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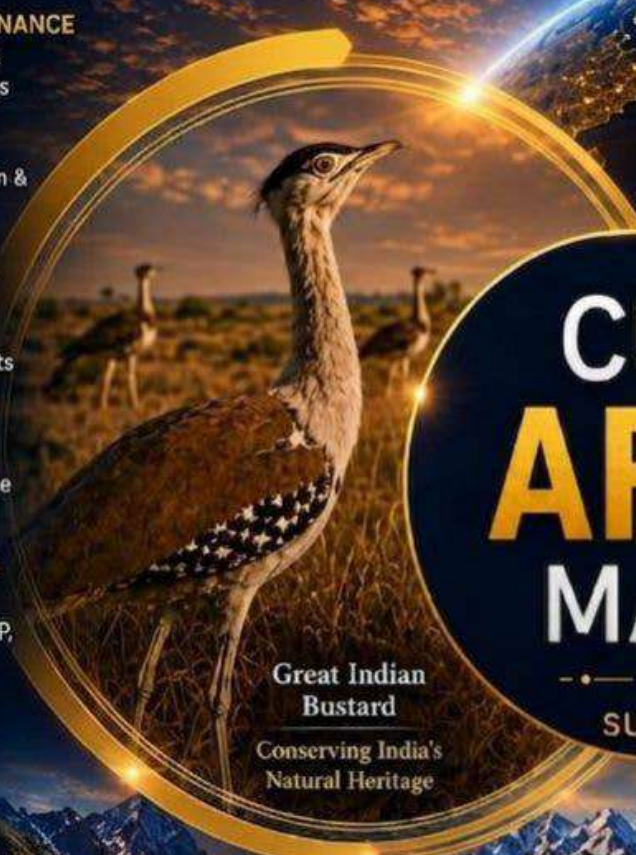
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1.1. Phase I of Census 2027

SYLLABUS

GS-1: Population and associated issues, poverty and developmental issues, urbanization, their problems and their remedies.

GS-2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.

Context

The Government of India has commenced the first phase of Census 2027, the world's largest population census exercise, with a first-ever digital approach.

More on the News

- The first phase of Census 2027 began on **April 1, 2026**, with the **Houselisting and Housing Census (HLO)**.
- The exercise starts with a **self-enumeration window of 15 days**, followed by **door-to-door houselisting operations** by enumerators.
- Self-enumeration has been rolled out in select States and Union Territories, including **Andaman and Nicobar Islands, Goa, Karnataka, Lakshadweep, Mizoram, Odisha, Sikkim, and areas under NDMC and Delhi Cantonment Board**.
- **President Droupadi Murmu** became the **first citizen** to complete self-enumeration, continuing the tradition of initiating the Census with the Head of State.

About the Census of India 2027

- Census 2027 will be the **16th Census of India and the 8th after Independence**.
- Conducted under the **Census Act, 1948, and Census Rules, 1990**
- The Census will be conducted in **two phases**:
 - ✓ **Houselisting and Housing Census (April–September 2026)**: Involves listing all buildings and structures with geo-tagging and unique IDs, while

collecting detailed data through a 33-question schedule on housing conditions, amenities, assets, and key household indicators such as headship, consumption patterns, and family composition.

- ✓ **Population Enumeration (February 2027)**: The Phase will collect data on demographic, socio-cultural, and economic parameters, including migration and fertility.
- ✓ **March 1, 2027**, has been fixed as the reference date for most of the country.
- ✓ For snow-bound regions such as **Ladakh and parts of Jammu and Kashmir, Himachal Pradesh and Uttarakhand, the reference date has been fixed as October 1, 2026**.
- **Digital and Technological Innovations: Census 2027 will be India's first fully digital census, with the following initiatives**:
 - ✓ **Mobile applications** (Android & iOS) for real-time data collection.
 - ✓ **Census Management & Monitoring System (CMMS)**: A dedicated portal for end-to-end, real-time monitoring.
 - ✓ **Houselisting Block (HLB) Creator Web Map Application**: For precise area demarcation by Charge Officers.
 - ✓ **Self-enumeration option** for citizens.
 - ✓ Robust **data security features** for digital operations.
 - ✓ **Census-as-a-Service (CaaS)**: Clean, machine-readable, and actionable data delivery to Ministries.
 - ✓ Improved **data dissemination** with user-friendly dashboards and visualization tools, down to village/ward level.
- **Inclusion of Caste Enumeration**: As decided by the **Cabinet Committee on Political Affairs (April 2025)**, **caste enumeration** will be included.
 - ✓ Caste data will be collected **digitally during the Population Enumeration phase**, considering India's social and demographic diversity.

- **Implementation Strategy:** Door-to-door household visits with *separate questionnaires* for HLHC and PE.
 - ✓ Census functionaries appointed at the *sub-district, district, and state levels* by respective administrations.
 - ✓ A *nationwide publicity and awareness campaign* focusing on inclusive participation, last-mile outreach, and dissemination of accurate information.
- Unlike 2019, the government statement *does not mention a separate budgetary allocation for updating the National Population Register (NPR)*.

About the Census

- The Census is a *comprehensive administrative and statistical exercise* that collects, compiles, and analyses demographic, social, and economic data of the entire population.
- It is conducted by the *Office of the Registrar General and Census Commissioner of India* under the Ministry of Home Affairs.
- The Census is conducted *once every 10 years (decennial)* as a convention.
- The *2021 Census was postponed* due to the COVID-19 pandemic.

Historical Overview of Census in India

Pre-Independence

- For the first time, a census was conducted in the towns of *Allahabad* (1824) and *Banaras* (1827-28) by James Prinsep.
- The first complete census of an Indian city was conducted in 1830 in *Dacca* by Henry Walter.
- The first nationwide census was undertaken in *1872* under Lord Mayo.
- The first *modern synchronous census* covering all of British India (except Kashmir) was undertaken in *1881* by W.C. Plowden, initiating the decennial census followed to the present day.
- The *1931 census* was the last to record comprehensive caste data. This caste data was used by the *Mandal Commission* to recommend 27% reservations for Backward Classes.

Post-Independence

- The 1951 census was the first to be conducted

under the *Census Act, 1948*. It excluded caste enumeration for the general population except for SC and ST population. Now, the focus shifted to socio-economic parameters like education, literacy, and employment status.

- The *National Population Register (NPR)*, launched in 2010 and updated in 2015, was designed to build a detailed identity database of all usual residents.
- The *Socio-Economic and Caste Census (SECC) 2011* was a one-off exercise conducted separately from the main Census.

Constitutional and Legal Framework

- **Article 246 and 7th Schedule:** Census is listed as *item 69* in the *Union List*, making it an exclusive responsibility of the Central Government.
- **Article 82:** Mandates a readjustment of seats in the Lok Sabha allotted to the States after every Census.
- **Census Act of 1948:** It provides the legal framework for carrying out the Census.
 - ✓ It does *not mandate the decennial conduct of census*, meaning that the conduct of census every 10 years is merely a convention.
- **Census Rules, 1990:** Details the procedure for data collection, responsibilities of enumerators, etc.
- **Nodal Authority:** The *Registrar General and Census Commissioner of India (RGCCI)*, under the Ministry of Home Affairs, is the nodal authority for conducting the Census and managing vital statistics.

1.2. Andhra Pradesh Reorganisation (Amendment) Bill, 2026

SYLLABUS

GS 2: *Indian Constitution- historical underpinnings, evolution, features, amendments, significant provisions and basic structure.*

Context

Recently, both houses of the Parliament passed the Andhra Pradesh Reorganisation (Amendment) Bill, 2026, making Amaravati the state's sole and permanent capital.

Key Provisions of the Bill

- It aims to resolve long-standing uncertainty over the state's capital, as the *Andhra Pradesh*

Reorganisation Act, 2014, had designated **Hyderabad as the common capital of Telangana and Andhra Pradesh** for a transitional period of up to ten years.

- Amaravati will replace Hyderabad as Andhra Pradesh's capital with **retrospective effect from June 2, 2024**, covering all areas notified under the Andhra Pradesh Capital Region Development Authority Act, 2014.
- **The earlier 2019–2025 policy of having three capitals:** Administrative at Visakhapatnam, legislative at Amaravati, and judicial at Kurnool has been reversed, restoring **Amaravati as the sole capital**.

About Andhra Pradesh Reorganisation Act, 2014

- It is an Act of the Indian Parliament that **bifurcated the state of Andhra Pradesh into Telangana and the residuary Andhra Pradesh state**.
- **Key Provisions:**
 - ✓ **Hyderabad would be designated as the common capital of Telangana and Andhra Pradesh** for up to ten years, after which it would remain the capital of Telangana, with Andhra Pradesh establishing a new capital.
 - ✓ The Central Government was mandated to constitute an expert committee to examine options for the new capital of Andhra Pradesh and submit recommendations within six months of the enactment of the Andhra Pradesh Reorganisation Act, 2014.
 - ✓ From the appointed day, the **High Court of Judicature at Hyderabad** would serve as the common High Court for Telangana and Andhra Pradesh until a separate High Court for Andhra Pradesh is established under **Article 214 of the Constitution**.
 - A separate High Court for the state of Andhra Pradesh was established on **January 1, 2019**, at the Interim Judicial Complex at Nelapadu, Amaravati, Guntur district.

Constitutional Provisions for the Formation of States

- **Article 1:** Declares India as a Union of States,

encompassing all States, Union Territories, and any future acquired territories, reflecting a strong Centre with flexible constituent units.

- **Article 2:** Empowers Parliament to admit new States into the Union or establish new States on terms it considers appropriate.
- **Article 3:** Authorises Parliament to create new States by **separation, merger, or reorganisation**, and to alter the area, boundaries, or names of existing States.
 - ✓ Such a Bill requires prior recommendation of the President, who refers it to the concerned State Legislature for its views.
 - ✓ This provision has facilitated reorganisations like the formation of Chhattisgarh, Jharkhand, Uttarakhand (2000), and Telangana (2014).
- **Article 4:** Provides that laws made under **Articles 2 and 3 may amend the First Schedule (States and UTs)** and the Fourth Schedule (Rajya Sabha seats), **and such laws are not considered Constitutional Amendments under Article 368**.

1.3. Report on Internet Shutdowns in 2025

SYLLABUS

GS-2: Important aspects of governance, transparency and accountability, e-governance- applications, models, successes, limitations, and potential.

GS-3: Challenges to internal security through communication networks.

Context

The report *"Rising Repression Meets Global Resistance: Internet Shutdowns in 2025"* released by Access Now and the #KeepItOn campaign, highlights the rising trend of internet shutdowns globally.

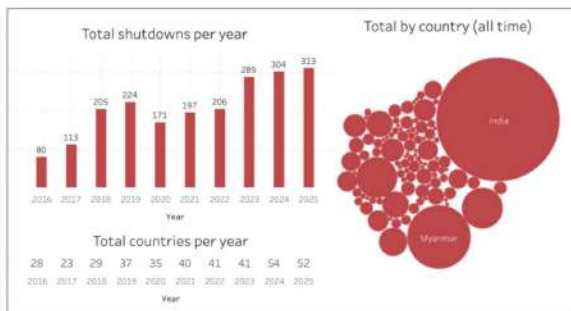
About the Report

- The report is part of the **#KeepItOn campaign launched in 2016** at RightsCon to end internet shutdowns globally.
- The campaign has grown to include **366+ organisations from 106 countries**, including civil society, research bodies, and media groups.
- The data is based on technical monitoring and

POLITY AND GOVERNANCE

contextual sources such as news reports and field accounts.

- The dataset is dynamic and may be updated, as some shutdowns may remain unreported.
- It recorded **313 shutdowns across 52 countries in 2025**, the highest ever, while **India reported 65 shutdowns, its lowest since 2017**, but still among the highest globally.



Key Findings

- **Record High Global Shutdowns:** Internet shutdowns reached a historic high of **313 incidents in 2025 across 52 countries**.
 - ✓ Not a single day of 2025 passed without at least one shutdown somewhere in the world.
 - ✓ The number of affected countries has increased significantly from 28 in 2016 to 52 in 2025.
- **Regional Concentration of Shutdowns:** The **Asia-Pacific region accounted for 195 shutdowns**, the highest globally.
 - ✓ **Myanmar** recorded the **highest number of shutdowns (95)**, driven by military repression.
 - ✓ **Eastern Europe and Central Asia recorded 29 shutdowns**, with **Russia and Belarus** using shutdowns during elections and security situations.
- **India's Continued High Usage:** India recorded **65 shutdowns in 2025**, the lowest since 2017, but still ranked second globally.
 - ✓ These shutdowns affected **12 states and Union Territories**.
 - ✓ They were primarily imposed during **protests, communal violence, conflicts, and religious events**.

- ✓ India remains the **highest globally in cumulative shutdowns (920 since 2016)**.
- ✓ The report highlights concern over the **normalisation of shutdowns in a democratic setup**.



- **Conflict as the Primary Trigger:** Conflict remained the leading cause, accounting for **125 shutdowns (around 40%)**.
 - ✓ Shutdowns were used as tools of warfare to disrupt communication and conceal atrocities.
 - ✓ They were frequently imposed in conflict zones to isolate populations and control information.
- **Political Instability and Protests:** Protests and political instability led to **64 shutdowns across 19 countries**.
 - ✓ Governments used shutdowns to suppress dissent and control public narratives.
 - ✓ Election-related shutdowns were recorded in multiple countries to influence political outcomes.
- **Human Rights Concerns:** Around **70 shutdowns were linked to human rights abuses**.
 - ✓ Shutdowns were used to hide violence, restrict information flow, and prevent documentation of abuses.
 - ✓ They disrupted emergency services, humanitarian aid, and access to essential information.
- **Expansion of Digital Restrictions:** Authorities increasingly targeted **VPNs and circumvention tools** to prevent bypassing restrictions.
 - ✓ There was a rise in blocking of social media platforms such as Facebook, WhatsApp, Telegram, and Instagram.
 - ✓ New trends included the disruption of **LEO**

satellite internet services, indicating expansion of control over alternative connectivity.

- **Cross-Border Shutdowns:** At least **18 shutdowns were imposed by external actors** across different regions.
 - ✓ These included methods such as cyberattacks, infrastructure disruption, and interference with communication systems.
 - ✓ Such actions intensified the impact of conflicts and crises.
- **Normalisation of Shutdowns as Governance Tool:** Shutdowns are increasingly being used as a **default response to unrest, elections, and security concerns**.
 - ✓ This reflects a growing trend of using digital restrictions as tools of governance and control.
 - ✓ The report warns that such normalisation is incompatible with democratic principles.
- **Growing Global Resistance:** There is increasing resistance from civil society and legal institutions against shutdowns.
 - ✓ Courts and international organisations have begun recognising shutdowns as violations of rights.
 - ✓ Efforts are underway globally to ensure accountability and prevent the normalisation of such practices.

1.4. Supreme Court Forms Constitutional Bench to Review Sabarimala Verdict

SYLLABUS

GS 1: Salient features of Indian Society, Diversity of India.

GS 2: Indian Constitution- historical underpinnings, evolution, features, amendments, significant provisions and basic structure.

Context

Recently, the Supreme Court notified a Nine-Judge Bench headed by Chief Justice of India Surya Kant to hear the Sabarimala review case.

More on the News

- The nine-judge Bench is examining broad religious practice issues **beyond the Sabarimala dispute** and

has implications for similar controversies involving religious practices across various faiths, including Muslim and Jain.

- Apart from the CJI, it comprises Justice BV Nagarathna, Justice MM Sundresh, Justice Ahsanuddin Amanullah, Justice Aravind Kumar, Justice Augustine George Masih, Justice Prasanna B Varale, Justice R Mahadevan and Justice Joymalya Bagchi.
- The reference concerns broader constitutional issues from the 2018 Sabarimala judgment, including the **balance between religious freedom and rights to equality and dignity**, and the **extent of judicial review in essential religious practices**.

About the Sabarimala Verdict

- On September 28, 2018, a five-judge Supreme Court bench, by a 4:1 majority, struck down **Rule 3(b) of the Kerala Hindu Places of Public Worship Rules, 1965**, and lifted the age-based restriction on women's entry as unconstitutional.
- The issue reached the judiciary through a petition filed by the **Indian Young Lawyers Association in 2006**, challenging the ban as **violative of women's rights to equality and religious freedom** under the Constitution.
- The Supreme Court held that Rule 3(b) is **ultra vires the Constitution**, as well as **Section 3 and Section 4 of the Kerala Hindu Places of Public Worship (Authorisation of Entry) Act, 1965**, which prohibit discrimination against any Hindu based on class or section.
- The Court described the exclusion of women as a form of **"hegemonic patriarchy"**, and said that **exclusion on grounds of biological and physiological features like menstruation was unconstitutional, which violates the right to equality and dignity of women**.
- **Hegemonic Patriarchy** refers to a system where patriarchal norms become so deeply embedded that discrimination appears natural, leading even women to internalise and perpetuate such biases.
- The Supreme Court held that the **exclusion of women, based on notions of menstrual impurity and pollution, amounts to a form of untouchability** and perpetuates the stigmatisation of women.
- It also ruled that devotees of Lord Ayyappa do not

constitute a separate religious denomination, but are part of the broader Hindu community.

- SC emphasised that granting immunity to customs and personal laws would undermine the supremacy of the Constitution and its fundamental rights framework.
- **Justice Indu Malhotra** dissented from the majority opinion, asserting that *courts should not apply rationality to religion and that essential practices must be determined by the faith itself, not judges*.
- She emphasised that **Article 25** protects the freedom of diverse sects to follow their customs, requiring fundamental rights to harmonise with religious beliefs.

Arguments Opposing Women's Entry

- **Customary Traditions:** The Sabarimala temple follows long-standing religious customs, and the Travancore Devaswom Board argued that restricting women's entry was an essential part of these traditions.
✓ Since **Lord Ayyappa is worshipped as a celibate deity**, the exclusion was claimed to be a reasonable and integral religious practice.
- **Freedom of Religion:** It was contended that Sabarimala constitutes a religious denomination protected under **Article 26**, which guarantees the *right to manage internal religious affairs*.
- **Statutory Backing:** **Rule 3(b) of the Kerala Hindu Places of Public Worship (Authorisation of Entry) Rules, 1965** provided legal support by allowing exclusion based on custom, including restrictions on women during certain ages.
- **Judicial Precedent:** In **Ritu Prasad Sharma v State of Assam**, the court held that religious practices protected under Articles 25 and 26 are immune from challenge under other fundamental rights.

Arguments Supporting Women's Entry in Religious Places

- **Right to Equality (Article 14):** The exclusion of women based on age and menstruation is **arbitrary and discriminatory**, violating **Article 14** and **Article 15(1) (non-discrimination on sex)**, as it reinforces gender stereotypes and systemic bias.
- **Freedom of Religion for Women (Article 25):** Women have an **equal right to practice religion**

(**Article 25**); denying entry restricts this freedom unless justified by **public order, morality, or health**.

- **Doctrine of Constitutional Morality:** Constitutional morality mandates that customs align with **equality, dignity, and liberty**, and any violative practice must be reformed.
- **Right to Dignity (Article 21):** Exclusion based on menstruation treats women as impure, undermining their **dignity and bodily autonomy**.
- **Not an Essential Religious Practice:** The Court ruled that the ban is **not an essential religious practice**, and as Ayyappa devotees are **not a separate denomination**, it lacks protection under **Article 26**.
- **Gender Justice and Social Progress:** Allowing women's entry promotes **gender justice, inclusivity, and social reform**, aligning religious practices with evolving democratic values and human rights standards.

Way Forward

- **Balancing Fundamental Rights and Religious Freedom:** Ensure a harmonious balance between equality (Arts. 14, 15, 21) and religious freedom (Arts. 25–26), upholding dignity without undue interference in faith.
- **Promoting Constitutional Morality through Dialogue:** Promote dialogue among the judiciary, religious bodies, and civil society to reform regressive practices while respecting faith.
- **Effective Implementation with Sensitivity:** Ensure uniform enforcement of court rulings with awareness campaigns to reduce resistance and promote gender inclusion.

1.5. The Constitution (131st Amendment) Bill, 2026

SYLLABUS

GS 2: *Indian Constitution—Historical Underpinnings, Evolution, Features, Amendments, Significant Provisions and Basic Structure.*

Context

The Constitution (One Hundred and Thirty-First Amendment) Bill, 2026, was introduced in the Lok Sabha on April 16, 2026, and aims to amend the Constitution with regard to delimitation.

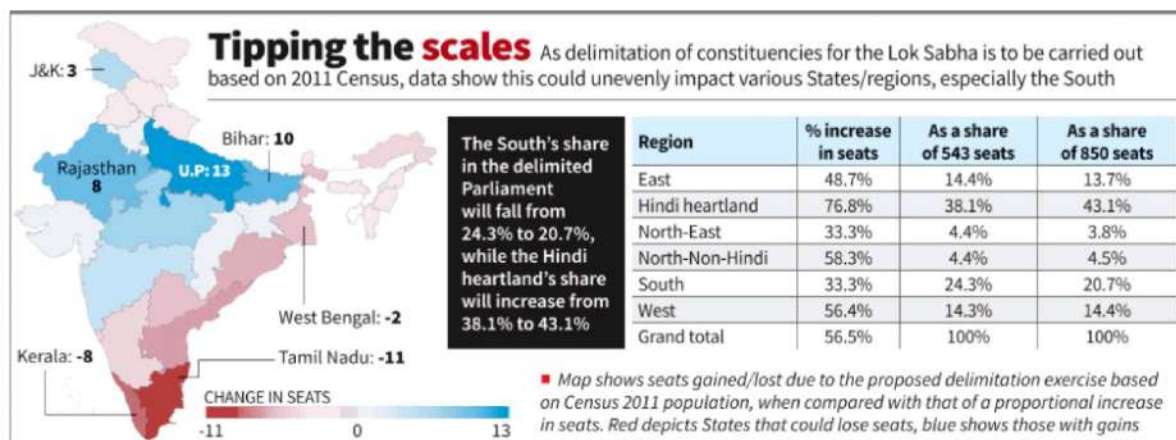
More on the News

- Along with the Constitution (131st Amendment) Bill, 2026, the Delimitation Bill, 2026, and the Union Territories Laws (Amendment) Bill, 2026 were also introduced in the Lok Sabha.
- These Bills increase the size of Lok Sabha, seek to enable delimitation based on the 2011 census, and enable reservation for women to be based on this delimitation.
- The Union Territories (UTs) Laws Bill gives effect to

similar provisions in cases of Puducherry, Delhi, and Jammu & Kashmir.

About the Constitution (131st Amendment) Bill, 2026

- **A Much Larger Lok Sabha:** The present strength of the Lok Sabha, as laid out in Article 81, is capped at 550 (530 seats from states and 20 from Union Territories).
✓ The Bill raises that ceiling sharply: 815 from states and 35 from UTs, an increase of 300 seats.



- **Redefining "Population":** Article 81 defines "population" as per the latest published Census, but until the first Census after 2026, it uses the 1971 Census for seat allocation and the 2001 Census for constituency delimitation.
✓ The Bill amends Articles 55, 81, 82, 170, 330, and 332 to introduce flexibility, allowing Parliament to decide which published Census to use.
✓ Population will be defined as that "ascertained at such census, as Parliament may by law determine."
- **Delinking Delimitation from the Census:** One of the more significant changes is to Article 82, which currently requires that parliamentary constituencies be readjusted after each census. The Bill makes **three changes**.
✓ **First**, it drops the requirement that a completed census must trigger delimitation; the exercise can now be initiated at any time, on the basis of whichever published census Parliament

designates.

- ✓ **Second**, it names the Delimitation Commission as the constitutionally mandated authority for the exercise.
- ✓ **Third**, and most consequentially, it deletes the third proviso entirely, lifting the freeze on both seat allocation and constituency boundaries that has been in place since 1971.
- **Delimitation Commission Given Constitutional Status:** The Bill amends Articles 82 and 170 to name the **Delimitation Commission as the constitutionally mandated body** for delimitation, replacing the existing formulation, which leaves the designation of the authority to Parliament by law.
- **Women's Reservation:** The Bill substitutes the entire Article 334A, as introduced by the **106th Amendment and the Nari Shakti Vandan Adhiniyam, 2023**, marking a major shift in the implementation of women's reservation.
✓ Earlier, the 33% reservation for women was

contingent upon delimitation after the first Census post-Act, delaying its implementation. The Bill removes this condition and requires only that a **delimitation exercise be conducted**, without linking it to any specific Census.

- ✓ Read with the proposed Delimitation Bill, 2026, which allows delimitation based on the **2011 Census**, the reservation can now be implemented **before the 2029 general elections**.
- ✓ The **15-year sunset clause** remains, counted from the commencement of the 106th Amendment (2023), with Parliament empowered to extend it.
- **Safeguards for Tribal Representation:** Amendments to **Article 332** ensure that the **Scheduled Tribe** representation is not diluted, particularly in **Arunachal Pradesh, Meghalaya, Mizoram, Tripura, and Nagaland**.

Challenges

- **Federal Structure Concerns:** Since the Bill's circulation, public debate over its timing and intent has been swift and sharp, with Opposition leaders calling it a **threat to India's federal structure**.
- **Gerrymandering Concerns:** A similar pushback was mounted during delimitation in **Jammu and Kashmir (2022)**, which saw allegations of **gerrymandering**. With the new Bill, these concerns are magnified, as a nationwide exercise based on **incomplete and uneven census data** (with the 2021 Census still pending) carries risks at a much larger scale.
- **Redistribution of Political Power:** While the stated objective is to implement **women's** reservation before the 2029 general elections, the underlying consequence may be a fundamental redistribution of political power across states.

Significance

- **More representative Lok Sabha:** Raising Lok Sabha strength to 850 improves the population–representation ratio, bringing the system closer to the “one person, one vote” principle.
- **Faster women's reservation:** Removing earlier delays enables 33% women's reservation to be

implemented in the next general election, instead of waiting until the 2030s.

- **Updated seat allocation:** Redrawing constituencies on current data corrects the outdated 1971-based seat distribution and reflects present-day demographic shifts.

Delimitation Commission

- The responsibility of delimitation is explicitly assigned to a Delimitation Commission under the proposed Delimitation Bill, 2026.
- **Composition:** Chairperson (sitting/former Supreme Court judge), Chief Election Commissioner (or nominee), and State Election Commissioner
- **Each State** will have 10 associate members (5 MPs and 5 MLAs) without voting rights.
- **The Commission will:**
 - ✓ Determine **Lok Sabha seat** allocation among States and Union Territories
 - ✓ Decide the **total strength of State Assemblies**
 - ✓ Redraw parliamentary and Assembly constituencies
 - ✓ Identify seats reserved for Scheduled Castes (SCs), Scheduled Tribes (STs), and women
- **Judicial Immunity:** Once finalised and notified in the Gazette of India, the Commission's orders will have the force of law and **cannot be challenged in court**, and will apply to subsequent elections.

1.6. Government Extends River Basin Management Scheme

SYLLABUS

GS-2: *Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation; Issues and challenges pertaining to the federal structure.*

GS-3: *Conservation, environmental pollution and degradation, environmental impact assessment; Disaster and disaster management.*

Context

The Government of India has extended the River Basin Management (RBM) Scheme for the 2026–31 period with an enhanced outlay of about ₹2183 crore, reflecting a renewed focus on integrated water governance.

About the River Basin Management Scheme

- RBM is a **central sector scheme** of the Department of Water Resources, River Development, and Ganga Rejuvenation under the **Ministry of Jal Shakti**.
- The scheme aims to facilitate integrated planning, investigation, and development of water resources at the river basin level, including both surface water and groundwater systems.
- It is implemented through three key organisations—
 - ✓ Brahmaputra Board
 - ✓ Central Water Commission (CWC), and
 - ✓ National Water Development Agency (NWDA)
- It supports activities such as the preparation of basin master plans, the survey and investigation of projects, and the planning of multipurpose projects.

About River Basin Management

- It is an integrated framework that treats an entire river system—including its tributaries, groundwater, associated ecosystems, and human use patterns—as a single hydrological and ecological unit.
- It emphasises coordinated planning of water-related infrastructure, land use, and environmental protection measures across the basin, rather than treating isolated projects in isolation from one another.

Objectives of the Scheme

- The Scheme is designed to address the diverse challenges associated with water resource planning and development at the basin level.
- The objective of the scheme is to focus on promoting sustainable use of water while supporting **irrigation, hydropower, and flood management**.

Key Features and Components

- **Basin-Level Planning Approach:** The scheme promotes planning based on natural river basins, enabling holistic management of water resources across regions.
- **Scientific and Technological Integration:** Advanced tools such as GIS, remote sensing, LiDAR, and drone-based surveys are used for accurate mapping and planning.
- **Multipurpose Development Focus:** It supports projects related to irrigation, hydropower, flood

control, and water storage, ensuring multi-sectoral benefits.

- **Institutional Coordination:** The scheme ensures coordination among central agencies, state governments, and basin-level institutions for effective implementation.



Geographical and Strategic Focus

- **Focus on Critical River Basins:** The scheme prioritises major river basins such as Brahmaputra, Barak, Teesta, and Indus, which are crucial for water availability and regional stability.
- **Emphasis on North-East and Himalayan Regions:** Special attention is given to the North-Eastern and Himalayan regions, which are rich in water resources but face challenges like floods, erosion, and underdevelopment.
- **Strategic and Transboundary Importance:** These river systems have transboundary implications, making basin-level management essential for national security and international water cooperation.

Significance of the Scheme

- **Enhancing Water Security:** The scheme plays a critical role in ensuring long-term water security by promoting the efficient, equitable, and sustainable utilisation of water resources across different sectors.
- **Supporting Economic Development:** By facilitating irrigation, hydropower generation, and multipurpose water projects, the scheme contributes significantly to agricultural productivity, energy generation, and overall economic development.

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- **Disaster Risk Reduction:** Basin-level planning enables a more scientific approach to flood control, erosion management, and waterlogging mitigation, thereby reducing disaster risks in vulnerable regions.
- **Environmental Sustainability:** The scheme promotes the conservation of river ecosystems by integrating environmental considerations into water resource planning, thereby maintaining ecological balance.

Challenges and Constraints

- **Inter-State Coordination Issues:** Since river basins often extend across multiple states, differences in priorities and interests frequently lead to coordination challenges and disputes, affecting effective implementation.
- **Data and Capacity Gaps:** The lack of reliable, real-time hydrological data and limited technical capacity in certain regions hinder accurate planning and timely decision-making.
- **Institutional Fragmentation:** The presence of multiple agencies with overlapping mandates often results in fragmented governance, leading to inefficiencies and delays in project execution.
- **Climate Change Uncertainty:** Increasing climate variability, including erratic rainfall patterns and extreme weather events, adds a layer of uncertainty to water resource planning and management.

Way Forward

- **Strengthening Institutional Mechanisms:** There is a need to establish and empower basin-level authorities with clear legal mandates and administrative autonomy to ensure coordinated and effective governance.
- **Improving Data and Technology Use:** The integration of advanced technologies such as real-time monitoring systems, GIS, and remote sensing can significantly enhance the accuracy and efficiency of water resource management.
- **Promoting Cooperative Federalism:** Strengthening collaboration between the Centre and states through institutional mechanisms and dialogue is essential for resolving disputes and ensuring coordinated basin-level planning.

- **Policy Convergence:** There is a need to permanently integrate river basin-based planning into state-level water resource strategies and ensure convergence with major national programmes such as Jal Jeevan Mission, AMRUT, and Namami Gange Programme.
- **Encouraging Community Participation:** Active involvement of local communities, stakeholders, and grassroots institutions can improve implementation outcomes and ensure that water management practices remain inclusive and sustainable.

1.7. SC Issues Pan-India Directions for Road Safety

SYLLABUS

GS-2: *Important aspects of governance, transparency and accountability, e-governance-applications, models, successes, limitations, and potential; citizens charters, transparency & accountability and institutional and other measures.*

Context

Recently, the Supreme Court of India issued pan-India directions on road safety while hearing a suo motu case triggered by repeated highway accidents.

More on the News

- The Court highlighted that **National Highways constitute only about 2% of road length but account for nearly 30% of road fatalities**, underscoring systemic safety gaps.
- It emphasised that expressways must not become **“corridors of peril” due to administrative lapses and infrastructural deficiencies**.

Key Highlights of the Directives

- The Court imposed a **ban on parking of heavy and commercial vehicles on highways**, except at designated areas, to reduce accident risks.
- It ordered that no new dhaba, eatery, or commercial structure be allowed within the right of way of national highways, and existing licences in safety zones must be reviewed promptly.
- The Court mandated **identification and rectification of accident-prone “black spots”**, along with improved monitoring and enforcement mechanisms.

- It said enforcement of the direction shall be effected through the Advanced Traffic Management System — ATMS real-time alerts to State Police, GPS — timestamped photographic evidence, and integrated eChallan generation.

Significance of Directives

- **Reinforcing Right to Life:** The directives affirm that safe road travel is an integral component of **Article 21 (Right to Life)**, thereby placing a constitutional obligation on the State to ensure safer highways.
- **Strengthening Institutional Accountability:** By issuing time-bound directions to states and agencies, the Court enhances **accountability and coordination** among stakeholders such as NHAI, police, and local authorities.
- **Addressing Systemic Gaps:** The focus on black spot rectification, regulation of roadside activities, and enforcement highlights the need to tackle **structural deficiencies in infrastructure and governance**, rather than relying on ad hoc measures.
- **Promoting Technology-Driven Governance:** The emphasis on surveillance systems, GPS-based monitoring, and data-driven enforcement encourages the adoption of **modern technological solutions** for improving road safety.

1.8. Promotion and Regulation of Online Gaming Rules, 2026

SYLLABUS

GS-2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.

GS-3: Indian Economy and issues relating to mobilization of resources, growth, development and employment.

Context

The Government has notified the Promotion and Regulation of Online Gaming Rules, 2026, to operationalise the Promotion and Regulation of Online Gaming Act, 2025, effective from May 1, 2026.

About the Promotion and Regulation of Online Gaming Act, 2025

- The Act categorises online games into **e-sports,**

online social games, and online money games.

- It imposes a **complete ban on online money games**, including their advertisement and financial facilitation.
- It promotes **e-sports and online social games** as part of India's digital economy.
- It provides for the establishment of a **central regulatory authority** for classification, compliance, and grievance redressal.
- It introduces **strict penalties and enforcement provisions**, including imprisonment and fines.

Key Provisions of the Rules, 2026

- **Online Gaming Authority of India (OGAI):** Establishes a **central digital-first regulator under MeitY** with 6 members (Additional Secretary as Chairperson + Joint Secretaries from key ministries), empowered to **classify games, issue directions, hear complaints, and impose penalties.**
- **Game Classification (Determination Mechanism):** Provides a **clear and time-bound (within 90 days)** process to classify games as **online money games, online social games, or e-sports**, based on factors like **user fees, stakes, winnings, and monetisation.**
- **Optional Determination System:** Determination is **not mandatory for most online social games** and is triggered only when **OGAI initiates, service provider applies for e-sports, or the government notifies categories.**
- **Complete Ban on Online Money Games:** Online money games are **fully prohibited**, including **offering, advertising, and facilitating financial transactions**, with strict enforcement action.
- **Registration Framework:** Registration is **mandatory mainly for e-sports and notified categories**, with **validity extended to 10 years** to reduce compliance burden.
- **Financial System Integration:** Banks, payment gateways, and intermediaries must **verify regulatory status before transactions** and **block/restrict payments related to banned games**, making payments a key enforcement tool.
- **User Safety Features:** Mandatory safeguards include **age verification, age-gating, time limits, parental controls, reporting tools, counselling support, and**

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fair-play monitoring, based on game risk.

- **Grievance Redressal Mechanism:** Introduces a *two-tier system (platform-level → OGAI)* with further appeal to an **Appellate Authority**, ensuring *time-bound resolution and natural justice*.
- **Data Localisation Requirement:** Requires platforms to *store gaming traffic and related data within India* for regulatory oversight.
- **Compliance Rationalisation:** Notification requirements limited to *payment-related changes (stakes, winnings, monetisation)* instead of all changes, reducing compliance burden.
- **Enforcement & Investigation:** Empowers *cyber police units at the district/commissionerate level* and integrates financial surveillance for effective enforcement.
- **Regulation-light Approach:** Most online social games are *exempt from mandatory registration/determination*, encouraging innovation and growth.

Challenges

- **Federal Jurisdiction Issues:** Potential conflict with states' powers over *betting and gambling under the State List*.
- **Judicial & Constitutional Concerns:** Blanket ban on money games may clash with *judicial recognition of games of skill under Article 19(1)(g)*.
- **Governance & Oversight Gap:** Absence of an independent regulator or appellate body raises concerns of *bureaucratic control and discretion*.
- **Economic & Industry Impact:** Ban on real-money gaming may lead to *loss of revenue, investment slowdown, and job cuts*.
- **Risk of Illegal Market Expansion:** Users may shift to *offshore or unregulated platforms*, increasing enforcement challenges.

Way Forward

- **Balanced Regulatory Approach:** Adopt a *nuanced framework distinguishing harmful gambling from legitimate skill-based gaming*.
- **Independent & Transparent Oversight:** Establish an *autonomous appellate mechanism and consultative rule-making process*.
- **Strengthened Enforcement Mechanisms:** Use

AI-based monitoring, payment controls, and inter-agency coordination to curb illegal gaming.

- **User Awareness & Responsible Gaming:** Promote *digital literacy, behavioural safeguards, and mental health support systems*.
- **Cooperative Federalism:** Ensure *alignment between central and state laws* to avoid legal conflicts and uncertainty.

Significance of the Law

 **Unlocking Economic Growth:** India's gaming sector, valued at approx. USD 3.7 billion in 2024, and is projected to grow to USD 60 billion by 2034. The law can help provide certainty, attract investment, and protect the intellectual property of the Indian gaming industry.

 **Job Creation and Skill Development:** The Indian gaming industry currently employs around 130,000 people. With proper regulation, it could create over 2 million skilled jobs by 2034, offering youth careers in game design, e-sports, and tournament management.

 **Fosters a Safe Digital Environment:** By defining clear rules distinguishing between safe, non-stake based social/e-sports games and risky money-gaming platforms, the law aims to reduce predatory design, misleading advertising, and false promises.

 **Global Leadership:** With the passage of the law, India could emerge as a global leader in responsible gaming and digital policy, positioning India as a model for other countries that are facing similar challenges from online money games.



1.9. Revised Guidelines for TDIP Scheme

SYLLABUS

GS-2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.

GS-3: Awareness in the fields of IT; Indigenization of Technology and Developing New Technology.

Context

The Department of Telecommunications recently released revised guidelines for the Technology Development and Investment Promotion (TDIP) Scheme to strengthen India's role in the global telecom ecosystem.

About the TDIP Scheme

- The **Technology Development and Investment Promotion (TDIP) Scheme** is an initiative of the Department of Telecommunications aimed at **strengthening India's telecom innovation ecosystem and global competitiveness**.
- It focuses on enabling Indian stakeholders to actively participate in international telecom standardisation processes, thereby influencing global technology standards rather than merely adopting them.
- The scheme supports the development of indigenous technologies, intellectual property (IP), and standards-based solutions, aligned with national priorities such as *Digital India* and *Atmanirbhar Bharat*.
- It seeks to bridge the gap between research, innovation, and commercial deployment by facilitating collaboration among industry, academia, startups, and research institutions.
- The scheme also promotes investment and global market access for Indian telecom products and solutions, enhancing their integration into global value chains.

Key Features of Revised Guidelines

- **Expanded Scope and Stakeholder Participation:** The revised scheme broadens eligibility to include startups, MSMEs, academia, R&D institutions, telecom service providers, and industry players, fostering a collaborative innovation ecosystem.
- **Financial Support and Outlay:** The scheme has a total outlay of **₹203 crore for 2026–31**, providing financial assistance for global participation, technical contributions, leadership roles in international bodies, and hosting global telecom events in India.
- **Support for Innovation and Commercialisation:** It promotes pilot projects, proof-of-concept initiatives, and technology demonstrations, helping bridge the gap between research and market-ready telecom solutions.
- **Focus on Global Standardisation:** The scheme aims to enhance India's presence in global standard-setting bodies such as the **International Telecommunication Union (ITU)**, **3GPP**, and

oneM2M, enabling India to influence future telecom standards.

- **Alignment with Future Telecom Vision:** The revised framework aligns with India's broader vision of becoming a technology leader in next-generation telecom, including **5G Advanced** and **6G ecosystems**.
- **Institutional Implementation Framework:** The scheme will be implemented through key agencies like **TSDSI**, **Telecom Centres of Excellence (TCoE)**, and **TCIL**, ensuring effective coordination and execution.
- **Policy Convergence:** It complements existing initiatives such as the **Telecom Technology Development Fund (TTDF)** and **Bharat 6G Mission**, creating a cohesive policy ecosystem for telecom innovation.

Significance and Expected Outcomes

- **From Participant to Standard-Setter:** The scheme aims to transform India from a **technology adopter to a global standard-setter**, enhancing strategic influence in telecom governance.
- **Boost to Indigenous Innovation:** By supporting domestic R&D and participation in global platforms, it promotes the **creation of intellectual property and innovation-led growth**.
- **Enhancing Global Competitiveness:** Integration of Indian technologies into global standards will **improve export potential and market access** for telecom products.
- **Strengthening Telecom Ecosystem:** The inclusive approach fosters **collaboration across startups, academia, and industry**, strengthening the overall telecom innovation ecosystem.

1.10. National Panchayati Raj Day

SYLLABUS

GS-2: *Indian Constitution—Features, Amendments, Significant Provisions; Devolution of Powers and Finances up to Local Levels and Challenges Therein.*

Context

The Ministry of Panchayati Raj celebrated the National Panchayati Raj Day (NPRD) on 24th April 2026 at Vigyan Bhawan in New Delhi.

More on the News

- The day highlights the importance of **decentralised governance, grassroots democracy, and participatory development** in India.
- A key highlight of the occasion was the launch of the **Panchayat Advancement Index (PAI)-2.0**, aimed at improving monitoring and evaluation of Panchayat performance.
- The government reiterated its commitment to **“Viksit Bharat @ 2047” through empowered local bodies**, emphasising last-mile service delivery.

About Panchayat Advancement Index (PAI)-2.0

- PAI is a **composite index** designed to assess the performance of Gram Panchayats (GPs) across multiple development indicators.
- Under it, the United Nations’ Global SDGs have been localized into 9 thematic LSDGs (Localized Sustainable Development Goals), namely—
 - ✓ Poverty-Free and Enhanced Livelihoods Panchayat
 - ✓ Healthy Panchayat
 - ✓ Child-Friendly panchayat
 - ✓ Water-Sufficient panchayat
 - ✓ Clean and Green panchayat
 - ✓ Self-Sufficient Infrastructure Panchayat
 - ✓ Socially Just and Secured Panchayat
 - ✓ Panchayat with Good Governance
 - ✓ Women-Friendly Panchayat
- The revised PAI 2.0 **rationalises the indicator framework**, reducing it from **516 indicators in PAI 1.0 to 150 indicators**, thereby improving **data quality, ease of reporting, and usability**.

About the National Panchayati Raj Day

- **National Panchayati Raj Day** is observed annually on **24th April** to commemorate the enactment of the **73rd Constitutional Amendment Act, 1992**, which came into force on 24 April 1993.
- This amendment granted constitutional status to Panchayati Raj Institutions (PRIs).
 - ✓ The provisions related to Panchayats are laid down in Part IX of the Constitution of India.
- The day was first observed on **24 April 2010**, when it was declared by the then Prime Minister Manmohan Singh.

About the Panchayati Raj System and its Historical Background

- The Panchayati Raj system refers to **local self-government institutions in rural India, structured as a three-tier structure**: Gram Panchayat (GP), Block Panchayat (BP), and District Panchayat (DP).
- The Panchayati Raj System has roots in ancient India, where village assemblies (*sabhas* and *samitis*) managed local affairs.
- After independence, the need for decentralized governance led to the recommendation of the **Balwant Rai Mehta Committee (1957)**, which proposed a three-tier Panchayati Raj structure.
- This system was formally strengthened by the **73rd Constitutional Amendment Act**, granting constitutional status to Panchayats and making Panchayati Raj institutions mandatory.
- Rajasthan became the first state to implement it in 1959, when this system was inaugurated in the **Bagdari village** in the Nagaur district on 2nd October 1959 by Prime Minister Jawaharlal Nehru.

Objectives of the Panchayati Raj System

- The Panchayati Raj System is guided by a set of core objectives aimed at strengthening local governance and improving developmental outcomes:
 - ✓ Ensuring active participation of people in the planning and implementation of development programmes.
 - ✓ Enhancing accountability by making elected representatives directly answerable to local communities.
 - ✓ Improving the efficiency and responsiveness of public service delivery in rural areas.
 - ✓ Enabling more targeted and effective implementation of government schemes through local institutions.
 - ✓ Promoting inclusive development by ensuring representation of marginalised groups, including women, Scheduled Castes, and Scheduled Tribes.

Initiatives Taken to Strengthen the Panchayati Raj System

- **e-Gram Swaraj Platform**: The government has developed the e-Gram Swaraj portal as an

integrated digital platform for **planning, budgeting, accounting, and monitoring Panchayat activities**, thereby improving transparency, accountability, and real-time tracking of development works.

- **AuditOnline:** The AuditOnline system enables **online auditing of Panchayat accounts**, ensuring timely financial scrutiny, reducing leakages, and strengthening fiscal discipline at the grassroots level.
- **Rashtriya Gram Swaraj Abhiyan (RGSA):** Under RGSA, the government focuses on **capacity building of elected representatives and Panchayat functionaries** through structured training, institutional strengthening, and knowledge-sharing initiatives to improve governance outcomes.
- **SVAMITVA Scheme:** This scheme uses **drone-based mapping technology to provide legal ownership records of rural properties**, thereby empowering Panchayats with better revenue generation capabilities and reducing land-related disputes.

1.11. NITI Aayog Releases Report on Framework for Million-Plus Cities

SYLLABUS

GS-1: Urbanization, their problems and their remedies.

GS-2: Important Aspects of Governance; Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.

Context

NITI Aayog recently released a comprehensive report titled *"Moving Towards Effective City Government – A Framework for Million-Plus Cities"*, highlighting the urgent need for urban governance reforms in India's largest cities.

More on the News

- The report assumes significance as India aims to achieve the vision of **Viksit Bharat by 2047** and progress towards a **\$30 trillion economy**, with cities expected to contribute nearly **70% of GDP**.
- It focuses on **million-plus cities**, which are emerging as hubs of economic activity, innovation, and

employment generation, but are constrained by weak governance structures.

- ✓ Million-plus cities in India are urban areas or aggregations (UAs) with a population exceeding 1 million (10 lakh).

Rationale Behind the Report

- India is undergoing rapid urbanisation, with the urban population projected to exceed **600 million by 2036**, placing immense pressure on infrastructure and service delivery.
- **However, urban governance remains constrained by:**
 - ✓ **Fragmented institutional structures**, with multiple agencies exercising overlapping functions
 - ✓ **Dominance of parastatal agencies** (state-controlled bodies such as development authorities like DDA, and utilities like Water/Sewerage Boards), which often bypass elected municipal bodies
 - ✓ **Limited functional, financial, and administrative devolution** to Urban Local Bodies (ULBs)
- These challenges prevent cities from functioning as **efficient service providers and engines of growth**, necessitating systemic reforms.

Key Findings of the Report

- The report highlights that Indian cities are characterised by **weak and diffused leadership**, where mayors often have limited executive authority.
- Governance is fragmented among **municipal corporations, parastatal agencies, and state departments**, leading to duplication of roles and inefficiencies.
- Urban Local Bodies remain **financially constrained**, with low own-source revenues and heavy dependence on state and central transfers.
- There are significant **capacity deficits in urban planning, data systems, and project execution**, limiting the ability of cities to respond to complex urban challenges.
- Consequently, Indian cities are unable to function as **effective engines of growth and service delivery**, despite their economic importance.

Key Recommendations

- **Empowered City Governments:** The report recommends establishing **clearly defined, empowered city governments** with unified authority over planning, service delivery, and infrastructure.
- **Directly Elected Mayors:** It advocates for **directly elected mayors with fixed tenure and executive powers**, ensuring strong leadership and accountability at the city level.
- **Rationalisation of Parastatal Agencies:** The report calls for **integration or alignment of parastatal agencies with municipal governments**, reducing fragmentation and improving coordination.
- **Fiscal Empowerment of ULBs:** Strengthening municipal finances through **enhanced property tax systems, user charges, and predictable fiscal transfers** is emphasised.
- **Capacity Building and Professionalisation:** It highlights the need for **skilled urban cadres, technical expertise, and institutional strengthening** to improve governance outcomes.

- **Data-Driven Urban Governance:** Promotes adoption of **digital platforms, real-time data systems, and evidence-based planning** for efficient decision-making.

Significance of the Report

- **Urban Growth as Economic Driver:** Effective city governance is critical for India's transition towards a **\$30 trillion economy**, as cities will be central to productivity and investment.
- **Improved Service Delivery:** Strengthened governance can ensure better provision of urban services such as water supply, waste management, housing, and mobility.
- **Strengthening Democratic Decentralisation:** The recommendations reinforce the spirit of the **74th Constitutional Amendment**, promoting genuine devolution to urban local bodies.
- **Enhancing Global Competitiveness:** Well-governed cities can attract investment, innovation, and global value chains, improving India's position in the global economy.



2.1. UNGA Passes Landmark Resolution to Strengthen UN System

SYLLABUS

GS 2: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; Important International institutions, agencies and fora- their structure, mandate.

Context

Recently, the United Nations General Assembly adopted a landmark resolution to strengthen how *UN mandates* are created, implemented and reviewed across the system.

More on the News

- The resolution introduces, for the first time, a more structured approach across the full mandate lifecycle - from design to implementation and review.
 - ✓ Mandates are the decisions taken by Member States that guide the whole UN system.
- The resolution is intended to make it easier for Member States to navigate an increasingly complex mandate landscape, while helping the United Nations reduce duplication, fragmentation and inefficiency.
- The move marks a major milestone under the **UN80 Initiative**, reflecting a *shared understanding of the full mandate lifecycle* and a *shared commitment to strengthening each step* of it.

About UN80 Initiative

- Launched in March 2025 by the **resolution 79/318** on the **UN's 80th anniversary**, the UN80 initiative is the United Nations' *ambitious, system-wide reform effort*.
- It aims to make the United Nations more responsive and resilient, better equipped to serve the people whose lives depend on it, more accountable to

taxpayers who underwrite its work, and more supportive of staff in their critical roles.

- It **proposes changes impacting the whole UN system** — from how mandates are created, to how they are delivered and reviewed.

Working of the UN80 Initiative

- **Efficiency in the UN Secretariat:** Focuses on optimising Secretariat functioning through consolidation of administrative platforms, relocation to lower-cost duty stations, and operational efficiencies across all pillars.
- **Mandate Implementation Review:** Addresses gaps in mandate design, delivery, and review, including duplication, poor coordination, weak accountability, and funding misalignment, by promoting streamlined, outcome-oriented processes.
- **Structural and Programmatic Realignments:** Aims to reduce fragmentation and improve coordination through reforms such as streamlined peace operations, a new humanitarian framework, restructuring development agencies, and better alignment of human rights efforts.

India's Role in United Nations Reforms

- **Founding Member & Early Leadership:** A founding UN member *since 1945*, India championed global efforts against *colonialism, disarmament, and racial discrimination*, leading the struggle against apartheid even before its independence.
- **Contribution to Human Rights Framework:** From 1947 to 1948, it promoted gender equality in the *Universal Declaration on Human Rights* by changing "*all men are created equal*" to "*all men and women are created equal*".
- **Leadership in the UN General Assembly:** In 1953, *Vijaya Laxmi Pandit became the first female UN General Assembly President*, and at the time, India advocated for global disarmament and a more equitable international economic order.

- **Role in Decolonisation Efforts:**
 - ✓ India strongly advocated for global decolonisation and national sovereignty.
 - ✓ It co-sponsored the **1960 United Nations Declaration** and served as the **first Chairman of the Decolonisation Committee** established to end colonial rule.
- **Stand Against Apartheid:** India was a pioneering critic of South African apartheid, **being the first to raise the issue at the UN**, leading the **creation of the Sub-Committee against Apartheid**, and becoming an **early signatory to the 1965 Convention on Racial Discrimination**.
- **Leadership in Global South Forums:** Being the founding member of the **Non-Aligned Movement** and the **Group of 77 (G77)**, India cemented its position within the UN system as a leading advocate of the concerns and aspirations of developing countries and the creation of a more equitable international economic and political order.
- **Advocacy for UNSC Reforms:**
 - ✓ India advocates for restructuring the UNSC to reflect contemporary global realities, arguing that its current post-WWII architecture is outdated.
 - ✓ Despite UN membership growing to 193, the Council has not expanded since 1963, notably **leaving Africa without permanent representation** despite being the **focus of 75%** of the UNSC's work.
- **Claim for Permanent UNSC Membership:** India has strongly advocated for permanent membership in the UN Security Council, citing its major contributions to UN activities, especially in **peacekeeping missions**, with over **160,000 troops in 43 missions** and being the **third-largest contributor in 2014**.
- **Promotion of Global Cultural Initiatives:** **June 21** was declared the **International Day of Yoga** by the United Nations General Assembly on December 11, 2014.
- **Peacekeeping Leadership:** Since the **1950s**, India has sent over **290,000 peacekeepers** to more than **50 missions worldwide**, making it the largest contributor to UN peacekeeping efforts.

2.2. United Nations Interim Force in Lebanon (UNIFIL)

SYLLABUS

GS 2: Important International institutions, agencies and fora- their structure, mandate.

Context

Recently, India condemned the killing of three Indonesian peacekeepers, deployed in South Lebanon as part of the UNIFIL and expressed concern about the growing number of anti-UNIFIL attacks.

About UNIFIL

- The United Nations Interim Force in Lebanon (UNIFIL) is a peacekeeping mission in **southern Lebanon**, established **by the Security Council in 1978 through Resolutions 425 and 426**.
- It was created to confirm **Israeli withdrawal from Lebanon**, restore international peace and security, and assist the Lebanese Government in restoring its effective authority in the area.
- Following the **34-day war between Hezbollah and Israel** in Lebanon in 2006, which killed around 1,100 Lebanese, UNIFIL's mandate was expanded to monitor the ceasefire and assist Lebanese armed forces in southern Lebanon.
- Its **17% of activities are carried out jointly with the Lebanese Armed Forces**. UNIFIL is complemented by a five-vessel Maritime Task Force.
- As of **30 March 2026**, UNIFIL's force consists of **7,505 peacekeepers from 47 troop-contributing countries**.
- India is one of the largest and longest serving contributors to Peacekeeping with a total of **642 troops. Indonesia is the largest contributor with 755**.
- **Head of Mission and Force Commander:** Major General Diodato Abagnara (Italy)

About United Nations Peacekeeping

- United Nations Peacekeeping is one of the most important instruments of the United Nations for maintaining international peace and security. Since 1948, it has deployed missions across conflict zones to help countries transition from war to peace.

- It represents **multilateral cooperation**, where member states contribute troops, police, and civilians—symbolised by the iconic “*Blue Helmets*”.
- **Objectives of UN Peacekeeping:**
 - ✓ Maintain ceasefires and peace agreements
 - ✓ Protect civilians from violence
 - ✓ Support political processes and elections
 - ✓ Facilitate humanitarian assistance
 - ✓ Promote the rule of law and human rights
 - ✓ Assist in disarmament, demobilisation, and reintegration (DDR)
 - ✓ They act as a bridge between conflict and sustainable peace.
- **Core Principles of UN Peacekeeping:**
 - ✓ **Consent of the Parties** – Missions operate with the approval of the conflicting parties.
 - ✓ **Impartiality** – Peacekeepers remain unbiased while implementing mandates.
 - ✓ **Non-use of Force (except in self-defence and mandate defence)** – Force is used only as a last resort.

India and Peacekeeping

- India is among the largest contributors to UN peacekeeping, with its armed forces deployed in **nine missions**, including UNDOF, UNIFIL, UNTSO, UNFICYP, MONUSCO, UNMISS, UNIFSA, MINUSCA, and MINURSO.
- Since the 1950s, India has deployed over **290,000 peacekeepers in 50+ missions, with 5,000+ currently serving in nine missions**, and nearly 180 personnel having made the ultimate sacrifice.
- The Indian Army has set up the **Centre for UN Peacekeeping (CUNPK) in New Delhi** to provide specialised training for peacekeeping operations.
- In line with the UN’s gender parity goals and the **Nari Shakti initiative**, India, in 2007, deployed **the first-ever all-female Formed Police Unit (FPU) to Liberia**.
- **Awards Conferred to Indians:**
 - ✓ Major Radhika Sen was honoured with the UN’s “**Military Gender Advocate of the Year 2023**” award.
 - ✓ Major Swathi Shantha Kumar won the prestigious **2025 UN Secretary-General’s Award** for her project “**Equal Partners, Lasting Peace**,” promoting gender-responsive peacekeeping in South Sudan.

2.3. India’s Stand on UNSC Reform

SYLLABUS

GS-2: Important International institutions, agencies and fora- their structure, mandate.

Context

At the Inter-Governmental Negotiations (IGN) on reforms of the United Nations Security Council, India firmly opposed the creation of a “two-tier” system of permanent membership.

Outcome of the Inter-Governmental Negotiations (IGN)

- **Rejection of New Category Without Veto:** India rejected proposals to create a **new category of permanent members without veto powers**, warning that such a move would complicate negotiations and entrench inequality within the Council.
- **Support for G4 Proposal:** India supported the **G4 proposal (India, Brazil, Germany, Japan)**, under which **new permanent members would not exercise veto powers for 15 years**, followed by a review.
- **Comprehensive Reform Emphasis:** India reiterated that meaningful reform must address both membership expansion and veto power simultaneously, as piecemeal approaches would fail to resolve structural distortions.
- **Support for African Position:** India backed the **African demand that new permanent members should enjoy veto powers** as long as the veto exists, highlighting concerns of historical injustice and unequal representation.

About the United Nations Security Council (UNSC)

- The United Nations Security Council is one of the **principal organs of the United Nations** and is primarily responsible for maintaining international peace and security.
- Originally consisting of **11 members**, the Council was expanded to **15 members in 1965** through an amendment to the UN Charter, **comprising**

5 permanent members and 10 non-permanent members elected for two-year terms by the United Nations General Assembly.

- Each member has **one vote**, and all UN member states are obligated to comply with the decisions of the Security Council under the UN Charter.
- The Council determines the existence of threats to peace or acts of aggression and initially seeks peaceful resolution of disputes through dialogue and negotiation.
- It can **impose** diplomatic and economic sanctions, authorize peacekeeping operations, and, as a last resort, approve the use of military force to maintain or restore international peace and security.
- **Any** state, even if not a UN member, can **bring a dispute** before the Council for consideration.
- The Council has a **rotating presidency** that changes monthly and is supported by various subsidiary organs that assist in its functioning.

Need for UNSC Reform

- **Outdated Structure:** The United Nations Security Council was established in 1945 and does not reflect present-day geopolitical realities, with the only major reform in **1965 expanding non-permanent membership only**.
- **Imbalance in Power:** The ratio of *permanent to non-permanent members* shifted from 5:6 to 5:10, increasing the **relative power of veto-wielding members**.
- **Lack of Representation and Legitimacy:** India identified two core problems—**membership structure and veto system**—arguing that the current system leads to a lack of representativeness and reduced credibility of the Council.
- **Ineffective Veto Restraint Mechanisms:** A **2022 United Nations General Assembly resolution** mandates **discussion after veto use**, vetoes continue frequently, and are often driven by national interests.
- **“Effective Veto” Beyond P5:** Even non-permanent members informally exercise an **“effective veto”** by blocking press statements and sanctions decisions.

Challenges in UNSC Reform

- **Deep Divisions Among Member States:** Wide-ranging and conflicting views among member states make consensus on reform of the United Nations Security Council difficult.
- **Veto Reform Paradox:** Any limitation on veto requires amendment of the UN Charter and approval by existing veto holders.
- **Institutional Resistance:** Permanent members benefit from the status quo and therefore resist structural changes.
- **Complexity of Reform Models:** Proposals such as new membership categories add layers of negotiation and risk, further leading to deadlock.
- **Ineffectiveness of Incremental Measures:** Existing attempts to regulate veto use have not worked effectively.

Way Forward

- **Shift to Result-Oriented Negotiations:** Reform discussions must move beyond repetitive position statements towards convergence-driven negotiations to break the long-standing deadlock.
- **Text-Based Negotiations:** Initiating negotiations based on a consolidated draft text can provide a structured framework for resolving differences among member states.
- **Minimum Consensus Approach:** Instead of seeking complete agreement, efforts should focus on building convergence on broadly accepted aspects while deferring contentious issues for phased resolution.
- **Phased Reform Strategy:** Given the difficulty of immediate veto reform, a gradual and pragmatic approach can help advance reform without abandoning the principle of equality.
- **Coalition Building:** Strengthening alliances among developing countries, African nations, and emerging powers can create collective pressure for meaningful reform.
- **Aligning with Contemporary Realities:** Reform must ensure that the UNSC reflects current geopolitical and developmental realities to enhance its legitimacy and effectiveness.

2.4. UNDP Report on the Impact of West Asia Military Escalation

SYLLABUS

GS-2: Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora. Important International institutions, agencies, and fora- their structure, mandate.

GS-3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Context

According to the UNDP report, the conflict and military escalation in West Asia threatens to push 2.5 million people in India into poverty, and the country is projected to experience some loss in its human development progress.

About the Report

- The findings are based on the UNDP report titled *"Military Escalation in the Middle East: Human Development Impacts Across Asia and the Pacific."*
- The report assesses impacts across **36 countries**, drawing from **22 UNDP country offices**, CGE simulations, and external analytical inputs.
- It considers a **28-day conflict scenario with extended adjustment (up to 8 months)** to estimate economic and human development impacts.
- It highlights that the crisis is not just a geopolitical issue but a **human development shock**, transmitted through **rising fuel prices, increased freight and insurance costs, supply chain disruptions and higher input costs**.
- These factors collectively reduce purchasing power, increase food insecurity, strain public finances, and weaken livelihoods.

Key Findings of the Report

Rising Poverty and Economic Losses

- Globally, poverty could increase from **1.9 million to 8.8 million people** across scenarios.
- **South Asia bears the largest burden**, with **1.7 million to over 8 million people** pushed into poverty.
- Asia-Pacific could face economic losses between **\$97 billion and \$299 billion (0.3–0.8% of GDP)**.

India-Specific Impact:

- ✓ Poverty rate projected to rise from **23.9% to 24.2%**.
- ✓ Around **2.46 million additional people** likely to fall into poverty.
- ✓ Total poor population may increase to **354 million (from ~351.6 million)**.
- China may see a moderate increase (**115,000 to 620,000 people**) due to smaller proportional shocks.

Human Development Setbacks (HDI Impact)

- The UNDP simulation estimates the impact of the conflict on the Human Development Index (HDI) for countries across the region.
- **Iran's HDI** could decline by an amount equivalent to roughly **one to one and a half years** of human development progress.
- **India** is projected to experience a **loss of approximately 0.03–0.12 years** of HDI progress.
- **Nepal** is projected at **around 0.02–0.09 years** and **Vietnam at 0.02–0.07 years**.
- **For China**, the estimated effects on HDI remain limited in magnitude, ranging roughly **0.01–0.05 years**.

Economic and Output Losses

- **Output losses in Asia-Pacific** could range from roughly **US\$97 billion to US\$299 billion**, equivalent to 0.3 to 0.8 percent of regional GDP.
- **South Asia** accounts for the largest losses in both absolute and relative terms.
- **East Asia registers** sizeable absolute losses but modest proportional declines.

Transmission Channels

- The shock is affecting people through multiple and reinforcing channels.
- **Energy** is the **dominant transmission** pathway, with **33 out of 36 countries** reporting high vulnerability to oil-price shocks.
- **Over 80 percent of crude and liquefied natural gas** transiting the *Strait of Hormuz* is destined for Asian markets.
- **Rising living costs** are squeezing poor and near-poor households.

- **Food and fertilizer price increases**, hitting ahead of key planting cycles, threaten to deepen food insecurity.

India's External Dependence

- India meets more than **90% of its oil needs** through imports.
- More than **40% of crude imports** and **90% of LPG imports** come from West Asia.
- West Asian countries supply more than **45% of India's fertilizer imports**.
- **85% of the country's domestic** urea production depends on imported regasified liquefied natural gas.
- West Asian markets account for **14% of exports and 20.9% of imports**.
- **Roughly \$48 billion in non-oil exports** include basmati rice, tea, gems and jewellery, and apparel.

Food Security and Agriculture Risks

- Food security pressures could be compounded by **remittance losses**.
- Reduced Gulf economic activity **weakens household incomes and purchasing power**.
- In India, the timing is especially sensitive as disruptions coincide with preparations **for the Kharif season**.
- **Urea stocks stood at 6.114 million tonnes**, providing a near-term buffer but not fully insulating the sector.

Remittances and Migration

- India has the **largest absolute exposure** to Gulf labour markets.
- **9.37 million Indians** were residing in Gulf Cooperation Council countries as of October 2024.
- They send about **38–40% of India's inward remittances**.
- The scale of **direct exposure to Gulf labour markets and remittance flows** is both substantial and consequential.

Employment and MSME Impact

- Employment risks are high, especially in MSME-intensive sectors:

- ✓ Around **90% of India's workforce is informal**.
- ✓ Small firms face **higher input costs, supply shortages, and delayed orders**.
- ✓ Likely impacts include Job losses, reduced working hours, and business disruptions.

Sectoral Cost Pressures

- **Medical devices**: Raw material costs may rise by **~50%**.
- **Medicines**: Wholesale prices already up by **10–15%**.
- Rising LNG prices have pushed countries (including India) toward **coal-based power**.

Government Response and Constraints

- Countries have adopted short-term measures **such as subsidies and tax relief, supply management and demand reduction, and monetary and financial interventions**.
- However, these measures **increase fiscal pressure and highlight the limited policy space** in many economies.
- They also create long-term trade-offs between **price stability, social protection, and public investment**.

UNDP report highlights four major Policy Priorities

- **Strengthen shock-responsive** social protection so that support can be targeted, scaled, and delivered quickly.
- **Protect livelihoods and firm-level resilience**, especially for MSMEs and informal workers.
- **Reduce structural exposure** to external shocks through resilient energy, food, and employment systems.
- **Deepen regional cooperation** across energy, trade, food, and labour mobility systems.

2.5. Visit of the Federal Chancellor of Austria to India

SYLLABUS

GS-2: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Context

At the invitation of Indian Prime Minister Narendra Modi, Federal Chancellor of Austria, Christian Stocker, paid his first official visit to India, marking the first visit by an Austrian Chancellor in over four decades.

More on the News

- The visit took place in the backdrop of **strengthening India–EU relations**, including the conclusion of the **India–EU Free Trade Agreement (2026)**, which is expected to boost bilateral trade and investment.
- It builds upon the “**Enhanced India–Austria Partnership**” launched during Prime Minister Modi’s 2024 Vienna visit, which expanded cooperation into areas such as innovation, renewable energy, and artificial intelligence.



- Both leaders reviewed the growing trajectory of bilateral relations across sectors such as trade, technology, infrastructure, and education, and agreed to further deepen cooperation through institutional mechanisms.
- The visit also assumes significance amid a rapidly evolving global geopolitical environment marked by **tensions in Ukraine and West Asia**, with both sides

emphasizing dialogue, diplomacy, and a rules-based international order.

Key Outcomes of the Visit

- **Institutional Agreements and Frameworks:**
 - ✓ India and Austria concluded several agreements to strengthen structured cooperation, including an **Agreement on Audiovisual Co-production** to enhance cultural collaboration.
 - ✓ A **Fast-Track Mechanism** to resolve business and investment-related issues.
 - ✓ They also signed a **Letter of Intent on Military Cooperation** to promote defence industry collaboration, training, and policy dialogue.
 - ✓ A **Joint Working Group on Counter-Terrorism** to deepen cooperation in combating terrorism and radicalisation.
 - ✓ An MoU between the **Food Safety and Standards Authority of India and Austria's food safety** authority was signed to improve regulatory practices.
 - ✓ A **Joint Letter of Intent on vocational education and skills** was agreed to promote dual training systems and recognition of qualifications.
- **Security and Strategic Cooperation:**
 - ✓ Both countries **unequivocally** condemned terrorism, **including recent attacks in India**, and committed to strengthening cooperation against terror financing and extremism through international frameworks.
 - ✓ They agreed to launch an **Institutional Cybersecurity Dialogue** to address emerging cyber threats and enhance coordination in digital security.
 - ✓ A partnership between **India's Centre for UN Peacekeeping and Austria's Austrian Armed Forces International Centre (AUTINT)** was also welcomed, reflecting growing collaboration in peacekeeping and global security initiatives.
- **Economic and Trade Engagement:**
 - ✓ The leaders emphasized expanding bilateral trade and investment, supported by the newly **established Fast-Track Mechanism** and increasing business participation.
 - ✓ They underlined the significance of the **India–EU**

Free Trade Agreement (2026) in enhancing market access, strengthening supply chains, and creating new economic opportunities.

- ✓ Cooperation will be further promoted in sectors **such as infrastructure, manufacturing, green technologies, and digital economy.**
- **Infrastructure and Energy Cooperation**
 - ✓ Both sides renewed cooperation in **road infrastructure**, including **Intelligent Transport Systems**, road safety, and traffic management.
 - ✓ They highlighted Austria's expertise in railways, tunnelling, and ropeways as valuable for India's infrastructure expansion, while also promoting collaboration in renewable energy sectors **such as green hydrogen and pumped storage.**
- **Technology, Innovation and Space:**
 - ✓ **High-technology cooperation** was identified as a central pillar of the partnership, with collaboration in areas **such as artificial intelligence, quantum technology, semiconductors, and advanced research.**
 - ✓ The leaders also agreed to organise a **bilateral space industry seminar in Vienna (2026)** to expand cooperation in the space sector and encourage industry participation.
- **Education, Skills and Mobility:**
 - ✓ Both countries agreed to launch a **structured bilateral Dialogue on Education** to strengthen academic collaboration, curriculum development, and institutional partnerships.
 - ✓ They operationalised the **Working Holiday Programme** and promoted skill mobility through vocational training cooperation and recognition of qualifications.
 - ✓ Austria's **"Focus India" initiative** will further facilitate access for Indian students to technical education in Austrian universities.
- **Multilateral and Global Cooperation**
 - ✓ The two sides reaffirmed their commitment to multilateralism, including support for **UN reforms and a more representative Security Council.**
 - ✓ They also emphasized a **rules-based international order**, support for peace through diplomacy in Ukraine and West Asia, and cooperation in the Indo-Pacific in accordance with international law.

India-Austria Bilateral Relations

Historical Relations	- Diplomatic relations were formally established in 1949, soon after India's independence. - Austria developed a strong tradition of Indology (study of Indian culture, Sanskrit, religion), and Sanskrit teaching began at the University of Vienna in 1845. Rabindranath Tagore visited Vienna (1921 & 1926), strengthening intellectual ties. - The relationship is rooted in shared democratic values, with Austria's neutrality (since 1955) aligning with India's strategic autonomy approach in foreign policy.
Political Relations	- High-level visits have played a key role: - Prime Minister's visit (July 2024) marked 75 years of relations and resulted in an Enhanced Partnership. - Regular meetings at global platforms like UNGA, COP summits, Munich Security Conference. - Austria, as a neutral EU country, is an important partner for India in strengthening India-EU relations.
Economic & Trade Relations	- Total trade reached USD 3.47 billion in 2025, showing continuous growth from 2021. India's exports: electronics, textiles, footwear, auto components, machinery. Imports from Austria: high-value machinery, steel, and railway technology.
Science & Technology Cooperation	- Cooperation between India's DST and the Austrian Science Fund promotes joint research projects. - TU Austria initiative (2025) enhances academic exchange and attracts Indian students. - Launch of India-Austria Startup Bridge (2024) marks a shift toward innovation-led partnership.
Migration & Skill Mobility	The Comprehensive Migration and Mobility Partnership Agreement (2023) provides legal pathways for migration, especially for students and skilled workers

Diaspora	• Around 13,500 Indians live in Austria. • Over 730 Indian students are pursuing higher education, and the number is rising. • The diaspora acts as a bridge for cultural exchange, business, and academic cooperation.
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2.6. Borrowers' Platform for Rebalancing Global Financial Governance

SYLLABUS

GS-2: Important International institutions, agencies and fora- their structure, mandate. Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Context

At the International Monetary Fund–World Bank Spring Meetings 2026, developing countries launched the first-ever Borrowers' Platform, marking a significant step toward rebalancing a global financial system historically shaped by creditor interests.

About the Borrowers' Platform

- The Borrowers' Platform is a dedicated forum for developing countries that brings **together finance ministers and central bank governors** to exchange knowledge and experiences on **sovereign debt**, strengthen coordination **among borrowing nations**, enhance debt management capacity, and articulate a collective voice in **global debt discussions**.
- **Secretariat:** The initiative is supported by the **United Nations Conference on Trade and Development as its secretariat**.
- **Objective:** It aims to address long-standing asymmetries in the global financial system, historically dominated by creditor-led frameworks such as the **Paris Club**.
- **Nature and Scope:** It functions as a technical and cooperative mechanism and is not a negotiation or debt restructuring forum.
- **Focus Areas:** The platform promotes peer learning and technical cooperation, strengthens

capacity-building and debt transparency, and facilitates the sharing of best practices in debt management.

- **Institutional Backing:** The initiative was proposed by the **UN Secretary-General's Expert Group on Debt in June 2025** and later endorsed in the **Sevilla Commitment 2025 and the UNCTAD16 Geneva Consensus 2025**.
- **Governance Structure:** The platform is guided by a working group led **by Egypt as Chair and Pakistan as Vice-Chair**, with members including Colombia, Honduras, Nepal, Zambia, and the Maldives.

About the United Nations Conference on Trade and Development

- UNCTAD is the United Nations' leading body on trade and development, **established in 1964**.
- It supports 195 member states through expert analysis, policy advice, and technical assistance, while also serving as a key platform for intergovernmental dialogue.
- The organization **works to help developing countries** leverage trade, finance, investment, and the digital economy for inclusive and sustainable development.

About the Paris Club

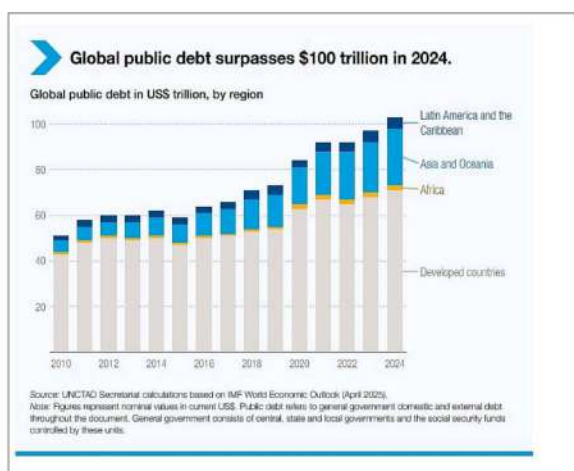
- It is an informal group of **22 major** creditor nations, established in practice **since 1956**, that works to find coordinated and case-by-case solutions to payment difficulties faced by debtor countries.
- It operates without **formal statutes**, meeting regularly in Paris to negotiate debt relief with countries that demonstrate need and are typically under an International Monetary Fund-supported reform programme.
- Its functioning is guided by key principles such as consensus, conditionality, solidarity, comparability of treatment, and information sharing.

Significance

- **Addressing Structural Imbalance:** The initiative seeks to correct the **creditor-dominated global debt system (e.g., Paris Club)** by providing borrowing countries, which previously lacked a formal coordination platform, with a collective voice to rebalance power asymmetry.
- **Rising Debt Crisis in Developing Countries:** Developing countries face a rapidly worsening debt

situation, with **external debt reaching \$11.7 trillion in 2024**, contributing to **\$31 trillion out of the \$102 trillion global public debt**, and growing at twice the rate of developed economies since 2010.

- **Fiscal Stress and Development Constraints:** High debt servicing burdens—**around 10% of revenues (and ~25% for least developed countries)**—along with \$920 billion in annual servicing costs have led 54 countries (home to 3.4 billion people) to **spend more on debt than on health or education**.



- **Unequal Financing Conditions:** Developing countries face structurally unequal financial conditions, including **borrowing costs 2–4 times higher than the United States**, with nearly half spending at least 6.5% of export revenues on debt servicing and experiencing a negative net resource transfer of \$25 billion in 2023.
- **Strengthening Capacity and Transparency:** Through initiatives **like UNCTAD's Debt Management and Financial Analysis System (DMFAS) programme**, which has supported over 75 countries for more than 40 years, the platform enhances debt transparency, governance, and sustainability.
- **Political Momentum:** The platform has strong political backing, with participation from 30 countries, including major economies **like India and South Africa, as well as vulnerable states such as the Maldives**, reflecting the widespread nature of debt challenges.

Challenges

- **Limited Mandate:** The platform is not a negotiation or restructuring body and therefore cannot directly influence creditor decisions.
- **Fragmented Global Debt Architecture:** Multiple overlapping mechanisms, **such as the Paris Club, G20 Common Framework, and Global Sovereign Debt Roundtable**, create coordination inefficiencies.
- **Persistent Creditor Dominance:** Global financial decision-making remains largely controlled by creditors, limiting the effectiveness of borrowers' collective voice.
- **Information Asymmetry:** Lack of transparency in debt contracts and treatment comparability weakens the bargaining power of developing countries.
- **Rising Debt Burdens:** Rapidly increasing interest payments, **reaching \$921 billion in 2024**, are crowding out essential spending on health, education, and climate action.

Way Forward

- **Strengthening Institutional Capacity:** Capacity should be enhanced by expanding technical assistance through the United Nations Conference on Trade and Development and scaling up DMFAS systems.
- **Enhancing Borrower Coordination:** Developing countries should build shared frameworks on debt transparency and negotiation strategies to strengthen collective action.
- **Integrating with Global Mechanisms:** The platform should align with **the International Monetary Fund–World Bank and G20 processes** for better policy coherence.
- **Improving Data Transparency:** Standardized reporting on debt contracts and obligations is needed to reduce information asymmetry.
- **Pushing Structural Reforms:** Efforts should focus on fairer debt restructuring mechanisms and more balanced representation in global financial governance.

2.7. India Extends OCI Card Eligibility in Sri Lanka

SYLLABUS

GS-2: India and its Neighborhood- Relations; Effect of Policies and Politics of Developed and Developing Countries on India's interests, Indian Diaspora.

Context

India has recently expanded the scope of the Overseas Citizen of India (OCI) scheme in Sri Lanka by extending eligibility from the fourth generation to the sixth generation of persons of Indian origin.

More on the News

- The announcement was made during the official visit of Vice-President C P Radhakrishnan to Sri Lanka, reflecting India's renewed engagement with its diaspora in the region.
- The move primarily benefits the **Indian-origin Tamil (Mala iyaha Tamil) community**, whose ancestors migrated during the colonial plantation period.
- It represents a significant shift in India's diaspora policy, aligning with its broader neighbourhood outreach and regional diplomacy objectives.

Key Highlights of the Expansion

- The eligibility for OCI cards has been **extended to the fifth and sixth generations**, compared to the earlier limit of the fourth generation.
- To ease procedural challenges, **documents issued by the Sri Lankan government will now be accepted** as proof of ancestry.
- Removes barriers for younger descendants lacking old Indian records, benefiting an estimated 300,000 people in hill-country plantations.

Significance of Expansion

- **Strengthening People-to-People Ties:** The extension reconnects multiple generations of Indian-origin Tamils with their ancestral roots, deepening cultural and social linkages.
- **Boost to Neighbourhood First Policy:** It reflects India's commitment to strengthening ties with Sri Lanka as part of its broader regional diplomacy.
- **Enhancing Soft Power:** The move reinforces India's cultural influence and goodwill through inclusive diaspora engagement.
- **Economic and Educational Opportunities:** OCI access enables greater mobility and opportunities in education, employment, and business for beneficiaries.
- **Strategic Relevance:** It helps India sustain its

influence in Sri Lanka amid growing geopolitical competition in the Indian Ocean region.

About the OCI Scheme

- The Overseas Citizenship of India (OCI) scheme was introduced in **August 2005** by amending the **Citizenship Act, 1955**, to strengthen ties with the Indian diaspora.
- It provides a **lifelong multiple-entry visa to India and residency rights** to foreign citizens of Indian origin, allowing them to live, work, and travel freely in India. They are also exempt from registering with local police authorities for long stays.
- OCI is **not equivalent to full citizenship**, as it does not grant political rights such as voting or holding public office.
- Cardholders enjoy parity with Non-Resident Indians (NRIs) in areas like education, economic activities, and property ownership (except agricultural land).
- The scheme has evolved over time, including the merger of the earlier PIO (Person of Indian Origin) card with OCI in 2015 to simplify diaspora engagement.

2.8. State Visit of President of the Republic of Korea to India**SYLLABUS**

GS-2: *Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

Context

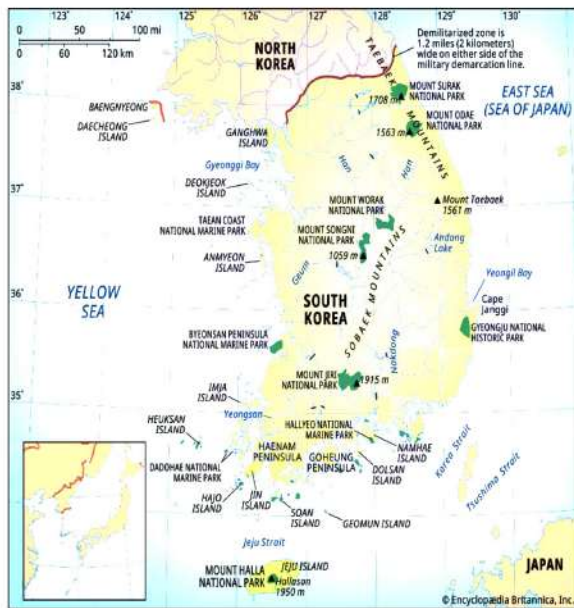
Recently, the President of South Korea paid a State Visit to India from April 19–21, 2026, resulting in the adoption of a Joint Strategic Vision (2026–2030) to strengthen the India–ROK Special Strategic Partnership.

More on the News

- The visit aimed to **strengthen the Special Strategic Partnership** between the two countries across multiple sectors.
- Discussions focused on key areas such as **trade, investments, shipbuilding, semiconductors, artificial intelligence, and emerging technologies**.

INTERNATIONAL RELATION

- Both countries also exchanged views on **regional and global issues**, particularly in the **Indo-Pacific region**, highlighting their shared vision for peace and stability.
- The visit reflects the **growing importance of India–South Korea relations in the context of global economic shifts and geopolitical tensions**.



Key Outcomes of the Visit

- **Strategic & Institutional Outcomes:** Adoption of a **Joint Strategic Vision** to transform ties into a “**futuristic partnership**.”
 - ✓ Adoption of a **Joint Strategic Vision** to transform ties into a “**futuristic partnership**.”
 - ✓ Launch of **Economic Security Dialogue** to strengthen **resilient supply chains and critical technologies cooperation**.
 - ✓ Establishment of an **Industrial Cooperation Committee** to coordinate investments in **advanced manufacturing, clean energy, and critical minerals**.
 - ✓ Initiation of **Foreign Ministry Dialogue on global issues** such as climate change, Arctic governance, and maritime cooperation.
 - ✓ Agreement to launch a **2+2 Dialogue (Defence and Foreign Affairs)** at the Vice-Minister level.
- **Economic & Trade Outcomes:** Bilateral trade is currently at **\$27 billion**, with a target to reach **\$50 billion by 2030**.
 - ✓ Decision to **upgrade the India–South Korea CEPA** by **mid-2027**, focusing on reducing **non-tariff barriers**, easing **rules of origin**, and expanding **market access**.
 - ✓ Launch of **India-Korea Financial Forum** to facilitate financial flows.
 - ✓ Establishment of a **Korean Industrial Township in India**, especially for SMEs.
- **Technology & Industrial Cooperation:** Launch of the **India-Korea Digital Bridge** for collaboration in **Artificial Intelligence, semiconductors, and digital innovation ecosystems**.
 - ✓ MoUs signed in **Shipbuilding and maritime logistics** (identified as a priority sector), **ports cooperation, steel supply chains, and Science & Technology collaboration**.
 - ✓ Recognition of shipbuilding as a **new pillar of industrial cooperation**.
 - ✓ Establishment of **India–ROK Annual Steel Dialogue** and POSCO–JSW collaboration.
 - ✓ Launch of **Korea–India Defence Accelerator (KIND-X)** for innovation in defence technologies.
 - ✓ Expansion of **space cooperation (ISRO–KASA Joint Working Group)**.
- **Energy, Climate & Sustainability:** Joint Statements on **energy resource security and sustainability cooperation**.
 - ✓ Cooperation on **critical minerals supply chains**, including recycling and circular economy approaches.
 - ✓ MoUs on **climate and environment**, including cooperation under **Paris Agreement Article 6.2**.
 - ✓ South Korea joined the **International Solar Alliance** and Indo-Pacific Oceans Initiative.
 - ✓ India joined the **Global Green Growth Institute**.
- **Cultural & People-to-People Initiatives:** Announcement of **India-ROK Friendship Year (2028–29)**.
 - ✓ Launch of **Cultural Exchange Programme (2026–2030)**.
 - ✓ Historical-cultural linkage reaffirmed through the legend of **Princess Suriratna of Ayodhya and King Kim Suro**.

- **Financial & Institutional Agreements:** MoU between *IFSCA and Korean financial regulators and NPCI International Payments Ltd. and Korean clearing systems.*
- ✓ Launch of *Distinguished Visitors Programme (DVP).*

India–Republic of Korea (ROK) Bilateral Relations

Historical Relations	• India and the ROK established consular relations in 1962 and diplomatic ties in 1973, later upgraded to a Special Strategic Partnership in 2015. • Leadership interactions continued through G20, G7, and East Asia Summit platforms (2023–2025). • India contributed significantly during the Korean War through UN mediation, medical aid, and prisoner repatriation efforts. • Cultural connections were reinforced by Rabindranath Tagore's poem Lamp of the East.
Economic Relations	• The CEPA (2010) boosted trade to about USD 26.9 billion in 2024–25, though with a trade deficit for India. • India exports petroleum products, metals, and steel, while importing electronics, machinery, and automobile components. • ROK is the 13th largest FDI investor in India with a strong presence in manufacturing, electronics, and automobiles.
Defence Relations	• Defence ties are guided by key MoUs: 2005 (Defence Industry & Logistics), 2010 (Defence R&D), and 2020 (Defence Industry Roadmap). • Maritime cooperation is a major pillar, including the first bilateral naval exercise (2025) and Coast Guard MoU on Maritime Search and Rescue. • Participation in defence exhibitions like KADEX and dialogues such as Seoul Defence Dialogue and Delhi Defence Dialogue strengthens strategic and technological cooperation.

Diaspora

- The Indian community in ROK is **around 18,000**, comprising students, professionals, and researchers.
- A large number of Indians are engaged in STEM education and high-skilled sectors like IT and automobiles.
- Indian diaspora associations actively promote cultural engagement and community welfare.

2.9. India Approves Currency Swap for Maldives

SYLLABUS

GS-2: India and its Neighbourhood- Relations; Bilateral, Regional and Global Agreements involving India and/or affecting India's interests.

GS-3: Indian Economy and issues relating to Planning, Mobilization of Resources.

Context

India has approved a ₹30 billion (₹3,000 crore) currency swap facility for the Maldives under the SAARC Currency Swap Framework, reinforcing its role as a key financial partner in the region.

More on the News

- The facility is being extended through the **Indian Rupee (INR) swap window**, as part of the broader SAARC Currency Swap Arrangement.
- This marks the **first drawdown under the current framework**, which was put in place by the RBI in June 2024, for the period 2024 to 2027.
- ✓ Under it, the RBI and the Maldives government signed the bilateral agreement during President Mohamed Muizzu's State visit to New Delhi in October 2024.
- It follows the **maturity of a \$400 million swap facility** availed by the Maldives in October 2024 under the USD/Euro window.
- The move comes amid **external liquidity pressures and foreign exchange constraints** faced by the Maldives economy.

What is a Currency Swap?

- A **currency swap** is a financial arrangement between two countries' central banks to **exchange currencies for a predefined period.**

INTERNATIONAL RELATION

- It involves borrowing one currency in exchange for another, with an agreement to **repay the original currency**, along with interest, at a specified future date.
- It provides **short-term foreign exchange liquidity** without requiring countries to tap international capital markets.
- Such arrangements help manage the **balance of payments pressures, currency volatility, and external shocks**.

About the SAARC Currency Swap Arrangement

- The SAARC Currency Swap Framework is a **regional financial arrangement introduced by India in 2012** to provide short-term foreign exchange liquidity support to SAARC countries.
- It allows participating countries to **exchange local currency for foreign currency (USD/Euro/INR)** through swap windows under pre-agreed terms.
- The framework helps countries **address balance of payments pressures** and avoid external borrowing shocks.
- The total corpus (for 2024–27) is **\$2 billion** under the USD/Euro window and **₹250 billion** (₹25,000 crore) under the INR window. It is available to SAARC members upon signing bilateral swap agreements.
- Under this framework, the Maldives Monetary Authority signed an agreement in October 2024 for up to **\$400 million** under the USD/Euro window and **₹30 billion** under the INR window.

Significance of the Currency Swap

- **Economic Stability for Maldives:** Provides immediate **liquidity support**, helping manage foreign exchange shortages and stabilise macroeconomic conditions.
- **Strengthening Neighbourhood First Policy:** It enhances bilateral trust and economic cooperation, while reinforcing India's position as a reliable partner and **"first responder"** in the region.
- **Regional Financial Cooperation:** It demonstrates the effectiveness of SAARC mechanisms in addressing regional economic challenges and also promotes **financial resilience and cooperation in South Asia**.
- **Strategic and Geopolitical Importance:** It strengthens

India's influence in the **Indian Ocean Region (IOR)** and aligns with India's broader initiatives, such as **Neighbourhood First** and **Vision MAHASAGAR**.

2.10. Fourth India-Africa Forum Summit (IAFS-IV)

SYLLABUS

GS-2: *Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

Context

Recently, the External Affairs Minister (EAM) unveiled the logo, theme and official website for the Fourth India–Africa Forum Summit (IAFS-IV) in New Delhi.

More on the News

- India will host the fourth India-Africa Forum Summit (IAFS-IV) on 31 May 2026 in New Delhi in collaboration with the African Union Commission.
- **The Summit will be held under the theme "IA SPIRIT: India Africa Strategic Partnership for Innovation, Resilience, and Inclusive Transformation"**, reflecting the comprehensive nature of the India-Africa partnership.

About India-Africa Forum Summit (IAFS)

- The **India–Africa Forum Summit (IAFS)** is a premier platform for **high-level engagement between India and African countries**, launched in 2008.
- It is held periodically to strengthen cooperation in areas such as **trade, investment, capacity building, technology, and development partnership**.
- **So far, three summits have been held:**
 - ✓ IAFS-I (2008, New Delhi)
 - ✓ IAFS-II (2011, Addis Ababa)
 - ✓ IAFS-III (2015, New Delhi) (largest, with participation of all 54 African countries)
- The summit operates on the principles of **South-South cooperation, mutual respect, and demand-driven development partnership**.

Significance of India-Africa Forum Summit (IAFS)

- **Strengthening South–South Cooperation:** IAFS

serves as a key platform for promoting **South–South cooperation**, based on mutual respect, equality, and shared developmental priorities between India and African nations.

- **Enhancing Strategic Engagement:** The summit strengthens India's **strategic presence in Africa**, particularly in the context of growing global competition in the region.
- **People-to-People and Capacity Building Focus:** Through initiatives like **scholarships, training programmes, and skill development**, IAFS enhances human resource development and long-term institutional ties.
- **Alignment of Development Visions:** The partnership aligns India's **"Viksit Bharat 2047"** with Africa's **Agenda 2063**, promoting sustainable development.



3.1. CAG Flags Gaps in Welfare Delivery to Odisha's PVTGs

SYLLABUS

GS-2: Welfare Schemes for Vulnerable Sections of the Population by the Centre and States and the Performance of these Schemes; Issues Relating to Development and Management of Social Sector; Functions and Responsibilities of various Constitutional Bodies.

Context

A recent audit by the Comptroller and Auditor General of India has highlighted serious gaps in the implementation of welfare schemes for Particularly Vulnerable Tribal Groups (PVTGs) in Odisha.

More on the News

- The report reveals that **over half of the eligible PVTG population did not receive benefits** under targeted schemes, raising concerns about governance and last-mile delivery.
- The audit, tabled in the Odisha Assembly, scrutinised the ST and SC Development Department, and schemes like the Odisha PVTG Empowerment and Livelihood Improvement Programme.
- The findings assume importance in the context of recent initiatives like **PM JANMAN**, which aim to improve the socio-economic conditions of PVTGs but depend heavily on effective identification and delivery mechanisms.

Key Findings of the CAG

- **Exclusion of Beneficiaries:** The audit found that **about 54%** (around 160,000 out of Odisha's total PVTG population of 294,000) of the PVTG population were not covered under major welfare schemes.
- **Non-Coverage of Newly Identified Villages:** A baseline exercise identified 1,138 new PVTG villages, yet welfare programmes were implemented in only 541 villages, covering 1.34 lakh people.
✓ This exclusion was linked to the

non-operationalisation of newly created Micro Project Agencies (MPAs), which were meant to extend coverage to these areas.

- **Defunct Infrastructure and Poor Asset Creation: A significant proportion of development assets were found to be non-functional:**
✓ 55% of drinking water projects and 58% of irrigation projects were defunct.
✓ 46% of livelihood-related processing units were non-operational despite substantial investments.
- **Basic Services Deficit in Excluded Households:** Among excluded PVTG households, access to basic amenities was extremely limited, as only about 18% had access to safe drinking water, and around 34% had LPG connectivity.
- **MGNREGS Failure:** MGNREGS provided the mandated 100 days of work to just 10% of PVTG households. 1.22 lakh households got no work but were denied unemployment allowances.
- **Failure in Addressing Child Marriage:** The late marriage incentive programme covered only 43% of villages between 2019 and 2024, indicating weak implementation.

About CAG (Comptroller and Auditor General of India)

- The CAG is a **constitutional authority under Article 148** of the Constitution of India.
- It is responsible for auditing Union and state government accounts, compliance audits, and **performance audits** of public schemes to ensure accountability and value for money.
- Its reports are submitted to the **President or Governor** and examined by legislative committees such as the Public Accounts Committee (PAC).
- Appointed by the **President** for a **6year term** (or age 65).

Who are PVTGs?

- Particularly Vulnerable Tribal Groups (PVTGs) are a distinct sub-category within the Scheduled Tribes (STs), identified as the most marginalized and disadvantaged among them.

- They are marked by stagnant or declining population, pre-agrarian level of technology (hunting, gathering, shifting cultivation), economic backwardness, geographical isolation, and extremely low literacy levels.
- The **Dhebar Commission (1960–61)** first highlighted intra-tribal disparities and recommended special attention to the most vulnerable sections of STs.
- Acting on this, the Government of India created a separate category called **Primitive Tribal Groups (PTGs) in 1975**, listing 52 communities. In 1993, another 23 were added, bringing the total to 75.
- In 2006, the term PTG was officially renamed as **Particularly Vulnerable Tribal Groups (PVTGs)** to reflect their special status.
- Currently, 75 PVTGs are spread across 18 States and 1 Union Territory (Andaman and Nicobar Islands). Among the 75 listed PVTGs, **Orissa has the highest (13) number of them.**
- As per a 2023 survey of MoTA, there were an estimated 47.5 lakh PVTGs across India. At 13.22 lakh, Madhya Pradesh had the highest estimated population of PVTGs, followed by Maharashtra with an estimated population of 6.7 lakh.

Challenges Faced by PVTGs

- **Socio-economic Marginalisation:** Small population size, geographical isolation, and pre-agrarian subsistence practices keep PVTGs at the lowest rung of development indicators.
- **Limited Access to Basic Services:** Inadequate healthcare, education, sanitation, and infrastructure in remote areas restrict their human development and perpetuate poverty.
 - ✓ For instance, a 2018 survey on 13 PVTGs in Odisha revealed a significantly low literacy rate of approximately 37.4%, much below the state average of about 73%.
- **Land Alienation and Displacement:** Encroachment for mining, industrialisation, and development projects has led to large-scale loss of traditional lands and livelihoods.
 - ✓ For instance, the **Great Nicobar Development Project** threatens the survival of the Shompens.
- **Weak Implementation of FRA:** Despite being

crucial for recognizing their traditional habitat and livelihood rights, progress has been dismal.

✓ For instance, as per a response given by MoTA in the Lok Sabha, in the last 2 decades after the **Forest Rights Act (FRA) of 2006** came into effect, only 10 PVTGs have been granted habitat rights across 14 districts in three States of Odisha, Madhya Pradesh, and Chhattisgarh.

- **Cultural Erosion and Climate Vulnerability:** Traditional knowledge and cultural identity are threatened by assimilation pressures, while climate change exacerbates livelihood insecurity through resource depletion and extreme weather events.

Measures Taken by the Government

- **Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM JANMAN):** Launched on Janjatiya Gaurav Divas (15th November) in 2023, it aims to uplift the socio-economic status of PVTGs by addressing gaps in health, education, livelihoods, and infrastructure.
- **Eklavya Model Residential School (EMRS):** The MoTA is implementing the flagship scheme of EMRS to provide quality education to ST Students from class 6th to 12th. 5% seats in each of the EMRSs are reserved for PVTG students.
- **Higher Education Support:** In the scheme of National Fellowship, 25 slots out of 750 slots, and under the National Overseas Scholarship for ST students, 3 slots out of 20 slots are reserved for PVTG candidates.
- **National Scheduled Tribes Finance and Development Corporation (NSTFDC):** It provides concessional financial assistance for income-generating activities, skill development, and self-employment ventures of Scheduled Tribes, including PVTGs.

3.2. Atal Pension Yojana (APY) Crosses Historic Milestone

SYLLABUS

GS-2: Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes.

GS-3: Inclusive growth and issues arising from it.

Context

The *Atal Pension Yojana (APY)*, a flagship social security initiative of the Government of India administered by the Pension Fund Regulatory and Development Authority (PFRDA), has achieved a significant milestone by crossing 9 crore gross enrolments as of April 2026.

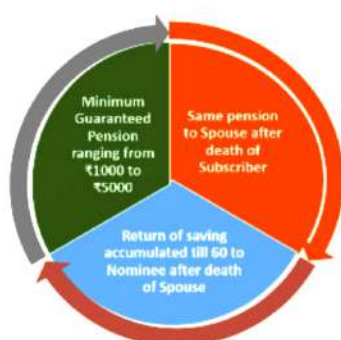
More on the News

- This reflects the expanding reach of pension coverage among India's unorganised workforce and marks a major step toward universal social security.
- The scheme has witnessed steady and impressive growth since its launch:
 - ✓ **Total enrolments crossed 9 crore subscribers** (April 2026).
 - ✓ **FY 2025–26 recorded over 1.35 crore new enrolments**, the highest ever in a single financial year.

About Atal Pension Yojana (APY)

- APY, launched by the Government of India on **9 May 2015** and **operational from 1 June 2015**.
- The scheme was designed to **encourage voluntary savings** for retirement by offering **defined pension benefits**, linked to the age of joining and amount of contribution.
- Targeted primarily at poor and **underprivileged workers** in the **informal sector**, the scheme has emerged as one of the **most inclusive and accessible social security initiatives** in India.

"APY ka Saath hai to Jeevan ka Suraksha Kavach Saath hai"
 ("एपीवाई का साथ है, तो जीवन का सुरक्षा कवच साथ है।")



Background and Rationale

- A majority of India's workforce operates outside formal employment structures, lacking access to structured retirement benefits.
- **This creates:**
 - ✓ Dependence on family support in old age
 - ✓ Financial insecurity after working years
 - ✓ Absence of a stable savings mechanism
- APY was introduced as a response to these structural gaps, aiming to create a **sustainable and inclusive pension framework**.

Pension Fund Regulatory and Development Authority

- **About**
 - ✓ A **statutory regulatory body** established under the **PFRDA Act, 2013 (effective 2014)**
 - ✓ Functions under the **Ministry of Finance, Government of India**
 - ✓ Headquarters in **New Delhi**
- **Composition (Section 4, PFRDA Act, 2013)**
 - ✓ Chairperson
 - ✓ Three Whole-Time Members
 - ✓ Three Part-Time Members
- **Appointed by the Central Government**
 - ✓ Members are selected based on their expertise in economics, finance, or law, ensuring leadership with integrity and professional standing.
- **Key Functions**
 - ✓ Regulates the **National Pension System (NPS)** and other notified pension schemes
 - ✓ Promotes pension awareness, financial literacy, and retirement planning
 - ✓ Approves pension schemes and investment guidelines

Salient Features of APY

Feature	Details
Target Group	Aimed at workers in the unorganised sector lacking formal pension coverage; open to Indian citizens aged 18–40 years ; income taxpayers not eligible (from 1 Oct 2022)
Defined Pension Benefit	Provides fixed monthly pension at 60 years; pension slabs: ₹1,000, ₹2,000, ₹3,000, ₹4,000, ₹5,000

Contribution Period & Calculation	Minimum 20 years contribution; amount depends on age at entry and desired pension amount
Government Co-contribution	Applicable for subscribers joining 1 June 2015–31 March 2016; government contributed 50% or ₹1,000 per annum (whichever lower) for 5 years; only to subscribers not covered under any statutory social security scheme and not income taxpayers at the time
Administering Body	Regulated by Pension Fund Regulatory and Development Authority (PFRDA) ; implemented through National Pension System (NPS) framework. Over the past decade, the scheme has witnessed remarkable growth, driven by sustained efforts of Banks (PSBs/RRBs/Private Banks/SFBs/Co-operative banks), SLBCs/UTLBCs/LDMs, the Department of Posts (DoP) and continuous support from the Government of India

Benefits and Social Security Impact

- **Assured Pension:** Lifelong fixed pension ensures income stability after retirement
- **Family Protection:** Spouse receives pension after subscriber's death; nominee receives accumulated corpus
- **Auto-Debit Facility:** Ensures regular and disciplined savings
- **Tax Benefits:** Contributions eligible under relevant provisions of the Income Tax Act

Exit and Withdrawal Provisions

- **The scheme promotes long-term savings discipline:** Pension benefits begin at the age of 60
 - ✓ Premature exit is allowed only under exceptional conditions like death or terminal illness
 - ✓ Voluntary exit leads to return of contributions with interest, excluding government contribution

Challenges

- **Economic Constraints**
 - ✓ Limited ability of low-income groups to contribute regularly

- ✓ Pension amounts may remain modest in the long term

• Social Constraints

- ✓ Low awareness and financial literacy in informal sectors
- ✓ Irregular income affecting continuity of contributions

• Administrative Challenges

- ✓ Ensuring deeper penetration in rural and remote areas
- ✓ Sustaining long-term participation across decades

Implications

• For Individuals

- ✓ Provides financial independence during old age
- ✓ Reduces vulnerability and dependency

• For Economy

- ✓ Encourages long-term savings
- ✓ Strengthens financial inclusion

• For Society

- ✓ Supports social security for vulnerable populations
- ✓ Reduces pressure on informal family-based support systems

Institutional Efforts and Awareness Measures

- Awareness campaigns at state and district levels
- Training and outreach programmes
- Use of digital platforms such as e-APY, mobile apps, and online banking
- Multilingual information dissemination
- Help desks, chatbots, and QR-based services for subscriber support

Way Forward

• Short-Term Measures

- ✓ Strengthen awareness campaigns and outreach
- ✓ Simplify onboarding and contribution mechanisms

• Long-Term Measures

- ✓ Enhance pension adequacy over time
- ✓ Improve financial literacy and digital inclusion

• Institutional Strengthening

- ✓ Strengthen coordination between financial institutions and regulators
- ✓ Expand digital and multilingual service delivery

3.3. Telangana Assembly Passes Gig Workers Bill

SYLLABUS

GS 2: Government policies and interventions for development in various sectors and issues arising out of their design and implementation; Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes

GS 3: Inclusive growth and issues arising from it.

Context

Recently, the Telangana state Assembly passed the *Telangana Platform-Based Gig Workers (Registration, Social Security and Welfare) Bill, 2026*, seeking to regulate and ensure protection to gig and platform workers.

About the Telangana Gig Workers Bill

- The main objective of the bill is **to give legal recognition to gig workers in the digital economy** and protect their rights, dignity, and livelihood.
- It addresses the problems faced by the gig and platform workers, like a lack of minimum wages, job security, health insurance, labour rights, grievance redressal system, or any other benefits.
- **The bill is similar to those passed by four other states:** Karnataka, Rajasthan, Jharkhand, and Bihar.

Key Provisions of the Bill

- **Regulatory Compliance for Platforms:**
 - ✓ Platform companies are required to periodically submit details and file electronic returns of customer transactions every three months, on which the government will **levy 1–2% on the transactions**.
 - ✓ Strict penalties have been prescribed for non-compliance: Rs 50,000 for the first violation, Rs 1 lakh for the second, Rs 1.5 lakh for the third, and up to five times the arrears thereafter.
- **Provision for Social Security and Welfare Board:**
 - ✓ **A 20-member welfare board for gig workers** will be set up using the levy corpus to provide insurance, pension, and maternity benefits, with representation of women and persons with disabilities.

✓ Aggregators, including delivery, ride-hailing, and service apps, will be required to deposit 1 to 2% of their transaction value into a state-managed welfare fund. A maximum of **5% of the fund can be used for the board's operating expenses**.

✓ Every registered gig worker will be given a **unique ID** for direct access to Government Schemes.

- **Grievance Redressal System:** It introduces a strong grievance redressal system, creating platform-level committees and district-level complaint mechanisms to protect workers from sudden termination or payment stoppages
- **Transparency:** Platforms must clearly disclose salary and deduction details, and there can be no arbitrary use of algorithms that affect workers.

About the Gig Economy and Workers

- The gig economy is a market system characterised by the **prevalence of short-term and flexible work** arrangements, where organisations engage independent workers for specific tasks or projects.
- A gig worker refers to an individual who undertakes work or participates in income-generating activities outside the traditional employer–employee relationship, as defined under the Code on Social Security, 2020.
- It is witnessing rapid expansion, driven by digitalisation and increasing preference for flexible employment, with a growing number of workers entering gig-based roles.
- **There are two types of Gig Workers:**
 - ✓ **Platform-Based Workers:** Individuals whose work is mediated through online applications or digital platforms (e.g., Uber, Swiggy).
 - ✓ **Non-Platform Gig Workers:** Workers engaged outside digital platforms, including casual labourers and self-employed individuals in conventional sectors, working either part-time or full-time.

Significance of the Gig Economy

- **Employment Generation and Inclusivity:** The gig economy creates large-scale employment opportunities, especially for youth, women, and low-skilled workers, enabling wider labour market participation.

- **Flexibility and Work Autonomy:** It offers flexible working hours and location independence, allowing workers to balance multiple income sources and personal commitments.
- **Boost to Digital Economy:** The expansion of platform-based work accelerates digitalisation and supports the growth of sectors such as e-commerce, ride-hailing, and online services.
- **Cost Efficiency for Businesses:** Firms benefit from reduced labour costs and operational flexibility by hiring workers on a task-based or short-term basis instead of maintaining a permanent workforce.
- **Scope for Innovation:** The gig economy promotes self-employment and micro-entrepreneurship, encouraging innovation and the development of new service models.

Challenges Before Gig Workers

- **Lack of Social Security:** Gig workers often lack access to benefits such as health insurance, pensions, and paid leave, leading to income insecurity.
- **Income Instability:** Earnings are irregular and depend on demand, platform algorithms, and ratings, making financial planning difficult.
- **Absence of Job Security:** Workers can be easily deactivated or removed from platforms without prior notice, reflecting weak contractual protection.
- **Algorithmic Control and Opacity:** Work allocation, pricing, and ratings are governed by opaque algorithms, limiting transparency and worker autonomy.
- **Limited Legal Protection:** Gig workers fall outside traditional labour laws, resulting in inadequate grievance redressal and weak bargaining power.
- **Gender and Social Gaps:** The gig economy often reinforces existing inequalities, with women and marginalised groups concentrated in low-paying, insecure work and facing barriers like safety concerns and the digital divide.
- **Lack of Collective Bargaining Power:** Gig workers operate individually and lack unionisation, limiting their ability to negotiate better wages, working conditions, or dispute resolution mechanisms.

Major Government Initiatives Addressing the Gig Economy

- **Code on Social Security, 2020:** It recognises gig

and platform workers and provides for social security schemes; however, enforceable norms on wages, working conditions, grievance redressal, and algorithmic transparency remain limited or inadequately implemented.

- **National Social Security Board:** It has been constituted under the '**Code on Social Security, 2020**' to oversee and coordinate the implementation of social security measures for workers in both the organized and unorganized sectors (including gig workers), and to recommend appropriate welfare schemes.
- **e-SHRAM Portal (launched in 2021):** It serves as a national database for unorganised workers, including gig workers, enabling access to government welfare schemes and social security benefits. **As of December 2025, over 31.2 crore workers are registered** on the portal.
- **State-Level Initiatives:** Various states have undertaken measures to extend social security and welfare support to gig workers
 - ✓ **Rajasthan:** It was the first state to pass the Rajasthan Platform-Based Gig Workers (Registration and Welfare) Act, which mandates registration of gig workers, setting up of a welfare board, with one-third of its members to be women.
 - ✓ **Bihar:** The Bihar Platform-Based Gig Workers (Registration, Social Security and Welfare) Act, 2025, provides social security benefits such as provident fund, insurance, maternity support, accident cover, and old-age protection through a welfare fund, along with provisions for minimum wages and grievance redressal.
 - ✓ **Karnataka:** The Karnataka Platform-Based Gig Workers (Social Security and Welfare) Act, 2025, provides a legal framework for the constitution of a welfare board. It has provisions like social security, insurance, and minimum wages.
 - ✓ **Jharkhand:** The Jharkhand Platform-Based Gig Workers (Registration and Welfare) Act provides for registration of all gig workers, with an ID being provided, social security benefits and grievance redressal.

3.4. India's Designer Rice

SYLLABUS

GS-2: Issues relating to development and management of Social Sector/Services relating to Health.

GS-3: Science and Technology- Developments and their Applications and Effects in Everyday Life.

Context

Recently, Scientists at CSIR – National Institute for Interdisciplinary Science and Technology (CSIR–NIIST), Thiruvananthapuram, have developed 'designer rice', a high-protein, low glycemic index (GI) grain for Type 2 diabetes.

More on the News

- The rice is claimed to have **three times the protein of normal grains** while maintaining a **low glycemic index**, helping in **diabetes management**.
- The technology has also been transferred to Tata Consumer Products Limited for commercialisation, indicating its potential for large-scale public use.

About Designer Rice

- 'Designer rice' refers to rice that is **scientifically altered using food-processing technology** to improve its nutritional composition.
- It is not a simple surface fortification but a **"fundamental re-architecture of the grain"**, where its internal composition is redesigned.
- The process involves **deconstructing rice into starch, protein, and fibre, and then reassembling them in a controlled manner**, ensuring that the final product retains the **same taste, appearance, and cooking properties** as conventional rice.
- **Technology and Production Process**
 - ✓ The innovation uses **broken rice**, usually a low-value byproduct. This is **ground into flour**, blended with **protein and micronutrients such as iron, folic acid, and vitamin B12**, and then reformed into rice-like grains.
 - ✓ This approach not only improves nutrition but also **adds value to agricultural waste**, making it economically and environmentally significant.
- **Key nutritional features of the designer rice**
 - ✓ **Low glycaemic index (GI < 55)** - Supports improved

blood sugar management and metabolic regulation

- ✓ **>20% Protein content** - Substantially higher protein levels compared to conventional polished rice
- ✓ **Improved dietary fibre** - Contributes to digestive health and prolonged satiety
- ✓ **Micronutrient enrichment** - Includes iron, folic acid, and vitamin B12 to address dietary deficiencies
- **Advantages:**
 - ✓ Enhanced nutritional quality in a widely consumed staple
 - ✓ Improved glycaemic control supporting metabolic health
 - ✓ Reduction in micronutrient deficiencies
 - ✓ Delivery of essential vitamins and minerals within traditional dietary frameworks
 - ✓ Improved satiety and favourable sensory acceptance
 - ✓ Scalable extrusion-based production suitable for large-scale food systems
- **Difference between regular rice and designer rice**
 - ✓ Regular white rice is predominantly carbohydrates and has a higher glycemic index (GI), leading to quicker spikes in blood sugar levels.
 - ✓ Designer rice, in contrast, has higher protein content and a lower GI, making it more nutritionally balanced and beneficial for controlling blood sugar levels and enhancing satiety.
- **Target Beneficiaries**
 - ✓ Designer rice is particularly useful for **children, elderly individuals, and people recovering from illness**, who have higher nutritional needs.
 - ✓ It is also beneficial for **vegetarians and low-income groups**, as it enhances nutrition without requiring a shift to expensive dietary alternatives.
- **Economic and Policy Relevance**
 - ✓ By utilising **broken rice**, the innovation increases value addition in agriculture.
 - ✓ Its large-scale adoption can support **food security and nutritional security**, and it holds potential for integration into **public food distribution and nutrition programmes**.
 - ✓ Promotes a **circular economy in agriculture** by utilising **broken rice**, an underutilised byproduct of milling.

About Type 2 Diabetes

Type 2 Diabetes	Details
Definition	Type 2 diabetes is a condition where blood glucose (blood sugar) levels are too high . Glucose comes from food and is the body's main energy source.
Role of Insulin	Insulin , produced by the pancreas, helps glucose enter cells. In Type 2 diabetes, the body doesn't produce enough insulin or doesn't use it effectively (insulin resistance) , causing glucose to remain in the blood.
Risk Factors	More likely if age ≥45, family history of diabetes, overweight/obesity, physical inactivity, high blood pressure, prediabetes, or history of gestational diabetes .
Symptoms	Increased thirst and urination, increased hunger, fatigue, blurred vision, numbness/tingling in hands or feet, slow-healing sores, unexplained weight loss.

Symptom Nature	Develop slowly over years ; may be mild or absent , leading to late diagnosis.
Causes	Combination of overweight/obesity, physical inactivity, insulin resistance, and genetic factors .
Diagnosis	Diagnosed through blood tests measuring glucose levels .
Medications	May include oral medicines or injectable drugs (including insulin) ; multiple medicines may be required over time. Also includes drugs for blood pressure and cholesterol if needed.
Complications (if unmanaged)	Can lead to heart disease, stroke, nerve damage, kidney disease, foot problems, eye disease, gum/dental issues, sexual and bladder problems .



4.1. Income Tax Act, 2025

SYLLABUS

GS 3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment; Government Budgeting.

Context

The Income Tax Act, 2025, has come into force on April 1, 2026, marking the beginning of a new chapter in India's tax administration and a significant step towards 'Viksit Bharat'.

About Income Tax Act, 2025

- It replaces the six-decade-old Income-tax Act, 1961, marking a comprehensive effort to simplify and modernise the country's income-tax law.
- It marks a shift towards greater clarity and ease of compliance through simple language, a streamlined structure and a reader-friendly presentation, without altering the underlying tax policy.

Objectives of the Act

- **Simplification:** Replace archaic language and redundant provisions with clear, concise, and modern legal text.
- **Digital Integration:** Enable faceless assessments and digital compliance to reduce human interface and corruption.
- **Taxpayer-Centric Approach:** Improve ease of filing, reduce litigation, and enhance transparency.
- **Global Alignment:** Reflect contemporary economic realities, including taxation of digital assets and global income.

Key Highlights of Income Tax Act, 2025

- **Introduction of 'Tax Year':** The Act replaces the confusing terms "*Assessment Year*" and "*Previous Year*" with a single "*Tax Year*," defined as the **12-month financial year** starting April 1, to improve clarity and ease compliance.

- **Power to Frame Schemes:** The Act authorizes the Central Government to design new schemes by
 - ✓ **Eliminating the interface** with the assessee or any other person to the extent technologically feasible, and
 - ✓ **Optimising utilisation** of the resources through economies of scale and functional specialisation.
- **Simplified Compliance:** Dispersed provisions have been consolidated, for instance, all TDS rules are now grouped under Section 393, making them easier to locate and interpret.
- **Digital-First Enforcement:** Introduces "Virtual Digital Space" (e.g., email, cloud, social media, trading platforms) and expands "Virtual Digital Assets" to include all value-bearing, cryptography-based digital assets like cryptocurrencies.
- **Clearer Structure for MAT and AMT:** Provisions related to *Minimum Alternate Tax (MAT)* and *Alternate Minimum Tax (AMT)* have been placed in separate sub-sections to enhance clarity.
- **Extended Time for Updating Returns:** Taxpayers can now revise their returns up to four years from the end of the relevant assessment year, enabling correction of errors without additional penalties or tax burden.
- **Reduced Reopening Period:** The time limit for reopening assessments has been **shortened to five years**, providing greater certainty and reducing prolonged scrutiny.

Rationale Behind the Shift from Income Tax Act 1961 to Income Tax Act 2025

- **Extensive Amendments:** The Act has undergone nearly 65 amendments and over 4,000 changes through Finance Acts and 19 Taxation Laws Amendment Bills, making it lengthy and complex despite efforts to keep it updated.
- **Reduced Tax Base:** The numerous exemptions and incentives granted over time significantly **reduced the tax base**, which in turn contributed to increased

litigation, higher administrative costs, and greater compliance burdens.

- **Complex Language:** The Act was written in **traditional legal language**, characterized by long sentences, numerous provisos, making it difficult for the average taxpayer to understand.
- **Fragmented Structure:** The accumulation of amendments and additions led to a **fragmented structure**. This complexity was further compounded by the presence of outdated provisions that were no longer in use.
- **Direct Tax Reforms Perspective:**
 - ✓ The shift also aligns with broader direct tax reforms aimed at improving efficiency, transparency, and ease of compliance.
 - ✓ It seeks to broaden the tax base, reduce disputes, leverage digital enforcement, and create a simpler, taxpayer-friendly system in line with evolving economic and technological realities.

Key Concerns Regarding the Act

- **Expanded Search Powers and Privacy Concerns:** While the Income Tax Bill, 2025 seeks to simplify compliance, it introduces provisions that raise concerns over digital privacy.
- **Enhanced Access to Digital Information:** Unlike the Income Tax Act, 1961, which allowed inspection of electronic records and physical access, the new law requires taxpayers to provide “reasonable technical assistance,” including sharing passwords.
- **Broad Scope of Access:** In the absence of clear limits, authorities may access a wide range of digital data, such as personal emails, social media accounts, and other private information.
- **Power to Override Security Measures:** If taxpayers refuse cooperation, officials are empowered to bypass access controls and directly enter computer systems.
- **Concerns of Misuse and Overreach:** These expanded powers raise fears of potential misuse, threatening citizens’ **right to digital privacy** and enabling administrative overreach.

Way Ahead

- **Strengthening Privacy Safeguards:** Clear legal

boundaries must be defined on the scope of digital access, with safeguards such as prior judicial/independent approval, proportionality tests, and strict data protection protocols to prevent misuse.

- **Alignment with Data Protection Framework:** Ensure consistency with India’s data protection regime (such as the **Digital Personal Data Protection framework**) to harmonise tax enforcement with privacy rights.
- **Detailed Rules and Standard Operating Procedures (SOPs):** Frame precise guidelines on “**reasonable technical assistance**,” access to digital systems, and data handling to remove ambiguity and ensure uniform implementation.
- **Balancing Enforcement with Taxpayer Rights:** Adopt a rights-based approach by strengthening grievance redressal mechanisms, ensuring transparency in proceedings, and protecting taxpayer confidentiality.
- **Periodic Review and Stakeholder Consultation:** Undertake regular reviews of the Income Tax Act, 2025, through consultations with industry, professionals, and civil society to address emerging concerns and refine provisions.

4.2. Mahi Banswara Rajasthan Atomic Power Project (MBRAPP)

SYLLABUS

GS-3: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Context

The Atomic Energy Regulatory Board has approved excavation activities for Units 1 and 2 of the Mahi Banswara Rajasthan Atomic Power Project, marking progress in India’s nuclear expansion.

About the Mahi Banswara Rajasthan Atomic Power Project

- It was launched in Banswara, Rajasthan, on September 25, 2025.
- The project was being implemented by **Anushakti Vidhyut Nigam Limited (ASHVINI)**, a subsidiary of Nuclear Power Corporation of India Limited, as a joint venture with NTPC Limited.

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- It was the **first nuclear power project** in the country to be set up by a joint venture of two Central Public Sector Enterprises (CPSEs).
- The project comprised **four units of 700 MW Pressurised Heavy Water Reactors (PHWR)** indigenously developed by NPCIL.
- It was to be set up on a twin-unit basis in two phases: **Mahi Banswara 1 & 2 (2 × 700 MW) and Mahi Banswara 3 & 4 (2 × 700 MW), at a total cost of ₹42,000 crore.**
- Technology:
 - ✓ **Pressurised Heavy Water Reactors (PHWRs)** indigenously designed by NPCIL.
 - ✓ Use **natural uranium** as fuel and **heavy water (deuterium oxide)** as coolant and moderator.
- It is part of India's **"fleet mode" nuclear programme**, which aims to build ten standardised 700 MWe reactors across multiple sites to ensure cost efficiency, faster deployment, and operational standardisation.
 - ✓ Other reactors under this programme are planned or operational at **Kaiga (Karnataka), Gorakhpur (Haryana), Chutka (Madhya Pradesh), Kakrapar (Gujarat), and Rajasthan.**

India's Nuclear Power Status

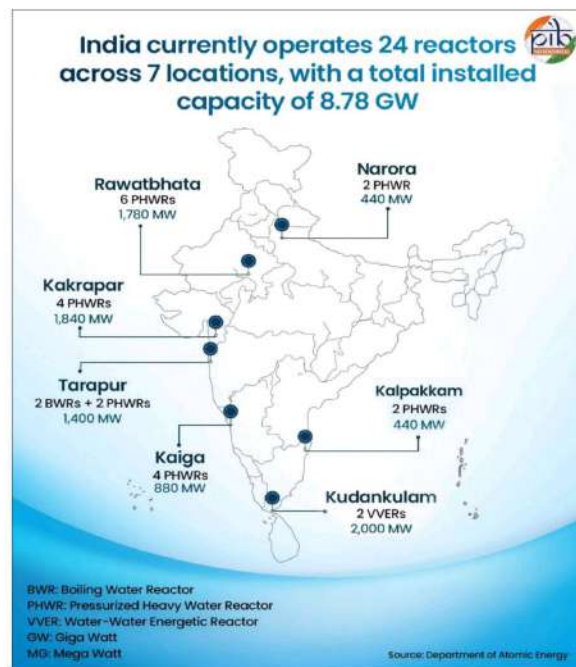
- India currently has **24 operable nuclear reactors** with a total installed capacity of 8,780 MWe.
 - ✓ Additionally, 8 reactors are under construction with a combined capacity of 6,028 MWe.
 - ✓ There is also 1 reactor that has been shut down, with a capacity of 135 MWe.
- Nuclear energy accounts for **1.7% of the total installed power generation** capacity in India.
- Under the **Viksit Bharat 2047 vision**, India aims to achieve at **least 100 GWe nuclear capacity by 2047** to support the clean energy transition and energy security.

Government Initiatives to Achieve the 2047 Nuclear Target

- **Long-Term Vision (2025):** In 2025, Nirmala Sitharaman announced that at least 100 GWe nuclear capacity by 2047 is essential for India's energy transition, aligning with Viksit Bharat 2047

and the net-zero 2070 goal.

- ✓ India is also shifting **toward Light Water Reactors (LWRs) alongside Pressurised Heavy Water Reactors (PHWRs)** to meet this target and enhance export competitiveness.



- **Bharat Small Reactors (BSRs):** In the Union Budget 2024–25, the government proposed **Bharat Small Reactors based on indigenous 220 MWe PHWR technology**, ensuring technological continuity and strengthening domestic capabilities.
- **Nuclear Energy Mission (2025):** In February 2025, the **Nuclear Energy Mission for Viksit Bharat** was announced to develop **at least five indigenous Small Modular Reactors (SMRs) by 2033** with federal funding and legislative support.
- **Development of Indigenous SMR Technologies:** In August 2025, Bhabha Atomic Research Centre announced the development of a 200 MWe Bharat SMR, a 50 MWe SMR, and a 5 MWt high-temperature gas-cooled reactor for hydrogen and industrial use.
- **International Cooperation (2025):** In February 2025, **India and France** signed a Letter of Intent

on advanced and SMR technologies, while **India and the United States** agreed to advance the civil nuclear agreement, including plans for US-designed reactors in India.

- **Legislative Transformation – SHANTI Bill (2025):** In December 2025, Parliament passed the **SHANTI Bill**, replacing the **Atomic Energy Act, 1962**, and **Civil Liability for Nuclear Damage Act, 2010**, with a single comprehensive framework to facilitate nuclear expansion.

India's Nuclear Energy Programme

- It was launched under the leadership of **Homi J. Bhabha**.
- **Objective:** To ensure the safe and reliable generation of electricity for the nation's socio-economic development while achieving self-reliance in all aspects of nuclear technology.
- India has limited reserves of fissile uranium (U-235) but fairly abundant reserves of thorium (Th-232).

The three-stage strategy of India

- **Stage 1 Pressurised Heavy Water Reactor (PHWR):**
 - ✓ It is a pressure-tube reactor that uses **heavy water (D₂O)** as both moderator and coolant, along with natural uranium dioxide as fuel.
 - ✓ In view of rising energy demands and the need to enhance power capacity, a second line of light water reactors has been incorporated alongside the existing indigenous PHWR programme.
- **Stage 2 Fast Breeder Reactor (FBR):**
 - ✓ It utilises Pu-239, produced in first-stage reactors, as the primary fissile material in fast breeder reactors (FBRs).
 - ✓ A blanket of U-238 surrounding the core undergoes transmutation to generate additional Pu-239 as the existing fuel is consumed.
 - ✓ The Fast Breeder Programme is currently in the technology demonstration phase.
 - ✓ **Liquid sodium** is used as the coolant due to its excellent heat transfer capabilities and favourable nuclear properties.
- **Stage 3 Thorium-based Reactor:**
 - ✓ The long-term objective of India's Nuclear Power Programme is the utilisation of thorium. The third stage focuses on breeder reactors based on the thorium–**Uranium-233** fuel cycle.

4.3. India–Australia Economic Cooperation and Trade Agreement

SYLLABUS

GS-2: *Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

GS-3: *Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.*

Context

The India–Australia Economic Cooperation and Trade Agreement (Ind-Aus ECTA) has completed four years since its signing on 2 April 2022, marking a significant milestone in the evolving economic partnership between India and Australia.

More on the News

- Over the past four years, the Agreement has significantly strengthened bilateral economic engagement through improved market access and reduced trade barriers.
- India's exports to Australia have more than doubled, while **total bilateral trade reached USD 24.1 billion in 2024–25**, reflecting sustained growth in economic ties.
- The Agreement has emerged as a **key pillar of bilateral engagement**, enhancing trade flows, fostering industry linkages, and generating new opportunities for businesses, entrepreneurs, and employment in both countries.

About the India–Australia ECTA

- The ECTA was signed on **2 April 2022** and came into force on **29 December 2022**, providing an institutional mechanism to promote and facilitate trade between the two countries.
- It covers **almost all tariff lines**, ensuring comprehensive trade liberalisation.
- **Tariff Liberalisation:**
 - ✓ **Australia:** Granted **100% tariff line access** to India; **98.3% became duty-free immediately**, with the remaining phased out over five years.
 - ✓ From **1 January 2026**, **all Indian exports enjoy**

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zero-duty access to Australia.

- ✓ **India:** Granted preferential access on **70.3% of tariff lines**, covering **90.6% of trade value**.
- **Sectoral Coverage:**
 - ✓ **India's export gains:** Gems and jewellery, textiles, pharmaceuticals, agriculture, engineering goods, automobiles.
 - ✓ **Australia's export gains:** Focus on raw materials and intermediates such as coal, mineral ores, chemicals, and fertilisers.
- **Trade in Services**
 - ✓ **Australia:** Offers access in **135 sub-sectors, with Most Favoured Nation (MFN) status in 120 sub-sectors**.
 - ✓ **India:** Provides access in **103 sub-sectors** for Australian services.
- **Strategic Significance:** Australia is a key strategic partner of India through platforms such as the *Quadrilateral Security Dialogue* and the *Indo-Pacific Economic Framework for Prosperity*, reinforcing the broader Indo-Pacific economic and supply chain cooperation.

Impact of India–Australia ECTA

- **Growth in Bilateral Trade:**
 - ✓ India's exports to Australia increased from **USD 4 billion (FY 2020–21) to USD 8.5 billion (FY 2024–25)**.
 - ✓ Total bilateral trade reached **USD 24.1 billion in 2024–25**.
 - ✓ In **FY 2025–26 (up to February)**, trade stood at **USD 19.3 billion**.
 - ✓ India's exports recorded an **8% growth** in 2024–25.
- **Sectoral Expansion and Diversification:**
 - ✓ Export growth has become **broad-based**, covering textiles, pharmaceuticals, chemicals, and agricultural products.
 - ✓ Increased access has supported **MSMEs, employment generation, and industry linkages**.
- **Supply Chain Resilience:**
 - ✓ Imports of essential raw materials such as base metals, raw cotton, fertilisers, chemicals, and pulses have strengthened **manufacturing and domestic value addition**.

✓ The complementary trade structure has enhanced **supply chain resilience**.

• Institutional and Regulatory Cooperation:

- ✓ The **Mutual Recognition Arrangement (MRA) on Organic Products (2025)** has enabled seamless trade by recognising certification systems, reducing costs, and improving transparency and trust.

About the India–Australia Comprehensive Economic Cooperation Agreement (CECA)

- The India–Australia CECA negotiations are ongoing, **with the 11th round held in New Delhi (18–23 August 2025)** covering areas such as goods, services, digital trade, rules of origin, environment, and labour.
- India and Australia have reaffirmed their commitment to a balanced and mutually beneficial agreement, continuing discussions through intersessional meetings.
- The CECA builds upon the India–Australia ECTA, which enabled early liberalisation of trade.
- Negotiations follow a phased trajectory; **initially launched in 2011, paused in 2016, and re-launched in 2021**.
- CECA aims to deepen cooperation across trade, investment, and emerging sectors, with a target of achieving **AUD 100 billion bilateral trade by 2030**.

4.4. Government Notifies Conditional Concessional Customs Duty for SEZ

SYLLABUS

GS 3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment; Changes in industrial policy and their effects on industrial growth; Investment models.

Context

Recently, the Centre notified the conditional customs duty concessions on clearance of goods manufactured in Special Economic Zones (SEZs) to the Domestic Tariff Area (DTA) to improve capacity utilisation of manufacturing units impacted by global trade disruptions.

More on the News

- It will benefit approximately **1,200 SEZ manufacturing units** by enabling economies of scale, reducing costs and enhancing resilience, while preserving the export-oriented nature of SEZs.
- **Duration:** The notification is effective from April 1, 2026, to March 31, 2027.
- **Concessional Rates:** Eligible SEZ manufacturing units are permitted to supply goods to the DTA at concessional duty rates, **up to 30% of the highest FOB export value achieved in any of the three preceding financial years.**
 - ✓ To prevent double benefits, export incentives such as duty drawback on inputs are not permitted on such withdrawals.
 - ✓ The DTA refers to the entire country of India (including the territorial waters and continental shelf) but excludes the specific designated areas of SEZs.
 - ✓ As per Section 30 of the Special Economic Zones Act, 2005, clearance of goods from SEZs to the DTA is treated as imports into India and attracts applicable customs duties.
- **Eligibility:** The notification sets key eligibility criteria, including **a minimum 20% value addition within the SEZ**, calculated through a specified formula based on assessable value and input costs.
- **Wide Sectoral Coverage:** The concessional framework spans a wide range of sectors, including minerals, chemicals, plastics, leather, wood and paper, textiles, footwear, ceramics and glass, metals, machinery, transport equipment, instruments, arms, and other manufactured goods.
 - ✓ However, sectors such as **agriculture (including marine and processed food products, tobacco, etc.)**, marble and granite, gems and jewellery, vehicles, toys and petroleum are excluded.
- **Compliance Requirements for Concessional Duty:** To avail concessional duty benefits, SEZ units must submit a certificate from the Development Commissioner confirming compliance, along with an undertaking to pay full duty in case of non-fulfilment.
- **Audit:** The units will also be subject to audit under the SEZ Rules, 2006.

About Special Economic Zones in India

- A Special Economic Zone (SEZ) is a specifically delineated duty-free enclave **treated as outside India's customs territory** for authorised operations. It operates under a distinct regulatory and fiscal framework to promote trade and investment.
- SEZ units are set up for manufacturing, providing services, and undertaking warehousing activities, including through Free Trade Warehousing Zones.
- **Objectives of SEZs:** SEZs serve as **engines of export-led growth** by generating additional economic activity, boosting exports, attracting domestic and foreign investment, creating employment opportunities, and developing world-class infrastructure.
- Currently, there are 368 notified SEZs across India as of 28th February, 2026.



Key Incentives & Facilities Offered to the Units in SEZs

- **Duty-free import/domestic procurement** of goods for development, operation and maintenance of SEZ units.
- **Exemption from Central Sales Tax, Service Tax and State Sales Tax.** These have now been subsumed into GST, and supplies to SEZs are zero-rated under the IGST Act, 2017.

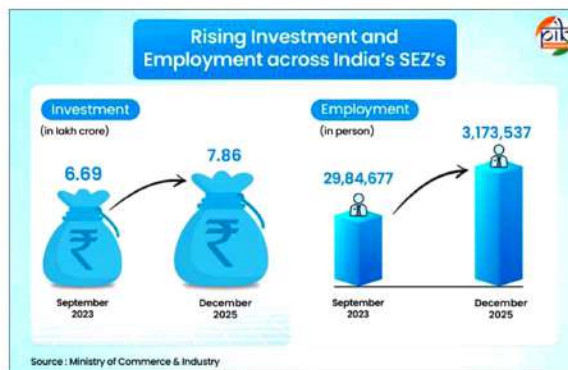


- Other levies, if exempted by the respective State Governments.
- **Single window clearance** for Central and State-level approvals.

Special Economic Zones Act, 2005 and Special Economic Zones Rules, 2006

- The SEZ Act, 2005, along with the SEZ Rules, 2006, introduce a **simplified framework with single-window clearances** for Central and State approvals.
- The Act sets out guiding principles for SEZs—promoting economic activity, infrastructure development, and employment generation—while also mandating environmental compliance by developers and units.
- The performance and impact of SEZs under the framework of the SEZ Act and Rules, with the Government evaluating outcomes based on monthly reports submitted by **Development Commissioners**, who are **appointed by the Government** to oversee the functioning, approval, and compliance of SEZ units.
- SEZ Rules, 2006 were amended in June 2025 to facilitate the establishment of SEZs exclusively for the manufacturing of semiconductors and electronic components.

India's SEZ Performance Snapshot



Key Concerns Before SEZs

- **Declining Export Competitiveness:** SEZs face pressure from global trade disruptions, rising protectionism, and competition from countries like Vietnam and Bangladesh, affecting export performance.
- **Underutilisation of Capacity:** Many SEZ units operate below capacity due to subdued global demand and limited domestic market access.
- **Erosion of Fiscal Incentives:** Gradual phasing out of tax holidays and incentives has made SEZs less attractive compared to earlier years.
- **Infrastructure and Logistics Bottlenecks:** Inadequate connectivity, high logistics costs, and delays in infrastructure development affect efficiency.
- **Land Acquisition and Social Concerns:** Issues related to land acquisition, rehabilitation, and environmental clearances create delays and resistance.
- **Policy Uncertainty and Frequent Changes:** Frequent amendments in tax regimes (e.g., transition to GST, withdrawal of certain exemptions) have reduced predictability for investors.

4.5. Defence Exports Touched an All-Time High in Financial Year 2025-26

SYLLABUS

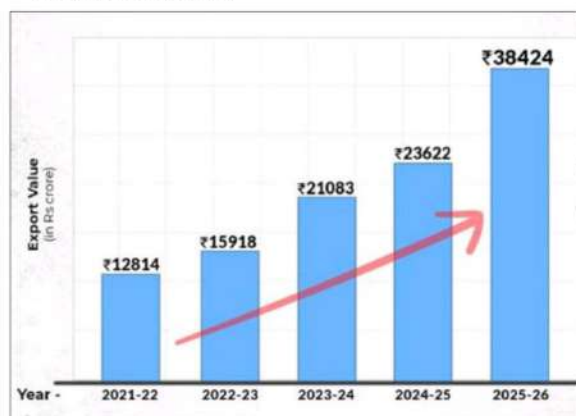
GS 3: Effects of liberalisation on the economy, changes in industrial policy and their effects on industrial growth; Indigenisation of technology and developing new technology.

Context

According to the Ministry of Defence, India's defence exports touched an all-time high of ₹38,424 crore in the financial year 2025–26, marking a sharp increase of ₹14,802 crore (62.66%) over the previous fiscal year's figure of ₹23,622 crore.

More on the News

- In FY26, India exported defence equipment to **over 80 countries**, including both complete systems and sub-systems.
- The milestone highlights significant contributions from both sectors, with **Defence Public Sector Undertakings (DPSUs) accounting for 54.84%** of exports and the **private sector contributing 45.16%**.
- DPSU's exports grew by 151% year-on-year, while private sector exports increased by 14%.
- In value terms, DPSUs exported ₹21,071 crore and the private sector ₹17,353 crore, up from ₹8,389 crore and ₹15,233 crore, respectively, in the previous year.
- The number of registered defence exporters increased **from 128 to 145, a rise of 13.3%** over the previous fiscal.
- This growth comes even as **India continues to be the world's second-largest arms importer**, holding an **8.3% share of global sales** during 2021–2025, according to the **Stockholm International Peace Research Institute**.



Significance of the Development

- **Boost to Strategic Autonomy:** Higher exports strengthen India's defence industrial base, reducing

dependence on imports and enhancing self-reliance under the **Aatmanirbhar Bharat vision**.

- **Global Recognition of Indigenous Capability:** Exports to over 80 countries reflect growing international trust in India's defence manufacturing quality and technological capabilities.
- **Economic Gains and Employment Generation:** The surge in exports contributes to **foreign exchange earnings**, supports domestic industries, and generates employment across manufacturing and ancillary sectors.
- **Strengthening Public-Private Partnership:** Balanced contributions from DPSUs and the private sector indicate a maturing defence ecosystem with increasing private participation and competitiveness.
- **Expansion of Defence Diplomacy:** Defence exports act as a tool of strategic diplomacy, deepening bilateral ties and enhancing India's geopolitical influence, especially in developing regions.
- **Momentum for Industrial Growth and Innovation:** Increased demand **encourages R&D, innovation**, and **scale economies**, helping India move up the global defence value chain.
- **Diversification Despite Import Dependence:** Even as India remains a major arms importer, rising exports signal a transition towards becoming a net contributor in the global defence market.

4.6. Benchmark Issuance Strategy (BIS) for State Development Loans

SYLLABUS

GS-3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Context

The Reserve Bank of India has introduced the Benchmark Issuance Strategy (BIS) on a pilot basis from FY 2026–27 for select States.

More on the News

- **Telangana** has joined a group of nine participating States—**Andhra Pradesh, Bihar, Chhattisgarh,**

Kerala, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh—under the RBI's Benchmark Issuance Strategy (BIS).

- The move comes amid rising State borrowings, with gross State Government Securities (SGS) issuance projected at ₹13.4–14 lakh crore in FY2027.

About the Benchmark Issuance Strategy (BIS)

- BIS is a **structured borrowing framework** for State Development Loans (SDLs).
- It involves issuing securities in **standardised benchmark tenor buckets** according to a **pre-announced borrowing calendar**.
- It is aligned with practices followed in the **Central Government securities market**.
- **Objective:**
 - ✓ Enhance **transparency and predictability** in State borrowings
 - ✓ Improve **liquidity and price discovery** in the SDL market
 - ✓ Develop a **reliable yield curve** for State government securities
 - ✓ Reduce **market fragmentation** and uncertainty
- **Key Features:**
 - ✓ **Benchmark Tenor Buckets:** Standard maturities such as **5-year, 10-year, 15-year, extending up to 25+ years**.
 - ✓ **Pre-announced Borrowing Calendar:** Provides investors with visibility on **timing and volume of issuances**.
 - ✓ **Standardised Issuances:** Larger and more liquid **benchmark bonds**.
 - ✓ **Reduction in Fragmentation:** Avoids scattered issuances across multiple maturities.
 - ✓ **Alignment with G-Sec Market:** Brings the SDL market closer to the **government securities framework**.

Implementation of Benchmark Issuance Strategy (BIS)

- Under the framework, participating States will **issue securities in predefined benchmark maturity buckets** in line with a **pre-announced borrowing calendar**.
- Around **₹1.5 trillion of borrowings in Q1 FY27** is

planned through **structured benchmark issuances** under BIS.

- The remaining borrowings will continue through the **conventional route**, where maturities are less standardised and issuance timing is flexible.
- The effectiveness of BIS depends on **close alignment between indicated and actual issuances**, which has been a challenge in recent years.
- **Proper implementation requires:**
 - ✓ Timely submission of borrowing plans by States
 - ✓ Faster approval and communication of borrowing limits by the Centre

Significance

- **Improved Market Efficiency:** The strategy enhances transparency, liquidity, and price discovery in the SDL market, while supporting the development of a robust SDL yield curve.
- **Better Investor Confidence:** It provides predictability and visibility of bond supply, thereby attracting broader investor participation.
- **Reduced Market Fragmentation:** Issuances are concentrated in standard maturities, leading to the creation of large and more liquid benchmark securities.
- **Fiscal Discipline for States:** It encourages structured and planned borrowing programmes, improving overall debt management efficiency of States.
- **Alignment with National Debt Market:** The SDL market becomes better integrated with the central government securities ecosystem, ensuring greater coherence in the debt market.
- **Medium-Term Gains (Not Immediate):** The impact on yields and borrowing costs will be gradual due to high supply of state bonds and elevated SDL spreads (~0.65–0.75%), with long-term benefits depending on stronger demand, a deeper secondary market, and better adherence to issuance plans.

About the State Development Loans (SDLs)

- SDLs are dated securities issued by State Governments to raise funds from the market, representing their debt obligations similar to Central Government dated securities.
- They carry **sovereign backing**, making them

low-risk instruments, and are issued through auctions conducted by the **Reserve Bank of India on its E-Kuber platform**.

- SDLs pay **interest (coupon) half-yearly**, while the **principal is repaid at maturity**, and they typically offer slightly higher yields than Central Government securities.
- These securities qualify for **Statutory Liquidity Ratio (SLR)** requirements and are eligible as collateral for **market repo** and the RBI's **Liquidity Adjustment Facility (LAF)**.
- The RBI manages SDL issuance under **Section 21A of the RBI Act, 1934**, with borrowings subject to **Central Government approval under Article 293(3) of the Constitution**.
- SDLs are issued as part of the **Market Borrowing Programme**, with the RBI announcing a **quarterly borrowing calendar in consultation with States**, followed by individual State notifications before each auction.
- State Governments can also **repurchase (buy back) SDLs**—through auctions or the secondary market—to reduce high-cost debt and manage their debt profile efficiently.

4.7. Minerals Concession (Second Amendment) Rules, 2026

SYLLABUS

GS-1: Distribution of key natural resources across the world (including South Asia and the Indian subcontinent).

GS-3: Indian Economy and issues relating to Planning, Mobilization of Resources.

Context

The Ministry of Mines has notified the Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession (Second Amendment) Rules, 2026, to operationalise provisions related to mining lease expansion and inclusion of additional minerals.

More on the News

- The rules are framed pursuant to amendments in the Mines and Minerals (Development and Regulation) Act, 1957 through the **MMDR Amendment Act, 2025** (effective September 2025).
 - The amendment aims to boost **exploration, production, and efficient utilisation of critical, strategic, and deep-seated minerals**.
 - It aligns with the objective of **Atmanirbhar Bharat** by strengthening domestic mineral supply chains.
 - The rules provide the **operational framework** for implementing key legislative changes introduced in 2025.
- ### Key Provisions of the Amendment
- **Inclusion of Contiguous Areas:** A **one-time extension is allowed for Mining Lease (ML) and Composite Licence (CL) holders** of deep-seated minerals for inclusion of contiguous areas.
 - ✓ The limit is up to **10% of the existing area for ML and up to 30% for CL**, with payment fixed at **10% of the auction premium** for auctioned leases and **additional royalty** equivalent for non-auctioned leases.
 - **Optimal Extraction of Deep-Seated Minerals:** The amendment enables mining of minerals locked in adjoining areas. It also prevents uneconomic fragmentation of mining operations.
 - **Inclusion of Associated Minerals:** The amendment allows inclusion of additional minerals, including minor minerals, in existing leases.
 - ✓ State Governments must approve **such inclusion within 30 days**, and no extra payment is required for critical minerals, strategic minerals, and deep-seated minerals listed in the **Seventh Schedule**.
 - **Provisions for Minor and Major Minerals:** For minor mineral leases granted before 2025, a mechanism is provided to include major minerals.
 - ✓ For future leases, exploration up to **G3 level is mandatory** (except sand), and if major minerals are discovered, the area will be **auctioned as a major mineral block**.
 - **Removal of Restrictions on Captive Mines:** The cap on the **sale of minerals from captive mines** has been removed.
 - ✓ If the plant operates at **full capacity**, surplus sale is **allowed**, whereas if it operates below capacity, sale is limited to the quantity consumed annually.
 - **Time-bound and Simplified Procedures:** The

amendment introduces a *simple and time-bound application process*. This is aimed at enhancing ease of doing business in the mining sector.

MMDR Amendment Act, 2025

- **Expansion of NMET (now NMEDT):** The National Mineral Exploration Trust has been expanded and renamed as the National Mineral Exploration and Development Trust (NMEDT), allowing fund utilisation within India (including offshore areas) and abroad, with lessee contribution increased from 2% to 3% of royalty.
- **Inclusion of New and Associated Minerals:** The amendment enables the inclusion of new and associated minerals in existing leases, including permitting major minerals in minor mineral leases under conditions, with an additional payment mechanism introduced while exempting critical and strategic minerals to boost their production.
- **One-time Extension for Contiguous Areas:** State Governments can grant a one-time extension of mining leases or composite licence areas to include adjacent contiguous regions on payment, capped at 10% for mining leases and 30% for composite licences to support efficient extraction.
- **Promotion of Mineral Markets and Exchanges:** The Central Government is empowered to promote mineral markets and establish exchanges for trading minerals and their processed forms to ensure transparent price discovery and better market stability.
- **Liberalisation of Sale from Captive Mines:** Captive mine owners are now allowed to sell minerals after meeting their own requirements and paying additional charges, including sale of unused accumulated dumps to improve resource utilisation and increase state revenue.
- **Removal of Prior Approval for Auction:** The requirement of prior Central Government approval for auction of certain notified mineral blocks for composite licences has been removed to streamline and speed up the auction process.

Significance

- **Economic & Industrial Impact:** The amendment boosts the supply of critical and strategic minerals,

thereby *enhancing domestic mineral production and reducing import dependence*.

✓ It strengthens industrial growth, supports MSMEs through improved mineral availability, and contributes to the vision of *Atmanirbhar Bharat*.

- **Ease of Doing Business:** It introduces simpler and time-bound procedures, which help *reduce regulatory delays and improve* the overall business environment in the mining sector.
- **Optimal Resource Utilisation:** The amendment promotes scientific mining and efficient extraction of deep-seated minerals. It also helps avoid fragmentation of mineral resources by enabling integrated, optimal mining operations.
- **Benefits to States:** States gain higher revenue through *additional payments and increased mineral production*. The clear role assigned to State Governments also strengthens *cooperative federalism*.

4.8. MPC Keeps Repo Rate unchanged

SYLLABUS

GS-3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Context

The Reserve Bank of India Monetary Policy Committee (MPC) in its bimonthly meeting kept the repo rate unchanged at 5.25% with a neutral stance amid heightened global uncertainty driven by the West Asia (US–Iran) conflict.

Key Highlights of the Meeting

- The MPC kept the **Repo Rate** unchanged **at 5.25%**; consequently, the **standing deposit facility (SDF)** rate remains **at 5%**, and the **marginal standing facility (MSF) rate** and the **Bank Rate** remain at **5.50%**.
- The committee continued with a **neutral stance**, signalling flexibility and data-dependence.
- Real GDP growth for FY27 is projected at **6.9%**, supported by domestic demand despite global headwinds.
- CPI inflation for FY27 is projected at **4.6%**, with moderate underlying core inflation pressures.
- The RBI introduced a **core inflation estimate of 4.4%**,

enhancing transparency in inflation assessment.

- The RBI adopted a **“wait and watch” calibrated strategy** to balance inflation control with growth support.

Key Terms

- **Repo Rate:** It is the interest rate at which the central bank lends money to commercial banks, usually against government securities.
- **Bank Rate:** It is the minimum rate of interest at which the Reserve Bank of India lends money to commercial banks to meet their fund requirements.
- **Standing Deposit Facility Rate:** Introduced in April 2022, the Standing Deposit Facility (SDF) allows banks to deposit excess funds with the RBI without needing collateral. This helps the RBI manage liquidity more effectively.
 - ✓ It replaced the reverse repo rate as the new floor of the Liquidity Adjustment Facility (LAF) corridor.
- **Marginal Standing Facility (MSF):** The MSF, introduced in May 2011, allows banks to borrow overnight from the RBI at a rate 1% higher than the repo rate. This facility was adjusted to strengthen the rupee in July 2013, widening the gap between the repo rate and MSF to 3%.

Factors Influencing the Decision

- **Global Geopolitical Conflict:** The ongoing West Asia conflict involving the **United States and Iran** has disrupted global supply chains for weeks and created uncertainty due to risks of escalation, prolongation, and wider geographical spread.
- **Energy and Commodity Prices:** Disruptions in the **Strait of Hormuz** led to a sharp surge and volatility in crude oil and other commodity prices, increasing fuel costs, input costs across sectors, and acting as a drag on domestic production.
- **External Sector and Financial Markets:** Global financial market turmoil resulted in the **US dollar strengthening, rupee depreciation, FPI volatility**, equity market corrections, rising bond yields, higher freight and insurance costs, and potential widening of the current account deficit, though remittances are not expected to see a significant dent.
- **Inflation Trends and Risks:** Headline inflation increased due to base effects and food prices, while core inflation remained moderate, but volatility in

global energy prices and risks such as possible El Niño conditions pose upside risks to inflation.

- **Domestic Growth Conditions:** Growth continues to be supported by **robust private consumption, fixed investment, services sector momentum, manufacturing activity, rising capacity utilisation and healthy balance sheets**, although supply disruptions and global volatility may constrain growth prospects.

About the Monetary Policy Committee (MPC)

- It was established in September 2016, under **Section 452B (1) of the Reserve Bank of India Act, 1934 (RBI Act)**.
- The **Urijit Patel Committee** had recommended the setting up of the MPC
- The MPC's primary role is to set the Policy Rate required to achieve the inflation target.
- **According to Section 42B (2) of the RBI Act, the MPC consists of:**
 - ✓ The Governor of RBI, who serves as the Chairperson, ex officio.
 - ✓ The Deputy Governor of RBI is responsible for Monetary Policy, as a member, ex officio.
 - ✓ One RBI officer nominated by the Central Board, as a member, ex officio.
 - ✓ (Three individuals appointed by the Central Government, as Members.
- Members appointed by the Central Government hold their positions for a **term of four years** or until further orders, whichever is earlier.
- According to Section 452A of the RBI Act, the inflation target is set at 4%, **with an upper tolerance level of 6% and a lower tolerance level of 2%**.
 - ✓ If inflation exceeds 6% or drops below 2% for three consecutive quarters, it is deemed a failure to meet the target.

4.9. Pradhan Mantri MUDRA Yojana Completes 11 years

SYLLABUS

GS-3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment and Inclusive growth and issues arising from it.

Context

Recently, the Pradhan Mantri MUDRA Yojana (PMMY) has completed 11 years, marking a decade of expanding financial inclusion and grassroots entrepreneurship.

About Pradhan Mantri MUDRA Yojana (PMMY)

- PMMY was launched on **April 8, 2015**, to provide financial support to micro and small enterprises.
- The scheme aims to “**Fund the Unfunded**” by extending institutional credit to non-corporate, non-farm small businesses.
- It seeks to promote **financial inclusion, entrepreneurship, and self-employment**, especially among underserved sections.
- **Mission:** To create an inclusive, sustainable, and value-based entrepreneurial culture, in collaboration with our partner institutions, in achieving economic success and financial security.
- **Financial Inclusion Framework:** PMMY operates within the three pillars of financial inclusion:
 - ✓ **Banking the Unbanked** – expanding access to banking services.
 - ✓ **Securing the Unsecured** – providing insurance and social security.
 - ✓ **Funding the Unfunded** – enabling access to credit.
- **Key Features:**
 - ✓ PMMY provides **collateral-free loans up to ₹20 lakh** for income-generating activities.
 - ✓ Loans are classified into **four categories** based on business stage:
 - **Shishu (up to ₹50,000)** – for early-stage businesses.
 - **Kishor (₹50,000–₹5 lakh)** – for growing enterprises.
 - **Tarun (₹5–10 lakh)** – for the expansion stage.
 - **Tarun Plus (₹10–20 lakh)** – for advanced growth stage.
 - ✓ Loans are extended to **non-corporate, non-farm micro and small enterprises** and are classified as **MUDRA loans**.
 - ✓ Interest rates are **regulated by RBI guidelines** with flexible repayment options.
 - ✓ Loans are provided through **banks, NBFCs, and microfinance institutions (MFIs)**.

Significance/Achievements of PMMY

- **Deepening Financial Inclusion:** With **57.79 crore loans and ₹40.07 lakh crore** disbursed, PMMY has formalised credit access for millions and reduced dependence on informal lending systems.
- **Boost to First-Time Entrepreneurship:** Nearly **12.15 crore first-time borrowers receiving ₹12 lakh crore** reflects the scheme’s critical role in expanding India’s entrepreneurial base.
- **Employment & Micro-Economy Expansion:** The dominance of **Shishu loans (74% of accounts)** indicates strong support for micro-enterprises, driving self-employment and local economic activity.
- **Women-led & Socially Inclusive Growth:** With **67% women beneficiaries and 51% from SC/ST/OBC categories**, PMMY has strengthened gender empowerment and inclusive development.
- **MSME Scaling & Credit Deepening:** The rise in annual sanctions from **₹1.37 lakh crore (2015–16) to ₹5.65 lakh crore (2025–26)**, along with the Kishor–Tarun loan mix, shows a shift from survival to growth-oriented financing, supporting MSME expansion and the **Viksit Bharat 2047 vision**.

Challenges and Shortcomings of PMMY

- **Rising NPAs and Credit Risk:** The NPA rate under PMMY for Scheduled Commercial Banks has increased from **5.47% in March 2018 to 9.81% in March 2025**, reflecting growing repayment stress in the scheme.
 - ✓ However, the NPA rate relative to disbursed loans remains moderate at **2.19% (March 2025)**, indicating that overall risk is still manageable but rising.
- **Nature of Collateral-Free Lending:** Since PMMY loans are **collateral-free and targeted at new and small entrepreneurs**, they inherently carry higher credit risk compared to traditional lending, especially when borrowers lack prior credit history.
- **Financial Illiteracy and Poor Credit Discipline:** As only **27% of Indian adults** meet basic **financial literacy** standards (National Centre for Financial Education), leading to poor fund utilisation, weak business planning, and low repayment behaviour.
- **Diversion and Misuse of Funds:** Instances of **loan diversion for personal consumption instead of**

productive business use have contributed to repayment defaults and asset quality concerns.

- **Structural Issues in MSME Financing:** MSMEs continue to face constraints such as a *lack of collateral, limited access to consultancy services, high borrowing costs, and inadequate financial information*, which affect their repayment capacity.

Way Forward

- **Graduation-based Credit Scaling:** With the introduction of Tarun Plus, PMMY should institutionalise a *"graduation pathway"* to transition successful borrowers into higher credit brackets and formal MSME financing, preventing credit ceilings and enabling enterprise scaling.
- **AI & Fintech-driven Credit Underwriting:** Banks and NBFCs should leverage AI-based predictive analytics using GSTN and UPI data, along with digital *platforms like LOKOS and Digital Aajeevika Register*, to improve credit assessment, enable real-time income tracking, and reduce NPAs.
- **Convergence with SHG & Women-led Initiatives:** Integrating PMMY with schemes *like Lakhpati Didi Scheme and SHG ecosystems* can enhance credit absorption and support women-led enterprises through market linkages such as *SHE-Marts*.
- **Inclusion of Gig & Platform Workers:** Expanding PMMY coverage under reforms *like EASE 8.0 banking reforms* to include gig and platform workers by recognising digital platforms as valid workplaces can deepen financial inclusion and formalise the urban informal economy.

4.10. Nutrient-Based Subsidy Rates for Kharif 2026

SYLLABUS

GS-3: Issues related to direct and indirect farm subsidies and minimum support prices.

Context

Recently, the Union Cabinet has approved the Nutrient-Based Subsidy (NBS) rates for the Kharif Season 2026 (1 April 2026 – 30 September 2026) on Phosphatic and Potassic (P&K) fertilizers.

More on the News

- The government has increased subsidy rates by **around 12% for Kharif 2026** to offset rising international fertilizer prices driven by geopolitical disruptions such as the West Asia crisis.
- Revised per kg subsidy rates are **₹47.32 for Nitrogen (N)**, **₹52.76 for Phosphorus (P)**, **₹2.38 for Potash (K) (unchanged)**, and **₹3.16 for Sulphur (S)**, applicable to P&K fertilizers including DAP, MOP, and NPKS complexes.

Rationale for Revision of NBS Rates

- **Global Price Volatility:** Rising international prices of key inputs *such as DAP, MOP, urea, and sulphur*, coupled with supply disruptions due to geopolitical tensions, necessitated subsidy revision.
- **Farmer Protection:** The government acts as a *price shock absorber* to shield farmers from fluctuations in global fertilizer markets.
- **Balanced Fertilization Imperative:** The revision aims to address declining crop productivity and correct soil nutrient imbalance caused by excessive urea usage.
- **Food Security Concerns:** Ensuring adequate and stable fertilizer availability is essential to sustain agricultural output and national food security.
- **Subsidy Rationalisation:** The adjustment aligns subsidy levels with global trends while maintaining fiscal prudence.

Key Benefits of NBS Revision

- **Affordable Access:** Ensures fertilizers are available to farmers at subsidized and reasonable prices.
- **Balanced Nutrient Use:** Promotes the application of Nitrogen (N), Phosphorus (P), Potash (K), and Sulphur (S) in appropriate proportions.
- **Soil Health Improvement:** Encourages the use of secondary and micronutrient-enriched fertilizers to restore soil fertility.
- **Farmer Empowerment:** Enables farmers to make informed choices based on crop needs and soil conditions.
- **Market Efficiency:** Fosters competition among fertilizer companies while promoting innovation and product diversification.

- **Supply Stability:** Ensures the timely availability of fertilizers during the critical Kharif season.

About the Nutrient-Based Subsidy (NBS) Scheme

- The Government of India introduced the **Nutrient-Based Subsidy (NBS) Scheme** on 1 April 2010 for phosphatic and potassic (P&K) fertilizers.
- Under NBS, a **fixed subsidy is provided based on nutrient content** (per kg of **Nitrogen (N), Phosphorus (P), Potassium (K), and Sulphur (S)**), covering fertilizers like DAP and NPKS grades.
- Subsidy rates are **revised annually or biannually**.
- **Coverage and Scope:** The scheme **covers 28 grades of P&K fertilizers**, including DAP, MAP, MOP, TSP, SSP, complex fertilizers, and micronutrient-fortified variants.



- **Pricing and Market Structure:** It operates under a **decontrolled** regime **where companies fix MRP (market-linked pricing)** while the government monitors prices to prevent excessive increases.
- **Subsidy Mechanism:** Subsidy is paid to **manufacturers and importers**, which is then passed on to farmers through reduced retail prices.
- **Institutional Mechanism:** Subsidy rates are determined by the **Department of Fertilizers** based on recommendations of **the Inter-Ministerial Committee (IMC)**.

- **Distribution and Regulation:** Fertilizer movement is tracked through the **Fertilizer Monitoring System**, with partial control **under the Essential Commodities Act, 1955**, and imports allowed under the Open General License.

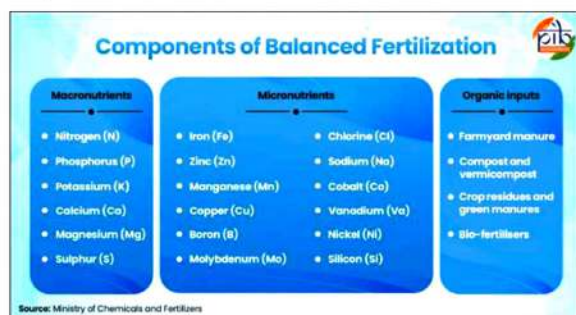
About the Fertilizers

- Fertilizers are **concentrated plant nutrients** made from **inorganic chemicals**, used to supply essential elements required for proper plant growth.
- They contain **nutrients in higher concentrations than organic manure**, are applied in smaller quantities, and are readily available for plant uptake, though some may be lost through leaching or runoff.
- Based on composition, fertilizers are classified as **sole fertilizers, mixed fertilizers, and micronutrient fertilizers**.
- **Current Fertilizer Scenario in India:**
 - ✓ India is the **second-largest producer** and consumer of fertilizers globally, after China.
 - ✓ It is **one of the country's eight core industries**.
 - ✓ India produces key fertilizers such as **Urea, DAP (Diammonium Phosphate), NP and NPK Complex Fertilizers, Ammonium Sulphate, Potash, and Single Super Phosphate (SSP)**.
 - ✓ Around 87% of **urea consumption is domestically met**.
 - ✓ **90% of NPK Fertilizers** are also produced within the country.
 - ✓ However, for DAP, **only about 40% comes** from local production.
 - ✓ In the case of Muriate of Potash (MOP), **100% is still imported**.



About the Balanced Fertilization

- Balanced fertilization refers to the application of all essential plant nutrients, **macronutrients and micronutrients**, in appropriate proportions, quantities, timing, and methods based on crop needs, soil fertility, and climatic conditions.
- It aims to enhance fertilizer use efficiency, improve crop productivity, sustain soil health, and reduce environmental impacts such as nutrient losses and emissions.
- The concept is guided by **Justus von Liebig's Law of the Minimum** and goes beyond the traditional **NPK-focused approach** to a holistic nutrient management system.



4.11. Report on Land Inequality in India

SYLLABUS

GS-2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.

GS-3: Land Reforms in India.

Context

The World Inequality Lab has released a working paper titled "Land Inequality in India: Nature, History, and Markets", highlighting extreme inequalities in land ownership in rural India.

More on the News

- The findings are based on data from the **2011 Socio-Economic and Caste Census (SECC)**, which covered about 650 million people from 270,000 villages across ten of the largest states of India.

- The findings are significant in the context of ongoing debates on agrarian distress, farm laws, and the need for land reforms.

Key Findings of the Study

- Extreme Concentration of Land Ownership:** The **top 10% of rural households own about 44% of total land**, indicating a high concentration of land ownership.
 - ✓ Even within this group, the top 5% and top 1% control **32% and 18% respectively**, indicating a highly skewed distribution at the top.
- Dominance of Large Landholders at Village Level:** In an average village, the **largest landholder controls about 12.4% of total land**, and in nearly 3.8% of villages, a single individual owns more than 50%, indicating persistent landlord dominance.
- Sharp Regional Disparities:** Land inequality varies significantly across states, with **Kerala having the highest Gini coefficient at 90**, followed by Bihar, Punjab, Tamil Nadu and West Bengal, each with a Gini coefficient of around 80.
 - ✓ States like **Karnataka and Rajasthan (Gini coefficient <65)** exhibit relatively lower inequality.
 - ✓ A lower Gini coefficient indicates a more equal distribution of income or wealth within a population, meaning a smaller gap between the rich and poor.
- High Inequality (Gini Coefficient):** The **land Gini coefficient stands at around 71**, reflecting extremely high inequality, especially when landless households are included in the analysis.
- Widespread Landlessness:** Nearly **46% of rural households are landless**, making landlessness the single largest contributor to overall inequality in rural India.
- High Variation in Landlessness Across States:** States such as **Punjab (73%), Bihar (59%), and Madhya Pradesh (51%)** report very high levels of landlessness, whereas **Rajasthan (34%) and Uttar Pradesh (39%)** have comparatively lower proportions.

Key Determinants of Land Inequality in India

- Historical Legacy:** Colonial land tenure systems such

as zamindari and landlordism created entrenched inequalities that persist even today.

- **Socio-Economic Factors:** Caste hierarchies and social stratification have historically limited land access for marginalized communities, especially SCs and STs.
- **Market Forces:** Rising land prices, commercialisation, and “land squeeze” due to urbanisation and infrastructure projects have increased concentration.
- **Agro-Ecological Conditions:** Regions with fertile land and better productivity tend to have higher concentration, as land becomes more valuable and competitive.

Implications of Land Inequality

- **Economic Inequality and Rural Distress:** Unequal land distribution reinforces **rural poverty and agrarian distress**, as landless households lack productive assets and collateral for credit, often leading to indebtedness and migration.
- **Deepening Social Inequality:** Land concentration exacerbates **caste and class divides**, limiting access of marginal groups to economic opportunities, public services, and decision-making structures.
- **Distorted Agricultural Development:** Concentration of land restricts **broad-based agricultural growth**, as small farmers face constraints in access to inputs and technology, while large holdings are not always efficiently utilised.
- **Policy Ineffectiveness:** Welfare schemes such as subsidies and MSP support may **disproportionately benefit larger landholders**, reducing their impact on vulnerable sections.
- **Food Security and Climate Risks:** High land inequality can weaken **agricultural resilience to climate shocks**, as marginal farmers lack adaptive capacity, posing long-term risks to food security and sustainable farming.

Land Reform Measures to Reduce Inequality

- **Post-Independence Structural Reforms:** Early reforms (1950s–70s) focused on **abolition of intermediaries (zamindari), tenancy regulation, and land ceiling laws**, but redistribution remained

limited (~2% of cultivable land) due to uneven implementation.

- **Tenancy Reforms and Security of Cultivation:** Measures were introduced to provide **security of tenure and fair rent**, though outcomes varied across states due to weak enforcement and informal tenancy practices.
✓ **Operation Barga (West Bengal, 1978)** registered around 1.4 million sharecroppers, improving both equity and agricultural productivity, making it one of the most effective tenancy reforms.
- **Rights-Based Approach:** The **Forest Rights Act, 2006**, recognises individual and community land rights of forest-dwelling tribes, aiming to correct historical injustices.
- **Digitisation and Modern Governance Initiatives:** Programmes such as **Digital India Land Records Modernization Programme (DILRMP)** and **SVAMITVA** aim to modernise land records, enhance transparency, and reduce disputes, thereby improving land governance.

4.12. Startup India Fund of Funds 2.0

SYLLABUS

GS-3: *Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.*

Context

Recently, the Union Cabinet approved the Startup India Fund of Funds 2.0 (FoF 2.0) with a total corpus of ₹10,000 crore to mobilize venture and growth capital for India's startup ecosystem.

About Startup India Fund of Funds 2.0

- The scheme builds upon the success of the **Fund of Funds for Startups (FFS 1.0) launched in 2016** under the Startup India Action Plan, which addressed funding gaps and catalysed domestic venture capital.
- Startup India FoF 2.0 is a government-backed funding mechanism aimed at strengthening India's startup ecosystem through structured investment in **SEBI-registered Alternative Investment Funds (AIFs)**.

- **Key Features**

- ✓ **Corpus:** ₹10,000 crore
- ✓ **Duration:** Spread across **16th and 17th Finance Commission cycles**.
- ✓ **Investment Route:** Contribution to AIFs, which in turn invest in startups.
- ✓ **Implementation Agency:** *Small Industries Development Bank of India (SIDBI)*, along with an additional domestic agency.
- ✓ **Nodal Department:** *Department for Promotion of Industry and Internal Trade*.

Cabinet approves
Startup India Fund of Funds 2.0 to mobilise venture capital for India's startup ecosystem

- ₹10,000 crore corpus to support deep tech, tech-driven manufacturing & early-growth startups
- Mobilises long-term domestic capital and strengthens India's venture capital ecosystem
- Focus on innovation, high-risk capital gaps, and expanding startup funding beyond major metros
- Aims to boost high-quality jobs, manufacturing, and India's position as a global innovation hub
- Builds on **Fund of Funds 1.0**, which supported Alternative Investment Funds and funded **1,370+ startups**

CABINET DECISION 14-02-2026

- **Investment Structure:** The scheme adopts a **segmented approach** targeting four priority areas:
 - ✓ **Deep Tech Startups** – High R&D, long gestation innovations
 - ✓ **Early Growth Stage Startups** – Supported via smaller AIFs (micro-VCs)
 - ✓ **Tech-driven Manufacturing Startups** – Aligned with “Make in India”
 - ✓ **Sector/Stage Agnostic Startups** – Broad-based innovation support
- **Operational Mechanism:**
 - ✓ Investments are made **indirectly via AIFs**, not directly into startups.

- ✓ AIFs raise additional capital and invest in startups in **tranches**.
- ✓ Post-investment, AIFs provide **mentorship and support**.

- **Governance & Monitoring:**

- ✓ **Venture Capital Investment Committee (VCIC):** Screens and recommends AIFs
- ✓ **Empowered Committee (EC):** Monitors implementation and performance
- ✓ **DPIIT:** Will issue operational guidelines including eligibility, reporting, and disbursement mechanisms

- **Additional Features**

- ✓ **Co-investment framework** with institutional investors
- ✓ **Operational flexibility** for long-duration and capital-intensive sectors.
- ✓ Up to **5% of returns** earmarked for ecosystem development (capacity building, mentorship, etc.).
- ✓ Returns are deposited back into the **Consolidated Fund of India (CFI)**.

- **Building on Fund of Funds for Startups (FFS 1.0):** FoF 2.0 follows the strong performance of **FFS 1.0 (2016)**, which was launched to address funding gaps and catalyse domestic venture capital.

- ✓ ₹10,000 crore corpus committed to 145 Alternative Investment Funds (AIFs).
- ✓ Over ₹25,500 crore invested in 1,370+ startups.
- ✓ **Coverage across sectors:** agriculture, AI, robotics, automotive, clean tech, e-commerce, fintech, healthcare, manufacturing, space tech, biotechnology, etc.
- ✓ FFS 1.0 played a pivotal role in nurturing first-time founders, crowding in private capital, and building a strong foundation for India's venture capital ecosystem.

Significance of Startup India FoF 2.0

- **Strengthening Domestic Capital Base:** Reduces dependence on foreign venture capital and encourages a long-term domestic investment ecosystem.
- **Boost to Deep Tech and Manufacturing:** Focus on high-tech sectors with long gestation periods and support strategic sectors critical for economic and technological sovereignty.

- **Support for Early-Stage Startups:** Addresses early-stage funding gaps and provides a safety net to reduce startup failures.
- **Inclusive Startup Growth:** Encourages investments beyond major metros and strengthens smaller funds and regional innovation ecosystems.
- **Enhancing Innovation-led Growth:** Promotes the development of globally competitive technologies and products and aligns with national goals *like Viksit Bharat @ 2047*.
- **Economic Impact:** Boosts job creation (high-quality employment), manufacturing capabilities, and economic resilience.
- **Ecosystem Development:** Promotes mentorship, capacity building, and regulatory support and strengthens the overall startup ecosystem infrastructure.

4.13. e-NAM Completes 10 Years: Digital Revolution in India's Agricultural Marketing

SYLLABUS

GS 3: Economic Development- Storage, Transport and Marketing of Agricultural Produce and Issues and Related Constraints; E-technology in the aid of farmers

Context

National Agriculture Market (e-NAM), launched in April 2016 is a pan-India electronic trading platform integrating agricultural mandis into a unified digital market enabling seamless online trading transparent price discovery and wider market access for farmers and traders representing a major step toward achieving the vision of "One Nation One Market" in agricultural marketing.

Key Achievements of e-NAM

- **e-NAM** has emerged as a major digital reform in agricultural marketing, strengthening market integration and improving transparency in trade across India.
 - ✓ Its achievements reflect both scale expansion and deeper structural transformation of agricultural markets.
- A total of **1,656 mandis** across **23 States** and **4**

Union Territories have been successfully integrated into the platform, indicating wide geographical coverage and increasing adoption of digital trading systems.

- The platform has built a strong stakeholder ecosystem with more than **1.80 crore farmers, 2.73 lakh traders, and 4,724 Farmer Producer Organizations (FPOs)** registered, showing large-scale participation of key actors in agricultural markets.
- In terms of trade performance, e-NAM has enabled cumulative transactions of around **13.25 crore metric tonnes of agricultural produce valued at approximately ₹4.84 lakh crore (2016–2026)**, reflecting its growing role in national agricultural commerce.
- The platform has also demonstrated strong growth momentum, with trade value rising significantly from **₹3.19 lakh crore in 2024 to ₹4.84 lakh crore in 2026**, highlighting increasing trust and deeper market engagement among stakeholders.
- Operational activity remains robust, with **over 204.76 lakh metric tonnes of produce traded in recent periods**, indicating sustained usage and expanding digital participation in mandis.
- The e-NAM mobile application provides **real-time price information for 247 agricultural commodities**, enabling farmers to access market signals and improve price realisation.
- Additionally, the government has supported infrastructure development by providing **financial assistance of up to ₹75 lakh per mandi**, strengthening digital and physical integration of mandis into the e-NAM ecosystem.

Other Digital Marketing Initiatives in Agriculture

- Agri-Stack
- Krishi UDAN 2.0
- Digital Agriculture Mission (DAM)
- India Digital Ecosystem of Agriculture (IDEA)
- ITC's e-Choupal
- Agri Market Infrastructure Fund (AMIF)
- National e-Governance Plan in Agriculture (NeGP-A)

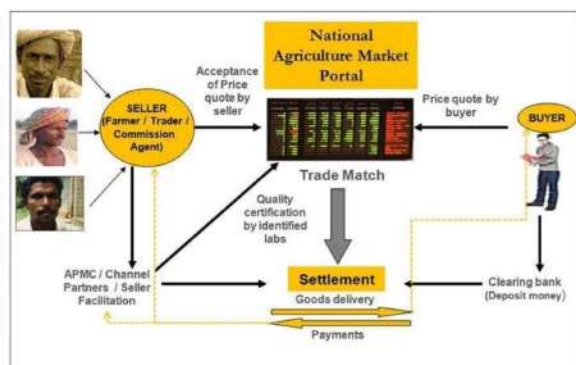
Objectives of e-NAM

- To create a **unified national market** for agricultural

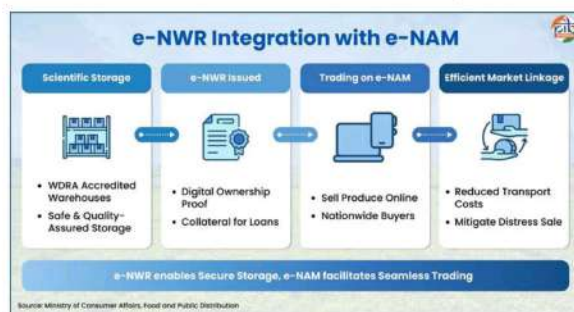
- commodities through digital integration of mandis
- To ensure **transparent price discovery** through competitive online bidding
- To enhance **market access for farmers, FPOs, and traders** beyond local mandis
- To reduce **intermediaries and transaction inefficiencies** in agricultural trade
- To promote **digital payments and financial inclusion** in agricultural marketing
- To improve **post-harvest value realization** and reduce distress sales

Key Features e-NAM

- Single-window service:** It connects **APMC mandis** across India and develops a single unified national market for agricultural commodities; Commodity arrivals, quality assaying, bidding, payment, all on one platform;
- Unique Lot ID tracking:** Each lot tracked from gate entry to final sale via mobile
- Live price dashboard:** Real-time commodity prices, mandi arrivals, trade volumes, publicly accessible.
- Inter-state trade facility:** State Unified License enables traders to bid across State boundaries
- The platform integrates multiple digital payment modes, including **NEFT, RTGS, internet banking, and UPI**, enabling it to adapt across states.
- Unique lot ID tracking system** ensuring transparency from arrival to sale
- Multilingual mobile application enabling wider accessibility for farmers (12-language interface:** Hindi, English, Gujarati, Marathi, Telugu, Bengali, Tamil, Odia and others).



- A key advancement in the evolution of e-NAM was the introduction of the **Platform of Platforms (PoP)** on 14 July 2022, which integrates a wide range of services through a unified digital interface on the e-NAM mobile application.
 - ✓ It enables farmers and stakeholders to access services across the agricultural **value chain, including logistics, warehousing, quality assurance, grading and packaging, agri-inputs, financial and insurance services**, along with advisory support such as weather updates and crop forecasting.
- The Electronic Negotiable Warehouse Receipt (**e-NWR**) system has been integrated with **e-NAM** to enable a more **seamless and efficient agricultural**.



Benefits of e-NAMss

Benefit Area	Key Impact
Better price discovery	Online competitive bidding across integrated mandis ensures transparent pricing and helps farmers obtain improved prices through wider buyer participation.
Reduced dependence on intermediaries	The role of middlemen and commission agents is curtailed, which strengthens farmers' direct access to markets and improves their bargaining position.
Greater market transparency	Real-time price updates and digital recording of transactions enhance transparency, reduce information gaps, and limit unfair practices like cartelisation.
Wider market access	Farmers and Farmer Producer Organisations can sell beyond local mandis and access national-level markets, improving scale and opportunities.

ECONOMY AND AGRICULTURE

Financial inclusion through digital payments	Direct online payment systems ensure timely and secure transfers, while transaction records help farmers access formal credit more easily.
Promotion of quality-based pricing	Grading and assaying facilities encourage pricing based on quality standards, improving fairness and trust in trade.
Lower transaction costs	Digital integration reduces multiple layers of charges, cuts down inefficiencies, and lowers overall marketing and transaction expenses.

Challenges

- Uneven **digital infrastructure** and **internet connectivity** in rural areas
- Limited **digital literacy** among small and marginal farmers
- Slow integration and adoption by some **APMC mandis and states**
- Inadequate **standardization of quality grading and assaying infrastructure**
- Resistance from **traditional market intermediaries**
- Logistics bottlenecks in **inter-state agricultural movement**
- Limited awareness about advanced features like **PoP and e-NWR linkage**

Way Forward

- **Strengthen rural digital and physical infrastructure** by improving internet connectivity, standardizing grading facilities, and ensuring better APMC reforms across states for smoother e-NAM integration.
- **Promote digital literacy among farmers** through targeted training and capacity-building programs so that small and marginal farmers can effectively participate in online agricultural markets.
- **Enhance collective participation and partnerships** by empowering Farmer Producer Organisations (FPOs) and collaborating with private logistics and fintech companies to improve market access and backend support systems.
- Improved coordination between states for **seamless inter-state trade**
- Wider awareness of **e-NWR-based trading and collateral financing**

- Integration of **AI-based price forecasting and market intelligence tools**

Conclusion

- The **National Agriculture Market (e-NAM)** represents a structural shift in India's agricultural marketing system by transitioning from fragmented mandi-based trade to a **digitally integrated national marketplace**. While challenges in adoption and infrastructure remain, its expanding ecosystem—linking markets, storage, finance, and logistics—positions it as a key instrument for achieving **efficient, transparent, and farmer-centric agricultural transformation** in India.

4.14. Operational Guidelines Launched for Urban Challenge Fund

SYLLABUS

GS-1: *Urbanization, their problems and their remedies.*
GS-3: *Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.*

Context

The Ministry of Housing and Urban Affairs (MoHUA) has launched the operational guidelines for the Urban Challenge Fund (UCF) along with the Credit Repayment Guarantee Credit Sub-Scheme (CRGSS), marking a major step towards market-linked urban infrastructure financing.

More on the News

- The UCF aims to mobilise a total of ₹4 lakh crore (including ₹1 lakh crore central assistance) for urban development between FY 2025–26 and FY 2030–31.
- It focuses on Tier-II and Tier-III cities, including hilly and North-Eastern regions, to strengthen urban development.
- Key sectors include redevelopment of old city areas, urban mobility, last-mile connectivity, non-motorised transport, water & sanitation, and climate-resilient infrastructure.

- Of the total outlay, ₹90,000 crore has been earmarked for projects, while ₹5,000 crore each will support project preparation, capacity building and ₹5,000 crore for the Credit Repayment Guarantee Sub-Scheme.
- The initiative aims to make cities financially viable, strengthen ULBs, and support the vision of Viksit Bharat @2047.

About Urban Challenge Fund (UCF)

- The Fund gives effect to the Government's vision announced in **Budget 2025–26** to implement proposals relating to Cities as Growth Hubs, Creative Redevelopment of Cities, and Water and Sanitation.
- **Aim:**
 - ✓ UCF aims to leverage market finance, private participation, and citizen-centric reforms to deliver high-quality urban infrastructure.
 - ✓ It seeks to build resilient, productive, inclusive, and climate-responsive cities, positioning them as key engines of India's next phase of economic growth while improving the financial discipline of Urban Local Bodies.
- **Organisation involved:**
 - ✓ It is a **Centrally Sponsored Scheme** under the Ministry of Housing and Urban Affairs (MoHUA).
- **Key Features:**
 - ✓ **Financing Structure and Investment Scale:** The Fund provides ₹1 lakh crore of Central Assistance for projects worth ₹4 lakh crore in total.
 - The Centre will finance **25% of the project cost**, while **at least 50% must be raised from market sources, including municipal bonds**, bank loans, and public-private partnerships (PPPs).
 - The remaining funding will come from States, Union Territories, and Urban Local Bodies or their own sources.
 - ✓ **Implementation Period:** The scheme will be operational from **FY 2025–26 to FY 2030–31**, with an extendable implementation period up to FY 2033–34.
 - ✓ A dedicated **₹5,000 crore corpus** will enhance the creditworthiness of 4223 cities, including **Tier- II**

and **Tier-III cities**, particularly for first-time access to market finance.

- **Challenge-Based Selection Framework:** Projects under the Fund will be selected through a challenge-based framework, including transformative impact, sustainability & reform orientation.
 - ✓ Funding will be linked to reforms, milestones and clearly defined outcomes. Continuation of reforms will be a prerequisite for further fund release.
- **Focus Areas/Project Verticals: The Fund will support three major categories of projects:**
 - ✓ **Cities as Growth Hubs:** Identification of city regions and important economic nodes, integrated spatial economic and transit planning, development of greenfield and semi-greenfield areas, development along transit and economic corridors, urban mobility, and critical infrastructure projects to enhance economic competitiveness.
 - ✓ **Creative Redevelopment of Cities:** Renewal of central business districts and heritage cores, brownfield regeneration, Transit Oriented Development, retrofitting of legacy infrastructure, climate resilience, disaster mitigation, and countermagnets to decongest existing cities in Northeastern and Hilly States.
 - ✓ **Water and Sanitation:** Upgradation of water supply, sewerage and stormwater systems, rural infrastructure, water grids, integrated solid waste management, and legacy waste remediation, focusing on Swachhata.
- **Coverage: The Fund will cover:**
 - ✓ All cities with a population of 10 lakh or more (2025 estimates);
 - ✓ All State and Union Territory capitals not covered above; and
 - ✓ Major industrial cities with a population of 1 lakh or more.
 - ✓ Additionally, all ULBs in hilly States, North-Eastern States, and smaller ULBs with a population below 1 lakh will be eligible for support under the **Credit Repayment Guarantee Scheme**. In principle, all cities will be covered under UCF.

• Credit Repayment Guarantee for Smaller Cities

Component	Details
Objective	Facilitate first-time access to market finance for Cities/ULBs in Northeastern and Hilly States and smaller ULBs (<1,00,000 population) in other States/UTs
Scheme Outlay	₹5,000 crore Credit Repayment Guarantee Scheme approved
Guarantee Support (First Loan)	Central guarantee up to ₹7 crore or 70% of the loan amount (whichever is lower)
Guarantee Support (Subsequent Loans)	After successful repayment of the first loan, Central guarantee up to ₹7 crore or 50% of the loan amount (whichever is lower)
Project Support Capacity	Enables support for projects of a minimum of ₹20 crore (first time) and ₹28 crore (subsequent projects) in smaller cities

Significance of the Fund

- **Catalyses Market-Based Urban Financing:** The Fund shifts urban infrastructure financing from grant-based dependency to **market-linked mechanisms**, thereby crowding in private investment and reducing fiscal burden on governments.
- **Strengthens Municipal Financial Ecosystem:** By improving creditworthiness and linking funds with reforms, it promotes **better financial discipline, transparency, and governance** in Urban Local Bodies (ULBs), making them viable borrowers.
- **Drives Inclusive & Balanced Urbanisation:** Focus on Tier-II, Tier-III, and special category regions ensures **decentralised growth**, reducing pressure on metros and enabling smaller cities to emerge as economic growth hubs.
- **Promotes Sustainable & Resilient Urban Development:** Emphasis on climate-resilient infrastructure, water management, and mobility enhances **urban sustainability, service delivery efficiency, and long-term livability**.

4.15. Government Expands Coverage of RELIEF Scheme

SYLLABUS

GS-3: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Context

In response to the ongoing West Asia crisis, which has disrupted shipping routes and increased freight and insurance costs, the Government of India has expanded the coverage of the RELIEF (Resilience & Logistics Intervention for Export Facilitation) scheme.

More on the News

- The government has expanded the list of eligible destinations under the scheme to include additional countries such as **Egypt and Jordan**, thereby widening its geographical coverage.
- The revised framework continues to cover both completed shipments during the disruption period and forward-looking exports, with special emphasis on Micro, Small and Medium Enterprises (MSMEs).
- In addition, exporters obtaining a fresh ECGC Whole Turnover Policy on or after 16 March 2026 shall also be eligible for support under Component II of the Scheme.

About RELIEF Scheme

- RELIEF (Resilience & Logistics Intervention for Export Facilitation) is a time-bound scheme launched in March 2026 under the **Export Promotion Mission** with an outlay of ₹497 crore.
- It is being implemented through the **Export Credit Guarantee Corporation of India (ECGC)**, which provides enhanced insurance coverage and reimbursement support for eligible shipments to or through impacted West Asian countries.
- The scheme also offers **partial reimbursement of elevated freight and insurance costs**, particularly for MSME exporters.
- It aims to mitigate logistics disruptions, prevent order cancellations, and **maintain India's export competitiveness during geopolitical uncertainty**.

4.16. Bharat Maritime Insurance Pool (BMI Pool)

SYLLABUS

GS 2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation

GS 3: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Context

Recently, the Union Cabinet chaired by the Prime Minister of India has approved the creation of the Bharat Maritime Insurance Pool (BMI Pool) with a sovereign guarantee of ₹12,980 crore to ensure continuous and affordable maritime insurance coverage for Indian trade.

Background

- India's maritime sector handles over **70% of trade by volume and ~95% by value**.
- Heavy dependence on foreign insurers and International P&I Clubs.
- Recent **disruptions in Red Sea, Strait of Hormuz, and Gulf of Oman** exposed risks:
 - ✓ Sharp rise in insurance premiums
 - ✓ Withdrawal of coverage in conflict zones
 - ✓ Highlighted the need for a domestic, sovereign-backed insurance mechanism

Government of India launches Bharat Maritime Insurance Pool (BMIP)

An initiative to manage large maritime risks, ensuring uninterrupted, sovereign-backed coverage for critical exposures.

With coverage up to **USD 1.5 billion** per event and dedicated solutions for:

- War & SRCC risks in high-risk zones
- Hull & Machinery protection
- Protection & Indemnity (P&I) for Indian shipowners

Sovereign Guarantee
Backed by the Government of India, providing unshakable stability to our maritime sector

National Collective
Managed by GIC Re, India's national reinsurer, with the unified support of the entire Indian General Insurance Industry

Strategic Autonomy
Ensuring that Indian vessels and vital energy supplies remain secure, resilient, steadfast, & uninterrupted by global headwinds

India's Ships. India's Supplies. India's Security

About BMI Pool

- The BMI Pool is a **domestic insurance mechanism** designed to reduce external dependence and manage maritime risks effectively.
- It will Cover **all major maritime risks** including *Hull & Machinery, Cargo, Protection & Indemnity (P&I), and War risk*.
 - ✓ Apply to **Indian-flagged/controlled vessels** and ships **to/from Indian ports**, even through **volatile maritime corridors**.
 - ✓ Operate through **member insurers** with a combined underwriting capacity of about **₹950 crore**.
 - ✓ Managed under a **Governing Body**

Need for a Domestic Insurance Pool

- **Global Challenges**
 - ✓ Rising **geopolitical instability** and **global volatility** have increased risks to maritime trade.
 - ✓ Higher **insurance premiums** and **uncertainty** in coverage availability.
 - ✓ Risk of **withdrawal of insurance** due to **sanctions or conflicts**.
- **External Dependence**
 - ✓ Heavy reliance on **International Group of Protection & Indemnity (IGP&I) Clubs** for **P&I insurance**.
- **Coverage includes:**
 - ✓ Oil pollution liability
 - ✓ Wreck removal
 - ✓ Cargo damage
 - ✓ Crew injury and repatriation
 - ✓ Collision liabilities

Strategic Significance

- **Economic Stability**
 - ✓ Reduces exposure to sudden premium spikes.
 - ✓ Ensures predictable logistics and trade costs.
- **Trade Security**
 - ✓ Enables ships to operate even in volatile maritime corridors.
- **Self-Reliance and Sovereignty**
 - ✓ Strengthens **Atmanirbhar Bharat** in insurance sector.
 - ✓ Builds domestic capacity in marine underwriting, claims management, and legal expertise.

Global Best Practice

- Similar frameworks exist in **UK, Japan, and South Korea**
- Aligns with Maritime India Vision 2030

Conclusion

- The BMI Pool represents a transformational step in India's maritime strategy, providing a sovereign safety net for shipping and trade. By ensuring continuous insurance coverage, reducing foreign dependence, and enhancing resilience against global shocks, it strengthens India's position in an increasingly uncertain global trade environment.

4.17. Extension of Pradhan Mantri Gram Sadak Yojana (PMGSY-III)

SYLLABUS

GS 3: Infrastructure-Energy, Ports, Roads, Airports, Railways etc.

Context

In a significant infrastructure push, the Union Cabinet, chaired by the Prime Minister of India, has approved the continuation of PMGSY-III beyond March 2025 up to March 2028, along with an enhanced financial outlay.

More on the News

- The decision is aimed at completing pending works and unlocking the full socio-economic potential of rural road connectivity.
- It involves consolidation of through Routes and Major Rural Links connecting habitations to Gramin Agricultural Markets (GrAMs), Higher Secondary Schools and Hospitals.

Key Decisions and Financial Outlay

- **Scheme Extension:**
 - ✓ **Roads and bridges** (plain areas) and roads in hilly areas: till March 2028
 - ✓ **Bridges in hilly areas:** timeline extended till March 2029
- **Revised Outlay:**
 - ✓ Increased to **₹83,977 crore** from **₹80,250 crore**

Pending Works Provision:

- ✓ Projects **sanctioned before 31 March 2025 but not yet awarded** can now be taken up for tendering and execution

Long Span Bridges (LSBs):

- ✓ LSBs (161 Nos. with estimated cost of Rs.961 crore) pending for sanction but lying on the alignment of already sanctioned roads may be sanctioned and tendered/awarded.

Significance

- **Boost to Rural Economy and Connectivity:** The extension of PMGSY-III ensures the completion of targeted upgradation of rural roads, enabling full realisation of its intended socio-economic benefits.
- ✓ **Enhanced Market Access:** Improves connectivity for both agricultural and non-farm products, strengthening rural trade.
- ✓ **Reduced Logistics Costs:** Cuts down transportation time and costs, leading to higher efficiency.
- ✓ **Improved Rural Incomes:** Better market integration directly contributes to income enhancement.
- ✓ **Access to Social Infrastructure:** Facilitates connectivity to education and healthcare institutions, ensuring timely delivery of essential services, especially in remote and underserved areas.
- **Employment Generation and Inclusive Growth**
 - ✓ **Direct Employment:** Through large-scale construction and infrastructure activities.
 - ✓ **Indirect Employment:** By promoting rural enterprises, services, and allied sectors.
 - ✓ **Bridging Rural-Urban Divide:** Strengthens integration of rural regions with the broader economy.
 - ✓ **Sustainable Growth Path:** Supports long-term, inclusive development outcomes.
 - ✓ **Vision Alignment:** Contributes to achieving the national goal of Viksit Bharat 2047.

About Pradhan Mantri Gram Sadak Yojana (PMGSY)

- Launched on **25 December 2000**, PMGSY completes 25 years in 2025, evolving into a key instrument of socio-economic transformation through all-weather rural connectivity.

- PMGSY was initially launched as a **100% Centrally Sponsored Scheme**, but its funding pattern was revised in **2015–16** to a **60:40 Centre–State sharing**, and **90:10 for North Eastern and Himalayan States**.
- **Implementing ministry:** Ministry of Rural Development (MoRD), Government of India
- As of **December 2025**, a total of 8,25,114 km of roads have been sanctioned, of which 7,87,520 km (~95%) have been completed.

Evolution of the Scheme

- **Phase I (Universal Connectivity):** Launched in **2000**, Phase I aimed to provide **all-weather road connectivity to previously unconnected rural habitations**, laying the foundation for universal access.
- **Phase II (Network Consolidation):** Introduced in **2013**, Phase II focused on strengthening and upgrading existing rural roads, especially routes connecting markets, growth centres, and service hubs, to improve transport efficiency and rural economic growth.
- **Road Connectivity Project for Left Wing Extremism Affected Areas (RCPLWEA):** Launched in **2016**, this targeted intervention covers **44 LWE-affected districts across 9 States** (Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Telangana, Uttar Pradesh).
- **Phase III (Economic Linkages):** Launched in **2019**, focuses on upgrading **1,25,000 km** of Through Routes and Major Rural Links to connect habitations with **GrAMs, higher secondary schools, and healthcare facilities**.
 - ✓ As of December 2025, out of the total target, 1,22,393 km of road have been sanctioned, and 1,01,623 km (83%) have been constructed nationwide.
- **Phase IV (Last-Mile Inclusion):** Launched in **2024**, Phase IV aims to construct **62,500 km roads** during **2024–25 to 2028–29** with an outlay of **₹70,125 crore**, targeting **25,000 unconnected habitations**, based on **Census 2011 population criteria**:
 - ✓ Habitats with a population of 500 and above in plain areas,
 - ✓ 250 and above in North-Eastern and Himalayan States/UTs, and
 - ✓ Habitations located in special category areas, including Tribal (Schedule V) regions, Aspirational
 - ✓ Districts/Blocks, and Desert areas

4.18. India's First Dedicated Venture Capital Fund for Space Startups

SYLLABUS

GS 3: *Changes in Industrial Policy and their Effects on Industrial Growth.*

Context

Recently, the Government revealed that the “Antariksh Venture Capital Fund”, set up to boost India’s emerging spacetechnology ecosystem, has been operationalised with key institutional mechanisms now in place.

About the Antariksh Venture Capital Fund

- It is **India’s first dedicated venture capital fund for the space sector**, which will begin investing in startups from the first quarter of 2027.
 - ✓ **Venture capital (VC)** is a form of private equity financing where investors provide **capital to startups and early-stage companies** with high growth potential in exchange for equity.
- It is a SEBI-registered Category II Alternative Investment Fund (AIF) with **Indian National Space Promotion and Authorisation Centre (IN-SPACe)** as the key investor, and **SIDBI Venture Capital Limited (SVCL)** as the Fund Manager.
 - ✓ AIFs are privately pooled investment vehicles established in India that collect funds from sophisticated investors for investing in non-traditional asset classes.
- **Objective:** To provide capital to innovative Indian companies developing technologies with TRL 4 and above, enabling them to scale operations, commercialize cutting-edge solutions, and strengthen India’s contribution to the global space economy.

4.18. Over 55,000 startups recognised in 2025-26

SYLLABUS

Prelims: *Current events of National & International importance.*

Context

India recorded its highest-ever annual startup recognition in FY 2025–26 under the Startup India initiative, reflecting rapid ecosystem expansion.

More on the News

- Over **55,200 startups** were recognised in FY26, marking a **51.6% year-on-year growth** compared to about 36,400 in FY25.
- The total number of recognised startups has crossed **2.23 lakh**, collectively generating **23.36 lakh direct jobs**, with FY26 alone adding **nearly 4.99 lakh jobs**.
- **Maharashtra, Karnataka, Uttar Pradesh, and Delhi** emerged as leading startup hubs, while nearly **48% (1.07 lakh)** startups have **at least one woman director/partner**, indicating growing gender inclusion.

About Startup India Initiative

- Launched on **16 January 2016**, the Startup India initiative aims to build a **robust, innovation-driven entrepreneurial ecosystem** by promoting startups across sectors and regions.
- Startups recognised by the Department for Promotion of Industry and Internal Trade receive benefits such as **tax exemptions (3-year tax holiday), faster compliance, self-certification under labour & environmental laws, and easier exit under IBC norms**.
- The initiative focuses on **funding support across lifecycle stages**:
 - ✓ **Fund of Funds for Startups (FFS)** catalyses venture capital through AIFs.
 - ✓ **Startup India Seed Fund Scheme (SISFS)** supports early-stage ideas and prototypes.
 - ✓ **Credit Guarantee Scheme for Startups (CGSS)** improves access to debt financing by reducing lender risk.
- It promotes **innovation and intellectual property rights (IPR)** through **fast-track patent examination, fee rebates, and legal support**, leading to rising patent filings by startups.
- The programme emphasises **inclusive entrepreneurship**, encouraging participation from **women, SC/ST entrepreneurs, and startups**

in Tier-2 & Tier-3 cities, thereby widening the geographic spread.

- **Ease of doing business reforms** include **startup recognition portal, simplified regulatory processes, and digitisation of approvals**, reducing entry barriers.
- The initiative also promotes **public procurement (GeM onboarding), incubation support, and innovation-led growth**, strengthening India's position as a **global startup hub**.

4.19. NITI Aayog Launches Seventh Edition of "Trade Watch Quarterly"

SYLLABUS

GS-3: Indian Economy and issues relating to Planning, Mobilization of Resources, Growth, Development and Employment.

Context

Recently, NITI Aayog released the 7th edition of the Trade Watch Quarterly for Quarter 3 of FY26 (October-December 2025), providing a comprehensive assessment of global and domestic trade trends amid evolving global conditions.

About Trade Watch Quarterly

- Trade Watch Quarterly is a **periodic analytical report** that evaluates India's merchandise and services trade performance across quarters.
- It provides insights into **sectoral trends, global demand patterns, and India's positioning in international trade and global value chains**.
- The report also includes **thematic analyses of key sectors**, offering policy-relevant recommendations to enhance competitiveness.
- It serves as an important tool for **evidence-based policymaking and trade strategy formulation**.

Key Highlights and Trends

- **Resilient but Mixed Trade Performance**
 - ✓ India's trade performance in Q3 FY 2025–26 reflects a **mixed yet resilient trend**, with merchandise exports growing modestly by **1.6% (to \$110.48 bn)**, while imports increased at a

faster pace of **7.9% (to \$202.33 bn)**, leading to a widening trade deficit.

- ✓ In contrast, **services exports recorded strong growth of around 7.8% (to \$111.2 bn)**, maintaining a significant trade surplus that supports overall external stability.
- ✓ Overall trade (goods + services) recorded **positive growth of about 5.6% year-on-year**, indicating sustained external sector activity.
- **Sectoral Focus:** Gems and Jewellery
 - ✓ The report highlights the **gems and jewellery sector** as a key pillar of India's labour-intensive manufacturing ecosystem.
 - ✓ The global market size (excluding raw gold) is estimated at **around \$378 billion**, with India contributing **about \$29.5 billion (7.8% share)** in exports.
 - ✓ India continues to play a dominant role as a **global processing hub**, particularly in diamond cutting and polishing.
- **Evolving Trade Structure**
 - ✓ India's trade patterns indicate **stable export composition and changing import dynamics**, reflecting deeper integration with global production networks.
 - ✓ **Herfindahl-Hirschman Index (HHI) trends** indicate India's exports have become more geographically and product-wise diversified, with Asia's share moderating from ~49% to ~40% alongside rising shares of Europe (~22%) and America (over 25%) during 2017-18 to 2024-25.

Challenges Highlighted

- **Persistent Merchandise Trade Deficit:** The faster growth of imports relative to exports has resulted in a **large merchandise trade deficit (~\$91.85 bn in Q3)**, posing concerns for external sustainability.
- **Global Uncertainties:** Ongoing **geopolitical tensions and macroeconomic volatility** pose risks to trade flows and global demand.
- **Structural Constraints:** The report identifies issues such as **limited value addition, dependence on imported inputs, and sectoral concentration** as barriers to competitiveness.
- **Constraints in Trade Policy and FTA Utilisation:**

Misalignment of FTAs with sector-specific needs, along with delays in duty refunds and unclear export incentives, constrain liquidity and limit effective use of preferential market access.

- **High Cost of Finance and Limited Credit Access:** High capital costs and restricted formal credit for MSMEs increase reliance on informal financing, raising production costs and reducing global competitiveness.

Policy Recommendations

- **Strengthening Domestic Capabilities:** Emphasis is placed on **enhancing domestic manufacturing and value addition**, particularly in key export sectors.
- **Export Diversification:** India needs to **diversify its export basket and markets** to reduce vulnerability to global shocks and demand fluctuations.
- **Integration with Global Value Chains (GVCs):** The report calls for deeper integration into **global value chains** to improve competitiveness and expand market access.
- **Invest in Skills, Technology, and Cluster Infrastructure:** Enhancing productivity and moving up the value chain requires simultaneous investments in skills, technology, and infrastructure.

4.20. Circularity Gap Report 2026

SYLLABUS

GS-3: *Conservation, environmental pollution and degradation, Inclusive Growth and issues arising from it.*

Context

The Circularity Gap Report 2026, released by Circle Economy, a non-profit organisation in collaboration with Deloitte Netherlands, highlights that economies worldwide fundamentally depend on materials, yet a significant portion of their value is lost at each stage of production, use, and disposal.

About Circularity Gap Report 2026

- Each year, an estimated **€25.4 trillion in economic value is lost** due to resource inefficiencies, premature product disposal, and under utilised assets.
- Compared with a **global GDP of €82.6 trillion**, the scale of material-related losses is immense, implying

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that for every €3 of economic value created globally, around €1 is lost due to linear material use.



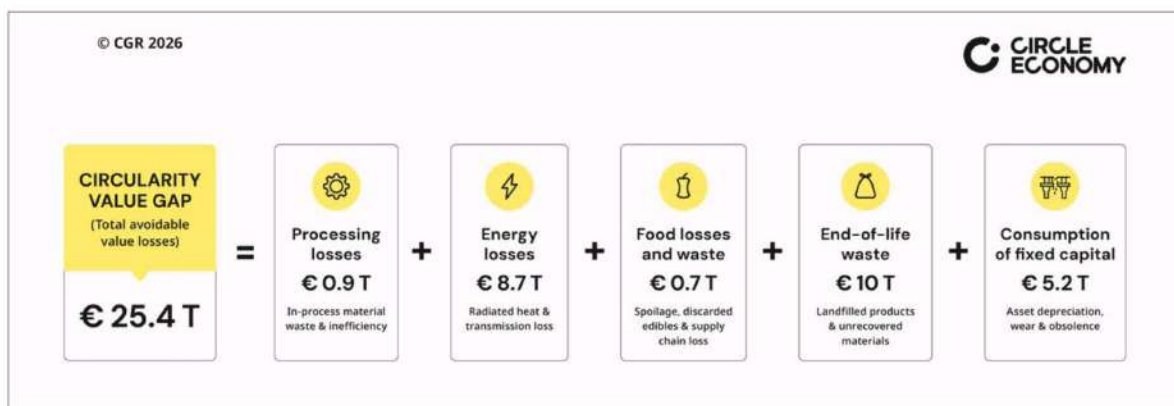
- The report introduces the concept of the **Value Gap**, which measures avoidable economic losses tied to linear material use systems.
- ✓ This gap reflects not only financial inefficiencies

but also hidden environmental and social costs, such as pollution, resource depletion, and negative health impacts.

- ✓ Understanding this gap helps identify where interventions can reduce waste and improve long-term value retention across economies.

Key Findings of the Report

- **Pathways of Value Loss:** Value loss can be understood through five key pathways across production, use, and disposal stages:
 - ✓ **Processing losses (€904.2 billion):** Inefficiencies during manufacturing stages
 - ✓ **Energy losses (€8.7 trillion):** Wasted energy throughout extraction and use
 - ✓ **Food losses and waste (€650.7 billion):** Edible food that exits the supply chain without being consumed, including losses during storage, transport, retail, and final consumption
 - ✓ **End-of-life waste (€10.0 trillion):** Discarded products whose value is not recovered
 - ✓ **Consumption of fixed capital (€5.2 trillion):** Deterioration of buildings, infrastructure, and machinery



- **Mechanisms Driving Value Loss:** These losses are driven by four main mechanisms:
 - ✓ **Poor management of materials and products (€6.2 trillion):** About 24% of total value loss
 - ✓ **Internalised shadow costs (€7.5 trillion):** About 30% of total value loss, reflecting environmental damage
 - ✓ **Premature obsolescence (€6.5 trillion):** About 26% of total value loss
 - ✓ **Deterioration of long-lived assets (€5.2 trillion):** About 20% of total value loss
- **Value Loss Across the Value Chain:** Looking at the value chain, losses are spread across all stages:
 - ✓ **Upstream activities:** €5.3 trillion, mainly from energy inefficiencies

- ✓ **Use phase:** €10.1 trillion, due to energy waste and asset deterioration
- ✓ **Downstream stage:** €10.0 trillion, largely from discarded products
- **Implications for Economy and Sustainability**
 - ✓ **Economic Implications:** The magnitude of €25.4 trillion in annual losses reflects significant inefficiencies in global production and consumption systems, indicating large untapped potential for value recovery.
 - ✓ **Environmental and Social Implications:** The Value Gap includes hidden costs such as pollution, resource depletion, and health impacts, highlighting the broader sustainability challenges associated with linear material use.

Way Forward

- **Role of Businesses:**
 - ✓ **Build a holistic business case for circular value creation:** Systematically identify and quantify value losses to uncover circular opportunities that can deliver financial, strategic, and risk-related benefits.
 - ✓ **Innovate and scale circular business models:** Engage in innovative circular business models based on their market readiness across technology, finance, and regulation.
- **Role of Financiers:**
 - ✓ **Integrate resource-use maximisation into decision-making:** Factor repairability, durability, and recoverability into investment and lending assessments.
 - ✓ **Assess exposure to resource-related risks:** Evaluate vulnerabilities in supply chains and asset lifetimes.
- **Role of Policymakers:**
 - ✓ **Support target-setting:** Setting goals and science-based targets could help optimise resource extraction and consumption and guide businesses and societies toward sustainable practices.
 - ✓ **Consider economic instruments:** Recognise how taxes and incentives can reduce value loss, making circular practices more profitable and discouraging resource-intensive behaviour.

Conclusion

- The €25.4 trillion Value Gap reflects inherent inefficiencies of linear growth models, highlighting broader sustainability challenges; the Circularity Gap Report 2026 underscores the need to shift from extraction-driven growth to value retention, regeneration, and a more resilient, efficient, and sustainable global economy.

4.21. Sustainable Aviation Fuel (SAF)

SYLLABUS

GS-3: Infrastructure: Energy.

Context

The Government has notified an amendment to the Aviation Turbine Fuel (ATF) (Regulation of Marketing) Order, 2001, to bring ATF blended with Sustainable Aviation Fuel (SAF) under its regulatory ambit.

More on the News

- The amendment expands the **definition of ATF**, which was earlier limited to petroleum-based fuels meeting BIS standards.
- It now includes **fuels blended with sustainable or synthetic hydrocarbons** such as SAF.
- This provides legal clarity and allows oil companies to blend and supply SAF within the existing regulatory framework. The move aligns India with the global **carbon-reduction mechanism** known as **CORSIA, which becomes mandatory in 2027**.
- The move is aligned with India's broader strategy to transition toward cleaner fuels, reduce dependence on crude oil imports, and comply with global climate commitments.
- It also prepares the aviation sector for upcoming **international emission regulations under International Civil Aviation Organization frameworks**.

About Sustainable Aviation Fuel (SAF)

- Sustainable Aviation Fuel (SAF) is a **renewable aviation fuel made** from alternative feedstocks **such as agricultural residues, waste oils, municipal waste, and non-food crops**.

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- It consists of **aviation-grade hydrocarbons** chemically similar to conventional jet fuel, ensuring compatibility with existing aircraft engines and infrastructure.
- It can be produced through multiple pathways, including Alcohol-to-Jet (ATJ), where ethanol is processed into high-energy jet fuel comparable to conventional ATF.
- SAF undergoes rigorous **certification under ASTM standards** and is approved by the International Civil Aviation Organization for aviation use.
- Currently, SAF can be blended with **conventional jet fuel (typically up to 50%)** and used without modifying aircraft or infrastructure.

Benefits of SAF

- **Decarbonisation Potential:** SAF alone is expected to contribute **over 60% of the global aviation sector's** decarbonisation efforts, making it the most critical near-term solution for reducing aviation emissions.
- **Engine and Infrastructure Compatibility:** SAF blended with conventional jet fuel can be used in existing aircraft engines and fuel infrastructure without requiring major modifications.
- **Lower Emissions:** Compared to conventional jet fuel, **100% SAF** can reduce greenhouse gas emissions **by up to 80%**, depending on the feedstock and production pathway.
- **Operational Flexibility:** SAF acts as a **drop-in replacement fuel** and can be produced from a wide range of feedstocks using multiple technological pathways.

Challenges of SAF

- **High Production Cost:** SAF currently costs **nearly three times more than** conventional aviation fuel, limiting its commercial viability.
- **Airline Resistance:** Airlines remain cautious about adopting SAF due to concerns over **increased operational costs and reduced profitability**.
- **Delayed Domestic Mandates:** India plans to mandate SAF blending for domestic flights only after 2027, which slows down demand creation and large-scale adoption.
- **Supply and Scale Limitations:** Limited availability

of sustainable feedstocks and underdeveloped production infrastructure restrict the ability to scale SAF to meet growing aviation demand.

- **Ethanol Feedstock Constraint:** Large-scale SAF production using ethanol can increase pressure on sugarcane and other feedstocks, making sustainability dependent on the timely expansion of second-generation (2G) ethanol from agricultural residues.

India's SAF Blending Roadmap

- India has announced **indicative SAF blending targets for international flights**:
 - ✓ **1% by 2027**
 - ✓ **2% by 2028**
 - ✓ **5% by 2030**
- No mandatory targets have yet been set for **domestic flights**.
- **India's approach focuses on:**
 - ✓ Gradual scaling aligned with global mandates
 - ✓ Promoting domestic SAF production
 - ✓ Integrating ethanol and synthetic hydrocarbons into aviation fuel
- **Globally, countries are moving faster:**
 - ✓ **EU:** 2% (2025) → 70% (2050)
 - ✓ **UK:** 10% by 2030
 - ✓ **Japan:** 10% by 2030
 - ✓ **Singapore:** 1% (2026) → 3–5% (2030)
- Globally, SAF has already been used in **over 360,000 flights** and is considered the most viable near-term solution for decarbonising aviation.

4.22. RBI Cancels Paytm Payments Bank Licence

SYLLABUS

GS-3: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment; Inclusive growth and issues arising from it.

Context

The Reserve Bank of India cancelled the banking licence of Paytm Payments Bank Limited, under the Banking Regulation Act, 1949, citing serious regulatory and governance failures.

More on the News

- The RBI cancelled the licence under **Section 22(4)**, prohibiting the bank from carrying out any banking activity under **Sections 5(b) and 6 of the Act** with immediate effect.
- The central bank will **approach the High Court for winding up** of the bank; however, it has clarified that the bank has **sufficient liquidity to repay all depositors**.
- **The action was based on multiple violations, including:**
 - ✓ Operations conducted in a manner **detrimental to depositors' interests** (Section 22(3)(b))
 - ✓ **Poor management character** affecting public interest (Section 22(3)(c))
 - ✓ No public interest in allowing continuation (Section 22(3)(e))
 - ✓ **Non-compliance with licence conditions** (Section 22(3)(g))
- RBI had been tightening restrictions since **March 2022** (ban on new customers), followed by **2024 restrictions** prohibiting deposits, credits, and wallet top-ups due to persistent compliance failures.
- The move is largely **procedural culmination**, with minimal impact on parent company One 97 Communications Ltd, as it had already transitioned operations to partner banks.

About Payments Banks

- A Payment Bank is a financial institution set up to operate on a smaller scale with minimal credit risk.
- It was introduced based on the recommendations of the **Nachiket Mor Committee (2014)** to promote financial inclusion by providing banking services to the unbanked and underbanked populations.
- **Key Objectives:**
 - ✓ Serve migrant workers, low-income households, and small entrepreneurs
 - ✓ Offer essential banking services such as deposits, payments, and remittances
 - ✓ Facilitate the digital banking ecosystem in India
- **Regulatory Framework:**
 - ✓ **Registered under:** Companies Act, 2013
 - ✓ **Governed by:** Banking Regulation Act, 1949, RBI Act, 1934, Foreign Exchange Management Act, 1999

and Payment and Settlement Systems Act, 2007.

Key Features of Payment Banks:

- ✓ **Differentiated Banks** – Unlike universal banks, they have specific operational limitations
- ✓ **Smaller Scale Operations** – Focus on low-value, high-volume transactions
- **Capital Requirements:**
 - ✓ Minimum paid-up capital – ₹100 crore
 - ✓ Promoter's minimum initial contribution – 40% of paid-up equity capital for the first five years
- **Functions:**
 - ✓ **Accept Deposits** – Up to ₹2,00,000 per customer
 - ✓ **Offer Savings & Current Accounts** – No time deposits allowed
 - ✓ **Issue Debit Cards** – But no credit cards
 - ✓ **Invest Deposits:** 75% in Statutory Liquidity Ratio (SLR) securities and 25% as time deposits with scheduled commercial banks.
 - ✓ Enable personal payments and cross-border remittances

About the Differentiated Banks

- Differentiated banks, **including Small Finance Banks (SFBs) and Payments Banks (PBs)**, were introduced by the Reserve Bank of India to promote financial inclusion and extend formal banking services to underserved and unbanked populations.
- It was first discussed in 2007 and later formalised in the RBI's 2013 paper **"Banking Structure in India – The Way Forward,"** followed by recommendations of the **Nachiket Mor Committee**.
- These banks operate in **niche segments** by focusing on specific functions such as payments, deposits, or credit, rather than offering all services like universal banks.

Payments Banks vs Commercial Banks

Feature	Payments Banks	Commercial Banks
Max deposit limit	₹2 lakh per customer	No cap
Lending & credit	Not allowed (no loans, credit cards)	Allowed (loans, credit cards, overdraft)

ECONOMY AND AGRICULTURE

Product range	Basic: savings/ current accounts, debit cards, UPI, bill payments	Comprehensive: FDs, RDs, loans, cards, insurance, wealth products	Operational focus:	Digital-first, small-ticket transactions	Full-service retail & corporate banking
Capital requirement	₹100 crore minimum	Typically ₹500 crore+	Account accessibility:	Zero-balance, instant onboarding	Often requires minimum balance, stricter KYC
NRI/Time deposits:	Not allowed	Allowed	Deposit insurance (DICGC):	Yes, up to ₹5 lakh (effectively covers all deposits)	Yes, up to ₹5 lakh per depositor



5.1. 15th COP to the Convention on Conservation of Migratory Species

SYLLABUS

GS 3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

Recently, the 15th meeting of the Conference of the Parties (COP 15) to the Convention on Conservation of Migratory Species (CMS) of Wild Animals was concluded in Campo Grande, Brazil.

More on the News

• Expansion of Protected Species List:

- ✓ 40 new species of migratory birds, aquatic and terrestrial animals were added to the protected list category, which comes in the backdrop of new evidence *“that many migratory species are moving closer to extinction”*.
- ✓ It includes cheetah, striped hyena, snowy owl, giant otter, great hammerhead shark, and several shorebird species.
- The theme of the Conference was *“Connecting Nature to Sustain Life”*, highlighting the vital role of ecological connectivity for conserving ecosystems, which are crucial both for migratory species and human well-being.
- This is the first time CMS COP is hosted in Brazil, the world’s most biodiverse country.
- **Migratory Species Champion Award: 9 new Champions were recognised for their contributions to long-term conservation initiatives:**
 - ✓ Government of Uzbekistan
 - ✓ Government of Australia
 - ✓ Government of the Principality of Monaco
 - ✓ Government of Flanders
 - ✓ French Biodiversity Agency
 - ✓ National Centre for Wildlife of the Kingdom of Saudi Arabia

- ✓ European Commission
- ✓ German Federal Agency for Nature Conservation (BfN)
- ✓ Regional Organization for the Protection of the Marine Environment (ROPME)

About the Convention on the Conservation of Migratory Species (CMS)

- Signed in Bonn on **23 June 1979**, the Convention, popularly known as the **Bonn Convention**, is an environmental treaty operating under the aegis of the **United Nations Environment Programme**.
- It provides a global platform for conservation and sustainable use of migratory animals and their habitats.
- **Unique Feature:** It is the **only UN-based intergovernmental treaty** exclusively dedicated to the conservation and management of **terrestrial, aquatic, and avian migratory species** across their entire range.
- **Core Objective:** Parties recognise the need to protect migratory species, especially those with an unfavourable conservation status.
- **Institutional Mechanism:** The Conference of the Parties (COP) serves as the principal decision-making body of the Convention. It meets once **every 3 years** and sets the budget and priorities of the following three years.
- **Parties:** 133 Parties (132 countries, plus the European Union).
 - ✓ **Jamaica** signed the original Convention but has yet to ratify it, so it is not a Party.
- **Implementation Instruments:** CMS operates through a range from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding.
- **Appendices under CMS:**
 - ✓ **Appendix I – Endangered Migratory Species:** It includes migratory species classified as **Extinct in the Wild, Critically Endangered, or Endangered**

as per the IUCN Red List of Threatened Species, and promotes **strict protection along with transboundary conservation** efforts.

- ✓ **Appendix II – Species with Unfavourable Status:** It includes migratory species with unfavourable conservation status, covering those from **Near Threatened to Extinct in the Wild** as per the IUCN Red List of Threatened Species, and promotes international cooperation through conservation agreements.
- ✓ The total number of unique species across both appendices now exceeds 1,200.

India and CMS COP

- India has been a signatory to CMS since 1983.
- India hosted the 13th CMS COP for the first time in 2020 at Gandhinagar (Gujarat).
- The theme of the COP13 was, **“Migratory species connect the planet, and together we welcome them home!”**
- India contains a significant bird flyway network, like the Central Asian Flyway.

5.2. Solid Waste Management (SWM) Rules, 2026

SYLLABUS

GS 2: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS 3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

Recently, the Ministry of Environment, Forest and Climate Change notified the Solid Waste Management (SWM) Rules, 2026, superseding the Solid Waste Management Rules, 2016.

More on the News

- The rules, notified under the Environment (Protection) Act, 1986, introduce an enhanced compliance framework effective from **April 1, 2026**.
- They mandate source-level waste processing by bulk generators, who contribute approximately one-third of India's total solid waste, thereby

strengthening decentralised waste management.

- The revised rules integrate the principles of Circular Economy and Extended Producer Responsibility, with a specific focus on efficient waste segregation and management.

Key Provisions of the 2026 Rules

Waste Management Measures

- **Source Segregation Norms:** Waste generators are required to segregate waste at the source into four categories—**wet, dry, sanitary, and special care waste (domestic hazardous waste)**.
- **Landfill Use Guideline:** Sanitary landfills are permitted to accept only non-recyclable, non-energy-recoverable waste along with inert materials. Higher landfill charges are imposed on unsegregated waste than on the cost of processing segregated waste, to discourage indiscriminate dumping.
- **EBWGR Compliance:** Under the **Extended Bulk Waste Generator Responsibility (EBWGR)**, bulk waste generators **must process wet waste on-site** or obtain certification for off-site processing.
- **Criteria for Bulk Generators:** Entities are classified as bulk waste generators if they exceed **20,000 sq. m of built-up area, consume over 40,000 litres of water daily, or generate more than 100 kg of waste per day**.
- **Role of Material Recovery Facilities:** Material Recovery Facilities (MRFs) are formally designated as centres for segregation of recyclables and for handling special waste streams, including e-waste.
- **Mandatory Use of Refuse-Derived Fuel (RDF):** Industrial units relying on solid fuels, such as cement plants and waste-to-energy facilities, are required to substitute a portion of their fuel with RDF. The share of RDF in fuel usage is to be progressively increased from **5% to 15% over a six-year period**.
- **Obligations for the Hospitality Sector:** Hotels and restaurants located in ecologically sensitive areas must adopt decentralised systems for processing their wet waste.

Regulatory Oversight Framework

- **Polluter-Pays Enforcement:** For the first time,

Environmental Compensation (EC) is imposed for violations such as *misreporting, operating without registration, and improper waste handling*.

- **Land-Use Planning Norms:** The rules introduce graded land-use allocation criteria, along with buffer zones, based on the processing capacity of waste management facilities.
- **Audit and Oversight: State Pollution Control Boards (SPCBs)** are required to conduct *annual landfill audits* under the supervisory *oversight of District Collectors*.
- **Buffer Zone Guidelines:** The *Central Pollution Control Board (CPCB)* will prescribe buffer-zone norms for facilities handling more than 5 tonnes of waste per day.
- **Digital Monitoring Mechanism:** A centralised online portal has been established to track the entire waste lifecycle, facilitate facility registration, and manage mandatory audit reporting.
- **Promotion of Carbon Credits:** Urban local bodies are encouraged to generate carbon credits through efficient and sustainable waste management practices.
- **Regulation in Tourist Areas:** Local bodies in *hilly regions* and *island territories* are authorised to levy user fees on tourists and regulate visitor inflow.

Significance of Solid Waste Management (SWM) Rules, 2026

- **Promotion of Decentralised Waste Management:** Mandatory on-site processing by bulk generators reduces the burden on municipal infrastructure and improves efficiency at the source.
- **Shift towards Circular Economy:** Emphasis on segregation, recycling, and RDF usage enables resource recovery and reduces dependence on landfills.
- **Reduction in Landfill Dependency:** Strict landfill restrictions and disincentives for unsegregated waste help minimise environmental pollution and land use pressures.
- **Enhanced Accountability through Polluter-Pays Principle:** Environmental Compensation (EC) ensures that violators are held financially responsible, strengthening compliance and deterrence.

- **Technology-Driven Monitoring and Governance:** Digital tracking systems improve transparency, traceability, and enforcement of waste management practices.

About Solid Waste Management in India

- India's solid waste governance framework is chiefly governed by rules formulated under the *Environment (Protection) Act, 1986*.
- India generates nearly **1.85 lakh tonnes** of solid waste daily, with **about 30–40% originating from bulk waste generators** such as residential complexes, commercial establishments, institutions, and government offices.
- A substantial portion of collected waste is still disposed of in landfills, resulting in land degradation, groundwater contamination, air pollution, and associated public health concerns.
- Inadequate segregation at source remains a persistent bottleneck, increasing the cost and reducing the efficiency of downstream waste processing systems.

Key Challenges Related to Solid Waste Management in India

- **Weak Source Segregation Compliance:** Despite mandates, segregation at source remains inconsistent due to low public awareness and behavioural gaps, undermining effective waste processing.
- **Capacity Constraints of Urban Local Bodies (ULBs):** Many ULBs lack adequate financial resources, technical expertise, and infrastructure to implement advanced waste management systems.
- **Enforcement and Monitoring Gaps:** Ensuring compliance with provisions like Environmental Compensation and digital tracking may be difficult due to institutional weaknesses and limited manpower.
- **High Compliance Burden on Bulk Waste Generators:** Mandatory on-site processing and certification requirements may increase operational costs and face resistance from residential and commercial entities.
- **Limited Waste Processing Infrastructure:** Insufficient number of Material Recovery Facilities (MRFs), waste-to-energy plants, and RDF utilisation units may hinder full implementation of the rules.

ENVIRONMENT

Way Forward

- **Strengthening Source Segregation:** Intensive awareness campaigns, behavioural nudges, and strict enforcement at the household and institutional level are needed to ensure effective segregation at source.
- **Enhancing Capacity of Urban Local Bodies (ULBs):** Adequate financial support, capacity building, and adoption of modern technologies are essential to improve the planning and execution of waste management systems.
- **Expanding Waste Processing Infrastructure:** Scaling up **Material Recovery Facilities (MRFs)**, composting units, and waste-to-energy plants is crucial to bridge the gap between waste generation and processing capacity.
- **Leveraging Technology:** Effective utilisation of digital platforms for real-time tracking, data transparency, and compliance monitoring can strengthen enforcement and accountability.
- **Promoting Public-Private Partnerships (PPP):** Encouraging private sector participation and market linkages for recycled products and RDF can enhance efficiency and ensure long-term sustainability.

5.3. India as a Global Leader in IRCCs under the Nagoya Protocol

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

India has emerged as the global leader in issuing Internationally Recognized Certificates of Compliance (IRCCs) under the Nagoya Protocol, accounting for over 56% of all certificates issued worldwide.

More on the News

- According to the latest data from the ABS Clearing-House, India has issued **3,561 IRCCs out of a global total of 6,311**, placing it far ahead of all other countries in implementing the Access and Benefit-Sharing (ABS) framework.
- Out of **142 countries registered** on the ABS

Clearing-House—a global platform promoting transparency and accountability—only **34 countries have issued IRCCs** so far.

- ✓ **India** is followed by France (964), Spain (320), Argentina (257), Panama (156), and Kenya (144).
- **India's strong performance reflects the effective implementation of its ABS framework under the Biological Diversity Act, 2002, supported by a robust institutional structure:**
 - ✓ National Biodiversity Authority (central level).
 - ✓ State Biodiversity Boards/UT Biodiversity Councils.
 - ✓ Biodiversity Management Committees (local level).



About Internationally Recognized Certificates of Compliance (IRCCs)

- IRCCs are **official certificates** issued under the **Nagoya Protocol** as proof that **access to genetic resources has been granted in accordance with international rules**.
- They certify that **Prior Informed Consent (PIC)** has been obtained and **Mutually Agreed Terms (MAT)** have been established.
- Once issued, IRCCs are uploaded to the **ABS Clearing-House**, where they become globally accessible records.
- Legally, a permit or its equivalent becomes an IRCC when it is issued by a **competent national authority** and published on the ABS Clearing-House.
- Each IRCC contains key details such as the **issuing authority and date, provider and user of the resource, genetic resource covered, confirmation of**

PIC and MAT, and the nature of use (commercial or non-commercial).

- IRCCs act as a digital **“legal passport”** for genetic resources, enabling traceability across international borders and reducing risks of biopiracy.
- **Functional Role of IRCCs:**
 - ✓ IRCCs help track the utilisation of genetic resources across the value chain from research to innovation and commercialisation.
 - ✓ They ensure transparency and accountability in access and benefit-sharing processes.
 - ✓ They monitor compliance with ABS regulations.
 - ✓ They facilitate fair and equitable benefit-sharing with provider countries.

About the Nagoya Protocol on Access and Benefit-sharing (ABS)

- The Nagoya Protocol is a supplementary agreement to the Convention on Biological Diversity, **adopted in 2010** at COP-10 and entering into **force in 2014**.
- **Objective:**
 - ✓ It aims to ensure the fair and equitable sharing of benefits arising from the utilisation of genetic resources.
 - ✓ It also contributes to biodiversity conservation and the sustainable use of its components.
- **Scope:**
 - ✓ It covers genetic resources, including plants, animals, and microorganisms.
 - ✓ It includes traditional knowledge associated with genetic resources.
 - ✓ It applies to both research and commercial utilisation.
- **Core Obligations:**
 - ✓ **Access obligations:** Parties must establish clear procedures for Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT), ensure legal certainty and transparency, and provide permits as evidence of access.
 - ✓ **Benefit-sharing obligations:** Parties must ensure fair and equitable sharing of benefits arising from utilisation, including monetary and non-monetary forms such as royalties, research results, and technology transfer.

- ✓ **Compliance obligations:** Parties must ensure that genetic resources are accessed legally, monitor utilisation across value chains, and provide mechanisms for dispute resolution.

• Institutional Mechanisms:

- ✓ The ABS Clearing-House functions as an information-sharing platform.
- ✓ **National Focal Points (NFPs) and Competent National Authorities (CNAs)** facilitate implementation at the national level.
- ✓ Capacity-building and financial support are provided through mechanisms such as the **Global Environment Facility**.

Significance

- **Global Leadership & Model Implementation:** India's dominant share of IRCCs and the limited number of countries issuing them highlight its **advanced implementation capacity**, making it a global model in ABS governance.
- **Institutional Strength & Decentralised Governance:** The effective coordination between National Biodiversity Authority, State Boards, and local committees reflects **cooperative federalism and strong institutional mechanisms**.
- **Equity & Community Empowerment:** Ensures fair benefit-sharing with **local communities, farmers, and traditional knowledge holders**, promoting inclusive and just resource governance.
- **Transparency, Compliance & Legal Certainty:** IRCCs create a **traceable and accountable system** for monitoring genetic resource utilisation across the value chain.
- **Conservation–Development Linkage:** By linking economic benefits with resource use, the framework incentivises **biodiversity conservation, sustainable use, and bio-economy growth**.

5.4. India's Multi-Hazard Early Warning Decision Support System

SYLLABUS

GS 3: Disaster and disaster management.

Context

India's high vulnerability to frequent and diverse extreme weather events, such as floods, cyclones, and heatwaves, led to the development of an integrated early warning system like the Multi-Hazard Early Warning Decision Support System (MHEW-DSS) to improve disaster preparedness and reduce losses.

About the Multi-Hazard Early Warning Decision Support System (MHEW-DSS)

- It is a digital platform that automates the decision-making on critical weather forecasting processes and forecast and warning services to the public, government, and non-government agencies, as well as specific stakeholders.
- It has been developed by *the India Meteorological Department* using open-source technology and in-house expertise.
- Launched under *Mission Mausam* in January 2024, it **combines satellite, radar, and other observational data** with advanced forecasting tools and utilises **Geographic Information System (GIS) maps** for efficient collection, analysis, and dissemination of weather data.
- It delivers real-time, impact-based multi-hazard forecasting across India, empowering decision-makers and communities by translating complex meteorological data into actionable warnings.
- It also includes a public platform named **Mausamgram**, which provides hyper-local weather forecasts by entering the name of the place or the Pincode of the place. It reflects the **Government of India's** vision of a "Weather Ready and Climate Smart Nation" and embodies the philosophy of "**Har Har Mausam, Har Ghar Mausam**".

Salient Features of the MHEW-DSS

- **Automated Weather Data Processing:** Over 90% of weather data collection, quality checks, and integration are automated.
- **Better Use of Forecast Models:** More than 95% of numerical weather prediction model inputs are now used in forecasting.
- **Longer Forecast Lead Time:** Forecast lead time has

increased from 5 days to 7 days.

- **Faster Forecast Preparation:** The time required to prepare forecasts has reduced by **about 3 hours from 6 hours**.
- **Cost Savings and Self-Reliance:** The system has generated around ₹250 crore in cost savings and eliminated dependence on foreign vendors.
- **Reduced Evacuation Costs:** Improved early warnings have helped reduce evacuation costs to **one-third from 1999 to 2024** due to a reduction in cyclone landfall point forecast error in the 3-5 days ahead forecast issued by IMD.



Operational Architecture of the MHEW-DSS

- **Weather Analysis and Forecast Enabling System (WAFES)** helps forecasters analyse data, generate charts, and visualise weather conditions through GIS-based maps.
- Using a GIS-enabled platform, it integrates **colour-coded alerts** for various hazards and disseminates them through **digital channels like SMS, emails, Application Programming Interface (API), Mobile App (Mausam), Common Alerting Protocol (CAP) and graphical bulletins** to ensure timely action and disaster preparedness.

System Characteristics of the MHEW-DSS

- **Interoperable:** Different modules work together on one platform, allowing easy sharing of data across ministries, departments, and sectors using common standards.

- **Scalable:** The system can easily grow over time—adding new data, technologies, regions, and types of disasters without major changes.
- **Replicable:** It is built using standard methods, making it easy to use in other sectors and even by other countries.
- **Efficient:** Real-time forecasts and impact-based warnings have reduced preparation time by 50% and improved accuracy by 30%.
- **Responsive:** The system is user-friendly and dynamic, sharing information through multiple channels such as SMS, APIs, mobile apps, and websites.
- **Transparent:** Clear data processes and open systems make it easy to track, verify, and ensure accountability.
- **Sustainable:** Supported by long-term planning, regular training, system upgrades, and continuous knowledge sharing.

Significance of the MHEW-DSS

- **Cyclone and Marine Safety:** Provides early warnings for cyclones and severe weather, issuing alerts for fishermen when **wind speeds exceed 45 kmph**, with updates shared via **SMS, apps, and broadcasts** to ensure timely safety measures.
- **Human Health:**
 - ✓ Weather data facilitates heatwave forecasting, emergency health preparedness for vulnerable groups, and the **prediction of vector-borne diseases like dengue and malaria**.
 - ✓ It also provides air quality and temperature advisories to strengthen community resilience and preventive health measures.
- **Energy Sector:** Provides weather forecasts for renewable management, protects infrastructure with early warnings, and uses automation to reduce costs and **save 210,240 kWh annually**.
- **Water Resource Management:**
 - ✓ Optimizes weather forecasting, flood control, and irrigation efficiency.
 - ✓ **Digital workflows save 63 kilolitres of water annually** by eliminating paper chart production.
- **Livelihood Protection:** Provides timely weather data to safeguard assets, plan safely, and secure

livelihoods across key sectors.

- **Strengthening Governance:**
 - ✓ Digital transformation has streamlined forecasting workflows across 40 offices, improving accuracy and inter-agency coordination.
 - ✓ This shift saves ₹57.6 crore annually and provides critical data to over 200 organisations, including NITI Aayog and NDMA.

5.5. Plastic Waste Management (Amendment) Rules, 2026

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

The Ministry of Environment, Forest and Climate Change has notified the Plastic Waste Management (Amendment) Rules, 2026, amending the Plastic Waste Management Rules, 2016, under the Environment Protection Act, 1986, to strengthen the Extended Producer Responsibility (EPR) framework.

Key Features of 2026 Amendment Rules

- **Carry-forward of EPR Targets:** Companies failing to meet recycling targets in 2025–26 can carry forward the **shortfall for up to 3 years (2026–27 onwards)**, provided at least one-third of the deficit is met annually.
 - ✓ This marks a shift from strict annual compliance to flexible multi-year compliance.
- **Mandatory Use of Recycled Plastic:** **Producers, importers, and brand owners must use recycled plastic in packaging, with progressive category-wise targets:** **Category I (Rigid plastic)** from 30% to 60% by 2028–29, **Category II (Flexible plastic)** from 10% to 20%, and **Category III (Multi-layered plastic)** from 5% to 10%.
 - ✓ Mandatory labelling and marking must indicate the use of recycled content.
- **Reuse Obligations:** Specific reuse targets are introduced for rigid packaging, **including about 10% for small containers and up to 70% for large water packaging**.
 - ✓ These targets will increase gradually over time.

ENVIRONMENT

- **Tradable EPR Certificates (Market Mechanism):** A plastic credit trading system is introduced where companies can buy certificates from those exceeding targets. This enables cost-efficient compliance but reduces direct responsibility.
- **End-of-Life Disposal Allowed:** The rules explicitly include energy recovery methods *such as waste-to-energy (WTE), co-processing in cement and steel industries, waste-to-oil conversion, and use in road construction.*
- **Exemptions from Targets:** Recycled content targets are not applicable were prohibited by food safety norms and drug regulations.
 - ✓ Oversight is provided by *the Food Safety and Standards Authority of India and the Central Drugs Standard Control Organisation.*
- **Strengthened Monitoring & Governance:** A centralised reporting system will be implemented by the *Central Pollution Control Board, along with State/UT-level monitoring committees* and local bodies as enforcement authorities. Compliance will be tracked through a *digital portal.*
- **Continuation of EPR Framework (since 2022):** The rules retain the *100% collection target (by 2024–25)* and phased increase in recycling and reuse.
 - ✓ Over 20.7 million tonnes have been recycled since rollout.

Concerns/Challenges

- **Dilution of Accountability:** The carry-forward provision is seen as an “*escape route*” for companies and may delay real action by major FMCG firms.
- **Questionable Effectiveness of Waste-to-Energy:** Burning plastic is linked to *toxic emissions (dioxins, furans, heavy metals) and micro/nano-plastic pollution*, and is criticised for lacking scientific backing.
- **Weak Compliance & Data Gaps:** There is no verified evidence of *achieving the 100% EPR collection target*, with heavy reliance on self-reporting and detection of *fake EPR certificates (~6 lakh cases).*
- **Limited Recycling & Reuse Capacity:** India lacks infrastructure for large-scale reuse systems and efficient segregation and processing, *while packaging (≈40% of plastic use) remains largely single-use.*

- **Exemptions May Undermine Targets:** Exclusion of food and pharmaceutical sectors reduces the scope of the *circular economy transition.*
- **Credit Trading Risks:** Companies may buy credits instead of recycling, thereby weakening the “*polluter pays*” principle.

Significance

- **Push Towards Circular Economy:** Mandatory recycled content and reuse obligations encourage resource efficiency and reduced use of *virgin plastic.*
- **Market-Based Environmental Governance:** Tradable certificates introduce flexibility and cost efficiency while aligning with *global carbon and credit trading models.*
- **Institutional Strengthening:** A multi-level governance system involving the Central Pollution Control Board, State/UTs, and local bodies enhances monitoring and accountability.
- **Policy Continuity with Evolution:** The amendment builds on the *EPR framework (2022)* and moves toward a more structured yet flexible compliance system.

5.6. India Becomes World's 3rd Largest in Renewable Energy Capacity

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment. Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Context

India has emerged as a major global player in the clean energy transition, ranking third globally in renewable energy installed capacity, according to the Renewable Energy Statistics 2026 released by the International Renewable Energy Agency (IRENA).

Key Highlights

- The country has surpassed *Brazil and now stands behind only China and the United States.*
- **Installed Capacity and Growth:** India's total non-fossil fuel installed capacity reached **283.46 GW**

as of March 31, 2026, including **274.68 GW from renewable energy** and **8.78 GW from nuclear power**.

- ✓ Renewable energy capacity has increased **3.6 times since 2014**.
- ✓ During FY 2025–26, the country recorded a historic addition of 55.3 GW in non-fossil capacity, marking the highest-ever annual increase.
- ✓ **Solar leads** the energy mix with 150.26 GW, followed by **wind at 56.09 GW** and **large hydro at 51.41 GW**.
- ✓ **Bioenergy contributes 11.75 GW**, and **small hydro accounts for 5.17 GW**.
- ✓ Distributed Renewable Energy **added 16.3 GW in FY 2025–26**, driven by **rooftop solar and PM-KUSUM**.
- ✓ Integration of battery storage, electric vehicles, and solar-based household systems is increasing.
- **Early Achievement of Climate Target:** India **achieved 50%** of its cumulative installed electricity capacity from non-fossil sources in June 2025.
 - ✓ This milestone was reached **five years ahead of its 2030 climate target**.
- **Future Targets:** India aims to **achieve 500 GW of non-fossil capacity by 2030** as part of its COP26 commitment.
 - ✓ Proposed targets for 2031–35 include a **47% reduction in emissions intensity**, **60% power capacity from non-fossil sources**, and creation of a **3.5–4 billion tonne carbon sink**.

Significance of Renewable Energy

- **Climate Change Mitigation:** Renewable energy reduces greenhouse gas emissions by lowering dependence on fossil fuels, as seen in **India achieving 50% installed capacity** from clean sources ahead of its **NDC targets**, reflecting a strong climate commitment.
- **Energy Security:** By promoting domestic sources **like solar, wind, and hydro, renewable energy minimizes reliance on imported fuels** and ensures long-term energy stability during global supply disruptions.
- **Rural Development and Electrification:** Decentralized systems **like rooftop solar and**

PM-KUSUM enhance rural electrification, improve agricultural productivity, and reduce dependence on diesel, strengthening rural livelihoods.

- **Technological Advancement and Innovation:** Investments in renewables accelerate innovation in technologies like battery storage, perovskite solar cells, and green hydrogen, with positive spillover effects across industries.
- **Alignment with Global Commitments:** The expansion of renewables supports India's obligations under the Paris Agreement and contributes to **Sustainable Development Goals like clean energy (SDG 7) and climate action (SDG 13)**.

Key Challenges and Areas for Concern

- **Capacity–Generation Mismatch:** Despite thermal capacity falling below 50%, **coal still contributes nearly 70–75% of actual electricity generation** due to the low-Capacity Utilization Factor (CUF) and intermittency of solar and wind, creating a structural hurdle for deep decarbonization.
- **Intermittency and Grid Stability Issues:** Renewable energy generation is **weather-dependent, leading to fluctuations in supply**, which were evident during peak demand stress events (e.g., 250 GW demand in 2024) and price crashes due to curtailment, highlighting the need for grid balancing mechanisms.
- **Inadequate Energy Storage Infrastructure:** With less than **5 GW of storage capacity compared to over 160 GW** of intermittent renewable capacity, India faces a critical gap in energy storage that limits effective renewable integration and reliability.
- **Supply Chain and Infrastructure Constraints:** Dependence on China for battery materials and constraints in key technologies like HVDC transformers expose India to geopolitical risks and infrastructure bottlenecks in scaling renewable energy.

Initiatives Behind India's Renewable Energy Progress

- **PM Surya Ghar Yojana:** The PM Surya Ghar scheme has enabled **23.9 lakh households** to install rooftop solar systems, adding about 7 GW of distributed

clean energy capacity while promoting energy independence at the household level.

- **PM-KUSUM Scheme:** The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan (PM-KUSUM) drives **solarisation in agriculture** by installing standalone pumps and reducing diesel dependence, thereby ensuring reliable and clean energy for farmers.
- **Solar Park Development Programme:** The approval of **55 solar parks across 13 states with nearly 40 GW capacity** has accelerated large-scale solar deployment, supporting grid integration and economies of scale in renewable energy generation.
- **Production Linked Incentive (PLI) Scheme:** The **₹24,000 crore PLI scheme** strengthens domestic solar manufacturing by incentivising production across the value chain, reducing import dependence and building a self-reliant clean energy ecosystem.
- **National Green Hydrogen Mission (NGHM):** Launched in 2023, the mission aims to **produce 5 MMT of green hydrogen annually by 2030**, positioning India as a global hub for clean fuel while reducing emissions and fossil fuel imports.
- **Green Hydrogen Certification Scheme (2025):** This scheme establishes emission standards for hydrogen production, ensuring credibility and facilitating India's integration into global green hydrogen markets.
- **Global Biofuels Alliance (GBA):** Launched during India's G20 Presidency, the alliance promotes international cooperation on biofuels, enhancing clean energy adoption and strengthening global energy transition efforts.
- **International Solar Alliance (ISA):** Co-founded by India, ISA mobilises global solar finance and technology transfer, expanding affordable solar deployment especially across developing countries.

5.7. India Moves to Phase Down HFCs

SYLLABUS

GS-3: Conservation, Environmental Pollution and Degradation.

Context

India has announced a major regulatory step to restrict new production capacity of Hydrofluorocarbons (HFCs) after 2027, signalling a transition towards climate-friendly cooling systems.

More on the News

- The Government has directed all state and Central authorities to stop granting environmental clearances for new or additional HFC production beyond December 31, 2027.
- From January 1, 2028, India will freeze HFC consumption and production at baseline levels, marking the beginning of the phase-down trajectory.
- The policy is expected to be implemented through amendments to the **Ozone Depleting Substances (Regulation and Control) Rules**, extending regulatory control to HFCs.
- The direction is in line with India's commitments under the **Kigali Amendment** to phase down HFCs, potent greenhouse gases used in refrigeration and air conditioning.

About HFCs (Hydrofluorocarbons)

- HFCs are **synthetic refrigerant gases** widely used in air conditioning, refrigeration, aerosols, and fire suppression systems.
- They were introduced as **alternatives to ozone-depleting substances CFCs and HCFCs**, which were phased out under the landmark Montreal Protocol of 1989.
- While they have zero ozone depletion potential (ODP), they have extremely high global warming potential (GWP)—up to **14,800 times that of CO₂ over 100 years**—making them a major driver of climate change.
- HFCs account for **2% of total GHG emissions** globally, but their increasing use in developing economies has made them a key target for climate mitigation efforts.

About the Montreal Protocol and Kigali Amendment

- The **Montreal Protocol (1987)** is a landmark global treaty aimed at phasing out ozone-depleting

substances, widely regarded as one of the most successful environmental agreements.

- The **Kigali Amendment (2016)** extended the protocol to include phasing down HFCs, recognising their high climate impact.
- **India ratified the Kigali Amendment in 2021**, committing to a gradual reduction in HFC production and consumption.
 - ✓ India has agreed to a phase-down schedule from January 1, 2028, onwards, which will see 10 per cent reduction in HFCs by 2032, rising up to 85 per cent by 2047.
- Globally, the amendment is expected to **avoid up to 0.5°C of global warming by 2100**, making it a critical climate mitigation instrument.

India's Roadmap to Phase Out HFCs

- **Reduction Targets:**
 - ✓ 10% reduction by 2032
 - ✓ 20% reduction by 2037
 - ✓ 30% reduction by 2042
 - ✓ 85% reduction by 2047
- **Baseline Years:** 2024–2026 for calculating HFC consumption and production levels.
- **Freeze Year:** 2028 (consumption and production capped at baseline levels).

5.8. Global Ocean Protection Reaches 10% Milestone

SYLLABUS

GS-3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment.

Context

As per the latest updates from the United Nations Environment Programme (UNEP), the world has reached a major conservation milestone, with 10.01% of the global ocean now officially designated as protected and conserved areas.

More on the News

- This milestone marks a rise from **8.6% in 2024**, meaning roughly **5 million sq km** of ocean was added to the protection network in just two years.
- However, the milestone comes six years after the

original target under the **Aichi Biodiversity Targets**, where countries agreed to protect **10% of the ocean by 2020**.

- The milestone is closely linked to the broader global goal under the **Kunming–Montreal Global Biodiversity Framework**, which calls for protecting **30% of land and sea by 2030** (“**30×30 target**”).

Key Highlights of the Latest Update

- Global ocean protection has **crossed the 10% threshold for the first time**, marking a significant milestone in marine conservation efforts.
- The increase in protected areas over the past two years is substantial, covering an area **larger than the European Union**, indicating accelerated but still insufficient progress.
- However, **effective protection remains limited**, with only a small proportion of these areas being strictly or fully protected, raising concerns about the quality and enforcement of Marine Protected Areas (MPAs).
- Progress is **highly uneven**, with most gains concentrated within **national jurisdictions**, while protection in areas beyond national jurisdiction (high seas) remains minimal.
- To meet the **30×30 target by 2030**, global ocean protection must expand significantly—**by an area roughly equivalent to the Indian Ocean**, highlighting the scale of effort still required.

About Marine Protected Areas (MPAs)

- MPAs are designated ocean regions where human activities are regulated to conserve biodiversity and ecosystems.
- They range from fully protected “no-take zones” to partially protected areas allowing limited activities.
- MPAs serve multiple purposes, including species conservation, habitat restoration, fisheries management, and climate resilience.

Significance of Ocean Protection

- **Ecological Importance:** Oceans host immense biodiversity, including coral reefs, deep-sea ecosystems, and migratory species critical for ecological balance.
- **Climate Regulation:** Marine ecosystems act as

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major carbon sinks (blue carbon), helping mitigate climate change and regulate global temperatures.

- **Economic Value:** Oceans support fisheries, tourism, and livelihoods for millions, forming a key pillar of the global blue economy.
- **Disaster Resilience:** Healthy marine ecosystems such as mangroves and coral reefs provide natural protection against storms and coastal erosion.

Challenges and Concerns

- **Gap to 30x30 Target:** Despite reaching ~10% protection, the **current pace is too slow**, and achieving 30% by 2030 will require a rapid and large-scale expansion of well-managed MPAs.
- **“Paper Parks” Problem:** Many MPAs lack effective enforcement and monitoring, existing only on paper and **failing to prevent harmful activities**, thereby limiting real conservation impact.
- **Limited High Seas Governance:** Protection in areas beyond national jurisdiction remains minimal due to **weak legal frameworks and coordination challenges**, reducing overall global effectiveness.
- **Funding and Capacity Constraints:** Developing countries often face **financial and technical limitations**, hindering proper management, monitoring, and enforcement of protected areas.
- **Conflict of Interests:** Conservation efforts frequently clash with **economic activities like fishing, shipping, and mining**, creating policy trade-offs and slowing implementation.

Global Initiatives and Agreements

- **Kunming-Montreal Global Biodiversity Framework (2022):** It sets the “30x30 target”, committing countries to protect 30% of global land and oceans by 2030, forming the central guiding framework for biodiversity conservation.
- **BBNJ Agreement (High Seas Treaty):** It provides a **legal framework for conserving biodiversity in areas beyond national jurisdiction**, addressing gaps in governance of the high seas.
- **Protected Planet Initiative:** Led by the UNEP and International Union for Conservation of Nature (IUCN), it tracks global progress on protected areas and supports data-driven conservation planning.

- **UN Sustainable Development Goal 14 (Life Below Water):** It aims to ensure the conservation and sustainable use of oceans and marine resources, aligning global efforts with broader sustainable development objectives.

5.9. Emperor Penguins and Fur Seals now Endangered

SYLLABUS

GS-3: *Conservation, Environmental Pollution and Degradation.*

Context

The latest update of the International Union for Conservation of Nature (IUCN) Red List has uplisted Emperor penguin (*Aptenodytes forsteri*) and Antarctic fur seal (*Arctocephalus gazella*) to the *Endangered* category.

More on the News

- This reclassification marks a significant departure from their earlier conservation status and reflects the rapidly intensifying impacts of climate change in Antarctica.
- Antarctica has lost ice cover equivalent to ten times Los Angeles’s area over three decades, accelerating ecosystem disruptions.

Key Highlights of Red List Update

- The **emperor penguin** has been upgraded from **Near Threatened to Endangered**, with projections indicating that its population could decline by nearly half by the end of the century under current warming trends.
- The **Antarctic fur seal**, which had earlier recovered from historical overexploitation, has now been moved from **Least Concern to Endangered** due to a steep population decline in recent decades.
- The Red List assessment underscores that **climate change, rather than direct human exploitation**, has emerged as the primary driver of species decline in Antarctica.
- Both species are now regarded as **sentinel species**, meaning that their declining populations serve as early indicators of broader ecological disruptions.

Emperor Penguin (<i>Aptenodytes forsteri</i>)
• The emperor penguin is the largest penguin species and is endemic to Antarctica. • It is uniquely adapted to breed during the harsh Antarctic winter, relying heavily on stable sea ice for reproduction.
Antarctic Fur Seal (<i>Arctocephalus gazella</i>)
• The Antarctic fur seal is a marine mammal found across sub-Antarctic and Antarctic regions. • It primarily feeds on krill and small fish, making it highly dependent on ocean productivity.

Drivers Behind the Change

- **Rapid Decline in Sea Ice Cover:** The rapid loss of Antarctic sea ice has severely affected breeding habitats, as emperor penguins depend on stable ice, and its early breakup leads to high chick mortality.
- **Disruption of Food Chains:** Ocean warming has reduced krill availability, which is the primary food source for both species, thereby affecting their survival and reproductive success.
- **Increasing Extreme Climatic Events:** The rise in extreme climatic events, such as sudden ice collapses and temperature anomalies, has destabilised breeding colonies and disrupted life cycles.
- **Long-term Habitat Unsuitability:** The combined impact of these changes is making Antarctic habitats increasingly unsuitable, reducing the chances of long-term species recovery.

Global Governance & Legal Framework for Antarctica

- **Antarctic Treaty System (ATS):** It forms the foundation of Antarctic governance by designating the continent for peaceful purposes, scientific research, and international cooperation, while prohibiting military activities.
- **Protocol on Environmental Protection (Madrid Protocol, 1991):** It strengthens conservation by declaring Antarctica a “natural reserve,” banning mineral resource exploitation, and mandating environmental impact assessments.
- **Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR, 1980):** Adopts an ecosystem-based approach to manage Southern Ocean fisheries, particularly krill, and promotes

marine protected areas to conserve dependent species like penguins and fur seals.

Ecological Significance of Antarctica

- **Role in Global Climate Regulation:** Antarctica regulates the Earth’s climate through the albedo effect, and declining ice cover accelerates global warming.
- **Influence on Ocean Circulation:** It plays a key role in global ocean circulation, influencing climate systems and weather patterns worldwide.
- **Support to Marine Biodiversity:** The region sustains a complex marine ecosystem, where the decline of key species disrupts ecological balance.
- **Indicator of Global Ecological Health:** Changes in Antarctic ecosystems act as an early warning signal of broader environmental degradation at the planetary level.

5.10. Financing for Sustainable Development Report 2026

SYLLABUS

GS-3: *Conservation, environmental pollution and degradation, environmental impact assessment.*

Context

According to the United Nations Financing for Sustainable Development Report 2026, global development financing is moving in the wrong direction, with SDG progress stalling or reversing due to rising geopolitical tensions, trade fragmentation, declining aid, and weakening multilateral cooperation.

About the Report

- The *Financing for Sustainable Development Report 2026 (FSDR 2026)* is the **10th edition** of the flagship UN report and the **first assessment after the 2025 Sevilla Commitment (FFD4)**, providing a global review of development financing trends.
- It is prepared by the **Inter-agency Task Force on Financing for Development**, comprising **60+ UN agencies, programmes, regional commissions, and major institutions** such as IMF, World Bank, WTO, UNCTAD, and UNDP, coordinated by **UN DESA**.

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- The report evaluates the *global macroeconomic environment*, identifies *financing challenges and risks*, and assesses their implications for achieving the Sustainable Development Goals (SDGs).
- It provides a *mapping and early progress review* of commitments made under the Sevilla framework, including reforms related to *investment, debt sustainability, and international financial architecture*.
- The report gives detailed analysis of:
 - ✓ Private business and finance.
 - ✓ International trade.
 - ✓ International financial architecture and systemic issues.
 - ✓ Data, monitoring, and follow-up mechanisms.
- **Rising Debt Burden:** Debt service reached **20-year highs in 2024**.
 - ✓ In several countries, it exceeds **20% of government revenue**, crowding out spending on health, education, and infrastructure
 - ✓ Borrowing costs surged (average bond rates for low-income countries rose to **8.4% in 2025**)
- **Sharp Decline in External Financing:**
 - ✓ **Official Development Assistance (ODA):** Fell **6% in 2024** and projected to decline further (up to **25% for LDCs**).
 - ✓ **Foreign Direct Investment (FDI):** Dropped **11% in 2024**, continuing a downward trend.
 - ✓ **International project finance:** Fell **40% (2021–2024)**, impacting infrastructure and energy projects

Sevilla Commitment for Financing Sustainable Development

- The *Sevilla Commitment* was adopted at the *Fourth International Conference on Financing for Development (FfD4)* in Sevilla.
- It is the first global financing framework since 2015 aimed at addressing the **\$4 trillion annual SDG financing gap** in developing countries.
- It highlights severe debt stress, noting that **nearly 3 billion people live in countries spending more on interest payments than on health or education**, underscoring the urgency of debt reforms.
- The framework focuses on three key actions—***mobilising large-scale investment for sustainable development, addressing the global debt crisis, and reforming the international financial architecture***.
- It also calls for ***greater voice and representation of developing countries*** in global financial institutions amid declining aid and rising economic uncertainties.

Key Findings

- **Severe Financing Squeeze in Developing Countries:** Developing nations face *large unmet SDG financing needs* amid:
 - ✓ High borrowing costs and fiscal pressures
 - ✓ Climate-related expenses and environmental degradation
 - ✓ Structurally low tax revenues (77 countries below 15% tax-to-GDP threshold)
- **Impact of Fragmentation on Development:**
 - ✓ Geopolitical divisions are *increasing capital volatility, raising the cost of finance, and weakening multilateral institutions*.
 - ✓ Fragmentation complicates *WTO reforms, Global financial coordination and Climate action and debt resolution*.
- **Risk to SDG Progress: Without urgent action:**
 - ✓ Governments may *cut development spending further*.

- ✓ Progress toward SDGs could **reverse significantly before 2030**.
- **Way Forward: The report recommends five priority action areas:**
 - ✓ **Scale up financing and investment** to close SDG gaps
 - ✓ **Align finance with sustainable development goals**
 - ✓ **Invest in resilience** against economic and climate shocks
 - ✓ **Adopt multilayered international cooperation** (national + regional + global)
 - ✓ **Strengthen and reform multilateralism**, rather than retreat from it

5.11. Fourth-Warmest March Signals El Niño Surge

SYLLABUS

GS-1: Important Geophysical Phenomena.

GS-3: Conservation, Environmental Pollution and Degradation.

Context

As per the latest monthly Climate Bulletin of Copernicus Climate Change Service (C3S), March 2026 emerged as the fourth-warmest March on record globally.

Key Highlights of the Bulletin

- **Global Temperature Snapshot:**
 - ✓ March 2026 was the **fourth-warmest March on record globally**, with an average surface air temperature of 13.94°C, which was 1.48 °C above the estimated pre-industrial level (1850–1900).
 - ✓ Europe experienced its second-warmest March on record, and much of the continent witnessed drier-than-average conditions.
- **Sea Surface Temperatures:**
 - ✓ Global sea surface temperatures (SSTs) were the second-highest ever recorded for March, only slightly below the record levels of March 2024's El Niño peak of 21.14°C.
 - ✓ The average SST over extra-polar oceans (60°S–60°N) remained close to 21°C, highlighting sustained ocean heat accumulation.

- **Sea Ice Extremes:**

- ✓ March 2026 also broke the record for lowest average sea ice extent in the Arctic, measuring approximately 5.7% below the 1991–2020 average.
- ✓ In the Antarctic region, sea ice extent was 10% below the March average.

- **El Niño Outlook:**

- ✓ These climate indicators point toward an increasing likelihood of El Niño conditions developing in 2026.

Implications

- **Global:**

- ✓ Rising temperatures are likely to increase the frequency and intensity of **extreme weather events**, including heatwaves, floods, and cyclones.
- ✓ Warmer oceans can trigger **marine heatwaves**, coral bleaching, and disruptions in marine ecosystems, thereby affecting global fisheries and biodiversity.
- ✓ The possibility of El Niño may further elevate global temperatures, as such events typically add **0.1–0.2°C to global averages**, amplifying climate risks.
- ✓ Declining sea ice accelerates warming through feedback mechanisms, contributing to **sea-level rise and polar instability**.

- **India-Specific:**

- ✓ India may experience **weakened or erratic monsoon patterns** during El Niño years, affecting agriculture and water security.
- ✓ Increased likelihood of **heatwaves and drought conditions** could impact public health, energy demand, and rural livelihoods.
- ✓ Warmer oceans in the Indian Ocean region may intensify **cyclonic activity and coastal vulnerabilities**.

About El Niño–Southern Oscillation

- **ENSO (El Niño–Southern Oscillation)** is a periodic climate phenomenon involving **changes in sea surface temperatures (SSTs) and atmospheric circulation** in the equatorial Pacific Ocean.
- **Normal Conditions:**

- ✓ Trade winds blow from east to west along the equator.
- ✓ Warm water accumulates in the western Pacific, while **cold, nutrient-rich water upwells near South America.**
- **El Niño Phase (Warm Phase):**
 - ✓ Trade winds weaken or reverse.
 - ✓ Warm waters shift eastward toward the central and eastern Pacific.
 - ✓ Upwelling reduces, disrupting global atmospheric circulation.
 - ✓ Defined when **SSTs rise by at least 0.5°C above normal for sustained periods.**
 - ✓ El Niño typically occurs every **2 to 7 years** and lasts for several months, but there is no fixed schedule.
- **La Niña Phase (Cool Phase):**
 - ✓ Trade winds strengthen.
 - ✓ Enhanced upwelling leads to **cooler-than-normal SSTs** in the eastern Pacific.
 - ✓ Reinforces normal circulation patterns.

5.12. AMOC Weakening Raises Global Climate Risk

SYLLABUS

GS-1: *Salient features of World's Physical Geography; Important Geophysical Phenomena.*

GS-3: *Conservation, environmental pollution and degradation, environmental impact assessment.*

Context

A recent study in *Nature Communications Earth and Environment* highlights that a potential collapse of the Atlantic Meridional Overturning Circulation (AMOC) could release significant oceanic carbon, particularly from the Southern Ocean, thereby amplifying global warming and pushing the climate system toward a critical tipping point.

About the Atlantic Meridional Overturning Circulation (AMOC)

- It is a major system of ocean currents and forms the Atlantic branch of the thermohaline circulation, also known as the **global ocean conveyor belt.**
- It transports warm surface water to the Arctic, influencing climate in northern North America and Europe, and returns cold deep water to the tropics.
- It plays a crucial role in **transporting heat, carbon, and nutrients** across the world's ocean basins.
- **Process of circulation:**
 - ✓ Warm surface waters from the tropics move northward into the North Atlantic.
 - ✓ In the colder northern regions, these waters lose heat, become denser, and sink into the deep ocean.
 - ✓ The deep currents then flow southward, moving towards the tropics and the South Atlantic.
 - ✓ From there, they are redistributed globally through the **Antarctic Circumpolar Current**, completing the conveyor-belt circulation.

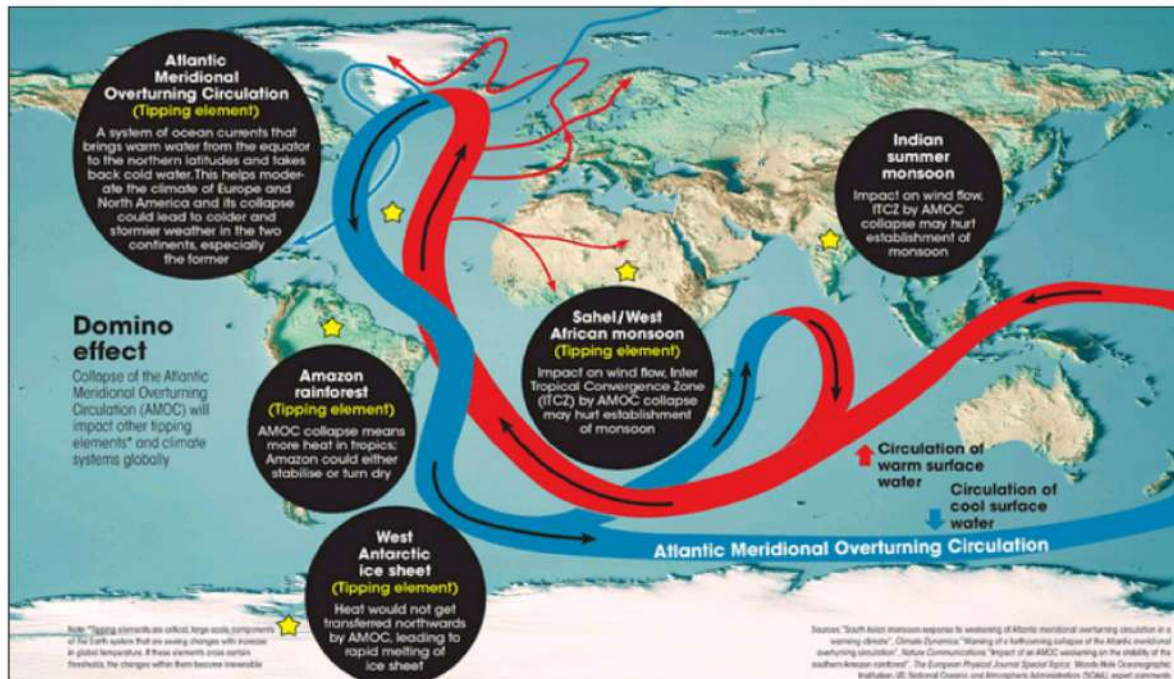
Key Highlights

• Role of AMOC in the Climate System

- ✓ **Heat Distribution Mechanism:** The AMOC functions as a global ocean conveyor belt, transporting warm surface water from the tropics to the North Atlantic and returning cold deep water southward. This process ensures balanced heat distribution across the planet.
- ✓ **Climate Regulation Function:** It moderates temperatures in regions such as Europe and North America and plays a crucial role in maintaining global climate stability.
- ✓ **Carbon Cycle Contribution:** The AMOC helps in the storage and redistribution of carbon within the oceans, making it essential for regulating atmospheric CO₂ levels.
- **AMOC as a Climate Tipping Element**
 - ✓ **Threshold Behaviour:** AMOC is **one of the 16 climate tipping elements** that could undergo abrupt, irreversible changes with widespread cascading impacts.
 - ✓ **Irreversibility Risk:** Such a collapse could be difficult to reverse, especially under ongoing global warming conditions.
 - ✓ **Cascading Impacts:** Its disruption could trigger widespread changes across oceanic, atmospheric, and ecological systems.
- **Evidence of Ongoing Weakening**
 - ✓ **Observed Decline:** Studies indicate a steady weakening of the AMOC over the past two decades.

✓ **Western Boundary Changes:** Significant reductions have been observed in the western Atlantic boundary currents, which account for a major portion of the circulation strength.

✓ **Ocean Monitoring Data:** Ocean bottom pressure measurements confirm a decline in deep-water transport, strengthening concerns about system instability.



• **Causes of AMOC Weakening**

- ✓ **Freshwater Input from Greenland:** Melting of the Greenland Ice Sheet introduces freshwater into the North Atlantic, reducing salinity and weakening density-driven sinking.
- ✓ **Impact of Global Warming:** Rising temperatures alter ocean stratification and reduce vertical mixing, further weakening the circulation.
 - Observations show that the AMOC is already weakening, and a 2023 study in Nature Communications estimates a possible collapse between 2037 and 2109.

• **Climate Impacts of AMOC Collapse**

- ✓ **Global Temperature Change:** AMOC collapse could increase global temperatures by about **0.17–0.27°C**, largely due to additional CO₂ release.
 - The study estimates that an AMOC collapse could release an additional 47-83 gigatonnes of CO₂ into the atmosphere.

✓ **Regional Climate Contrast:** The impacts would be uneven, with **cooling of up to 7°C in the Arctic** due to reduced heat transport, and **warming of up to 6°C or more in parts of Antarctica**, with some regions experiencing even higher warming. This creates a sharp **polar contrast**.

• **Ocean-Carbon Feedback Mechanism**

- ✓ The collapse would also intensify feedback mechanisms such as **Sea ice albedo feedback**, where increased ice cover reflects more sunlight, further cooling the Northern Hemisphere.
 - At the same time, rising carbon-rich deep waters in the Southern Ocean would amplify atmospheric CO₂ levels.

• **Broader Implications**

- ✓ **Climate System Disruptions:** Changes in rainfall patterns, including impacts on monsoons, could affect agriculture and water availability.
- ✓ **Ecological Consequences:** Marine ecosystems

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may be severely disrupted, affecting biodiversity and fisheries.

- ✓ **Socio-Economic Risks:** Food insecurity, coastal vulnerability, and climate-induced migration may increase significantly.

Conclusion

- The AMOC is a vital component of the Earth's climate system, and its observed weakening signals a potential approach towards a tipping point. The findings from recent research highlight the urgency of strengthening climate action, enhancing ocean monitoring, and incorporating tipping point risks into global policy frameworks to prevent irreversible climate consequences.

5.13. Project Cheetah Achieves First Wild Birth in India

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact

Context

India's ambitious cheetah reintroduction programme, known as Project Cheetah, marked a historic milestone, when an Indian-born female cheetah gave birth to four cubs in the wild at Kuno National Park—the first such recorded instance since the project began in 2022.

About the Project Cheetah

- It is a landmark wildlife conservation initiative launched on **17 September 2022** at Kuno National Park.
- It marks the **world's first inter-continental translocation of a large carnivore**, aiming to reintroduce cheetahs to India after their extinction in 1952.
- The project is implemented by the National Tiger Conservation Authority under the Ministry of Environment, Forest, and Climate Change.
- **Key Phases of the Project:**
 - ✓ **September 2022:** Introduction of 8 cheetahs from Namibia (first-ever translocation)
 - ✓ **February 2023:** Arrival of 12 cheetahs from South Africa, including Gamini
 - ✓ **February 2026:** Third phase involving the

translocation of 9 cheetahs from Botswana.

Objectives:

- ✓ To establish breeding cheetah populations in safe habitats across their historical range and manage them as a **metapopulation**.
- ✓ To use the cheetah as a **charismatic flagship and umbrella species** to mobilise resources for restoring open forest and savanna ecosystems, benefiting biodiversity and ecosystem services.
- ✓ To enhance India's capacity for **carbon sequestration** through ecosystem restoration in cheetah conservation areas, contributing to global climate change mitigation goals.
- ✓ To promote **ecodevelopment and ecotourism**, thereby improving local community livelihoods.
- ✓ To manage **human-wildlife conflict** through compensation, awareness, and timely management actions to ensure community support.

Long-Term Vision:

- ✓ Develop a connected **Kuno–Gandhi Sagar landscape** capable of supporting **60–70 cheetahs**.
- ✓ Expand cheetah habitats to other suitable regions across India.
- ✓ Create a model for **global wildlife reintroduction and conservation practices**.

Kuno National Park

- It is a national park and wildlife sanctuary located in **the Gwalior–Chambal region of Madhya Pradesh**.
- It derives its name from **the Kuno River** that flows through the area.
- The park was established in **1981 as a wildlife sanctuary** and was later upgraded to a national park.

5.14. Tibetan Antelope

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact

Context

In a landmark ruling for wildlife law enforcement in India, a New Delhi court has convicted a Jaipur art gallery owner for attempting to illegally export Shahtoosh shawls, made from the hair of the critically endangered Tibetan Antelope, in violation of the Wildlife Protection Act, 1972.

More on the News

- The Court delivered the verdict, concluding a 17-year-long case that began with the seizure of 1,290 shawls at Indira Gandhi International Airport in 2008.
- The case is notable as **the first wildlife crime prosecuted** through the Central Bureau of Investigation, based on a complaint by the Wildlife Crime Control Bureau.



About the Tibetan Antelope (*Pantholops hodgsonii*)

- **Taxonomy & Identity:**
 - ✓ **Scientific name:** *Pantholops hodgsonii*
 - ✓ **Common name:** Chiru (Tibetan Antelope)
 - ✓ Native to the high-altitude Qinghai-Xizang Plateau.
- **Key Features:** Possesses extremely fine underfur (Shahtoosh), one of the lightest and warmest natural fibres.
 - ✓ Males have long, upright horns (up to ~60 cm).
 - ✓ Adapted to extreme cold environments (temperatures below -40°C).
- **Habitat & Distribution:** Found in **alpine steppe and meadow** regions at elevations of 3,250–5,500 m.
 - ✓ Major stronghold: **Chang Tang region** of northwestern Tibet.
 - ✓ Highly migratory, travelling up to **400 km seasonally**.
- **Ecology & Behaviour:** **Herbivorous** grazer feeding on grasses and shrubs.
 - ✓ Plays a key ecological role in nutrient cycling

and supports **predators like snow leopards and wolves**.

- ✓ Females migrate to **specific birthing grounds**; calves can stand within minutes of birth.
- **Conservation Status & Threats:**
 - ✓ **Schedule I** of the Wildlife Protection Act, 1972.
 - ✓ International ban under **CITES (since 1975)**.
 - ✓ Currently listed as Near Threatened (recovering but still vulnerable).
 - ✓ **Major threats:** Illegal wildlife trade, habitat loss, infrastructure expansion, and climate change.

5.15. Marine Heatwaves Amplifying Tropical Cyclone Risks

SYLLABUS

- GS-1:** Important Geophysical Phenomena such as earthquakes, Tsunami, Volcanic activity, cyclones, etc.
GS-3: Disaster and disaster management.

Context

A recent study published in *Science Advances* found that Tropical cyclones (TC) moving across exceptionally warm ocean waters associated with marine heatwaves could rapidly intensify and become stronger, leading to more severe impacts upon landfall and increasing economic losses.

Key Findings of the Study

- Tropical cyclones experiencing rapid intensification during marine heatwaves result in **60% more billion-dollar disasters** compared to those without heatwave influence, even after accounting for coastal exposure.
- Researchers analyzed 1,600 landfalling tropical cyclones since 1981, finding that those passing over marine heatwave conditions were more likely to intensify rapidly.
- Costlier storms showed consistently **higher maximum wind speeds** (up to 20% higher in marine heatwave cases), storm surges, and precipitation rates (up to 12% higher).
- Billion-dollar tropical cyclones **occur 1.6 times more frequently** when marine heatwaves are present.

About Marine Heatwaves and Linkage with Tropical Cyclones

- Marine heatwaves refer to **prolonged periods of abnormally high ocean temperatures**, lasting from days to months and extending over large oceanic regions.
- They are driven by **climate change, ocean circulation anomalies, and climatic phenomena such as El Niño**.
- Tropical cyclones derive their energy from warm ocean waters, and higher sea surface temperatures enhance the transfer of heat and moisture from the ocean to the atmosphere.
- When cyclones pass over marine heatwave regions, they encounter elevated ocean heat content, which **acts as an additional energy source**.
- **Elevated sea surface temperatures lead to:**
 - ✓ Rapid intensification of cyclones within short durations
 - ✓ Higher wind speeds and increased rainfall
 - ✓ Prolonged duration and sustained intensity of storms
- This interaction represents a compound climate effect, where multiple hazards reinforce each other.

Implications

- **Global:**
 - ✓ Intensified cyclones result in **greater economic losses**, affecting infrastructure, supply chains, and insurance systems worldwide.
 - ✓ Marine ecosystems face stress due to **coral bleaching, biodiversity loss, and disruptions in fisheries**.
 - ✓ Disaster management systems are challenged by **rapid intensification**, reducing response time for evacuation and preparedness.
 - ✓ Vulnerable developing countries face **disproportionate impacts**, widening global inequality in climate resilience.
- **India:**
 - ✓ The **Arabian Sea and Bay of Bengal** are experiencing rising sea surface temperatures, increasing the likelihood of stronger cyclones.
 - ✓ India may face:
 - More intense cyclones such as those observed in recent years

- Increased coastal flooding, erosion, and displacement
- Threats to agriculture, fisheries, and coastal livelihoods
- ✓ The phenomenon also complicates **monsoon dynamics and disaster management planning**, requiring improved forecasting systems.

About Tropical Cyclones

- Tropical cyclones are **intense low-pressure systems** that form over warm ocean waters in tropical regions.
- **They are characterised by:**
 - ✓ Strong winds exceeding 119 km/h
 - ✓ Heavy rainfall and storm surges
- **They form under specific conditions, including:**
 - ✓ Sea surface temperatures above **26–27°C**
 - ✓ High humidity and low vertical wind shear
- These systems are known by different names across regions, such as **cyclones** in the Indian Ocean, **hurricanes** in the Atlantic, and **typhoons** in the Pacific.
- Climate change is influencing cyclone behaviour, leading to **greater intensity, rapid intensification, and changing spatial distribution**.
- **On the basis of wind speed and the degree of potential destruction, Cyclones can be categorized as:**
 - ✓ **Low Pressure:** Wind speeds below 31 km/h
 - ✓ **Depression:** Wind speeds between 32–61 km/h
 - ✓ **Cyclonic Storm:** Wind speeds between 62–88 km/h
 - ✓ **Severe Cyclonic Storm:** Wind speeds between 89–117 km/h
 - ✓ **Very Severe Cyclonic Storm:** Wind speeds between 118–167 km/h
 - ✓ **Extremely Severe Cyclonic Storm:** Wind speeds between 168–221 km/h
 - ✓ **Super Cyclone:** Wind speeds exceeding 221 km/h
- **Naming of Cyclones:**
 - ✓ Worldwide, there are six regional specialised meteorological centres (RSMCs) and five regional Tropical Cyclone Warning Centres (TCWCs) mandated for issuing advisories and naming of tropical cyclones.

- ✓ India Meteorological Department (IMD) is one of the six RSMCs to provide tropical cyclone and storm surge advisories to 13 member countries under the WMO/ESCAP Panel on Tropical Cyclones.
 - **13 member countries:** Bangladesh, India, Iran, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates and Yemen
- ✓ In April 2020, the IMD released a list of 169 cyclone names, with each of the 13 member countries contributing 13 names.
- ✓ The cyclone name list arranges member countries alphabetically, with each country's suggested names listed alongside.
- ✓ Then these names are allotted to any cyclone which takes place in the region, on a rotational basis, regardless of which country proposed it.

5.16. State of India's Bats (SolBats) 2024–25 Report

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

The State of India's Bats (SolBats) 2024–25, the first-ever national bat assessment, highlights a serious lack of research centres and data gaps despite India hosting around 135 bat species, making bats the largest order of mammals in the country.

About State of India's Bats (2024–25) Report

- Thirty-four experts from 27 institutions carried out the two-year study titled 'State of India's Bats'.
- The Solbats was conducted in collaboration with the Nature Conservation Foundation (NCF) and Bat Conservation International (BCI).

Key Findings of the Report

- **Data Deficit and Neglect:** The report underlined that **data deficit and neglect of bats** is a major concern.
 - ✓ Around **35 species are either not assessed or data deficient**, which means the current conservation picture is incomplete. This lack of data prevents accurate evaluation of species status and risks.



- **Ecological Importance of Bats:** Bats play a **crucial role in pollinating plants, dispersing fruit seeds, controlling pests that damage crops, and providing soil nutrition through their droppings**. Their ecosystem services directly support agriculture, biodiversity, and soil health.
- **Endemism and Threat Status:** Out of **135 bat species, 16 are endemic (about 12 percent)**, meaning they are found only in India.
 - ✓ Among these, **seven species are listed under threatened categories** by the International Union for Conservation of Nature Red List.

IUCN Red List Assessment	Species
Critically Endangered	Kolar Leaf-nosed Bat (<i>Hipposideros hypophyllus</i>)
Endangered	Nicobar Leaf-nosed Bat (<i>Hipposideros nicobarulae</i>), Pomona Leaf-nosed Bat (<i>Hipposideros pomona</i>), Salim Ali's Fruit Bat (<i>Latidens salimalii</i>), Nicobar Flying Fox (<i>Pteropus faunulus</i>), Andaman Horseshoe Bat (<i>Rhinolophus cognatus</i>)
Vulnerable	Durga Das's Leaf-nosed Bat (<i>Hipposideros durgadasi</i>)

- **Distribution and Diversity Pattern:** The report documented **significant inter-variability in distribution**. West Bengal leads with **68 species**, followed by Meghalaya (66), Uttarakhand (52), Sikkim (43), and Kerala and Karnataka with 41 each.
 - ✓ In contrast, Haryana and Punjab recorded only **five species**, largely due to **limited forest cover and farm expansion**.
 - ✓ An important urban insight is that **Delhi recorded 15 bat species despite urbanisation pressures**, showing adaptability but also highlighting habitat stress.
- **Roosting Behaviour and Habitat:** Bats were

found to roost across **natural habitats and man-made structures**. **Caves and trees are the most common roosting sites**, with caves offering a **stable microclimate and protection from environmental fluctuations and predators**.

- ✓ A notable example is the **Robber's cave in Mahabaleshwar**, which hosts nearly **1 lakh individuals of Phillip's long-fingered bat** during the **breeding season**.
- ✓ Certain species show extreme habitat specificity. The **Critically Endangered Hipposideros hypophyllus** is known from **only one cave at the base of a granite hill in Kolar district, Karnataka**.
- **Regional Research Bias:** Most studies on the ecology and biology of bats are concentrated in the **southern states, particularly the Western Ghats biodiversity hotspot**, leaving large parts of India under-researched.

Threats to Bat Species

- **Habitat loss** driven by **urbanisation, deforestation, land-use changes, and climate change** is a major factor impacting bat populations.
- **Mining activities and hunting** pose direct threats to certain species, especially those with restricted habitats.
- **Negative public perception of bats** has intensified, particularly after the **COVID-19 pandemic**, leading to stigma and persecution.
- Bats are often **misrepresented only as disease carriers**, ignoring their ecological importance, which further aggravates their conservation challenges.

Recommendations

- **Expand research and monitoring**, particularly in **under-studied regions**, to address data gaps.
- **Strengthen disease surveillance systems**, especially in biodiversity hotspots like the **Northeast and Western Ghats**.
- **Enhance public awareness** to reduce stigma and promote understanding of bats' **ecological role**.
- **Promote collaboration** among government agencies, researchers, and conservation organisations.

- **Prioritise habitat protection**, focusing on **critical roosting sites** such as caves and forests.

About Bats

- Bats are the **only mammals capable of true flight** and belong to the order **Chiroptera**.
- They exhibit remarkable size variation, ranging from **flying foxes with wingspans up to 2 metres and weighing 1.5 kilograms**, to the **bumblebee bat weighing only 2 grams**, the smallest mammal in the world.

Key Characteristics

- **Echolocation:** Most microbats use **echolocation**, a highly refined biological sonar in which they emit **ultrasonic calls (20–200 kHz)** and interpret returning echoes to navigate and hunt. Contrary to popular belief, **bats are not blind**, and their vision varies across species.
- **Anatomy:** Their characteristic **upside-down roosting** is an adaptation that enables efficient take-off, as their wings cannot generate lift from a stationary ground position and their hind limbs are not suited for running.
- **Bats and Zoonotic Diseases:** Bats are recognised as reservoirs of several zoonotic pathogens, including **Nipah virus, Hendra virus, Marburg virus, and SARS-like coronaviruses**.
 - ✓ Their ecological traits—such as **large colony sizes, long lifespan, seasonal migration, mixed-species roosting, and transplacental transmission**—facilitate the maintenance and spread of viruses.
 - ✓ The **Nipah virus** is primarily associated with **fruit bats of genus Pteropus**, with transmission occurring through **contaminated fruits or raw date palm sap**.
 - ✓ The **Marburg virus** is linked to **Rousettus fruit bats**, while **coronaviruses are commonly found in horseshoe bats**.
- **Evolutionary Perspective:** Evidence suggests that bats evolved around **52–50 million years ago**, coinciding with a **rise in global temperature and emergence of zoonotic viruses**, indicating a long history of host-virus co-evolution.

ENDEMICISM	
16 bat species found nowhere else on Earth	
About 12% of India's 135 bat species are endemic – found exclusively within Indian territory. They span six distinct geographic zones, from island chains to mountain ranges and plateaus.	
Endemic Species by Region (16 total)	
NE	Himalayas & Northeast India - 4 species Sombre Bat, Meghalaya Thick-thumbed Bat, Rainforest Tube-nosed Bat, Peter's Tube-nosed Bat
WG	Western Ghats - 4 species Salim Ali's Fruit Bat, Pomona Leaf-nosed Bat, Peyton's Whiskered Myotis, Srin's Long-fingered Bat
AN	Andaman & Nicobar Islands - 4 species Nicobar Flying Fox, Homfray's Horseshoe Bat, Andaman Horseshoe Bat, Nicobar Leaf-nosed Bat
PI	Peninsular India - 2 species Kolar Leaf-nosed Bat (Critically Endangered), Cryptic Woolly Bat
GP	Gangetic Plains - 1 species Durga Das's Leaf-nosed Bat (Vulnerable)
CP	Chotanagpur Plateau - 1 species Mitled Horseshoe Bat

Conclusion

- The SolBats 2024–25 report reveals that despite their **ecological significance and diversity**, bats in India remain **understudied, underfunded, and often misunderstood**. Bridging the **data deficit**, **expanding research infrastructure**, and **protecting critical habitats** are essential for ensuring their conservation and maintaining ecological balance.

5.17. India's Forests Could Double Carbon Storage by 2100

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment

Context

A new modelling study published in the journal *Environmental Research: Climate* projects that India's forests could significantly increase their carbon storage capacity by 2100 under current greenhouse gas emission trends.

- The study, conducted by researchers from multiple Indian institutes, provides scenario based projections that differ from the official estimates of the **Forest Survey of India**.

Key Findings of Study

- Sharp Rise in Carbon Storage:** The study estimates

that vegetation carbon biomass in **India's forests may increase by 35% under a low emission scenario, 62% under a medium emission pathway, and up to 97% under a high emission fossil fuel intensive scenario.**

- ✓ All scenarios show similar trends until around 2030, after which they diverge sharply. The steepest increase in forest carbon is expected after 2050.

• Key Drivers of Forest Carbon Increase

- ✓ **Role of Precipitation:** Higher rainfall across most regions improves soil moisture and supports enhanced tree growth and biomass accumulation.
- ✓ **Role of Carbon Dioxide Fertilisation:** Increasing atmospheric carbon dioxide enhances photosynthesis and improves water use efficiency in vegetation.
- ✓ **Time Lag in Ecosystem Response:** Rainfall effects on vegetation appear with a delay of about 2 years in low and medium emission scenarios and about 4 years in high emission scenarios due to slow ecological response and biomass buildup.

• Regional Variation in Carbon Storage Potential

- ✓ **High Growth Regions:** The highest increase in vegetation carbon, **exceeding 60%** under high emission scenarios, is projected in desert and semi arid regions such as Rajasthan, Gujarat, western Madhya Pradesh and adjoining dry interiors.
- ✓ **Moderate Growth Regions:** Moderate increases are expected in the **Trans Himalayan region, the Gangetic plains and the Deccan Peninsula**.
- ✓ **Low Growth Regions:** Relatively lower increases are projected in the Western Ghats and the Himalayas due to ecological saturation and climatic constraints despite their ecological significance.

• Comparison with Forest Survey of India Data

- ✓ **Historical Carbon Stock Trends:** According to the Forest Survey of India, India's forest carbon stock has increased from 6.94 billion tonnes in 2013 to 7.29 billion tonnes in 2023.
- ✓ **Future Projection:** It is projected to reach 8.65 billion tonnes by 2030 based on field measurements and remote sensing data that reflect observed forest conditions.

Limitations of the Study

- ✓ The study does not fully account for deforestation, land use change, forest fires and pest outbreaks that can reduce carbon storage in reality.
- ✓ It does not include soil nutrient limitations, which are critical for long term forest growth and carbon sequestration.
- ✓ The projections are based on climate and vegetation models and require further validation using field based ecological data.

About Forest Survey of India (FSI)

- FSI is a premier organisation under the *Ministry of Environment, Forests and Climate Change (MoEFCC)*.
- It was established in **1981** and headquartered in **Dehradun, Uttarakhand**.
- It is responsible for assessment, monitoring and inventory of India's forest resources.
- India State of Forest Report (ISFR) is a **biennial publication** of Forest Survey of India (FSI) since **1987** and provides an assessment of the country's forest cover based on satellite data mapping.
- ISFR 2023 is the **18th report** in the series published by the FSI.

Climate Commitments and Policy Relevance

- India's updated **Nationally Determined Contribution (NDC)** for 2031 to 2035 sets a target of creating an additional forest **carbon sink of 3.5 to 4 billion tonnes** of carbon dioxide equivalent by 2035.
- **Forests and Bioeconomy:** Forests play a crucial role in carbon sequestration, climate mitigation, livelihood support for forest-dependent communities, sustainable bioeconomy, and forest-based resources.
- **Need for Region-Specific Planning:** One-size-fits-all ineffective; ecological and climatic diversity; climate-sensitive, region-specific policies; future risk adaptation.

5.18. Shekha Jheel Declared India's 99th Ramsar Site

SYLLABUS

GS-3: Conservation, environmental pollution and degradation, environmental impact assessment.

Context

India has added Shekha Jheel Bird Sanctuary in Aligarh, Uttar Pradesh, to the list of internationally important wetlands under the Ramsar Convention, taking the total number of Ramsar sites in the country to 99.

More on the News

- With this addition, **Uttar Pradesh's tally of Ramsar sites has increased to 12**, making it one of the leading states in wetland conservation.
- The designation acknowledges the ecological importance of Shekha Jheel as a **habitat for migratory and resident bird species**, especially along the Central Asian Flyway.

About Shekha Jheel Bird Sanctuary

- Shekha Jheel Bird Sanctuary is a **freshwater wetland located in Aligarh district, Uttar Pradesh**, about **17 km from Aligarh on Gangiri Road**, covering an area of approximately **25 hectares**.
- The wetland was **formed in 1852 due to seepage from the Upper Ganga Canal**, making it a man-made yet ecologically significant habitat.
- It is an important stopover along the **Central Asian Flyway**, attracting nearly **20,000 migratory birds annually**.
- The sanctuary hosts **around 249 bird species**, of which **over 60 are wetland-dependent**, highlighting its biodiversity significance.
- Key avifauna include **bar-headed goose, painted stork, various ducks, and the sarus crane (state bird of Uttar Pradesh)**, along with other resident and migratory species.
- The area also supports terrestrial fauna such as **nilgai (blue bull), blackbuck, mongoose, and small mammals**, indicating a diverse ecosystem.

About the Ramsar Convention

- The Ramsar Convention is an international treaty established in 1971 in Ramsar (Iran).
- Its aim is the conservation and sustainable use of wetlands to preserve biodiversity and maintain ecological balance.
- The convention promotes the concept of "**wise**

use” of wetlands, balancing conservation with sustainable development.

- According to the Convention, Wetlands are defined as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.
- World Wetlands Day is celebrated annually on 2nd February since 1997.

Ramsar Sites in India

- India acceded to the Ramsar Convention on Wetlands on February 1, 1982.
- India has the **highest number of Ramsar sites in Asia (99, including the recent one) and the third highest in the world** after the **United Kingdom (176)** and **Mexico (144)**.
- Tamil Nadu has the highest number of Ramsar Sites in India, with 20 designated wetlands, followed by Uttar Pradesh at 12.
- The Sundarban Wetland in West Bengal, covering 4,230 square kilometres, is India’s largest Ramsar site, while Renuka Lake in Himachal Pradesh, with an area of 0.2 square kilometres, is the smallest.
- These wetlands are protected under various national laws, including the Forest (Conservation) Act (1980), the Environment (Protection) Act, 1986, the Indian Wildlife (Protection) Act (1972), and Wetlands (Conservation and Management) Rules, 2017.

5.19. UNESCO People and Nature Report

SYLLABUS

GS-3: Environment Conservation, environmental pollution and degradation, environmental impact assessment.

Context

The *UNESCO People and Nature Report* presents a stark warning that nearly 90% of UNESCO-designated sites are under high environmental stress, despite their global protection status.

About the Report

The Report is the **first assessment across all UNESCO categories** such as World Heritage Sites, Biosphere Reserves and Global Geoparks.

- It brings together a single network of more than **2,260 sites covering over 13 million sq km**, which is **larger than the combined area of China and India**.
- Most critically, about **98% of these sites** are already experiencing climate change impacts, indicating that no major ecological region is untouched by global warming.
- Every 1°C of warming avoided could halve the number of sites exposed to major disruption by the end of the century.
- The report highlights a key global governance challenge, even the most protected ecosystems are increasingly vulnerable to climate and human pressure.



Key Findings of People and Nature Report

- **Climate Change as the Dominant Pressure:** Climate change has emerged as the most widespread threat, with **98% of UNESCO sites experiencing at least one extreme climate event since 2000**.

ENVIRONMENT

- ✓ These include heatwaves, glacier retreat, sea-level rise, coral bleaching, droughts, floods, and wildfires.
- ✓ A key finding is the sharp rise in **extreme weather events** such as droughts, floods, and wildfires, which have increased by **40% in the past decade**, reflecting growing climate instability.
- ✓ Cryosphere loss is also severe, with over **2,500 gigatonnes of glacier ice lost since 2000** and mountain glaciers declining by around **9% in volume**. Ocean acidification is further weakening marine ecosystems and coral reefs.
- **Land-Use Change and Ecosystem Degradation:** Alongside climate change, human pressures are reshaping these protected areas.
 - ✓ **Wildfires** have become the **leading driver of forest change in World Heritage sites**, surpassing logging and agricultural expansion.
 - ✓ Infrastructure development such as roads, railways, and energy projects is fragmenting ecosystems and reducing ecological connectivity.
 - ✓ Since 2000, over **300,000 sq km of forest cover has been lost**, while invasive species are now present in more than **80% of UNESCO sites**.
- **Risk of Ecological Tipping Points:** The report warns that more than **25% of UNESCO sites** may cross irreversible ecological **tipping points by 2050**.
 - ✓ **Coral reef systems** face the risk of functional collapse due to repeated bleaching events, while forest ecosystems may shift from carbon sinks to carbon sources.
 - ✓ **Freshwater ecosystems** are also under stress, with over 300 sites experiencing chronic water scarcity.
- **Biodiversity and Global Significance:** Despite rising pressures, UNESCO sites remain critical biodiversity strongholds.
 - ✓ They host over **60% of globally mapped species**, including a large share of endemic and endangered species.
 - ✓ **Habitat degradation** within these sites is significantly lower than in surrounding landscapes, highlighting their effectiveness as conservation refuges.
- **Climate Regulation and Human Dependence:** UNESCO sites play a vital role in global climate stability. They absorb nearly **700 million tonnes of**

CO₂ annually and store around **240 gigatonnes of carbon** in forests, soils, and coastal ecosystems.

- ✓ They also support nearly **900 million people (about 10% of the global population)** and contribute close to **10% of global GDP**, mainly through tourism, agriculture, and ecosystem-based livelihoods.
- ✓ Ecosystem services such as freshwater supply, soil fertility, and pollination are essential for global food security, with pollination alone valued at around **\$500 billion annually**.
 - UNESCO initiatives like **"Women for Bees"** support sustainable beekeeping, including in India's Western Ghats.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

- **UNESCO:** A **UN specialized agency** promoting cooperation in education, science, culture, and communication to support peace and sustainable development.
- **Role and Purpose:** Develops global standards, creates knowledge-based solutions, and addresses challenges like inequality, education access, heritage protection, biodiversity loss, and information reliability.
- **Headquarter:** Paris, France
- **Governance:** Structured through **three bodies:** General Conference (policy-making), Executive Board (oversight), and Secretariat (implementation under the Director-General).
- **Global Presence:** Works with **194 Member States** across the world to implement programmes in its core areas.
- **Mandate**
 - ✓ Leads **SDG 4 (Education 2030 Agenda)**
 - ✓ Implements **World Heritage Convention**
 - ✓ Implements **Intangible Cultural Heritage Convention**
 - ✓ Runs science-based programmes like **Man and the Biosphere (MAB)**
- **Key Reports:** Global Education Monitoring (GEM) Report, UNESCO Science Report, World Water Development Report.

Case Studies of Sustainable Development Models

- **Lake Malawi National Park (Africa):** Community-led management has helped reduce illegal fishing activities in the lake. This has supported the recovery of aquatic ecosystems while also safeguarding **food security and livelihoods of 34 local communities** dependent on the resource.

- **Amazon Basin (South America):** In the Amazon region, sustainable agroforestry practices are enabling riverine communities to balance income generation with conservation.

✓ Families produce essential oils from forest resources such as rosewood and copal, supporting local livelihoods while maintaining ecological stability and forest cover.

- **Lauca Biosphere Reserve (Chile):** In Chile's Lauca Biosphere Reserve, the revival of traditional vicuña shearing practices allows communities to earn income from high-value fibre without harming the animals.

5.20. Fund for Responding to Loss and Damage (FRLD)

SYLLABUS

GS-3: Conservation, environmental pollution and degradation; Conservation, environmental pollution and degradation.

Context

More than 200 organisations worldwide have written an open letter to the board of the Fund for Responding to Loss and Damage (FRLD), warning that without urgent financial contributions, the fund may soon run dry.

About the Fund for Responding to Loss and Damage (FRLD)

- The FRLD is an operating entity under the financial mechanism of the **United Nations Framework Convention on Climate Change (UNFCCC)**, created to support developing countries facing irreversible impacts of climate change.
- It was **established during COP27 and operationalised at COP28**, marking a major milestone after decades of demand from vulnerable nations.
- The Fund addresses both **economic losses** (such as infrastructure damage and livelihood loss) and **non-economic losses** (including biodiversity loss, cultural heritage erosion, and displacement).
- It functions under the guidance of the Conference of the Parties (COP) and the Meeting of the Parties to the Paris Agreement (CMA).
- A key operational step has been the launch of its **first**

funding calls under the Barbados Implementation Modalities (BIM) during 2025–26, enabling grant-based, country-led projects.

Significance of the Fund

- **Climate Justice Recognition:** The FRLD represents a landmark in climate justice by acknowledging the disproportionate burden borne by developing and least-developed countries despite their minimal contribution to global emissions.
- **Dedicated Financial Mechanism:** It provides a dedicated financial mechanism to address “loss and damage”—including sea-level rise, extreme weather events, heatwaves, and desertification.
- **Bridging Adaptation Gaps:** The Fund bridges the gap between adaptation limits and real-world climate impacts through support that is expected to be grant-based, non-debt creating, and predictable.
- **Legal and Moral Responsibility:** It reflects evolving global recognition of legal and moral responsibility, reinforced by interpretations such as the climate advisory opinion of the International Court of Justice.

Challenges Faced by the Fund

- **Severe Funding Gap:** Total pledges stand at about **\$822 million**, with around \$448 million disbursed—less than 0.1% of the estimated \$400 billion annual requirement.
- **Risk of Fund Depletion:** Without new contributions, the Fund risks running out of **resources by 2027**.
- **Rising Financial Needs:** Developing countries may require over **\$724 billion annually by 2030**, with actual needs likely higher due to worsening climate impacts and inflation.
- **Slow Commitments by Developed Countries:** Delays in fulfilling financial commitments undermine trust and effectiveness.
- **Limited Initial Allocation:** The initial \$250 million funding envelope under the start-up phase is grossly inadequate.
- **Governance and Equity Concerns:** There are calls for a human rights-based, inclusive, and equitable resource mobilisation strategy.

Proposed Financial Mechanisms

- **Justice-Oriented Global Taxes and Levies:**
 - ✓ Climate damage tax on fossil fuel extraction and production.
 - ✓ Windfall taxes or permanent levies on fossil fuel corporation profits.
 - ✓ Financial transaction taxes to mobilise global capital flows.
 - ✓ Levies on luxury aviation and premium frequent flyers.
 - ✓ Maritime shipping levies with a dedicated share for the Fund.
- **Redistribution and Wealth-Based Measures:**
 - ✓ Wealth taxes targeting ultra-rich individuals.
 - ✓ Redirecting fossil fuel subsidies towards climate finance.
 - ✓ Reallocation of public spending, including portions of military expenditure.
- **Systemic Financial Reforms:** Measures to curb global tax evasion and avoidance.
- **Incremental Financing Roadmap:**
 - ✓ At least \$50 billion annually by 2027.
 - ✓ Scaling to \$100 billion annually by 2031.
 - ✓ Reaching \$400 billion annually by 2035.

Implications for India

- India is among the most climate-vulnerable countries due to its diverse geography, including the Himalayan ecosystem and a coastline exceeding 11,000 km.
- States such as Assam, Bihar, West Bengal, Andhra Pradesh, Maharashtra, and Karnataka face risks from floods, droughts, and cyclones.
- 27 out of 35 States/UTs are exposed to high hydro-meteorological disaster risks.
- **Importance of FRLD Funding for India:**
 - ✓ Address climate-induced disasters and economic losses.
 - ✓ Support vulnerable communities and livelihoods.
 - ✓ Invest in resilient infrastructure and recovery systems.
 - ✓ Reduce dependence on debt-based climate finance.
- **Risks of Inadequate Funding:** Insufficient FRLD resources could constrain India's ability to respond effectively to escalating climate impacts, especially in disaster-prone and economically weaker regions.

5.21. Climate Extremes Threaten Over One-Third of Global Terrestrial Habitats by 2085

SYLLABUS

GS-3: *Conservation, Environmental Pollution and Degradation.*

Context

A recent study published in *Nature Ecology & Evolution* warns that climate-driven extreme weather events could affect 36% of the species' current terrestrial habitats by 2085.

More on the News

- The study was conducted by an international team led by the Potsdam Institute for Climate Impact Research, analysing global biodiversity exposure under climate scenarios.
- It uses **climate projections, impact models, and species distribution data** to assess risks to terrestrial ecosystems.
- The concept of "**compound extremes**" is central, where multiple hazards occur simultaneously or sequentially, amplifying ecological damage.
- The findings indicate that current conservation strategies may be **inadequate**, as they often fail to account for sudden and overlapping extreme events.

Key Findings of the Study

- **36% of land animal habitats at risk:** By 2085, nearly **36% of terrestrial vertebrate habitats could be exposed to multiple extreme weather events** under a high-emission scenario, indicating a substantial escalation in climate-related risks to biodiversity.
- **Large-scale scientific assessment:** The study is based on a comprehensive analysis of **33,936 species across 794 ecoregions**, making it one of the most extensive global assessments of climate-induced habitat vulnerability.
- **Dominance of heatwaves:** Heatwaves have been identified as the **most widespread and dominant threat**, followed by wildfires, droughts, and floods, all of which contribute significantly to ecosystem stress and habitat degradation.

- **Projected exposure by 2050:** By 2050, **heatwaves are projected to affect around 74% of habitats**, while wildfires, droughts, and floods are expected to impact approximately 16%, 8%, and 3%, respectively.
- **Escalation by 2085:** By the end of the century, the intensity and scale of exposure are expected to increase further, with **heatwaves potentially affecting up to 93% of species' geographic ranges**, along with significant increases in wildfire, drought, and flood risks.
- **Hotspots of vulnerability:** Biodiversity-rich regions such as the **Amazon Basin, tropical Africa, and Southeast Asia** are expected to face the highest levels of exposure and ecological stress.
- **Compound risk escalation:** The number of ecoregions exposed to **multiple extreme events is projected to increase sharply from 22 by 2050 to 236 by 2085**, highlighting the rapidly intensifying nature of compound climate risks.
- **Evidence of ecological damage:** Past extreme events have already caused **significant ecological damage**, including population declines exceeding 25% in over 100 documented cases and instances of local extinctions.
- **Mitigation potential:** The study indicates that if global emissions are reduced to net-zero, the exposure of habitats to multiple extreme events could decline substantially to around **9%**, underscoring the critical importance of climate mitigation efforts.
- **Reduced adaptive capacity of species:** The ability of species to adapt, migrate, or recover is significantly constrained under conditions of repeated and overlapping climate stresses, particularly for endemic and geographically restricted species.
- **Challenges to conventional conservation approaches:** Traditional conservation strategies, which are largely based on gradual climatic changes, are becoming inadequate and must be replaced with dynamic, climate-resilient, and risk-based planning frameworks.
- **Threat to ecosystem services and human well-being:** The degradation of biodiversity and ecosystems directly impacts essential services such as food security, water availability, and climate regulation, thereby affecting human livelihoods and economic stability.

Global Initiatives for Conservation of Terrestrial Biodiversity

- **Convention on Biological Diversity (CBD):** The CBD provides a global framework for conserving biodiversity, promoting sustainable use of biological resources, and ensuring equitable sharing of benefits arising from genetic resources.
- **Kunming–Montreal Global Biodiversity Framework (2022):** This framework sets ambitious global targets, including the protection of **30% of terrestrial and marine areas by 2030 (30x30 target)** and the restoration of degraded ecosystems.
- **Convention on International Trade in Endangered Species (CITES):** CITES regulates international trade in endangered species to prevent over-exploitation and ensure their long-term survival.
- **UN Decade on Ecosystem Restoration (2021–2030):** This initiative aims to scale up efforts to restore degraded ecosystems, thereby enhancing resilience against climate change and biodiversity loss.
- **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES):** IPBES provides scientific assessments and policy guidance to support evidence-based decision-making for biodiversity conservation at global and national levels.

Implications of the Findings

- **Accelerated biodiversity loss:** The increasing frequency and intensity of compound extreme events are likely to accelerate biodiversity loss by pushing many species beyond their ecological tolerance limits, thereby increasing the risk of extinction.
- **Ecosystem instability:** These extreme events disrupt key ecological processes such as pollination, nutrient cycling, and food chain dynamics, leading to long-term instability and degradation of ecosystems.

SCIENCE AND TECHNOLOGY

6.1. Artemis II Mission

SYLLABUS

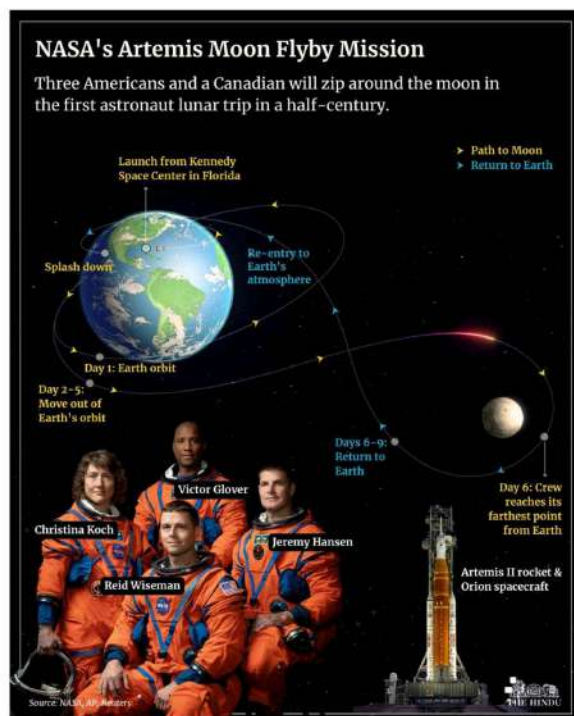
GS-3: Awareness in the fields of Space.

Context

Recently, NASA has successfully launched the Artemis II mission, marking the first crewed journey to the vicinity of the Moon since Apollo 17 in 1972.

More on the News

- The mission was launched on **April 1, 2026**, from the Kennedy Space Center using the **Space Launch System (SLS)** rocket, carrying four astronauts aboard the Orion spacecraft.
- ✓ After liftoff, Orion enters Earth orbit, where multiple engine burns (perigee and apogee raising) place it in a high Earth orbit (~40,000+ miles).



- The crew remains in Earth orbit for about a day to:
 - ✓ Test life-support, navigation, and communication systems
 - ✓ Perform manual piloting and proximity operations
- After system validation, the spacecraft performs the **Trans-Lunar Injection (TLI) burn**, sending it toward the Moon.
- The spacecraft follows a **free-return trajectory**, travelling around the Moon at a **distance of about 7,500–10,000 km**, including views of the far side, before returning to Earth.
- The mission duration is **approximately 10 days**, ending with re-entry at around 40,000 km/h and splashdown in the Pacific Ocean.

About the Artemis II Mission

- Artemis II is the **first crewed mission of NASA's Artemis programme**, marking humanity's return to deep space beyond low Earth orbit for the first time since Apollo 17.
- It is designed as a **test flight without a lunar landing** to validate systems required for future missions.
- The mission uses NASA's powerful **Space Launch System (SLS)** rocket to launch the crew aboard the **Orion spacecraft**, which is specifically designed to support human life and operations during deep-space missions.
- **Objectives:** The primary objective of Artemis II is to **test life-support systems with astronauts onboard**, while also validating the spacecraft's **navigation, communication, and safety systems**, thereby ensuring that all critical technologies and operations are ready for future crewed lunar landing missions.
- **Crew Composition:** The mission carries a four-member crew consisting of **commander Reid Wiseman, pilot Victor Glover, and mission specialists Christina Koch and Jeremy Hansen**.
 - ✓ It represents a historic milestone as it includes the **first woman, first person of colour, and first**

non-U.S. astronaut to travel on a lunar trajectory.

- **Scientific & Technical Aspects:** The mission includes deployment of CubeSats and scientific observations.
 - ✓ Key areas of study include **Radiation exposure in deep space, Human physiological response, and Lunar surface imaging.**
- **Significance:**
 - ✓ Artemis II is the first human mission beyond low Earth orbit in over 50 years.
 - ✓ It serves as a crucial stepping stone for future missions such as Artemis III, which aims to land humans on the Moon.
 - ✓ It contributes to long-term goals of establishing a sustained human presence on the Moon and enabling future missions to Mars.
 - ✓ Strategically, it assumes importance amid the evolving global space race, especially with China's plans for a crewed Moon landing by 2030, focusing on the lunar south pole.

About the Artemis I Mission

- Launched in 2022, Artemis I was the first mission of NASA's Artemis programme and marked the beginning of a series of increasingly complex missions aimed at enabling human exploration of the Moon and eventually Mars.
- It was an uncrewed lunar flight test conducted from November 16 to December 11, 2022, lasting 25 days, during which the Space Launch System (SLS) carried the Orion spacecraft on a 1.4-million-mile journey beyond the Moon and back.
- The mission was designed to test critical deep-space exploration systems and successfully demonstrated key capabilities of Orion, including lunar flybys, operation in a distant retrograde orbit, and safe atmospheric re-entry followed by splashdown in the Pacific Ocean.
- Artemis I also set a new benchmark in human-rated deep space exploration, as the spacecraft reached a **maximum distance of 268,563 miles from Earth**, surpassing the previous record set **during Apollo 13**, thereby paving the way for future crewed missions.

6.2. Prototype Fast Breeder Reactor at Kalpakkam, Tamil Nadu attains First Criticality

SYLLABUS

GS-3: Infrastructure: Energy and Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Context

India has achieved a major milestone in its nuclear energy programme with the 500 MWe Prototype Fast Breeder Reactor (PFBR) at Kalpakkam, attaining first criticality, marking the start of a controlled nuclear chain reaction.

More on the News

- PM described it as a *"defining step in India's civil nuclear journey"*, marking progress in the **second stage of the three-stage nuclear programme**.
- The achievement signifies India's advancement towards **long-term energy security, nuclear fuel self-reliance, and clean energy transition**.

About the Kalpakkam PFBR Project

- The PFBR is a **500 MWe sodium-cooled, pool-type fast breeder reactor** designed by the **Indira Gandhi Centre for Atomic Research (IGCAR)** and built by **Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI)**, both operating under the Department of Atomic Energy (DAE).
- The reactor achieved criticality after meeting all safety requirements and obtaining clearance from the Atomic Energy Regulatory Board.
- **Approved in 2003 and started in 2004**, the project took over two decades to reach criticality due to technological complexities, achieving it in April 2026 after core (March 2024) and fuel loading (October 2025).
- The cost rose from about ₹3,492 crore to nearly ₹7,600 crore due to delays and technical issues, with procurement inefficiencies also flagged by the Comptroller and Auditor General of India.
- **Global Context:** With PFBR, India is expected to become **only the second country after Russia** to operate a commercial fast breeder reactor.

- ✓ Fast breeder reactor programmes in countries like **Japan, France, and the United States** have been scaled back due to safety and economic concerns.

About the Criticality

- Criticality refers to the stage at which a **nuclear reactor achieves a self-sustaining chain reaction**, where each fission event produces enough neutrons to sustain further reactions.
- At this stage, the **reactor no longer requires an external neutron source** and indicates that the reactor core is functioning as designed.
- However, criticality is only an initial milestone, and the reactor must undergo low-power testing and regulatory approval before full-scale electricity generation begins.

About the Prototype Fast Breeder Reactor (PFBR)

- The PFBR is a nuclear reactor that produces **more fuel than it consumes**.
- It is a **fast breeder reactor**, meaning it generates additional fissile material during operation.
- Its core-loading marks a **milestone** because it initiates **Stage II of India's three-stage nuclear programme**.
- The Department of Atomic Energy (DAE) set up a special-purpose vehicle in 2003 called **BHAVINI** to implement **Stage II** of the nuclear programme.

Role in India's Three-Stage Nuclear Programme

- The three-stage programme was designed by **Homi J Bhabha** because India hosts roughly a quarter of the world's thorium.
- **Stage I – PHWRs:** India used pressurised heavy water reactors (PHWRs) and **natural uranium-238 (U-238)**, which contains small amounts of **U-235, as the fissile material**.
 ✓ The heavy water in PHWR slows neutrons enough to be captured by U-238 and U-235 nuclei and cause new fission.
 ✓ These reactions produce **Plutonium-239 (Pu-239) and energy**.
- **Stage II – PFBR:** Only **U-235, not U-238**, can sustain a chain reaction, and it is consumed in Stage I.
 ✓ In Stage II, India uses **Pu-239 together with U-238** in the PFBR to **produce energy, Uranium-233, and**

more Pu-239.

- **Stage III – Thorium-Based Reactors:** In Stage III, **Pu-239 is combined with Thorium-232 (Th-232)** in reactors to produce energy and Uranium-233.
 ✓ The three stages are expected to allow the country **complete self-sufficiency in nuclear energy**.

How PFBR Works

- **Fuel and Core Design:** PHWRs use **natural or low-enriched U-238** and **produce Pu-239 as a by-product**.
 ✓ This Pu-239 is combined with more U-238 into a mixed oxide and loaded into the core of a new reactor together with a blanket.
- **Breeding Mechanism:** The blanket is a material that reacts with fission products in the core to produce more Pu-239.
 ✓ The PFBR is designed to produce more Pu-239 than it consumes.
- **Fast Neutron System:** In a fast breeder reactor, neutrons are not slowed, allowing them to trigger specific fission reactions efficiently.

Coolant and Energy Transfer System

- The PFBR uses **liquid sodium**, a highly reactive substance, as **coolant in two circuits**:
 ✓ Coolant in the **first circuit** enters the reactor and leaves with heat energy and radioactivity. Through heat exchangers, it transfers only the heat to the coolant in a secondary circuit.
 ✓ The **secondary circuit** transfers the heat to generators to produce electricity.
- This design ensures efficient heat transfer while maintaining separation between **radioactive and non-radioactive systems**.

About the Nuclear Fission Process

- In nuclear fission, the nucleus of an atom absorbs a neutron, destabilises, and breaks into two while releasing energy.
- If the destabilised nucleus releases more neutrons, the reactor facilities attempt to use them to instigate more fission reactions.

Current Status of Nuclear Power in India

- India currently operates about **24 nuclear reactors** with a total installed capacity of **8,780 MW**, dominated by PHWR technology.

- The government aims to expand nuclear capacity to **22,400 MWe by 2032** and around **100 GW by 2047**.
- Plans include construction of **10 PHWRs in fleet mode** and 6 fast breeder reactors of **600 MWe each**.
- A **Fast Reactor Fuel Cycle Facility (FRFCF)** is under construction at Kalpakkam to enable reprocessing and support a closed fuel cycle.

Significance

- **Energy Security:** The PFBR enables the extraction of **60–100 times more energy** from a given quantity of uranium, significantly improving resource efficiency and **reducing India's dependence on imported nuclear fuel**.
- **Clean Energy Transition:** Nuclear energy from PFBR provides reliable, low-carbon base-load power, complementing renewables and supporting **India's carbon reduction and climate goals**.
- **Technological Capability:** The PFBR demonstrates India's indigenous strength in advanced nuclear engineering, reactor design, and expertise in **fuel cycle technologies, materials, and reactor physics**.
- **Strategic Importance:** The PFBR acts as a bridge between **uranium-based and thorium-based systems**, positioning **India among a select group of countries** with advanced fast breeder technology.
- **Industrial Development:** The project involved over 200 Indian industries, including MSMEs, strengthening domestic manufacturing and supporting the **Atmanirbhar Bharat initiative**.

6.3. National Quantum Mission

SYLLABUS

GS-3: *Achievements of Indians in science & technology; indigenization of technology and developing new technology and awareness in the fields of IT and Computers.*

Context

Under the National Quantum Mission (NQM), India has successfully demonstrated a 1,000 km quantum communication network within two years of launch.

More on the News

- This milestone has been achieved **ahead of schedule** against the target of **2,000 km secure quantum communication over 8 years**.
- The network is based on **Quantum Key Distribution**

(QKD) and developed using **indigenous technology** by QNu Labs.

- The 1,000 km network is among the **longest QKD deployments globally**, marking a **landmark advancement in secure quantum communication**.
- It enables **data transmission using quantum principles**, replacing classical binary systems (0s and 1s).

Significance

- Strengthens **secure communication infrastructure** for defence, financial systems, and critical sectors.
- Demonstrates **rapid progress in indigenous quantum capability**, reducing dependence on foreign technologies.
- Enhances India's position in the **global quantum technology race**.
- Contributes to building a **secure digital ecosystem** against cyber threats.
- Expanding **startup participation and R&D funding** reflects growing industry interest and ecosystem development.

What is Quantum Computing?

- Quantum computers use special units called qubits to store and process information. Unlike regular computers, where bits can only be 0 or 1, qubits can be both 0 and 1 at the same time. This ability to be in multiple states at once makes quantum computers different and potentially much more powerful than traditional ones.

Quantum Communication

- The field of quantum communication is the study of **encoding and transmitting information** between distant quantum systems.
- This relatively new field takes advantage of the peculiar properties of quantum physics, such as superposition, teleportation, and entanglement, which have no classical equivalents.

Classical Communication

- Communication technologies today rely on classical communication, taking advantage of the properties of information carriers that follow the laws of classical physics.
- Communication and information processing capabilities are fundamentally tied to the laws that govern the physical systems that are used to transmit and process that information.

About the National Quantum Mission (NQM)

- It was approved by the Union Cabinet on **19 April 2023** with a financial outlay of **₹6003.65 crore** for the period **2023–24 to 2030–31**.
- It is one of the **nine initiatives under the Prime Minister's Science, Technology and Innovation Advisory Council (PMSTIAC)**.
- It focuses on advancing **quantum computing, communication, sensing, and materials**.
- The mission aims to **seed, nurture, and scale quantum technologies** in the country while fostering a **vibrant ecosystem of R&D, startups, and skilled human resources**.
- It seeks to accelerate **quantum-led economic growth**, enhance technological self-reliance, and position India at the forefront of next-generation technologies.
- **Core Objectives:**
 - ✓ **Quantum Computing Development:** Build quantum computers with **20–50 qubits (3 years)**, **50–100 qubits (5 years)**, and **up to 1000 qubits (8 years)** across superconducting and photonic platforms.
 - ✓ **Satellite-Based Quantum Communication:** Enable **quantum-secured communication over 2000 km** and expand for international connectivity.
 - ✓ **Inter-City QKD Network:** Develop **2000 km quantum communication networks** using optical fibre infrastructure with trusted nodes.
 - ✓ **Multi-Node Quantum Networks:** Establish **scalable quantum networks (2–3 nodes)** using entanglement swapping and quantum repeaters.
 - ✓ **Quantum Sensing & Atomic Clocks:** Develop **ultra-sensitive sensors and high-precision clocks** for navigation, communication, and defence applications.
 - ✓ **Quantum Materials & Devices:** Develop advanced materials like **superconductors and topological materials** for quantum devices and photon systems.
- **Implementation Strategy:**
 - ✓ Four **Thematic Hubs (T-Hubs)** have been established across India.
 - ✓ These hubs bring together **14 Technical Groups across 17 states and 2 Union Territories**.

- ✓ Focus areas include **technology innovation, skill development, entrepreneurship, industry partnerships, and global collaborations**.
- ✓ Participation of **women scientists** is actively encouraged.
- **Hub-Spoke-Spike Model:** Each T-Hub follows a **Hub-Spoke-Spike structure**.
 - ✓ **Hubs:** Central institutions coordinating research.
 - ✓ **Spokes:** Thematic research projects.
 - ✓ **Spikes:** Individual research groups.

Initiatives under the National Quantum Mission (NQM)

- **Quantum-Safe Ecosystem Framework:** A concept paper outlines a strategic roadmap to secure India's digital infrastructure against quantum threats.
- **Defence Research and Development Organisation (DRDO):** DRDO is developing and testing quantum-resilient security schemes along with quantum-safe symmetric and asymmetric cryptographic algorithms.
- **Society for Electronic Transactions and Security (SETS):** SETS is advancing PQC research and has implemented it in FIDO authentication systems and IoT security applications.
- **Centre for Development of Telematics (C-DoT):** C-DoT has developed solutions such as QKD, PQC frameworks, and quantum secure video IP phones.

6.4. Integrated Air Drop Test (IADT-02) - Gaganyaan Mission

SYLLABUS

GS 3: Science & Technology – *achievements of Indians in science & technology; indigenization of technology and development of new technology; awareness in the fields of IT, space.*

Context

Recently, Indian Space Research Organisation successfully conducted the second Integrated Air Drop Test (IADT-02) at the Satish Dhawan Space Centre as part of the Gaganyaan mission.

About Integrated Air Drop Test (IADT-02)

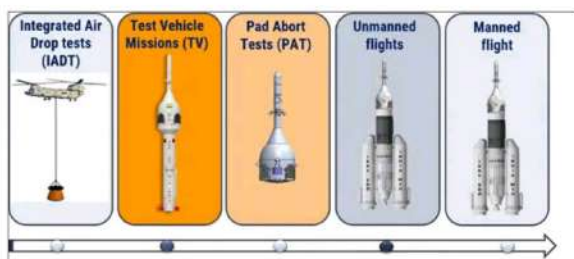
- Simulated Crew Module (~5.7 tonnes, equivalent

to Gaganyaan G1) was lifted by an Indian Air Force Chinook helicopter to ~3 km and released over a sea drop zone near Sriharikota coast .

- 10 parachutes of 4 types deployed in a precise sequence during descent.
- Parachutes ensured gradual velocity reduction for safe touchdown.
- Module successfully recovered with Indian Navy; IADT-02 validated parachute-based deceleration system.
- The test is crucial for ensuring the safe recovery of the crew module, which carries astronauts during human spaceflight.
- The first test was conducted on August 24, 2025 at the Satish Dhawan Space Centre.
- A 4.8-tonne dummy Crew Module was dropped from a height of 3 km using a helicopter.

About Gaganyaan Mission

- The Gaganyaan mission envisages demonstration of human spaceflight capability by launching a crew of 3 members to an orbit of **400 km for a 3 days mission** and bringing them back safely to earth by landing in Indian sea waters.



- **Pre-requisites of the Gaganyaan mission include development of critical technologies such as:**
 - ✓ Human rated launch vehicle for safe crew transport
 - ✓ Life Support System for Earth-like environment in space
 - ✓ Crew emergency escape system
 - ✓ Crew management including training, recovery and rehabilitation
- **Various precursor missions are planned to demonstrate Technology Preparedness Levels:**
 - ✓ Integrated Air Drop Test (IADT)

✓ Pad Abort Test (PAT)

✓ Test Vehicle (TV) flights

- Safety and reliability of all systems will be proven through unmanned missions before the final manned mission.

Gaganyaan Mission – Key Components and Features

Component	Details
HLVM3 (Human Rated LVM3)	LVM3 rocket of Indian Space Research Organisation identified for Gaganyaan mission; consists of solid, liquid and cryogenic stages; re-configured for human rating; capable of placing Orbital Module in 400 km orbit; includes Crew Escape System (CES) with high burn rate motors for emergency escape
Orbital Module (OM)	Comprises Crew Module (CM) and Service Module (SM); equipped with advanced avionics systems with redundancy for human safety
Crew Module (CM)	Habitable module with Earth-like environment; double-walled structure with pressurized inner and unpressurized outer structure with Thermal Protection System; includes life support, avionics, crew interfaces and deceleration systems; designed for safe re-entry and landing
Service Module (SM)	Provides support to CM in orbit; contains thermal, propulsion, power, avionics systems and deployment mechanisms; unpressurized structure
New Technologies	Development of engineering systems and human-centric systems with focus on crew safety

Significance of IADT-02

- Marks a key milestone in the Gaganyaan mission, advancing readiness for India's first human spaceflight.
- Successfully validates the Crew Module's parachute-based deceleration system, crucial for safe re-entry and landing.
- Demonstrates effective coordination between Indian Space Research Organisation, Indian Air

Force, Indian Navy, and Defence Research and Development Organisation.

- Strengthens confidence in crew safety systems, including controlled descent and sea recovery operations.
- Builds on earlier tests (IADT-01) and contributes to technology validation before uncrewed (G1) and eventual crewed missions.

6.5. NITI Aayog Reports on “Ease of Doing Research & Development in India”

SYLLABUS

GS-3: *Conservation, Environmental Pollution and Degradation.*

Context

NITI Aayog recently released two reports on Ease of Doing Research & Development in India, aimed at enabling a more efficient, facilitative, and innovation-driven research ecosystem in the country.

More on the News

- The reports provide a comprehensive assessment of India’s R&D ecosystem and outline a set of actionable recommendations focused on improving funding mechanisms, institutional governance, regulatory frameworks, and research translation.
- A key emphasis is on shifting towards a more trust-based, outcome-oriented, and facilitative environment to enable researchers and institutions to perform at their full potential.
- This initiative aligns with India’s vision of becoming a **global innovation hub under the “Viksit Bharat” framework**.

Key Highlights of the Reports

- **ROPE Framework (Removing Obstacles, Promoting Enablers):** The reports propose the **ROPE framework** as a central reform strategy to eliminate bureaucratic hurdles and promote a supportive ecosystem for research and innovation.
- **Focus on “Lab-to-Market” Translation:** There is a strong emphasis on **translating research into**

commercially viable technologies, moving beyond academic outputs to real-world applications.

- **Enhancing Funding Mechanisms:** The reports recommend diversifying funding sources, including **greater private sector and CSR participation**, to supplement public investment.
 - ✓ The reports stress the need to better leverage the ₹1 lakh crore Research, Development and Innovation (RDI) / Anusandhan National Research Foundation (ANRF) fund.
- **Governance and Regulatory Reforms:** Simplification of procedures, reduction in approvals, and improved institutional governance are highlighted as critical to improving ease of doing R&D.
- **Building a Trust-Based Ecosystem:** The reports advocate a shift from **compliance-heavy systems to trust-based frameworks**, enabling researchers to focus on innovation rather than administrative burdens.

State of India’s R&D Landscape

- India has emerged as a significant global knowledge producer, with rising research output and has improved its ranking to **38th on the Global Innovation Index**.
- However, the Gross Expenditure on R&D (GERD) remains low at around **0.6–0.7% of GDP**, which is significantly below leading innovation economies.
- The R&D ecosystem is largely **public-sector driven**, with the private sector contributing less than 40% of total R&D, a stark contrast to advanced economies where the private sector accounts for over 70%.
- Further, according to the WIPO World Intellectual Property Indicators (WIPI) 2024 report, India ranked 6th globally in patent applications with 64,480 filings in 2023.

Challenges to India’s R&D Ecosystem

- **Funding and incentives:** Low overall R&D investment, rigid budgeting cycles, and delayridden grant disbursements make it difficult for researchers to sustain medium and longterm projects.
- **Bureaucratic and procedural hurdles:** Cumbersome procurement rules, multilayered approvals, and overcautious riskaversion slow the import of

scientific equipment and raw materials, and add to project timelines.

- **Fragmented ecosystem:** Research laboratories, universities, and industries often operate in parallel, with limited formal mechanisms for joint projects, shared infrastructure, and commercialisation partnerships.
- **Translation gap:** While India produces a sizable number of research papers, the system struggles to convert these into patents, scalable products, and industrial applications, reflecting weak technology transfer and IP management support.
- **Institutional and cultural barriers:** Faculty-centric teaching loads, limited incentives for applied research, and slow adoption of digital tools and big data-enabled science constrain the culture of innovation in many institutions.

Measures Taken to Strengthen India's R&D Ecosystem

- **Institutional Reforms and Funding Support:** The establishment of initiatives such as the **Anusandhan National Research Foundation (ANRF)** and the **RDI Scheme** aims to streamline funding mechanisms and promote high-quality research across disciplines.
- **Promotion of Innovation and Startups:** Initiatives such as the **Atal Innovation Mission** and **Startup India** have strengthened the innovation ecosystem by encouraging entrepreneurship and applied research.
- **Mission-Mode Research Initiatives:** The government has prioritised mission-driven research in strategic sectors such as artificial intelligence, clean energy, and biotechnology to address national priorities.
- **Digital and Collaborative Platforms:** Efforts have been made to develop digital platforms and research networks to enhance collaboration, data sharing, and coordination among institutions.

Way Ahead

- **Increase and channelise R&D funding:** India needs to raise R&D intensity to at least 1.5–2% of GDP over the medium term, with a clear roadmap to shift the

balance toward higher private sector participation and mission-oriented public investment.

- **Deepen industry-academia linkages:** Stronger mechanisms for joint research, shared infrastructure, and technology transfer offices are required, along with fiscal incentives for corporate R&D, and CSR-linked innovation funding.
- **Regulatory and procedural reform:** Simplified procurement, flexible cost recovery, shorter approval timelines, and harmonised rules across ministries will reduce the “ease of doing R&D” gap compared to international peers.
- **Strengthen IP and translation ecosystems:** Institutions need better support for patent filing, licensing, incubation, and proof-of-concept funding so that laboratory outputs can move swiftly toward the market.

6.6. Gujarat's Sports Genomics Programme

SYLLABUS

GS-3: Science and Technology- Developments and their Applications and Effects in Everyday Life; Awareness in the fields of Nano-technology, Bio-technology.

Context

Gujarat has launched India's first Sports Genomics Programme to scientifically analyse genetic factors influencing athletic performance.

More on the News

- The initiative reflects a shift towards **data-driven sports development**, aligning with India's ambition to improve performance in global sporting events such as the 2030 Commonwealth Games.
- It is being implemented by the Gujarat Biotechnology Research Centre in collaboration with state sports authorities, marking a convergence of **biotechnology and sports science**.

What is Sports Genomics?

- Sports genomics is a field that studies how genes influence athletic traits such as endurance, strength, speed, injury susceptibility, and recovery ability.
- Scientific studies suggest that genetic factors may

contribute significantly (up to around two-thirds) to athletic potential, although environmental factors remain equally important.

- The approach represents a move from traditional training methods to precision-based, personalised sports science.

Key Features of Gujarat's Programme

- The programme aims to create a comprehensive **Athlete Genome Database**, integrating genetic, physiological, and performance-related data for long-term analysis.
- It plans to collect around **10,000 genetic samples over five years**, covering multiple sports disciplines, including both endurance and power-based sports.
- Approximately **2,000 samples will be collected annually**, ensuring a systematic and scalable research framework.
- The initiative is supported by a **dedicated financial allocation** and involves collaboration between scientific institutions and sports authorities for effective implementation.
- The programme aims to support **evidence-based athlete identification and training strategies** ahead of major international competitions.

Potential Benefits

- **Scientific Talent Identification:** Sports genomics can enable early identification of athletic potential by linking genetic traits with suitability for specific sports disciplines.
- **Personalised Training and Performance Enhancement:** It facilitates customised training regimes based on an individual's genetic profile, thereby improving performance and efficiency.
- **Injury Prevention and Recovery:** Genetic insights can help predict injury risks and design better recovery protocols, reducing long-term health impacts on athletes.
- **Strengthening Competitive Performance:** The integration of advanced sports science can enhance India's preparedness and performance in global sporting events.

Ethical and Social Concerns

- **Data Privacy and Security Risks:** The collection of

genetic data raises concerns regarding privacy, as sensitive biological information requires robust protection mechanisms.

- **Risk of Genetic Discrimination:** There is a possibility that athletes may be unfairly selected or excluded based solely on genetic traits rather than overall ability.
- **Fairness and Integrity in Sports:** The use of genomics may lead to concerns about creating "genetic advantages," potentially challenging the level playing field in sports.
- **Overemphasis on Genetics:** Excessive reliance on genetic factors may undermine the role of training, environment, and socio-economic conditions in shaping performance.

Way Forward

- **Establishing Ethical and Regulatory Frameworks:** Clear guidelines must be developed to regulate the use of genetic data and ensure ethical implementation of sports genomics.
- **Ensuring Data Protection and Consent:** Strong safeguards, including informed consent and secure data handling, are essential to protect athletes' rights.
- **Integrating with Holistic Training Approaches:** Genomics should complement traditional factors such as coaching, nutrition, and infrastructure rather than replace them.
- **Promoting Inclusive and Balanced Development:** The focus should remain on equitable access to sports opportunities, ensuring that genomics supports inclusive growth in the sporting ecosystem.

6.7. Indian Space Situational Awareness Report for 2025 (ISSAR 2025)

SYLLABUS

GS-2: *Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation; Issues and challenges pertaining to the federal structure.*

GS-3: *Conservation, environmental pollution and degradation, environmental impact assessment; Disaster and disaster management.*

Context

The Indian Space Situational Awareness Report 2025 (ISSAR 2025) has been released by the Indian Space Research Organisation as its annual assessment of the space environment.

Key Highlights of the Report

- **Record Space Activity:** The year 2025 witnessed the highest number of launches since the beginning of the space age.
 - ✓ There were 328 launch attempts, out of which 315 launches were successful in placing 4198 known operational satellites.
- **Rise in Lunar Exploration Activities:** There were four lunar missions in 2025, reflecting the renewed interest in lunar exploration.
 - ✓ All of these missions were launched by private players. Among them, Blue Ghost Mission 1 made history by becoming the first privately owned spacecraft to successfully soft land on the Moon.
- **Rising Space Congestion:** Approximately 1.6 lakh close-approach alerts were issued globally, including a significant number for Indian satellites, indicating increasing congestion, especially in Low Earth Orbit (LEO).
- **Growing Space Debris Threat:** The accumulation of defunct satellites and fragmentation debris continues to increase collision risks, making space debris one of the most pressing challenges for space operations.
- **Emergence of Private and Commercial Space Activity:** The report highlights the rising role of private players and commercial missions, including lunar missions, contributing to increased orbital traffic.

Indian Space Scenario by the End of 2025

- By the end of 2025, India operated a total of about 144 spacecraft, including government, private, and academic/institutional satellites.
 - ✓ The number of operational satellites owned by the Government of India was 22 in Low Earth Orbit (LEO) and 31 in Geo-synchronous Earth Orbit (GEO).
- India's launch activity in 2025 included five

missions from Sriharikota, of which four achieved their intended orbits, and the milestone **100th Indian launch** took place with GSLV F15, marking Sriharikota as a key long-term spaceport.

- In addition, two Indian deep space missions, namely, Chandrayaan-2 Orbiter (CH2O) and Aditya-L1 at the Sun-Earth Lagrange point, are also active.
- Beyond traditional satellites, India also advanced in orbit demonstrations with the **SpaDeX mission**, which showcased autonomous satellite docking and undocking, laying the groundwork for future in-orbit servicing, constellation management, and potential debris removal technologies.
- 2025 also marked the historic voyage of the Indian astronaut, **Group Captain Shubhanshu Shukla**, who commanded the private Axiom 4 crewed mission to ISS in the Dragon crew module.

India's Efforts to Preserve Space Sustainability

- **Institutional Mechanisms:** ISRO has established **IS4OM (ISRO System for Safe and Sustainable Space Operations Management)** as a dedicated platform to monitor space objects, assess collision risks, and ensure compliance with global sustainability guidelines.
- **Indigenous SSA Capabilities:** India is developing indigenous Space Situational Awareness (SSA) capabilities such as **Project NETRA**, which enables tracking of space debris and prediction of collision threats, reducing dependence on foreign data.
- **Debris Mitigation Initiatives:** ISRO has launched the **DebrisFree Space Missions (DFSM) 2030** initiative, committing to eliminate the creation of new orbital debris from all Indian space missions by 2030.
- **Collision Avoidance and Monitoring:** Regular collision avoidance manoeuvres (CAMs) and continuous monitoring of space objects help protect Indian satellites from potential hazards.
- **International Cooperation:** India actively participates in the deliberations related to space debris in international fora like Inter-Agency Space Debris Coordination Committee (IADC), IAA Space Debris Committee, etc., promoting responsible behaviour in outer space.

6.8. Mission MITRA

SYLLABUS

GS-3: Achievements of Indians in science & technology; indigenization of technology and developing new technology and awareness in the fields of IT and Computers.

Context

Recently, ISRO announced the launch of Mission MITRA (Mapping of Interoperable Trades and Response Assessment), which will contribute to the design and development of the Gaganyaan mission.

About Mission MITRA

- Mission MITRA is launched in **Leh, Ladakh**, to investigate the behaviour, performance, and dynamics of the crew in an environment that simulates space flight.
- It aims to develop critical insights into *team interoperability between 'Gaganyatris'* and ground-control teams, and assess their **decision-making effectiveness under extreme environmental and operational conditions**.
- It is launched by **ISRO's Human Space Flight Centre** in collaboration with the **Institute of Aerospace Medicine (Indian Air Force)** and **Protoplanet Pvt. Ltd., Bengaluru**.
- In this mission, ISRO is utilising the extremely challenging environment of Ladakh—characterised by **high altitude (approximately 3,500 meters above sea level)**, **sub-zero temperatures for more than half of the year**, and **low humidity**—and is employing it as a **'Space-Like' test bed** for human spaceflight missions.

About Gaganyaan Mission

- Gaganyaan project envisages demonstration of human spaceflight capability by launching a **crew of 3 members** to an orbit of **400 km for a 3-day mission** and bringing them back safely to earth.
- It integrates Indian and international expertise. Key requirements include **human-rated launch vehicles**, **life support systems**, **emergency escape provisions**, and **crew management**.
- Various precursor missions, including **Integrated**

Air Drop Test (IADT), Pad Abort Test (PAT) and Test Vehicle (TV) flights, are planned to demonstrate the technology preparedness levels before carrying out the actual Human Space Flight mission.

6.9. Global Wildlife Trade and Zoonotic Disease Risk

SYLLABUS

GS-3: Science and Technology- Developments and their Applications and Effects in Everyday Life; Awareness in the fields of Nano-technology, Bio-technology.

Context

A recent study published in Science highlights that global wildlife trade—both legal and illegal—is accelerating Zoonotic Spillover (transmission of pathogens from animals to humans), raising concerns about future epidemics and pandemics.

Key Findings

- **Elevated Risk:** Traded mammals are **1.5 times more likely** (~50% higher probability) to share pathogens (virus, bacteria, fungi, parasites) with humans.
- **Strong Evidence Base:** Analysis of **2,000+ mammal species** and **40 years of global trade data (1980–2019)** shows **41% of traded species vs 6.4% of non-traded** share at least one pathogen.
- **Time in Trade Matters:** Each **10 years in trade adds one additional shared pathogen**, indicating cumulative zoonotic risk.
- **Live & Illegal Trade Hotspots:**
 - ✓ Live-animal markets → **1.34–1.5× higher pathogen exchange**.
 - ✓ Illegal trade → **~1.4× higher pathogen sharing**.
- **Supply Chain Amplification:** Hunting, breeding, transport, storage, and sale create **multiple human–animal contact points**, increasing transmission probability.
- **Scale of Impact:** Wildlife trade involves **~25% of all mammal species globally**, expanding the pool of potential zoonotic hosts.
- **Additional Drivers:**
 - ✓ **Synanthropy** (species adapting to human environments)
 - ✓ **Wild meat consumption** (secondary but linked factor)

- **Historical Linkages:** Outbreaks such as HIV/AIDS, Ebola virus disease, Mpox, and COVID-19 are associated with wildlife-human interfaces.
- **Governance Gap:** The Convention on International Trade in Endangered Species of Wild Fauna and Flora focuses on conservation, **not zoonotic disease risk**.

6.10. India's First Chip Fabrication Plant at SEZ Dholera

SYLLABUS

GS-I Prelims: Current events of national and international importance.

GS-3: Science and Technology- Developments and their Applications and Effects in Everyday Life; Indigenization of Technology and Developing New Technology.

Context

The Government of India has notified a Special Economic Zone (SEZ) by Tata Semiconductor Manufacturing Private Limited at Dholera to establish the country's first semiconductor chip fabrication plant.

Key Features of the Semiconductor Fab Project

- The SEZ will be developed over **66.166 hectares** with a proposed investment of **₹91,000 crore**.
- This is **India's first chip fabrication plant**.
- The SEZ is designed to support **electronic hardware, software, and IT/ITES services** with integrated infrastructure.
- It includes a **dedicated approval and logistics mechanism** to ensure ease of doing business.
- The approval was granted by the **Board of Approval (BoA)**, the apex body for SEZ-related decisions.
- It is part of a broader push under initiatives like the **India Semiconductor Mission 2.0**, aimed at building a full-stack semiconductor ecosystem.
- **Policy & Regulatory Reforms: Amendments to Special Economic Zones Rules, 2006 (June 2025)** tailored for semiconductor manufacturing. Key reforms include:
 - ✓ Reduction in **minimum land requirement (50 → 10 hectares)**
 - ✓ Relaxation of **encumbrance norms**

- ✓ Inclusion of **free-of-cost supplies in Net Foreign Exchange (NFE)**
- ✓ Allowing **Domestic Tariff Area (DTA) sales** on payment of duties
- These reforms aim to promote **high-value, capital-intensive investments** and improve ease of doing business.

About the Semiconductor Fabrication Plant (Fab)

- A semiconductor fabrication plant (fab), also known as a **foundry**, is a facility where **integrated circuits (chips)** are manufactured in the microelectronics industry.
- Foundries typically **do not design chips**; instead, they manufacture chips for **fabless companies** based on their designs.
- Semiconductor fabs are **highly capital-intensive**, often requiring investments of **several billion dollars** and high production volumes to remain viable.
- The core of a fab is the **clean room**, where dust, temperature, humidity, and vibrations are strictly controlled, as even microscopic particles can damage chip circuits.
- The fabrication process involves advanced equipment such as **lithography (steppers), etching, doping, cleaning, and dicing machines**, each costing millions of dollars.

Other Approved Semiconductor & Electronics SEZs

- **Micron Semiconductor Technology India Pvt Ltd** is setting up a ₹13,000 crore ATMP unit in **Sanand, Gujarat**, to strengthen chip packaging capabilities.
- **Hubballi Durable Goods Cluster Private Limited** is establishing an electronics components manufacturing SEZ in **Dharwad, Karnataka**.
- **CG Semi Pvt Ltd** is developing a ₹2,150 crore OSAT facility to support semiconductor assembly and testing.
- **Kaynes Semicon Pvt Ltd** is setting up a ₹681 crore OSAT unit to enhance domestic semiconductor value chains.

Significance of the Plant

- **Strengthening Semiconductor Supply Chains:** With the global semiconductor market exceeding **USD 600 billion** and projected to cross **USD 1 trillion by**

2030, India's entry into chip fabrication enhances **supply chain resilience** and reduces external vulnerabilities.

- **Boost to Electronics Manufacturing:** As India's electronics production has already crossed **USD 115 billion (2023–24)**, domestic chip manufacturing will support key sectors like **smartphones, automobiles, and consumer electronics**, reducing reliance on imports.
- **Employment and Skill Development:** The project will generate **high-skilled jobs (~21,000)** and promote **advanced R&D, specialised training, and industry-academia collaboration** in semiconductor technologies.
- **Integration into Global Value Chains (GVCs):** The fab, along with ATMP/OSAT units (like Micron Semiconductor Technology India Pvt Ltd), positions India as a **reliable node in global semiconductor supply chains**, complementing hubs in East Asia and the US.
- **Support for Emerging Technologies:** Domestic semiconductor capability is critical for **AI, electric vehicles, telecom (5G/6G), defence systems, and data centres**, making it strategically vital for future industries.
- **Strategic & Technological Sovereignty:** Indigenous chip manufacturing reduces **import dependence**, **enhances national security**, and ensures control over critical digital infrastructure.
- **Catalyst for Ecosystem Development:** The plant will anchor **integrated semiconductor clusters**, linking fabrication, design, packaging, and component manufacturing—thereby accelerating India's transition to a **full-stack semiconductor ecosystem**.

About the India Semiconductor Mission

- It was launched in **2021 under the Semicon India Programme** with a financial outlay of **₹76,000 crore** to build a comprehensive semiconductor and display ecosystem.
- **Core Objectives:**
 - ✓ **Fabrication & Manufacturing:** Promote the establishment of **semiconductor fabs, ATMP/OSAT units, and display manufacturing facilities**.
 - ✓ **Design & Innovation:** Develop **chip design capabilities**, support semiconductor start-ups, and strengthen domestic intellectual property.

✓ **Research & Development:** Encourage **advanced R&D** in areas like automotive electronics, telecom, and next-generation chips.

✓ **Global Partnerships:** Foster **international collaborations** to integrate India into global semiconductor value chains.

Key Features:

- ✓ Provides **financial incentives, infrastructure support, and policy facilitation** to attract global and domestic players.
- ✓ Promotes **industry-academia collaboration** for skill development and innovation.
- ✓ Focuses on building a **complete value chain**, from design to manufacturing and packaging.

- **Recent Expansion (ISM 2.0 – Budget 2026):** Expands beyond fabrication to include **chip packaging, compound semiconductors, materials, and supply chain infrastructure**.

✓ Aims to create a **full-stack, self-reliant semiconductor ecosystem** in India.

Schemes under ISM

- **Semiconductor Fabs Scheme:** Provides up to 50 per cent fiscal support for setting up semiconductor wafer fabrication units, covering advanced and mature technology nodes.
- **Display Fabs Scheme:** Offers up to 50 per cent financial support to establish AMOLED and LCD display fabrication units in India.
- **Compound Semiconductors and ATMP/OSAT Scheme:** Supports compound semiconductor and chip assembly, testing and packaging units with up to 50 per cent capital assistance.
- **Design Linked Incentive Scheme:** With an outlay of ₹1,000 crore, supports chip design startups and MSMEs through R&D support and incentives of up to 15 crore per company.

6.11. Amaravati Quantum Reference Facility

SYLLABUS

GS-3: Achievements of Indians in science & technology; indigenization of technology and developing new technology and awareness in the fields of IT and Computers.

Context

India's first indigenous quantum computing testing facility at SRM University in Amaravati was launched on 14 April 2026 by Andhra Pradesh Chief Minister, with the establishment of the Amaravati Quantum Reference Facility (AQRF) aimed at enabling the Amaravati Quantum Valley to emerge as an international hub for quantum computing.

More on the News

- AQRF was launched on **World Quantum Day (14 April)**, marking the establishment of India's **open sovereign quantum infrastructure**, and features two distinct platforms—the **1Q testbed at Medha Towers** and the **1S testbed at SRM University, Amaravati**.
- It was launched under the **Andhra Pradesh government's** flagship quantum technology hub, which is under **India's National Quantum Mission**.
- Developed under a national consortium, the project involves premier institutions such as the Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), IIT Bombay, and DRDO, along with contributions from industry players like Qubitech and Qbit Force.
- It will host an **IBM 133-qubit quantum computer** and has established 80+ industry and academic partnerships, positioning it among leading global quantum hubs.
- The launch of AQRA adds an indigenous hardware component, complementing existing quantum cloud, skilling, and innovation infrastructure within the ecosystem.

About National Quantum Mission (NQM)

- Approved on **19th April 2023** by the Union Cabinet, the mission is set to span from 2023–24 to 2030–31, with a budget allocation of ₹6,003.65 crore.
- It aims to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in **Quantum Technology (QT)**.
- NQM is one of the nine initiatives under the Prime Minister's Science Technology Innovation Advisory Council (PMSTIAC), aimed at positioning India as a global leader in quantum technology.
- As part of this mission, **four Thematic Hubs (T-Hubs)**

have been set up, bringing together 14 Technical Groups across 17 states and 2 Union Territories.



Objectives of the NQM

- **Quantum Computing Development:** Build intermediate-scale quantum computers in a phased manner—20–50 qubits (3 years), 50–100 qubits (5 years), and 50–1000 qubits (8 years)—across platforms such as superconducting and photonic technologies.
- **Satellite-Based Quantum Communication:** Enable quantum-secured communication between ground stations over a range of 2000 km within India, with future expansion for international secure links.
- **Inter-City Quantum Key Distribution (QKD):** Establish secure communication networks over 2000 km using trusted nodes and wavelength division multiplexing on existing optical fiber infrastructure.
- **Multi-Node Quantum Networks:** Develop scalable quantum networks (2–3 nodes) using quantum memories, entanglement swapping, and synchronized quantum repeaters.
- **Quantum Sensing and Atomic Clocks:** Develop high-precision devices including magnetometers (1 femto-Tesla/VHz in atomic systems; better than 1 pico-Tesla/VHz in NV centers), gravity sensors (better than 100 nano-meter/second²), and atomic clocks with 10⁻¹⁹ fractional instability.
- **Quantum Materials and Devices:** Design and synthesize advanced materials such as superconductors, novel semiconductor structures, and topological materials, along with components like qubits, single-photon sources/detectors, and entangled photon systems for computing, communication, and sensing applications.

Initiatives under the National Quantum Mission

- **Quantum-Safe Ecosystem Framework:** A concept paper has been developed to provide a strategic roadmap for securing and strengthening India's digital infrastructure against quantum threats.
- **DRDO Initiatives:** DRDO is leading projects to design and test quantum-resilient security schemes, along with quantum-safe symmetric and asymmetric key cryptographic algorithms.
- **Advancements by SETS:** The Society for Electronic Transactions and Security (SETS) under the Office of the Principal Scientific Adviser (PSA) is advancing Post-Quantum Cryptography (PQC) research. It has implemented PQC algorithms for applications such as Fast IDentity Online (FIDO) authentication tokens and Internet of Things (IoT) security.
- **C-DoT Innovations:** The Centre for Development of Telematics (C-DoT) under the Department of Telecommunications (DoT) has developed solutions including Quantum Key Distribution (QKD), Post-Quantum Cryptography (PQC), and Quantum Secure Video IP Phones.

Global Competitiveness and Strategic Impact

- The NQM has the potential to transform India's technology ecosystem and make it globally competitive.
- It will drive advancements in communication, healthcare, finance, and energy, with applications in drug discovery, space exploration, banking, and security.
- It will also strengthen key national missions such as Digital India, Make in India, Skill India, Stand-up India, Start-up India, Self-Reliant India, and the Sustainable Development Goals (SDGs).

Core Concepts in Quantum Technology

Core Concepts	Explanation
Quantum Computing	It uses special units called qubits to store and process information. Unlike regular computers where bits are either 0 or 1 , qubits can exist in both 0 and 1 simultaneously .

Quantum Technology	It involves the development of necessary hardware, software, algorithms, and protocols for designing and building quantum computing devices like quantum computers .
Principles of Quantum Technology	It works on the principles of quantum mechanics , including superposition, quantum entanglement, and interference , to achieve higher efficiency in large-scale computations.
Superposition	It refers to a quantum system existing in multiple states at the same time until it is measured. Once observed, it collapses into a single state .
Entanglement	It is a phenomenon where two subatomic particles become interlinked regardless of distance , so that a change in one particle is instantly reflected in the other. It supports secure quantum communication by linking sender and receiver qubits.
Interference	It is a wave-like superposition of quantum states that affects the probability of outcomes during measurement. It can be constructive or destructive , helping improve accuracy in quantum algorithms by reducing less probable outcomes and enhancing more probable ones.

6.12. China Discovers 11th Lunar Mineral

SYLLABUS

GS-3: Science and Technology- Developments and their Applications and Effects in Everyday Life; Awareness in the fields of IT, Space.

Context

Chinese scientists have recently identified a new lunar mineral named Cerium–Magnesium Changesite (also referred to as Magnesiochangesite-(Ce)), marking a significant advancement in planetary science.

More on the News

- This discovery adds to the growing catalogue of extraterrestrial materials and brings the **total number of known lunar minerals to 11 globally**.
- The mineral was discovered in a **44-gram lunar meteorite named Pakepake 005**, which was recovered from the **Taklamakan Desert in Xinjiang, China, in January 2024**.
✓ This meteorite is notable as the **first lunar meteorite found in China**, providing a rare opportunity to study Moon material that reached Earth naturally.
- The new mineral has been **officially approved and classified by the International Mineralogical Association (IMA)**, the global authority on mineral nomenclature.
- With this finding, China has identified **four lunar minerals**, placing it on par with the United States in lunar mineral discoveries.

About the New Lunar Mineral

- **Composition and Classification:** Cerium–Magnesium Changesite is a **rare-earth-bearing phosphate mineral**, containing elements such as cerium, magnesium, and iron, and belonging to the merrillite mineral group.
- **Physical Characteristics:** The mineral is **colourless, transparent, and brittle**, with a glass-like lustre and shell-like fracture patterns.
- **Fluorescent Property:** One of the notable properties of the mineral is its **fluorescence under ultraviolet light**, which is attributed to the presence of rare-earth elements such as cerium.
- **Microscopic Nature:** It occurs as extremely small crystals, typically ranging from **3 to 25 micrometres**, with most particles measuring less than 10 micrometres.
- **Scientific Value:** Its unique chemical composition and crystal structure provide important clues about **lunar magma processes, planetary formation, and the Moon's interior dynamics**.

Significance of the Discovery

- **Advancement in Lunar Geology:** The discovery provides **key mineralogical evidence for**

understanding the origin, evolution, and volcanic history of the Moon, thereby enriching global planetary science knowledge.

- **Insights into Rare-Earth Elements:** The presence of cerium and other rare-earth elements helps scientists understand how such elements are **distributed and separated during planetary formation**, which has implications for both Earth and space resource studies.
- **Technological Potential:** The mineral's **luminescent (fluorescent) properties** could contribute to the development of **next-generation LED materials and advanced optical technologies**, highlighting the practical benefits of space research.
- **Role of Meteorite Studies:** The finding demonstrates the value of **lunar meteorites as natural samples**, complementing space missions by providing accessible material for scientific investigation without requiring sample-return missions.
- **Strategic and Scientific Leadership:** The discovery reinforces China's growing capabilities in **space science, mineralogy, and advanced analytical technologies**, strengthening its position in the global space research landscape.

6.13. India's First Advanced 3D Chip Packaging Unit

SYLLABUS

GS-3: Awareness in the fields of IT, Space, Computers, robotics, Nano-technology, bio-technology and issues relating to intellectual property rights.

Context

The foundation stone for India's first advanced 3D chip packaging unit in Bhubaneswar marks a significant milestone under the India Semiconductor Mission (ISM).

About the Advanced 3D Chip Packaging Unit

- **First in India:** Establishment of the country's first Glass substrate-based Advanced Semiconductor Packaging Unit in Odisha
- **Cutting-edge Technology:** Introduction of advanced 3D Heterogeneous Integration modules
- **Rapid Progress:** Groundbreaking within months of

approval by the Union Cabinet, reflecting fast-track implementation

- **Strategic Investment:** Project outlay of approximately ₹1,943 crore
- **Employment Generation:** Creation of around 2,500 direct and indirect jobs
- **High Capacity:** Annual production capacity of 50 million assembled units
- **Critical Applications:** Chips to serve key sectors including aerospace, defence, artificial intelligence, 5G technologies and Data Centres.

India Semiconductor Mission

- Launched in **2021** with a **Rs 76,000-crore** outlay, the **India Semiconductor Mission** was conceived as a state-backed push to build a **full-stack chip ecosystem**.
- Under the mission, **ten semiconductor projects have been approved** across six states, attracting investments of over **Rs 1.6 lakh crore**.
- **Mission focus of ISM**
 - ✓ Set up Chip Manufacturing plants (fabs)
 - ✓ Create packaging and testing units
 - ✓ Supporting startups in chip design
 - ✓ Training young engineers
 - ✓ Bring Global companies to Invest in India
- **Schemes under ISM:**
 - ✓ **Semiconductor Fabs Scheme:** Up to 50% fiscal support for semiconductor wafer fabrication (fab) units.
 - ✓ **Display Fabs Scheme:** Up to 50% financial assistance for display fabrication units; covers AMOLED and LCD.
 - ✓ **Compound Semiconductors and ATMP/OSAT Scheme:** Supports compound semiconductors, silicon photonics, MEMS/sensors, discrete semiconductors.
 - ✓ **Design Linked Incentive (DLI) Scheme:** ₹1000 crore outlay; supports startups and MSMEs.

Understanding 3D Glass Semiconductor Technology

- Unlike traditional semiconductor manufacturing, which relies on **silicon wafers and planar (2D) packaging**, this facility will deploy **glass-based substrates and 3D stacking technologies**.
- These technologies allow multiple chip components to be vertically integrated, increasing computing

power within the same footprint.

- The approach enables **heterogeneous integration**, where logic, memory, and sensors are combined efficiently. Glass substrates provide **better thermal stability, lower signal loss, and higher precision for advanced nodes**.

Why This Project is India's Most Important Chip Bet?

- **Technological Shift Beyond Moore's Law:**
 - ✓ **Moore's Law**, proposed in 1965, suggested that the number of transistors on a chip would double every two years. However, as chips approach **physical and thermal limits**, this pace has slowed.
 - ✓ The semiconductor industry is now moving towards alternatives such as **advanced packaging, chiplets, and 3D integration**. The 3D glass semiconductor project aligns with this transition and represents an effort to sustain performance improvements through **vertical integration rather than mere miniaturisation**.
- **Strategic Importance for India:**
 - ✓ Among all projects under the **India Semiconductor Mission**, this is considered the most significant in terms of **advanced packaging technology**. It positions India at the **cutting edge of semiconductor innovation**.
 - ✓ The project strengthens India's role in the global semiconductor value chain by:
 - Enabling participation in the **3D packaging drive**
 - Supporting critical sectors like **AI, 5G, defence, and data infrastructure**
 - Reducing dependence on external technology ecosystems

Future Direction: ISM 2.0

- The government is working on the next iteration of the mission, with a possible outlay of around **\$11 billion**. While ISM 1.0 focused on infrastructure creation, **ISM 2.0 is expected to emphasise ancillary industries** such as gases, chemicals, and capital goods.
- ✓ The **Union Budget 2026–27** marked a decisive push to India's technology ambitions with the announcement of India Semiconductor Mission 2.0.

- ✓ A provision of Rs. **1,000 crore has been allocated for FY 2026–27**, signalling continued commitment to strengthening the semiconductor ecosystem.
- There is also likely to be a stronger push towards **design-linked incentives**, with a focus on market-based outcomes and deeper ecosystem integration.

Challenges and Way Forward

- Despite its promise, the project faces several challenges. The semiconductor sector requires **high capital investment, advanced technological capabilities, and a skilled workforce**.
- India also faces competition from established semiconductor hubs and dependence on global supply chains.
- Addressing these challenges will require sustained policy support, ecosystem development, and long-term investment in research and innovation.



7.1. INS Aridhaman

SYLLABUS

GS 3: Achievements of Indians in science & technology; indigenisation of technology and developing new technology; Security challenges and their management in border areas.

Context

Recently, India commissioned its third indigenous nuclear-powered ballistic missile submarine (SSBN), named INS Aridhaman (S4), in Visakhapatnam.

More on the News

- INS Aridhaman is the **third nuclear-powered ballistic missile submarine (SSBN)** in a row after **INS Arihant (commissioned in 2016)** and **INS Arighaat (commissioned in August 2024)**.
 - ✓ The fourth SSBN, codenamed S4* (which may be named Arisudan) is currently undergoing sea trials.
 - ✓ SSBN stands for ship submersible ballistic nuclear or nuclear-powered ballistic missile submarines.
 - These developments are part of the classified **Advanced Technology Vessel (ATV) project, launched in the 1980s**.
 - INS Aridhaman significantly upgrades India's "**second-strike**" **capability**, completing a critical phase of the nation's '**nuclear triad**', meaning India can launch a nuclear weapon from air, land and under the sea.
 - With Aridhaman's induction, India joins a select group of nations, including the **United States, Russia, the United Kingdom and China**, that operate a full-fledged nuclear triad backed by nuclear-powered submarines.
 - India's nuclear assets are managed by the **Strategic Forces Command (SFC)**; within this tri-level system, the sea-based component is considered the most secure, primarily due to the stealth capabilities and mobility of submarines.
- India is also strengthening its **attack submarine fleet** by preparing to induct '**Chakra III**', a **Russian-built Akula-class nuclear-powered attack submarine (SSN)**, expected to be commissioned around 2027–28.
 - ✓ Unlike SSBNs, which are designed for strategic deterrence, **attack submarines -Ship Submersible Nuclear (SSNs)** are tasked with hunting enemy vessels and protecting naval assets.

Key Features of INS Aridhaman (S4)

- Displacement:** Approximately **7,000 tonnes** submerged (about 1,000 tonnes heavier than earlier models).
- Propulsion:** Powered by an upgraded **83 MW Compact Light Water Reactor (CLWR)** developed by the **Bhabha Atomic Research Centre**, which offers lower acoustic signatures for enhanced stealth.
- Indigenous Content:** **About 70%**, advancing India's self-reliance goals.
- Missile Capability:** It features **eight launch tubes**, doubling the missile capacity of Arihant and Arighaat.
- Missile Payloads:** Its eight vertical launch tubes can carry up to **24 K-15 Sagarika short-range missiles (~750 km range)** or **eight K-4 nuclear-capable submarine-launched ballistic missiles (SLBM) (~3,500 km range)**.
- Endurance:** Capable of months-long submerged operations without surfacing, making it far more stealthy than conventional submarines.
- Stealth capabilities:** It is considered a game-changer due to its cutting-edge communication, navigation, sensor, and weapon-control systems, which enable precision strikes.

Submarine Launched Ballistic Missiles (SLBMs)

- SLBMs are ballistic missiles capable of being launched from submarines.
- The '**K**' family of missiles (codenamed after Dr APJ Abdul Kalam) are India's indigenously developed SLBMs.

- These are based on the Agni series of missiles but are lighter, more compact and stealthier than Agni missiles.
- Part of the K family are K-15 Sagarika with a range of 750km, and K-4 with a range of 3500 km.
- K-5 and K-6, with a range of 5,000 km and 6,000 km respectively, are also under development.

Strategic Importance of INS Aridhaman

- **Strengthening the Nuclear Triad:** It contributes to India's nuclear triad, providing the ability to launch nuclear weapons from land, air, and sea.
- **Enhanced Nuclear Deterrence:** As a nuclear-powered submarine with ballistic missile capabilities, it can survive a nuclear strike and still retaliate, thus bolstering India's "No First Use" policy and maintaining a **Credible Minimum Deterrence** (CMD).
- **Strategic Maritime Advantage:** Given China's deployment of nuclear submarines in the Indian Ocean Region, India's capacity building on nuclear-powered submarines is crucial for nuclear deterrence.
- **Boost to India's Naval Power:** It enhances India's naval strength with two nuclear-powered submarines in the Indo-Pacific, providing strategic leverage and deterring nations like China.
- **Operational Flexibility and Regional Security:** The induction of INS Aridhaman enhances India's maritime security architecture by ensuring a more stable 'continuous at-sea' deterrence posture, thereby strengthening regional deterrence and stability.

7.2. INS Taragiri

SYLLABUS

GS 3: Achievements of Indians in science & technology; indigenisation of technology and developing new technology; Security challenges and their management in border areas.

Context

Recently, the Indian Navy commissioned INS Taragiri at Visakhapatnam, marking a major step in enhancing India's maritime power, self-reliance, and Indo-Pacific security presence.

About INS Taragiri

- INS Taragiri is the **fourth Nilgiri-class (Project 17A)** stealth guided-missile frigate.
- It is part of a **7-ship Project 17A programme**, with 4 built by Mazagon Dock Shipbuilders Limited and 3 by GRSE.
- It is designated as **F41 and inducted into the Eastern Fleet under the Eastern Naval Command**.
- It is named after the **Taragiri hills in Uttarakhand**.
- It carries forward the legacy of the **Leander-class INS Taragiri (1980–2013)**.
- Its motto is "**Rise Above.**"
- **Construction & Indigenous Ecosystem:**
 - ✓ The ship has a displacement of approximately **6,670 tonnes**.
 - ✓ It was built in **about 15% less time compared to earlier ships**.
 - ✓ It has more than **75% indigenous content** with contributions from over 200 MSMEs.
 - ✓ It reflects a strong public-private partnership and supports thousands of jobs.
- **Design & Advanced Technology:**
 - ✓ It represents a generational upgrade over **Shivalik-class frigates**.
 - ✓ It incorporates **stealth features** with **reduced radar, acoustic, and infrared signatures**.
 - ✓ It is powered by a **CODOG (Combined Diesel or Gas) propulsion system**.
 - ✓ It can achieve high speeds of **around 30 knots along with long endurance**.
 - ✓ It is equipped with a **Combat Management System (CMS) for real-time threat response**.
 - ✓ It includes an **Integrated Platform Management System (IPMS) for centralised control of machinery and power**.
- **Combat Capabilities:**
 - ✓ It is equipped with **BrahMos supersonic missiles** for surface strike capability.
 - ✓ It uses the **MRSAM/Barak system along with MF-STAR radar for air defence**.
 - ✓ It is fitted **with HUMSA sonar** for anti-submarine warfare.
 - ✓ It carries **torpedoes and ERASR (Extended Range Anti-Submarine Rocket)**.
 - ✓ It includes a **76 mm SRGM and close-in weapon**.

systems (30 mm and 12.7 mm guns).

- ✓ It is capable of addressing threats across air, surface, and sub-surface domains.
- **Operational Role & Versatility:**
 - ✓ It can perform *carrier battle group escort missions*.
 - ✓ It is capable of *undertaking independent offensive operations*.
 - ✓ It supports *maritime surveillance and anti-piracy missions*.
 - ✓ It can conduct *coastal security operations*.
 - ✓ It is suitable for *Humanitarian Assistance and Disaster Relief (HADR) operations*.
 - ✓ It can operate helicopters *such as Kamov and MH-60R*.
 - ✓ It can remain deployed at sea for extended durations.
- **Unique Features & Utility:**
 - ✓ It generates *approximately 4 MW of power*, enough to support around 8,000 homes during disasters.
 - ✓ Its indigenous systems enable faster maintenance and reduced downtime.
 - ✓ It is operated by around 300 personnel, including provision for women officers and sailors.

Significance

- **Maritime Security Imperative:** With a *~11,000 km coastline and ~95% of trade via sea*, it ensures protection of sea lanes, choke points, energy routes, and undersea communication cables, thereby safeguarding India's economic and digital infrastructure.
- **Strengthening Naval Capability:** As a stealth, multi-role warship with advanced sensors, supersonic missiles, and long endurance, it enhances operational reach, combat readiness, surveillance, and rapid response while strengthening presence from the *Persian Gulf to the Malacca Strait*.
- **Aatmanirbhar Bharat in Defence:** With over *75% indigenous content and participation of 200+ MSMEs*, it reduces import dependence, strengthens the defence industrial ecosystem, reflects strong public-private partnership, and aligns with rising defence exports (*~₹38,000+ crore*).

- **Strategic & Geopolitical Significance:** Equipped for *multi-domain warfare and deployed in the Eastern Fleet*, it acts as a credible deterrent in Indo-Pacific geopolitics, supports India as a net security provider, remains relevant amid tensions *like Strait of Hormuz disruptions, and complements naval modernisation including INS Aridhaman*.
- **Multi-Dimensional Role:** Beyond combat, it enables carrier escort operations, anti-piracy missions, maritime surveillance, coastal security, disaster relief, evacuation missions, and humanitarian assistance, including power support during crises.
- **Symbol of Maritime Power & Sovereignty:** It represents Make in India, technological maturity, faster shipbuilding capability, and India's transition to a self-reliant blue-water navy, reinforcing the vision *of Viksit Bharat 2047 and a secure Indo-Pacific*.

About the Project 17 & Project 17A (India's Stealth Frigate Programme)

- Design work for India's stealth frigates began in the *1990s under Project 17*, which later evolved into the more advanced Project 17A programme.
- **Project 17 (Shivalik-Class Frigates):** A total of 3 multipurpose stealth frigates were constructed at Mazagon Dock Shipbuilders Limited (Mumbai) between 2001 and 2012.
 - ✓ The three ships are *INS Shivalik (2010), INS Satpura (2011), and INS Sahyadri (2012)*.
- **Transition to Project 17A:** *Project 17A* was launched as an advanced follow-on to *Project 17*, focusing on enhanced stealth features, greater automation, and improved combat capabilities. Construction began in December 2017, five years after the completion of Project 17.
- **Project 17A (Nilgiri-Class Frigates):** A total of *7 stealth frigates* are being built under this programme, marking a significant expansion in India's naval capability.
- **The frigates are being constructed at two major shipyards:** Mazagon Dock Shipbuilders Limited (4 ships) and Garden Reach Shipbuilders and Engineers (3 ships).
- *INS Nilgiri was commissioned in January 2025,*

followed by *INS Udaygiri* and *INS Himgiri* in 2025.

- *INS Taragiri* has now been commissioned; *INS Dunagiri* has already been delivered to the Indian Navy, while the remaining ships—*Mahendragiri* and *Vindhyagiri*—are expected to join the fleet by 2026.

7.3. Classification of Districts Affected by Left Wing Extremism

SYLLABUS

GS 2: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS 3: Role of external state and non-state actors in creating challenges to internal security

Context

Recently, the Union Ministry of Home Affairs (MHA) has re-categorised the total number of left-wing extremism (LWE) affected districts in the country, replacing the earlier classification.

More on the News

- The move seeks to **realign anti-Naxal strategies with evolving ground realities**, reflecting a **significant shrinking of the Red Corridor** (Naxal-affected districts in India).
- Earlier in the Lok Sabha, the Union Government declared that India has become virtually '**Naxal-free**', signifying a major achievement in internal security.
- **Revised Classification:** The previous "**most affected districts**" category has been replaced by a refined three-tier categorisation:
 - ✓ **LWE Affected Districts:** At present, only Bijapur (Chhattisgarh) and West Singhbhum (Jharkhand) are classified as LWE Affected Districts.
 - ✓ **Districts of Concern:** Kanker district in Chhattisgarh
 - ✓ **Legacy & Thrust (L&T) Districts:** Includes 35 districts that are either no longer significantly affected but need continued support to prevent relapse (Legacy) or are vulnerable to potential Naxal expansion (Thrust).
- **Sharp Contraction of the Red Corridor:** The spread

of Left-Wing Extremism has reduced drastically from over **200 districts in 2005 to just 2 in 2026**, highlighting the effectiveness of sustained security and developmental measures and aligning with **India's goal to eliminate LWE by March 2026**.

- **Security Related Expenditure (SRE) Scheme:** The updated categorisations will shape resource allocation under the SRE Scheme, under which the **Centre reimburses States for security force operations**, ex gratia payments, rehabilitation of surrendered LWE cadres, and community policing.

About Left-Wing Extremism (LWE) in India

- Left-Wing Extremism (LWE), also known as **Maoism/Naxalism**, is an **armed insurgency** that seeks to overthrow the democratic state through a **protracted people's war, inspired by Maoist ideology**.
- **Origin:** The movement began with the **1967 Naxalbari uprising** in West Bengal and later expanded across parts of **central and eastern India**, forming the so-called "**Red Corridor**."
 - ✓ Although its footprint has declined, it continues to affect select pockets across multiple states.
- **Evolution of CPI (Maoist):** In 2004, major insurgent groups such as the **People's War Group (PWG)**, the **Maoist Communist Centre of India (MCCI)**, and factions of the **CPI (ML)** merged to form the **CPI (Maoist)**, which remains the primary LWE organisation carrying out insurgent activities.
- **Objectives:** The movement aims to **capture state power through armed struggle**, leveraging tribal discontent, land alienation, inequality, and governance deficits.
 - ✓ It follows a strategy of **guerrilla warfare**, establishing control in remote areas and gradually expanding influence.
- **Urban-Rural Linkages:** LWE operates through an **urban-rural network**, where urban fronts facilitate **ideological support, funding, and recruitment**, while rural strongholds act as **operational bases and zones of influence**.

Government Initiatives to Address LWE

- **Security Related Expenditure (SRE) Scheme:**

DEFENCE AND INTERNAL SECURITY

Implemented as a sub-scheme of the Modernisation of Police Forces, it enables the Centre to **reimburse States for security-related costs in LWE-affected and monitored districts**.

- **SAMADHAN Strategy:** It is a comprehensive framework based on Smart leadership, Aggressive strategy, Motivation & training, Actionable intelligence, Dashboard-based monitoring, Harnessing technology, Theatre-specific action plans, and choking financing, ensuring a coordinated response to LWE.
- **Surrender and Rehabilitation Scheme:** Designed to weaken insurgent ranks by offering financial incentives and livelihood support of ₹5 lakh for top cadres, ₹2.5 lakh for others, along with a **₹10,000 monthly stipend for up to 36 months** for skill training.
- **National Policy and Action Plan (2015):** Adopts a **multi-pronged approach** combining security operations, development initiatives, and protection of rights and entitlements of local communities.
- **Educational & Skill Development Initiatives:** To address root causes, the government has sanctioned **48 ITIs** and **61 Skill Development Centres** in LWE-affected districts to enhance employment opportunities.
- **Operation Black Forest (2025):** A **21-day large-scale counter-insurgency operation** launched in April 2025 targeting Maoist strongholds in the **Karreguttalu Hills** along the Chhattisgarh–Telangana border, aimed at dismantling insurgent networks.

Way Forward

- **Consolidation of Security Gains:** Sustain intelligence-driven operations and strengthen coordination between Central and State forces to prevent any resurgence in residual hotspots.
- **Deepening Development Interventions:** Accelerate **infrastructure, connectivity, healthcare, and education** in affected regions to address root causes like poverty, exclusion, and underdevelopment.
- **Strengthening Last-Mile Delivery:** Improve administrative presence and service delivery in remote areas, ensuring effective implementation of welfare schemes and building trust among local communities.

- **Focus on Tribal Rights and Inclusion:** Ensure proper implementation of laws like the **Forest Rights Act (FRA)** and promote participatory development, safeguarding the rights and livelihoods of tribal populations.
- **Rehabilitation and Reintegration:** Further strengthen surrender and rehabilitation policies to ensure long-term reintegration of former cadres into mainstream society.

7.4. Government to Procure Indigenous Mountain Radars for Air Force

SYLLABUSS

GS-3: *Achievements of Indians in Science & Technology; Indigenization of Technology and Developing New Technology.*

Context

Recently, the Ministry of Defence signed a ₹1,950-crore contract with Bharat Electronics Limited (BEL) for the procurement of two mountain radars for the Air Force.

More on the News

- The Mountain Radar systems have been indigenously designed and developed by the **Electronics & Radar Development Establishment** under the **Defence Research and Development Organisation (DRDO)**, and will be manufactured by **BEL**.
- The manufacturing of the radars is being facilitated under the **Buy (Indian–Indigenously Designed, Developed and Manufactured) category**.
- These radars are specifically suited for deployment in **high-altitude and mountainous terrain**, significantly enhancing surveillance and detection capabilities along sensitive borders.
- **Objective:** The radars are meant to strengthen India's layered air-defence network in difficult border terrain, where conventional radar coverage is weak.
- **Significance:** The procurement aligns with the **Aatmanirbhar Bharat** and **Make in India initiatives**, and is expected to **reduce dependence on foreign-origin defence equipment** while **boosting domestic defence manufacturing capabilities**.

About Mountain Radars

- Mountain Radars are specialised surveillance systems designed for high-altitude, rugged terrain, where conventional radars often fail due to physical obstructions such as peaks and valleys.
- They are engineered to bridge “shadow zones”—blind spots created by uneven landscape—to detect low-flying drones, cruise missiles, and enemy aircraft.

7.5. Indigenous Stealth Frigate ‘Dunagiri’ Delivered to the Indian Navy

SYLLABUS

GS-3: *Achievements of Indians in Science & Technology; Indigenization of Technology and Developing New Technology.*

Context

Recently, the Indian Navy received ‘Dunagiri’ at GRSE, Kolkata, marking a major milestone in achieving self-reliance in warship design and construction.

About Dunagiri

- It is the **fifth ship of Nilgiri Class under the Project 17A** and the second of the class built at Garden Reach Shipbuilding and Engineers Ltd (GRSE), Kolkata.
 - ✓ The 4 already commissioned frigates are – Nilgiri, Himgiri, Taragiri, and Udaygiri.
- **Legacy and Continuity:** The ship is a **successor to the earlier INS Dunagiri**, a Leander-class frigate that served the Indian Navy for over three decades from 1977 to 2010.
- **Indigenous and Advanced Design:** Designed entirely by the Warship Design Bureau (WDB), **the vessel has about 75% indigenous content**, significantly strengthening the domestic defence ecosystem by **engaging over 200 MSMEs** and generating substantial employment.
- **Propulsion System:** The frigate employs a **Combined Diesel or Gas (CODOG) propulsion system**, operating Controllable Pitch Propellers (CPP) on each shaft, supported by an advanced **Integrated**

Platform Management System (IPMS).

- **Integrated Combat Suite:** It is equipped with a sophisticated array of weapons and sensors, including **BrahMos surface-to-surface missiles, MF-STAR radar, the MRSAM system**, along with specialised rockets and torpedoes for anti-submarine warfare (ASW).

About Project 17A

- **Project 17A** is India’s programme to build **seven Nilgiri-class stealth frigates** as advanced successors to the **Shivalik class**.
- Four ships are being constructed by Mazagon Dock Shipbuilders Ltd (MDL) and three by Garden Reach Shipbuilders & Engineers (GRSE).

7.6. Exercise Cyclone-IV

SYLLABUS

GS-3: *Various Security Forces and Agencies and their Mandate.*

Context

The Indian Army contingent is participating in the Exercise Cyclone-IV, which is currently being held at Anshas, Egypt, from 9 to 17 April 2026.

About Exercise Cyclone-IV

- The **Exercise Cyclone-IV** is the fourth edition of the joint military exercise between the **Special Forces of India and Egypt**.
- The exercise is a continuation of the growing military cooperation between India and Egypt and follows the successful conduct of the third edition (Cyclone-III) hosted in India at Mahajan Field Firing Ranges.
- The exercise aims to enhance joint mission planning capabilities and improve interoperability through the exchange of best practices in special operations.
- The participating troops will undertake a series of training activities focused on special operational tactics, techniques and procedures in desert and semi-desert terrain.

7.7. Exercise DUSTLIK

SYLLABUS

GS-3: *Various Security Forces and Agencies and their Mandate.*

Context

An Indian Army contingent of 60 personnel has departed for the 7th edition of Exercise DUSTLIK, a joint India–Uzbekistan military exercise being held from April 12 to 25, 2026, at the Gurumsaray Field Training Area in Namangan, Uzbekistan.

More on the News

- The Indian contingent includes **45 personnel from the Indian Army (mainly the Mahar Regiment) and 15 personnel from the Indian Air Force**, while Uzbekistan has deployed a similar strength from its Army and Air Force.
- The joint training will culminate in a **48-hour validation exercise** focusing on special operations to neutralise unlawful armed groups.



About Exercise DUSTLIK

- Exercise DUSTLIK is an **annual bilateral military exercise**, conducted **alternatively in India and Uzbekistan**.
✓ The previous edition (2025) was held at Aundh, Pune.
- **Objective:** To **strengthen military cooperation** and enhance the ability of both forces to conduct **joint operations in semi-mountainous terrain**.

- **Key Focus Areas:** The exercise emphasizes joint planning and execution of operations, along with enhancing tactical drills, special arms skills, and high standards of physical fitness.
✓ It also focuses on establishing a unified command-and-control framework while improving interoperability and operational synergy.
- **Operational Activities:** The activities include land navigation exercises, strike missions on enemy bases, and the seizure of enemy-held areas.
✓ It also involves training for special operations against unlawful armed groups.
- **Strategic Significance:**
✓ Promotes sharing of **best practices in Tactics, Techniques, and Procedures (TTPs)**.
✓ Enhances **interoperability and coordination** between the armed forces.
✓ Builds **camaraderie and mutual trust** among troops.
✓ Strengthens **defence cooperation and bilateral relations** between India and Uzbekistan.

7.8. F414 fighter jet engine

SYLLABUS

GS-3: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Context

Recently, India and the United States have reached a major milestone as GE Aerospace and Hindustan Aeronautics Limited conclude technical talks for co-producing F414 fighter jet engines in India.

More on the News

- The two sides have **finalised technical negotiations**, paving the way for a commercial contract to be signed, with production expected to begin **within two years**.
- The deal involves an unprecedented transfer of advanced aero-engine manufacturing technology—reportedly up to ~80%—marking a first-of-its-kind cooperation from the U.S. to India.
- The engines will power India's next-generation fighters, including **the HAL Tejas Mk-2 and initial variants of the Advanced Medium Combat Aircraft**.

- Additionally, a domestic MRO facility for F404 engines will be set up in India to support the HAL Tejas Mk-1A fleet, reducing dependence on foreign repair pipelines.

About F414 Jet Engine

- The **F414-GE-400** is an **afterburning turbofan engine** developed by GE Aerospace and is an advanced evolution of the F404 engine used in earlier fighters.
- It generates **~98 kN thrust with afterburner, with a thrust-to-weight ratio of ~9:1 and a pressure ratio of ~30:1**, reflecting high efficiency and power density.
- The engine incorporates **FADEC (Full Authority Digital Electronic Control)**, which enables precise digital control, improved fuel efficiency, and reduced pilot workload.
- It uses **advanced materials, thermal coatings, and cooling technologies**, significantly enhancing durability, component life, and high-temperature performance.
- A key feature is its **modular design**, allowing easier maintenance, quicker replacement of parts, and lower lifecycle costs—crucial for operational readiness.
- The engine is **combat-proven**, powering aircraft like the **Boeing F/A-18 Super Hornet and EA-18G Growler, and has been in service with the U.S. Navy for decades**.
- It supports **multi-role operations**, improving aircraft capabilities in terms of **range, payload, survivability, and mission flexibility**.
- The **Enhanced Durability Engine (EDE)** upgrade offers **up to ~20% higher thrust or improved fuel efficiency**, along with reduced maintenance costs.



8.1. Balirajgarh Excavation and the Legacy of Mithila Civilisation

SYLLABUS

GS-1: Indian culture covers the salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

Context

The Archaeological Survey of India has begun a fresh (fifth) round of excavation at Bihar's Balirajgarh site, believed to be the gateway to ancient Mithila, with the aim of uncovering early urban civilisation and verifying its antiquity.

More on the News

- Balirajgarh has undergone **multiple excavations (1962–63, 1972–73, 1974–75, 2013–14)**, with the latest effort aiming to overcome past constraints such as high-water tables.
- The ASI plans to excavate **~20 trenches** using modern tools (satellite mapping, systematic survey) to study **five cultural phases**: Mauryan (NBPW), Sunga, Kushan, Gupta, and Pala.
- Earlier findings include **NBPW pottery, a 10-foot-wide fortification wall (~2200 years old), beads, copper objects, terracotta artefacts, and punch-marked coins**, indicating advanced urban planning and continuous habitation from early historic to early medieval periods.
- Preliminary evidence suggests the site may date back to the **Iron Age Videha Kingdom**, potentially pushing the region's history back by several centuries.

About the Archaeological Survey of India (ASI)

- Established in **1861 by Alexander Cunningham**, it is India's premier institution for archaeological research and heritage conservation under the Ministry of Culture.
- It is responsible for the **maintenance and protection of 3,679 centrally protected monuments and sites of national importance**.

- The ASI operates under key legislations such as the **Ancient Monuments and Archaeological Sites and Remains Act, 1958** and the **Antiquities and Art Treasures Act, 1972**.
- Its functions include **excavation, conservation, documentation, and heritage management**, carried out through specialised branches and regional circles.

About Balirajgarh Fort

- Balirajgarh, located in **Madhubani district (Bihar)**, is a massive fortified archaeological site spread over more than **120–176 acres**, locally known as **Raja Bali Ka Garh**.
- It was first identified in **1884 by George Abraham Grierson** and declared a **protected monument by the ASI in 1938**.
- The site is associated with **mythological King Bali** and is considered by scholars to be a **major administrative centre of the Videha Kingdom**.
- Archaeological evidence shows a five-fold cultural sequence: NBPW (c. 700–200 BCE) → Sunga → Kushan → Gupta → Pala.
- Indicates **continuous habitation from early historic to early medieval period**.
- Features such as **fortification walls and artefact diversity reflect a well-planned urban settlement**.

About Videha Kingdom / Mithila

- **Mithila** was the ancient capital of the **Videha Kingdom**, one of the **16 Mahajanapadas** during the Later Vedic period (c. 8th–6th century BCE).
- Geographically, it lay in the **eastern Gangetic plains**, covering present-day **north Bihar and parts of Nepal**, and is commonly identified with **Janakpur**.
- The kingdom was later part of the **Vajji confederacy (a republican gana-sangha)**, reflecting early forms of oligarchic governance.
- Mithila is deeply rooted in **mythological and cultural traditions**, associated with the Janaka dynasty and the **Ramayana**, where King Janaka (father of Sita)

symbolises ideals of dharma and philosophical wisdom.

- It was a major centre of **Vedic learning and intellectual activity**, linked with figures like **Gautama Buddha, Mahavira, and Yajnavalkya**.
- The region contributed significantly to **scriptural traditions, philosophy, language (Maithili), and art forms like Madhubani painting**, maintaining a continuous cultural legacy.
- Politically, Videha was later annexed by Magadha, yet Mithila remained an enduring **centre of Sanskrit and philosophical traditions**.

8.2. Raja Ravi Varma Painting Sets New Record for Indian Art

SYLLABUS

GS-1: Indian culture covers the salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

Context

Raja Ravi Varma's painting '**Yashoda and Krishna**' sold for a record-breaking Rs 167.20 crore at Saffronart's Spring Live Auction, the highest price ever for an Indian artwork at auction.

More on the News

- The canvas depicts Yashodhara milking a cow, with an infant Krishna standing behind her. The oil-on-canvas is painted in Varma's recognised realist style, with a **chiaroscuro technique** that **contrasts light and dark**.
- Previously, **MF Husain's 1954 Untitled (Gram Yatra)** held the Indian art auction record, selling for Rs 118 crore in March 2025.



About Raja Ravi Varma

- Raja Ravi Varma (1848–1906), born in the erstwhile **princely state of Travancore (present-day Kerala)**, was an Indian painter who blended Hindu

mythological subjects with European realist and naturalist styles.

- His works primarily depict themes from the **Puranas** and epics like the **Mahabharata and Ramayana**.
- **Famous Works:** *Damayanti Talking to a Swan, Shakuntala Looking for Dushyanta, Lady Adorning Her Hair, Shantanu and Matsyagandha*.
- **Features of His Work:**
 - ✓ Among the first Indian artists to blend Western techniques with Indian themes and styles.
 - ✓ Departed from the earlier dominance of Persian and Mughal artistic influences.
 - ✓ One of the earliest Indian painters to use oil painting techniques.
 - ✓ Popularised art by producing affordable lithographs for the masses.
 - ✓ Known for realistic portrayals of mythological figures and Indian royalty.
- **Recognition:**
 - ✓ Awarded the **Kaisar-i-Hind Gold Medal in 1904 by Lord Curzon**.
 - ✓ Conferred the **personal title of "Raja" by Lord Curzon**.

8.3. Mahatma Jyotiba Phule

SYLLABUS

GS-1: Modern Indian history from about the middle of the eighteenth century until the present- significant events, personalities, issues.

Context

The Government of India has commenced the nationwide commemoration of the 200th Birth Anniversary of Mahatma Jyotiba Phule through a two-year-long celebration from 11 April 2026 to 11 April 2028, as part of its efforts to honour his contributions to social justice, education, and equality.

About the Mahatma Jyotiba Phule

- Jyotirao Govindrao Phule (11 April 1827 – 28 November 1890) was an Indian social reformer, writer, and champion of equality for lower castes, women, and poor labourers.
- Born in the **Bombay Presidency (present-day**



Maharashtra), he belonged to **the Mali caste** (gardeners and vegetable farmers), classified under the Shudra social class.

- **Early Life and Influences:**

- ✓ He studied at the **Scottish Mission School in Pune**, completing his education in 1847.

- ✓ He was influenced by thinkers like **Thomas Paine** and his work **Rights of Man**, as well as anti-slavery movements, the **teachings of Buddha**, and **poet-saint Kabir**.

- ✓ A turning point came in **1848**, when he was insulted at a Brahmin wedding due to his caste, shaping his lifelong opposition to caste discrimination.

- He was a strong critic of the **Hindu caste system**, which ranked people by birth and led to discrimination against Shudras and present-day Dalits.

- He was conferred the title **"Mahatma" in 1888** by **Vithalrao Krishnaji Vandekar**.

- His major work, **Gulamgiri (1873)**, compared caste oppression in India with slavery in the United States.

- **Satyashodhak Samaj (1873)**: Founded Satyashodhak Samaj to promote social equality and upliftment of non-Brahmins.

- ✓ Encouraged non-Brahmin rituals and social reforms.

- ✓ Supported by reformist rulers like Chhatrapati Shahu Maharaj.

Education and Women's Rights

- **Believing education to be the key to social change, Phule:**

- ✓ Educated his **wife, Savitribai Phule**, who became India's first woman teacher.

- ✓ Opened the **first girls' school in 1848 at Bhidewada, Pune**.

- ✓ Established schools for **Shudras, Ati-Shudras, and Dalits**.

- He opposed **child marriage** and supported **widow remarriage**.

- Established a **home for pregnant widows** and an orphanage; later adopted one of the children.

Fight Against Caste System

- Phule rejected Brahminical dominance and argued

that caste inequality was imposed and unjust.

- He worked for the dignity and upliftment of **Shudras and Dalits**, and is believed to be among the first to use the term **"Dalit"** for oppressed communities.

- Opened his **personal well for all castes**, symbolizing social equality.

Legacy of Jyotiba Phule

- Phule's work laid the foundation for **anti-caste and social justice movements in India**.

- His ideas deeply influenced B. R. Ambedkar and later Dalit movements.

- **Key aspects of his legacy:**

- ✓ Promotion of **universal education**, especially for women and marginalized groups.

- ✓ Early advocacy for **gender equality and social justice**.

- ✓ Institutional challenge to **caste hierarchy and Brahminical dominance**.

- His vision of an egalitarian society continues to inspire efforts to eliminate caste discrimination in modern India.

8.4. Jallianwala Bagh massacre

SYLLABUS

GS-1: Modern Indian history from about the middle of the eighteenth century until the present- significant events, personalities, issues.

Context

On the 107th martyrdom day of the 1919 Jallianwala Bagh massacre at Jallianwala Bagh, the nation pays homage to the innocent victims whose sacrifice became a turning point in India's freedom struggle.

The Jallianwala Bagh Massacre (April 13, 1919)

- The **Jallianwala Bagh Massacre** occurred in **Amritsar**, Punjab, on April 13, 1919.

- It was a tragic culmination of the tensions stirred by the Rowlatt Act.

- ✓ The Rowlatt Act, officially **known as the Anarchical and Revolutionary Crimes Act of 1919**, was a law passed by the British government in India to suppress dissent and revolutionary activities.

- A large crowd of about 20,000 people had gathered at Jallianwala Bagh to celebrate **Baisakhi**, a religious festival, and to protest the arrest of *local leaders Saifuddin Kitchlew and Dr Satyapal*.
- The crowd was unaware of the martial law orders, including a ban on public gatherings.
- **Brigadier-General Reginald Dyer**, in charge of enforcing martial law, arrived at the scene with his troops, surrounded the gathering, and opened fire without warning.
- Official British records claimed 379 dead and over 1,100 wounded, while Indian sources and other estimates suggest much higher casualties.
- It marked a decisive turning point in India's freedom struggle, destroying faith in British rule and pushing **Mahatma Gandhi toward mass mobilisation through the Non-Cooperation Movement (1920–22)**.
- **Rabindranath Tagore renounced his knighthood** in protest, while revolutionary sentiment also deepened—later influencing figures like Udham Singh, who assassinated Michael O'Dwyer in 1940.
- The British-appointed **Hunter Commission** censured Dyer and forced his resignation, though reactions in Britain were divided, with some praising him.

Significance

- Marked a **decisive shift from moderate politics to mass nationalism**
- Strengthened Gandhi's leadership in the freedom struggle
- Exposed the **brutal nature of colonial rule**
- Became a symbol of **sacrifice and resistance in India's independence movement**

About the Baisakhi festival

- Baisakhi is a spring harvest festival celebrated primarily by the Punjabi community in India and around the world.
- Also spelled Vaisakhi, it is traditionally observed on the **first day of the month of Vaishakha** in the Hindu solar calendar, which falls in April–May.
- The annual festival is observed on **April 13 or 14**.
- Baisakhi celebrates the spring harvest of crops sown in winter (rabi crops), making it an important agricultural festival.

8.5. Adi Shankaracharya Jayanti 2026

SYLLABUS

GS-1: Indian Culture - Salient aspects of Art Forms, Literature and Architecture from ancient to modern times.

GS-4: Human Values – lessons from the lives and teachings of great leaders, reformers and administrators.

Context

On 21 April 2026, the Prime Minister of India, paid homage to Adi Shankaracharya on the occasion of his 1238th birth anniversary, recognising him as one of India's greatest spiritual luminaries.

About Adi Shankaracharya (approx. 788–820 CE)

- Adi Shankaracharya was born in Kalady, a village in the present Ernakulam district of Kerala state in India on the Vaisakha Shukla Panchami day of the Hindu calendar.
- His father was Shivaguru and mother Aryamba.
- At the age of **8 years**, he took **sanyasa** under the guidance of **Govinda Bhagavatpada**.
- He mastered and wrote commentaries on the **Prasthanatrayi Shastras**, establishing himself as a profound scholar early in life.
- By the age of **16**, he had already achieved significant philosophical accomplishments.



Philosophical Contributions: Advaita Vedanta

- **Adi Shankaracharya's central contribution lies in systematising Advaita Vedanta, a doctrine of non-dualism:**
 - ✓ **Reality** is non-dual (Advaita) and rooted in Brahman, the ultimate truth.
 - ✓ The **individual self** (Atman) is identical with Brahman.
 - ✓ The world is often interpreted as **empirical or illusory** (Mithya).
- His philosophy is encapsulated in the formulation: "**Brahma satyam, jagan mithya, jivo brahmaiva naaparah.**"

Debates

- He **defeated Buddhist scholars in philosophical debates**, reasserting the foundations of Sanatana Dharma.
- He also defeated scholars like **Mandana Mishra** and made them his disciples.
- His deep understanding and interpretation of shastras strengthened the intellectual framework of dharma.

Revival and Propagation of Sanatana Dharma

- He **preached and propagated Vedic Sanatana Dharma** widely.
- He revived a society that had fallen into decline and restored spiritual awareness.
- He contributed to the **renovation of temples and strengthening of religious institutions**.

Four Peethas Established by Adi Shankaracharya

Direction	Peetha (Matha)	Location	Associated Veda
East	Govardhana Peetha	Puri	Rig Veda
South	Sharada Peetha	Sringeri, Karnataka	Yajur Veda
West	Dwaraka Peetha	Dwaraka, Gujarat	Sama Veda
North	Jyotirmath	Badarinath	Atharva Veda

- He also appointed his disciples Padmapada, Hasthamalaka, Sureshwara and Totaka as the Shankaracharyas of the four Peethas in East, south, west and north respectively.

Organisation and Social Integration

- Adi Shankaracharya also organised his disciples into **ten categories**—*vana*, *parvata*, *aranya*, *tirtha*,

ashrama, *giri*, *puri*, *bharati*, *sagar*, and *saraswati*.

- ✓ These sanyasis were entrusted with the task of **propagating dharmic values across regions**.
- ✓ His efforts contributed significantly to the **spiritual and cultural unity of Bharat**, despite diversity and limited communication.

Legacy and Relevance Today

- **Philosophical Legacy**
 - ✓ Regarded as the **most important early exponent of Advaita Vedanta**
 - ✓ Provided a **systematic metaphysical and epistemological framework**
- **Diverse Interpretations**
 - ✓ Some view him as a **reviver of Vedic tradition**
 - ✓ Later thinkers like **Sri Narayana Guru** reinterpreted his ideas for **social reform**
- **Debates on Social Thought**
 - ✓ His works have been used to both **justify and critique social hierarchies**
 - ✓ Questions of authorship and interpretation continue to shape debates
- **Contemporary Relevance**
 - ✓ Promotes social harmony and collective well-being
 - ✓ Encourages ethical living and discipline
 - ✓ Strengthens cultural and spiritual unity
 - ✓ Inspires the establishment and preservation of spiritual institutions
- **Statue of Oneness**
 - ✓ The unveiling of the **108-foot 'Statue of Oneness' (Ekatmata Ki Pratima)** of Adi Shankaracharya at Omkareshwar, in Khandwa district, Madhya Pradesh marks an important intersection of **heritage, philosophy, and cultural tourism**.
 - The statue depicts the philosopher as a **12-year-old child**, symbolising the age at which he is believed to have visited Omkareshwar and begun his intellectual journey.



9.1. QS Subject Rankings 2026

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

Recently, India strengthened its presence in the 16th edition of QS Subject Rankings 2026, released by the London-based QS Quacquarelli Symonds.

Key Highlights of the Ranking regarding India

- India added 20 new institutions this year, taking its total to 99. It also holds the fourth-highest number of institutions overall in the rankings.
- India also recorded 120 new subject entries, placing India **fourth globally in fresh inclusions after the US, China, and the UK.**
- According to the rankings, India records 27 top 50 positions across subjects and broad faculty areas - more than double the 12 recorded in 2024 - earned by 12 institutions.
- The Indian Institute of Management Kozhikode (IIM-K) (ranked 78th worldwide) has attained a significant global achievement by entering the Top 100 of the ranking by Subject 2026 for the first time.
- India's four **Indian Institutes of Technology (IITs), Jawaharlal Nehru University (JNU), and Birla Institute of Technology and Science (BITS), Pilani**, ranked among the world's top 50 universities in various subjects.
- The **Indian School of Mines University, Dhanbad**, led the individual charge, ranking **21st globally in Mineral and Mining Engineering.**
- **IIM Ahmedabad earned 21st place in both Business and Management Studies and Marketing**, marking India's first appearance in the global Marketing rankings.
- Indian Institute of Management (IIM) Ahmedabad has made a notable debut in marketing at 21st rank,

marking India's first-ever entry in this subject.

- IIT Delhi recorded six top-50 entries, leading India in Chemical Engineering (48th), Electrical & Electronic Engineering (36th), Mechanical Engineering (44th), and Engineering & Technology (36th).

About QS World University Rankings 2026

- It assesses universities through a robust methodology focusing on academic reputation, employability, research impact, global engagement, and sustainability, serving as a widely respected benchmark of institutional excellence.
- The 16th edition evaluates **over 21,000 academic programs across 1,900 universities** in more than 100 countries, covering 55 disciplines and five broad faculty areas.
- **Top 5 Ranks:**
 - ✓ Massachusetts Institute of Technology (MIT), USA
 - ✓ Imperial College London, UK
 - ✓ Stanford University, USA
 - ✓ University of Oxford, UK
 - ✓ Harvard University, USA

9.2. FAO Food Price Index

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

Recently, the FAO Food Price Index rose in March 2026, driven mainly by higher energy costs linked to the West Asia conflict, which in turn pushed up global food prices.

About the FAO Food Price Index

- It is a monthly indicator that tracks the international price movements of a basket of key food commodities.
- It is published by the **Food and Agriculture Organisation (FAO)** of the United Nations.

MISCELLANEOUS

- It is calculated as a weighted average of 5 *commodity group* indices: *cereals, vegetable oils, dairy, meat, and sugar*, based on their average export shares.
- **Base year: 2014–16**
- It serves as an important global food inflation indicator, reflecting trends in international food markets and is widely used to assess *global food security conditions, inflationary pressures, and commodity market volatility*.

About the Food and Agriculture Organization (FAO)

- It is a *specialised agency of the United Nations* that leads global efforts to eliminate hunger, improve nutrition, and ensure food security.
- Its core objective is to achieve food security for all, ensuring regular access to adequate, safe, and nutritious food for an active and healthy life.
- **Headquarters:** Rome, Italy
- **Membership:** It comprises *195 members (194 countries + the European Union)* and operates in over *130 countries worldwide*.
- Works in coordination with sister UN bodies such as the *World Food Programme (WFP)* and the *International Fund for Agricultural Development (IFAD)*.
- **Reports published by FAO:**
 - ✓ The State of Food Security and Nutrition in the World (SOFI)
 - ✓ The State of the World's Forests (SOFO)
 - ✓ The State of World Fisheries and Aquaculture (SOFIA)
 - ✓ The State of Agricultural Commodity Markets (SOCO)

9.3. Government notifies NCERT as Deemed University

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

Recently, the Education Ministry has issued a notification declaring the National Council for Educational Research and Training (NCERT) as an institution deemed to be a university.

More about the News

- The government granted this status after the UGC approved the recommendation of an expert committee.
- The new status significantly *expands NCERT's mandate beyond school curriculum design*, enabling it to launch academic programmes, including doctoral and innovative courses.

Conditions for NCERT after Granting the Status

- The notification brings NCERT squarely within the regulatory ambit of the UGC.
- NCERT can start new programmes, including *off-campus or offshore*, only as per UGC norms and guidelines.
- It is *prohibited from commercial activities* and must align its programs with UGC and statutory standards.
- It must ensure its programmes are accredited by the *National Board of Accreditation (NBA)* and the institution by the *National Assessment and Accreditation Council (NAAC)*.
- It is mandated to participate in *NIRF rankings* and *create Academic Bank of Credits (ABC) IDs*, uploading student *credits to the ABC portal via digital lockers*.

Important Information

- A *Deemed-To-Be University* in India is a high-performing institution (often a college or research institute) granted autonomous university status by the *Department of Higher Education on the advice of the University Grants Commission (UGC)*.
- Under *Section 3 of the UGC Act, 1956*, these institutions *enjoy academic autonomy, allowing them to design their own curricula, set fees, and conduct independent examinations*.

About NCERT

- It is an autonomous organisation *established in 1961 under the Societies Registration Act*.
- It serves as the *apex body advising the Central and State Governments on school education*.
- **Key Functions:**
 - ✓ Educational research and innovation
 - ✓ Curriculum development and revision

- ✓ Development of textbooks and teaching-learning materials
- ✓ Teacher education and professional development
- ✓ Educational evaluation and assessment
- ✓ International cooperation in education
- As per the National Education Policy (NEP) 2020, **NCERT is the nodal agency for developing National Curriculum Frameworks (NCFs) for Early Childhood Care and Education (ECCE), School Education, and Adult Education.**

9.4. World Health Day 2026

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

World Health Day 2026, observed on 7 April, is being marked under the theme “Together for health. Stand with science”, highlighting the importance of scientific evidence and collaboration in improving global health outcomes.

More on the News

- The campaign launches a **year-long global initiative** promoting science-driven solutions and strengthening trust in public health through the **One Health approach**, integrating human, animal, plant, and environmental health.
- It emphasizes **scientific collaboration and multilateral partnerships**, highlighted by key events such as the **International One Health Summit (France, 7 April)** and the **Global Forum of WHO Collaborating Centres (7–9 April)**, involving **~800 institutions from 80+ countries**.
- The campaign urges stakeholders to **engage with evidence-based knowledge, rebuild trust in science, and support science-led solutions**, while encouraging public participation through global awareness initiatives.
- It also encourages global participation through awareness activities, storytelling, and digital engagement using hashtags like **#StandWithScience** and **#WorldHealthDay**.

About World Health Day

- World Health Day is celebrated annually **on 7 April** to draw global attention to pressing health issues affecting people worldwide.
- The date marks the **founding of the World Health Organization (WHO) in 1948**, following the decision taken during the **First World Health Assembly**.
- The observance aims to promote **better health standards, awareness, and international cooperation**, aligning with the broader goals of the United Nations to ensure improved living conditions, global well-being, and health security for all.

9.5. World Homoeopathy Day 2026

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

World Homoeopathy Day 2026 was observed on 10 April to commemorate the birth anniversary of Samuel Hahnemann, the founder of Homoeopathy.

More on the News

- The theme for 2026 is **“Homoeopathy for Sustainable Health”**, focusing on promoting holistic, affordable, and patient-centric healthcare.
- The campaign stresses **evidence-based expansion, scientific research, and interdisciplinary collaboration** to enhance global credibility and effectiveness of homoeopathy.
- India has one of the largest homoeopathy ecosystems, with **over 3.45 lakh practitioners, ~300 institutions, and extensive research infrastructure**, supporting its integration into public healthcare.
- Key initiatives include strengthening the AYUSH ecosystem through **digital platforms (Ayush Grid), improved training, regulatory reforms, and research-based validation**.
- New digital tools, certification courses, and research publications were launched to improve **accessibility, knowledge dissemination, and quality standards** in homoeopathy.

MISCELLANEOUS

About World Homoeopathy Day

- World Homeopathy Day is celebrated **annually** to honour the work of German physician and chemist **Dr Samuel Hahnemann** on his birth anniversary - **April 10**.
 - ✓ Dr Samuel Hahnemann is famously known as the **founder of homoeopathy**.
- In 1997, the Government of India declared **April 10th as World Homoeopathy Day** to honour Dr Hahnemann's remarkable contributions to the field of medicine.
 - ✓ Since then, this day has been observed annually.
- It serves as a platform to **promote awareness about homoeopathy's gentle, non-invasive approach to healing and its potential** to address a wide range of health conditions.

What Is Homeopathy?

- Homoeopathy, also known as homoeopathic medicine, is a medical system that was developed in **Germany more than 200 years ago**.
- Homoeopathy is a holistic system of medicine that uses **highly diluted natural substances** to stimulate the body's self-healing mechanisms and focuses on treating the individual rather than just the disease.
 - ✓ It's based on two unconventional theories:
- **"Like cures like"**—the notion that a disease can be cured by a substance that produces similar symptoms in healthy people.
- **"Law of minimum dose"**—the notion that the lower the dose of the medication, the greater its effectiveness. Many homoeopathic products are so diluted that no molecules of the original substance remain.

9.6. 9th Indian Ocean Conference

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

The 9th Indian Ocean Conference (IOC 2026) was held in Mauritius from April 10–12, 2026, bringing together ministers, policymakers, and experts from across the Indian Ocean Region (IOR).

More on the News

- **Theme:** *"Collective Stewardship for Indian Ocean Governance"*.
- The conference was organised by the India Foundation in collaboration with the Government of Mauritius.
- It was conducted against the backdrop of **increasing geopolitical competition, maritime security challenges, and disruptions in global trade routes**, making the Indian Ocean a critical strategic space.

Key Highlights of the 9th Indian Ocean Conference

- Participants at the 9th IOC reaffirmed the need for collective, rulesbased governance of the Indian Ocean and stressed that unilateral coercive actions or greyzone tactics are incompatible with longterm stability and shared prosperity.
- India's External Affairs Minister outlined a fivepronged priority framework for the region, emphasising maritime security, economic cooperation, connectivity, climateresilience, and strong institutional collaboration.
- The forum also highlighted IndiaMauritius cooperation, including an emerging energysecurity arrangement on oil and gas, to strengthen the island nation's resilience against regional shocks.

About the Indian Ocean Conference

- The Indian Ocean Conference was launched in 2016 by the India Foundation in collaboration with the Government of India and regional partners, and has evolved into a **flagship multilateral forum** for dialogue on regional cooperation and maritime governance.
- It serves as a platform bringing together **governments, strategic experts, and international organisations** to discuss shared challenges and opportunities in the Indian Ocean Region.
- As a key consultative forum for IOR countries, the IOC serves as an important platform for India to articulate its vision of a secure, stable, and cooperative Indian Ocean under the rubric of *Security and Growth for All in the Region (SAGAR)*.

9.7. Operation Upstream

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

The World Anti-Doping Agency (WADA) recently highlighted the progress of *Operation Upstream* during its Intelligence and Investigations conference held in India.

More on the New

- The initiative comes amid growing concerns over **organized doping networks and supply chains of performance-enhancing drugs (PEDs)**, including in countries like India.
- It reflects a strategic shift from targeting athletes alone to addressing the **broader ecosystem enabling doping**.

About Operation Upstream

- Operation Upstream is WADA's key antidoping intelligence and enforcement project, implemented in collaboration with INTERPOL, Europol, and lawenforcement agencies from over 20 countries, including India's Central Bureau of Investigation (CBI).
- It focuses on **disrupting the supply chains of banned performance-enhancing substances**, including manufacturers, traffickers, and support personnel like coaches and medical staff.
- The operation spans **over 20 countries** and is part of WADA's broader intelligence-led initiative under the Global Anti-Doping Intelligence and Investigations Network (GAIIN).

Need to Strengthen Anti-Doping Framework in India

- **Rising Incidence of Doping Violations:** India consistently ranks among the countries with the **highest number of doping offenders**, indicating a systemic and deep-rooted problem in the use of prohibited substances across sporting disciplines.
- **Institutional and Capacity Constraints:** Key institutions such as the National Anti-Doping Agency

(NADA) face a **shortage of trained personnel and operational limitations**, while past lapses at the National Dope Testing Laboratory (NDTL) highlight gaps in compliance with international standards.

- **Need for Systemic and Preventive Approach:** There is a pressing need to move beyond athlete-centric penalties towards **targeting supply chains, strengthening testing mechanisms, and enhancing awareness**, in line with global initiatives like intelligence-led anti-doping operations.

9.8. Project DANTAK of BRO Celebrates 66th Raising Day

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

Project DANTAK, a flagship overseas project of the Border Roads Organisation (BRO), celebrated its 66th Raising Day in Bhutan.

About Project DANTAK

- Project DANTAK was established in **1961** as a special initiative of India to support Bhutan's infrastructure development.
- It is the **oldest overseas project of BRO**, headquartered at **Deothang (Bhutan)**.
- It is responsible for constructing and maintaining **over 1,500 km of roads and several key infrastructure projects** in Bhutan, including **Bhutan's East-West Highway**.
- It plays a crucial role in strengthening strategic and economic ties between India and Bhutan, especially in border and remote regions.
- Over the years, it has contributed to capacity building and employment generation for local communities in Bhutan.

About Border Roads Organisation (BRO)

- The Border Roads Organisation (BRO) was established in **1960** to develop and maintain infrastructure in **border and remote areas of India**.
- **Motto:** "*Shramena Sarvam Sadhyam*" (Everything achievable through hard work).

MISCELLANEOUS

- It operates under the **Ministry of Defence** and plays a key role in enhancing connectivity for defence preparedness and socio-economic development.
- BRO undertakes projects not only in India but also in neighbouring countries such as **Bhutan, Myanmar, and Afghanistan**, reflecting India's regional outreach.
- It is known for executing projects in challenging terrains, including high-altitude regions, deserts, and dense forests.

9.9. Goldman Environmental Prize 2026

SYLLABUS

Paper-I (Prelims): *Current events of National & International importance.*

Context

The Goldman Environmental Prize 2026, often referred to as the "Green Nobel Prize", was awarded to six grassroots environmental activists from different regions of the world.

Awardees and their Work

- **Yuvelis Morales Blanco (Colombia):** Led community resistance against **hydraulic fracturing (fracking)** projects along the Magdalena River, contributing to their suspension.
- **Sarah Finch (United Kingdom):** Secured a landmark Supreme Court ruling requiring fossil fuel projects to account for their **full climate impact**, reshaping

environmental law.

- **Alannah Acaq Hurley (United States):** Led a coalition that stopped the **Pebble Mine project**, protecting vast salmon ecosystems in Alaska.
- **Borim Kim (South Korea):** Won Asia's first **youth-led constitutional climate case**, compelling stronger emissions reduction targets.
- **Theonila Roka Matbob (Papua New Guinea):** Forced mining giant Rio Tinto to accept responsibility for **environmental damage from the Panguna mine**.
- **Iroko Tanshi (Nigeria):** Led community action to protect **endangered bat habitats and rainforest ecosystems** from wildfires.

About Goldman Environmental Prize

- The Goldman Environmental Prize, often called the "Green Nobel", is the world's largest award for grassroots environmental activists and is administered by the **Goldman Environmental Foundation**.
- Philanthropists **Richard and Rhoda Goldman** founded the prize in 1989 to highlight the international nature of environmental problems and inspire global action through individual leadership.
- The prize annually recognises one grassroots environmental leader from each of six continental regions—Asia, Africa, Europe, North America, South & Central America, and Islands & Island Nations.
- The winners are selected by an international jury and **awarded with \$200,000 USD each**.

PRACTICE MCQS

Q 1. Consider the following statements regarding the Convention on Conservation of Migratory Species (CMS):

1. COP 15 to the CMS was held in Campo Grande, marking the first time Brazil hosted the event.
2. It is the only UN-based treaty exclusively focusing on migratory species.
3. India hosted CMS COP-12 in 2020 and formally assumed the presidency.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 2 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 2. Consider the following statements regarding the Gig Economy:

1. The Telangana Gig Workers Bill, 2026, transitions the gig economy towards a regulated and welfare-oriented framework.
2. The act provides for a Welfare Board to provide legal status to gig workers as traditional full-time employees.
3. The gig economy is characterised by short-term and flexible work arrangements.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 3. Consider the following statements regarding the Solid Waste Management (SWM) Rules, 2026:

1. Bulk waste generators are mandated to process waste only through authorised off-site facilities.
2. The rules introduce Environmental Compensation for violations such as improper waste handling.
3. Landfills can accept only non-recyclable and inert waste.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 4. With reference to Internationally Recognized Certificates of Compliance (IRCCs) and the Nagoya Protocol, consider the following statements:

1. IRCCs are official certificates issued as proof that access to genetic resources has been granted in accordance with international rules, certifying Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT).
2. India is the global leader in issuing IRCCs, accounting for over 56% of all certificates issued worldwide.
3. The Nagoya Protocol is a supplementary agreement to the Convention on Biological Diversity, adopted in 2010 and entering into force in 2014.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 5. With reference to India's nuclear power status and government initiatives, consider the following statements:

1. India currently has 24 operable nuclear reactors with a total installed capacity of 8,780 MWe.
2. Under the Viksit Bharat 2047 vision, India aims to achieve at least 100 MWe nuclear capacity by 2047.
3. The Nuclear Energy Mission (2025) aims to develop at least five indigenous Small Modular Reactors (SMRs) by 2033.
4. The SHANTI Bill (2025) replaces the Atomic Energy Act, 1962, and the Civil Liability for

PRACTICE MCQS

Nuclear Damage Act, 2010, with a single comprehensive framework.

Which of the statements given above is/are correct?

- (a) 1, 3 and 4 only (b) 1 and 2 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

Q 6. Consider the following statements:

1. The first phase of Census 2027 began on April 1, 2026, with the Houselisting and Housing Census (HLO).
2. Census 2027 will be India's first fully digital census with mobile applications and real-time monitoring systems.
3. The Census Act, 1948, mandates that the Census must be conducted every 10 years.
4. The Registrar General and Census Commissioner of India function under the Ministry of Home Affairs.

Which of the statements given above is/are correct?

- (a) 1, 2 and 4 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2, 3 and 4

Q 7. Consider the following statements regarding the Income Tax Act, 2025:

1. It replaces the Income Tax Act, 1961 and changes tax rates and slabs to simplify taxation.
2. It focuses on simplifying the language and structure of tax laws.
3. MAT and AMT have been placed in separate sub-sections.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 8. With reference to the Artemis II Mission, consider the following statements:

1. It will be the first human mission beyond low Earth orbit in more than 50 years.
2. The mission aims to land astronauts on the lunar surface as part of its primary objective.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Q 9. Consider the following statements regarding Special Economic Zones (SEZs) in India:

1. SEZs are treated as being outside the customs territory of India for authorised operations.
2. Minimum 20% value addition within SEZ is required to avail benefits under the Concessional Customs Duty Framework for clearance of goods to the Domestic Tariff Area (DTA).
3. SEZs operate under the framework of the Special Economic Zones Act, 2005.

Which of the statements given above is/are correct?

- (a) 1 and 3 only (b) 1 only
(c) 2 and 3 only (d) 1, 2 and 3

Q 10. With reference to the defence exports of India, consider the following statements:

1. Defence Public Sector Undertakings (DPSUs) contributed more than half of total exports.
2. Defence exports reached ₹38,424 crore in FY 2025–26.
3. Private sector exports grew faster than DPSUs.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 only (d) 1, 2 and 3

Q 11. With reference to the India–Australia Economic Cooperation and Trade Agreement (Ind-Aus ECTA), consider the following statements:

1. The ECTA was signed on 2 April 2022 and came into force on 29 December 2022.
2. Australia has granted 100% tariff line access to India, with 98.3% becoming duty-free immediately and the rest phased out

over five years.

3. From 1 January 2026, all Indian exports to Australia will enjoy zero-duty access.
4. India's exports to Australia have more than doubled from FY 2020–21 to FY 2024–25, reaching USD 8.5 billion in the latter year.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 1, 2 and 3 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

Q 12. Consider the following statements regarding MHEW-DSS:

1. It is developed by the India Meteorological Department using open-source technology.
2. It has automated over 90% of weather data processing.
3. One of its objectives is to regulate pollution levels in cities.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 13. Consider the following statements regarding the United Nations Interim Force in Lebanon (UNIFIL):

1. It was established in 1978 by UN Security Council resolutions.
2. Its initial mandate included confirming Israeli withdrawal from Lebanon.
3. India is the largest troop contributor to UNIFIL.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 2 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 14. With reference to the UN80 Initiative, consider the following statements:

1. It was launched in 2025 on the occasion of the UN's 80th anniversary as a system-wide reform initiative.
2. It is limited to reforming UN peacekeeping operations and security-related mandates.

3. It seeks to enhance efficiency, accountability, and responsiveness across the entire UN system.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

Q 15. With reference to the Plastic Waste Management (Amendment) Rules, 2026, consider the following statements:

1. Companies failing to meet recycling targets in 2025–26 can carry forward the shortfall for up to three years, provided at least one-third of the deficit is met annually.
2. The rules mandate 100% use of recycled plastic in all categories of plastic packaging by 2028–29.
3. A tradable EPR certificate mechanism has been introduced to enable companies to meet compliance targets.
4. Recycled content targets apply even to food and pharmaceutical packaging without any exemptions.

Which of the statements given above are correct?

- (a) 1 and 3 only (b) 1, 2 and 3 only
(c) 2 and 4 only (d) 1, 3 and 4 only

Q 16. With reference to the Sabarimala verdict (2018), consider the following statements:

1. The Supreme Court struck down Rule 3(b) of the Kerala Hindu Places of Public Worship Rules, 1965.
2. The Court upheld the restriction on women's entry as an essential religious practice.
3. The judgment held that devotees of Lord Ayyappa don't constitute a separate religious denomination.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

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Q 17. With reference to the recent reclassification of LWE-affected districts, consider the following statements:

1. The category of "most affected districts" has been replaced by a three-tier classification.
2. Bijapur and West Singhbhum are currently classified as LWE-affected districts.
3. Kanker district is classified under the Legacy & Thrust category.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 18. With reference to the Minerals Concession (Second Amendment) Rules, 2026 and the Mines and Minerals (Development and Regulation) Act, 1957, consider the following statements:

1. A one-time extension is allowed for Mining Lease (ML) and Composite Licence (CL) holders of deep-seated minerals for inclusion of contiguous areas, up to 10% of the existing area for ML and up to 30% for CL.
2. No extra payment is required for critical minerals, strategic minerals, and deep-seated minerals listed in the Seventh Schedule for inclusion of associated minerals.
3. The cap on the sale of minerals from captive mines has been removed, and surplus sale is allowed after meeting own requirements.

Which of the statements given above are correct?

- (a) 1 and 3 only (b) 1, 2 and 3
(c) 2 and 3 only (d) 1 and 2 only

Q 19. Consider the following statements:

1. Benchmark Issuance Strategy (BIS) involves issuing State Development Loans in standardised benchmark maturities based on a pre-announced borrowing calendar.
2. State Development Loans are issued by the Central Government and carry sovereign backing.

3. State Development Loans qualify for Statutory Liquidity Ratio (SLR) requirements and are eligible as collateral for RBI's liquidity operations.

Which of the statements given above are incorrect?

- (a) 1 only (b) 2 only
(c) 2 and 3 only (d) 1, 2 and 3 only

Q 20. With reference to the Draft Tar-balls Management Rules, 2026, consider the following statements:

1. The rules mandate that coastal states treat tar-ball pollution as a State Disaster.
2. Only offshore oil drilling companies are brought under the definition of "oil facilities."
3. The rules allow utilisation of tar-balls as fuel in certain industries subject to conditions.

Which of the statements given above is/are correct?

- (a) 1 and 3 only (b) 2 only
(c) 1, 2 and 3 (d) 1 only

Q 21. With reference to the Prototype Fast Breeder Reactor (PFBR) at Kalpakkam, consider the following statements:

1. It is a sodium-cooled, pool-type fast breeder reactor that produces more fuel than it consumes.
2. It uses slowed neutrons to sustain nuclear reactions similar to Pressurised Heavy Water Reactors (PHWRs).
3. It plays a key role in Stage II of India's three-stage nuclear programme by using Plutonium-239 and Uranium-238.
4. India will become the first country in the world to operate a commercial fast breeder reactor after its commissioning.

Which of the statements given above are correct?

- (a) 1 and 3 only
(b) 1, 2, and 3 only
(c) 2 and 4 only
(d) 1, 3, and 4 only

Q 22. With reference to the Pradhan Mantri MUDRA Yojana (PMMY), consider the following statements:

1. PMMY provides collateral-free loans up to ₹20 lakh for income-generating activities.
2. The scheme is applicable only to corporate sector enterprises engaged in agriculture.
3. Loans under PMMY are classified into Shishu, Kishor, Tarun, and Tarun Plus categories based on business stage.
4. Interest rates under PMMY are directly fixed by the Government of India.

Which of the statements given above is/are correct?

- (a) 1 and 3 only (b) 1, 2 and 3 only
(c) 2 and 4 only (d) 1, 3 and 4 only

Q 23. With reference to Particularly Vulnerable Tribal Groups (PVTGs), consider the following statements:

1. PVTGs are a sub-category within Scheduled Tribes.
2. All Scheduled Tribes with a declining population are automatically classified as PVTGs.
3. PVTGs were first identified as a separate category based on the recommendations of the Renke Commission.

Which of the statements given above is/are correct?

- (a) 1 and 3 only (b) 1 only
(c) 2 and 3 only (d) 1, 2 and 3

Q 24. With reference to the Monetary Policy Committee (MPC) of India and its recent policy decision, consider the following statements:

1. The MPC kept the Repo Rate unchanged at 5.25%.
2. It was established in September 2016 under Section 45ZB (1) of the Reserve Bank of India Act, 1934.
3. The Deputy Governor of the Reserve Bank of India serves as the Chairperson of the MPC, ex officio.

Which of the statements given above is/are correct?

- (a) 2 only (b) 2 and 3 only
(c) 1 and 2 only (d) 1, 2 and 3

Q 25. Consider the following statements regarding the Nutrient-Based Subsidy (NBS) Scheme:

1. Under the NBS scheme, subsidy is linked to the nutrient content—Nitrogen (N), Phosphorus (P), Potassium (K), and Sulphur (S)—and is fixed per kg, later converted into per tonne subsidy.
2. The NBS scheme provides a subsidy directly to farmers in cash based on the quantity of fertilizers purchased.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Q 26. With reference to Balirajgarh and Mithila civilisation, consider the following statements:

1. Balirajgarh was declared a protected monument by the Archaeological Survey of India in 1938.
2. The Videha Kingdom, with Mithila as its capital, was one of the 16 Mahajanapadas during the Later Vedic period.
3. Mithila was associated with important religious and philosophical figures such as Gautama Buddha and Mahavira.

Which of the statements given above is/are correct?

- (a) 1 only (b) 1 and 2 only
(c) 2 and 3 only (d) 1, 2 and 3

Q 27. With reference to global ocean protection, consider the following statements:

1. More than 10% of the global ocean is currently under protection.
2. Most Marine Protected Areas (MPAs) are located in areas beyond national jurisdiction.
3. Only a small fraction of MPAs are fully or effectively protected.

Which of the statements given above is/are correct?

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- (a) 1 and 3 only (b) 1 only
(c) 2 and 3 only (d) 1, 2 and 3
- Q 28. With reference to the Sundarbans, consider the following statements:**
1. It is the world's largest contiguous mangrove forest located in the Ganga-Brahmaputra-Meghna delta.
 2. The entire Sundarbans region is designated as a single UNESCO World Heritage Site.
 3. The Indian Sundarbans was designated as a Ramsar Site in 2019.
- Which of the statements given above is/are correct?
- (a) 1 and 3 only (b) 1 only
(c) 2 and 3 only (d) 1, 2 and 3
- Q 29. With reference to the National Quantum Mission (NQM), consider the following statements:**
1. It was approved on 19 April 2023 with an outlay of ₹6003.65 crore (2023–24 to 2030–31) to develop quantum technologies.
 2. It aims to establish satellite-based secure quantum communication over a range of 500 km in India.
- Which of the statements is/are correct?
- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2
- Q 30. Consider the following statements regarding India's renewable energy sector:**
1. India has surpassed Brazil and now stands behind only China and the United States in global renewable energy installed capacity rankings.
 2. Wind energy leads the energy mix in India, followed by solar power.
 3. India has already achieved its target of 500 GW of non-fossil fuel capacity before 2030.
- Which of the statements given above is/are correct?
- (a) 1 only (b) 1 and 2 only
(c) 2 and 3 only (d) 1, 2 and 3
- Q 31. Which of the following best describes the objective of the Digital India Land Records Modernization Programme (DILRMP)?**
- (a) To redistribute land among marginal farmers
(b) To digitise and modernise land records for better governance
(c) To provide subsidies for agricultural inputs
(d) To regulate agricultural markets
- Q 32. Which of the following best describes the objective of the Kigali Amendment to the Montreal Protocol?**
- (a) To eliminate all greenhouse gases globally
(b) To phase down hydrofluorocarbons due to their climate impact
(c) To regulate carbon trading mechanisms
(d) To promote renewable energy adoption
- Q 33. With reference to Jyotirao Govindrao Phule, consider the following statements:**
1. Founded Satyashodhak Samaj to promote social equality and upliftment of non-Brahmins.
 2. He was conferred the title "Mahatma" in 1873 by Vithalrao Krishnaji Vandekar.
- Which of the statements given above are incorrect?
- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2
- Q 34. With reference to the Reserve Bank of India's Scale-Based Regulatory (SBR) Framework for NBFCs and the proposed draft changes to NBFC-Upper Layer (NBFC-UL), consider the following statements:**
1. The proposed framework seeks to replace the existing parametric scoring and "top 10 NBFCs" rule with a single asset-size criterion of ₹1,00,000 crore and above.
 2. Government-owned NBFCs are currently included in the Upper Layer but are proposed to be excluded under the new draft.
 3. NBFCs under the Upper Layer may face stricter norms such as reduced credit concentration limits and higher governance standards.
 4. The Top Layer (NBFC-TL) is a permanent regulatory layer for high-risk NBFCs mandated to remain active at all times.

Which of the statements given above are correct?

- (a) 1 and 3 only (b) 1, 2 and 3 only
(c) 2 and 4 only (d) 1, 3 and 4 only

Q 35. With reference to Integrated Air Drop Test (IADT-02) and Gaganyaan mission, consider the following statements:

1. IADT-02 tested the parachute based deceleration system of a simulated Crew Module.
2. In IADT-02, 5.7 tonne Crew Module was dropped from about 3 km using a Chinook helicopter.
3. Ten parachutes of four types were deployed in a fixed sequence during descent.
4. Service Module in Gaganyaan is designed to be a habitable module for astronauts.

Which of the statements given above are correct?

- (a) 1, 2 and 3 only (b) 1 and 4 only
(c) 2 and 3 only (d) 1, 2, 3 and 4

Q 36. With reference to the initiation of removal proceedings of a High Court Judge under the Judges (Inquiry) Act, 1968, consider the following statements:

1. A motion for removal can be initiated in either House of Parliament.
2. The notice must be signed by at least 100 members of Lok Sabha or 50 members of Rajya Sabha.
3. The notice is submitted to the President of India for initiating proceedings.

Which of the above statements is/are correct?

- (a) 1 and 2 only (b) 2 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 37. Consider the following statements regarding the National Agriculture Market (e-NAM):

1. It was launched in April 2016 as a pan-India electronic trading platform to create a unified national market for agricultural commodities by integrating existing APMC mandis.

2. The platform enables features such as online bidding, real-time price discovery, and direct electronic transfer of payments to farmers.
3. As of March 2026, e-NAM has integrated across 28 States and 4 Union Territories making it a fully unified national agricultural market system.

How many of the above statements are correct?

- (a) Only one (b) Only two
(c) All the three (d) None

Q 38. With reference to the Atlantic Meridional Overturning Circulation, consider the following statements:

1. It is driven by differences in both temperature and salinity of ocean waters.
2. Freshwater input from melting ice sheets can strengthen the circulation by increasing density gradients.
3. It operates independently of other global ocean currents such as the Antarctic Circumpolar Current.

How many of the above statements are correct?

- (a) Only one (b) Only two
(c) All the three (d) None

Q 39. Consider the following statements regarding climate change and poverty in India as highlighted in a recent NISER study:

1. Districts with higher variability in temperature are less likely to be classified as poor due to adaptive agricultural practices.
2. Flood-affected areas show a higher probability of poverty because of repeated damage to crops, homes, and infrastructure.
3. Economic diversification towards the tertiary sector increases vulnerability to climate shocks due to service-sector instability.
4. Drought-prone districts that are heavily dependent on agriculture are more likely to experience chronic poverty.

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How many of the above statements are correct?

- (a) Only one (b) Only two
(c) Only three (d) All the four

Q 40. With reference to the Startup India Fund of Funds 2.0 (FoF 2.0), consider the following statements:

1. It is a government-backed funding mechanism aimed at strengthening India's startup ecosystem through structured investment in SEBI-registered Alternative Investment Funds (AIFs).
2. Investments under the scheme are made directly into startups by the government.
3. The scheme adopts a segmented approach targeting deep tech startups, early growth stage startups, tech-driven manufacturing startups, and sector/stage agnostic startups.
4. Returns generated under the scheme are deposited back into the Consolidated Fund of India (CFI).

Which of the statements given above are correct?

- (a) 1, 3 and 4 only (b) 1 and 2 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

Q 41. With reference to the UNDP report titled "Military Escalation in the Middle East: Human Development Impacts Across Asia and the Pacific," consider the following statements:

1. Military escalation in West Asia may push about 2.5 million people in India into poverty.
2. South Asia bears the largest burden of poverty increase among regions.
3. India is projected to experience no loss in its Human Development Index (HDI) progress.
4. Energy is identified as the dominant transmission pathway of the crisis impacts.

Which of the statements given above are correct?

- (a) 1, 2 and 4 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2, 3 and 4

Q 42. With reference to the Urban Challenge Fund (UCF), consider the following statements:

1. The Fund provides Central Assistance covering 25% of the project cost subject to raising at least 50% of the project cost from market sources.
2. The Urban Challenge Fund is expected to mobilise a total investment of ₹2 lakh crore in the urban sector.
3. It is a Centrally Sponsored Scheme announced in the Budget 2026–27.
4. A Credit Repayment Guarantee Scheme of ₹5,000 crore has been approved to support smaller cities and first-time borrowers.

How many of the above statements are correct?

- (a) Only one (b) Only two
(c) Only three (d) All four

Q 43. Consider the following statements:

1. India rejected proposals to create permanent members without veto powers, warning it would entrench inequality in the Council.
2. India supported the G4 proposal where new permanent members would not exercise veto for 15 years, followed by a review.
3. The United Nations Security Council was expanded to 15 members in 1965, with 5 permanent and 10 non-permanent members.

Which of the statements given above is/are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Q 44. With reference to the report "Universal Social Protection in Changing Labour Markets: Protecting Workers in All Types of Employment" by the International Labour Organization, consider the following statements:

1. Social protection includes nine areas such as child and family benefits, maternity protection, unemployment support, and survivors' benefits.

2. Social security contributions accounted for 18.8% of total taxation and 5.7% of global GDP in 2019.
3. Social security contributions account for more than 27% of total taxation in Africa, Asia and the Pacific.
4. Social protection systems must evolve from reducing poverty to preventing vulnerability in changing labour markets.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All the four

Q 45. With reference to NITI Aayog's reports on "Ease of Doing Research & Development in India", consider the following statements:

1. The reports propose the ROPE framework to remove bottlenecks and promote enablers in the R&D ecosystem.
2. The reports recommend reducing private sector participation in R&D to maintain academic autonomy.
3. The reports emphasise a shift from compliance-based regulation to a trust-based research environment.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 and 2 only
- (d) 1, 2 and 3

Q 46. Consider the following countries:

1. Germany
2. Switzerland
3. Hungary
4. Italy
5. Poland

Which of the above share a border with Austria?

- (a) 1, 2, 3 and 4 only
- (b) 1, 3, 4 and 5 only
- (c) 2, 3 and 5 only
- (d) 1, 2, 4 and 5 only

Q 47. With reference to the Constitution (One Hundred and Thirty-First Amendment) Bill, 2026, consider the following statements:

1. The Bill proposes to expand the Lok Sabha strength to 850 members including 815 from States and 35 from Union Territories.
2. The Bill fixes delimitation exclusively to be conducted after the completion of a new Census.
3. The Bill removes the constitutional freeze on seat allocation and constituency boundaries that has been in place since 1971.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q 48. With reference to the Borrowers' Platform for Rebalancing Global Financial Governance, consider the following statements:

1. The Borrowers' Platform is a dedicated forum for developing countries that brings together finance ministers and central bank governors to exchange knowledge and experiences on sovereign debt.
2. The platform functions as a negotiation and debt restructuring body to directly influence creditor decisions.
3. The initiative is supported by the United Nations Conference on Trade and Development.

Which of the statements given above are correct?

- (a) 1 and 3 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Q 49. With reference to the use of sports genomics in athlete development, consider the following statements:

1. It may lead to ethical concerns such as genetic discrimination and unequal access to opportunities.

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2. It ensures accurate prediction of athletic success solely based on genetic profiling.
3. It raises concerns related to data privacy and informed consent in handling sensitive biological information.
4. It can complement conventional training methods but cannot substitute environmental and socio-economic factors.

Which of the statements given above is/are correct?

- (a) 1, 3 and 4 only
- (b) 1 and 2 only
- (c) 2, 3 and 4 only
- (d) 1, 2, 3 and 4

Q 50. Consider the following statements regarding the Indian Space Situational Awareness Report 2025 (ISSAR 2025):

1. It highlights increasing congestion in Low Earth Orbit due to rising satellite launches.
2. It reports a decline in space debris due to improved mitigation measures.
3. It points to the growing role of private players in space activities.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 and 2 only
- (d) 1, 2 and 3

ANSWER KEY

1. a	6. a	11. d	16. b	21. a	26. d	31. b	36. a	41. a	46. a
2. c	7. b	12. a	17. a	22. a	27. a	32. b	37. b	42. b	47. b
3. b	8. a	13. a	18. b	23. b	28. a	33. b	38. a	43. d	48. a
4. d	9. d	14. b	19. b	24. c	29. a	34. a	39. b	44. c	49. a
5. a	10. a	15. a	20. a	25. a	30. a	35. a	40. a	45. a	50. a