WEEKLY

4 APRIL - 10 APRIL 2025

CURRENT AFFAIRS

For UPSC, PCS and Other Exams | Pre & Mains Practice Questions

Dhokra Art- a Traditional Metal Casting Technique

Undersea Cables and India's Digital Infrastructure

*GS3 – Infrastructure / Digital Economy*

Context:
India is strengthening its international digital connectivity with new undersea cable landings, including **SEA-ME-WE 6** and **2Africa Pearls**, with major hubs at Mumbai and Chennai.

Significance of Undersea Cables:

- Carry **~90% of global data** and enable global internet & financial transactions.
- Essential for **AI integration, cloud computing**, and **digital trade**.

India's Status:

- **17 cable systems**, domestic projects like CANI & Kochi-Lakshadweep.
- **Project Waterworth (Meta)**: 50,000 km long, aimed at expanding bandwidth and AI access.
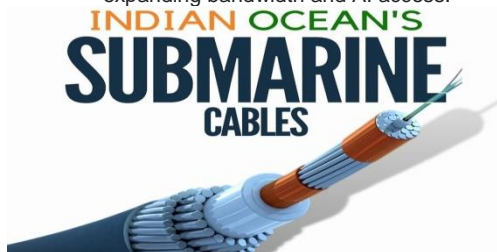
Challenges:

- **Regulatory delays**, lack of **repair vessels**, and **high-risk zones** (e.g., Red Sea disruptions).
- **Future demand** may outstrip existing capacity.

Suggestions:

- Categorize as **critical telecom infrastructure**.
- Streamline approvals, develop repair capabilities.
- Set up dedicated **subsea cable corridors** to avoid damage.

Prelims Facts:

- **Optical Fibers** work on **Total Internal Reflection (TIR)**.
- **SEA-ME-WE 6** connects Singapore to France, covering 21,700 km.

Coastal Shipping Bill, 2024

GS3 – Economy / Infrastructure

Context:
Lok Sabha passed the **Coastal Shipping Bill, 2024**, to revamp India's coasting trade laws and promote maritime logistics.

Key Provisions:

- Repeals Part XIV of **Merchant Shipping Act, 1958**.
- Covers all vessels incl. ships, boats, offshore rigs.
- Expands definition of coasting trade (includes exploration & research).
- **License-free** for Indian-owned vessels; licenses required for others.
- Penalties made **civil**, up to ₹15 lakh.

Institutional Measures:

- DG Shipping to issue licenses.
- **National Coastal Shipping Database** for better coordination.
- **Strategic Plan** to be formulated within 2 years.

Impact:

- **Boost to Indian shipbuilding**, employment, and port logistics.
- Eases compliance, reduces reliance on foreign vessels.
- Aligns with **Sagarmala, MIV 2030**, and **Green Tug Transition** goals.

India's Maritime Vision:

- Coastal cargo rose **119% (2014–24)**; goal: 230 MT by 2030.
- Targeting **1000 new ships**; $82 billion planned investments by 2035.
- **Port ranking** improved to 38th globally (2023).

Associated Schemes:
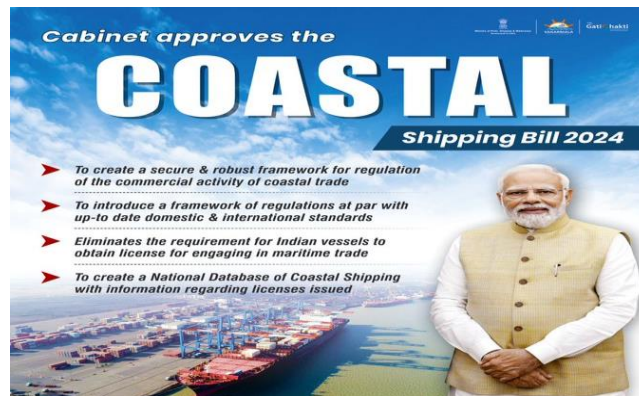
- **Sagarmala, MIV 2030, Maritime Dev. Fund (₹25,000 cr)**, **Shipbuilding Financial Assistance Policy (SBFAP 2.0)**.

USA's 'Reciprocal Tariffs' and Impact on India

GS2 – International Relations; GS3 – Economy / Trade

Context:
US President Trump imposed **'reciprocal tariffs'** (10–50%) on global imports, targeting trade imbalances. India faces a **26% tariff**.

What are Reciprocal Tariffs?

- Retaliatory trade measures mimicking partner nation's duties.
- Aimed at **level playing field** and addressing **non-tariff barriers**.

Impact on India:

- **Sectors hit:** Textiles, electronics, gems & jewellery.
- Pharmaceuticals and energy exports **exempt**.
- India may cut tariffs on **US goods** (e.g., gems, auto parts) to stabilize ties.

Comparative Advantage:

- India's 26% tariff lower than other countries (e.g., Vietnam – 46%, China – 34%).
- Could **enhance India's competitiveness** in US markets.
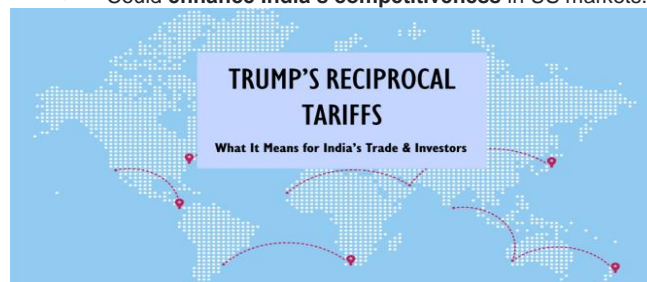
India-USA Trade Snapshot (2024):

- Total trade: **$129.2 bn**.
  - US exports to India: $41.8 bn
  - US imports from India: $87.4 bn
- US trade deficit with India: **$45.7 bn**

Broader Implications:

- Raises **global trade tensions**, may escalate into **trade wars**.
- Triggered **market volatility** and **retaliatory tariffs** by affected nations.

Conclusion:
While the tariffs pose short-term export challenges, India can leverage its **comparative advantages** to retain a foothold in the US market and deepen **strategic economic cooperation**.

Forest Rights Act (FRA), 2006

Syllabus: GS2 – Governance | Welfare Schemes for Vulnerable Sections | Government Policies and Interventions

Context:
Civil society groups allege that the government has failed to review rejected claims under FRA ahead of a Supreme Court hearing, raising concerns over implementation and data transparency.

About the FRA, 2006:

- Enacted to recognize **historical injustices** against **Scheduled Tribes (STs)** and **Other Traditional Forest Dwellers (OTFDs)**.
- Grants **legal rights** over forest land, minor forest produce, and traditional livelihood resources.

- **Empowers Gram Sabhas** to verify and approve claims.
- Includes **individual and community rights** over land, forest produce, grazing areas, and traditional knowledge.
- Seeks to prevent **eviction without proper rehabilitation**, in line with the Land Acquisition Act, 2013.

Rights for the dwellers

What the Forest Rights Act, 2006, entails

- Tenurial security over the forestland under occupation prior to December 13, 2005
- Recognition of community right over forest and forest products
- Protection and conservation of community forest resources
- Conversion of all forest villages and habitation located inside the forestland into revenue villages
- In situ rehabilitation of displaced persons evicted without compensation prior to December 13, 2005
- Recognition of ancestral domain (habitat) right to

Residents of Gunduribadi village in Odisha's Nayagarh district get ready for mapping their land boundaries for the Forest Rights Act implementation. ■ SPECIAL ARRANGEMENT

Particularly Vulnerable Tribal Groups
- Seasonal access to nomadic, pastoral and semi-nomadic communities over forestland

- Conversion of all leases granted by erstwhile governments, zamindars and king into permanent land records
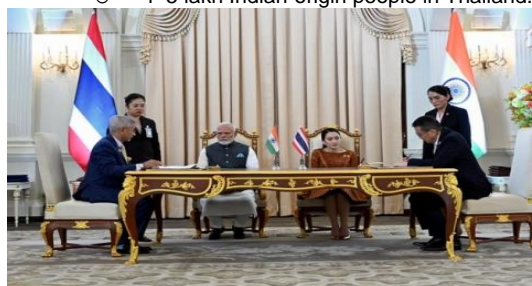
Evolution:

- Colonial forest laws excluded tribal communities from forest management.
- **National Forest Policy, 1988** emphasized tribal participation in forest protection.
- FRA enacted in 2006 to provide **tenurial security**, protect **livelihoods**, and ensure **environmental justice**.

Key Issues and Challenges:

- **117 land conflicts** related to FRA (since 2016), affecting over **6 lakh people**.
- Major concerns:
  - **Poor implementation** (88%)
  - **Lack of legal protection** (49%)
  - **Forced evictions** (41%)

- Rejected claims often lack transparency; **due process not followed**, especially in **LWE-affected tribal areas**.
- **Gram Sabhas under-informed**; many claimants are **illiterate and unaware** of legal procedures.

Way Forward:

- FRA is key for **tribal empowerment** and **sustainable forest governance**.
- Requires:
  - **Transparent review** of rejected claims
  - **Capacity building** of Gram Sabhas
  - **Awareness campaigns** among forest dwellers
  - **Better data reporting and monitoring** mechanisms

India–Thailand Strategic Partnership

(GS2 – International Relations; India & ASEAN/BIMSTEC)
Context
PM Modi visited Thailand for the 6th BIMSTEC Summit. A new India–Thailand Strategic Partnership was declared.
Key Highlights of the Partnership

- **Historical Ties**: Diplomatic ties since 1947; 75th anniversary in 2022.
- **Policy Synergy**: India's *Act East* aligns with Thailand's *Act West*.
- **Multilateral Engagements**: ASEAN, BIMSTEC, MGC, IORA, EAS, ACD, ACMECS.

Key Areas of Cooperation

- **Defence**:
  - MoU on Defence Cooperation (2012).
  - Joint patrols, annual dialogues, and multilateral exercises.
- **Trade & Economy**:
  - Bilateral trade reached USD 17.5 billion (2024).
  - India = Thailand's 11th largest trade partner.
- **Connectivity & Tourism**:
  - 400+ weekly flights across 15 Indian cities.
  - India offers e-tourist visas; Thailand gives 60-day visa-free entry.

- **Education**:
  - MoU (2005); 75 scholarships + 100 ASEAN Ph.D. fellowships for Thai students.
- **Culture & Diaspora**:
  - Vivekananda Cultural Centre, CEP 2022–27.
  - 4–5 lakh Indian-origin people in Thailand.

Recent Developments

- Strategic Partnership established to deepen collaboration across defence, trade, culture, education, and health.

India–Bangladesh Relations: Developments & Issues

(GS2 – International Relations; India & Neighbourhood)
Context
PM Modi met Bangladesh's new Chief Adviser on the sidelines of BIMSTEC Summit.
Historical Milestones

- 1971: India supported Bangladesh's liberation.
- 1974: Land Boundary Agreement (ratified in 2015).
- 1996: Ganges Water Sharing Treaty.
- 2011: Teesta Agreement drafted (not signed).
- 2021: 50 years of diplomatic relations.
- 2022–24: Revival of rail and water links.

Key Dimensions of Cooperation

- **Strategic & Political**:
  - 70+ bilateral mechanisms.
  - Cooperation in border management, security, and infrastructure.
- **Trade & Economy**:
  - Bilateral trade: USD 14.01 billion (2023–24).
  - Duty-free access for Bangladeshi goods under SAFTA.
- **Connectivity**:
  - Rail links (e.g., Maitri, Bandhan, Mitali Express).
  - Port access (Chittagong, Mongla) for India's NE transit.
  - Inland waterways via PIWTT.
- **Energy**:
  - Diesel pipeline (IBFPL, 2023).
  - Collaboration in solar and hydro energy.
- **Culture & People-to-People**:
  - Scholarships, Maitree Diwas, linguistic ties (esp. with West Bengal).

Key Challenges

- **Teesta Water Dispute**: Long-pending due to political resistance in India.
- **Border Management**: Illegal migration, smuggling, occasional clashes.
- **China Factor**: Growing Chinese presence in infrastructure and defence.
- **Migration & NRC-CAA Tensions**: Fear of demographic influx; diplomatic sensitivity.

- **Trade Issues**: Bangladesh's concerns on non-tariff barriers and trade imbalance.
- **Minority Rights**: India's concern over treatment of Hindus in Bangladesh.

Way Forward

- **Sustained Dialogue**: High-level talks and CBMP for smoother border ties.
- **Inclusive Approach**: Focus on marginalized groups' welfare.
- **Strategic Balancing**: Bangladesh diversifies partners; India avoids dominance perception.
- **Strengthening Connectivity**: Expand trade, energy, and infrastructure links.

Conclusion

India–Bangladesh relations are crucial for regional stability. Navigating issues with pragmatism and cooperation can ensure a robust bilateral partnership aligned with *Neighbourhood First* and *Act East* policies.

BIMSTEC Summit 2025 – Key Takeaways

Context

- 6th BIMSTEC Summit held in Thailand.
- Theme: *"BIMSTEC: Prosperous, Resilient, and Open"*
- Chairmanship handed over to Bangladesh.
- First in-person summit in 7 years.

6th BIMSTEC Summit 2025 – Key Takeaways

📍 Held in Bangkok on April 4, 2025

🔷 Attended by 7 member nations: Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka & Thailand

☀ Theme: Prosperous, Resilient, and Open BIMSTEC

This summit marks a major step in regional cooperation, economic integration & disaster response across the Bay of Bengal region.

India's Major Proposals & Initiatives

- **21-Point Action Plan** proposed by PM Modi.
- **Disaster Management**:
  - BIMSTEC Centre of Excellence in India.
  - 4th Joint Exercises in India (2025).
- **Youth Skilling (BODHI Programme)**:
  - Training & scholarships for students, professionals, diplomats.
  - 300 BIMSTEC youth hosted annually in India.
- **People-to-People Links**:
  - BIMSTEC Athletics Meet 2025.
  - First BIMSTEC Games in 2027.
  - Traditional Music Festival, Hackathon, Young Leaders' Summit.
- **Digital Cooperation**:
  - Pilot on Digital Public Infrastructure.
  - UPI integration with BIMSTEC payment systems.
- **Economic Connectivity**:
  - Proposal for BIMSTEC Chamber of Commerce.
  - BIMSTEC Business Summit.
- **Space & Maritime Sectors**:
  - Nano-satellites & ground stations for BIMSTEC countries.
  - Maritime Transport Centre in India for capacity building.

Summit Outcomes

- **BIMSTEC Bangkok Vision 2030**:
  - Long-term strategic roadmap for trade, transport, and security.
- **Rules of Procedure Adopted**:
  - Institutional strengthening and operational clarity.
- **Eminent Persons Group Report**

  - Strategic recommendations aligned with 2030 vision.
- **Maritime Transport Agreement**:
  - Improved sea connectivity and reduced shipping costs.

About BIMSTEC

- Formed in 1997 via *Bangkok Declaration*.
- Members: Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, Thailand.
- Objective: Promote regional cooperation in economic, social, and technological fields.

India's Changing Remittance Landscape

GS3 – Indian Economy

Key Findings – RBI Remittance Survey (2023-24)

- Total remittances: **$118.7 billion** (from $55.6 bn in 2010-11).
- **Advanced Economies (AEs)** now dominate remittance inflow:
  - **US (28%)**, UK, Singapore, Canada, Australia.
  - **GCC share declined** (UAE down to 19.2%).

INDIA' CHANGING REMITTANCE LANDSCAPE

Top Contributing Countries

- **US**: Largest contributor since FY21 (28% in FY24).
- **UAE**: 2nd largest, but declining trend.
- **Singapore**: Steady rise (6.6% in FY24).

State-wise Impact

- Half of the inflows went to: **Maharashtra, Kerala, Tamil Nadu**.
- Others: Haryana, Gujarat, Punjab (<5% each).

Reasons for Shift

- **GCC Decline**:
  - COVID-19 impact: Job losses, salary cuts.
  - "Saudisation"/localisation policies.
- **AE Rise**:
  - Higher wages, stronger currencies.
  - Rise in **skilled professionals** and **Indian students**.

Implications

- **Higher Per Capita Remittances** from AEs.
- **Larger transfer amounts**: 28.6% of remittances > ₹5 lakh.
- **Wider migration footprint** beyond Gulf nations.

Future Trends

- **Restrictive immigration policies** in AEs may impact permanent migration.
- **Increased remittance as risk diversification** by migrants.
- India poised to be major **labour exporter till 2048** due to demographic advantage.

Policy Recommendations

- Skill harmonisation with destination countries.
- Bilateral/multilateral migration agreements.
- Protection for low-skilled workers from exploitation and deskilling.

India's Coal Boom

GS3 – Economy, Energy Resources, Infrastructure

Context:

India crossed **1 billion tonnes** (BT) of coal production in FY 2024–25 — a historic milestone.

Significance of Coal in India:

- **Energy dependence:** Coal contributes **55%** to India's energy mix and powers **74%** of electricity generation.
- India is the **second-largest consumer** and holds the **fifth-largest reserves** of coal.

Recent Achievements:

- **Production:** Reached **1047.57 MT** in FY 2024–25.
- **Dispatch:** Crossed **1024.99 MT** (Provisional).
- **Imports down by 8.4%**, saving **$5.43 billion** in foreign exchange (April–Dec 2024).

Government Initiatives:

- **Commercial Coal Mining:** Opened to private sector for better efficiency and output.
- **Mission Coking Coal:** Reduce import dependency for coking coal.
- **Coal Mitra Portal:** For flexible allocation of coal to power plants.
- **Safety Reforms:** Upgraded **Coal Mines Regulations (2017)** with modern safety and emergency protocols.

Economic Contribution:

- **Railways:** Coal contributes **49%** of freight income (~₹82,275 crore in 2022–23).
- **Government Revenue:** Over ₹70,000 crore annually via royalties, GST, and levies.
- **Employment:** Over **2.39 lakh** workers in Coal India Ltd + many in contractual roles.

Coal Gasification Initiatives:

- Converts coal to **syngas** for methanol, fertilisers, and Synthetic Natural Gas.
- **₹8,500 crore** approved for promotion of coal/lignite gasification projects.
- **50% revenue share rebate** for coal used in gasification (min. 10% usage required).

Conclusion:

Coal remains **crucial to India's energy security and economic development**.
Efforts like **clean coal technologies**, gasification, and **regulatory modernization** are key to balancing **energy needs and sustainability**.
The sector will play a pivotal role in India's goal of **self-reliance by 2047**.

Land Subsidence in Urban Areas

GS1 – Urbanization Issues

Context

- Belgachia (West Bengal) witnessed land subsidence at a dumping ground, disrupting water and electricity for hundreds.
- Reflects growing man-made urban vulnerabilities.

**What is Land Subsidence?**

- Sinking of ground due to underground material movement (NOAA).
- Causes: Extraction of water/oil/minerals, mining, geological activity.

Notable Instances

- Joshimath (Uttarakhand, 2023): ~65% houses impacted.
- Global examples: Jakarta, Manila, New Orleans, Mexico City.

Causes in Urban Areas

- **Over-extraction of groundwater** – collapses aquifers.
- **Unregulated waste dumping** – weight stresses weak/marshy soil.
- **Rapid urbanization** – high-rise construction without soil assessment.
- **Natural causes** – tectonics, geological faults, karst landscapes.
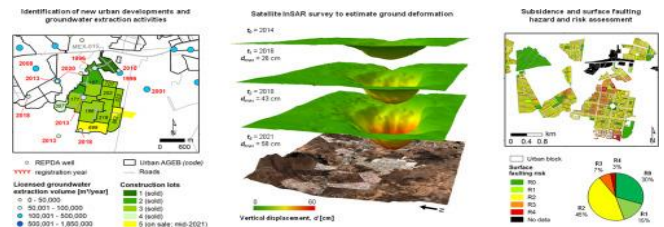
Impacts

- **Infrastructure damage** – roads, pipelines, buildings.
- **Displacement** – low-income/slum populations most vulnerable.
- **Public health risks** – urban flooding, disease, toxic exposure.

Way Forward

- **Scientific landfill management** – segregation, recycling, slope monitoring.
- **Soil testing & early warning systems** – risk prediction & mitigation.
- **Strengthen urban local governance** – elected civic bodies for accountability.
- **Inclusion of ragpickers** – integrate into formal waste systems.

World Health Day 2025

GS2 – Health

Context

- Observed on **7 April** annually to raise awareness about global health challenges.
- **2025 Theme**: *"Healthy Beginnings, Hopeful Futures"* – focuses on **maternal and newborn health**.

Global Concerns

- ~**300,000 maternal deaths** annually.
- **2 million newborn deaths** + **2 million stillbirths** yearly.
- 4 out of 5 countries are off-track to meet **2030 maternal survival targets**.

India's Progress

Maternal and Child Mortality

- **MMR**: Dropped from **130 (2014-16)** to **97 (2018-20)** per 1 lakh live births.
- **IMR**: From **39 (2014)** to **28 (2020)** per 1,000 live births.
- **NMR**: From **26 (2014)** to **20 (2020)** per 1,000 live births.

Key Government Initiatives

- **MDSR**: Identifies causes of maternal deaths; implements corrective action.
- **RCH Portal**: Tracks pregnant women & newborns for timely care.
- **Anaemia Mukt Bharat (AMB)**: Under POSHAN Abhiyan for anaemia prevention.
- **National Health Mission (NHM)**: Strengthens maternal & child healthcare, especially in rural areas.
- **Ayushman Bharat Digital Mission (ABDM)**: Digital ecosystem for healthcare access.

Disease Control Achievements

- **Malaria**: 69% drop in cases (2017–2023).
- **TB**: 17.7% fall in incidence (2015–2023).
- **Kala-azar**: Eliminated as of 2024.
- **Trachoma**: Eliminated as a public health issue in 2024.

Challenges

- Rural-urban disparity in access and infrastructure.
- High out-of-pocket expenditure.
- Shortage of skilled healthcare workers.
- Dual burden of communicable and non-communicable diseases.
- Fragmented public-private health systems.

Conclusion

India's steady improvement in maternal and child health reflects its **commitment to universal, equitable, and quality healthcare**.
Sustained investment in **infrastructure, digital health, disease**

prevention, and **capacity-building** is essential for achieving **SDG targets by 2030**.

Financial Regulators in India: Autonomy and Reform Needs

GS3 – Economy | Financial Sector Reforms

Context

- An **IMF-World Bank assessment report** recommends **legislative reforms** to enhance the **autonomy, power, and governance** of Indian financial regulators (RBI, SEBI, IRDAI).

Key Financial Regulators in India

- **RBI** – Central bank, regulates monetary policy and banking.
- **SEBI** – Regulates capital markets and protects investor interests.
- **IRDAI** – Regulates insurance sector and policyholder protection.
- **PFRDA** – Regulates pensions (e.g., NPS).
- **MCA** – Oversees corporate governance under Companies Act.
- **Ministry of Finance (MoF)** – Oversees financial policies and regulatory framework.

Concerns Highlighted by the Report

- **MoF Influence**: Over board appointments and decision-making in regulators.
- **Limited RBI Autonomy**: MoF can overturn supervisory decisions; restricted control over PSBs and insurers.
- **IRDAI Power Gaps**: Cannot act decisively against state-owned insurers.
- **Governance Issues**: Conflict of interest in regulator boards (e.g., RBI staff on bank boards).
- **PSB Vulnerability**: Lower capital buffers compared to private banks.

Importance of Regulatory Autonomy

Aspect	Importance
Financial Stability	Enables swift, independent crisis response.
Investor & Depositor Confidence	Boosts transparency and fairness.
Corporate Governance	Ensures enforcement of accountability in financial institutions.
Risk Management	Supports early warning and resolution of systemic risks.
Global Investor Confidence	Makes Indian markets attractive for FDI.
Tackling Emerging Risks	Enables adaptive regulation for cyber/climate threats.

Recommendations by IMF-World Bank Report

- Transfer MoF's **appellate authority** to an **independent body**.
- Empower **IRDAI** against public insurers; separate board and management roles.
- **RBI** to improve board oversight guidance and eliminate conflicts of interest.
- Strengthen **PSBs' capital base** for liquidity resilience.
- Enhance supervision of **financial conglomerates** and **climate risk monitoring**.
- SEBI to expand macroprudential oversight and **cybersecurity** resilience in non-bank sectors.

Conclusion & Way Forward

- Ensuring **greater autonomy and authority** of regulators is vital for a **stable, efficient, and transparent financial system**.

- Reforms must focus on **institutional independence**, **better governance**, and **modern regulatory capacities** to meet future financial challenges.

Antibiotic Use in Livestock and AMR: A Growing Threat

GS3 – Agriculture | Livestock | Health & Environment

Context

- **FAO study** projects a **30% rise in global antibiotic use in livestock** by **2040**, increasing risk of **antimicrobial resistance (AMR)**.
- **Asia-Pacific** expected to contribute **~65%** of the global increase.

Key Concerns

- **Overuse of antibiotics** for growth promotion and disease prevention in intensive farming systems.
- **AMR as a "silent pandemic"** (WHO): drug-resistant infections cause over **1.2 million deaths/year**.
- **Projected rise** in antibiotic use:
  - **2019**: 110,777 tons
  - **2040**: 143,481 tons (+29.5%)

Drivers of Antibiotic Overuse

- **Intensive livestock farming** and poor hygiene practices.
- **Regulatory gaps** and lack of enforcement in many countries.
- **Global livestock trade** spreads resistant bacteria.
- Use as **growth promoters** in unsanitary, overcrowded conditions.
- **Horizontal gene transfer** via plasmids accelerates AMR spread.

Implications of AMR
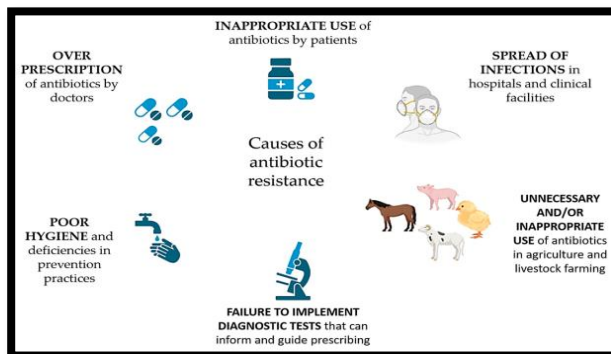
- Threatens **food security, public health,** and **economic development**.
- Increased **treatment costs**, **mortality**, and **drug inefficacy**.
- Disrupts global efforts to achieve **sustainable livestock production**.

Global and National Measures

- **UNGA AMR Declaration (2024)**: Target to reduce antimicrobial use in agrifood systems by **30–50% by 2030**.

- **RENOFARM (FAO)**: Technical support to countries to curb antibiotic use.
- **One Health Approach**: Joint strategy by FAO, WHO, and WOAH linking human, animal, and environmental health.

India's Efforts
- **National Action Plan on AMR**: Reduce antibiotic use in agriculture.
- **Standard Veterinary Treatment Guidelines (SVTG)**:
  o Issued by Ministry of Animal Husbandry.
  o Regulates antibiotic use in livestock.
  o Promotes **Ayurvedic** and **ethnoveterinary** practices.

Way Forward
- Shift towards **sustainable livestock practices**:
  o Better animal health, hygiene, **vaccination**, **biosecurity**, and **nutrition**.
  o Could reduce antibiotic use by **up to 57%**.
- **Strengthen regulation and enforcement** of antibiotic use globally.
- **Promote research and innovation** in antibiotic alternatives and diagnostics.

Aquaculture in India: Growth, Challenges, and Way Forward

GS3 – Agriculture | Fisheries | Blue Economy
Context
India has become a global leader in **aquaculture**, particularly **prawn farming**, balancing **economic growth**, **nutritional security**, and **exports**.
### What is Aquaculture?
Controlled cultivation of aquatic species (fish, prawns, etc.) in **freshwater, brackish, coastal**, or **marine** environments.

- Supplements capture fisheries.
- Supports **food security, employment, and exports**.

India's Achievements in Aquaculture
- **3rd largest** global aquaculture producer.
- **2nd largest** in prawn production.
- Key states: **Andhra Pradesh, West Bengal, Odisha, Tamil Nadu, Gujarat**.
- **Black tiger prawn farming** (Penaeus monodon) is a major export earner.
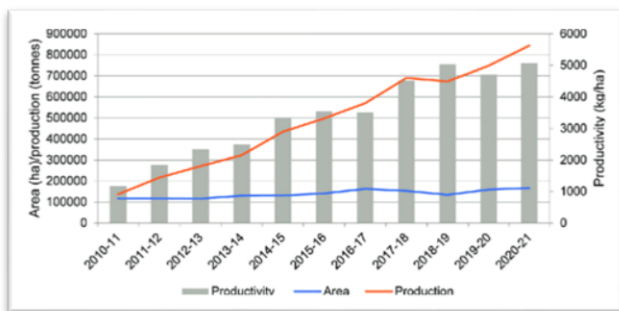
Drivers of Growth
1. **Geographic Advantage**:
   o 11,098 km coastline, large brackish water areas.
   o Coastal groundwater aids salinity control (10–25g/L ideal for prawn).
2. **Innovative Techniques**:
   o Small ponds (Andhra model) for better productivity and disease control.
   o Mixed salinity water management using river and brackish sources.
3. **Institutional Support**:
   o ICAR-CIBA's SPF broodstock.
   o Growth of aquafeed industry and disease testing labs.

Challenges
- **Disease outbreaks** (e.g., White Spot Syndrome Virus, Vibrio harveyi) causing up to **25% yield loss**.
- **Climate variability**: Water salinity/temperature fluctuations affect prawn life cycles.
- **Infrastructure gaps**: Inadequate labs, hatcheries, and cold chains, especially in remote areas.

Government & Research Initiatives
- **ICAR-CIBA**: Developed SPF prawns; promotes **phage therapy**.
- **PM Matsya Sampada Yojana**: Skill training, credit access, infrastructure support.
- Lab and diagnostic networks for early disease detection.

Way Forward
- **Scale up biosecure hatcheries** and SPF broodstock.
- Invest in **R&D** for feed, disease resistance, and genetics.
- Strengthen **cold chain and export logistics**.
- Promote **digital aquaculture platforms** for small farmers.
- Adopt **eco-friendly practices** (e.g., mangrove-integrated shrimp farming).
- Build **climate-resilient aquaculture systems**.

Shingles Vaccine and Dementia Risk Reduction

GS2 – Health | Public Health | Geriatric Care
Context
A recent study from **Wales**, published in *Nature*, suggests the **shingles vaccine** may reduce the **risk of dementia** by about **20% over seven years**.
What is Shingles?
- Caused by **Varicella-Zoster Virus (VZV)** — same virus as chickenpox.
- Reactivates later in life as **Herpes Zoster** (shingles), leading to painful rashes and nerve damage.

Dementia Overview
- Group of diseases causing **cognitive decline**, memory loss, and impaired daily function.
- Types include **Alzheimer's**, **vascular dementia**, **Lewy body dementia**, and **frontotemporal dementia**.
- No cure; treatments include **medications**, **physical activity**, and **mental stimulation**.

Key Risk Factors
- **Age (65+), hypertension, diabetes, obesity, smoking**, **alcohol abuse**, **social isolation**, and **brain injuries**.
- Leads to significant **socio-economic and caregiving burden**.

Study Findings
- Individuals **eligible for the shingles vaccine** (based on birth cohort) showed a **lower incidence of dementia**.
- **Effect stronger in women** than in men.
- Suggests potential **neurological protective role** of vaccination.

Significance for Public Health Policy
- Highlights potential for **preventive strategies** through **vaccination** in addressing non-communicable neurological diseases.
- Supports integration of **geriatric vaccines** in **primary healthcare and elderly wellness programs**.

PM Modi's Visit to Sri Lanka – UPSC Mains Notes

GS Paper 2 – International Relations | India–Sri Lanka Relations
Context:
PM Modi visited Sri Lanka and met President Anura Dissanayake in Colombo, reaffirming India's commitment to its "Neighbourhood First" policy.
Key Outcomes of the Visit:
- **Civilian Honour**:
  PM Modi conferred **'Mithra Vibhushana'**, Sri Lanka's highest civilian award.
- **Energy Cooperation**:
  o Agreement to develop **Trincomalee as an energy hub**.
  o **Sampur Solar Power Project** inaugurated.
  o **Grid interconnectivity deal** signed to facilitate future power trade.
- **Rail Connectivity**:
  o Upgradation of **Maho–Omanthai railway line** and signalling system at Anuradhapura.
- **Defence Cooperation**:

- o Comprehensive **MoU consolidating defence engagements** and institutionalising structured dialogue.

Bilateral Relations – Overview

- **Trade & Investment:**
  - o India–Sri Lanka FTA (2000) key driver of trade.
  - o India: **top trading partner** and major FDI source.
- **Cultural Linkages:**
  - o Based on **Buddhist and Tamil heritage**.
  - o Cultural Cooperation Agreement (1977) underpins exchanges.
- **Tourism:**
  - o India: **Top inbound tourism source** (2023).
- **Defence & Maritime Security:**
  - o Exercises: **Mitra Shakti, SLINEX, Dosti**.
  - o Member of **Colombo Security Conclave**.
- **Multilateral Cooperation:**
  - o Shared forums: **SAARC, BIMSTEC, SACEP, SAU**.

Areas of Concern

- **Fishermen Issue:**
    Frequent arrests due to overlapping fishing zones.
- **Chinese Influence:**
  - o Strategic assets like **Hambantota Port** under Chinese control.
  - o Growing debt-diplomacy concerns.
- **Economic & Developmental Issues:**
  - o Stalled **CEPA negotiations**.
  - o **Delays in Indian projects** (e.g., Trincomalee oil farm, housing schemes).
- **Political Instability:**
  - o 2022 economic crisis led to **refugee influx into India**.

Way Forward

- Strengthen economic, defence, and energy ties.
- Expedite Indian-funded projects through diplomatic and bureaucratic coordination.
- Ensure a **balanced approach to regional stability** countering Chinese influence.
- Reinforce **people-to-people connect** and cultural diplomacy.
- Align cooperation with **Neighbourhood First and SAGAR** doctrines for mutual growth.

New Policy on Foreign Funds – UPSC Mains Notes

GS2: Governance | GS3: Economy
Context:
The Ministry of Home Affairs (MHA) has revised rules under the **Foreign Contribution (Regulation) Act (FCRA), 2010**, fixing a **4-year validity** for foreign funds received under the **prior permission route**.
About FCRA:

- Enacted: **1976**, amended in **2010** and **2020**.
- Regulates: Foreign donations to **NGOs, associations, individuals** for social, educational, religious, cultural, and economic purposes.
- Requirements:
  - o NGOs must register with MHA (valid for **5 years**, renewable).
  - o Must file **annual returns** like IT filings.
  - o Must not affect **sovereignty, communal harmony, or foreign relations**.

Exemptions & Restrictions:

- **Prohibited** from receiving foreign funds:
  - o Legislators, political parties, judges, government servants, media personnel.
- **2017 amendment:** Allowed political parties to receive funds from foreign companies with **over 50% Indian ownership**.

Suspension & Cancellation of FCRA:

- **Suspension:** Up to **180 days**; during which new funds cannot be received.
  - o Only **25% of existing funds** can be used with prior MHA approval.
- **Cancellation:** No reapplication or prior permission for **3 years**.

New Policy Highlights (April 2025):

- **Validity Limit:**
  - o Funds received via **prior permission** valid for **4 years** from approval date (earlier: till funds were exhausted).
  - o **Violation of this limit** will attract penal action under FCRA.
- **Transition Clause:**
  - o For existing prior permission projects with more than 3 years left as of **April 7, 2025**, the new 4-year window begins from that date.
- **Eligibility for Prior Permission:**
    NGOs without FCRA registration can still receive specific foreign funds if registered under:
  - o **Societies Registration Act (1860)**
  - o **Indian Trusts Act (1882)**
  - o **Section 25 of Companies Act (1956)**

Significance of FCRA:

- **National Security:** Prevents misuse of foreign funds.
- **Regulatory Control:** Ensures accountability of foreign contributions.
- **Transparency & Reporting:** Promotes financial discipline.
- **Political Neutrality:** Restricts foreign influence in politics.
- **Checks Money Laundering:** Mitigates illegal flow of funds.

Pradhan Mantri MUDRA Yojana

GS3: Economy | Inclusive Growth | MSME Sector
Context:
India completed **10 years** of **Pradhan Mantri MUDRA Yojana (PMMY)** on **8 April 2025**, aimed at empowering micro and small entrepreneurs with access to formal credit.
About PMMY:

- **Launched:** April 2015
- **Objective:** Provide **collateral-free credit** to **non-corporate, non-farm micro and small enterprises**.
- **Tagline:** *Funding the Unfunded*
- **Implementing Agency:** MUDRA (Micro Units Development & Refinance Agency)
- **Loan Limit:** Up to ₹20 lakh
- **Lending Institutions:** SCBs, RRBs, NBFCs, MFIs
- **Loan Categories:**
  - o **Shishu:** up to ₹50,000
  - o **Kishore:** ₹50,000 – ₹5 lakh
  - o **Tarun:** ₹5 lakh – ₹20 lakh

Key Achievements (as of FY25):

- **Loans Sanctioned:** Over 52 crore
- **Loan Value:** ₹32.61 lakh crore
- **Women Beneficiaries:** 68%
- **SC/ST/OBC Beneficiaries:** ~50%
- **Minority Beneficiaries:** ~11%

Significance:
1. Financial Inclusion & Empowerment:

- Enables **access to credit** for small entrepreneurs, especially in Tier-2/3 cities and rural areas.

- Recognized by **IMF** for promoting formalisation, self-employment, and women entrepreneurship.

2. Women Empowerment:
- 68% accounts held by women.
- 13% CAGR in per-woman disbursement.
- Boosts **economic participation and independence**.

3. Social Equity:
- High outreach to **marginalised communities** – SC/ST/OBCs and minorities.
- Bridges gaps in **financial exclusion**.

4. MSME Growth:
- MSME credit rose from ₹8.51 lakh crore (FY14) to ₹27.25 lakh crore (FY24).
- Projected to cross ₹30 lakh crore in FY25.
- MSME share in bank credit increased from 15.8% to ~20%.

5. Employment Generation:
- Promotes **self-employment and job creation** at the grassroots.
- Significant role in rural and semi-urban entrepreneurship.

Challenges:
- **Rising NPAs** in some sectors.
- **Need for credit appraisal training** and borrower capacity building.
- Requires **complementary support**: market access, digital literacy, mentoring.

Conclusion:
PMMY reflects the **success of grassroots financial inclusion** and a **bottom-up economic model**, empowering informal sector entrepreneurs and enhancing inclusive growth. With robust implementation and ecosystem support, it can further consolidate India's MSME backbone.

UNHRC Resolution on Plastic Pollution & Human Rights

GS2: Role of International Organizations | GS3: Environment | SDGs
Context:
The **UN Human Rights Council** adopted a resolution (April 2025) recognizing the **interlinkages between plastic pollution, ocean health, and human rights**, especially the **right to a clean, healthy, and sustainable environment**.

Key Highlights:
- **Interconnected Crises:**
  o Plastic pollution, **climate change**, and **biodiversity loss** jointly endanger planetary health and human rights.
- **Human Rights-Based Ocean Governance:**
  o Calls for inclusive ocean governance focused on **coastal communities** and **small island developing states (SIDS)**, who are most vulnerable.
- **Builds on UN Precedents:**
  o Reinforces **UNHRC Resolution (2021)** and **UNGA Resolution (2022)** affirming a healthy environment as a human right.
  o Inspired by UN Special Rapporteur's report.

Scale of Plastic Pollution:
- **11 million+ metric tons/year** of plastic enter oceans globally; may **triple by 2040**.
- Major sources: **single-use plastics**, packaging waste.

- Impacts:
  o Coral reef destruction, marine species entanglement, habitat degradation.

Global Relevance & Future Action:
- **Influences Upcoming Events:**
  o **UN Ocean Conference (France, June 2025)**
  o **Plastic Treaty Negotiations (Geneva, August 2025)**
- **Strengthens International Law:**
  o Pushes for **human rights-based environmental treaties**.
- **SDG Integration:**
  o Links **SDG 14 (Life Below Water)** with SDGs on **poverty, gender equality, health, and climate action**.
- **Call for Action:**
  o Urges **governments, industries, and civil society** to embed **human rights in environmental policymaking**.

India's Legal Framework on Right to Healthy Environment:
1. Constitutional Provisions:
- **Article 21:** Right to life includes right to a healthy environment.
- **DPSPs:**
  o **Article 48A:** State duty to protect the environment.
  o **Article 51A(g):** Citizens' duty to preserve nature.

2. Judicial Interpretations:
- **MC Mehta v. Union of India**, **Subhash Kumar v. State of Bihar**: Recognized environmental protection as part of **Fundamental Rights**.
- Courts uphold principles like **polluter pays**, **precautionary principle**, and **sustainable development**.

Conclusion:
The UNHRC resolution represents a shift towards integrating **human rights into global environmental governance**. For India, this aligns with constitutional commitments and judicial precedents promoting environmental justice and sustainable development.

Iron Opacity in the Sun – Implications for Solar Modelling

GS3: Science and Technology | Space | Astrophysics
Context:
Recent research indicates that the **opacity of iron in the Sun** is significantly higher than previously estimated, impacting solar models and astrophysical predictions.

What is Opacity in Stars?
- **Opacity** = Material's ability to absorb light/radiation.
- Higher opacity → Greater absorption → Alters **energy transport** from core to surface.
- In stars, it affects **temperature gradients, sound wave propagation**, and energy balance.

Key Findings:
- Iron's opacity inside the Sun may be **30–400% higher** than earlier theoretical values.
- Traditional solar models have **underestimated iron's role**, affecting accuracy in:

- o **Solar neutrino emission estimates**
- o **Sunspot activity and flare predictions**
- o **Stellar aging models**
- o **Galactic evolution and cosmology simulations**
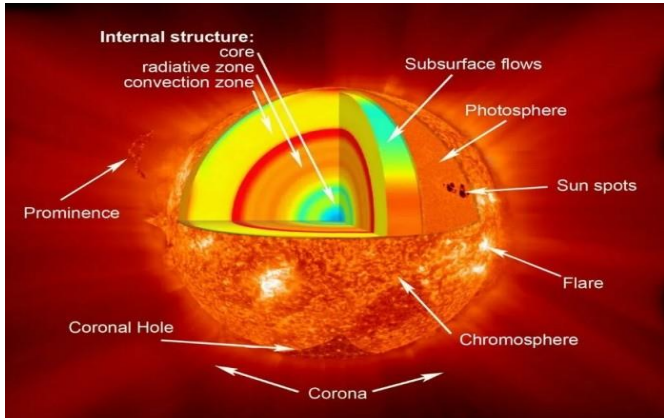
Why Iron's Opacity Matters?

- Iron, though present in trace amounts, heavily influences **radiative energy transfer** due to its complex atomic structure.
- Errors in Sun's model → **Cascading inaccuracies** in models of other stars and galaxies.

Impact on Scientific Understanding:

- **Improved opacity data refines**:
  - o **Solar structure and seismic modelling**
  - o **Astrophysical predictions across star types**
  - o **Cosmological theories on universe formation**
- **Enhances accuracy in**:
  - o **Solar energy output**
  - o **Space weather forecasting**
  - o **Fusion research applications**

Internal Structure of the Sun (for conceptual clarity):

1. **Core** – Site of nuclear fusion; energy generation.
2. **Radiative Zone** – Energy transported via radiation.
3. **Convection Zone** – Heat carried via convection currents.
4. **Photosphere** – Visible surface of the Sun.
5. **Chromosphere** – Thin layer above the photosphere.
6. **Corona** – Outer atmospheric layer; hot, low-density plasma.

Conclusion:

The revised understanding of **iron's opacity** emphasizes the **sensitivity of astrophysical models to micro-level atomic properties**.
Accurate solar modeling is critical not just for heliophysics but for broader insights into **stellar and cosmic evolution**.

Digital Threat Report 2024: Key Insights for Cybersecurity in BFSI Sector

GS3: Cybersecurity | Economy
Context:
The **Computer Emergency Response Team (CERT-In)** and **SISA** released the first **Digital Threat Report 2024** to enhance cybersecurity resilience in the **Banking, Financial Services, and Insurance (BFSI)** sector.

Key Findings:

1. Evolving Cyber Threat Landscape

- Cyberattacks are **increasing in sophistication**, persistence, and stealth.
- **AI-driven attacks** are growing, enabling personalized and large-scale threats.
- Traditional defenses like **multi-factor authentication** are being bypassed using **stolen session cookies** and credentials.

### 2. Rise in Social Engineering

- Sharp increase in **phishing, Business Email Compromise (BEC)**, and **data leaks from the dark web**.

3. Supply Chain Vulnerabilities

- Exploitation of **third-party vendors** and **open-source codebases** has led to widespread **supply chain breaches**.

Future Threats:

- **AI-based cyberattacks** will challenge existing detection systems.
- Need for adaptive, **intelligence-led security models**.

Recommended Mitigation Strategies:

- **Multi-Factor Authentication (MFA)** for all critical systems.
- **Timely updates & patching**, including virtual patching for legacy systems.
- **Data encryption**, backups, and recovery systems.
- **Network segmentation** to isolate sensitive data and operations.
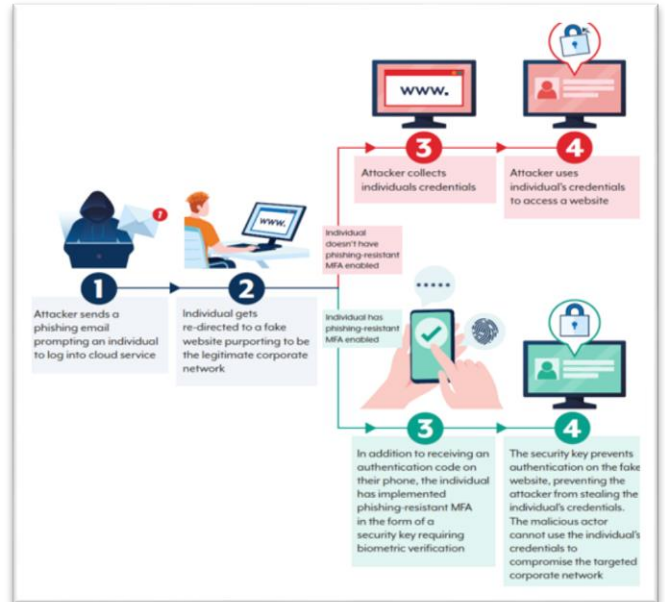
Cybercrime – Types and Tools:

- **Hacking, Phishing, Malware, Identity Theft**
- **Cyber espionage**, **Cyberbullying**, **Online financial frauds**

Cybersecurity Initiatives in India:

- **Cyber Fraud Mitigation Centre (CFMC):** Rapid response to digital financial frauds.
- **Cyber Commandos Program:** State-level trained cyber response teams.
- **Samanvay Platform:** Centralized portal for cybercrime data and analytics.
- **Cyber Suspect Registry:** Database to aid fraud risk management in finance.
- **Central Police Organizations (CPOs):** Capacity building in digital forensics and investigations.

Conclusion:

The Digital Threat Report 2024 underscores the **urgent need for integrated cybersecurity frameworks**, combining **technology, compliance, and threat intelligence**, particularly in the BFSI sector.
A **proactive and adaptive strategy**, rooted in **forensic intelligence and AI-readiness**, is essential to safeguard national financial systems.

One State, One RRB: Amalgamation of Regional Rural Banks

(GS3 – Indian Economy: Banking Sector)
Context:
The Department of Financial Services (DFS) has initiated **Phase IV of RRB amalgamation**, reducing 43 RRBs to **28**, following the principle of **"One State, One RRB"** to improve rural banking efficiency.

About Regional Rural Banks (RRBs):

- Established in **1975** under **RRB Act, 1976** based on Narasimham Committee recommendations.
- Objective: Provide **credit and banking services to rural poor**, especially small and marginal farmers.
- **Ownership Structure**:
  - o Central Government – 50%
  - o State Government – 15%

o   Sponsoring Bank – 35%
- Regulated by **RBI**, supervised by **NABARD**, treated as **cooperative societies for tax purposes**.
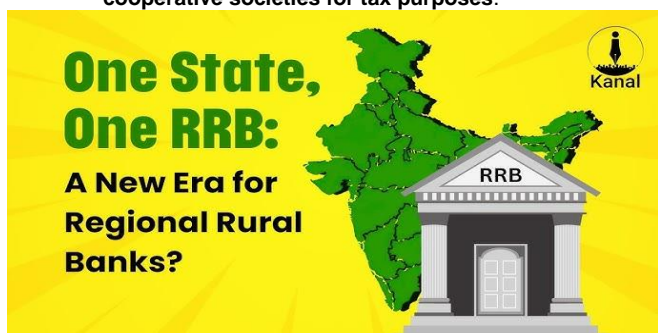
One State, One RRB Policy – Key Objectives:
- **Operational Efficiency**: Economies of scale, shared technology & human resources.
- **Cost Rationalization**: Avoids service duplication, reduces administrative overhead.
- **Improved Credit Flow**: Easier access to finance for rural borrowers.
- **Governance & Monitoring**: Enhanced planning with one entity per state.
- **Technological Integration**: Common Core Banking System (CBS), digital banking.
- **Financial Inclusion**: Better outreach to farmers, artisans, and rural entrepreneurs.

Amalgamation Phases:

Phase	Years	RRBs Reduced From → To	Objective
I	2006–10	196 → 82	Address inefficiencies
II	2013–15	82 → 56	Enhance operational scale
III	2019–21	56 → 43	Align with modern banking
IV	2025	43 → 28	Implement "One State One RRB"

Current Status (Post-Phase IV):
- 28 RRBs in **26 States & 2 UTs**.
- **22,000+ branches**, covering **700 districts**.
- **92% branches** located in rural/semi-urban areas.

Challenges:
- **Staff integration & retraining** in unified systems.
- **Regional disparities** in banking needs and infrastructure.
- **Customer onboarding** in remote/rural areas.

Way Forward:
- Strengthen **capacity building & financial literacy**.
- Address **regional needs** with localized strategies.
- Ensure **technology accessibility** and inclusive banking.

Electronic Surveillance on Jammu & Kashmir Border

(GS3 – Internal Security: Border Management)
Context:
The Union Home Minister announced two **models of electronic surveillance** to enhance border security along the **India-Pakistan border**, especially in **Jammu & Kashmir**.

Key Highlights:
- **Deployment Plan:** Surveillance tech to be implemented **along the entire India-Pakistan border in 4 years**.
- **Technological Focus:**
  o 26+ tech initiatives under testing (anti-drone, tunnel detection).
  o Results expected by **2026**.
- **Persistent Threat:** While terrorism in J&K has decreased, the threat is not fully eliminated.

Major Border Management Initiatives:
1. **Border Infrastructure and Management (BIM) Scheme:**
   o Central Sector Scheme for fencing, roads, floodlights, BOPs, helipads.
   o Focus on **tech-based solutions** where physical barriers are unfeasible.

2. **Comprehensive Integrated Border Management System (CIBMS):**
   o Integrates **sensors, intelligence, networks, and command systems** for real-time monitoring.
   o Aimed at India-Pakistan and India-Bangladesh borders.
3. **Vibrant Villages Programme (VVP-II):**
   o 100% centrally funded.
   o Promotes self-reliant, **strategically vital villages** along northern borders.

Need for Border Management:
- **India-Pakistan Border:** Cross-border terrorism, infiltration.
- **India-China Border:** Disputed stretches (Ladakh, Arunachal); Doklam-type standoffs.
- **India-Bangladesh Border:** Migration, smuggling, shifting bilateral dynamics.
- **India-Nepal Border:** Porous border, Chinese infrastructure near frontier.
- **India-Myanmar Border:** Ethnic ties, insurgency, refugee influx (esp. in Manipur).

Challenges:
- **Length & Terrain:** Over **15,000 km** of borders with varied geography.
- **Porosity:** Enables **illegal crossings**, smuggling, arms/drug trade.
- **Ethnic Dynamics:** Cross-border tribal affiliations complicate security.
- **Infrastructure Gaps:** Inadequate roads, communication hinders patrolling.
- **Disputed Borders:** With China and Pakistan, requiring constant vigilance.
- **Humanitarian Crises:** Refugee flows (Myanmar, Bangladesh) add complexity.

Way Forward:
- **Tech-Driven Surveillance:** Scale up electronic & smart fencing (like CIBMS).
- **Infrastructure Push:** Projects by **BRO** (Atal, Sela, and Shinku-La tunnels) to enhance access.
- **Capacity Building:** Localised training, community engagement, modern equipment.
- **Holistic Approach:** Combine **security, development, and diplomacy** for stable borders.

Technology and Innovation Report 2025 – UNCTAD

(GS3 – Science and Technology | Inclusive Development | Global Technology Trends)
Context:
The **UNCTAD** released its *Technology and Innovation Report 2025*, focusing on **Artificial Intelligence (AI)** and its role in sustainable and inclusive development.

Key Highlights:
- **Objective:**
  Guide policymakers on building **inclusive science, technology & innovation (STI) policies** for AI adoption.
- **Global AI Trends:**
  o **US** leads in private AI investment: **70% of global share (2023)**.
  o **China, India, Brazil** are emerging AI powers in research and development.
  o **China & US:** Dominant in **cloud infrastructure**.
  o **Brazil:** 4 million+ developers.
  o **India:** 13 million+ developers, major contributor to AI & GenAI.
- **Technological Domain Specialisation:**

o **Germany:** Wind energy
o **India:** Nanotechnology
o **Japan:** Electric vehicles
o **South Korea:** 5G

India's Performance:
- **Ranked 10th** in private AI investments ($1.4 billion in 2023).
- Among few developing countries with significant AI investment (alongside China).
- **Ranked 36th** in *Frontier Tech Readiness Index* (up from 48th in 2022).
- Strong academic base: Institutions like **IIT Hyderabad**, **IIT Kharagpur** focusing on AI education.
- **India AI Mission (2024):** Expanding AI access, skilling in smaller towns and cities.

UNCTAD's Technology and Innovation Report 2025 calls for people-first AI and global cooperation

Concerns Highlighted:
- **AI Inequality:**
  o Top 100 firms control **40% of global private R&D** (mostly US and China).
  o 118 countries (mainly Global South) excluded from AI governance.
- **Employment Impact:**
  o AI could affect up to **40% of global jobs** – risk of displacement, but scope for new job creation.
  o Widening inequality unless **reskilling and adaptation policies** are prioritized.

Recommendations & Way Forward:
- **Developing Countries Must Focus On:**
  o **Infrastructure:** Improve internet, computing capabilities.
  o **Data Access:** Ensure availability of diverse, secure datasets.
  o **Skills:** Invest in digital education and workforce training.
- **Global Measures:**
  o Establish **shared AI resource facilities**.
  o Create **public disclosure frameworks** for AI use.
  o Promote **equitable access** to AI and ensure it supports **inclusive human development**.

3D Printing: Transformative Technology in Manufacturing & Infrastructure

(GS3 – Science and Technology | Infrastructure | Innovation)
Context:
Japan's West Japan Railway Company unveiled the world's **first 3D-printed train station**—*Hatsushima Station*—built in under **six hours**, highlighting the **rapid potential** of additive manufacturing in infrastructure.
What is 3D Printing?
Also called **Additive Manufacturing**, it is the process of creating three-dimensional objects from a **digital file**, adding material layer by layer.
**Key Components:**
- **CAD Model:** Digital design blueprint.
- **Slicing Software:** Converts design into printable layers.
- **3D Printer:** Physically constructs the object.
- **Materials Used:** Plastic, metal powders, resin, concrete, bio-materials.
Types of 3D Printing Technologies:

- **FDM:** Thermoplastics; low cost and widely used.
- **SLA:** UV-curing resin; high-resolution but expensive.
- **SLS/DMLS/SLM:** Industrial-grade powders; used in **aerospace, defense, automotive**.

Applications:
- **Construction:**
  o Quick building of houses, stations, shelters.
  o *Example:* India's **1st 3D-printed post office** in Bengaluru (L&T, 2023).
- **Healthcare:** Prosthetics, implants, tissues.
- **Aerospace/Defense:** Lightweight, durable parts. (*DRDO exploring weapon/UAV components*).
- **Education:** Low-cost scientific models.
- **Food Industry:** Custom-designed edible items.

3D PRINTING TECHNOLOGY
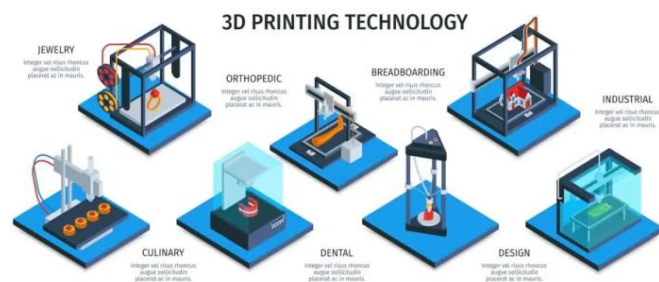
Advantages:
- **Speed:** Fast prototyping/construction.
- **Customization:** Personalized designs.
- **Waste Reduction:** Efficient material usage.
- **Low Volume Feasibility:** Cost-effective for small batches.
- **Design Complexity:** Intricate shapes possible.
- **Decentralized Production:** Reduces logistics burden.

Limitations:
- **Material Constraints:** Limited strength & variety.
- **High Initial Cost:** Especially for industrial-grade printers.
- **Size & Speed Limits:** Not suited for mass production.
- **Post-Processing Needs:** Additional finishing required.
- **IP Risks:** Digital models can be pirated.
- **Skill Gap & Lack of Regulation:** Especially in developing regions.

Conclusion & Way Forward:
3D printing has potential to **revolutionize manufacturing and infrastructure**, especially in sectors like housing, defense, and healthcare.
For countries like India, scaling up requires:
- Investment in **R&D and skilling**,
- Formulating **standards & regulations**, and
- Promoting **local innovation ecosystems**.

De-Extinction of Dire Wolf: Scientific Breakthrough or Ecological Gamble?

(GS3 – Science & Technology | Biodiversity | Ethics in Science)
Context:
A US-based bioscience firm claimed to have **revived the extinct Dire Wolf** using genetic engineering, marking a significant moment in **de-extinction research**.
About the Dire Wolf:
- **Scientific Name:** *Aenocyon dirus*
- **Extinct ~13,000 years ago**, once roamed **North America**
- Larger than modern grey wolves, apex predator of its time

What is De-Extinction?
The scientific attempt to **revive extinct species** or closely recreate them via **genetic engineering and bio-tech tools**.
De-Extinction Techniques:
1. **Back-Breeding:**
   o Uses selective breeding of related species
   o Limitation: Cannot restore original genome
2. **Cloning (SCNT):**
   o Cloning from preserved cells
   o Limitation: Not viable for long-extinct species due to lack of intact cells
3. **Genome Editing & Synthetic Genomics:**

o Tools like **CRISPR** + synthetic DNA segments
o Produces **hybrids**, not pure species

Concerns & Challenges:

- **Ecological Disruption:** May threaten current ecosystems
- **Genetic Health Risks:** Inbreeding, mutations, limited gene pool
- **Habitat Mismatch:** Modern environment may not support revived species
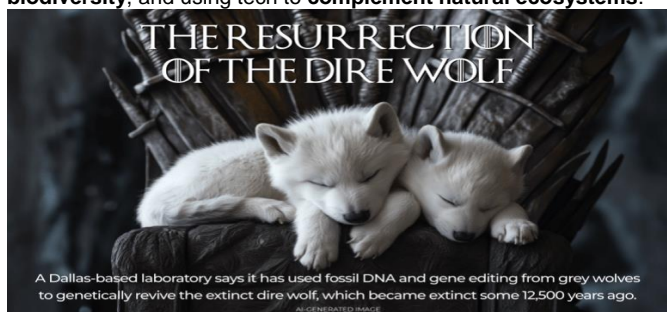- **Ethical & Legal Issues:** Animal rights, scientific accountability

India-Specific Relevance:
While India isn't currently pursuing de-extinction, debates over **reintroducing cheetahs**, managing **invasive species**, and **bioethics** are increasingly relevant.

Conclusion & Way Forward:
While the **revival of the dire wolf** showcases the power of genomic science, de-extinction must be approached with **regulatory oversight**, **ethical scrutiny**, and **ecological foresight**.
Focus should be on **restoring habitats**, conserving **existing biodiversity**, and using tech to **complement natural ecosystems**.

THE RESURRECTION OF THE DIRE WOLF

A Dallas-based laboratory says it has used fossil DNA and gene editing from grey wolves to genetically revive the extinct dire wolf, which became extinct some 12,500 years ago.
AI-GENERATED IMAGE

The resulting cubs, though 99% grey wolf genetically, are seen by some as a resurrection of the dire wolf's phenotype, making them the closest living relative of the extinct species.
The dire wolf gained widespread fame through its appearance in the HBO series Game of Thrones.

Source: Al Jazeera, Colossal Biosciences | April 8, 2025

UAE Crown Prince's Visit to India – Key Highlights and Significance

Context:
The Crown Prince of the UAE is on an official visit to India aimed at enhancing strategic bilateral ties.

Major Outcomes:

1. Defence Cooperation:

- Strengthened defence manufacturing partnership.
- Identified training exchanges and Coast Guard MoU as future areas of collaboration.

2. Education Diplomacy:

- First overseas campus of IIM Ahmedabad in Dubai.
- Indian Institute of Foreign Trade (IIFT) campus launched at Expo City Dubai.

3. Economic & Infrastructure Initiatives:

- Construction of *Bharat Mart* launched.
- Land allocated for *UAE-India Friendship Hospital* in Dubai.
- Ship-repair clusters to be developed in Kochi and Vadinar.
- India office for *Dubai Chamber of Commerce* established.

India-UAE Relations – Snapshot:
Political:
Diplomatic ties since 1972; robust high-level engagements.
Economic:

- CEPA signed in 2022; bilateral trade increased from $43.3 bn (2020-21) to $83.7 bn (2023-24).
- UAE is India's 2nd largest export destination.
- Target set to achieve $100 bn in non-oil trade.

Multilateral Engagement:
Part of I2U2, UFI Trilateral, G-20 Guest Country.

Strategic & Defence:
Defence ties institutionalized via Joint Defence Cooperation Committee; cooperation since 2003 agreement.
Space Cooperation:
ISRO-UAE MoU (2016) for peaceful outer space usage.
Diaspora:
3.5 million Indians (35% of UAE's population); key to soft power diplomacy.

Challenges:

- **Trade Imbalance** due to oil imports.
- **Geopolitical instability** in Gulf affecting strategic ties.
- **Labour issues** involving rights and welfare of Indian migrants.
- **Diverging foreign policy priorities** (e.g., Iran, Pakistan).

Way Forward:

- Achieve $100 bn non-oil trade through effective CEPA implementation.
- Diversify trade into tech, renewable energy sectors.
- Enhance mutual investments in infrastructure and startups.
- Leverage diaspora and education diplomacy for deeper ties.

India-Israel Sign Comprehensive Agriculture Agreement

Context:
India and Israel signed a Comprehensive Agriculture Agreement to enhance collaboration in sustainable and modern farming practices.

Key Highlights:

1. Focus Areas of Cooperation:

- Soil and water management, precision farming, horticulture, post-harvest technologies.
- Agricultural mechanisation, animal husbandry, and R&D.
- Special emphasis on a **Five-Year Seed Improvement Plan**.

2. Centres of Excellence (CoEs):

- 43 CoEs established under Indo-Israel Agricultural Project (IIAP) praised for transforming farming practices across India.

3. Global Commitment:

- India reaffirmed the principle of *Vasudhaiva Kutumbakam*.
- Emphasis on climate-smart agriculture and international partnerships.
- Israel invited to *World Food India 2025*.

Why Israel is a Key Partner for Indiain Agriculture:
- Expertise in:
  - Drip/micro-irrigation (aligned with PM-Krishi Sinchayee Yojana)
  - Soil-less agriculture, hydroponics
  - Greenhouse/polyhouse technology
  - Agro-automation and remote sensing
- Aligns with India's goals of **sustainable agriculture**, water-use efficiency, and smallholder farmer support.

India-Israel Relations – Snapshot:

Historical Ties:
- Defence assistance during 1962 and 1965 wars.
- Diplomatic understanding during Pokhran-II nuclear tests (1998).

Economic Relations:
- Bilateral trade (2024): $5.65 billion (excluding defence).
- India: 3rd largest Asian trade partner of Israel.
- Key exports: Gems & jewelry, engineering and electronic goods.

Technology & Innovation:
- **I4F Fund**: $40 million for joint R&D and industrial innovation projects.

Defence Cooperation:
- Israel among top arms suppliers to India.
- Key imports: Phalcon AWACS, Heron drones, Barak & Spyder missile systems, PGMs (e.g., Spice-2000).
- **Recent Deal (Jan 2025):** $400 million MRSAM contract for Indian Navy with Bharat Dynamics Ltd.

Way Forward:
- Scale Indo-Israel Centres of Excellence to more states.
- Promote collaborative R&D in agri-technology and water conservation.
- Leverage Israeli expertise for India's climate-resilient agriculture goals.
- Integrate small and marginal farmers with high-tech solutions.

Supreme Court Clears 10 Bills Using Article 142

Context:
The Supreme Court used its powers under Article 142 to clear 10 pending Bills in Tamil Nadu, bypassing the Governor's assent. This decision marked the Court's intervention to ensure "complete justice," granting assent to these Bills directly.

Key Points:
1. **Supreme Court's Role**: The Court invoked Article 142 to bypass the Governor's discretion and provide assent to Bills, setting a timeline for Governors to act:
   - 1 month for re-passed Bills.
   - 3 months if Bills are withheld against Cabinet advice.
2. **Governor's Delays**: The Court ruled that Governors cannot indefinitely delay Bills after state legislature approval.
3. **Significance**: This decision limits the Governor's powers, reinforcing the authority of state legislatures and redefining Centre-State relations.

What is Article 142?
Article 142 empowers the Supreme Court to pass any order for "complete justice" in pending matters. It also allows the Court to exercise executive and legislative functions in specific cases, safeguarding public interest, constitutional values, and fundamental rights.

Criticism:
Article 142 has been criticized for potentially infringing on the separation of powers, leading to judicial overreach.

Governor's Role in Bill Passage
- **Article 200**: When a Bill is presented, the Governor can either assent, withhold assent, reserve it for the President's consideration, or return it for reconsideration.
- **Reconsidered Bills**: If passed again by the legislature, the Governor must grant assent and cannot reserve the Bill for Presidential consideration.

Concerns:
- **State Autonomy**: Governors reserving Bills for the President is seen as undermining state autonomy, especially for state list matters.

- **Misuse of Discretion**: Governors' decisions to reserve Bills against Cabinet advice are seen as misuse of discretionary powers.
- **Impact on Federalism**: Provisions under Articles 200 and 201 that give Governors power to reserve Bills are viewed as inconsistent with federal principles.

Conclusion:
There is a demand for clear guidelines and time-limits on the Governor's discretion, to strengthen the federal structure and ensure timely lawmaking.

Report on Death Sentences and Executions 2024

Context:
Amnesty International's report, *Death Sentences and Executions 2024*, highlights a significant global rise in executions, marking a disturbing trend in the use of the death penalty worldwide.

Key Findings:
1. **Global Execution Statistics**:
   - 1,518 executions were recorded in 2024, a 32% increase from 2023, the highest since 2015.
   - Iran, Saudi Arabia, and Iraq accounted for 91% of global executions.
2. **Reasons for Increase**:
   - The death penalty is being used politically to suppress dissent, punish minorities, and combat drug-related crimes.
   - Over 40% of executions in 2024 were linked to drug offenses.
3. **Declining Global Use**:
   - While executions increased, the number of countries carrying out executions remained low at 15, with 145 countries having abolished the death penalty in law or practice.
4. **China's Secrecy**:
   - China remained the highest executor globally but maintained secrecy around execution statistics.

Death Penalty in India:
1. **No New Confirmed Death Sentences**:
   - For the second consecutive year, India's Supreme Court did not confirm any new death sentences in 2024, according to Project 39A.
2. **Rarest of Rare Doctrine**:
   - India applies the 'rarest of rare' doctrine, limiting the death penalty to exceptional cases, defined by extreme brutality, depraved motives, and vulnerable victims.
   - The last execution in India was in 2020 in the Nirbhaya case.
3. **Legal Framework**:
   - The death penalty remains legal in India, though it is rarely imposed and is carried out by hanging.

Global Framework on Death Penalty:
1. **International Covenant on Civil and Political Rights (ICCPR)**:
   - Article 6 permits the death penalty in limited circumstances but emphasizes the move towards abolition.
2. **UN Safeguards and Protocols**:
   - The UN has urged a global moratorium on the death penalty, with multiple resolutions calling for progressive restriction and reduction in the number of crimes punishable by death.
3. **UN General Assembly's Stand**:
   - A significant majority of UN member states support a moratorium on the death penalty, reflecting the global shift towards abolition.

Conclusion:
The global trend towards restricting the use of the death penalty is evident, with India maintaining a cautious approach. International frameworks push for abolition, but the death penalty remains a contentious issue in some countries, used for political purposes and in response to certain crimes like drug offenses.

Panchayat Advancement Index (PAI) Baseline Report

Context:
The Ministry of Panchayati Raj released the first-ever Panchayat Advancement Index (PAI) Baseline Report for the fiscal year 2022-23, marking a significant step towards data-driven rural governance and aligning with India's commitment to the SDG 2030 Agenda.

Key Features of PAI:
1. **Composition**:
   - The PAI is a composite index with 435 local indicators (331 mandatory, 104 optional), covering 566 data points across 9 SDG localization themes.
   - It is aligned with the National Indicator Framework (NIF) and developed through collaboration between various Union Ministries, State Governments, and UN Agencies.
2. **Nine Themes of PAI**:
   - Focus areas include poverty alleviation, health, child welfare, water sufficiency, environmental sustainability, infrastructure, social justice, good governance, and women's empowerment.
3. **Performance Categories**:
   - **Achiever (90+ points)**: No Panchayat qualified this year.
   - **Front Runner (75–90 points)**: 699 Panchayats (0.3%).
   - **Performer (60–75 points)**: 77,298 Panchayats (35.8%).
   - **Aspirant (40–60 points)**: 1,32,392 Panchayats (61.2%).
   - **Beginner (below 40 points)**: 5,896 Panchayats (2.7%).
4. **State-Level Insights**:
   - **Top Performers**: Gujarat (346 Front Runners), Telangana (270 Front Runners).
   - States like Maharashtra, Madhya Pradesh, and Uttar Pradesh had high numbers of Performer Panchayats.
   - **Development Gaps**: Bihar, Chhattisgarh, and Andhra Pradesh had larger shares of Aspirant Panchayats, indicating areas needing focused attention.

Purpose of Panchayat Advancement Index
- Measure incremental progress on LSDGs using scores of GP over years
- Grading of Panchayats based on performance in achieving LSDGs
- Evidence Based Assessment and Planning – Prioritizing Development
- Better method for Incentivization on developmental progress
  - PAI Data being used for incentivization by MoPR
  - States can also adopt the same system for incentivization of Panchayats
- No Inter-State comparison but States can compare GPs on
  - LSDG thematic scores on each theme
  - Composite PAI scores

Purpose and Impact:
1. **Evidence-Based Planning**:
   - The PAI supports transparency and accountability, enabling policymakers to identify gaps and prioritize resources effectively.
2. **Empowering Panchayats**:
   - The standardized framework helps Panchayats craft targeted development plans suited to local needs.
3. **Commitment to SDGs**:
   - The initiative aligns with India's goals for the 2030 SDG Agenda, emphasizing participatory and bottom-up development.

Conclusion:
The PAI Baseline Report is a milestone in rural governance, linking SDG goals with local realities. It promotes evidence-based planning, fosters healthy competition among Panchayats, and aims to transform grassroots development in India.

India's Genome Mapping Reveals 180 Million DNA Variants

Context:
The GenomeIndia project has released preliminary findings from the genome sequencing of 9,772 individuals across 85 diverse Indian populations.

Key Findings:
1. **Discovery of Genetic Variants**:
   - 180 million genetic variants were identified, with 130 million in autosomes (non-sex chromosomes) and 50 million in sex chromosomes (X and Y).
2. **Population-Specific Variants**:
   - Some variants were found exclusively in specific communities, reflecting localized genetic adaptations.
3. **Disease and Environmental Adaptations**:
   - Variants were linked to susceptibility or resistance to diseases, as well as environmental adaptations, such as high-altitude survival.

Genome India Project

Genesis
Initiated by Department of Biotechnology in 2020, with collaborations of 20 institutions to map india'e genetic diversity.

Objective
The primary aim is to construct a comprehensive catalogue of genetic variations of the indian population that will better capture our unique diversity.

Achievement
Whole genome sequencing has been completed for 10,000 samples towards creating a comprehensive catalog of India's unique genetic diversity.

Data Storage
At Indian Biological Data Centre (IBDC) in Faridabad, Haryana.

Importance of the Study:
1. **Personalized Medicine**:
   - The findings enable personalized treatment strategies tailored to individual genetic profiles.
2. **Disease Prediction and Drug Response**:
   - Identification of genetic markers for diseases like diabetes, cancer, and cardiovascular disorders, as well as predicting drug responses to minimize adverse effects.

GenomeIndia Project:
- **Objective**: To create a comprehensive catalogue of genetic variations representing India's population diversity.
- **Collaborative Effort**: Involves 20 institutions and is funded by the Department of Biotechnology, Ministry of Science and Technology.

Goals:
1. **Biobank Establishment**: Collection of 20,000 blood samples for advanced biological research.
2. **Open Access Data**: Making genomic data publicly available via the Indian Biological Data Centre (IBDC) to foster global research collaborations.

Conclusion:
The GenomeIndia project marks a significant step in advancing personalized medicine and global research, reflecting India's diverse genetic landscape.

National Critical Mineral Mission

Context:
The National Critical Mineral Mission (NCMM) was launched in 2025 to ensure self-reliance in critical minerals essential for clean energy technologies and national security.

Key Features:
1. **Critical Minerals**:
   - Critical minerals are vital for clean energy technologies, such as lithium, cobalt, nickel, and rare earth elements (REEs), which are essential for solar panels, wind turbines, electric vehicles (EVs), and energy storage systems.
2. **Mission Objectives**:
   - Establish a framework for the long-term availability and processing of critical minerals.
   - The Geological Survey of India (GSI) is tasked with 1,200 exploration projects from 2024 to 2030.
   - The Union Government has exclusive authority to auction mining leases and composite licenses for 30 critical minerals identified by a Ministry of Mines committee.
3. **Uses of Critical Minerals**:

o **Energy Security & Clean Transition**: Support for renewable energy and India's clean energy goals, such as 50% electric power from non-fossil sources by 2030 and net-zero emissions by 2070.

o **Economic Development & Job Creation**: Boosting mining, processing, R&D, and job creation in sectors such as exploration, refining, and clean-tech.

o **National Security**: Essential for defense technologies and electronics, reducing strategic vulnerabilities.

o **Infrastructure & Digital Economy**: Key to technologies like semiconductors, 5G/6G, smart grids, and digital India.

4. **Key Entities**:
   o **IREL (India) Limited**: A public sector enterprise crucial to the critical minerals value chain, focusing on rare earth elements (REEs) and processing minerals like ilmenite and zircon.

5. **International Engagements**:
   o Strategic partnerships with Argentina, Australia, the Democratic Republic of Congo (DRC), and other nations to secure mineral resources.

National Critical Minerals Mission

Challenges:
- **Geopolitical Risks**: Dependence on imports from countries like China and the DRC.
- **Lack of Domestic Processing Capacity**: Limited advanced technologies for REE separation.
- **Low Private Investment**: Regulatory and financial barriers in the mining sector.
- **Environmental Concerns**: Potential damage from mining and refining activities.
- **Recycling Ecosystem**: Nascent and underdeveloped.

Way Forward:
- Strengthen domestic exploration and incentivize private sector participation through Public-Private Partnerships (PPP).
- Forge strategic partnerships with mineral-rich countries.
- Focus on R&D and recycling to ensure sustainable mineral sourcing.
- Build capacity in critical mineral technologies and skilled labor.

Conclusion:
The NCMM is a critical step towards ensuring India's self-reliance in essential minerals for clean energy, economic growth, and national security, addressing both domestic and global challenges in the sector.

The Arctic Boreal Zone (ABZ) Rejects More Carbon

Context:
A recent study published in *Nature* highlights that due to escalating wildfires, over 30% of the Arctic Boreal Zone (ABZ) has shifted from being a carbon sink to a carbon source.

Key Findings:
1. **Increased Wildfire Activity**:
   o Rising temperatures and prolonged heatwaves have led to more intense wildfires in the Arctic region, which are contributing to the release of carbon.
   o Wildfires in January 2025 alone released 800,000 tonnes of carbon, nearly four times the amount released a decade ago.
2. **Impact on the Arctic Boreal Zone (ABZ)**:
   o Historically, the ABZ, spanning parts of Alaska, northern Europe, and Siberia, has been a

significant carbon sink, absorbing CO_2 through its forests, soil, and permafrost.
   o However, wildfires and thawing permafrost have disrupted this ability, with over 30% of the ABZ now releasing carbon instead of absorbing it, exacerbating global warming.

3. **Broader Global Implications**:
   o The ABZ's role in the global carbon cycle is crucial, and its transition from a carbon sink to a carbon source is contributing to the intensification of climate change.
   o Global carbon emissions from wildfires, including 69 million tonnes annually from India, have increased significantly in recent years.
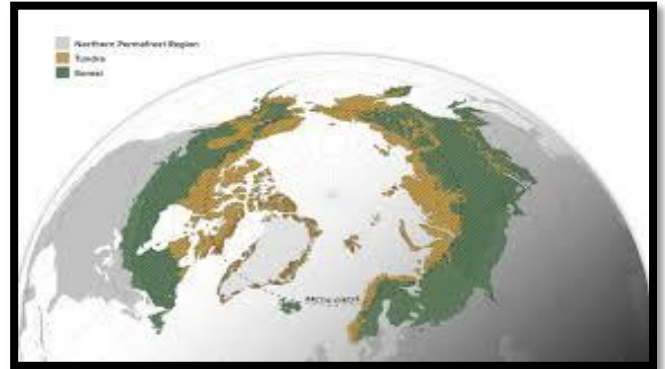
Conclusion:
The disruption of the Arctic Boreal Zone's carbon sink function underscores the urgent need for addressing climate change, particularly in regions like the Arctic, which play a vital role in regulating global carbon cycles.

Mains Questions

Digital Infrastructure & Cybersecurity
1) **Discuss the strategic significance of undersea cables for India's digital sovereignty and economic security. What steps are needed to secure this infrastructure?** *(GS3 – Infrastructure, Security)*
2) **Evaluate the key findings of the Digital Threat Report 2024. How can India strengthen cybersecurity in its BFSI sector?** *(GS3 – Cybersecurity)*
3) **National Mission on Power Electronics Technology (NaMPET) has the potential to revolutionize India's electronics sector. Discuss.** *(GS3 – S&T, Infrastructure)*

Economy, Trade & Financial Sector
4) **Analyze the implications of the USA's 'Reciprocal Tariffs' policy on India's trade competitiveness and export strategy.** *(GS2 - IR, GS3 - Economy)*
5) **India's changing remittance landscape reflects new global labour and migration trends. Discuss.** *(GS2/GS3 – Economy, Diaspora)*
6) **Critically examine the performance of the Pradhan Mantri MUDRA Yojana over the past 10 years in promoting financial inclusion and entrepreneurship.** *(GS3 – Economy)*
7) **Do you think the autonomy of financial regulators in India is being compromised? Examine with respect to recent developments.** *(GS3 – Economy, Governance)*
8) **What are the objectives behind the new policy on foreign funding? How does it balance national security with NGO functioning?** *(GS2 – Governance)*
9) **Critically assess the 'One State, One RRB' policy in the context of regional banking inclusion and rural credit delivery.** *(GS3 – Indian Economy)*

Agriculture & Rural Development
10) **How has aquaculture evolved in India? Discuss the challenges and suggest a roadmap for sustainable development.** *(GS3 – Agriculture)*
11) **Discuss the implications of India-Israel Comprehensive Agriculture Agreement in enhancing India's agri-tech and irrigation capabilities.** *(GS2/GS3 - Agriculture, IR)*
12) **Examine the achievements and limitations of the Stand-Up India Scheme in promoting entrepreneurship among**

SC/ST and women. *(GS2 - Welfare Schemes, GS3 - Inclusive Growth)*

13) **The Forest Rights Act, 2006 aims to empower forest dwellers. Evaluate its implementation challenges and impact.** *(GS2 - Governance, Welfare of Vulnerable Sections)*

14) **'Hamari Parampara Hamari Virasat' initiative reflects India's cultural revivalism. How can such initiatives support rural tourism and local livelihoods?** *(GS1 - Culture, GS3 - Economy)*

15) **Highlight the significance of the Panchayat Advancement Index (PAI). How can it strengthen grassroots governance?** *(GS2 - Local Governance)*

Health, Environment & Science

16) **Antibiotic misuse in livestock farming poses a serious AMR (antimicrobial resistance) threat. Discuss regulatory and awareness strategies to tackle this.** *(GS3 - Health, Environment)*

17) **How is ozone pollution different from other forms of air pollution? Suggest policy steps to address urban ozone levels in India.** *(GS3 - Environment)*

18) **Explain the importance of genome mapping initiatives like India's Genome Project. How can this help in personalized medicine and public health planning?** *(GS3 - Science & Tech, Health)*

19) **Iron opacity in the Sun affects our understanding of stellar evolution. Discuss the implications of such findings on space science.** *(GS3 - Science & Tech)*

20) **Discuss the significance of ESA's Biomass Mission in the global context of climate change and carbon accounting.** *(GS3 - Environment, S&T)*

21) **Plastic pollution is a human rights issue as much as an environmental one. Critically examine in light of recent UNHRC resolution.** *(GS3 - Environment, GS2 - Rights Issues)*

Security & Strategic Affairs

22) **India's Military Space Doctrine is a step towards securing national interests in outer space. Discuss its components and challenges.** *(GS3 - Internal Security, Defence)*

23) **Discuss the challenges and ethical concerns associated with increasing electronic surveillance on sensitive borders like Jammu & Kashmir.** *(GS3 - Security)*

24) **3D printing is being hailed as the next industrial revolution. Evaluate its transformative potential in infrastructure and defence sectors.** *(GS3 - S&T, Economy)*

International Relations & Federalism

25) **What are the key takeaways from BIMSTEC Summit 2025? How can India use BIMSTEC as a bridge between South and Southeast Asia?** *(GS2 - IR)*

26) **Under what conditions can President's Rule be imposed in a state? Critically examine the constitutional safeguards against its misuse.** *(GS2 - Polity & Governance)*

NEWS IN BRIEF

Lodhi Garden: Heritage with Ecological Legacy

GS1: History & Culture

- **Context**: Marks **89 years** of establishment (1936).
- **Historical Significance**: Dates to **14th–15th centuries**; burial ground of **Sayyid and Lodi dynasties**.
- **Architectural Highlights**:
  - **Tomb of Muhammad Shah** (Sayyid dynasty)
  - **Tomb of Sikandar Lodi**, **Bada Gumbad**, **Sheesh Gumbad**
  - **Khairpur Satpula Bridge** from Akbar's era
- **Cultural Role**: Nauroz celebrations held annually.
- **Post-Independence**: Redesigned by **Joseph Allen Stein**.

Online Gaming under PMLA

GS2: Governance

- **Context**: Centre proposes designating real-money gaming firms as **'reporting entities'** under **PMLA, 2002**.
- **Implication**: Firms must report user transactions to **FIU-IND** under Finance Ministry.
- **Rationale:**
  - High revenue (~$2.7 billion in 2024)
  - Risks: **Money laundering**, **illegal betting**, **tax evasion**
  - Previous step: 28% GST on deposits (2023)
- **Significance**: Aims to ensure **transparency and accountability** in digital economy sectors.

Discovery of Small Hive Beetle (SHB)

GS3: Environment, Science & Tech, Economy

- **Context**: First confirmed in India (Amdanga, West Bengal).
- **Threat**: Invasive species causing **colony collapse disorder** in bees.
- **Impact**: Jeopardizes **honey production** and **livelihoods in apiculture**.
- **Global Spread**: From Sub-Saharan Africa to US, Australia, and Asia.
- **Classification**: Notifiable disease by **OIE**.
- **Way Forward**: **Monitoring**, **containment**, and **awareness campaigns**.

Volatility Index (VIX): Economic Uncertainty Spike

- **Context**: India VIX jumped 65% to 22.8 (highest single-day spike).
- **Cause**: Global tension due to **US-China tariff standoff**.
- **About India VIX**:
  - Measures market's 30-day expected volatility
  - Based on **NIFTY options data**
- **Significance**: Reflects investor sentiment and risk perception.

New "Blue Category" for Industries – CPCB

- **Context**: CPCB introduces **Blue Category** under **Pollution Index classification**.
- **Purpose**: Recognize industries with high pollution but positive environmental impact.
- **Examples**: Waste-to-energy plants, CBG plants
- **Incentive**: Additional **2-year Consent to Operate (CTO)** validity.
- **Significance**: Balances **pollution control** with **environmental services**.

CREA Report on Air Pollution – FY 2024-25

- **Context**: Delhi recorded **highest PM10 levels** (206 µg/m³) under **NCAP**.
- **Goal**: 40% PM10 reduction by 2025-26 (baseline: 2017).

- **Mixed Outcomes**:
  - 77 cities showed improvement
  - 23 cities worsened; 91 still exceed national PM10 standards
  - **Bareilly**: 78% reduction; **Jalgaon**: 57% increase
- **Significance**: Highlights the **need for stronger enforcement** of air quality goals.

Tipitaka

GS1 – Art & Culture

- *Context*: Presented to PM Modi by Thai counterpart.
- *Significance*: Core Buddhist canonical text in Pali; compiled after Buddha's death at 1st Buddhist Council (5th BCE, Rajgir).
- *Structure*:
  - **Vinaya Pitaka** – Monastic rules.
  - **Sutta Pitaka** – Buddha's sermons.
  - **Abhidhamma Pitaka** – Philosophical analysis.
- *Relevance*: Reflects India's ancient Buddhist heritage and soft power diplomacy.

Kodungalloor Bharani Festival

- *Location*: Kerala's Sree Kurumba Bhagavathy Temple.
- *Cultural Aspects*: Celebrates Goddess Bhadrakali's birth; oracles (Velichappadus) in red attire perform rituals.
- *Relevance*: Living tradition reflecting folk religious practices and female divinity worship in South India.

President's Rule in Manipur

GS2 – Polity and International Relations

- *Article 356*: Invoked due to breakdown of constitutional machinery.
- *Legal Safeguards*: 44th Amendment, Sarkaria and Punchhi Commissions advocate caution and limited use.
- *Judicial Review*: S.R. Bommai Case ensures objective application.
- *Relevance*: Federalism, Centre-State relations, misuse of constitutional provisions.

Baku to Belém Roadmap (Climate Finance)

- *India's Stand*: Urged BRICS support for mobilizing $1.3 trillion for developing countries' NDCs.
- *Objective*: Define post-2025 climate finance goal, improve accessibility/predictability.
- *BRICS Role*: Represents 47% of global population; key to equitable climate transition.
- *Relevance*: Climate justice, global south cooperation, India's proactive diplomacy.

Dokra Art

GS1: Art & Culture

- **Context**: PM gifted a Dokra Brass Peacock Boat to Thai PM.
- **About**:
  - 4,000-year-old tribal art from **Dhokra Damar tribes** (West Bengal).
  - Uses **lost wax casting technique** – each piece is unique.
  - **GI tag** granted to Dokra of Bankura (2008).
  - Linked to **Indus Valley Civilization** (e.g., Mohenjo-daro's Dancing Girl).

Gaza Strip Conflict

GS1: Places in News / GS2: International Affairs

- **Context**: Israel controls over 50% of Gaza amid military operations against Hamas.
- **Details**:
  - Borders Israel, Egypt; area ~365 sq. km.
  - Frequent site of Israel-Hamas conflicts (2008–2024).
  - Faces severe **humanitarian crisis** – poverty, unemployment, resource scarcity.

Palna Scheme (Mission Shakti)

GS2: Health / Women Empowerment

- **Context:** Enhances childcare support for working women.
- **About:**
  - Recast version of the National Creche Scheme (2022) under 'Samarthya'.
  - Centrally Sponsored (60:40, 90:10 for NE/special states; 100% for UTs without legislature).
  - Provides **creche, nutrition, health monitoring** for children (6 months–6 years).
  - **Universal coverage**, regardless of mother's employment status.
  - Supports **SDG 8: Decent Work and Economic Growth.**

India-Nepal Judicial Cooperation MoU
GS2: India's Neighbourhood / Governance

- **Context:** MoU signed between Supreme Courts of India & Nepal.
- **Key Points:**
  - Focuses on **information exchange**, **joint training**, **tech-enabled courts**.
  - A **Joint Working Group** will strategize cooperation.
  - Encourages **adoption of shared legal doctrines** (e.g., Basic Structure).

UGC's New Rules for Foreign Degree Equivalence
GS2: Education Policy

- **Context:** UGC notified new norms for recognizing foreign academic degrees.
- **Key Points:**
  - Degree must be from a legally recognized foreign institution.
  - Entry-level criteria must match Indian norms.
  - Offshore degrees allowed if compliant with both host & origin country laws.
  - **Equivalence Certificate** necessary for higher studies/employment in India.

National Mission on Power Electronics Technology (NaMPET)
GS3: Science & Technology / Infrastructure

- **Context:** Commercialization agreements signed for NaMPET technologies.
- **Highlights:**
  - Wireless EV charger (89.4% efficiency).
  - Indigenous propulsion system for railways (aligned with 2030 electrification goal).
  - LVDC systems to support **Kerala's Carbon Neutrality Roadmap 2050**.
  - Focus on **e-mobility, microgrids, smart power systems**.
  - Implemented by **C-DAC**, Thiruvananthapuram.

ESA's Biomass Mission
GS3: Environment / Science & Tech

- **Context:** Launch on April 29, 2025.
- **About:**
  - Part of ESA's **Earth Explorer Programme**.
  - Uses **P-band SAR radar** to map global forest biomass.
  - Aims to measure **carbon storage**, monitor **climate change**, and track **deforestation**.
  - Will also study **ice sheets and create 3D terrain models**.
  - Fills gaps in **biomass and height data**.

Military Space Doctrine
GS3: Defence / Space Technology

- **Context:** India to release its first **military space doctrine**.
- **Highlights:**
  - Prepared by **Defence Space Agency (DSA)**.
  - Aims to counter China's anti-satellite capabilities.

- Defines **roles, strategy, research, and space laws**.
- Plans to launch **52 ISR satellites** with ISRO.
- India targets 10% of global space commerce by 2032, 25% by 2047.

Breakthrough Prize 2025
Miscellaneous / Science & Tech

- **Context:** Annual science awards announced.
- **About:**
  - Known as the "**Oscars of Science**"; each award worth **$3 million**.
  - Physics prize to 13,508 CERN physicists (Higgs boson research).
  - Life Sciences: Advances in **obesity drugs**, **MS treatment**, **gene editing**.
  - Math: **Dennis Gaitsgory** for work on **Langlands conjecture**.

Established by tech leaders like Zuckerberg, Sergey Brin, etc

Pamban Bridge Inauguration
GS3: Economy / Infrastructure

- The new **Vertical Lift Railway Sea Bridge** at Pamban replaces the 1914 bridge, enhancing regional connectivity and maritime navigation.
- Constructed by **Rail Vikas Nigam Limited**, it features a 72.5 m lift span for ship passage and is designed for semi-high-speed and heavy freight trains.
- It strengthens trade and pilgrimage links, especially with **Sri Lanka**, overcoming corrosion and maintenance challenges of the old bridge.
- Symbolic of India's infrastructural modernization with historical continuity.

Ottawa Convention Withdrawal by Baltic States
GS2: International Relations / Global Security

- **Poland, Finland, and Baltic states** plan to exit the **1997 Ottawa Convention** banning anti-personnel mines due to heightened threats from Russia.
- The treaty, adopted in 1997, led to the destruction of 40M+ landmines and reduced global civilian casualties.
- Exit raises global security concerns and may set a precedent amidst rising geopolitical tensions.
- Highlights a growing divide in disarmament commitments vs national security imperatives.

150th Assembly of Inter-Parliamentary Union (IPU)
GS2: Governance / International Relations

- **India's delegation**, led by Lok Sabha Speaker Om Birla, attends the IPU Assembly in Tashkent focusing on **"Parliamentary action for social development and justice."**
- IPU (est. 1889) is a global platform for promoting democracy, peace, gender equality, and sustainable development.
- Reinforces India's commitment to democratic global dialogue and inclusive governance.

Vibrant Villages Programme-II (VVP-II)
GS3: Infrastructure / Internal Security

- **₹6,839 crore** Central Sector Scheme aimed at strategic border development till FY 2028–29 across 17 border States/UTs.
- Focus: Infrastructure, SMART classes, tourism, livelihood generation, and border vigilance via local participation.
- Crucial for integrating border populations into the national fold and curbing trans-border threats.

African Giant Pouched Rat – Landmine Detection
GS3: Environment / Science & Technology

- A trained **African Giant Pouched Rat** set a world record detecting 109 landmines in Cambodia.
- The species' intelligence and lightweight make it ideal for humanitarian demining and even TB detection.
- Symbolizes low-cost innovation in post-conflict recovery and public health.
- Conservation Status: **Least Concern** (IUCN).

Agasthyamalai Landscape Survey – SC Order
GS3: Environment / Conservation

- SC directed a **Central Empowered Committee (CEC)** survey to identify encroachments and restore forest areas in the **Agasthyamalai Biosphere Reserve**.
- Covers protected areas across Kerala-Tamil Nadu and key tiger habitats.
- Supports enforcement of conservation laws and ecological restoration amid rising degradation.

9 Years of Stand-Up India Scheme
GS2: Governance / Inclusive Growth

- Launched in 2016 to boost **entrepreneurship among SCs, STs, and women** through loans between ₹10 lakh–₹1 crore.
- Focus on greenfield enterprises across sectors including agriculture-allied trades.
- Empowers disadvantaged groups economically, contributing to inclusive job creation and MSME growth.

'Hamari Parampara Hamari Virasat' Initiative
GS2: Polity / Governance / Tribal Welfare

- Launched by Jharkhand Govt. & MoPR, aligned with **PESA Act (1996)**, to document and preserve tribal customs, festivals, and self-governance in Scheduled Areas.
- Over 3,000 villages engaged, marking **150th birth anniversary of Birsa Munda**.
- Enhances grassroots cultural empowerment and safeguards tribal heritage within constitutional framework.

Sections 271 and 272 of the BNS
(GS2/Governance)

- An FIR was registered under Section 271 of the Bharatiya Nyay Sanhita (BNS) for acts likely to spread dangerous diseases. Section 271 punishes negligent acts with a maximum of 6 months imprisonment. Section 272, for malicious intent, carries the same punishment. Both are bailable offences.
- Prosecution must prove that the infection is lethal and that the accused's actions may spread it.

50 Years of India-Portugal Diplomatic Ties
(GS2/IR)

- President Murmu's visit marks 50 years of India-Portugal relations. She became the first Indian President to visit Portugal since 1998, receiving the 'City Key of Honour' from Lisbon's Mayor.
- Portugal is an EU member, with historical significance in the Age of Exploration.

World Homoeopathy Day
(GS2/Health)

- India hosts the largest Homoeopathic symposium in Gandhinagar on World Homoeopathy Day, commemorating Dr. Samuel Hahnemann's birth anniversary.
- Homoeopathy is India's second-largest medical system, regulated under the Ministry of AYUSH with the National Commission for Homoeopathy overseeing its practice and education.

Niveshak Didi Initiative
(GS3/Economy)

- Phase 2 of the 'Niveshak Didi' initiative aims to train women postal workers as financial educators in rural areas. It will involve 40,000 women educating communities on investing, fraud prevention, and savings habits.
- IEPFA and IPPB are collaborating to enhance financial literacy, especially among women.

Artemis Accords
(GS3/Space)

- Bangladesh becomes the 54th signatory of the Artemis Accords, a non-binding initiative for cooperative space exploration, focusing on peaceful purposes and space resource utilization, aligned with the 1967 Outer Space Treaty.

Project Varsha
(GS3/Defence)

- India plans to build a new naval base in Andhra Pradesh by 2026 under Project Varsha, focused on housing nuclear submarines and warships, enhancing India's maritime defense capabilities in the Bay of Bengal.

Nilgiri Tahr Census
(GS3/Environment)

- Kerala and Tamil Nadu will conduct a Nilgiri Tahr census to commemorate 50 years of Eravikulam National Park, which houses this endangered species, found only in the Western Ghats. The Nilgiri Tahr is the state animal of Tamil Nadu.

Ozone Pollution
(GS3/Environment)

- A study by IIT Kharagpur highlights the harmful effects of ozone pollution on India's crops, especially wheat, rice, and maize. Exposure to ozone exceeds safe limits in the Indo-Gangetic Plain, impacting food security and undermining SDG goals like 'no poverty' and 'zero hunger'.

Prelims questions

Environment & Biodiversity

1) **Which of the following states does the *Agasthyamalai Landscape* mainly cover?**
   A. Tamil Nadu and Kerala
   B. Karnataka and Andhra Pradesh
   C. Odisha and West Bengal
   D. Assam and Meghalaya

2) **The term "Blue Category" of industries, recently introduced by CPCB, refers to industries that:**
   A. Emit the highest pollutants
   B. Do not pollute at all
   C. Have low pollution potential
   D. Are water-intensive industries

3) **Consider the following statements regarding the *Arctic Boreal Zone (ABZ)*:**
   1. It acts as a carbon sink.
   2. Recent findings suggest it may now be rejecting more carbon than it absorbs.
      Which of the above is/are correct?
      A. 1 only
      B. 2 only
      C. Both 1 and 2
      D. Neither 1 nor 2

4) **The Small Hive Beetle (SHB), recently seen in the news, poses a threat to:**
   A. Pollinators like honeybees
   B. Soil microorganisms
   C. Aquatic species
   D. Wetland flora

Economy & Infrastructure

5) **The Volatility Index (VIX), often in the news, is associated with:**

A. Agricultural price fluctuations
B. Stock market uncertainty
C. Inflation prediction
D. Exchange rate monitoring

6) **Which of the following is the first sea bridge in India that was rebuilt using modern engineering for both road and rail traffic?**
   A. Bandra-Worli Sea Link
   B. Pamban Bridge
   C. Vivekananda Setu
   D. Chenab Bridge

7) **India's coal production is increasing due to:**
1. High energy demand
2. Supply-chain bottlenecks in renewables
3. Import substitution policies
   Select the correct answer using the code below:
   A. 1 and 2 only
   B. 2 and 3 only
   C. 1 and 3 only
   D. 1, 2 and 3

8) **The "National Critical Mineral Mission" is aimed at:**
   A. Increasing mineral exports to boost forex reserves
   B. Securing supply chains for minerals essential to clean energy technologies
   C. Promoting mineral-based tourism
   D. Replacing coal with green hydrogen

Science & Technology

9) **The Axiom-4 (Ax-4) Mission, recently in the news, is related to:**
   A. Space tourism to the Moon
   B. Private astronaut mission to the ISS
   C. Development of reusable rockets
   D. Planetary defense against asteroids

10) **India's genome mapping initiative has revealed:**
   A. Genome sequencing of endangered species
   B. Uniform genetic variation across India
   C. Over 180 million DNA variants in Indian population
   D. Rise in genetically modified food consumption

Polity, Governance & Law

11) **Sections 271 and 272 of the Bharatiya Nyay Sanhita (BNS) deal with:**
   A. Treason and sedition
   B. Misuse of official position
   C. Adulteration of food and drugs
   D. Cybersecurity threats

12) **The *Vibrant Villages Programme-II (VVP-II)* focuses on:**
   A. Promoting eco-tourism in coastal villages
   B. Border area development and preventing out-migration
   C. Electrification of tribal hamlets
   D. Urban amenities in rural zones

13) **The withdrawal of Baltic States from the Ottawa Convention implies:**
   A. They have legalized landmine use
   B. They have banned all landmines
   C. They will join the Convention on Cluster Munitions
   D. They are increasing civilian protection

Miscellaneous & Current Affairs

14) **"Kannadippaya", recently granted a GI tag, is a traditional:**
   A. Dyeing technique
   B. Textile product
   C. Musical instrument
   D. Sweet delicacy

15) **The *Baku to Belém Roadmap*, recently in the news, is associated with:**
   A. Global environmental education goals
   B. Renewable energy corridor in Europe
   C. India's strategic road connectivity in Eurasia
   D. UNESCO's literacy framework

16) **Which of the following programs has brought "online gaming" under the ambit of money laundering laws (PMLA)?**
   A. Digital India Mission
   B. Information Technology (Intermediary Guidelines) Rules

C. Prevention of Money Laundering Act notification
D. Cyber Safe India Campaign

International Relations & Summits

17) **The BIMSTEC Summit 2025 focused on which of the following key areas?**
1. Maritime security cooperation
2. Climate change adaptation
3. Digital and economic integration
   Select the correct answer:
   A. 1 and 2 only
   B. 2 and 3 only
   C. 1 and 3 only
   D. 1, 2 and 3

18) **India's remittance landscape is changing due to:**
   A. Rise in global oil prices
   B. Decline in emigration from rural India
   C. Shifts in migration patterns and digital transfer channels
   D. Government ban on overseas remittances

Health, Science & Society

19) **Excessive use of antibiotics in livestock is a concern because it leads to:**
   A. Increased protein levels in milk
   B. Higher resistance in plants
   C. Antimicrobial Resistance (AMR) in humans
   D. Livestock obesity

20) **The UNHRC resolution on plastic pollution connects pollution with:**
   A. Urban unemployment
   B. The right to food
   C. Human rights and environmental justice
   D. Global trade fairness

Governance & Institutions

21) **Financial sector regulators in India, such as SEBI and RBI, are undergoing reforms to:**
   A. Increase profit-making powers
   B. Align with WTO guidelines
   C. Enhance autonomy and coordination
   D. Merge into a single regulator

22) **'Hamari Parampara Hamari Virasat' initiative focuses on:**
   A. Conservation of endangered species
   B. Digital documentation of tribal art
   C. Preservation of India's cultural heritage
   D. Skill training in rural areas

23) **Which of the following statements is true about *President's Rule* in India?**
   A. It can be imposed without Parliament's approval
   B. It is imposed under Article 356 of the Constitution
   C. It leads to the dissolution of Lok Sabha
   D. It is recommended by the Supreme Court

Government Schemes & Economy

24) **The Stand-Up India Scheme primarily aims to promote entrepreneurship among:**
   A. Large companies
   B. Tribal and Dalit women
   C. SC/ST and women entrepreneurs
   D. Migrant workers

25) **What is the primary objective of the *Pradhan Mantri MUDRA Yojana*?**
   A. Housing loans for rural poor
   B. Providing microfinance to non-corporate small businesses
   C. Startup funding for IT sector
   D. Infrastructure loans for urban development

Technology & Innovation

26) **3D printing is considered transformative in the field of:**
1. Medical implants
2. Infrastructure development
3. Food packaging
   Select the correct answer:
   A. 1 only
   B. 1 and 2 only
   C. 2 and 3 only
   D. 1, 2 and 3

27) **The Digital Threat Report 2024, related to the BFSI sector, highlights rising risks from:**
  A. Internal audits
  B. Rural banking errors
  C. Ransomware and phishing attacks
  D. ATM failures

28) **The National Mission on Power Electronics Technology (NaMPET) is aimed at:**
  A. Promoting electric cooking devices
  B. Developing indigenous capabilities in power electronics systems
  C. Supporting power banks for solar parks
  D. Managing electric vehicle imports

Agriculture & Rural Development

29) **India-Israel Comprehensive Agriculture Agreement focuses on:**
  A. Importing fertilizers from Israel
  B. Transferring hi-tech farming and irrigation technologies
  C. Sending Indian farmers to Israel for training
  D. Buying agricultural land in Israel

30) **The Panchayat Advancement Index (PAI) aims to:**
  A. Rank panchayats on digital governance
  B. Measure decentralisation and local development outcomes
  C. Monitor election outcomes in rural areas
  D. Allocate funds to urban bodies