Bulk cargo documents reduced by 29% (from 150 to 106).
- **Sagar Ankalan - Logistics Port Performance Index (LPPI):**
  - A performance benchmarking tool to evaluate port efficiency and competitiveness, focusing on metrics like cargo handling and turnaround time.
- **MAITRI Digital Platform:**
  - Integration of Artificial Intelligence (AI) and Blockchain technologies to automate trade approvals and establish Virtual Trade Corridors (VTC) with countries such as the UAE, BIMSTEC and ASEAN nations.
- **Bharat Global Ports Consortium:**
  - Aims to **expand India's maritime reach** and **strengthen supply chains**.
  - Focuses on **port expansion, efficiency and innovation** to **enhance India's global trade**.
- **Green and Smart Port Infrastructure:**
  - Promotion of sustainable practices, including low-carbon logistics and modernized port facilities, to reduce environmental impact.

Private Capex Share in India's Gross Fixed Capital Formation (GFCF)

- Private capital expenditure's (**capex**) share in **Gross Fixed Capital Formation (GFCF)** dropped to **33% in FY24**, marking a significant decline.

What is GFCF?

- **GFCF** refers to the **net investment** in fixed assets like buildings, machinery, equipment, and infrastructure within an economy over a period.
- It indicates how much is being invested in productive assets **to boost future economic growth**.

Components of GFCF:

- **Public Sector Investment:** Government spending on infrastructure, roads, railways, defense, energy and public services.
- **Private Sector Investment:** Business investments in factories, offices, technology and manufacturing capacity. Includes **both listed and unlisted companies**.

- **Why is GFCF Important?**
  - **Higher GFCF** → Economic expansion and capacity building.
  - **Lower GFCF** → Low business confidence, weaker demand or financial constraints.

Merchant Discount Rate

- Recently the Union Cabinet approved a **₹1,500 crore incentive** scheme to promote low-value BHIM-UPI transactions.

Key Features of the Scheme

- Person-to-merchant (P2M) transactions up to ₹2,000 will be incentivized.
- **Banks will receive an incentive of 0.15% per transaction** to encourage UPI adoption.
- **Small merchants** will benefit as they pay **zero MDR**.
- **Transactions above ₹2,000** will remain **MDR-free** but **will not receive incentives**.

What is Merchant Discount Rate (MDR)?

- **MDR is a fee charged to merchants** for processing digital transactions.
- It is deducted from the transaction amount before the merchant receives payment.
- MDR covers the costs of banks, payment service providers, and digital payment platforms.
- It is also known as **Transaction Discount Rate (TDR)**.
- **Who pays MDR ?**
  - Normally, merchants pay MDR for card-based and UPI transactions.
  - In the UPI framework, the government covers MDR for small transactions to promote digital payments.

Unified Interface Logistics Platform (ULIP)

- ULIP has recorded over 100 crore API transactions, marking a key milestone in India's logistics sector.

About ULIP

- ULIP is a digital initiative launched under the National Logistics Policy (NLP) in September 2022 by Prime Minister Narendra Modi.
- It aims to create a **seamless, technology-driven, and efficient logistics ecosystem** in India.
- It integrates **logistics data from multiple government ministries and private stakeholders** to improve **supply chain efficiency and transparency**.
- **Real-time Cargo Tracking**: Enables tracking across **road, rail, ocean, and air transport**.
- **ULIP** simplifies compliance with government logistics policies and regulations → **Promoting EODB.**
- ULIP is maintained by **NICDC Logistics Data Services Ltd. (NLDSL).**
  - NLDSL is a joint venture between the Indian Government represented by **National Industrial Corridor Development and Implementation Trust (NICDIT)** and **Japanese** IT major **NEC Corporation.**

Grameen Credit Score (GCS)

- **GCS is a financial framework** to assess and improve the creditworthiness of **Self-Help Groups (SHGs) and rural individuals**.
- It was introduced by **Union Finance Minister Nirmala Sitharaman** in the **Union Budget 2025-26**.

Key Benefits of the Grameen Credit Score

- **Enhanced Financial Access:**
  - Helps **rural women entrepreneurs access loans** to expand their businesses.
  - **Promotes financial literacy**, introducing rural citizens to concepts such as: Creditworthiness, Loan EMIs and repayment, Credit scores and credit cards.
- **Customized Financial Products:**
  - **New credit cards** designed for **micro-enterprises** with a **limit of up to ₹5 lakh**.
- **Improved Credit Assessment:**
  - **Digital framework** for **assessing creditworthiness** of SHG members.
  - Helps **bridge gaps in the current credit bureau system**, which often **overlooks SHG members**.
  - **Allows rural women to track**: Their credit score &Loan limits and repayment options.
- **Economic Stability and Growth:**
  - **Increased access to loans → more financial independence** for SHG women.
  - Encourages **entrepreneurship** in **rural India**, leading to **sustainable economic growth**.

Swavalambini - Women Entrepreneurship Programme

- Recently the **Ministry of Skill Development and Entrepreneurship (MSDE),** in collaboration with NITI Aayog has launched - Swavalambini programme.

About Swavalambini

- It is a structured entrepreneurship initiative for young women in **Higher Education Institutions (HEIs).**
- It provides skill development, mentorship, funding support and incubation opportunities.
- **Nodal Ministry:** Ministry of Skill Development and Entrepreneurship.
- **Implementing Agency:** National Institute for Entrepreneurship and Small Business Development (NIESBUD) and NITI Aayog.

Objectives of Swavalambini Programme

- **Empowering women entrepreneurs** through structured training and mentorship.
- **Providing financial support** to help establish sustainable businesses.
- **Enhancing entrepreneurship education** in HEIs through faculty training.
- **Encouraging women-led development initiatives** instead of just making them beneficiaries of government schemes.

AGRICULTURE - PRELIMS

India's Position in the Global Spice Market

Context

India being the largest producer and exporter of diverse varieties of spices in the world, its share in the global seasoning market is very low.

Spice Production in India

- India is the **largest producer and exporter of spices**, contributing **75% of global spice production**.
- Produces a variety of spices like **black pepper, cardamom, ginger, turmeric, chili, cumin, coriander, and saffron**.
- **85%** of spices produced in India are consumed domestically.
- **Top spice-producing states in India:**
  - (1) Madhya Pradesh (2) Rajasthan (3) Gujarat (4) Karnataka (5) Telangana.

World Spice Organisation (WSO)

- **WSO is a Non-profit organization** bringing together **farmers, processors, traders, and consumers**.
- It was founded in **2011. (HQ**- Kochi, Kerala)
- WSO hosts the **National Spice Conference (NSC)** along with All India Spices Exporters Forum.
- **Focus areas**:
  - **Sustainability** – Promotes **eco-friendly spice farming**.
  - **Food safety & quality control** – Ensures adherence to **global standards**.
  - **Training & research** – Works with **Farmer Producer Organizations (FPOs)** to **improve farming techniques** and **pesticide management**.

India's Share in the Global Seasoning Market

- Despite being the **largest producer and exporter of spices**, India's share in the **global seasoning market ($14 billion in 2024)** is only **0.7%**.
  - **Spice** refers to a single, dried plant part like a seed, bark, or fruit used to add flavor to food.
  - **Seasoning** is a blend of various ingredients, including spices, herbs, salt and other flavor enhancers.
- In contrast, **China** holds **12%** of the market, while the **U.S.** accounts for **11%**.
- **Reason for Low Share in Seasoning Market:**
  - India primarily **exports raw spices**, whereas countries like **China and the U.S.** dominate **processed and value-added spices** (seasonings).
  - There is a **huge growth opportunity** in the **seasoning segment**.
- **Need for Value Addition in Spice Exports:**
  - Currently, **only 48%** of India's spice exports are **value-added** products.
  - The remaining **52%** are sold as **whole spices**.
  - **Target:**
    - Increase value-added spice exports to 70%.
    - Achieve $10 billion export revenue by 2030 **(Spices Board of India's target).**
- **Emerging competitors:** Vietnam, Indonesia, Brazil, China, and African countries are expanding their spice production.

Spices Board of India

- **Established**: 1987 under the **Ministry of Commerce & Industry**. **(HQ** - Kochi, Kerala).
- It is a statutory body under the **Spices Board Act 1986.**
- It was formed by merging the Cardamom Board (1968) and the Spices Export Promotion Council (1960).
- **Key functions**:
  - **Export promotion** – Enhancing India's global spice trade.
  - **Quality control** – Operating **testing labs** in cities like **Kochi, Mumbai, Chennai, Delhi, Tuticorin, Kandla, and Guntur**.
  - **Farmer support** – Training on **pesticide management, hygiene, and sustainable farming**.
- **It manages "Flavourit"** – An outlet selling premium spices directly to consumers.

Impact of Rising Temperatures on Wheat Production in India

Context

The Indian Meteorological Department (IMD) has warned that **March 2025 will experience above-normal temperatures** and a higher number of **heatwave days**. This coincides with India's **wheat harvest season**, posing a **serious threat to wheat production**.

Impact of Heat on Wheat Crops

- **Global warming reduces wheat grain yield and quality by affecting:**

  - Photosynthesis and respiration.
  - Nutrient absorption and water regulation.
  - Stress-induced hormones and proteins.
  - Grain number, size, and biomass production.
- **Optimum temperature for wheat during later growth stages should not exceed 30°C**, but rising temperatures are shortening the grain-filling period.
- **Scientific Explanation of Heat Stress on Wheat:**
  - Early flowering & faster ripening → Reduced starch accumulation → Lighter grains & lower wheat output.
  - Higher protein but lower starch content → Poorer milling quality & lower market prices.
  - Desperate farmers overuse fertilizers and pesticides → Inefficient resource use and long-term soil damage.

Wheat Cultivation in India

- **Wheat is India's second-largest crop** (after paddy) in terms of area coverage.
- In **2023-24**, wheat was cultivated on **318.33 lakh hectares**.
- It is a **rabi crop** that requires a cool growing season and bright sunshine at the time of ripening.
- **Soil**: Well-drained loamy soils rich in organic matter are ideal for wheat cultivation.
- **Temperature**: Ideal temperature range between 10°C and 24°C.
  - A **frost-free period** of about **100 days** is required for its cultivation.
- **Top Producers India:** (1) Uttar Pradesh (2) Madhya Pradesh (3) Punjab (4) Haryana (5) Rajasthan.
- **Top Producers Worldwide:** (1) China **(2) India** (3) Russia (4) USA.

Role of the Indian Ocean in Rising Temperatures

- The Indian Ocean is warming at an alarming rate.
- A study by Indian Institute of Tropical Meteorology, Pune has predicted that;
  - By the **end of the century**, the **Indian Ocean will be in a near-permanent heatwave state**.
  - **Marine heatwave days to increase from 20 to 220-250 per year**.
- **Impact on India's Monsoon**:
  - Delayed kharif crop season → Delayed rabi sowing → Rabi wheat harvest coincides with early heatwaves.

Turmeric Farming in India

Context

Indian turmeric production is projected to be 10-15% lower this season, due to unfavorable weather conditions and crop diseases.

About Turmeric

- Turmeric (Curcuma longa) is a bright yellow spice derived from the rhizomes of the turmeric plant.
- It has been used for centuries in Ayurvedic medicine due to its numerous health benefits.
- **Growing Conditions:**
  - **Climate:** Warm, humid, tropical climates with temperatures between 20-30°C.
  - **Rainfall:** It requires a high annual rainfall, ideally 1500 mm or more.
  - **Soil: loamy or sandy loam soil** with good drainage.
- **Medical Uses:**
  - **Anti-inflammatory Properties:** Curcumin, the active compound in turmeric, has potent anti-inflammatory effects that can help relieve conditions like arthritis and joint pain.
  - **Antioxidant Effects:** Protects against oxidative stress and lowers the risk of chronic diseases.
  - **Digestive Health:** Used to treat digestive disorders, it can alleviate symptoms of indigestion and bloating.
  - **Cancer Prevention:** Some studies suggest that curcumin may inhibit cancer cell growth and reduce the risk of certain types of cancer.
- **Effects of High Consumption:**
  - **Gastrointestinal Issues:** High doses (over 8 grams per day) can cause abdominal pain, nausea or diarrhoea.
  - **Blood Thinning Effects:** Turmeric can act as a natural blood thinner, which can pose risks for individuals on anticoagulant medications or those about to undergo surgery.

Facts:

- Turmeric is propagated through **rhizomes (not seeds)**.
- India is the **largest producer, consumer and exporter** of turmeric in the **world.**
- India has more than 62% share of world trade in turmeric.
- **Top Producing States: (1) Maharashtra (2) Karnataka (3) Telangana (4) Tamil Nadu.**
- The Government of India established the **National Turmeric Board in 2023 for** Developing and promoting the turmeric sector in India
  - **Nodal Ministry**: Ministry of Commerce and Industry

Six Years of PM-KISAN Scheme

Context

Recently the PM-KISAN scheme completed six years of its launch.

About Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)

- It was launched in **2019** by the Union Ministry of Agriculture & Farmers Welfare.
- **Aim**: Provide **direct income support** to farmers for agricultural investment and livelihood security.

- It is a **Central Sector scheme** (**100%** funding from Government of India).
- **Financial Assistance**: Eligible farmers receive **₹6,000 per year**, divided into **three installments of ₹2,000** each.
- **Direct Transfer**: Money is transferred **directly into farmers' bank accounts** via **DBT**.
- **Beneficiaries:** All landholding farmer families, excluding institutional landholders, higher-income taxpayers etc.
  - **Total Disbursement**: So far, the government has transferred **₹3.5 lakh crore to** over **11 crore** farmers.

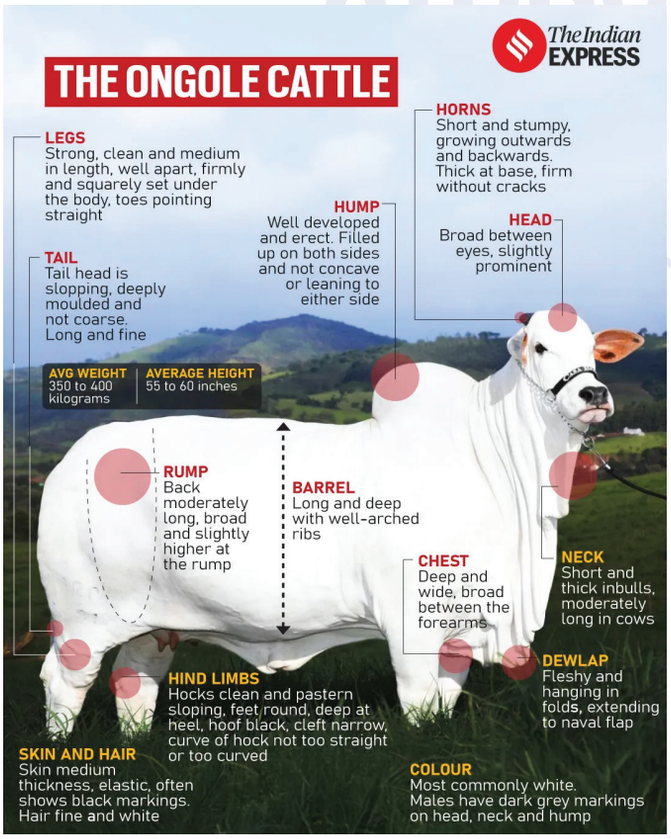
Impact of PM-KISAN

- Helps **reduce financial burden** on farmers.
- Provides **stability for crop production**.
- Supports **rural economy and agricultural investments**.
- Strengthens **food security** and **self-sufficiency** in agriculture.

Ongole Cattle: The Breed Flourishing in Brazil but Declining in India

Context

Recently a purebred Ongole calf was born at the Livestock Research Station (LAM Farm) in Guntur, Andhra Pradesh, through **IVF-embryo transfer technology**.



About Ongole Cattle

- Ongole cattle are native to the coastal plains of **Andhra Pradesh,** specifically the districts of Guntur, Prakasam, and Nellore.
- They are known for their **large size**, muscular build and a prominent hump, **Heat tolerance, Disease resistance, Strength & endurance & Survival on low fodder**
- Historically, they were used as **draught animals** for ploughing and transportation.

Why Did Ongole Cattle Decline in India?

- **Shift in Dairy Preferences:**
  - Farmers **preferred crossbreeds & exotic cattle** for higher milk production.
  - This led to **reduced breeding of Ongole cattle** for dairy purposes.
- **Mechanization of Agriculture:**
  - With the advent of: Tractors & mechanized ploughing & Transport vehicles replacing bullock carts, Demand for **draught cattle declined**, reducing their role in Indian agriculture.
- **Population Decline:**
  - **1944**: Ongole population was **15 lakh (1.5 million)**.
  - **2019 Livestock Census**: Dropped to **6.34 lakh (634,000)**.
  - Meanwhile, **crossbred cattle increased by 29.5% (2012-2019)**.

How Ongole Cattle Transformed Brazil

- In **1885**: The first **Ongole cow & bulls were sent to Brazil**. **7,000 Ongole cattle** were exported before the 1960s ban.
- Brazilian breeders **focused on size, meat quality, and climate adaptability**.
  - **Result:** Bigger, heavier, and more muscular Ongole cattle.
- **80% of Brazil's 226 million cattle** are Ongole/Nelore breed.
- Brazil became the **world's largest beef exporter**, supplying to: **China, Middle East, Europe, USA**

Dalle Chilly - Sikkim

The Agricultural and Processed Food Products Export Development Authority (APEDA), under the Ministry of Commerce & Industry, Government of India, has successfully exported 15,000 kg of GI-Tagged Dalle Chilly from Sikkim to the **Solomon Islands**.

About Dalle Chilly

- Dalle Chilly, also known as **Fire Ball Chilly** or **Dalle Khursani**, is a **highly pungent, bright red chili variety grown in Sikkim and the Eastern Himalayas**.
- It is famous for its **intense spiciness, rich nutritional value, and unique flavor**.

- It has **Rich nutritional value** (Vitamins A, C, and E, along with potassium)
- Its **Scoville Heat Units (SHU)** is **100,000 to 350,000**, making it one of the spiciest chillies.
  - SHU is a measurement of the pungency or "heat" of chili peppers and other spicy foods.
- **GI Tag**: Granted in **2020** by the **Department for Promotion of Industry and Internal Trade (DPIIT)** under the Ministry of Commerce & Industry.
- **Major Producing Regions: Sikkim**, Also grown in parts of **Darjeeling, Kalimpong, and Arunachal Pradesh**.

Gum Arabic

- The ongoing civil war between Sudan's national army and the paramilitary **Rapid Support Forces (RSF)** has significantly disrupted the legal supply chain of Gum Arabic.

About Gum Arabic

- It is a **natural gum** derived from the hardened sap of two species of the **Acacia tree** – Senegalia Senegal and Vachellia seyal.
- **Production:** Mostly in **Sudan (80%)** and throughout the **Sahel (from Senegal to Somalia).**
- It is **soluble** in water and edible.
- **Uses:** Food Industry, Cosmetics, and in Pharmaceuticals as Emulsifiers and stabilizers.

Impact of Sudan's Civil War on Trade

- **RSF Seizure of Key Regions:**
  - RSF took control of **Kordofan and Darfur**, the main gum-harvesting regions, in late 2023.
  - Sudanese traders must pay fees to RSF to market their products.
- **Rise of Informal Trade Routes:**
  - Gum Arabic is being smuggled into neighboring countries such as **Egypt, Chad, Cameroon, South Sudan, and Kenya**.
  - Traders are selling gum at **lower prices without proper certification**.

North East Centre for Technology Application and Reach (NECTAR)

- Union Minister of S&T Dr. Jitendra Singh laid the foundation stone for the permanent campus of NECTAR in Shillong.

About NECTAR

- It is an autonomous society, set up under the Department of Science & Technology, Government of India. **(HQ - Shillong, Meghalaya)**
- It was established in 2012 by merging two missions, viz., the National Mission for Bamboo Application (NMBA) and the Mission for Geospatial Applications (MGA).
- **NECTAR's Key Initiatives:**
  - **Mission Saffron Initiative:** Launched in 2021 to expand saffron cultivation in Northeast India.
    - **Current cultivation regions:** Menchukha (Arunachal Pradesh) & Yuksom (Sikkim).
    - **Upcoming expansion:** Nagaland and Manipur
  - **Advancements in Bamboo and Honey Production:** Boosting sustainable agriculture and economic empowerment.

About Saffron

- Saffron is a highly valued spice derived from the **stigmas of the Crocus sativus flower**.
- It is often referred to as **"red gold"** due to its high price and labor-intensive harvesting process.
- Saffron is primarily used in **culinary, medicinal a n d cosmetic applications.**
- Major saffron-producing countries include:
  - **Iran** – The largest producer (over **90% of global production**).
  - **India (Kashmir)** – Known for **high-quality saffron**, especially from Pampore, Jammu & Kashmir.
  - **Spain** – Produces Spanish saffron, famous for its milder flavor.
  - **Greece, Afghanistan, Morocco** – Other key producers.

SOCIETY, SOCIAL JUSTICE & SCHEMES

TOPICS FOR MAINS

Obesity as a leading health issue

Syllabus Mapping: GS2: Social Justice, Health

Context

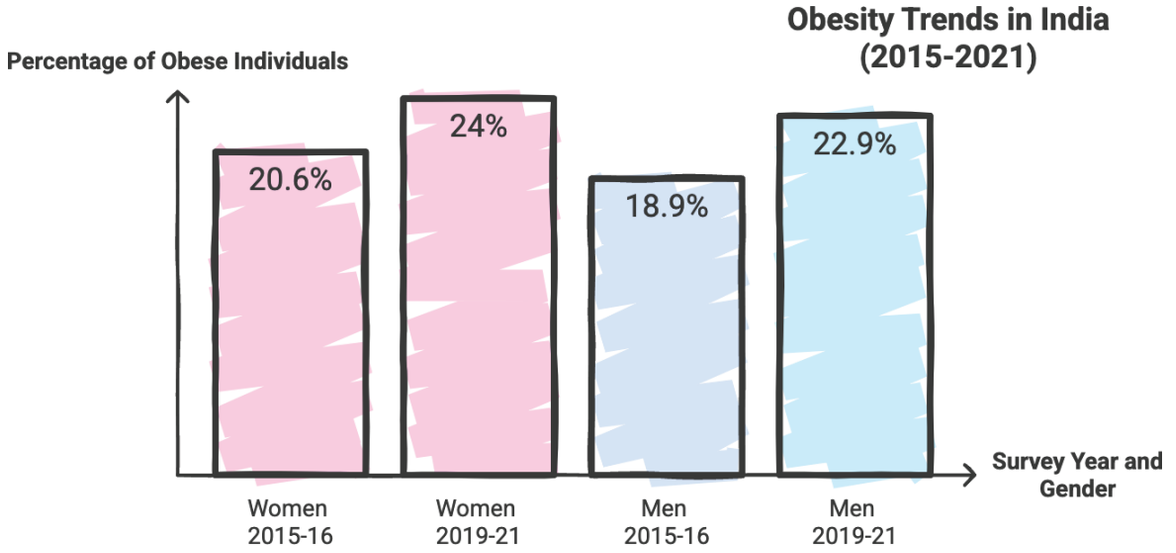
Recently, Prime Minister Narendra Modi, in his 'Mann Ki Baat' radio programme, highlighted the alarming increase in obesity in India. The PM cited that **1 in 8 Indians** is affected by obesity.

Data on obesity crisis in India

- **Definition**: The **World Health Organization (WHO)** defines **overweight and obesity** as **abnormal or excessive fat accumulation** that poses a **health risk**.
- **Childhood obesity projection**: Warns that by 2030, about 163 million Indians could be obese, with 10.81% of children 5-9 years of age at risk. (**World Obesity Atlas, 2023**)
- **Diabetes burden: India has the highest number of** diabetes cases in the world with 101 million people suffering from diabetes.
- **Non-Communicable Diseases (NCDs): 60% of all deaths** in India are now due to **NCDs**, which include obesity-related illnesses. (**WHO, 2023**)

Causes of rising obesity in India

- **Shift in dietary preferences: Urban India** has witnessed a shift from traditional diets to high-calories, low nutrient fast foods.
  - **Eg**: Higher consumption of packaged and processed foods.
- **Lifestyle changes:** A **Lancet Global Health Study (2023)** found that: **Nearly 50% of Indians** do not get **sufficient physical activity**. **Indoor lifestyle**: Increased use of **digital devices** and **sedentary work culture**
- **Environmental factors: Air pollution** contributes to **inflammation**, leading to an increased risk of **cardio-metabolic diseases**.
  - **Eg: Visceral fat accumulation** (fat stored around organs)
- **Genetic factors**: As per **Metabolic Syndrome,** Indians are genetically predisposed to storing fat in the abdomen.
- **Economic Barriers:** Low-income households rely on carbohydrate-heavy diets (rice & wheat) also posing a rise in obesity in rural poor.
  - **Eg**: According to the 2024 **State of Food Security and Nutrition Report**, **55% of Indians cannot afford a healthy diet**.



Challenges in combating obesity

- **Lack of Targeted Programs:** While undernutrition is a focus of government programs, obesity is **not holistically addressed** through structured policies.
  - **Eg**: Initiatives like **Khelo India, Fit India Movement** put the **burden of action solely on individuals**, ignoring systemic issues.
- **Regulation gaps: Ultra-processed foods (UPF) and high-fat, salt, sugar (HFSS) foods** are widely available at quick commerce platforms and supermarkets.
  - There is **no strong policy to tax junk food** or regulate misleading food advertisements.
- **Poor healthcare infrastructure:** Most **cities lack cycling tracks, pedestrian-friendly roads, and open gyms** for public use.
  - Sedentary lifestyles are increasing due to lack of accessible recreational spaces.
- **Nutrition Gap: Healthy food is more expensive than junk food** in India.
  - **Eg**: Organic foods are more expensive than their conventional counterparts as they use natural fertilizers, and the **absence of synthetic pesticides or genetically modified organisms (GMOs)**
  - It leads to a double burden of malnutrition with the coexistence of obesity and undernutrition, especially in lower income groups.
- **Lack of awareness**: Limited knowledge and false advertisement claiming healthy foods and no-sugar products leads to unhealthy diets and affects overall fitness.

Initiatives to address obesity

- **Fit India movement:** Promotes active lifestyles, launched by PM Narendra Modi in 2019.
  - **Eg**: Includes Fit India School Certification, **Fit India Sundays on Cycle**
- **National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD):** Focuses on screening, early diagnosis, and management of NCDs, including obesity.
- **POSHAN Abhiyaan:** Targets malnutrition and obesity through dietary interventions.
- **Eat Right India Movement (FSSAI)**: Promotes safe, healthy, and sustainable food habits through mass campaigns and social media outreach.
- **Food fortification**: Promoting fortified staples such as rice, wheat and edible oil in order to improve nutritional outcomes.
- **'Aaj Se Thoda Kam' Campaign (FSSAI):** Encourages reducing fat, sugar, salt intake, launched by FSSAI.
- **Check on false advertisement:** Ministry of Commerce and Industry (2024) issued an advisory to e-commerce companies, instructing them to remove all drinks and beverages including **Bournvita** from the category of **'health drinks'** on their platforms.

Way forward

- **Public Awareness:** Obesity must be seen as **a chronic disease, not just a lifestyle issue**.
  - Nationwide **awareness campaigns** should focus on the risks of obesity and the benefits of healthy eating.
- **Holistic Urban Planning:** Create **dedicated walking and cycling lanes** in cities.
  - Ensure **open gyms, public parks, and exercise-friendly spaces** are available and accessible.
- **Taxation on Junk Food:** Higher **taxes on ultra-processed foods** and sugar-laden beverages.
  - Subsidies on **fruits, vegetables, and other nutritious food** to make them affordable for all.
- **Nutrition education:** Schools should promote **healthy eating habits**, restrict unhealthy foods in canteens, and introduce nutrition education.
  - Workplaces should provide **regular health screenings** and promote active lifestyles.
- **Inter-Ministerial Coordination:** A **multi-sectoral task force** (Health, Finance, Education, Urban Development, and Agriculture ministries) should lead **India's obesity control strategy**.
- **Food Industry Regulation: Stringent advertising regulations** on HFSS foods, especially those targeting children.
  - Online food delivery platforms to be incentivized to **promote healthy choices**.

Conclusion

In the words of PM Modi in the Fit India movement, "**Fitness Ka Dose, Aadha Ghanta Roz**", making fitness a mass movement becomes vital to address the obesity epidemic.

Tackling obesity is not just a health necessity but a step ahead in realising the vision of Sarvashreshtha Bharat and a more productive Viksit Bharat @2047

Primary Healthcare In India

Syllabus Mapping: GS2: Social Justice, Health

Context

India has long been committed to '**Health for All**' under the World Health Organization's Universal Health Coverage (UHC) framework, which prioritises **primary health care (PHC) and to reduce out-of-pocket expenditure (OOPE)**.

About Primary Healthcare (PHC)

The foundation stone of any robust health system is laid by its primary health care. PHC lays emphasis on health and wellbeing centred around the needs of individuals, families and communities. Including disease prevention, treatment, rehabilitation and palliative care.

- **Alma-Ata declaration of 1978** and **Astana declaration of 2018** emphasise on the crucial role of PHC in achieving universal health coverage (UHC)
- According to NFHS-5, **infant mortality rate** has reduced to 35.2% from earlier 29.5% (NFHS-4).
- **Stunting of children, wasting and underweight** children under 5 years has also declined as per NFHS-5.
- However **anaemia among women** has risen significantly from NFHS-4 from earlier 58.6% to now 67.1% (NFHS-5) which calls for attention towards primary healthcare.

Need for primary health care (PHC)

- **Breaking the vicious cycle of poverty**: When citizens are burdened with high out-of-pocket health expenditure, it leads to a reduction in productivity, skills, and income, hence providing primary health structure is necessary.
  - **Eg: 65% of health expenditure is out of pocket** which pushes people into debt and poverty. **(Economic survey 2020-21)**
- **Upholding human rights**: Providing primary healthcare services is necessary to ensure that citizens can exercise their right to livelihood and dignity, and have the freedom to develop their holistic personality.
  - **Eg: The 1948 Universal Declaration of Human Rights**
- **Constitutional obligation**: DPSPs enshrined in the Indian Constitution under **Article 47 and Article 42**, create a constitutional obligation on the state to provide accessible primary health structures to all citizens.
- **Universal health coverage**: Ensuring all people have access to a full range of quality health services without financial hardship. To meet international obligations, the state must meet its national health targets.
  - **Eg: WHO and World Bank release Tracking Universal health coverage report.**
- **Healthy population**: It is the cornerstone of sustainable development, and primary health institutions are essential for advancing this goal by conducting **social audits** and involving masses through **jan andolan.**
  - **Eg: POSHAN Abhiyaan**
- **Preventing the spread of diseases**: Primary healthcare institutions can stop the spread of diseases by offering fundamental medical treatment and encouraging healthy lifestyles.
  - **Eg: WASH scheme and Swachh Bharat mission**
- **Stakeholder approach**: Apart from government services, other community health workers at grassroots can ensure an accessible and sustainable health care system.
  - **Eg: Anganwadi workers and Auxiliary Nurse Midwife (ANM)**

Issues in PHC in India

- **Resource crunch:** India's Public health expenditure is about 1% of GDP, whereas the global average is 6%. It leads to poorly equipped facilities, shortage of medical professionals and disparities in health outcomes.

- **Disease burden:** India is facing the dual burden of communicable and non-communicable diseases such as diabetes, hypertension.
- **Out of pocket expenditure:** About 70% health expenses in India are financed out-of-pocket which pushes people into poverty.
- **Unregulated private sector:** Fragmented and unregulated nature of private sector providing healthcare services leads to variability in quality of care, over-prescription of drugs, costly diagnostic tests.
- **Human resource crunch:** There is a low physician density with about 8 doctors per 10,000 people and an acute shortage of doctors, nurses and auxiliary nurse midwives (ANMs).

Interventions to strengthen the PHC

- **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY):** Launched in **2018**, AB-PMJAY is the world's largest government-funded health insurance scheme, providing coverage of up to **₹5 lakh per family per year** for secondary and tertiary care.
  - **Eg**: Over **36 crore Ayushman cards** have been issued, and more than **31,000 hospitals** have been empanelled under the scheme.
- **Vaccination Drive:** India conducted the **world's largest COVID-19 vaccination drive**, administering over **2.2 billion vaccine doses**.
  - **Eg**: Development of indigenous vaccines like **Covaxin** and **Covishield** and their rapid deployment demonstrated India's capacity for large-scale public health mobilisation.
- **Infrastructure boost:** Upgradation of health facilities, ensuring availability of essential drugs, expansion of health workforce and increased government spending on public health to at least 2.5% of GDP by 2025. (Recommended by National health policy, 2017)
- **National Digital Health Mission (NDHM):** Launched in **2020**, the NDHM aims to create a unified digital health ecosystem.
- **Public-private partnership (PPP):** Enhancing the quality of PHC services by leveraging the strengths of the private sector like capacity building, knowledge sharing.
  - **Eg: Merrygold health network** provides affordable healthcare through innovative business models.
- **Health literacy:** Community participation in health programs with the involvement of community health workers to deliver primary care can improve outreach & service delivery.
  - **Eg: Family health strategy of Brazil and Thailand's universal health coverage**

Conclusion

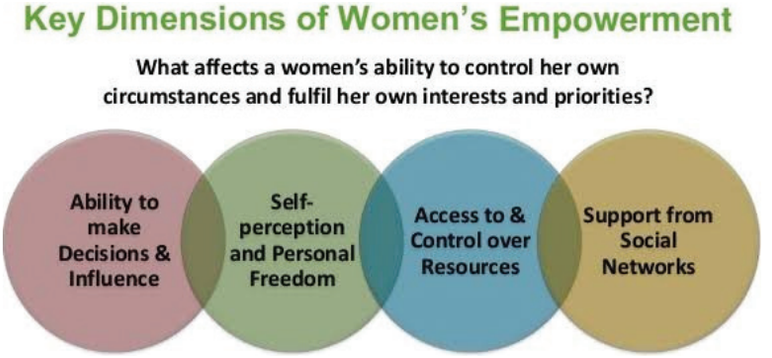
Best practices such as the **Danish universal healthcare system** provides Danes with free medical care which is financed through income tax. All permanent residents are entitled to a national health insurance card. Therefore, accessibility, affordability and availability of public health systems for all sections of the society needs to be revamped to meet the **SDG-3**

Women Empowerment

Syllabus Mapping: GS2: Social Justice

Context

- **International Women's Day** is celebrated around the world on **8th March**.
- Also, the year 2025 marks the 30th anniversary of the **Beijing Declaration and Platform for Action**.



Women in India post independence

- **Madhabi Puri Buch: First woman chairperson of SEBI (2023)**
- **Kiran Mazumdar-Shaw**: India's first self-made female billionaire as a **pioneer in the Indian biotechnology industry.**
- **Kalpana Chawla**: Indian-American astronaut and the **first woman of Indian origin to go to space.**
- **Arundhati Roy:** An author, essayist, and political activist to win the **Booker Prize in 1997.**
- **Mary Kom**: She is a **boxer** and the only woman to have won **six world championship** titles in boxing.
- **Jaswanti Ben:** Founder of **Lijjat Papad**

Constitutional perspectives of Gender Justice

Preamble	• Social, economic and political justice are secured through equal treatment of all citizens, elimination of inequalities of wealth and equal access to all political offices.
National Commission for Women (1992)	• To protect the social, educational and economic interests of women.
Fundamental rights	• **Article 14:** Ensures equality before law which connotes absence of special privileges, equal subjection of all persons to ordinary law of the land. • **Article 15:** No citizen shall be subjected to disability, liability, restrictions on grounds of sex in availing equal access to public places, use of wells, tanks dedicated for the use of public. • **Article 16:** Provides equality of opportunity for citizens in matters of employment or appointments to any office under the state.
Directive principles of state policy (DPSPs)	• **Article 38:** State shall set a path towards a welfare state by minimising inequalities in income, facilities and opportunities. – **E.g.- Minimum Wages Act (1948)** • **Article 39 (d)**: Equal pay for equal work for men and women and prevention of concentration of wealth. • **Article 42**: To make provisions for just and humane conditions of work and maternity relief – **E.g. - Janani Suraksha Yojana** providing cash transfer for delivery and post delivery relief.

Challenges in attaining Women empowerment in letter and spirit

- **Stigmatisation:** Various jobs have been reserved for women which leads to increased social cleavages and are termed as pink collared jobs.
  - **Eg: Air hostess, Nurses, Beauty and salon services**
- **Access to education:** Women face poor literacy levels of upto 59% as compared to 80% men. Gender divide leads to low enrollment of women in **STEM courses.**
- **Son meta preference:** Mortality ratio stands at 130 where female foeticide and **sex selective births** lead to increased woes of women.
- **Lack of representation:** Despite laws, reservation and codification in place, women are not adequately represented at positions of power.
  - **Eg: Only 14% women representation in Lok Sabha and the Sarpanch Pati Syndrome.**
- **Violence against women**: Women in India face high rates of violence, including domestic violence, sexual assault, and harassment.
  - **Eg: 300,000 reported cases of crimes against women in 2023 (NCRB)**
- **Role expectation**: Traditional gender roles in India place women in a subordinate position and limit their opportunities for personal and professional growth.
  - **Eg: Women as homemakers**
- **Access to religious places:** God is said to be a saviour of all, disregarding the gender, however the societal norms and values restrict entry of women in various religious institutions.
  - **Eg: Sabarimala case and Female genital mutilation amongst Bohra Muslims.**
- **Glass ceiling:** Women paid lesser than men in corporations which further raises questions over **equal pay for equal work.**
- **Glass cliff:** Promotion of women at higher ranks in times of crisis or during a recession when the chances of failure are more likely, this in turn leads to blaming the woman for losses.

- **Harassment at workplace:** Despite provisions like **POSH Act or the Vishaka guidelines,** sexual harassment goes underreported.
  - **Eg: NCRB in 2019 recorded 505 cases** of insult to modesty of women at work premises. **(However the actual incidence of abuse is much higher)**

Landmark judgements ensuring Gender Justice

- **Navtej singh johar v. Union of India (2018):** The Supreme Court decriminalised Section 377 of IPC, i.e. Homosexuality.
- **Sabrimala Temple case (2018):** The apex court held that devotion cannot be subject to gender discrimination which further aids the **doctrine of social inclusion.**
- **Karnataka hijab issue:** The state High court formed a distinction between **Freedom of Conscience** as an internal belief and **Religious Expression** as an outward expression. The essential **right of a woman to choose** was upheld.
- **Vishaka Guidelines**: A form of **judicial activism** where guidelines were provided by the apex court to prevent sexual harassment at workplace.
- **Nirbhaya Case (2014)**: Established **Justice J.S. Verma Committee** to suggest amendments to deal with sexual offences effectively. A harsher penalty with the gravity of offence was introduced.
- **Shah Bano case (1985)**: The apex court observed that a **common Civil code** will uphold national integration and gender justice by eliminating regressive laws.

Interventions to attain women empowerment in letter and spirit

- **Jal Jeevan Mission**: With primary objective to provide clean tap water to every rural household and public institution, **tap water connection has been provided to 14.45 crore households** under the mission.
  - Alleviating women's **burden of fetching water** over long distances.
- **Financial inclusion:** About **69% of the loans** have been sanctioned to women entrepreneurs under **Pradhan Mantri Mudra Yojana (PMMY)** and **84% of the beneficiaries under Stand-Up India are women.**
- **Mission Shakti:** An endeavour to enhance women's safety, empowerment and workforce participation.
  - **Eg:** Providing integrated services under one roof through **One-Stop Centres (OSCs)** and **Toll-free Women's helpline number - 181**
- **One Stop Centres (OSCs)**: Popularly known as **Sakhi Centres**, aim to facilitate women affected by violence (including domestic violence) with a range of integrated services under one roof such as Police facilitation, medical aid, providing legal aid and legal counselling etc.
- **Swadhar Greh Scheme:** The Swadhar Greh Scheme is being implemented as a Centrally Sponsored Scheme for women who are victims of difficult circumstances in need of institutional support for rehabilitation so that they could lead their life with dignity.
- **Ujjawala Scheme**: Implemented as a Centrally Sponsored Scheme for Prevention of trafficking and for Rescue, Rehabilitation, Reintegration and Repatriation of victims of trafficking for commercial sexual exploitation.
- **Gender sensitization programs:** To create awareness about the issues faced by women and the importance of gender equality.
  - **Eg: Gender Champions program in Delhi**
- **Media campaigns**: The media can play a crucial role in changing social attitudes of masses towards women.
  - **Eg: Bell Bajao campaign**

Best Practices

- **Gadchiroli study:** A semi-tribal district of Maharashtra was surveyed where alcoholism was prohibited.
  - It reported less crime/violence against women.
- **Piplantri model:** The village Pipalantri in Rajasthan celebrates the birth of every girl child with the plantation of 111 trees.
- **Gender fluidity:** Kerala introduced gender sensitive textbooks to ensure gender inclusivity in children.
  - **Eg**: Father shown cooking in the kitchen.
- **Nordic model:** Provides a broad definition of gender crimes such as provision of economic freedom and provision of parental leaves that checks on gender stereotyping.
  - **Eg**: India provides only maternity leaves which leads to the problem of low Female labour force participation rate.
- **Ghana model:** It came up with a **Rural response system (RRS)**, i.e. community based action teams to raise awareness about violence against women.

Conclusion

Learning from **best practices** such as **Japan** recommended **Womenomics,** where G20 leaders act to boost training in and equal use of technology to ensure no woman is left behind. Such steps can also help improve **India's ranking on Global gender gap index (2024), i.e. 129 out of 146 countries.**

Women like **Jaswanti Ben,** the **founder of Lijjat Papad** depict the role of gender empowerment as a vehicle steering the country's economic growth if provided with the right set of opportunities, skills and social inclusion.

Tackling hunger and nutrition

Syllabus Mapping: GS2: Social Justice, Hunger

Context

Although health was not a priority in Budget 2025, the increased allocations for **Saksham Anganwadi** and **Poshan 2.0** suggest a **stronger focus on nutrition** in the coming financial year. However, it remains uncertain whether this will effectively address India's nutrition challenge.

About Hunger and Nutrition

- **Defining hunger:** It refers to food deprivation or undernourishment (less than 1,800 calories a day). Malnutrition refers to both undernutrition and overnutrition.
- According to **UN's Hunger Report,** 'hunger is used to define periods when populations are experiencing severe food insecurity - going entire days without eating due to lack of money, lack of access to food and other resources'
- **Defining nutrition:** Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases and longevity. (**WHO**)

Micronutrient Deficiencies

- Nearly **2 billion people** worldwide suffer serious and long-term health conditions due to lack of crucial micronutrients in their diets.
- **WHO** defines **'micronutrients' as compounds required in significantly smaller amounts** — than macronutrients such as protein and carbohydrates, including vitamins and minerals.

Data on hunger and nutrition

Index/Report/Survey	Findings
Global hunger index, 2024	India was ranked 105 out of 125 countries.
UNICEF Report	Approximately 181 million children under 5 are suffering from severe child food poverty.
India's Multidimensional Poverty Index	Multidimensional Poverty decreased from 29.17% in 2013-14 to 11.28% in 2022-23; 24.82 crore people moved out of poverty.
NFHS-5	Provides insights about malnutrition and undernutrition among children. With prevalence of stunting (35.5%), wasting (7.7%) and underweight children (32.1%)
State of Food Security and Nutrition in the World (SOFI) by FAO	The hunger in India has decreased from 233.9 million in 2020-22 to 194.6 million by 2021-23. A total of 39.3 million people came out of hunger in India in one year.

Factors contributing to nutritional deficiencies

- **Micronutrient deficiencies** Not taking a balanced diet over the long-term creates micronutrient deficiencies of minerals or vitamins.
  - **Eg: The lack of iron, iodine, zinc, vitamin-A, vitamin-D, folate, and vitamin-B12 causes hidden hunger.**
  - **Eg: Anaemia**, the most common micronutrient deficiency, affects almost 50-60 percent of preschool children and women.
- **Economic constraints**: As per FAO, about 46% of South Asia's population, including India cannot afford a balanced diet.
  - **Eg: As per State of Food security and nutrition in the world report 2023**, 74% Indians cannot afford a healthy diet and 39% health a nutrient-adequate diet.

- **Social norms:** Historically based discrimination limits access to nutrient rich food for marginalized communities.
  - **Eg**: Women often eat last and consume less nutritious food than men traditionally.
- **Cultural influence:** Traditional food choices lack diversity in essential nutrients, leading to malnutrition.
  - **Eg**: Vegetarian diets often lack protein, iron and vitamin B12 increasing the risk of anaemia.
- **Dietary choices**: Fast food and processed food consumption in urban areas leads to obesity and other related lifestyle diseases.
  - **Eg: As per NFHS-5,** 22.2% men and 23% women in India are overweight or obese.

Initiatives to combat nutritional deficiencies

- **POSHAN Abhiyan:** Aims to generate Jan Andolan towards nutrition with the use of technology, further reducing stunning, anaemia and low birth weight.
- **National Nutrition Mission**: It aims to overcome calorie deficiency, handle hidden hunger, provide clean drinking water, sanitation and to create a **cadre of Community hunger fighters.**
- **Anemia Mukt Bharat (AMB):** Aims to provide iron and folic acid tables to children and women in order to tackle anaemia.
- **Nutrition literacy campaign:** Expansion of **Eat right India** into a year round grassroot movement to reinforce healthy dietary habits from childhood.
- **'My plate for the day':** Recommended by ICMR to include sourcing micronutrients from eight food groups with vegetables, fruits, green leafy vegetables, roots and tubers forming essentially half the plate.
  - Cereals, millets, pulses, fresh foods, eggs, nuts, oil seeds and milk/curd form the other major portion of the plate.
- **Large scale food fortification (LSFF):** It involves fortifying staple foods such as rice, flour, edible oils with essential micronutrients, aiming to combat nutritional deficiencies.

Conclusion

India must move a step ahead of food security to holistically provide nutritious food, aligning with **SDG-2 (Zero Hunger) and SDG-3 (Good health & well being).** A community driven, climate smart approach is key to achieving nutrition security for all.

Maternal Mortality in India

Syllabus Mapping: GS1: Women and associated issues

Context

India has **met the National Health Policy (NHP) 2017 target** of reducing the Maternal Mortality Rate (MMR) to **100 per lakh live births by 2020** and is on track to achieve the Sustainable Development Goal (SDG) target of reducing MMR to 70 by 2030, according to Union Health Minister.

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
- 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.

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

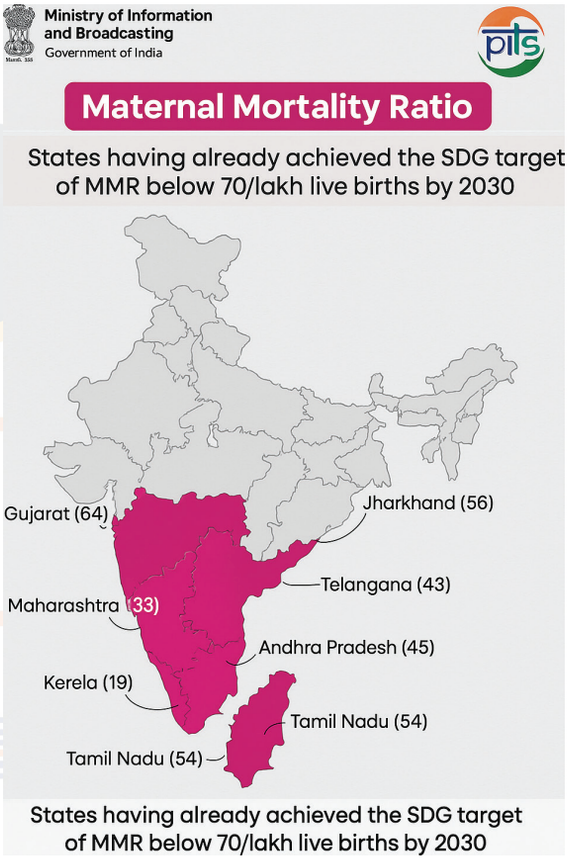
Causes of Maternal Mortality

- **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.
- **Unsafe Abortion:** Despite the legalization of abortion under the Medical Termination of Pregnancy Act, lack of awareness and access to safe services drives women to unsafe practices.
- **Anemia:** Severe anemia, often linked to poor nutrition and iron deficiency, weakens pregnant women, making them more vulnerable to complications like hemorrhage or heart failure during delivery. India has a high prevalence of anemia among pregnant women.
- **Social and Economic Factors:** Factors such as poverty, limited access to healthcare, lack of education, and cultural practices may contribute to delays in seeking and receiving appropriate maternal healthcare, thus increasing the risk of maternal death.

Government Initiatives to Reduce MMR

- **Janani Suraksha Yojana (JSY)**: Aims to reduce maternal and neonatal mortality by promoting **institutional deliveries**.
  - Provides financial assistance to pregnant women, especially from **SC, ST, and BPL** households.
- **Pradhan Mantri Matru Vandana Yojana (PMMVY)**: Provides maternity benefit of ₹**5000** for the first living child of the family.
  - Under **PMMVY 2.0**, an additional cash incentive is provided for the second child if it is a girl.
- **Surakshit Matritva Aashwasan (SUMAN)**: Ensures assured, respectful, and quality healthcare at no cost for pregnant women and newborns.
  - Focuses on ending preventable maternal and newborn deaths.
- **Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)**: Provides free, assured antenatal care on the **9th day** of every month. Under **e-PMSMA**, high-risk pregnancies are tracked with financial incentives for extra visits.
  - **Eg**: Over **5.9 crore** pregnant women have benefited from this scheme. (2025)
- **Anaemia Mukt Bharat (AMB) Strategy:** Part of **POSHAN Abhiyan** to address anaemia among adolescents and pregnant women.
  - Includes testing, treatment, and addressing non-nutritional causes of anaemia.



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

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.

Women Safety in Public Spaces

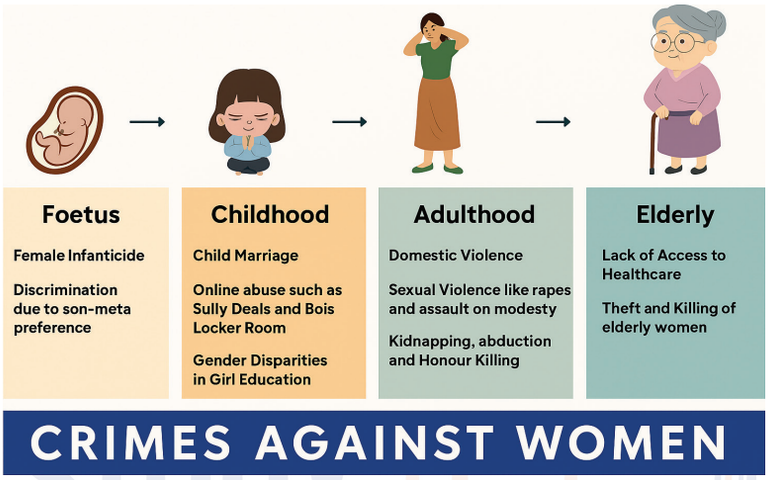
Syllabus Mapping: Syllabus Mapping: GS1: Women and associated issues

Context

Despite stringent laws, women remain far from feeling safe in most public spaces.

Introduction

- In the words of **Mahatma Gandhi,** "The day a woman can walk freely on the roads at night, that day we can say that India has achieved Independence"
- Public spaces are areas of crucial socio-economic and political zones and not just areas of movement.
  - As per **NFHS-4, only 54% of Indian women could visit markets alone.**
- **Labour force participation rate (LFPR)** for women in 2023-24 stood at 35.6%, indicating that more than half of India's female population remains outside the workforce.
- India's development journey is closely linked with empowerment of Women from **women development to Women led development.**
- While women's access to public spaces is often dictated by necessity rather than choice, men tend to socialise freely and relax in public spaces.
  - It leads to a **form of social exclusion** that reinforces patriarchal norms and undermines the efforts taken towards women empowerment.



Challenges faced by Women in Public Spaces

- **Sexual Harassment:** Women frequently face **catcalling**, **groping**, and **verbal abuse** in public spaces.
  - **Eg**: Incidents of **molestation** in public transport or crowded areas remain high.
- **Lack of Safety Infrastructure:** Poorly lit streets, absence of **CCTV surveillance**, and inadequate police patrolling increase vulnerability.
  - **Eg**: Lack of **separate compartments** or safe zones in public transport exposes women to greater risk.
- **Social stigmatization:** Victim-blaming and moral policing discourage women from reporting incidents.
  - **Eg**: Cultural norms restrict women's mobility, reinforcing the idea that they need to be **protected rather than empowered.**
- **Legal and Administrative Gaps:** Delayed justice and low conviction rates weakens faith in the legal system.
  - **Eg**: Understaffing in law enforcement and lack of gender sensitivity training among police officers.
- **Restricted Mobility:** Women are forced to avoid certain areas and times of day due to safety concerns.
  - **Eg**; Fear of harassment limits women's participation in economic, educational, and social activities.

Laws Related to Women Safety in India

- **Protection of Women from Domestic Violence Act, 2005:** Protects women from physical, emotional, sexual, and economic abuse.
  - Provides remedies like protection orders, residence orders, and monetary relief.
- **Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013** (POSH Act): Mandates Internal Complaints Committees (ICC) in workplaces.
  - Establishes procedures for preventing and addressing sexual harassment.
- **Criminal Law (Amendment) Act, 2013:** Introduced after the 2012 Delhi gang-rape case.
  - Defines new offenses (acid attacks, stalking, voyeurism) and prescribes stricter penalties, including the death penalty for certain rape cases.

- **Bharatiya Nyaya Sanhita (BNS), 2023**: Strengthens legal provisions related to crimes against women and children.
  - **Eg: Section 74** of BNS prescribes imprisonment of **one to five years** and a fine for assault or criminal force with the intent to **outrage the modesty of a woman**.
- **Protection of Children from Sexual Offences (POCSO) Act, 2012:** Protects minors from sexual abuse.
  - Provides stringent punishments and child-friendly reporting and trial procedures.

Measures to ensure safe Public Spaces

- **Sensitization programs:** Conduct **gender sensitization and awareness programs** for police personnel and society to change attitudes towards women's safety.
  - **Eg:** In **Raipur**, initiatives like **'Suno Raipur' and 'Walk A Cause'** connect women with police and encourage reporting through designated channels.
- **Deploying Women personnel:** Deploy more **women police officers** at key locations like bus stops, schools, and public transport. Increase **night-time patrolling** and ensure the presence of security personnel in public transport.
  - **Eg: Durga Vahini** in **Faridabad** – a dedicated police patrol unit to ensure women's safety in public spaces.
- **Surveillance:** Install and maintain **CCTV surveillance systems** in vulnerable public spaces.
  - **Eg:** Over **2,000 CCTV cameras** installed in **Meerut** to monitor and prevent harassment and chain-snatching.
- **Public Infrastructure:** Improve **street lighting** in isolated areas — use solar-powered lighting where possible. Building more women toilets with functional doors, lighting, ventilation and water availability.
  - **Eg: 60,000 streetlights** installed in **Ranchi** to improve visibility and enhance safety.
- **Victim Support:** Ensure effective implementation of **victim assistance centers** such as Women Helplines for timely intervention.
  - **Eg: Pink Gasht** WhatsApp helpline in **Raipur** for immediate assistance of Women.

Conclusion

In the words of **Swami Vivekananda**, 'All nations have attained greatness by paying proper respect to women. That nation which does not respect women has never become great'

By transforming the physical landscape and shifting cultural perspectives, India can pave the way for a future where women don't merely navigate public spaces but confidently assert their presence and participation in the same.

A life of dignity for Persons with Disabilities (PWDs)

Syllabus Mapping: GS2: Social Justice, Vulnerable sections of the society

Context

While addressing the **Global Disability Summit 2025**, the Deputy-Secretary General of UN noted that "providing opportunities to people with disabilities is a matter of dignity, of humanity, of human rights, adding that it is a test not only of our common values, but also plain common sense"

Introduction to PWDs

The **UN Convention on the Rights of Persons with Disabilities** defines persons with disabilities **(PWD)** as, 'persons who have long term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in the society on an equal basis with others'

Quotes

President Droupadi Murmu	"Providing a dignified life to persons with disabilities is the responsibility of the entire society"
PM Modi	"Disability does not mean inability"
CJI D.Y. Chandrachud	"Stereotyping differently-abled persons in visual media and films perpetuate discrimination"
Franklin D. Roosevelt	"We must take a position of 'positive action' for those who are disabled, not one of sympathy."

Note*: Quotes can be utilised in Introduction/Conclusions to provide quality enriched answers

Data on PWDs

Dimensions/ Report	Key Findings
2011 Census	About 26.7 million persons with disabilities (2.21%) constitute the Indian population.
Gender divide	14.9 million men and 11.9 million women
Rural-Urban divide	PWDs are more prevalent in rural areas with 18 million individuals
World Bank	Data suggests PWDs in India are between 40-80 million
Literacy rate	61% of PWDs aged 7 and above are literate as compared to 74% national literacy rate
Regional disparity	Highest population of PWDs reside in Nagaland, Sikkim and Arunachal Pradesh
Enrollment ratio	Children with disabilities (6-13 years) have a 61.9% enrollment ratio

Challenges faced by differently abled

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

Persons with Disabilities Act, 2016

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

Effectiveness of the Act

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

Inefficiencies of the Act

- **Exclusion error:** Scheme for PWD did not feature in the list of major schemes as released by the finance ministry. Hence it may not prioritise its implementation and allocation of resources.
  - **Eg: Accessible India Campaign (AIC)**

- **Implementation issues:** Implementation of provisions such as education, employment, health, and social security through a single scheme may not address the diverse needs of the population.
  - **Eg:** Scheme for Implementation of Persons with Disabilities Act **(SIPDA)**
- **Outdated data:** The government relies on **12-year-old data** for disabled people in the country. Any reliance on this data for determining financial allocation will be antithetical to the welfare mandate of the state.
- **Differential treatment**: Negative attitudes and stereotypes towards persons with disabilities can result in discrimination, exclusion, and marginalisation, which can limit their access to the benefits of the Act.

Measures to promote Social justice for differently abled

- **Insurance agencies: IRDAI in 2023** issued a circular **mandating all the insurers** to provide **annual health coverage to all PWDS, HIV-positive persons** and to those with **mental disabilities.**
- **Community participation:** Various **NGOs** work towards empowering PWDs through training, social connections, employment opportunities and providing entrepreneurial support to navigate through social barriers.
  - **Eg: Disabled people's association (DPA) and Enable India**
- **Private sector initiatives: Private companies like TATA consultancy services (TCS)** have implemented initiatives to hire and support employees with disabilities by providing an accessible work environment alongside equal opportunities.
  - **Eg: Microsoft's Autism Hiring Program** has boarded over 200 PwDs on the autism spectrum, **Lemon Tree Hotel chain** has over 380 employees with disability
- **Public awareness:** Rights and capabilities of PWD need to be brought to light to increase awareness and an inclusive approach towards a special cause.
  - **Eg: Accessible India campaign and Divyang Sarthi programme.**
- **Role of media:** Social stigma is countered by positive portrayals of PWD through entertainment to develop empathy and acceptance in public perception.
  - **Eg: Movies like 'Taare zameen par' and 'Margarita with a straw"**
- **Awareness:** Government and NGOs can conduct awareness campaigns to educate people about the needs and rights of persons with disabilities.
  - **Eg: CBM India**
- **Capacity building: Delhi police** has launched a program to train its personnel on how to interact with PWD.
- **Accessible public services:** Making public spaces, ramps and buildings accessible to PWD can also help sensitise people towards their needs.
  - **Eg: Mumbai Metro** has installed tactile paving, audio signals, and ramps for PWD.

Conclusion

In Indian culture, disability has never been considered as a hindrance in acquiring knowledge and achieving excellence. Just like **Rishi Ashtavakra,** who had eight physical deformities, and **blind poet Surdas** was one of the most influential figures of the **Bhakti Movement.** It displays how **'Insight is more important than sight'.**

TOPICS FOR PRELIMS

Pradhan Mantri Shram Yogi Maandhan Yojana

Syllabus Mapping: Schemes, Labour & Employment

Context

The budget allocation for the PM Shram Yogi Maandhan Yojana in 2025-26 has increased by 37% compared to the previous year.

About Pradhan Mantri Shram Yogi Maandhan Yojana (PM-SYM)

- It is a **voluntary and contributory pension scheme** launched by the **Government of India** in 2019 to provide **social security** to workers in the **unorganised sector**.
- It is a **Central Sector Scheme.**
- **Nodal Ministry:** Union Ministry of Labour & Employment.
- **Pension Fund Manager:** Life Insurance Corporation of India (LIC)
- **Current Status of implementation:**
  - **Coverage:** 36 States/UTs
  - **Enrollments:** ~46,12,330 (March 2025)
    - **Top 3 States:** Haryana, Uttar Pradesh, Maharashtra.

Key Features of PM-SYM

- **Pension Benefits:**
  - Minimum **assured pension of ₹3,000** per month after 60 years.

  - **Family pension: Spouse receives 50% of pension** in case of subscriber's death.
  - Family pension is applicable **only to spouse.**
- **Voluntary & Flexible Contribution:**
  - Workers contribute a **fixed monthly amount**, matched by the government.
  - The **monthly contribution varies based on the enrolment age**.
- **Eligibility Criteria:** To enroll in PM-SYM, individuals must meet the following criteria:
  - **Age Limit: 18 to 40 years**.
  - **Income Limit:** Monthly income ≤ ₹**15,000**.
  - **Employment in Unorganised Sector:** Includes street vendors, daily wage laborers, construction workers, beedi workers, domestic workers, fishermen, artisans, leather workers, etc.
- **Exclusion Criteria: He/She**
  - Should **not** be covered under **EPF, ESIC, or NPS**.
  - Should **not** be an **income taxpayer**.
  - Should **not** be receiving any other government pension benefits.

Livestock Health and Disease Control Programme

Syllabus Mapping: Schemes, Livestock

Context

The Union Cabinet approved the revision of the Livestock Health and Disease Control Programme with an outlay of ₹3,880 crore for 2024-26.

About Livestock Health and Disease Control Programme (LHDCP)

- LHDCP is a centrally sponsored scheme aimed at improving livestock health through vaccination, disease control, and veterinary infrastructure enhancement.
- **Diseases Covered:** Foot and Mouth Disease (FMD), Lumpy Skin Disease (LSD), Anthrax, Rabies, and other livestock diseases.

Key Components of the Programme

- **National Animal Disease Control Programme (NADCP):**
  - **Target Diseases:** Foot and Mouth Disease (FMD) & Brucellosis
  - **Goal:** 100% **vaccination coverage** for cattle, buffalo, sheep, goats, and pigs.
    - **Eradication of FMD and Brucellosis by 2030**.
- **Critical Animal Disease Control Programme (CADCP):** Targets Peste des Petits Ruminants (PPR) and Classical Swine Fever (CSF) through **100%** vaccination coverage.
- **Mobile Veterinary Units (MVUs):** Doorstep veterinary care through customized vehicles with diagnostic and treatment facilities.
- **Assistance to States for Control of Animal Diseases (ASCAD):** To target state-prioritized exotic, emergent, and zoonotic animal diseases, including Lumpy Skin Disease (LSD)
- **Pashu Aushadhi:** It is a new component added to the scheme for improving availability of generic veterinary medicine through the network of **PM-Kisan Samriddhi Kendra and Cooperative Societies.**

Pashu Dhan Initiative

Syllabus Mapping: Schemes, Livestock

Context

The Union government has launched the Pashu Aushadhi initiative, which aims to set up affordable generic veterinary medicine stores across the country.

About Pashu Aushadhi Initiative

- This initiative is part of the **revised Livestock Health and Disease Control Programme (LHDCP)**.
- **Concept Inspired by Janaushadhi Kendras:**
  - Modeled on **Pradhan Mantri Bharatiya Janaushadhi Kendras (PMBJK)**, which provide **quality generic medicines at affordable prices** to reduce healthcare costs for citizens.
  - Over **10,300 PMBJKs** are currently functional across India under the **Department of Pharmaceuticals, Ministry of Chemicals and Fertilisers**.
  - Just like **PMBJKs provide affordable generic medicines for humans**, **Pashu Aushadhi Kendras** will do the same for **livestock and other animals**.
- **Objectives:**
  - **Reduce farmers' financial burden** on veterinary healthcare.
  - **Improve livestock health & productivity** through affordable medicines.
  - Prevent and control major livestock diseases.
  - Promote traditional **ethnoveterinary treatments** alongside modern medicines.
- **Major Livestock Diseases Affecting Productivity:** Foot and Mouth Disease (FMD), Brucellosis, Peste des Petits Ruminants (PPR), Cerebrospinal Fluid (CSF), Lumpy Skin Disease.

Implementation & Functioning of Pashu Aushadhi Kendras

- **Who Will Run These Stores?**

  - Cooperative societies will manage the stores.
  - **Pradhan Mantri Kisan Samriddhi Kendras (PMKSK)** will also be involved in operating these stores.
- **Will Also Sell Traditional Ethnoveterinary Medicines:**
  - Apart from generic medicines, Pashu Aushadhi Kendras will also offer ethnoveterinary medicines based on traditional and indigenous knowledge.
- **Ethnoveterinary Medicines (EVM):**
  - EVM is a traditional system of animal health care that uses plants, spices, and other home remedies to treat animals.
  - It's based on indigenous knowledge and practices that are passed down through generations.
  - **E.g. - Traditional remedy for animal fever includes:** Coriander, garlic, bay leaves, pepper, cumin, turmeric powder, chirata, betel, tulsi, neem, sweet basil, jaggery, shallots/onions.

Parvatmala: National Ropeways Development Programme

Syllabus Mapping: Schemes, Infrastructure

Context

The Cabinet Committee on Economic Affairs (CCEA) has approved two major ropeway projects in Uttarakhand under the Parvatmala Pariyojana: **the Govindghat-Hemkund Sahib ropeway (12.4 km) and the Sonprayag-Kedarnath ropeway (12.9 km).**

About Parvatmala Programme

- It is a government initiative to develop **ropeway infrastructure in hilly and congested urban areas**.
- It was launched in the Union Budget 2022-23 by the Ministry of Road Transport and Highways (MoRTH).
- **Implementing Agency:** National Highway Logistics Management Limited (NHLML) under MoRTH.

- **Objective:**
  - Develop **ropeways as an alternative transport mode** in hilly regions and urban areas.
  - Improve **connectivity for tourism, pilgrimage, and remote areas**.
  - Reduce **travel time and environmental impact**.
  - Boost **local economies and job opportunities.**

Key Features of Parvatmala Programme

- **Public-Private Partnership (PPP) Model:**
  - The projects will be implemented through Public-Private Partnership with around **60% contribution support by the Government of India.**
- **Indigenous Component Requirement:**
  - **At least 50%** of the ropeway components must be **manufactured in India**, aligning with **'Make in India'**.
- **Environmental Sustainability:**
  - Ropeways have **minimal land and ecological impact** & **Lower emissions** compared to conventional road transport.
- **Coverage & Scope:**
  - Plan to **develop over 250 ropeway projects** covering **1,200 km in five years**.
  - Focus areas: **Himalayan states (Uttarakhand, Himachal Pradesh, J&K, Arunachal Pradesh, Sikkim, etc.)** and congested **urban centers**

PM-VIKAS Scheme

Syllabus Mapping: Schemes, Minorities

Context

The Union Government has recently launched the PM-VIKAS scheme for upliftment of minority communities.

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%**.

PM-YUVA 3.0: Prime Minister's Scheme for Mentoring Young Authors

Syllabus Mapping: Schemes, Infrastructure

Context

Recently The Ministry of Education, Department of Higher Education has launched PM-YUVA 3.0 (Prime Minister's Scheme for Mentoring Young Authors).

About PM-YUVA 3.0

- It is an **Author Mentorship Programme** aimed at training young and budding authors (below 30 years of age) to promote reading, writing, and book culture in India.
- A **total of 50 authors** will be selected through an **All India Contest** conducted on **MyGov.in**.
- **Implementing Agency:** National Book Trust (NBT).
  - NBT is a publishing house and autonomous organization under the Union Education Ministry that promotes reading and the production of books in India.
  - It was established in **1957.**
- **Objectives of PM-YUVA 3.0:**
  - **Promote Indian Heritage and Knowledge System** - Encourage young writers to explore India's **rich literary and cultural heritage**.
  - **Encourage Creative and Innovative Perspectives** - Young authors will write on themes that reflect India's **past, present, and future contributions**.
  - **Capacity Building and Nation Building -** With **66% of India's population being youth**, initiatives like PM-YUVA 3.0 can **develop future creative leaders**.

Themes of PM-YUVA 3.0

- **Contribution of Indian Diaspora in Nation Building:** Highlight the role of the Indian diaspora in India's development across political, economic, and socio-cultural spheres.
- **Indian Knowledge System -** Explore historical wisdom, traditional knowledge and their role in national development.
- **Makers of Modern India (1950-2025)** - Cover contributions of visionaries in fields such as education, science, economy, and social empowerment.

Swadesh Darshan Scheme

Syllabus Mapping: Schemes, Tourism

Context

The **Central Government** has sanctioned **116 new tourist destinations** across India under **SD 2.0 & CBDD scheme** in partnership with **State Governments**.

About Swadesh Darshan Scheme

- It was launched in **2015** by the **Ministry of Tourism**.
- The scheme is aimed at **integrated development** of theme-based **tourism circuits** across India.
- It provides **financial assistance** to **State Governments** and **UT Administrations** for developing tourism infrastructure.
- **Key Features:**
  - **Theme-Based Circuits:** Promotes tourism through specific themes.
  - **Infrastructure Development:** Funds road connectivity, signage, tourist facilities, and basic amenities.
  - **Government Support:** 100% funding by the Central Government.
  - **State Implementation:** Executed through State Governments and UTs.

Swadesh Darshan 2.0 (SD2.0)

- It was launched in 2022.
- Focus Shifted from circuit-based to destination-based approach.
- It encouraged public-private partnerships (PPP).
- **Key Focus Areas:** Tribal tourism, rural tourism, and heritage tourism.

Challenge-Based Destination Development (CBDD) (Sub-Scheme under SD2.0)

- It promotes holistic development of select destinations.
- Enhances visitor experience through better facilities and branding.

List of Tourism Circuits Under Swadesh Darshan

- **Buddhist Circuit** – Bihar, UP, MP, Gujarat
- **Ramayana Circuit** – Ayodhya, Chitrakoot, Rameswaram
- **Himalayan Circuit** – J&K, Himachal Pradesh, Uttarakhand
- **Coastal Circuit** – Maharashtra, Kerala, Goa, Tamil Nadu
- **Heritage Circuit** – Rajasthan, Madhya Pradesh, Assam

- **Wildlife Circuit** – Assam, Madhya Pradesh, Rajasthan
- **Tribal Circuit** – Chhattisgarh, Jharkhand, MP
- **Eco Circuit** – Kerala, Uttarakhand, Mizoram
- **North-East Circuit** – Arunachal Pradesh, Manipur, Nagaland
- **Spiritual Circuit** – Maharashtra, MP, Kerala

PM Internship Scheme

Syllabus Mapping: Schemes, Employment

Context

The Union finance Minister has launched PMIS Mobile application to enhance accessibility to **internship opportunities** for youth & Improve ease of registration and application process.

About PM Internship Scheme (PMIS)

- **Aim:** To provide internship opportunities to one crore youth in the top 500 companies.
- **Benefits:**
  - A monthly stipend of **₹4,500 will be provided** to the interns from the central government via DBT (Direct Benefit transfer)
  - Additional ₹500 offset will be provided by the **company's CSR fund.**
- **Internship Period:** 1 Year
- **Eligibility:**
  - Candidates aged between 21 and 24 years who are not engaged in full-time employment are eligible for the one-year internship programme.
  - Internships are available to those who have passed class 10 or higher.
- **Exceptions:**
  - Individuals from families with government jobs are excluded
  - A candidate who graduated from premier institutes such as IIT, IIM or IISER, and those who have CA, or CMA qualification would not be eligible to apply for this internship.
  - Anyone from a household that includes a person who earned an income of ₹8 lakh or more in 2023-24, will not be eligible.

What is CSR (Corporate Social Responsibility)?

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

Vigyan Dhara Scheme

Syllabus Mapping: Schemes, Science & Technology

Context

The **Government of India** has significantly increased the allocation for **Vigyan Dhara** scheme from **₹330.75 crore (2024-25) to ₹1425.00 crore (2025-26)**.

About Vigyan Dhara Scheme

- It is a **central sector** scheme unifying three umbrella schemes of the Department **of Science and Technology (DST).**
- **It has 3 major components:**
  - **Science and Technology (S&T) Institutional and Human Capacity Building**
    - Establishment of **advanced research laboratories** in academic institutions.
    - Faculty development and student research support.
    - Promotion of **international scientific collaborations**.
  - **Research and Development:**
    - **Encouragement of basic research** with access to **international mega facilities**.
    - Support for **translational research** in key areas like **sustainable energy and water**.
    - Strengthening India's **Full-Time Equivalent (FTE) researcher count** to enhance R&D output.
  - **Innovation, Technology Development and Deployment.**
    - **Support for startups and entrepreneurs** in science and technology.
    - Facilitation of **technology transfer and commercialization**.
    - Development of **indigenous technologies** to reduce reliance on imports.
    - Promotion of innovation **from schools to higher education and industries**.
- **Other Components:**
  - **Promoting Gender Parity in Science & Technology:**
    - Special programs to **increase women's participation in science and technology (S&T)**.
    - Ensuring **gender equality in Science, Technology, and Innovation (STI)** through targeted interventions.
- The **R&D component** of the scheme will be aligned in line with the **Anusandhan National Research Foundation (ANRF).**

Sagar Mala Scheme

Syllabus Mapping: Schemes, Infrastructure

Context

Recently the 4th NSAC meet was held to review and boost port-led development under the Sagarmala Programme.

About Sagarmala Scheme

- It is a **port-led** development initiative launched by the Government of India in **2015 under the Ministry of Ports, Shipping, and Waterways (MoPSW).**
- **Objective:** To **modernize ports, improve logistics efficiency and boost coastal economy** by leveraging India's long coastline (7,500 km), 14,500 km of navigable inland waterways and strategic location on global maritime trade routes.
- **National Sagarmala Apex Committee (NSAC):** It was **established in May 2015** to oversee **Port-Led Development** under Sagarmala.
- **Achievements of Sagarmala:**
  - Coastal shipping has grown by **118%** in the last decade.
  - Ro-Pax ferry services have transported over **40 lakh** passengers.
  - Nine Indian ports now rank among the **top 100 globally (Visakhapatnam among the top 20 container ports).**

5 Key Pillars of Sagarmala

- **Port Modernisation & New Port Development:** Increase cargo handling capacity, reduce turnaround time and improve global competitiveness of Indian ports.
  - **234 port modernisation projects worth ₹2.91 lakh crore** (103 completed, adding 230 MTPA capacity).
- **Port Connectivity Enhancement:** Improve last-mile connectivity of ports through road, rail and inland waterways.
  - **279 connectivity projects worth ₹2.06 lakh crore** (92 completed, adding 1,500 km of road/rail linkages).
- **Port-Led Industrialisation & Coastal Economic Zones (CEZs):** Establish industrial clusters near ports to boost manufacturing and exports.
  - **14 industrial projects worth ₹55,000 crore** (9 completed).
  - Development of Coastal Economic Zones (CEZs) in **Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh.**
- **Coastal Community Development:** Improve the livelihoods of coastal populations, especially fishermen and local businesses.
  - 310 projects worth ₹26,000 crore benefiting 30,000+ fishermen.
- **Inland Waterways Development:** Promote water-based transport to reduce congestion on roads and railways.
  - Revival of National Waterways **(Ganga, Brahmaputra, Godavari, etc.).**
  - Growth of inland waterway cargo by **700%** over a decade.

Sagarmala 2.0

- **Focus Areas:** Shipbuilding, repair, shipbreaking and recycling.
- **Investment:** ₹40,000 crore budgetary support to attract ₹12 lakh crore investments over the next decade.
- **Objectives:**
  - Bridge critical infrastructure gaps.
  - Enhance coastal economic growth.
  - Position India as a global maritime leader.

Sagarmala Startup Innovation Initiative (S2I2)

- **Objective:** Driving a new wave of **RISE (Research, Innovation, Startups, and Entrepreneurship)**.
- **Key Focus Areas:** Green shipping, Smart ports, Maritime logistics, Shipbuilding technology, Sustainable coastal development.
- **Support Provided**: Funding, mentorship and industry partnerships.

First women chairman of International Olympic Committee

Syllabus Mapping: Schemes, International Organisations

Context

For the first time in the IOC's 130-year history a woman has been elected to the post of IOC Chairman.

About International Olympic Committee (IOC)

- **IOC** is the **supreme authority of the Olympic Movement**.
- It is responsible for **organizing the Olympic Games** and promoting Olympism worldwide.
- It was founded in **1894** by **Pierre de Coubertin. (HQ - Lausanne, Switzerland)**

Structure of the IOC

- **President:**
  - The **IOC President** serves an **eight-year term**, renewable for **four more years**.
  - The **current President (2025)** is **Kirsty Coventry (Zimbabwe)**, the **first woman and African** to hold the post.
- **IOC Members:**
  - IOC has **100+ members**, including **royalty, heads of state, athletes, and business leaders**.
  - Members serve as **trustees of the Olympic Movement**, not as representatives of their countries.

  - **India's current IOC member**: **Nita Ambani (Reliance Foundation chairperson)**.
- **Executive Board:**
  - It oversees daily operations. It includes the **President, four Vice Presidents, and ten other members**.
- **Commissions & Committees:**
  - The IOC has various **commissions** that focus on issues like: Athlete welfare, Ethics & governance, Anti-doping policies etc.

- **Upcoming Olympics:** Paris 2024 (Summer), Milan-Cortina 2026 (Winter), Los Angeles 2028 (Summer), Brisbane 2032 (Summer).
- India is **bidding to host the 2036 Olympics**.

Badagas Tribe

Syllabus Mapping: Schemes, Tribes

- Badagas are an **indigenous** tribe of the **Nilgiri Hills** in **Tamil Nadu** and **Kerala**. They are the largest community in the Nilgiris.
- They were **once a warrior community** and later became settled agriculturists.

- **Religion**: Most Badagas follow **Hinduism**, worshipping deities like **Hethai Amman**, their principal goddess.
  - They practice **hypergamy**, a system in which women can marry into a caste that is higher than the one they were born into, and also marry into a lower caste.
- **Hethai Habba Festival**: The biggest festival of the Badagas, celebrated annually in honor of **Hethai Amman**.
- **Language and Culture:**
  - They speak **Badaga**, a **Dravidian language** with similarities to **Kannada**.
  - **Hatti (village) system**: Badagas traditionally live in **clan-based villages** known as **Hattis**.
  - **Dressing**: Men wear **white dhotis and turbans**, while women wear **white sarees**.

Jayshree Vencatesan wins Ramsar Award

Syllabus Mapping: Schemes, Awards

- **Jayshree Vencatesan**, co-founder of **Chennai-based Care Earth Trust**, has been honored with the **Ramsar Award for Wetland Wise Use**.
- She is the **first Indian to receive this prestigious honor**.
- She was recognized for her **outstanding contributions** to the conservation and sustainable management of wetlands, particularly in **Tamil Nadu**.
- **Conservation of Pallikaranai Marsh (Chennai's Last Remaining Wetland):**
  - Jayshree has worked for **decades** to document and protect **Pallikaranai Marsh**, one of India's **most significant urban wetlands**.

About Ramsar Awards

- The **Ramsar Wetland Conservation Awards** are globally recognized honors presented by the **Ramsar Convention on Wetlands** to individuals, organizations, and governments that have made outstanding contributions to wetland conservation and sustainable use.
- **Categories of the Award:**
  - **Wise Use of Wetlands** – Recognizing efforts to sustainably manage wetlands while maintaining their ecological character.
  - **Wetland Innovation** – Honoring innovative techniques, policies, or technologies in wetland conservation.
  - **Young Wetland Champions** – Acknowledging contributions from young individuals or youth groups in wetland conservation.

SCIENCE & TECHNOLOGY

TOPICS FOR MAINS

DeepSeek's market disruption must awaken India

Syllabus Mapping: GS 3, ICT

Context

DeepSeek, a Chinese company, has shaken up the global tech industry and stock markets with its low-cost artificial intelligence (AI) model.

About DeeSeek AI

- It was **founded by Liang Wenfeng in May 2023** and became widely popular in **early 2025** with the release of its **DeepSeek-R1 model**.
- **Features of DeepSeek AI:**
  - **Mixture-of-Experts (MoE) Architecture:** Unlike traditional AI models, MoE ensures that only a **small portion of the model's parameters are active at any time**.
    - This **reduces computing power requirements** while maintaining high efficiency.
    - It also enables **faster learning and improved performance** over time.
  - **Free to Use Without Limitations:**
    - Unlike ChatGPT's premium features, DeepSeek AI is **completely free** for regular users.
    - No restrictions on daily usage, making it accessible to everyone.
  - **Cost-Effective API Pricing:**
    - DeepSeek AI offers significantly **cheaper APIs compared to OpenAI's ChatGPT**, making it an attractive choice for developers.
  - **Real-Time Web Search Capability:** Users can search the web directly from DeepSeek AI to obtain real-time, updated information.

Impact of DeepSeek's Innovation on India's IT Dominance

- **Disruption of the Low-Cost IT Model:** India's IT sector has historically thrived on an abundant supply of skilled, cost-effective labor.
  - DeepSeek's AI-driven automation reduces the need for human intervention, threatening India's advantage in IT services.
- **AI Eliminating Skill and Language Barriers:** Generative AI models like DeepSeek's can perform tasks traditionally outsourced to India, such as customer support, coding, and data analysis.
  - This diminishes India's edge in English proficiency and IT services.
- **India's Lag in AI and R&D Investments:** DeepSeek's breakthrough reflects China's strong investment in AI and computational capabilities.
  - India's R&D expenditure remains below 1% of GDP, far behind China's 2.43%, impacting its ability to innovate.
- **Need to Move Beyond Labor-Led Growth:** Indian IT firms must shift from labor-intensive models to AI-powered solutions.
  - Failing to adapt could lead to reduced global demand for India's IT services.

Key Learnings from DeepSeek

- **Prioritizing R&D as a Strategic Investment:** DeepSeek's success highlights the need for continuous AI research and innovation, even if it's not a company's core business. Indian IT firms must invest in long-term technological advancements.
- **Utilizing Idle Capital for Innovation:** Companies should channel surplus resources into AI and emerging tech research instead of solely focusing on workforce optimization.
- **Encouraging Risk-Taking & Experimentation:** DeepSeek treated AI as a secondary initiative yet achieved breakthrough success. Indian firms must foster a culture where experimentation and failure are seen as steps toward innovation.
- **Building a Workforce that Works with AI, Not Against It:** Instead of resisting AI, India must train its workforce to enhance productivity through AI tools and automation.
- **Developing AI & Quantum Capabilities:** India must aggressively invest in AI and quantum computing to stay competitive in the next wave of technological advancements.

Is Artificial Intelligence Affecting Critical Thinking Skills?

Syllabus Mapping: GS 3, ICT

Context

- A 2023 study by TeamLease EdTech found that over 61% of educators in India are incorporating AI tools into their teaching methods.
- The growing reliance on AI has sparked concerns that students may start accepting AIgenerated content without critically analyzing the information.

Positive Impacts on Critical Thinking

- **Augments Analytical Abilities**: AI can assist in analyzing large amounts of data, helping students interpret complex patterns and make informed decisions.
- **Encourages Evaluation Skills**: Since AIgenerated content is not always accurate, students must critically assess its validity, improving their factchecking and reasoning skills.
- **Enhances ProblemSolving**: AI can provide multiple perspectives on a problem, encouraging students to compare, contrast, and refine their thinking.
- **Facilitates Creativity**: AI tools can generate diverse ideas, pushing students to think beyond conventional approaches.
- **Promotes Ethical Reasoning**: AI usage raises ethical questions, compelling students to engage in discussions about biases, misinformation, and responsible AI application.
- **Supports Personalized Learning**: AIdriven learning tools can adapt to individual needs, allowing students to focus on areas requiring deeper critical engagement.

Negative Impacts on Critical Thinking

- **Encourages Passive Learning**: Overreliance on AIgenerated answers may reduce independent thought and problem-solving efforts.
- **Weakens Deep Engagement**: AIgenerated summaries can discourage students from engaging with full texts, limiting nuanced understanding.
- **Reinforces Biases**: AI models may reflect inherent biases in their training data, leading students to accept biased perspectives uncritically.
- **Limits Original Thought**: If students rely on AI for writing or idea generation, their ability to think creatively and independently may diminish.
- **Reduces Cognitive Effort**: Easy access to AIgenerated solutions can discourage students from struggling through complex problems, weakening their cognitive resilience.
- **Challenges in Verification**: AI can sometimes generate false or misleading information, and if students lack strong verification skills, they may accept incorrect information without question.

Balancing AI Usage for Critical Thinking

- **Encourage Verification**: Students should be trained to factcheck AIgenerated content against credible sources.
- **Promote Ethical AI Use**: Institutions must integrate AI responsibly into curricula to ensure it supplements, rather than replaces, human cognition.
- **Reform Assessments**: Open ended, discussion-based assignments that require students to explain their reasoning can counteract AI overreliance.

Challenge of policing digital giants

Syllabus Mapping: GS 3, ICT

Context

The Competition Commission of India (CCI) issued a landmark order, imposing a fine of ₹213.14 crore on Meta and mandating several behavioral remedies.

More in News

- The CCI's order found that the privacy policy update introduced by WhatsApp, Meta's subsidiary, in 2021 was deemed an abuse of its dominant position in the "Over-The-Top (OTT) messaging services for smartphones" and "Online Display advertising" markets in India.
- In turn, Meta filed an appeal with the National Company Law Appellate Tribunal (NCLAT) challenging the CCI's order.
- On January 23, 2025, the NCLAT granted a stay on the five-year ban from sharing user data and the imposed penalty.

Past Regulatory Action Against Google in India

- **Fine on Google (2022):** CCI fined Google **₹1,337.76 crore** for abusing its dominant position in:
  - Licensable operating systems for smart mobile devices
  - App stores for Android devices
  - Non-OS-specific mobile web browsers
  - Online video hosting platforms
  - General web search services
- **Nature of Abuse:** Forced pre-installation of Google apps on Android devices.
- **NCLAT Ruling:** The penalty was upheld by NCLAT in **2023**.

Role of Data in Market Dominance

- **Data as a Strategic Asset:** In the 21st-century digital economy, **data is the new oil** but with virtually limitless utility.
  - Unlike oil, data can be **collected, analyzed, and reused indefinitely**.
- **Competitive Advantage:** Data provides insights into consumer behavior, enabling platforms to:
  - Refine algorithms
  - Offer hyper-targeted advertising
  - Create personalized user experiences
- **Data-Driven Network Effects:** More users generate more data → Data improves service quality → Attracts more users → Competitive barriers for rivals.
  - Reinforces platform dominance, making it harder for smaller competitors to enter the market.
- **Lock-in Effect:** Once platforms accumulate enough data, switching costs increase for users.
  - **Example**: Meta's data-sharing across platforms (WhatsApp, Facebook, Instagram) strengthens ecosystem dependence.
- **Market Entrenchment:** Data enables predictive modeling and product improvements, creating a self-reinforcing loop of market dominance.

Global Actions Against Tech Giants

Country/Region	Tech Giant	Violation/Issue	Action Taken	Outcome
United States	Meta	Antitrust violations over acquisitions of Instagram and WhatsApp	Litigation under antitrust laws	Case ongoing
	Google	Violation of Sherman Act (2024) due to exclusive agreements in search and advertising markets	US District Court found Google guilty	Awaiting final penalties
Europe	Meta (Facebook-Germany Case)	Combining user data from various platforms without user consent	Found guilty under EU competition law and GDPR	Forced to revise data-sharing practices
	Google	Anti-competitive practices in mobile operating systems, app markets, and advertising	Fined over €8 billion in three cases	Fines upheld
	Meta	Ad-supported subscription service under scrutiny for potential anti-competitive practices	Investigation ongoing	Awaiting outcome
Australia	Meta and Google	Market dominance in digital platforms and online advertising	Introduced regulations to curb dominance	Strengthened consumer protections

Country/Region	Tech Giant	Violation/Issue	Action Taken	Outcome
Historical Cases (U.S.)	AT&T	Monopoly in telecommunications market	Ordered to divest 22 operating companies	Broke up AT&T's monopoly
	Microsoft	Anti-competitive practices in the software market	Court-ordered oversight	Ensured API access for third-party developers and flexibility for PC manufacturers

Challenges in India

- **Competition Act, 2002:** Lacks explicit provisions to address **data-centric monopolies**.
  - The current framework focuses on **price-based dominance**.
- **Digital Personal Data Protection Act, 2023:** Regulates data collection, consent, and usage but it lacks coordination between CCI and the Data Protection Board of India.

Suggestions for Improvement

- Suggested Amendments to Competition Act:
  - Include **"data monopolization"** as a criterion for market dominance.
  - Redefine concepts like **"market power"** and **"dominant position"** to reflect data-driven dynamics.
  - Mandate interoperability and data-sharing agreements.
  - Introduce separation of integrated services.
- Align competition law with data protection laws, similar to the EU's **DMA** (Digital Markets Act) and **General Data Protection Regulation (GDPR)**.

Broader Economic and Regulatory Implications

- **Economic Survey 2024-25:** Highlighted India's rapid digital transformation.
  - Emphasized the role of **AI** in shaping India's economy.
- **Need for Future-Ready Regulatory Framework:** Regulatory frameworks must adapt to address:
  - Evolving market dynamics.
  - Data-driven dominance.
  - Emerging challenges from AI and big tech.

AI, UBI, in between

Syllabus Mapping: GS 3, ICT

Context

Bill Gates' overall vision is that **AI could generate enough wealth and efficiency** to make UBI feasible, but realizing this vision will require **effective policy, taxation, and wealth redistribution** strategies.

What is Universal Basic Income (UBI)

- UBI refers to a regular, unconditional payment made by the government (or another entity) to all citizens, regardless of employment status or income level.
- **Core Principles:**
  - **Unconditional:** No requirements related to work or income level.
  - **Universal:** Provided to all citizens, not just specific groups.
  - **Periodic:** Paid at regular intervals (monthly, annually).
  - **Cash-based:** Given in cash rather than goods or services.

Positive Impacts of AI On UBI

- **Increased Wealth Generation:** AI-driven automation and productivity could create significant economic value, which can be redistributed through UBI.

  - Higher efficiency in sectors like manufacturing, finance, and healthcare can boost overall GDP, creating more resources for UBI funding.
- **Reduced Cost of Living:** AI could lower the cost of essential services (like healthcare, education, and legal assistance) through automation and personalized AI solutions.
  - Lower living costs would reduce the amount of UBI required to meet basic needs.
- **Funding Through AI Taxation:** AI-driven companies generating super-profits can be taxed to create a sustainable funding source for UBI.
  - Taxing AI-based automation and intellectual property could provide a steady revenue stream for UBI.
- **Creation of New Economic Models:** AI could enable sovereign AI models, where governments own and lease AI systems to businesses, generating income for UBI.
  - AI-based productivity tools could be publicly owned, allowing citizens to earn dividends from AI-driven profits.
- **More Time for Creative and Intellectual Pursuits:** By reducing the need for traditional work, AI could allow people to focus on art, research, social work, and personal growth.
  - A post-labour economy could give rise to new cultural and intellectual movements.
- **Democratisation of Intelligence:** AI can make high-quality education, healthcare, and legal support widely accessible at little to no cost.
  - Greater access to AI-driven services could reduce social inequality and improve overall quality of life.

Negative Impacts of AI and UBI

- **Concentration of Wealth and Power:** AI development and ownership are currently dominated by a few large tech companies.
  - If AI-generated wealth remains concentrated, inequality could worsen rather than improve.
- **Displacement of White-Collar Jobs:** AI is likely to automate complex cognitive jobs (e.g., legal, financial, and educational sectors) before physical labour.
  - This could lead to structural unemployment and social instability.
- **Dependence on Government and Corporations:** If AI wealth is redistributed through UBI, people could become overly dependent on state or corporate policies.
  - Political instability or corporate failures could jeopardize livelihoods.
- **Loss of Purpose and Identity:** Work provides structure, identity, and social validation.
  - If AI eliminates the need for work, many individuals might struggle with a lack of meaning and purpose.
- **Ethical and Regulatory Challenges:** Determining how to tax AI-generated wealth and redistribute it fairly could be politically contentious.
  - Regulatory frameworks for AI ownership and UBI distribution may be complex and difficult to implement.
- **Risk of Global Inequality:** While AI tools are becoming more accessible, foundational AI research and infrastructure remain concentrated in the West and China.
  - Developing nations may face challenges in competing on an equal footing in the AI-driven economy.

Way Forward

- **Policy and Regulation**
  - Develop legal frameworks for taxing AI-generated wealth.
  - Ensure fair access to AI-driven services for all citizens.
- **Experimentation and Pilots**
  - Conduct pilot programs on UBI (like Finland's 2017-18 experiment).
  - Test different models of funding and distribution.
- **Investment in Public AI Infrastructure**
  - Develop sovereign AI models as public assets.
  - Encourage open-source AI development for wider access.
- **Social and Psychological Preparation**
  - Promote alternative structures of purpose (art, caregiving, volunteering).

  - Strengthen community and social engagement to replace work-based identity.
- **Equitable AI Governance**
  - Prevent monopolization of AI infrastructure and benefits.
  - Encourage global cooperation on AI ethics and wealth distribution.
- **AI-Driven Skill Transition**
  - Encourage lifelong learning and adaptation to AI tools.
  - Create programs for reskilling and upskilling in AI-based industries.

India's Scientific Publication

Syllabus Mapping: GS 3, Achievements of Indians in science & technology.

Context

On National Science Day, the Union Minister for Science and Technology said that "India will overtake the U.S. in the number of scientific publications by 2029".

Challenges in India Overtaking Scientific Research Publications

- **Low Investment in Research and Development (R&D):** India spends only **0.67% of its GDP** on R&D, which is significantly lower than other leading countries:
  - Israel – 6.30%, South Korea – 4.9%, U.S. – 3.46%, China – 2.4%, etc.
  - Lack of funding limits the availability of resources, infrastructure, and incentives for researchers.
- **Poor Quality of Research Output:** India's CNCI (Category Normalised Citation Impact) value is **0.879** compared to 1.12 for China and 1.25 for the U.S.
- **Low representation in top-tier journals:** Indian researchers publish more in low-impact journals rather than high-impact international journals.
  - Lack of high-quality, innovative research reduces the global impact of Indian publications.
- **Weak Research Ecosystem:** Inadequate collaboration between academia, industry, and government institutions.
  - Lack of competitive research culture and minimal industry funding for applied research.
  - Overemphasis on quantity over quality to meet publication mandates.
- **Limited International Collaboration:** Fewer joint research projects with global institutions compared to China and the U.S.
  - Limited opportunities for Indian researchers to access global funding and infrastructure.
- **Ethical Issues and Fraudulent Practices:** High incidence of plagiarism, paid publications, and publications in predatory journals.
  - The Omics case (Hyderabad-based group fined $50 million) exposed the scale of fraudulent research practices.
  - Clientelism and political interference weaken research integrity and accountability.

What Needs to Be Done

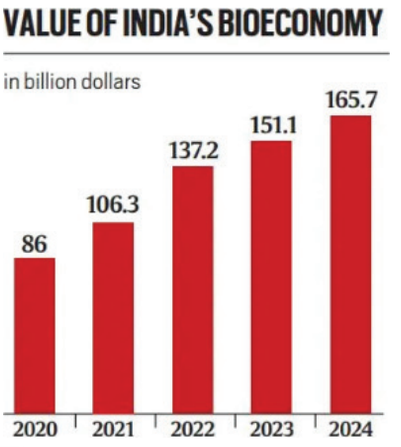
- **Increase R&D Investment:** Raise R&D spending to at least **2% of GDP** to match global standards.
  - Encourage private sector participation and industry-academia partnerships in research funding.
- **Focus on Quality Over Quantity:** Establish strict peer-review and publication standards to improve the quality of research output.
  - Incentivize researchers for publishing in high-impact journals rather than focusing on the number of publications.
- **Strengthen Research Ecosystem:** Develop research infrastructure and world-class laboratories in universities and institutions.
  - Promote a culture of research excellence through competitive grants and fellowships.
  - Encourage cross-disciplinary research and international collaborations.
- **International Collaboration and Exchange:** Sign more bilateral agreements for joint research with leading research nations.
  - Facilitate researcher exchange programs and access to global research platforms.
- **Address Ethical and Systemic Issues:** Establish a national-level regulatory body to monitor research integrity.
  - Penalize predatory journals and fraudulent practices through strict enforcement.
  - Encourage ethical research practices through training and awareness programs.

Status of India's bioeconomy

Syllabus Mapping: GS 3, biology & biotechnology

Context

The **India BioEconomy Report**, released by the **Department of Biotechnology**, highlights the status of India's bioeconomy.

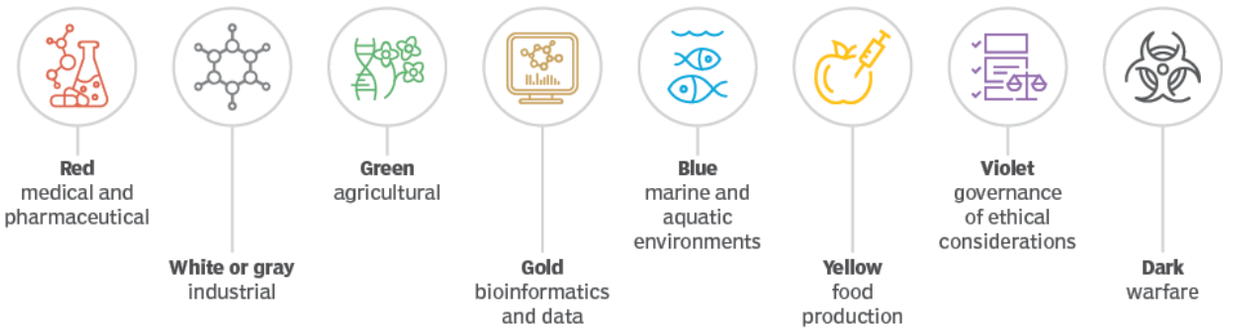


Status of India's Biotechnology Sector

- **Current Value and Growth:** India's bioeconomy was valued at $165 billion in 2024, contributing **4.2% to the GDP.**
  - The sector has nearly **doubled** from $86 billion in 2020**.**
  - It is projected to **grow to $300 billion by 2030 and reach $1 trillion by 2047.**
- **Major Contributors**
  - **Industrial Sector**: Accounts for nearly half of the bioeconomy's value ($78 billion) through biofuels, bioplastics, and bio-based chemicals.
  - **Pharmaceutical Sector:** Contributes 35%, mainly from vaccine production.
  - **Research and IT:** Fastest-growing segment in 2024, including biotech software development, clinical trials, and bioinformatics.

What is Bioeconomy?

- It refers to the economic activity derived from the use of **biological resources** (such as plants, animals, and microorganisms) and **biological processes** to produce goods and services.
- It involves the sustainable use of bioresources for industrial, agricultural, and healthcare applications, contributing to economic growth while reducing environmental impact.
- **Key Features:**
  - Utilizes renewable biological resources.
  - Focuses on sustainable and eco-friendly production processes.
  - Encourages circular economy principles by minimizing waste and maximizing resource efficiency.
  - Drives innovation in areas like biofuels, bioplastics, and biopharmaceuticals.
- **Components:**
  - **Industrial Bioeconomy:** Involves the use of biological processes and bioresources for manufacturing and industrial applications.
    - **Examples**: Biofuels, bioplastics, biodegradable chemicals, and industrial enzymes.
  - **Agricultural Bioeconomy:** Focuses on enhancing agricultural productivity and sustainability using biotechnology and natural processes.
    - **Examples**: Genetically modified (GM) crops, bio-fertilizers, and bio-pesticides.
  - **Healthcare and Pharmaceutical Bioeconomy:** Utilizes biological resources for drug development, medical treatments, and healthcare innovations.
    - **Examples**: Vaccines, biomedicines, gene therapy, and diagnostics.
  - **Marine and Aquatic Bioeconomy:** Involves the use of marine and aquatic organisms for developing bio-based products.
    - **Examples**: Marine-derived pharmaceuticals, biofuels from algae, and marine enzymes.
  - **Environmental Bioeconomy:** Focuses on improving environmental sustainability using biological solutions.
    - **Examples**: Bioremediation (using microbes to clean pollution), waste-to-energy conversion, and carbon capture.
  - **Research and Bioinformatics:** Supports bioeconomy through research in biotechnology, synthetic biology, and data-driven biological solutions.
    - **Examples**: Genetic engineering, synthetic biology, and clinical trials using bioinformatics.



Reasons for the Growth of Bioeconomy

- **Rising Demand for Sustainable Solutions:** Growing concerns over **climate change**, **environmental degradation**, and **resource depletion** have increased the need for eco-friendly alternatives.
  - Bio-based products like **bioplastics** and **biofuels** offer sustainable replacements for fossil-based products.
- **Technological Advancements in Biotechnology:** Rapid progress in fields like **genetic engineering**, **synthetic biology**, and **bioinformatics** has expanded the scope of bio-based solutions.
  - Innovations in **CRISPR gene editing** and **microbial fermentation** have improved the efficiency of bio-manufacturing.
- **Increased Investment and Government Support:** Governments are promoting bioeconomy through **policies** and **financial incentives**.
  - India's **BioE3 policy** (2024) aims to establish India as a global bio-manufacturing hub.
  - **Biotechnology Industry Research Assistance Council (BIRAC)** provides funding and infrastructure support.
- **Expansion of Bio-based Industries:** Growth in industries like **biofuels**, **bioplastics**, and **biopharmaceuticals** has boosted bioeconomy value.
  - Example: India's ethanol production for biofuel has increased due to the **Ethanol Blending Programme**.
  - Increased production of **vaccines** and **biomedicines** has also driven growth.
- **Cost-effectiveness and Local Availability of Bioresources:** Bioresources such as **plants** and **microorganisms** are **renewable**, **relatively cheap**, and **locally available**.
  - Bio-based production processes are often more **energy-efficient** and **less polluting** than conventional methods.
- **Global Shift Toward a Circular Economy:** Focus on reducing waste and reusing resources has aligned with the principles of bioeconomy.
  - Bio-based industries contribute to circular economy goals by converting waste into valuable products (e.g., **waste-to-energy** projects).

Challenges Facing India's Bioeconomy

- **Regulatory Uncertainty:** Lack of a clear and consistent regulatory framework for biotechnology innovations.
  - Continued **reluctance to approve genetically modified (GM) crops** limits agricultural productivity.
  - Complex approval processes and delays hinder the commercialization of biotech products.
- **Regional Imbalance:** Bioeconomy growth is concentrated in a few states like **Maharashtra**, **Karnataka**, **Telangana**, **Gujarat**, and **Andhra Pradesh** — contributing **over two-thirds of the sector's value**.
  - **Eastern and Northeastern India** generate **less than 6%** of the total bioeconomy value.

TOP CONTRIBUTING STATES (IN 2024)

State	Value*	Share of total value
Maharashtra	35.45	21.4%
Karnataka	32.4	19.5%
Telangana	19.9	12%
Gujarat	12.9	7.8%
Andhra Pradesh	11.1	6.7%
Tamil Nadu	9.9	6%
Uttar Pradesh	7.7	4.6%

*in billion $. Source: India BioEconomy Report

- **Limited R&D Investment**: Inadequate funding for biotech research and innovation compared to global leaders like the US, China, and the EU.
- **Shortage of Skilled Workforce**: Lack of trained professionals in bioinformatics, synthetic biology, and biomanufacturing.

Way Forward for India's Bioeconomy Growth

1. **Policy Strengthening**
   - Establish a **National BioEconomy Mission** to drive sectoral growth and innovation.
   - Develop a **single-window clearance system** for faster biotech product approvals.
2. **Infrastructure Development**
   - Enhance **biotech parks, incubation centers, and research hubs** to support startups and industries.
   - Strengthen **bio-manufacturing and supply chains** to boost production and exports.
3. **Research & Development (R&D) Promotion**
   - Increase **public-private partnerships (PPP)** to fund cutting-edge research.
   - Invest in **synthetic biology, precision medicine, and agri-biotechnology** for long-term gains.
4. **Bridging Regional Imbalance**
   - Encourage **biotech clusters in emerging regions** to reduce concentration in a few states.
   - Provide **subsidies and incentives** for biotech startups in tier-2 and tier-3 cities.
5. **Regulatory & Ethical Frameworks**
   - Ensure **robust biosafety regulations** to balance innovation with environmental safety.
   - Promote **ethical biotech practices** in genetic engineering and synthetic biology.
6. **Skilling & Workforce Development**
   - Expand **biotech education and vocational training** to build a skilled workforce.
   - Facilitate **industry-academia collaboration** for hands-on learning and innovation.

By implementing these measures, India can **sustain rapid bioeconomy growth**, enhance **global competitiveness**, and achieve **technological self-reliance** in biotechnology.

Space Debris

Syllabus Mapping: GS 3, biology & biotechnology

Context

A 500-kg metal object, believed to be space debris, crashed in Kenya, sparking concerns about accountability and legal gaps in space governance.

What is Space Debris?

Space debris refers to **defunct, non-functional objects** in Earth's orbit, including:

- Fragments of **retired satellites**
- **Spent rocket stages**
- **Collision remnants** from past space missions

Examples of Space Debris Events

- **SpaceX Starship Explosion (2024):** The massive **Starship spacecraft exploded** after launch, adding to orbital debris.
- **NASA-Linked Space Debris (2024):** A **0.7 kg cylindrical object** from the **International Space Station (ISS)** crashed into a home in Naples, Florida.
- **PSLV-C19 Stage Burn-up:** The **4th stage of PSLV-C19** (launched RISAT-1 in 2012) **burnt up over the Atlantic Ocean**.

Reasons for Increasing Space Debris

1. **Rising satellite launches** – More satellites are being launched for communication, navigation, and Earth observation.
2. **Lack of deorbiting mechanisms** – Many old satellites and rocket parts remain in orbit after their mission ends.
3. **Fragmentation from collisions** – Satellite collisions create thousands of tiny, high-speed debris pieces.

4. **Anti-satellite (ASAT) tests** – Some countries conduct ASAT missile tests, generating large debris clouds.
5. **Uncontrolled reentries** – Dead satellites and rocket stages often fall unpredictably to Earth.

Challenges Posed by Space Debris

1. **Risk of satellite collisions**, damaging operational spacecraft.
2. **Threat to human space missions**, including ISS astronauts.
3. **Kessler Syndrome**, where increasing debris causes more collisions.
4. **High-speed impact damage**, as debris travels at ~28,000 km/h.
5. **Limited deorbiting technology**, making cleanup difficult.
6. **Weak enforcement of international laws**, leading to poor compliance.

International Space Debris Regulations

- **Outer Space Treaty (1967):** Holds **states accountable** for space activities.
- **Liability Convention (1972):** Imposes **absolute liability** for space debris damage on Earth.
- **Space Debris Mitigation Guidelines (UN COPUOS):** Encourage **safe satellite disposal** (non-binding).

25-Year Rule (UN & IADC): Recommends **deorbiting satellites** within **25 years** (global compliance ~30%).

- **National Laws (U.S., EU, China):** Mandate **tracking, disposal, and deorbiting**, but enforcement remains weak.

India's Efforts in Space Debris Management

- **Debris-Free Space Missions (DFSM):** Targets **zero space debris** in Indian space missions by **2030**.
- **ISRO's Space Situational Awareness & Object Management (IS4OM):** Detects and tracks **orbital debris**.
- **Project Netra (2020):** An **early warning system** for **space debris monitoring**.
- **Manastu Space:** An Indian start-up working on **deorbiting, satellite lifespan extension, and in-orbit refueling**.
- **Collision Avoidance Maneuvers (2022):** ISRO conducted **21 maneuvers** to prevent satellite collisions.
- **Space Situational Awareness (SSA) Control Centre (2020):** Monitors and ensures **safe operations of Indian space assets**.

Way Forward

- **Active Debris Removal (ADR):** Using robotic arms, nets, or lasers to remove debris from orbit.
- **Deorbiting Mechanisms:** Designing satellites with **self-deorbiting technology** for safe disposal.
- **Space Traffic Management (STM):** Creating international regulations to **prevent collisions** and monitor debris.
- **Ban on ASAT Tests:** Countries should agree to **halt destructive anti-satellite weapon tests**.
- **Reusable Rocket Technology:** Encouraging **reusable rockets**, like SpaceX's Falcon 9, to reduce space waste.
- **Public-Private Collaboration:** Governments and private space firms must **work together** to ensure sustainable space activities.

Active Debris Removal (ADR) Technologies

- **European Space Agency (ESA) – ClearSpace-1 Mission (2026)**
  - World's first space debris removal mission.
  - Aims to capture and deorbit a defunct Vespa payload adapter (~100 kg) using robotic arms.
- **NASA's OSAM-1 (On-Orbit Servicing, Assembly, and Manufacturing):**
  - Working on robotic servicing of satellites to extend their lifespan and reduce debris.
- **Japan's Astroscale – ELSA-d Mission:**
  - To test magnetic docking technology to capture and remove defunct satellites.
  - It aims to develop commercial debris removal services.
- **China's Space Debris Removal Projects:**
  - Conducted tests with the Shijian-21 satellite, which successfully towed a defunct satellite to a graveyard orbit.

Space debris management remains **a critical global challenge**, requiring **collaborative efforts** to ensure **sustainable space exploration**.

TOPICS FOR PRELIMS

High Selenium Levels Causing Hair Loss

Syllabus Mapping: Chemistry

Context

Between December 2024 and January 2025, over 300 cases of sudden hair loss were reported in 18 villages in Shegaon taluka, Buldhana district, Maharashtra.

Investigations and Key Findings

- A team from **ICMR (Indian Council of Medical Research) and AIIMS Delhi** tested blood, hair, wheat, water, and soil samples.
- **Findings:**
  - Selenium in affected individuals' blood was **31 times higher than normal**.
  - Selenium levels in wheat samples from PDS shops were **2-8 times higher than safe limits**.
  - **Water samples were normal**, ruling out water as the cause.
  - **People who did not eat PDS wheat were not affected**, proving wheat as the source.

About Selenium

- Selenium is a **trace mineral** needed in small amounts for good health.
- It is found in foods like **wheat, eggs, fish, meat, and nuts**.
- It helps with **thyroid function, immune system, and antioxidant defense**.
- **Effects of Too Much Selenium:** Consuming **excess selenium** causes **selenosis**, leading to:
  - Hair loss
  - Brittle nails
  - Skin rashes
  - Digestive issues
  - In severe cases, nerve damage or kidney problems

Bose Metals & Superconductivity

Syllabus Mapping: Physics, Material Science

Context

Recently scientists found strong evidence that **Niobium Diselenide ($NbSe_2$)** behaves like a **Bose metal** under certain conditions.

What are Bose Metals ?

- It is a special type of metal that behaves **almost like a superconductor** but doesn't fully transition into one.
- **Key Features:**
  - **Cooper Pairs Exist**: Like in superconductors, electrons form **Cooper pairs** at very low temperatures.
  - **No Zero Resistance**: Unlike superconductors, these pairs **don't fully organize**, so the material still has **some resistance** instead of zero.
  - **Better Than Normal Metals**: Bose metals conduct electricity **better** than regular metals but **worse** than superconductors.

What is Superconductivity?

- **Superconductivity** is when a metal conducts electricity with **zero resistance** at very low temperatures.
- **E.g. Zinc at -272.3°C** becomes a **superconductor** with **infinite conductivity** (no energy loss).
- This happens because electrons in the metal form **Cooper pairs**, which move without resistance.

Proton Exchange Membrane Fuel Cells

Syllabus Mapping: Energy Technology

Context

A **hydrogen fuel cell-based backup power solution** has been developed for Uninterrupted Power Supply to Telecom Towers.

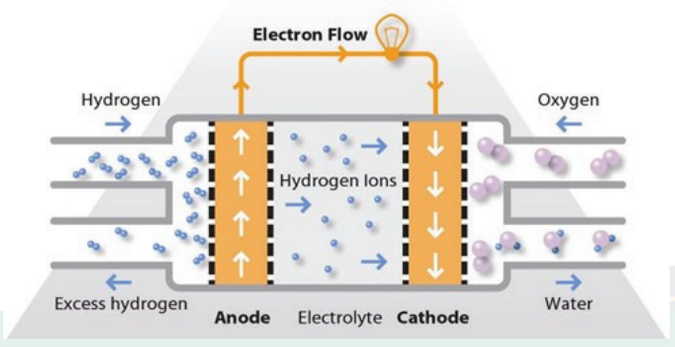
Need for Hydrogen Fuel Cells in Telecom Towers

- **India has over 1 million telecom towers**, with **tens of thousands in remote areas** where grid access is limited.
- Traditional **diesel generators** are commonly used as backup power sources but have several drawbacks:
  - High operational costs
  - Significant carbon emissions
  - Maintenance issues
- **Solution: Proton Exchange Membrane Fuel Cells (PEMFCs)** offer a **cleaner, cost-effective, and reliable** alternative.

About Proton Exchange Membrane Fuel Cells (PEMFCs)

- PEM Fuel Cells generate electricity using hydrogen, producing only water vapor as a by-product.
- It follows a **plug-and-play model**, making deployment easy and effective.
- **Working Principle:**
  - **Hydrogen gas (H_2)** is fed into the anode and oxidized, releasing **protons**.
  - Protons pass through a **polymer membrane** to reach the cathode.

  - At the **cathode**, they react with **oxygen (O_2)** from the air to generate **electricity and water (H_2O)**.
- **Key Advantages:**
  - **Zero emissions** (water is the only by-product).
  - **High power density** in a compact design.
  - **Fast start-up times** and **low operating temperatures**.
  - Low maintenance compared to diesel generators.



AI Initiatives launched by MeitY

Syllabus Mapping: ICT

Context

On the anniversary of the **IndiaAI Mission**, the **Ministry of Electronics and Information Technology (MeitY)** launched several key AI initiatives.

About AI Kosha

- AI Kosha is designed as a **data-sharing platform** to provide datasets for AI model development.
- It mainly contains **non-personal data** for use by **start-ups, academia, and researchers** to develop AI tools.
- Aims to enhance India's capabilities in **language translation tools** and other AI-driven applications.
- It serves as a central repository, offering over 300 datasets, 80+ models, and diverse AI use cases.
- It also features an **AI sandbox** with an integrated development environment, tools, and tutorials.

IndiaAI Compute Portal

- It is a centralized platform to provide affordable AI compute, network, storage, platform, and cloud services to startups, academia, and enterprises.
- Initially offering access to 10,000 GPUs, with 8,693 more GPUs to be added in subsequent phases.

AI Competency Framework for Public Sector Officials

- It is a structured framework to **upskill** government officials in AI.
- **Aim:** To **equip policymakers** with AI-related knowledge to make informed decisions.

iGOT-AI: AI-Powered Personalized Learning for Government Officials

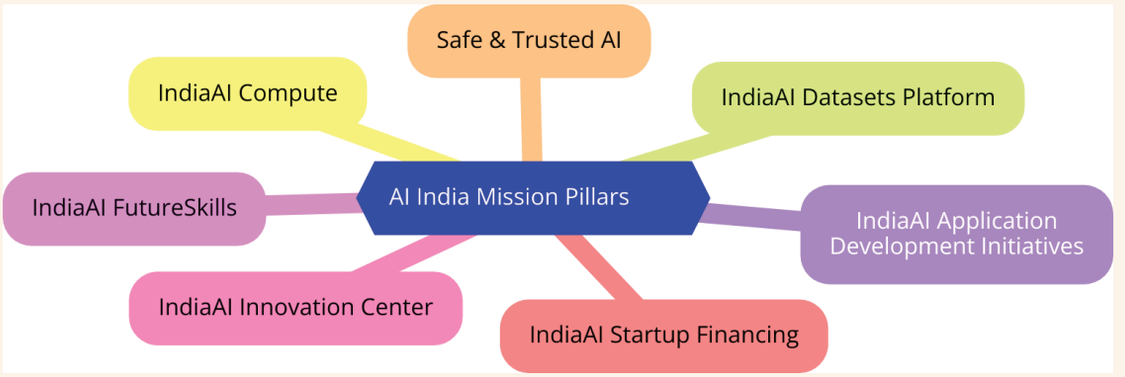
- It is an **AI-driven content recommendation system** integrated with the **iGOT Karmayogi platform**.
- It will enhance the **learning experience of public officials** by offering personalized AI training modules.

IndiaAI Startups Global Acceleration Program

- It is a **collaborative program with STATION F (France) and HEC Paris**.
- **10 Indian AI startups** will participate in a **four-month acceleration program**:
  - **1 month online**, followed by **3 months onsite** at STATION F, the world's largest startup campus in Paris.
- **Benefits:** mentorship, networking, and global market expansion in Europe.

India AI Mission

- It is a government initiative **(launched in March,2024)** to promote Artificial Intelligence (AI) innovation in India.
- **Focus areas:** Healthcare, education, agriculture, smart cities and infrastructure.
- **Seven Pillars of India-AI Mission:**



Secure Ink to Combat Counterfeiting

Syllabus Mapping: Chemistry

Context

Scientists from **INST Mohali and BARC Mumbai** have developed a **new fluorescent ink** using **strontium bismuth fluoride (Sr_2BiF_7) nanoparticles**.

About the New Ink

- Most security inks glow (fluoresce) under **either ultraviolet (UV) light or infrared (IR) light**, but **not both**.
- This new ink **glows under both UV and IR light**, making it much harder for counterfeiters to copy.
- **What is it Made Of?**
  - The ink contains tiny **nanoparticles** (super small particles, less than 100 nanometers in size).
  - These particles are made of **strontium bismuth fluoride (Sr_2BiF_7)** and **special elements (erbium & ytterbium)** that help them glow.
- **How Does It Glow -** When **different types of light** shine on the ink, it glows in different colors:
  - **365 nm UV light → Blue**
  - **395 nm UV light → Magenta**
  - **980 nm Infrared light → Orange-red**
  - This unique multi-color glow makes it much harder for counterfeiters to fake.
- **Where Can It Be Used?**
  - Can be printed on **currency notes, cheques, passports, and branded products** to prevent fakes.
  - Works even in **different temperatures, humidity, and lighting conditions**.

Importance of Security Printing

- **Security printing** prevents counterfeiting in banknotes, cheques, passports, branded consumer goods, and pharmaceuticals.
- Features used in security printing:
  - **Visible to humans**: Optically variable ink, watermarks, holograms, security threads, raised shapes, shifting textures.
  - **Machine-readable**: RFID chips (used in passports), invisible barcodes, digital watermarks, holograms.

Smart Proteins

Syllabus Mapping: Biology & Biotechnology

Context

The **Department of Biotechnology (DBT)** is funding research under the **BioE3 initiative** to develop **smart proteins.**

About Smart Proteins

- Smart proteins are **alternative protein sources** developed using **scientific and technological innovations** to **mimic the taste, texture and nutritional value** of traditional protein sources like meat, dairy, and eggs.
- These proteins are designed to be **sustainable, resource-efficient and climate-friendly** while addressing **protein deficiency** and **food security** concerns.

Types of Smart Proteins

- **Fermentation-Derived Proteins:**
  - Proteins obtained from **microbes** such as **algae, bacteria and fungi**.
  - These microbes generate proteins naturally, which can be **processed into food ingredients**.
- **Plant-Based Proteins:**
  - Proteins extracted from **plants** that can be modified to resemble **meat, dairy, or eggs**. **E.g.** Soy protein, Pea protein, Rice protein etc.
- **Cell-Cultured Proteins:**
  - Animal cells are grown in a lab to produce real meat without the need for raising and slaughtering animals. **E.g.** Cultured chicken, beef, fish etc.

Challenges in Smart Protein Development

- **High Production Costs** – Technology is still evolving, making smart proteins expensive.
- **Consumer Acceptance** – Taste, texture and cultural preferences play a key role.
- **Regulatory Approvals** – Food safety laws and approvals vary by country.
- **Scaling Production** – Efficient manufacturing processes are needed to meet demand at lower costs.

How a Lie Detector (Polygraph) Works

Syllabus Mapping: Biology and Biotechnology

Context

The Mumbai Police's Economic Offences Wing (EOW) conducted a polygraph test on Hitesh Mehta, the prime accused and former General Manager of New India Cooperative Bank.

Working Principle of a Polygraph

- A polygraph records **changes in bodily functions**, which are believed to occur due to the **emotional response to lying**.
- **The key parameters measured include:** Blood pressure, Heartbeat (pulse rate), Respiration (breathing rate), Perspiration (sweat levels, also known as electrodermal

response or psychogalvanic skin reflex) & Electrical impulses in the body.

- The **modern polygraph** was invented in **1921** by **John Larson**, a **medical student at the University of California**, in collaboration with a **police officer**.
- **Equipment Used in a Polygraph Test:**
  - **Pneumograph Tube** – Wrapped around the **chest** to measure **breathing rate**.
  - **Blood Pressure-Pulse Cuff** – Strapped to the **arm** to track **pulse and blood pressure changes**.
  - **Electrodes** – Pick up **electrical impulses** from different body parts.
  - **Moving Graph Paper** – Records **changes in physiological functions** when the subject answers questions.

How the Polygraph Detects Lies

- The examiner **asks a series of questions** to the subject.
- The polygraph records **baseline physiological responses** when neutral questions are asked.
- When a subject lies, **one or more body functions deviate from normal**, leading to changes in the recorded graph.
- The examiner **analyzes these deviations** to infer whether the person is lying.

Accuracy and Reliability of Polygraphs

- Although widely used in **interrogations**, polygraphs are **not scientifically proven** to detect lies accurately.
- Many researchers argue that **physiological responses can be influenced by factors other than lying**, such as **stress, anxiety, or nervousness**.
- Polygraphs are **not accepted as conclusive evidence in courtrooms** due to **their unreliability**.
- Some individuals can **train themselves to manipulate their physiological responses**, making it easy to **deceive the polygraph**.

Legal Admissibility of Polygraph Tests in India

- The **Supreme Court of India** Selvi & Ors vs State of Karnataka & Anr **(2010)** ruled that polygraph tests **cannot be forced** on any individual.
- The court emphasized that such tests **violate human rights**, including the **right against self-incrimination** under **Article 20(3) of the Constitution**.
- **Key legal points from the ruling:**
  - **Results of polygraph tests are NOT considered confessions.**
  - **Statements made during the test cannot be used as direct evidence.**
  - However, **evidence discovered as a result of these tests can be admissible**.
  - **Example**: If the accused reveals the location of a murder weapon during the test, the weapon itself can be used as evidence, but the statement revealing the location cannot.

New Green Electrochemical Process Converts Urine into Plant Fuel

Syllabus Mapping: Chemistry

Context

Scientists have developed a **new eco-friendly method** to extract **urea from urine** and turn it into **percarbamide**, a useful fertilizer.

Urine: The 'Liquid Gold' for Agriculture

- In the **17th century**, German alchemist **Hennig Brand** attempted to extract gold from urine. Though unsuccessful, he discovered **phosphorus**, an essential nutrient for plants.
- Urine is often referred to as **"liquid gold"** due to its high content of **phosphorus, potassium, and nitrogen (as urea)**—the **three key nutrients** in fertilizers.
- **Nutrient Composition of Urine:**
  - An **adult produces 450-680 liters** of urine annually.
  - Urine is **95% water**, but the **remaining 5% contains valuable nutrients**: **4 kg of nitrogen & 0.3 kg of phosphorus**
  - This nutrient content is enough to **grow wheat for one loaf of bread every day for a year**.
- **Challenges in Utilizing Urine Directly:** Despite its nutrient richness, urine is **chemically complex**, and its **salts interfere** with direct **urea extraction**.

New Electrochemical Process to Extract Urea

- A team of researchers developed a **low-energy, electrochemical method** using **graphitic carbon-based catalysts** to extract **urea as percarbamide**.
- **Key Reaction:** Urea combines with **hydrogen peroxide**, forming **percarbamide**, a **white crystalline solid** that can be separated from urine.
- The process is **almost 100% efficient** and works for both **human and animal urine**.
- **Key Advantages of Percarbamide:**
  - **Slow-release nitrogen fertilizer:** Improves plant nutrition by gradually releasing nitrogen.
  - **Promotes root respiration:** Enhances plant growth.
  - **Acts as an oxygen supplier:** Useful in **chemical reactions** requiring **active oxygen**.
  - **Helps recover urea from urine efficiently.**
- **Significance of the discovery:**
  - Turns waste into a valuable resource instead of flushing it away.
  - Makes agriculture more sustainable by reducing the need for synthetic fertilizers.
  - Improves wastewater treatment by removing excess nitrogen.

Starlink

Syllabus Mapping: Space Technology, ICT

Context

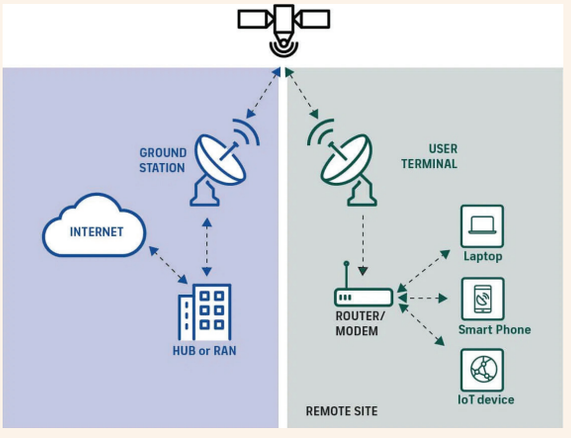
Recently, Bharti Airtel and Reliance Jio have signed separate agreements with SpaceX to bring Starlink internet services to India.

About Starlink

- Starlink is a **satellite-based internet service** developed by **SpaceX (founded by Elon Musk).**
- It uses a constellation of **low Earth orbit (LEO) satellites** (orbiting at ~550 km) to deliver high-speed, low-latency broadband.
- It supports high data-rate activities like streaming, gaming and video calls, making it popular in: **Remote areas, Disaster zones & Locations with restricted internet access.**
- The project was launched in 2019 and aims to deploy 42,000 small satellites in low Earth orbit (LEO) (under 2,000 km altitude).
- Currently, around **7,000** Starlink satellites are operational in space at an altitude of **547 km.**

What is Satellite Internet ?

- It is a type of internet connection that uses satellites to provide broadband service.
- This technology enables users to access the internet from virtually anywhere, particularly in remote or underserved areas where traditional terrestrial internet infrastructure is lacking.
- It **does not** require cables, fibre or phone lines.
- **How Does Satellite Internet Work?**
  - **User Device to Satellite:** The **user's device** sends signals to a **Starlink satellite** in space.
  - **Satellite to Ground Station:** The **satellite transmits the signal** to a **ground station**, which is connected to the Internet.
  - **Data Retrieval and Transmission:** The ground station **retrieves requested data** and sends it back via the satellite to the **user's dish**.



How Does Starlink Control Access?

- **Signal Encryption**: Prevents hacking or interception of satellite transmissions.
- **Geofencing**:Terminals are geographically restricted to areas authorized for service.
  - **E.g.** A Starlink device bought in the U.S. might not work in India unless its geographic location is reconfigured.
- **Challenges**:
  - Precise international border coverage is difficult due to:
    - Contested borders.
    - Satellites transmitting across moving boundaries.
  - Devices purchased abroad may bypass restrictions if not regulated.

Why Are the Starlink Deals Significant for India?

- **Bridging the Digital Divide:**
  - India is the **world's second-largest Internet market**, yet 670 million people (out of 1.4 billion) lack Internet access (as per a 2024 GSMA report).
- **Enhancing Nationwide Connectivity:** Starlink can provide **broadband in remote and underserved areas** where **fibre-optic or wireless networks are scarce**.
- **Potential Economic and Social Impact:**
  - **Supports digital inclusion** by providing **high-speed Internet** in rural areas.
  - **Boosts education, healthcare, and e-commerce** in **remote regions**.
  - **Enables better disaster response** by ensuring **uninterrupted connectivity** in emergencies.

Scientists Turn Light into a Supersolid

Syllabus Mapping: Physics, Material Science

Context

For the **first time**, scientists have successfully **turned light into a supersolid.**

What is a Supersolid?

- A **supersolid** is a **state of matter** where particles arrange in a **crystalline solid structure** but can also flow **without viscosity**, similar to a liquid.
  - **Viscosity** refers to a fluid's internal resistance to movement.
  - In a **normal solid**, particles remain fixed in place.
  - In a **normal liquid**, particles move freely but experience some friction.
  - **Supersolids** are unique because they **flow like a liquid while maintaining a structured, solid-like arrangement**.

- **Key Features of Supersolids:**
  - **Solid-like structure** – Particles arrange in an **orderly lattice**.
  - **Liquid-like motion** – Particles can flow without friction (zero viscosity).
  - **Quantum behavior** – Exists only under extreme conditions due to quantum effects.
- To form a supersolid, materials must be cooled **close to absolute zero**:
  - **Absolute zero = -459.67°F (-273.15°C)**.
  - At this temperature, **heat energy is almost entirely removed**, allowing **quantum effects** to dominate.
- Most liquids, like water or honey, **have friction** when they move. But **some special materials, like supersolids, move without friction**.
  - **E.g. Superfluid Helium:** When helium is cooled to near absolute zero, it **stops acting like a normal liquid**. It can **flow without resistance** and even climb up the walls of a container.

How Did Scientists Turn Light into a Supersolid?

- While **supersolids have been made from atomic gases before**, this research represents the **first successful attempt** to create a supersolid **from light**.
- Scientists used a type of **"quasiparticle"** called a **polariton**, which is formed when:
  - **Light (photons) and matter (excitons) interact strongly with each other.**
  - This creates a **hybrid particle** that behaves like both.
- **Procedure:**
  - **Scientists trapped light inside a special material** and made it interact with matter.
  - **This created polaritons**, which act like a mixture of light and matter.
  - **Polaritons can behave like atoms**—and when cooled down, they **formed a supersolid state**.

Why Are Supersolids Important?

- **Fundamental Physics Insights:**
  - Supersolids allow scientists to **study quantum mechanics in action**.
  - They reveal **how particles interact** at an atomic level **without temperature interference**.
- **Potential Technological Applications:**
  - **Quantum Computing** – Could enable **ultra-fast, frictionless data transfer**.
  - **Superconductors – Zero-resistance electrical systems**.
  - **Frictionless Lubricants** – Could reduce **energy loss in machines**.

Audible Enclaves: A New Era in Sound Control

Syllabus Mapping: Physics, Miscellaneous

Context

Recent research has introduced a groundbreaking technology that enables sound to be heard only in specific locations, creating "audible enclaves."

About Audible Enclaves

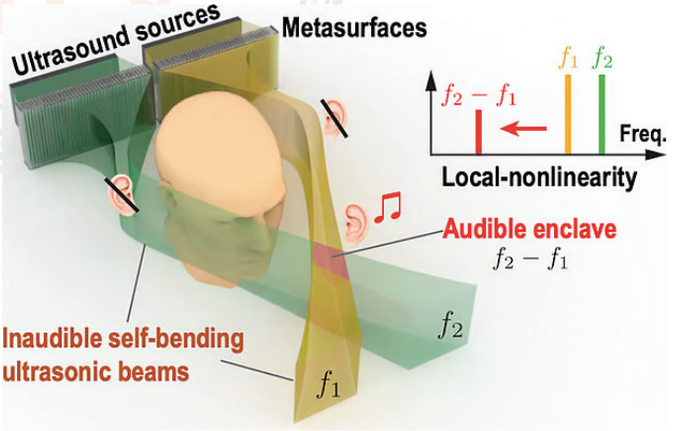
- **Audible enclaves** are **localized pockets of sound** that can be heard **only in a specific area**, while remaining completely silent elsewhere.
- This means sound can be directed to a single person or location without disturbing others nearby.

What is Sound?

- Sound is a **vibration that moves through air as a wave**.
- The **frequency** of sound waves determines **pitch**:
  - **Low frequency → Deep sounds** (e.g., bass drum).
  - **High frequency → Sharp sounds** (e.g., whistle).
- Sound waves **spread out** as they travel due to **diffraction**, making it difficult to **confine sound to a specific area**.

How Audible Enclaves Work?

- **Using Ultrasound as a Carrier:**
  - Ultrasound waves (above 20 kHz) are **inaudible to humans** but can carry normal sound through the air.
  - These ultrasound waves can be **shaped and controlled** to deliver sound only where needed.



- **Nonlinear Acoustics – Creating Sound at a Specific Spot:**
  - Normally, sound waves **mix linearly** (just adding together).
  - However, at high intensities, sound waves **interact nonlinearly**, producing **new frequencies** that weren't there before.

  - Scientists use **two ultrasound beams at different frequencies** that are **silent on their own** but generate **audible sound only where they intersect**.
- **Bending Ultrasound Waves:**
  - Normally, sound waves travel **in straight lines**.
  - By using **acoustic metasurfaces** (specialized materials that shape sound waves), scientists can **bend ultrasound beams** to meet at a specific target, creating an **audible enclave** in that location.
- **Difference Frequency Generation:**
  - When two ultrasound beams of **slightly different frequencies** overlap, they create a new sound at the difference between their frequencies.
  - **Example:**
    - One beam at **40 kHz**
    - Another beam at **39.5 kHz**
    - Difference = **0.5 kHz (500 Hz), which humans can hear**
  - **This means sound only exists at the point where the waves meet, and nowhere else.**

Potential applications of Audible Enclaves

- **Private Audio:** Listen to music, podcasts, or calls without headphones, and without disturbing others.
- **Personalized Audio in Public Places:** Museums, libraries, and offices can provide location-based audio without speakers.
- **Noise Control:** Can be used to create **silent zones** by canceling unwanted noise.
- **Confidential Conversations:** Military, corporate, and security settings can ensure **private discussions in open spaces**.
- **Car Audio:** Passengers can listen to music without distracting the driver.

DNA Polymorphisms and DNA Fingerprinting

Syllabus Mapping: Biology & Biotechnology

Context

According to recent findings, DNA polymorphism has various modern applications in forensics and medicine.

What is DNA?

- DNA, or deoxyribonucleic acid, is a molecule that carries the genetic instructions used in the development, functioning and reproduction of all known living organisms and many viruses
- Each human cell (from **skin, blood, teeth, bones etc.**) contains **46 DNA molecules (chromosomes)**.
- One set of **23 chromosomes** is inherited from the **father (via sperm)** and another **23 from the mother (via egg)**.
- **Sperm and egg cells** are exceptions as they contain **only one copy of the genome instead of two.**

Chromosomes and Polymorphisms

- DNA is packed into **chromosomes** (e.g., **Chromosome 3** contains **6.5% of total DNA** in a cell).
- The **paternal and maternal versions** of a chromosome are largely similar but have **some variations (polymorphisms)**.
- **Polymorphisms help trace ancestry** and distinguish individuals.

What Are DNA Polymorphisms?

- DNA polymorphisms are **sections of DNA where variations occur between individuals.**
- They allow scientists to determine **whether a specific chromosome was inherited from the maternal or paternal side**.
- DNA profiles are generated using polymorphisms in specific regions called **Short Tandem Repeats (STRs).**
  - STRs are **short sequences of DNA base-pairs that repeat multiple times**.
  - **STRs are often polymorphic**, meaning different individuals have **different numbers of repeats**.
- These variations make STRs useful in DNA fingerprinting.

How Does DNA Replicate?

- DNA is made up of **four chemical bases: Adenine (A), Cytosine (C), Guanine (G), and Thymine (T)**.
- The two strands of DNA are **anti-parallel and complementary** (A pairs with T, C pairs with G).
- When cells divide, DNA strands **separate and create complementary copies**.
- **Mutations** (errors in base-pairing) occur **less than once per billion base-pairs per generation**.

What is a DNA Fingerprint?

- A **DNA fingerprint** is a unique profile created by analyzing **STR patterns** in an individual's DNA.
- **DNA Can Be Extracted From:**
  - Teeth, bones, blood, saliva, semen, skin cells, etc.
  - Crime scenes (blood stains, sweat, spit on clothes or soil, etc.)
  - Mortal remains from disaster sites.
- **Uses of DNA Fingerprinting:**
  - **Establishing Relationships:** Determining parent-child relationships, Tracing ancestry through polymorphisms.
  - **Forensic Investigations:** Identifying **suspects from crime scene samples etc.**
  - **Identifying Human Remains:** Disaster victim identification.

- **Ancient DNA studies:** Scientists have extracted **65,000-year-old human DNA** from remains preserved in **deserts and cold environments**.
- Organ Donation Matching: Ensuring **donor-recipient compatibility** to prevent **organ rejection**.

Black Plastic

Syllabus Mapping: Chemistry

Context

A recent study on black plastic revealed the presence of toxic flame retardants, sparking concerns about food contamination and potential health risks.

What is Black Plastic?

- Black plastic is **made from recycled electronic waste** such as **computers, TVs, and appliances**.
- Electronic waste contains harmful substances, including:
  - **Flame retardants** like **bromine**
  - **Heavy metals** such as **lead, cadmium and mercury.**
- These substances are banned in many countries due to their toxicity.
- Black Plastic is commonly used in kitchen utensils, takeout containers, packaging and toys.
- **Harmful Effects of Black Plastic:**
  - **Health Risks:** Contains neurotoxic heavy metals and carcinogenic compounds.
  - **Food Contamination:** Heat exposure may cause chemical leaching into food.
  - **Environmental Hazard:** Difficult to recycle, leading to increased plastic pollution.

ISRO Successfully Conducts Crucial Test for Semi-Cryogenic Engines

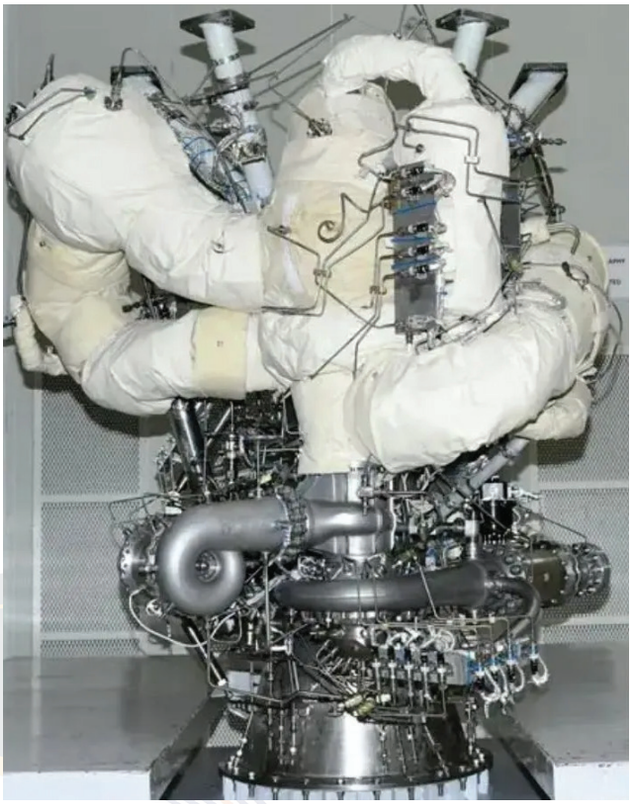
Syllabus Mapping: Space technology

Context

ISRO successfully tested SE2000 semi-cryogenic engine's Power Head Test Article for future heavy space launches.

About Power Head Test Article (PHTA)

- ISRO is developing a semi-cryogenic engine that uses a **Liquid Oxygen and Kerosene-based propulsion system** that offers an enhanced thrust.
- PHTA is the first hardware test for the development of semi-cryogenic engines.
- The test involves performing a hot-firing for an extremely brief duration of not more than **4.5 seconds.**



Why Semi-Cryogenic Engines Matter

- Current **cryogenic engines** use **Liquid Oxygen (LOX) and Liquid Hydrogen (LH2)**.
- **Liquid hydrogen is difficult to handle** due to its extreme storage temperature (**-253°C**) and **high inflammability**.
- The **semi-cryogenic engine** uses **LOX and Kerosene**, which has advantages such as:
  - **Higher density impulse** (more efficiency than cryogenic)
  - **Less toxic storage**
  - **More cost-effective** propulsion
  - **Easier handling** of kerosene compared to liquid hydrogen

Upcoming Developments by ISRO - Upgradation of LVM-3

- ISRO is working on upgrading **Launch Vehicle Mk III (LVM3).**
- The LVM3 will be equipped with a **C32 cryogenic upper stage**, replacing the older **C25 stage**.
- **C32 advantage over C25:**
  - **Carries more propellant**, extending mission duration.
  - **Increases payload capacity by 25%**.
  - Will **increase spacecraft launch capacity from 4 tonnes to 5.1 tonnes** to **Geosynchronous Transfer Orbit (GTO)** without increasing cost.

Solar Ultra-violet Imaging Telescope

Syllabus Mapping: Space technology

Context

Aditya-L1, has achieved a major scientific breakthrough by capturing the first-ever image of a solar flare 'kernel'.

Key Highlights of the Observation

- The **SUIT payload** onboard **Aditya-L1** has captured the first-ever image of a **solar flare 'kernel'** in the **lower solar atmosphere (photosphere & chromosphere)**.
- This is the first time such a solar flare has been observed in this wavelength range with such high detail.
- **Link Between Solar Flare & Energy Deposition:**
  - The observations confirm that the energy released from the flare spreads through different layers of the Sun's atmosphere.
  - A direct **correlation was found between localized brightening in the lower atmosphere and the temperature increase in the solar corona (outermost layer of the Sun)**.

About the SUIT Payload

- **SUIT (Solar Ultraviolet Imaging Telescope)** is one of the seven scientific payloads onboard **Aditya-L1**.
- It is designed to observe the **Sun's photosphere and chromosphere** in the **ultraviolet (UV) wavelength** range.
- **Developed by:** Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune.
- **Unique Features of SUIT:**
  - It is the **first instrument to observe the Sun in the Near Ultraviolet (NUV) range with such high precision**.
  - It can capture detailed images of **solar eruptions, flares and magnetic field interactions**.
  - It helps in understanding the **connection between the Sun's lower atmosphere and its outer corona**.

Other Scientific Payloads on Aditya-L1

- **VELC (Visible Emission Line Coronagraph)** – Studies the corona and its dynamics.
- **ASPEX (Aditya Solar Wind Particle Experiment)** – Analyzes solar wind particles.
- **PAPA (Plasma Analyzer Package for Aditya)** – Measures charged particles in solar wind.
- **SoLEXS (Solar Low Energy X-ray Spectrometer)** – Observes X-ray emissions.
- **HELIOS (High Energy L1 Orbiting X-ray Spectrometer)** – Studies high-energy solar radiation.
- **MAG (Magnetometer)** – Measures interplanetary magnetic fields.

Availability of water ice on Moon

Syllabus Mapping: Space technology

Context

A new study based on data collected by the Chandrayaan-3 mission has suggested that water ice could be present at more locations beneath the Moon's surface at the poles than previously thought.

Key Findings from Chandrayaan-3 Data

- **In-Situ Temperature Measurements by ChaSTE:**
  - The **ChaSTE (Chandra's Surface Thermophysical Experiment) probe** onboard the **Vikram lander** measured temperature at different depths (up to **10 cm**) beneath the lunar surface.
  - The lander **touched down at 69° South latitude**, near the Moon's **south pole** at **Shiv Shakti Point** on **August 23, 2023**.
- **Key Temperature Observations:**
  - The **peak surface temperature** at the **landing site (Sun-facing slope, 6° angle)** was **82°C** during the day and dropped to **-170°C** at night.
  - Just **one meter away**, on a **flat surface**, temperatures were significantly lower, **peaking at 60°C**.
  - This difference suggests that **even slight variations in slope impact surface temperatures**, which in turn affect where ice can form and remain stable.

Importance of Water Ice on the Moon:

- **Vital Resource for Future Missions** → Ice can be used for **drinking water, oxygen production, and rocket fuel**.
  - Lunar ice can be used to produce rocket fuel by splitting the water molecules into hydrogen and oxygen through **electrolysis**, which can then be liquefied and used as propellant.

- **Understanding the Moon's History** → Studying ice deposits can reveal how **water accumulated and moved** over time, providing clues about the Moon's **geological past**.
- **Exploration & Settlement** → Finding easily accessible ice makes it easier for **humans to live and work on the Moo**n.

How Slopes Affect Ice Formation

- Researchers developed a **temperature model** to understand how **the angle of a slope influences surface temperature**.
- **Findings from the Model:**
  - **Slopes facing the Sun** → Absorb more heat, making them **less likely to contain ice**.
  - **Slopes facing away from the Sun** (toward the lunar poles) → Remain **cooler**, allowing ice to **accumulate closer to the surface**.
  - A **slope with an angle greater than 14°** could maintain **temperatures low enough for ice to remain stable**.
- **Comparison with NASA's Artemis Mission:**
  - The temperature conditions found in this study **match the landing sites proposed for NASA's Artemis program**, which aims to explore the Moon's **south pole**.
  - This suggests that **ice may be accessible in more locations than previously thought**, making future lunar exploration **easier and more resource-efficient**.

Why Liquid Water Cannot Exist on the Moon

- The **Moon has no atmosphere**, so **liquid water cannot form**.
- Instead, ice **sublimates directly into vapor** when exposed to heat.
- This confirms that **the Moon likely never had habitable conditions in the past**.

NASA's Lunar Trailblazer Mission

Syllabus Mapping: Space technology

Context

Recently, NASA launched the Lunar Trailblazer satellite aboard a SpaceX Falcon 9 rocket.

About Lunar Trailblazer

- It is a small satellite (orbiter) designed to map water on the Moon's surface.
- It is Part of **NASA's Small, Innovative Missions for Planetary Exploration (SIMPLEX) program**.
- **Scientific Instruments onboard:**
  - **High-resolution Volatiles and Minerals Moon Mapper (HVM3):** Detects and maps the presence of water and hydroxyl molecules on the lunar surface by analyzing light patterns.
  - **Lunar Thermal Mapper (LTM):** Measures surface temperature variations, helping scientists understand how temperature influences the movement of water on the Moon.

Objectives of Lunar Trailblazer Mission

- **Mapping Lunar Water:** Identifying where water exists on the Moon, including in permanently shadowed craters at the poles.
- **Understanding the Lunar Water Cycle:** Studying how water moves and interacts with the Moon's surface over time.
- **Supporting Future Lunar Exploration:** Providing essential data for planning long-term human presence on the Moon, including resource utilization for drinking water, breathable oxygen and hydrogen fuel.

Planetary Parade

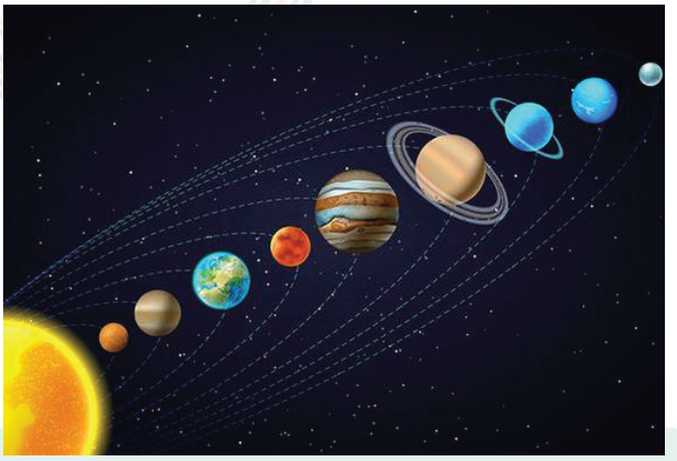
Syllabus Mapping: Space technology

Context

Recently, on 28th February **Seven planets** lined up for a rare "planetary parade".

About Planetary Parade

- It is an astronomical event where multiple planets appear to line up in the night sky in the order of their distance from the Sun.



- **Why Do Planetary Parades Occur?**
  - Planets move in elliptical orbits around the Sun but remain nearly in the same plane (**ecliptic plane**).
  - The planets don't actually align in space but appear so from Earth due to their positions in their orbits.

  - As they revolve, sometimes multiple planets appear in the same region of the sky when viewed from Earth.
- **Frequency of Planetary Parades:**
  - **Three or Four-Planet Parades**: Occur once every few years and are relatively common.
  - **Seven or Eight-Planet Parades**:Very rare, occurring only once in several decades.
- **The February 28, 2024 Event:**
  - **Planets Involved**: Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune (total 7 planets).
  - **Next Similar Event**:The next major planetary parade is expected in **2040**, involving **six planets**.

Related Terms

- **Conjunction**:When two or more celestial objects appear very close to each other in the sky.
- **Great Conjunctio**n: A rare event when Jupiter and Saturn appear extremely close together (last occurred in December 2020).

Altieri's Ring

Syllabus Mapping: Space Science

Context

The Euclid space mission of the European Space Agency recently spotted an Einstein ring named Altieri's ring.

About Altieri's Ring

- In September 2023, the **Euclid space telescope** found an Einstein ring in a nearby galaxy called **NGC 6505, which is 590 million light-years away.**
- It was discovered by **astronomer Bruno Altieri** in an early test image, and later, clearer images confirmed its existence.
- The ring was named Altieri's Ring in his honor.
- This ring is actually the **distorted image of another galaxy 4.5 billion light-years away.**
- **Significance of this discovery:**
  - Altieri's ring is special because it was found in **NGC 6505**, a well-studied nearby galaxy that has been known to astronomers since the 19th century.
  - Only **five** other gravitational lenses have been found at similar distances from Earth.

What is an Einstein Ring?

- An **Einstein ring** is a rare ring of light that forms due to **gravitational lensing**.
- **Gravitational lensing** occurs when a **massive celestial object** (a galaxy or cluster of galaxies) creates a **gravitational field** that **bends and magnifies the light** from a distant object behind it.
- This was predicted by **Albert Einstein's General Theory of Relativity** (1915), which stated that **gravity can bend light around massive objects**.
- **An Einstein ring forms only when** the background galaxy, the lensing galaxy, and Earth align perfectly.
- The first Einstein ring was discovered in **1987**, and though more have been found since, they remain **extremely rare**.
  - **Less than 1% of galaxies** are estimated to have an Einstein ring.
- Einstein rings are **not visible to the naked eye** and can only be observed using advanced space telescopes like **ESA's Euclid**.

Euclid Space Mission

- It was launched by the European Space Agency (ESA) in July, 2023.
- **Objective:** To investigate dark matter and dark energy, which together make up 95% of the universe.
- It is equipped with a **1.2-meter telescope**, it captures high-resolution images and spectra of distant galaxies.
- It operates from the **Sun-Earth L2 orbit**, about 1.5 million km from Earth.
- It is expected to map billions of galaxies, creating a 3D cosmic map spanning 10 billion years.
- **Mission Duratio**n - 6 Years.

Why Scientists Study Einstein Rings

- **Understanding Dark Matter: Dark matter** makes up **85% of the total matter in the universe**, but it has **never been directly observed**.
  - **Gravitational lensing helps indirectly detect dark matter** by observing how light bends around galaxies.
- **Studying Distant Galaxies:** Some galaxies are **too faint** to be observed directly. Gravitational lensing **magnifies their light**, allowing scientists to **study galaxies that would otherwise remain hidden**.
- **Measuring the Expansion of the Universe:** The universe is **expanding**, stretching space between Earth and other galaxies.

– Einstein rings provide data on **how fast galaxies are moving apart**, helping refine measurements of **cosmic expansion**.

Blue Ghost Mission 1

Syllabus Mapping: Space Science

Context

Recently, Firefly Aerospace's Blue Ghost Mission 1 successfully landed on the Moon.

Successful Private Lunar Landing

- Firefly Aerospace's **Blue Ghost lander** successfully landed on the **Moon** as part of **NASA's Commercial Lunar Payload Services (CLPS) initiative**.
  - CLPS program aims to **promote private-sector competition in lunar exploration** and reduce costs.
- **Landing site:** Mare Crisium, on the northeastern near side of the Moon.
- The spacecraft **descended autonomously from lunar orbit**, navigating the terrain to avoid hazards.
- **Expected mission duration:** Two weeks (one full lunar day).
- **First Private Lander to Land Upright:**
  - Blue Ghost is the first private lander to touch down on the Moon without crashing or toppling over.
  - Even national space agencies struggle with lunar landings—**only five countries (Russia, US, China, India, and Japan) have successfully landed on the Moon**.

Scientific Objectives and Instruments on Blue Ghost

- **Lunar Soil Collection:** A vacuum system to collect lunar soil samples.
- **Subsurface Temperature Measurement:** A drill capable of measuring temperatures up to 10 feet (3 meters) below the surface.
- **Lunar Dust Mitigation:** A **device designed to eliminate lunar dust**, addressing a significant challenge faced by **Apollo astronauts**, whose equipment and suits were covered in abrasive lunar dust.
- **Navigation Advancement:**
  - An onboard receiver successfully acquired signals from the US GPS and European Galileo satellite constellations.
  - This could improve navigation for **future lunar explorers**.
- **High-Resolution Lunar Imaging:**
  - It captured **detailed images of Earth** while en route to the Moon.
  - Also sent **high-resolution photos of the Moon's cratered surface** after landing.

Upcoming Private Lunar Missions

- **Intuitive Machines (U.S.):**
  - Houston-based **Intuitive Machines** is preparing for its **second lunar landing attempt**.
  - The company's **first lunar mission in 2023 tipped over**, but it marked the **first U.S. lunar landing since Apollo (1972)**.
- **ispace (Japan):**
  - Japanese company **ispace** is **three months away** from attempting its **second Moon landing**.
  - Its first lander crashed in 2023.

NASA's PUNCH Mission and the Solar Cycle

Context

NASA is set to launch its latest solar mission on March 6, 2025, from Vandenberg Space Force Base, California.

About PUNCH Mission

- **Full Form: Polarimeter to Unify the Corona and Heliosphere (PUNCH)**
- **Agency: NASA**
- **Aim:** Study the **Sun's corona** (outer atmosphere) and its transition into the **solar wind**.
- **Significance:** First mission dedicated to observing this transition in real-time.
- **Launch Timing:** During the **solar maximum**, when the Sun is most active.
- The satellites will be placed in a **sun-synchronous polar orbit** around Earth.
- **Objectives of the PUNCH Mission:**
  - **Study the Sun's Corona:** Observe the structure and dynamics of the Sun's outer atmosphere.
  - **Understand Solar Wind:** Track solar wind expansion and acceleration as it moves toward Earth.

- **Analyze Coronal Mass Ejections (CMEs):** Provide real-time imaging of **solar storms** that can impact Earth's satellites and power grids.
- Improve **space weather forecasting**.

Key Features

- **Satellite System:** Four **small, identical satellites** will continuously image the **corona**. These satellites will work together to **continuously image the solar corona and solar wind**.
- **Solar Flare & CME Tracking:** Monitors **coronal mass ejections (CMEs)** and **solar flares** that impact Earth's power grids, satellites, and communication networks.
- **Space Weather Prediction:** Helps forecast **solar storms** to mitigate disruptions in **GPS, radio signals, and astronaut safety**.
- **Polarization Imaging:** Studies how the **corona shapes the solar wind** and its impact on the solar system.
- **Collaborative Research:** Works alongside **NASA's Parker Solar Probe** and **ISRO's Aditya-L1** for a broader understanding of **solar activity**.
- **Advanced Imaging Technology:**
  - **Wide-Field Imagers:** Capture the Sun's corona and track solar winds as they move through space.
  - **Polarization Measurements:** Help understand the **magnetic structure of solar wind**.

Solar Cycle

- The solar cycle is an 11-year **cycle** of the sun's magnetic field and activity.
- During this cycle, the number of sunspots on the sun's surface changes from a minimum to a maximum and back again.
- **Working of Solar Cycles**
  - The **Sun has a magnetic field** with **north and south poles**, similar to a **bar magnet**.
  - This field is generated by the **movement of electrically charged particles within the Sun**.
  - Approximately **every 11 years**, the **Sun's magnetic poles switch places**, marking the start of a **new solar cycle**.
- **Role of Sunspots in Tracking the Solar Cycle:**
  - **Sunspots** are **dark, cooler regions on the Sun's surface** where the magnetic field is particularly strong.
  - Scientists **track the solar cycle** by **counting the number of sunspots**:
    - More sunspots = **Solar Maximum**
    - Fewer sunspots = Solar Minimum

Phases of the Solar Cycle

- **Solar Maximum:**
  - Occurs when the **Sun is most active**.
  - The **magnetic field flips** during this phase.
  - The Sun releases **intense bursts of radiation and particles** into space.
  - There is an **increase in solar flares and coronal mass ejections (CMEs)**.
- **Solar Minimum:**
  - The **least active phase** of the Sun.
  - Sunspots, flares, and eruptions **decrease significantly**.

Why Are More Solar Missions Being Launched Now?

- Current solar observations suggest that the **Sun is nearing its solar maximum**, although official confirmation is awaited.
- **NOAA (National Oceanic and Atmospheric Administration)** reports that **solar activity has been above normal since May 2022 and continues to remain high in 2024**.
- **The next intense solar activity** will not occur **until 2035-2036**, making **this the best window** for launching solar missions.

News in Short

Triboelectric Nanogenerator

- Researchers at the **Institute of Nano Science and Technology (INST), Mohali**, under the **Department of Science and Technology (DST), Government of India**, have developed a **triboelectric nanogenerator (TENG)** using **flexible single crystals of an organic compound**.

About Triboelectric Nanogenerator (TENG)

- **TENG** is a small device that **generates electricity from movement or friction**. It works on the **triboelectric effect**, which happens when two materials rub against each other and create an electric charge.
- **E.g.** When you rub a balloon on your hair, your hair sticks to it because of the electric charge. A TENG **uses a similar principle** but converts this charge into **usable electricity**.
- **Uses of TENG**:
  - **Energy Harvesting:**
    - Converts **body movements** (walking, stretching) into electricity.

- Generates power from **wind, water waves or vibrations**.
  - **Medical & Health Applications:**
- **Wearable health sensors** (e.g., tracking finger movement in rehabilitation).
- **Pacemakers or medical implants** without needing batteries.
  - **Smart Devices & Robotics:**
- **Self-powered touchscreens** (phones, tablets, ATMs).

GPS Spoofing

- **Between November 2023 and February 2025, 465 GPS interference and spoofing incidents** were reported, primarily in the **Amritsar and Jammu regions** near the India-Pakistan border.

What is GPS Spoofing?

- **GPS spoofing** is a **cyberattack technique** where a fake GPS signal is transmitted to mislead a GPS receiver into calculating an incorrect location, time, or velocity.
- **It differs from GPS jamming**, which blocks signals, whereas spoofing **manipulates** them to mislead users.
- **Impact of Spoofing:**
  - Aircraft can be **misled into thinking they are on a different flight path**.
  - Ships and vehicles may **navigate incorrectly**, leading to potential security risks.
  - **Military operations, financial transactions and personal navigation** apps can be affected.

Viatina-19

- Viatina-19 cow has made headlines worldwide as the most expensive cow ever sold. This sale made her the world's most expensive cattle, as per the Guinness World Record.

Origin & Background

- Viatina-19 is a distinguished variant of the **Nelore breed**, also known as **Ongole** cattle.
- It **originated in Prakasam district, Andhra Pradesh, India**, and was first introduced to **Brazil in the 1800s**.
- The breed is renowned for its **adaptability to tropical climates** and **high resistance to diseases**.

Key Characteristics

- **Size & Weight:** Weighs approximately **1,101 kg**, nearly **twice the average weight** of other Nelore cattle.
- **Distinct Appearance:**
  - Possesses **beautiful white fur** and **loose skin**.
  - Features a **prominent hump** on its shoulders, making it visually striking.
- **Temperature Regulation:** Exhibits a natural ability to **withstand high temperatures**, enabling survival in extreme climates.

Genetic Superiority & Global Demand

- **Exceptional Genetics:** Unlike cattle bred specifically for **dairy or meat production**, Viatina-19 has **distinct genetic traits**.
- **Embryo Export:** Due to its superior genetics, its **embryos are exported worldwide** for breeding programs.

Conservation Concerns in India

- The **Ongole breed** faces a **declining population** in India, with numbers dropping from **15 lakh in 1944 to 6.34 lakh** according to the **2019 Livestock Census**.
- **Economic Factors:**
  - Cattle prices in India remain relatively low.
  - Cows are priced at approximately **₹1 lakh**, while high-value bulls range between **₹10 to ₹15 lakh**.

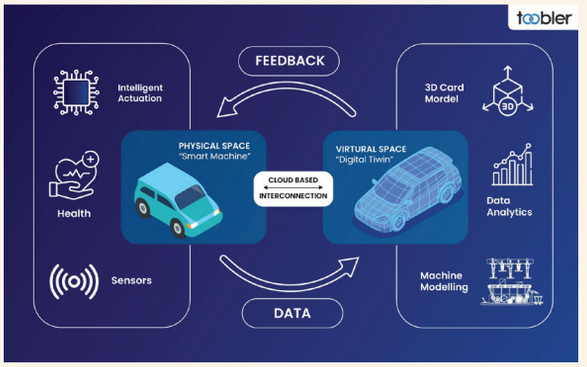
Digital Twin Technology

- A **Digital Twin** is a **virtual representation of a physical object, system, or process** that is continuously updated with real-time data.
- It **mirrors** the real-world entity by integrating **IoT sensors, AI, big data, and machine learning** to analyze and optimize performance.
- Used in **predictive maintenance, real-time monitoring, and simulation-based decision-making**.

Applications of Digital Twin Technology

- **Manufacturing & Industry 4.0:** Optimizes factory operations and **predicts machine failures** before they occur.
- **Smart Cities & Infrastructure:** Simulates traffic patterns, water supply, and urban development.
  - E.g. **Singapore's Smart Nation Initiative** uses a city-wide digital twin.

- **Healthcare & Biotechnology:** Creates digital twins of **human organs** for personalized treatments.
- **Aerospace & Defense:** Enhances aircraft maintenance and mission simulations.
- **Automotive & Transportation:** Helps in **autonomous vehicle testing** and predictive maintenance.
  - E.g. **Tesla's self-driving A**I relies on digital twin simulations.



Mycelium Bricks

- Mycelium bricks are an innovative, sustainable building material made by combining **fungal mycelium** (the root-like network of fungi) with organic waste like agricultural byproducts.
- They are **lightweight, biodegradable, and fire-resistant** alternatives to traditional bricks.
- Mycelium is the vegetative part of a fungus, consisting of a network of thin, branching filaments called **hyphae.**
- **Production Process**:
  - Created by combining **husk, sawdust, and fungal spores**.
  - The **fibrous network** solidifies into a **lightweight structure** within **a few days**.
- **Advantages of Mycelium Bricks:**
  - **Eco-Friendly: Biodegradable**, reducing **waste pollution**. **Lower carbon footprint** compared to fired clay bricks.
  - **Lightweight:** Easier to transport and handle.
  - **Good Thermal Insulation:** Can be used as **panelling material** in **interior design**.

GAIA Mission

- The European Space Agency (ESA) has officially decommissioned its Global Astrometric Interferometer for Astrophysics (GAIA) mission after more than a decade of operation. GAIA Mission.

Objective

- The mission aimed to create the **largest and most precise 3D map** of the **Milky Way** by surveying **approximately 1% of its 100 billion stars**.
- **Launched: 2013**.

Location & Instruments

- **Orbit:** Positioned at **Lagrange Point 2 (L2)**, **1.5 million km from Earth**, ensuring stable observations.
- **Equipment:**
  - **Two telescopes** and a **1-billion-pixel camera** (largest ever deployed in space).
  - **Key Instruments:**

- **Astrometer** – Measured star positions and movements.
- **Photometer** – Determines the brightness of celestial objects.
- **Spectrometer** – Analyzed star composition and motion.

Major Discoveries & Contributions

- **Milky Way Mapping:** Created a **detailed 3D map**, unveiling the galaxy's **structure, shape, and stellar motion**.
- **Black Holes:** Detected **previously unknown black holes** by identifying their **gravitational influence**.
- **Asteroid Tracking:** Monitored **over 150,000 asteroids**, aiding in **impact prediction** for Earth.
- **Stellar Evolution:** Provided crucial data on **star formation and life cycles**, including insights into the **Sun's evolution**.

Birefringence

- Some materials have **more than one refractive index**, meaning light bends differently in different directions. These materials are called **birefringent**.
- Birefringence results in **double refraction**: a single light ray splits into two separate rays when passing through the material.
- Birefringence arises because the material's **crystal structure varies in different directions**—a property called **anisotropy**.
- **Polarisation** plays a crucial role in determining the direction of light bending in birefringent materials.
- **Examples:** Natural (mica, quartz), Synthetic (barium borate and lithium niobate).

Refraction and the Refractive Index

- When light moves from one medium to another (e.g., from air to glass), its path **bends due to refraction**.
- **Refraction** occurs because the speed of light changes as it enters a new material.
- **Refractive Index (n) =** Speed of Light in vacuum/Speed of light in the material.
  - It determines the extent of bending.
- **Higher refractive index → greater bending of light.**

National Gene Bank

- The Government of India has announced the creation of a Second National Gene Bank to conserve 10 lakh crop germplasm. This initiative aligns with the "Investing in Innovations" theme of the Union Budget 2025-26.

What is a Gene Bank?

- A facility that preserves **seeds, pollen, and plant tissues** to prevent plant species from extinction.
- Ensures the availability of genetic resources for **future agricultural needs, scientific research, and biodiversity conservation**.

India's First National Gene Bank

- **Established:** 1996 by **ICAR – National Bureau of Plant Genetic Resources (NBPGR)**, New Delhi.
- **Global Ranking:** Second-largest Gene Bank in the world after the **Svalbard Global Seed Vault**, Norway.
- **Storage Capacity:**
  - Holds **4,71,561 accessions** from **2,157 species**.
  - Supplies plant genetic material to **public and private sectors** for **crop improvement and conservation**.

National Bureau of Plant Genetic Resources (NBPGR)

- **Apex Institution** under **ICAR**, responsible for **plant genetic resource management**.
- **Key Objectives:**
  - **Conservation, evaluation, and utilization** of plant genetic resources.
  - Supports **sustainable agriculture** and **food security**.
- **Headquarters: New Delhi**.

End-Permian Mass Extinction (EPME)

- The discovery of a plant refuge from the End-Permian mass extinction in China is significant because it challenges the long-held belief that the "Great Dying" was equally catastrophic for all life forms. End-Permian Mass Extinction (EPME).

About EPME

- The **End-Permian Mass Extinction (EPME)**, also known as the **"Great Dying,"** is the most severe extinction event in Earth's history.
- Occurred **~251.9 million years ago** at the end of the **Permian period**.
- Led to the extinction of **80-90% of marine species** and **70% of terrestrial species**.

Causes of Extinction

1. **Massive Volcanic Eruptions** – **Siberian Traps** released enormous amounts of **carbon dioxide (CO_2) and methane (CH□)**, intensifying the greenhouse effect.
2. **Global Warming** – Extreme rise in temperatures due to excessive greenhouse gas emissions.
3. **Oxygen Depletion in Oceans** – Warmer waters held less oxygen, suffocating marine life.
4. **Increased Metabolism in Marine Life** – Rising temperatures increased oxygen demands in marine organisms, but **oxygen levels dropped**, leading to mass deaths.
5. **Marine Extinctions** – About **96% of marine species perished** due to extreme environmental stress.
6. **Greater Impact at the Poles** – **Cold-water species** suffered the most as they lacked suitable habitats for migration.
7. **Additional Factors** – **Ocean acidification, toxic metal release, and disruptions in marine food chains** further aggravated the crisis.

Impact of EPME

1. **Marine Ecosystems:**
   - Entire groups of organisms, including **coral reefs, trilobites, and ammonites**, were wiped out.
   - The **collapse of marine food chains** led to widespread species loss.
2. **Terrestrial Ecosystems:**
   - Large **amphibians and reptiles** faced massive die-offs.
   - Some **plant species survived**, enabling ecological recovery.
   - Certain **early synapsids** (mammalian ancestors) endured the catastrophe, later evolving into dominant land species.
3. **Survival & Refuge Zones:**
   - Unlike marine species, some **land plants and animals** found shelter in regions **less affected by climate change**, aiding their survival.

Bollgard 3

- Recently, demand for Bollgard-3 in Punjab has increased ahead of the cotton sowing season.

About Bollgard 3

- This **genetically modified (GM) cotton variety** was developed by **Monsanto** over a decade ago.
- It offers **exceptional resistance** to insect attacks, particularly against **lepidopteran pests** like the **pink bollworm**.
- The cotton incorporates **three Bt proteins—Cry1Ac, Cry2Ab, and Vip3A**—which disrupt pest gut function, leading to their elimination.

Development and Adoption in India

- **Bt cotton** was first introduced in India with **Bollgard-1 (2002)**, followed by **Bollgard-2 (2006)**, which remains widely used.
- Farmers are now pushing for the introduction of **Bollgard-3** due to its enhanced pest control efficiency.

Key Benefits of Bollgard-3

1. **Triple-Protein Protection:** The **Cry1Ac, Cry2Ab, and Vip3A** proteins act in different ways to **eliminate larvae**, offering superior control over **Helicoverpa armigera and Helicoverpa puntigera** throughout the cotton season.
2. **Reduced Pesticide Usage:** With its built-in pest resistance, Bollgard-3 minimizes the need for **broad-spectrum pesticides**.
3. **Higher Yield Potential:** Bollgard-3 plants show **higher first-position fruit retention** on the **bottom five fruiting branches**.

Nag Anti-Tank Missile System (NAMIS)

- The Ministry of Defence has signed a contract with Armoured Vehicle Nigam Limited to procure the tracked version of the Nag Missile System (NAMIS), an anti-tank weapon platform. Nag Anti-Tank Missile System (NAMIS).

About NAMIS

- NAMIS is an **advanced anti-tank weapon system** designed as a **mobile launch platform** for the **Nag Anti-Tank Guided Missile (ATGM)**.
- **Developed by: Defence Research and Development Laboratory (DRDL), DRDO**.
- **Platform:** Mounted on a **BMP-2 chassis**, ensuring high mobility and operational flexibility.

Key Features

- **Armed with Nag ATGM:**
  - **Third-generation, fire-and-forget** missile with **lock-on after launch** capability.
  - Designed to **neutralize heavily armored enemy tanks**, including those equipped with **composite and reactive armor**.
- **Advanced Targeting System:**
  - **All-weather, day & night operational capability** using an **Imaging Infrared (IIR) Seeker**.
  - **Thermal imaging sighting system** ensures effective targeting in low-visibility conditions.
- **Range:** Capable of engaging targets between **500 meters and 4 k**m.

Ferrihydrite: The Iron-Rich Mineral Linked to Mars' Red Color

A new study has revealed that Martian red colour is due to ferrihydrite than previously thought, hematite, present in the planet's dust.

About Ferrihydrite

- **Ferrihydrite ($Fe_5HO_8 \cdot 4H_2O$)** is a **poorly crystalline iron oxide-hydroxide mineral**.
- It is a **nanoparticle-sized, rust-like compound** that commonly forms in **cool, watery environments** on Earth.
- It is a precursor to more stable iron oxides, **e.g. hematite, goethite.**
- It is used in sequestration of heavy element contaminants.

Ferrihydrite and Mars' Red Color

- Scientists suspect that **Mars' iron-rich surface may contain ferrihydrite** or its transformed products.
- Unlike **dry oxidation (which creates rust without water)**, ferrihydrite forms in **cool, wet conditions**, suggesting that Mars had **stable liquid water** in the past.
- Over time, ferrihydrite can **dehydrate and transform into hematite**, another iron oxide that gives Mars its red hue.
- This supports the hypothesis that **Mars had long-lasting water activity, rather than just short bursts of wet conditions**.

Euclid Space Telescope

- The Euclid Space Telescope has discovered a new Einstein ring, named Altieri's ring, in the nearby galaxy NGC 6505.

About Euclid Space Telescope

- **Launched by ESA** on **July 1, 2023**, to explore the **dark universe**, including **dark matter** and **dark energy**.
- **Aim:** To map the **large-scale structure** of the universe and track cosmic evolution.

Mission Objectives

- **Understanding Dark Energy:** Studying its role in the universe's expansion.
- **Mapping Dark Matter:** Using **gravitational lensing** to analyze its distribution.
- **Studying Galaxy Evolution:** Observing **billions of galaxies** over **10 billion years** to understand their formation.

Key Features

- **Positioned at Lagrange Point 2 (L2),** 1.5 million km from Earth, minimizing interference.
- **Wider field of view** than the Hubble Space Telescope, enabling efficient sky scanning.
- Over **six years**, it will survey **one-third of the sky** and billions of galaxies.

About Einstein Ring

- A **ring-shaped pattern of light** caused by **gravitational lensing**.
- Forms when light from a **distant galaxy** bends around a **massive foreground object** (like a galaxy or cluster).
- This bending creates a **circular ring** around the **closer object**.
- **Rare phenomenon**—less than **1% of galaxies** produce them.
- The **first Einstein ring** was discovered in **1987**; only a few have been found since.
- **Not visible to the naked eye**, requiring **powerful space telescopes** like **Euclid** and **Hubble** to observe.

Neonatal sepsis

- A recent study highlighted that more than one-third of newborns diagnosed with sepsis could die, emphasizing the urgent need for improved infection prevention and antibiotic management.

About Neonatal Sepsis

- **Definition:** A **bloodstream infection** affecting infants younger than **28 days**.
- **Common Causes:** Bacteria like **Escherichia coli (E. coli), Listeria**, and **Streptococcus** (especially **Group B Streptococcus (GBS)**).

Symptoms

- **Temperature instability** (fever or low body temperature)

- **Breathing difficulties**
- **Diarrhea** or **reduced bowel movements**
- **Low blood sugar levels**
- **Decreased activity** or **weak movement**
- **Poor sucking reflex**
- **Seizures**
- **Abnormal heart rate** (too slow or too fast)
- **Abdominal swelling**
- **Vomiting**
- **Jaundice** (yellowing of the skin and eyes)

Types of Neonatal Sepsis

- **Early-Onset Sepsis (EOS):** Occurs within the **first 72 hours** (some experts extend it to **7 days**).
- **Late-Onset Sepsis (LOS):** Develops **after 72 hours of birth**.

Global Impact

- A leading cause of **illness and death** among newborns, especially in **middle- and low-income countries**.
- Timely **diagnosis and treatmen**t are crucial for survival.

Tea's Ability to Remove Heavy Metals

- According to a new study **properly brewed tea can help filter heavy metals** like **lead and cadmium** from water.

How Tea Adsorbs Heavy Metals

- The process involved is called **adsorption**, where ions or molecules stick to the surface of another molecule, forming a film on it.
- Heavy metal ions attach to the surface of tea leaves and remain trapped there, preventing them from entering the brewed tea.
- **Key takeaways from the study:**
  - A standard cup of tea can remove up to 15% of lead.
  - Longer steeping times (e.g., overnight iced tea) remove more metals.
  - Cellulose tea bags are more effective than nylon or cotton bags.
  - Finely ground black tea adsorbs more metals due to its increased surface area.

Hanta Virus

- It is a **rodent-borne virus** that causes **severe respiratory or renal diseases** in humans.
- This disease has a **high fatality rate.**
- The two main diseases caused by hantavirus are:
  - **Hantavirus Pulmonary Syndrome (HPS)** – Found in North and South America.
  - **Hemorrhagic Fever with Renal Syndrome (HFRS)** – Found in **Europe and Asia**.
- **How is Hantavirus Transmitted?**
  - Inhalation of virus particles from dried rodent urine, droppings, or saliva.
  - Direct contact with rodent urine, droppings, or nesting materials.
  - Bites from infected rodents (rare).
  - Eating contaminated food or drinking contaminated water.
  - It does **NOT spread from person to person.**
- **Symptoms:** Flu-like symptoms (fatigue, fever, muscle aches), Severe shortness of breath,
- Lungs fill with fluid etc.
- Presently **no cure is available**, but early medical care improves survival.

Genetically-Engineered Non-Browning Banana

- Scientists have developed a genetically-engineered banana with a longer shelf-life to reduce food waste.

Why Do Bananas Turn Brown?

- Bananas undergo a natural ripening process due to the hormone **ethylene**, which they produce in large amounts, even after being harvested.
- Ethylene triggers genes responsible for producing **polyphenol oxidase (PPO)**—an enzyme that causes browning when it reacts with oxygen.
  - **PPO breaks down yellow pigments**, causing the fruit to turn brown.

- Scientists **disabled the gene responsible for PPO production** without affecting the ripening process.
- The technique has also been applied to tomatoes, melons, kiwifruits, and mushrooms.
- **Significance of the Development:**
  - **Reducing Food Waste: Up to 50% of bananas** go to waste annually.
  - **Environmental Benefits:** Food waste is a major contributor to **greenhouse gas (GHG) emissions**.

It is natural for bananas to turn brown. Wikimedia Commons

75/25 Initiative

- It was launched by the Union Ministry of Health & Family Welfare on **World Hypertension Day (May 17, 2023).**
- It aims to provide **standardized care to 75 million people** suffering from **Hypertension and Diabetes** by **December 2025**.
- **Objective:**
  - Address the **growing burden of Non-Communicable Diseases (NCDs)** in India.
  - Ensure **timely screening, diagnosis, and treatment** for individuals aged **30 years and above**.
  - Improve **access to healthcare services** at **primary, secondary, and tertiary** levels.
- **Hypertension and Diabetes** are two of the most **prevalent** NCDs in India.
  - **Other major NCDs include**: Oral Cancer, Breast Cancer, Cervical Cancer.
- **Progress So Far:**
  - **42.01 million people** treated for **hypertension**.
  - **25.27 million people** treated for **Diabetes**.
  - **Total achievement:** 89.7% of the target (75 million).

HISTORY, ART & CULTURE

TOPICS FOR MAINS

Third Battle of Panipat (1761)

Syllabus Mapping: GS I - Salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

Context:

The Chief Minister of Maharashtra described the Third Battle of Panipat as a symbol of Maratha valor during a discussion in the State Assembly.

The battle was fought between the **Maratha Empire** and a **coalition led by Ahmad Shah Durrani (Abdali)**, which included **the Rohilla Afghans and Shuja-ud-Daula, the Nawab of Oudh**. It is considered one of the largest and bloodiest battles of the 18th century.

Background

- The **Mughal-Maratha War (1680–1707)** resulted in territorial losses for the Marathas.
- Under **Peshwa Baji Rao**, the Marathas expanded into Gujarat, Malwa, and Rajputana.
- In **1737**, the Marathas defeated the Mughals near **Delhi**, extending their control south of Agra.
- By **1758**, the Marathas had invaded Punjab, removing **Timur Shah Durrani** (son of Ahmad Shah Abdali).
- This expansion brought them into direct conflict with **Ahmad Shah Abdali**, the ruler of Afghanistan.

Ahmad Shah Abdali's Invasions

- **Nadir Shah's invasion (1738-39)** weakened Mughal authority.
- **Ahmad Shah Abdali** became the ruler of Afghanistan in **1747** after Nadir Shah's assassination.
- He launched multiple invasions into India between **1748 and 1767**.
- In **1757**, he captured **Delhi**, installed his own administration, and appointed **Najib-ud-Daula** as Mir Bakshi.
- In **1758**, Marathas under **Raghunath Rao** expelled **Najib-ud-Daula** and took over Punjab, challenging Abdali's power.

Expansion of the Maratha Empire

- From **1712 to 1757**, the Marathas gained significant territories.
- By **1758**, they controlled **Delhi, Punjab, and Lahore**, pushing Abdali's influence back.
- The Maratha expansion alarmed **Muslim leaders like Shah Waliullah**, who invited Abdali to counter the Marathas.
- The Marathas sought alliances with **local rulers**, but many remained neutral.

Immediate Causes of the Battle

- Marathas aimed to consolidate power in **North India**, but Abdali sought to reclaim lost territory.
- Abdali gathered allies like the **Rohillas (Najib-ud-Daula) and Shuja-ud-Daula**.
- The Marathas, led by **Sadashivrao Bhau**, marched north with a large army.
- Initial victories at **Kunjpura** boosted Maratha confidence, but they failed to block Abdali's movements.

Results of the Battle

- **Casualties:**
  - **60,000–70,000** soldiers were killed, making it one of the deadliest battles.
  - The Maratha leadership suffered heavy losses, including **Sadashivrao Bhau** and **Vishwas Rao**.
- **Defeat of the Marathas:**
  - Abdali's forces had **superior artillery** and **tactical unity**.
  - Lack of support from **local rulers** weakened the Marathas.
  - The **Maratha army was far from its capital (Pune), causing supply issues**.
- **Political Impact:**
  - The **Maratha Empire's expansion was halted**, leading to a period of decline.
  - **Ahmad Shah Abdali reinstated Mughal rule in Delhi** under **Shah Alam II**.

- The power vacuum after this battle contributed to **British expansion in India**.

Significance of the Battle

- **Weakened Maratha Power:**
  - The empire took nearly a decade to recover.
- **Rise of Regional Powers:**
  - The battle allowed **Sikhs, Rajputs, and Jats** to gain prominence.
- **Maratha Resurgence (1771):**
  - **Mahadji Shinde** led a campaign to **re-establish Maratha control in North India**.
- **British Ascendancy:**
  - The defeat paved the way for the **British East India Company** to expand.
- **Cultural Impact:**
  - The battle remains a major theme in **Indian history, literature, and folklore**.

TOPICS FOR PRELIMS

Six sites added to India's tentative list by UNESCO

Syllabus Mapping: GS I - Salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

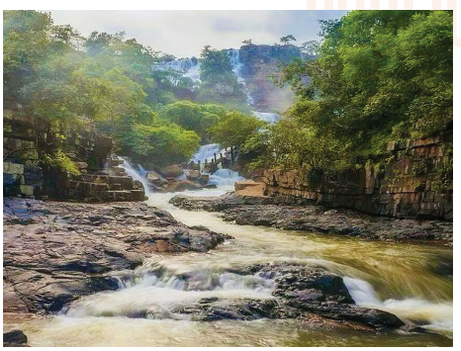
Context

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) has added six new sites from India to its Tentative List.

What is UNESCO's Tentative List:

- The **Tentative List** is an inventory of properties a country **intends to consider** for nomination to the **World Heritage List**.
- Inclusion in the tentative list is **mandatory** before a site is formally nominated.
- It helps UNESCO assess the site's **potential Outstanding Universal Value (OUV)**.
- India now has **62** sites on the Tentative List.

Sites Added

Name of Site	Key Features
1. Kanger Valley National Park 	• **Location:** Bastar District (Chhattisgarh). • It draws its name from **Kanger river. Tirthagarh waterfalls.** • Home to **limestone caves** (Kotumsar, Kailash, Dandak) and rare **blind cave fish**. • **Dense forests** with **Dandakaranaya**, linked to **Ramayana.**
2. Mudumal Megalithic Menhirs 	• They are located near the banks of **Krishna River, Telangana.** • They are estimated to be **3500-4000 years old.** • A menhir is a standing or an upright stone, which is usually tapered at the top. • It is one of **India's largest and best-preserved** megalithic astronomical observatories. • It is the only South Asian site featuring **celestial representations on stone**.

Name of Site	Key Features
3. Ashokan Edict Sites along the Mauryan Routes. 	• **Edicts of Emperor Ashoka** (**3rd Century BCE**) spread across India. • Inscribed on **rocks, pillars, and caves** in **Prakrit using Brahmi script**. • They depict the moral **and administrative policies of Ashoka** and spread of **Buddhism**.
4. Chausath Yogini Temples 	• **Circular temples** dedicated to **64 Yoginis** (**Tantric goddesses**). • Located in **Madhya Pradesh, Odisha, Uttar Pradesh** and Tamil Nadu. • Built between **8th–12th centuries**, early inspiration for **Parliament House design**.
5. Gupta Temples in North India 	• **Gupta period (4th–6th century CE) temples** showcasing **Nagara-style architecture**. • **E.g.** Dashavatara Temple (Deogarh), Bhitargaon Temple (UP), Eran Temple (MP). • Their architectural design combines elements of both Buddhist and Hindu styles. • Most of the Gupta temples are made of sun-dried bricks and terracotta, with some made in sandstone. • The temples had a basic square plan and flat roof with a circumambulatory path, a low height **shikhara** & doorways were mainly **T-shaped** with decorative bands.
6. Palace-Fortresses of the Bundelas 	• Built by **Bundela Rajputs (16th–19th century)**. • **Six forts:** Garhkundar fort, Raja Mahal, Jahangir Mahal, Datia Palace, Jhansi Fort & Dhubela Palace. • Blend of **Rajput and Mughal architectural styles.**

25th Jahan-e-Khusrau Sufi Music Festival

Syllabus Mapping: GS I - Salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

Context

Prime Minister Narendra Modi inaugurated the **25th edition** of the Jahan-e-Khusrau Sufi Music Festival at Sunder Nursery, New Delhi.

About Jahan-e-Khusrau Festival

- It is a leading **Sufi music festival in India**, celebrating the **spiritual and poetic legacy of Hazrat Amir Khusrau**.
- It was founded in **2001** by **Muzaffar Ali**, an acclaimed filmmaker and artist, under the patronage of the **Rumi Foundation**.
- It promotes **interfaith harmony, cultural diversity and musical heritage**.
- The festival has featured **renowned Sufi musicians from India, Pakistan, Iran, Turkey, and beyond**.

About Amir Khusrau (1253-1325)

- Amir Khusrau was a **13th-century poet, musician, and scholar** who played a **pivotal role in shaping India's syncretic culture**.
- He was given the title of **"Parrot of India" (Tuti-yi-Hind) by Alauddin Khilji.**
- He is regarded as a **pioneer of Hindavi poetry, Sufi qawwali, and Indian classical music**.
- He served five Delhi sultans over years.
- He was the **most beloved disciple** of **Hazrat Nizamuddin Auliya**, the renowned **Chishti Sufi saint** of Delhi.
- **Famous Works:** Masnavi Nuh Siphir (The Nine Skies)
- **Famous Qawwalis:** Chhaap Tilak Sab Chheeni, Zehal-e-Miskeen.

NEWS IN SHORTS

Gold Rush at Asirgarh Fort

About Asirgarh Fort: The 'Key to the Deccan'

- **Location:** Situated in **Satpura Range**, around **20 km from Burhanpur city** (Madhya Pradesh).
- It is built at an altitude of **701 meters above sea level**, offering a **commanding view of surrounding lands**.
- Asirgarh Fort is **associated with many legends of buried treasure**, especially **gold from the Mughal era**.

Historical Significance

- **Early History & Construction:**
  - It was built by Asa Ahir, a local chieftain, in the **15th** century.
  - Later **captured by the Faruqi dynasty** of Khandesh, who ruled Burhanpur.
- **Mughal Era:**
  - **Akbar captured Asirgarh in 1601** after a long siege, marking the **final conquest of Khandesh** into the Mughal Empire.
  - The fort became **a crucial military base for Mughal campaigns in the Deccan**.
- **Later Control:**
  - Passed into the hands of **Marathas, Scindias, and eventually the British in 1819**.
  - The British **used it as a garrison** due to its **strategic location**.

PEPSU Muzhara Movement

- It was an agrarian struggle led by landless tenant farmers (muzharas) in Punjab.
- It aimed at land ownership rights against feudal landlords (biswedars).
- It originated in the 1930s, intensified post-independence in PEPSU (Patiala and East Punjab States Union).
- **Key Leaders–** Jagir Singh Joga, Buta Singh, Teja Singh Sutantar, Sewa Singh Thikriwala, Bhai Jodh Singh – mobilized and led resistance.

- **About Muzharas**
  - They were tenant farmers forced to share one-third of produce with landlords.
  - They were originally small landowners, but lost land under British policies.
  - They were oppressed by the feudal system controlled by biswedars.

Indira Gandhi National Centre for Arts (IGNCA)

- **IGNCA** is a premier cultural institution in India dedicated to **preserving, promoting and documenting India's rich artistic and cultural heritage**.
- It functions as an **autonomous body under the Ministry of Culture, Government of India**.
- It was established in **1985. (HQ- New Delhi)**
- Notable Initiatives:
  - **National Cultural Audiovisual Archives (NCAA)** – A digital repository for India's cultural heritage.
  - **Bharat Vidya Prayojana** – A research program on Indian civilization and knowledge systems.
  - **Adopt a Manuscript Program** – Initiative to preserve and digitize rare manuscripts.

Tomb of Aurangzeb

- Recent events in **Nagpur** have brought renewed attention to the **tomb of Mughal emperor Aurangzeb**.

About Aurangzeb

- Aurangzeb Alamgir was the **sixth Mughal emperor**, ruling from **1658 to 1707**.
- His reign was the **longest of any Mughal ruler (49 years)** and marked both the empire's **greatest territorial expansion** and its **eventual decline.**
- He expanded the Mughal Empire to its **largest extent**, covering almost **all of present-day India, Pakistan, Bangladesh and parts of Afghanistan**.
- He reimposed **jizya tax** on non-Muslims (removed by Akbar).
- He introduced **Fatawa-e-Alamgiri**, a compilation of Islamic laws & Banned music and dance in court (unlike earlier Mughal rulers).

Aurangzeb's Burial in Maharashtra

- Aurangzeb ruled for **almost 50 years**, but in his final years, his empire was **collapsing** due to: **Agrarian crisis, Nobility deserting him & Maratha resistance** in the Deccan.
- He died during a **military campaign against the Marathas** in the Deccan at the age of **nearly 90**.
- His last wish was to be **buried in a simple tomb**, in line with **Islamic austerity**.
- His grave is located in the **dargah complex of Sheikh Zainuddin (14th-century Chishti Sufi saint) in Khuldabad, Maharashtra.**

Sarhul Festival

- Sarhul, literally "**worship of the Sal tree**", is among the most revered Adivasi festivals.
- It signifies nature worship and marks the arrival of spring.
- Sarhul also symbolizes the marriage between the Earth and the Sun.
- **Region & Tribes**: It is celebrated in Jharkhand and the Chhotanagpur region by **the Oraon, Munda, Santal, Khadia, and Ho** tribes.
- **Time of celebration:** It is observed on the third day of the moon in Chaitra (Hindu calendar), marking the arrival of spring (Phaagun) and continuing till Jeth (June).
- **Religious & Cultural Significance:** The festival honors **Sarna Maa**, the deity residing in Sal trees, at Sarna Sthals (sacred groves).

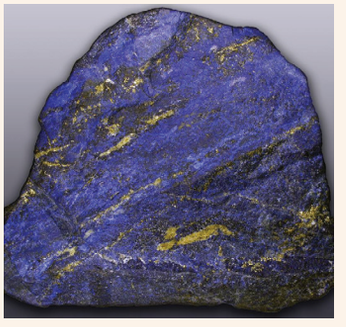
Warli Art

- It is a traditional tribal art form. It originated with the **Warli tribe which resides in North Sahyadri Range of Maharashtra.**
- It uses basic geometric shapes—**circles, triangles and squares** to depict everyday village life, rituals, and nature, with scenes of hunting, fishing, farming, festivals and dances.
- Traditionally, the art was created on the walls of mud huts using natural pigments like **rice paste (for white) and mud-brown from the earth.**
- **Bamboo sticks** were used as paintbrushes, and the paintings were often created by women of the Warli tribe.

Navroz Festival

- Navroz, also known as Nowruz, is the Persian New Year and marks the beginning of spring in the Northern Hemisphere.
- It is celebrated on **March 20 or 21**, aligning with the **spring equinox**.
- Associated with **Zoroaster**, the founder of **Zoroastrianism**, and has been celebrated for over **3,000 years**.
- **UNESCO** included Nowruz in its **Representative List of the Intangible Cultural Heritage of Humanity in 2009.**
- It was introduced in India by the **Delhi Sultan, Ghiyas-ud-din Balban.**

Lapis Lazuli: The Vivid Blue Gemstone



- Lapis Lazuli is a **deep blue metamorphic rock** composed of **25-40% lazurite**, which gives it its vivid blue color.
- **Mineral Content:** It contains calcite (which can reduce its blueness), pyrites (adding a golden sparkle), diopside and sodalite in smaller amounts.
- **Mining:** It is found in Chile, Russia and Afghanistan.
  - **Highest quality**: Found in **Badakhshan province, Afghanistan**, where mining has continued for over **6,000 years**.
- **Historical Significance:**
  - **India**: Traders imported lapis lazuli from Badakhshan **as early as 1000 BC**.
  - **Indus Valley Civilization (Mohenjo-daro & Harappa)**: Used for **ornamental jewellery**.

Revival of Vikramshila University

- The **Archaeological Survey of India (ASI)** is working to develop Vikramshila University as a **tourist attraction**.

About VikramShila University

- It was one of the most renowned centers of Buddhist learning in **ancient India**, alongside **Nalanda University**.
- **Location:** Antichak village, Bhagalpur district, Bihar
- It was founded by **Pala King Dharmapala** in the **late 8th or early 9th century AD**.
- It specialized in **Tantrayana Buddhism**, focusing on **tantric practices and rituals**.
- It flourished during the **Pala period (8th–12th century AD)**.
- **Notable Scholars:**
  - **Atisa Dipankara Shrijnana** – A great Buddhist scholar from Vikramshila who was instrumental in **reviving Buddhism in Tibet**.

Global Engagement Scheme

- Nodal Ministry– **Ministry of Culture**
- The Scheme aims to promote India's rich cultural heritage internationally and enhance India's global image.
- It was **previously known as the Scheme for promotion of International Cultural Relations**.
- This scheme is designed to strengthen India's cultural ties with foreign nations, promote bilateral cultural contacts, and project India's cultural identity on the world stage.
- It also **encourages inbound tourism** by showcasing Indian art and traditions globally.
- Major Components: The scheme is **administered through Indian Missions Abroad and consists of three major components**:
  - **Festival of India** – A platform for Indian artists to perform internationally.
  - **Grant-in-Aid to Indo-Foreign Friendship Cultural Societies** – Financial assistance to foreign cultural societies that promote Indian culture.
  - **Contribution Grant to International Organizations** – Funds allocated to international cultural organizations of which India is a member.

Project PARI (Public Art of India)

- It is a collaborative initiative by: **Ministry of Culture, Lalit Kala Akademi & National Gallery of Modern Art (NGMA).**
- **Objective:**
  - Revitalize **India's public art landscape**.
  - Promote **traditional and modern art forms** in public spaces.
  - **Encourage dialogue and artistic inspiration**.

Jalantheeswarar Temple (Thiruvooral)

- Jalantheeswarar Temple is dedicated to **Lord Shiva**.
- It is located in Thakkolam, a village in **Vellore district, Tamil Nadu**.
- In this temple, Shiva is worshipped in the form of a Lingam under the name Jalantheeswarar, while his consort Parvati is known as Giriraja Kannikambal.
- This temple is classified as a Paadal Petra Sthalam, as it is mentioned in the Tevaram, the 7th-century Tamil Saiva canonical work composed by the **Nayanar saints.**
- The temple is believed to have been **originally built by the Pallavas and later expanded during the Chola period.**
- The temple has four **inscriptions from the 10th and 11th centuries**, which provide details about women engaged in temple activities.
- Architectural Features: The temple complex spans approximately 1.5 acres, featuring a **three-tiered gopuram** (gateway tower) and **concentric granite walls**. The main sanctum houses the deity Jalantheeswarar in the form of a lingam made of sand.

Kamba Ramayana

- The Kamba Ramayana, also called Ramavataram, is a Tamil adaptation of Valmiki's Sanskrit Ramayana.

Authorship and Patronage

- **Author:** Tamil poet Kambar, a literary genius of the 12th century CE.
- **Patron:** Thiruvennai Nallur Sadayappa Vallal, whose name is mentioned every 1,000 verses as a token of gratitude.

Historical and Cultural Significance

- **Time Period:** 12th century CE.
- **Regional Connection:** Strongly associated with Tamil Nadu, particularly Therazhundur, Kambar's birthplace.
- **Language:** Classical Tamil, reflecting Tamil devotion, literature, and folklore.

Composition Structure

- Divided into **6 Kandams (books)** and **113 Padalams (sections)**.
- Comprises approximately **10,569 verses**.
- Merges **Tamil folk traditions** with **philosophical and spiritual themes**.

Traditional and Contemporary Influence

- Recited by the **Kamba Ramayana Mandali** in temples as part of religious traditions.
- Government and cultural organizations are working to **revive its oral tradition**.

Who Was Kambar

- Kambar, honored as **Kavichakravarthy Kamban (Emperor of Poets),** was a distinguished Tamil poet known for his masterful composition of the Ramavataram.
- His works significantly enriched Tamil literature with ethical and spiritual depth.

Life and Era

- **Birthplace:** Therazhundur, in present-day Mayiladuthurai district, Tamil Nadu.
- **Time Period:** Estimated lifespan between **1180 CE – 1250 CE**.
- **Kingdom:** Flourished under the **Chola Empire**, during the reign of **Kulothunga III**.
- **Influences:** Lived after Vaishnavite philosopher **Ramanuja**, whom he referenced in his writings.

Major Works and Contributions

1. **Kamba Ramayanam:** A Tamil retelling of the Ramayana, blending classical poetry with rich cultural and spiritual insights.
2. **Other Literary Contributions:**
   - Tirukkai Valakkam – Ethical and moral verses.
   - Erelupatu & Silai Elupatu – Spiritual compositions.
   - Kangai Puranam – A temple-centric mythological text.
   - Sadagopar Antati & Saraswati Antati – Devotional poetry.