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Contents

Polity and Governance

Highlights

Promoting Foreign Universities in India

Why in News?

The entry of foreign universities into India marks a significant shift in the country's **higher education landscape**. Encouraged by the **National Education Policy (NEP) 2020 and the UGC (FHEI) Regulations, 2023,** this presents **both opportunities and challenges** for India's education ecosystem.

- While it offers opportunities fo**r global integration and academic excellence, i**t also raises concerns about **equity, access, affordability, inclusivity, and alignment with national priorities.**

Note:

- **India is also expanding its global presence**, with **IIT Madras opening a campus in Zanzibar** and **IIT Delhi establishing one in Abu Dhabi.**

University Grants Commission (UGC)

- UGC is a **statutory body** in India established in 1953 to **coordinate, determine, and maintain standards of higher education.**
- It was created by the Indian government through the **UGC Act of 1956**. The UGC's main functions include **providing recognition to universities, disbursing funds, and advising the government on matters related to higher education.**
  - The **UGC headquarters** is located in **New Delhi**.

What is Driving the Entry of Foreign Universities into India's Higher Education Sector?

- **India's Demographic & Economic Potential:** With over **50% of the population under the age of 30** and a **Gross Enrolment Ratio (GER) in higher education just under 30%**, India offers a vast **untapped higher education marke**t.
  - **Rising incomes, a growing middle class, English proficiency**, and **increasing aspirations for international education** make India an attractive destination for foreign universities.
- **Global Push for Diversification:** Universities in the **UK, Australia, and Canada**, where international students comprise **approximately one third** of total enrolments are facing **stagnating domestic enrolments and declining public funding**.
  - Recent **visa restrictions and enrolment caps** in these countries have pushed institutions to **explore new, high-potential markets like India to sustain growth.**
- **Revenue Diversification & Global Footprint:** Setting up campuses in India (e.g., **GIFT City, Navi Mumbai)** allows foreign universities to **diversify revenue, reduce dependency on outbound mobility**, and **offer affordable international degrees while expanding global visibility.**
- **Collaboration with Indian Institutions**: India already hosts **globally ranked institutions** (e.g., **IIT Bombay, IISc Bangalore, Delhi University**).

- Foreign universities can **partner with these colleges** to open **joint campuses**, using **existing infrastructure** instead of building from scratch. This model ensures **faster entry**, **lower investment**, and strengthens **academic collaboration**.
- **Eg**: **Deakin University** (Australia) has partnered with **IIM Bangalore** prior to launching its campus in **GIFT City**.

What are the Benefits for India from Foreign Universities Entering its Higher Education Sector?

- **Global Education Access:** Foreign universities offer **internationally benchmarked curricula**, **globally recognised degrees**, and **experienced faculty** within India.
  - This allows students to access **high-quality education** without the burden of **high overseas costs**, **visa hurdles**, and **living expenses**, thereby promoting **affordability** and **educational inclusion**.
- **Brain Drain and Forex Retention:** India saw a **rise in outbound students from 5.8 lakh in 2019 to 9 lakh in 2023**, with over **75% intending to settle abroad**.
  - Domestic foreign campuses can provide similar academic value at home, thereby **retaining talent** and saving significant **foreign exchange outflow**.
- **Research and Academic Reforms:** Collaboration with foreign universities can promote **joint research centres**, **faculty exchanges**, and **governance reforms**, enhancing **academic standards**, boosting **research output**, and strengthening **innovation and excellence** in Indian HEIs.
- **Industry Skills and Employability:** Foreign universities offer **industry-aligned programs** with emphasis on **practical learning**, **internships**, and **entrepreneurship**, helping bridge the **skill gap** and enhancing the **employability** of Indian graduates in both **domestic and global markets**.
- **Mutual Facilitation & Strategic Diplomacy**: India can negotiate **reciprocal facilitation**, offering **land, regulatory support, and infrastructure assistance**, in return for helping Indian institutions **establish campuses abroad**, particularly in **Gulf nations and Europe**.
  - This would enhance **educational diplomacy**, promote **internationalisation of Indian higher education**, and strengthen **soft power**.
- **Positioning India as a Global Education Hub:** With **52% of the population under 30**, a **tech-savvy**, **English-speaking youth**, and strategic location, India is well-positioned to become an **international education hub**.
  - Hosting foreign campuses promotes **cross-border education**, attracts students from **South Asia, Africa, and the Middle East**, enhances **India's global academic presence**, and fosters **healthy competition** for top HEIs like **AIIMS, IIMs, and IITs**, paving the way for **India's own Ivy League**.

What are the Key Challenges Related to Foreign Universities Campuses in India?

- **Affordability and Equity:** Foreign branch campuses may charge **high tuition fees**, making them accessible mainly to the **wealthy elite**.
  - This risks **widening socio-economic inequality** in higher education, potentially **excluding talented students** from **economically weaker sections**, and undermines the **NEP 2020 goal** of **inclusive access to quality education**.
- **Limited Short-Term Systemic Impact:** Though foreign universities are a major reform step, only a few campuses with limited students will open in the near term.
  - So, their effect on improving **Gross Enrolment Ratio (GER)** and overall education system will be **small and gradual**.
- **Commercialisation & Sustainability Challenges:** Foreign institutions may **prioritise profit over academic integrity**, leading to **marketisation of education** and potential **quality dilution** without strong regulation.
  - Experiences from **China, Southeast Asia, and the Gulf** show that **low enrolments**, **high costs**, and **local misalignment** often led to **campus closures**.
- **Regulatory and Infrastructure Barriers:** Despite enabling frameworks like the **UGC (Setting up and Operation of Campuses of Foreign Higher Educational Institutions in India) Regulations, 2023,** foreign universities may still face challenges related to **land**

acquisition, **taxation**, **labour laws**, and **infrastructure readiness** in general areas.

- However, in **designated zones** like **GIFT City**, which offer **regulatory exemptions** and a more conducive business environment, these barriers are **significantly reduced**.

➢ **Cultural and Academic Disconnect:** Foreign universities may face challenges in adapting to India's **social**, **linguistic**, and **cultural context**.

- Without effective **local integration**, through **relevant curricula**, **Indian faculty**, and **collaboration with local institutions**, they risk becoming **elitist, isolated campuses**, disconnected from **India's educational ecosystem and societal needs**.

What are the Key Issues Associated with India's Higher Education System?

Click Here to Read: Key Issues in India's Higher Education System

What Measures can be Adopted to Revitalise India's Higher Education System?

Click Here to Read: Revitalise India's Higher Education System

SHGs in India

Why in News?

The **Ministry of Rural Development (MoRD)** and the **Ministry of Skill Development & Entrepreneurship (MSDE)** signed an **MoU** to strengthen the **Lakhpati Didi initiative** by empowering rural women from **Self Help Groups (SHGs)**.

➢ The MoU aims to create **3 crore Lakhpati Didis** and future **Millionaire Didis** by aligning **rural aspirations** with **institutional skills**, offering **customized training** in emerging sectors, **and formal certification.**

What is the Lakhpati Didi Initiative?

➢ **About Lakhpati Didi:** A **Lakhpati Didi** is an **SHG member** earning **Rs 1 lakh or more annually** through **sustainable livelihood activities**. It is an **outcome of Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM)** under the **Ministry of Rural Development**, **not a separate scheme.**

- **As of June 2024**, **1 crore Lakhpati Didis** have been created. The **Interim Budget 2024–25** raised the target from **2 crore to 3 crore women.**

➢ **Key Objectives:** It aims to **empower rural women** through **sustainable income generation**, **promote diversified livelihoods** (agriculture, handicrafts, services, etc.), and transform **SHG women into role models** of **economic self-reliance.**

- Income must be **sustained over at least four agricultural seasons or business cycles**, i.e., **Rs 10,000+ per month on average**.

➢ **Implementation Strategy:**

- **Diversified Livelihoods:** Focus on **agriculture**, **allied sectors**, **services**, and **small enterprises** for **multiple income sources.**
- **Digital Tools & Training: Community Resource Persons (CRPs)** use **digital tools** to guide **SHGs** in **livelihood planning** supported by **structured skilling programs** in **financial literacy**, **market access**, and **compliance.**
- **4-Pillar Support System:**
  - **Assets**: tools, equipment, and infrastructure.
  - **Skills**: training and hands-on knowledge.
  - **Finance**: easy **bank linkage** and access to government schemes.
  - **Market Access**: **branding, packaging, e-commerce**, and marketing support.
- **Convergence & Partnerships**: Collaboration with **government schemes** (like **Skill India**, **PM SVANidhi**, **MGNREGA**) and the **private sector** ensures **technical, financial, and institutional support** to scale up efforts.

What are Key Facts About Self Help Groups (SHGs)?

➢ **About SHGs: SHGs** are informal collectives of **10–20 members**, primarily **women**, formed to tackle shared challenges and enhance their **economic well-being.**

- **Kudumbashree** in Kerala, **Mahila Arthik Vikas Mahamandal** in Maharashtra, and **Looms of Ladakh** are a few examples of success stories from SHGs.

➢ **Evolution:** The **SHG concept** originated from the **Grameen Bank** in Bangladesh, founded in **1975 by**

Prof. Muhammad Yunus, offering **collateral-free microloans** based on **trust and social capital**, mainly benefiting **women**.

- In **India**, SHGs emerged during the **7th Five Year Plan (1985–90)** as a **poverty eradication** strategy.
- **MYRADA (Mysore Resettlement and Development Agency)** initiated **SHG-bank linkage** in the **mid-1980s**, and the **Government of India** launched **Swarnjayanti Gram Swarozgar Yojana (SGSY)** **in 1999**, focusing on SHG formation.

➢ **Functioning of SHGs:**

- **Creation and Meetings:** SHGs are formed within communities with support from **NGOs** **or government agencies**, and members meet **regularly** to discuss issues, manage **savings**, and handle **loans.**
- **Savings and Financing:** Members **regularly pool savings** into a group fund, which is used for **internal lending** to support needs like **businesses**, **medical emergencies**, or **education.**
- **Operational Planning:** Decisions on savings, loans, and activities are made **collectively**, with one member handling **record-keeping** of finances and meetings.
- **Bank Linkage:** SHGs build **bank linkages** to access larger loans and services, supported by **government schemes**, while their **savings and repayment history** enhance **creditworthiness**.
- **Training and Support:** SHGs receive **training** in **financial literacy**, **entrepreneurship**, and other skills from **NGOs**, **government agencies**, or **banks.**

➢ **SHGs in India:** As of **June 2025**, **10 crore women** are part of **91 lakh SHGs**. By **February 2023**, **8.9 million SHGs** had availed loans worth **Rs 2.54 lakh crore**, and in **2023–24 (till Feb 2024)**, loans worth **Rs 1.7 lakh crore** were disbursed.

- As per the **Economic Survey 2022–23**, SHGs maintain a **loan repayment rate of over 96%**, highlighting their **credit discipline and reliability**.

Why are SHGs Important for Community Development and Women's Empowerment?

- **Women's Empowerment: SHGs**, predominantly **female-led**, promote **financial independence**, **decision-making**, and **leadership skills** among women.
  - **SHGs** boost **social status, confidence,** and **political participation**, with many members becoming **Sarpanch/Pradhan**, while acting as **pressure groups** to ensure **Gram Panchayat accountability.**
  - **SHGs** ensure **employment**, foster **economic independence**, and improve **bank access**, empowering women in **decision-making** and in tackling **dowry**, **domestic violence**, and **alcoholism.**
- **Financial Inclusion:** SHGs help **marginalized communities**, especially **women**, access **formal banking services**, promote **savings**, and offer **small loans at reasonable interest rates**, reducing reliance on **moneylenders.**
- **Social Upliftment & Poverty Alleviation:** SHGs raise **awareness** about **health**, **education**, and **government schemes**, and address **social issues** like **child marriage**, **domestic violence**, and **sanitation**.
  - Through **microloans**, they support **income-generating activities** like **small businesses** and **farming**, helping break the **cycle of poverty** by promoting **self-employment**.
- **Strengthening Rural Economy:** SHGs promote **local entrepreneurship** and **agriculture-based livelihoods**, enhance **market linkages** and **bargaining power**, and encourage **unity** and **collective action** for **community welfare** (e.g., roads, schools).
  - They also serve as platforms for **skill development** and **vocational training.**
- **Sustainable Development & Governance:** SHGs promote **eco-friendly practices** like **organic farming** and **waste management**, and support **SDGs** such as **No Poverty (SDG 1)**, **Gender Equality (SDG 5)**, and **Decent Work & Economic Growth (SDG 8)**.
  - **Government programs** like **NRLM** use SHGs for effective delivery of **subsidies** and **welfare benefits**, while **banks** offer loans to SHGs under **priority sector lending.**

What are the Major Challenges Faced by SHGs?

- **Financial Challenges: Limited access to credit** due to lack of **collateral** or proper **documentation** hinders many SHGs from securing bank loans.
  - Some face challenges like **high dependence on subsidies**, **irregular savings**, and **repayment issues**, leading to **fund shortages** and **loan defaults.**
- **Managerial & Operational Issues:** Many SHGs face challenges like **lack of professional management** (poor **accounting**, **record-keeping**, and **governance**), **inefficient leadership** causing conflicts and **fund mismanagement**, and **overdependence on a few members**, limiting overall **effectiveness.**
- **Social & Cultural Barriers: Gender inequality** in some regions limits **women's participation** in SHGs due to **male dominance** while **caste and class divisions** create **internal conflicts**, reducing group **cohesion**.
  - A **lack of awareness** about **rights**, **government schemes**, and **financial literacy** hampers member empowerment.
- **Policy-Related Issues: Delayed bank linkages** due to **bureaucratic hurdles**, **political interference** from local leaders, and **inadequate government support** with implementation gaps in schemes like **NRLM** hinder SHG operations and autonomy.
- **Sustainability Concerns:** SHGs face challenges like **limited market linkages**, **lack of business skills**, and **competition from large businesses**, which reduce **profitability** and hamper **income-generating activities**.
  - Additional issues include **high dropout rates** due to migration or financial stress, and a **lack of innovation** in adapting beyond traditional activities.

SHG-Bank Linkage Programme

- **About:** **SHG-Bank Linkage Programme (SHG-BLP)** is a **flagship initiative** launched by **NABARD (National Bank for Agriculture and Rural Development)** in **1992** to connect **SHGs** with **formal banking systems**.

- **Objective:** It aims to promote **financial inclusion** for the **rural poor**, especially **women**, by linking **SHGs** with **banks** for **savings**, **credit**, and other **financial services**, reducing reliance on **high-interest informal moneylenders.**
- **Working:** SHGs open **bank savings accounts** and, after **6 months of regular savings**, become eligible for **collateral-free loans** at **reasonable interest rates.**
- **Models of Linkage:**
  - **Model I**: **Banks** directly form, manage, and finance SHGs, handling savings and loan disbursement.
  - **Model II**: **SHGs are formed by NGOs or agencies**, but **financed directly by banks**; these agencies also provide training and support.
  - **Model III**: **NGOs act as financial intermediaries**, forming SHGs and linking them to banks, especially in areas with limited banking access.
- **Loan Types: Loan types** include **microcredit** for income generation, **revolving funds** as seed money (e.g., under **NRLM**), and **term loans** for scaling up SHG enterprises.

Strengthening Parliamentary Committees

Why in News?

Lok Sabha Speaker speaking at the **National Conference of Estimates Committees** emphasized that **Parliamentary Committees** are not adversaries but **complementary to the government**.

- He urged governments and officials to **treat committee recommendations with seriousness and implement them in letter and spirit.**

What are Parliamentary Committees?

About

- A **Parliamentary Committee** is a body constituted by the **Lok Sabha or Rajya Sabha**, or nominated by the **Speaker/Chairman**, to **carry out functions delegated by Parliament**. These committees:
  - Work under the direction of the **presiding officer.**
  - Present their reports to the **House or the Speaker/ Chairman.**
  - Are serviced by the **Lok Sabha/Rajya Sabha Secretariat**.
- Parliamentary committees, originating from the **British Parliament**, in India derive their authority from the **Indian Constitution** under **Article 105 (powers and privileges)** and **Article 118 (regulation of business).**

Types

- **Standing Committees:** They are **permanent in nature**, **reconstituted every year** under the **Rules of Procedure or Acts of Parliament** and their work is **ongoing and regular**. It includes:
  - **Financial Committees**

Major Financial Committees of Parliament

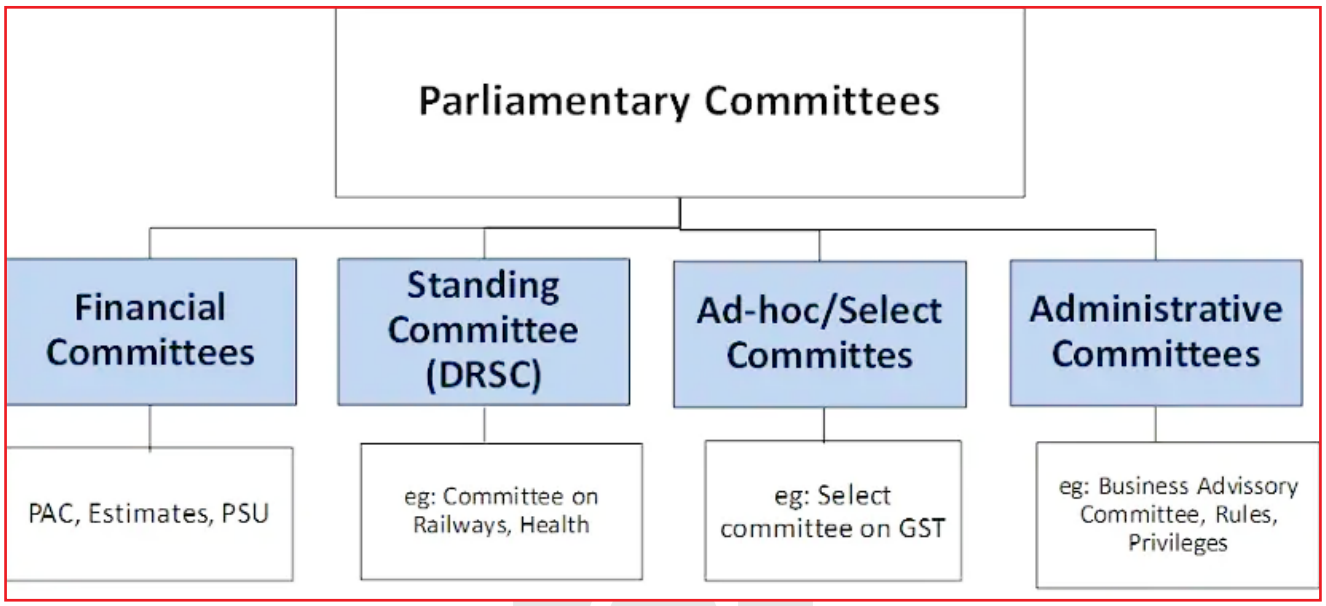
Name of Committee	Number of Members	Tenure	Mode of Selection
Estimates Committee	30 (All from Lok Sabha)	1 year	Elected by the **Lok Sabha**
Public Accounts Committee (PAC)	22 (15 from Lok Sabha + 7 from Rajya Sabha)	1 year	Elected by **both Houses of Parliament**
Committee on Public Undertakings (COPU)	22 (15 from Lok Sabha + 7 from Rajya Sabha)	1 year	Elected by **both Houses of Parliament**

- **Departmentally Related Standing Committees (DRSCs)** which examine demands for grants, bills, and policy documents of various ministries.

- **Other Standing Committees such as** Committee on Petitions, Committee on Subordinate Legislation, Committee on Government Assurances.

➢ **Ad hoc Committees:** They are **temporary in nature** and are constituted for a **specific task**, and **dissolve upon completion of that task.**

- **Eg:** Select Committee on GST, Joint Parliamentary Committees (JPCs) on specific Bills, Railway Convention Committee etc.
- Their purpose is to **transact the detailed business of Parliament** that the full House may not have time or expertise to handle in depth.



What is the Significance of the Parliamentary Committee System?

- **Ensure Executive Accountability:** Though **committee recommendations are not binding**, their **detailed reports** create a **public record & opinion**, enhance **scrutiny of the executive** and pressure the **government to reconsider** controversial decisions.
  - Their **closed-door nature** enables **candid and collaborative discussions**, free from **political posturing**.
- **Facilitate Informed & Inclusive Lawmaking:** Committees serve as platforms for MPs to consult **experts**, **civil society**, and **officials**, ensuring **evidence-based deliberation**.
  - **Clause-by-clause scrutiny** of bills, **stakeholder consultations**, and **public participation** improve **legislative quality** and **democratic legitimacy**.
- **Mini-Parliaments with Bipartisan Representation:** With **proportional party representation** and **year-round functioning**, committees foster **non-partisan debate**, **inter-ministerial coordination**, and in-depth examination of **budgets**, **annual reports**, and **policy proposals**.
  - **Ad hoc committees** further support **focused inquiry** into specific issues.
- **Capacity Building & Governance Reform:** Committees provide **authentic insights** and **value-added recommendations**, strengthening **legislation and governance.**
  - They act as **informal training grounds** for **young MPs**, and function beyond **populist pressures** and **party whips**, reinforcing **parliamentary democracy**.

What are the Key Challenges Related to Parliamentary Committees?

- **Limited Powers & Weak Follow-up:** Parliamentary committees are **advisory bodies** with **non-binding recommendations**.

- They lack **enforcement powers** and have **no institutional follow-up mechanism**, undermining their role in ensuring **executive accountability** and effective **policy implementation**.

- **Resource & Research Constraints:** Parliamentary committees face **staff and infrastructure limitations**, with technical support mostly confined to **secretarial tasks** like scheduling and note-taking.
  - The **National Commission to Review the Working of the Constitution (2002)** highlighted a critical deficiency in **specialist advisors** and **research support** for DRSCs, hampering **in-depth scrutiny** and **evidence-based analysis**.
- **Low Participation & MP Attendance:** The **attendance of MPs in committee meetings averages around 50%**, which is significantly **lower than the 84% attendance recorded during regular Parliament sessions**.
  - Factors such as **conflicting schedules**, **low incentives**, and **lack of interest** contribute to this limited participation, reducing the quality of deliberations.
- **Inadequate Parliamentary Time & Scrutiny:** The **decline in Parliamentary sittings** restricts time for effective **committee oversight**. In the **17th Lok Sabha's first session**, Parliament sat for only **37 days** with a **10-year average (2009-19)** sitting of just **67 days/year**.
  - As a result, key legislations and budgetary proposals often **bypass detailed scrutiny**, only **17% of the Union Budget** was discussed in the **16th Lok Sabha**.
- **Political Influence & Lack of Independence:** Parliamentary committees often face **political interference** from **party leadership** or **external pressures**, compromising their **impartiality**.
  - **Political considerations** in the **nomination of members** further dilute the **effectiveness** and **objectivity** of committee functioning.
- **Overburdened Committees & Fragmented Oversight:** **Department-related Standing Committees (DRSCs)** handle **multiple, often unrelated ministries**, resulting in limited **subject-specific focus** and **specialisation**.
  - Their **broad mandate**, along with **short one-year tenures**, hampers the development of **expertise** and limits **sustained, in-depth oversight**.

Zonal Councils

Why in News?

The Union Home Minister and Minister of Cooperation chaired the **25th Central** Zonal Council meeting in Varanasi, Uttar Pradesh, organized by the **Inter-State Council Secretariat** in collaboration with the **Uttar Pradesh Government.**

What are Zonal Councils?

- **About: Zonal Councils** are **statutory bodies** (not constitutional) established under the **States Reorganisation Act, 1956**, as a **high-level advisory forum** to foster **cooperative working** among states and to create a **healthy inter-State and Centre–State environment**.
  - The idea of Zonal Councils was first proposed by former **Prime Minister Jawaharlal Nehru** in **1956** during debates on the **States Reorganisation Commission's (Fazal Ali Commission, 1953) Report**.
  - Under **Sections 15 to 22** of the **States Reorganisation Act, 1956**, **five Zonal Councils** were established.
  - The **North Eastern region** has a separate council, the **North Eastern Council,** created in **1972**, set up under the **North Eastern Council Act, 1972.**
- **Composition:**

Zonal Council	States
Northern Zonal Council	Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Delhi, Chandigarh
Central Zonal Council	Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Uttarakhand
Eastern Zonal Council	Bihar, Jharkhand, Odisha, West Bengal, Sikkim
Western Zonal Council	Rajasthan, Gujarat, Maharashtra, Goa, Dadra & Nagar Haveli, and Daman & Diu
Southern Zonal Council	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry

- **Organizational Structure:**
  - **Chairman**: Union Home Minister (for all 5 Zonal Councils). He is also the **ex-officio Chairman** of the **North Eastern Council (NEC)**.
  - **Vice-Chairman**: Chief Minister of one of the member states (by annual rotation).
  - **Members**: The members include the **Chief Ministers**, **Lieutenant Governors**, or **Administrators** of the member States and Union Territories.
    - Additionally, from each member state, the **Governor nominates two ministers** as members of the Council.
  - **Advisors**: One nominee from **NITI Aayog** (earlier Planning Commission), Chief Secretaries, and Development Commissioners of the member states.
    - Each **Zonal Council** has a **Permanent Committee** comprising the **Chief Secretaries** of member states. **State-proposed issues** are first discussed by this committee, and unresolved matters are then placed before the full **Zonal Council** for further deliberation.
- **Objectives and Functions:** Zonal Councils serve as a **structured platform** for **dialogue and coordination** on issues involving **two or more states** or the **Centre and states**, promoting **mutual understanding and cooperation**.
  - Though **advisory in nature**, they have become key instruments of **cooperative federalism**, with **61 meetings** held in the last **eleven years**.
  - **They discuss and address:**
    - Issues, like the **speedy investigation of sexual offenses** and the implementation of **Fast Track Special Courts (FTSCs).**
    - **Financial inclusion** through **brick-and-mortar banking** in every village.
    - Implementation of the **Emergency Response Support System (ERSS-112).**
    - Regional matters like **nutrition, education, health, electricity, urban planning**, and **cooperative sector development.**

Organ Transplantation in India

Why in News?

A recent **report** by the **Union Ministry of Health and Family Welfare** has exposed **severe gaps** in **India's organ transplantation programme**, raising concerns over the country's ability to meet the growing demand for **life-saving procedures**.

- With only **13,476 kidney transplants** performed in 2024—far below the recommended **1 lakh**—the findings underscore an urgent need for **systemic reforms** to improve access to **organ transplants** for thousands of **patients**.

What is Organ Transplantation?

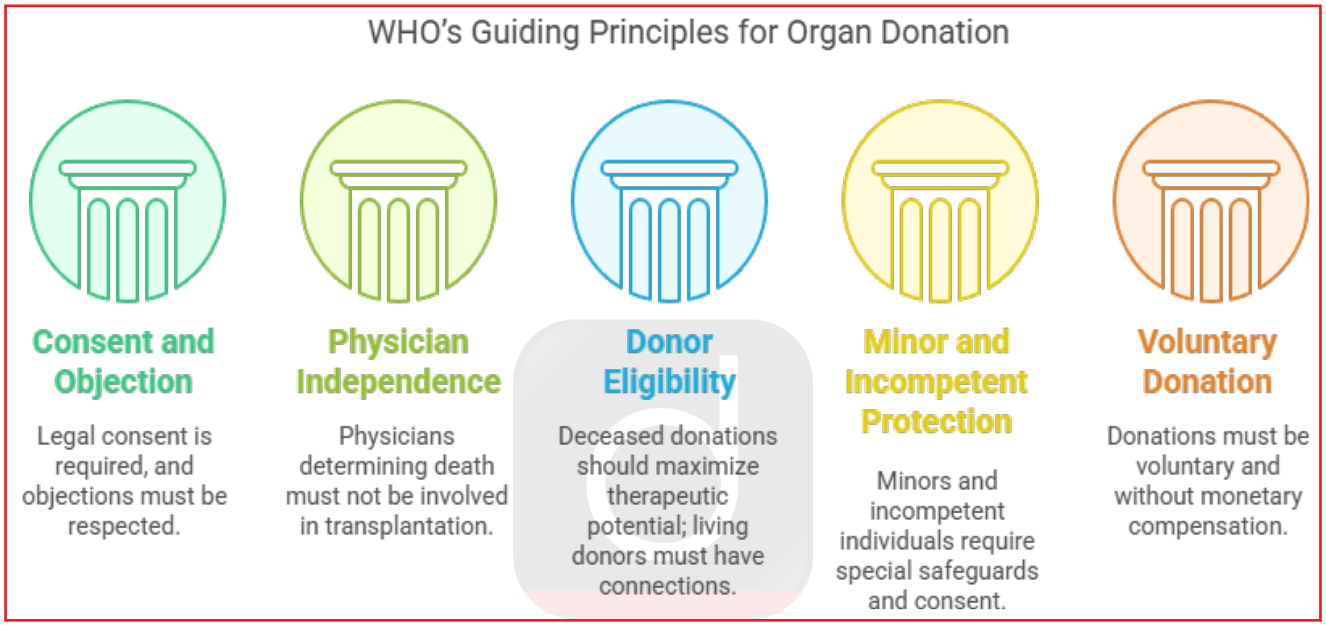
- **Definition: Organ transplantation** is a life-saving procedure where a **failing organ** (kidney, liver, heart, lung) is replaced with a **healthy organ** from a **living donor** (e.g., kidney, partial liver) or a **deceased donor** (brain-dead or after cardiac death) to restore function in **end-stage organ failure**. Common transplants include the **kidney**, **liver**, **heart**, **lungs**, **pancreas**, and **intestines.**
- **Status:** India is the **3rd country** in the world after the **USA and China**, in terms of the total number of transplants done in a year.
  - **Growing Demand and Persistent Shortage:** Of **1.8 lakh renal failure cases** annually, only **6,000 transplants** occur, with a donation rate under **1 per million** versus a need for **65 per million.**
  - **Slow Growth in Donor Numbers: Donor numbers**, including **living** and **deceased donors**, grew modestly from **6,916 in 2014** to about **16,041 in 2022.**
    - The **deceased organ donation rate** has stayed below **one donor per million population** for over a **decade.**
  - **Regional Variations: Telangana**, **Tamil Nadu**, **Karnataka**, **Gujarat**, and **Maharashtra** lead in **deceased donors**, while **Delhi-NCR**, **Tamil Nadu**, **Kerala**, **Maharashtra**, and **West Bengal** report the most **living donors**.

- **Rules and Regulations:**
  - **Transplantation of Human Organs and Tissues Act, 1994 (amended in 2011):** It regulates **organ and tissue transplantation** in India, covering **post-death donation**, setting rules for **healthcare providers**, and prescribing **penalties** for violation.
    - The **2023 revised guidelines** removed the **65-year upper age limit** for registering to receive **deceased donor organs** and ended the **state domicile requirement** for such registrations.
  - **National Organ Transplant Program (NOTP):** It is being implemented by the **Central Government** to promote **organ donation** and **transplantation** across all **States** and **Union Territories**. Under this, several bodies have been established:
  - **National Organ and Tissue Transplant Organization (NOTTO):** The **NOTTO,** under the **Ministry of Health**, was set up as per the **Transplantation of Human Organs (Amendment) Act, 2011.**
    - Its **National Network division** serves as the **apex centre** for **coordination**, **procurement**, **distribution**, and maintaining the **registry of organ and tissue donation and transplantation** in India.
    - **5 Regional Organ and Tissue Transplant Organizations (ROTTOs)** and **14 State Organ and Tissue Transplant Organizations (SOTTOs)** were established to strengthen the network at the **regional and state levels**.
  - **NOTTO-ID:** The **Union Health Ministry** has directed states/UTs to allocate a unique **NOTTO-ID** for all **organ transplants**. It is **mandatory** for **deceased donor organ allocation** and must be generated within **48 hours** of a **living donor transplant surgery.**

What are the Gaps in India's Organ Transplantation Programme?

- **Infrastructural Deficiencies:** Many **government hospitals** lack **dedicated infrastructure** for **organ retrieval** and **transplantation**, and face a severe shortage of **ICU beds** crucial for maintaining **brain-stem dead (BSD) donors** and **post-operative care.**
  - **Operation theatres (OTs)** and **ICUs** are **overburdened** with general **patient loads**, while several centres, including some **AIIMS branches**, lack **in-house Human Leukocyte Antigen (HLA) cross-matching labs**, causing **delays**.
- **Shortage of Skilled Transplant Professionals: Government hospitals** face a **critical shortage** of **trained transplant surgeons**, **nephrologists**, **urologists**, **anaesthetists**, **neurologists**, **neurosurgeons**, and **intensivists**.
  - **Frequent transfers**, absence of **dedicated teams**, and **lack of incentives** for **transplant staff** disrupt **continuity**, lower **motivation**, and hinder the **expansion of organ transplantation.**
- **Procedural Bottlenecks: Delays in approval** and formation of **Brain-Stem Dead (BSD) Committees**, essential for **deceased organ donation**, remain a major hurdle.
  - **Cumbersome handling** of **medico-legal cases**, especially involving **trauma patients**, and the absence of a **streamlined process** contribute to significant **procedural delays** and discourage **organ donation.**
- **Financial Strain: Insufficient funding** blocks the initiation or revival of specialised programmes like **lung transplantation**, while the **high cost of immunosuppressant drugs** imposes a heavy burden, as most schemes cover only the **first year** of medication.
  - **Liver** and **heart transplants** and their **lifelong follow-up costs** are excluded from major health schemes like **Ayushman Bharat**, limiting access for **poor patients.**
- **Peri-Transplant Donor Tissue Damage**: **Aging** and **diseases** reduce **donor organ quality**, leading to **Ischemia-Reperfusion Injury (IRI)**. Many **organs are discarded** due to **inferior quality**, impacting **transplant success rates.**
- **Chronic Rejection in Organ Transplantation**: **Long-term survival rates** for **transplanted organs** have not significantly improved over the past **20 years**. Current **anti-rejection therapies** remain largely unchanged, with only **modest improvements** in **survival rates.**

- **Access and Awareness Gaps: India's organ transplantation programme** is challenged by the **dominance of the private sector**, limiting affordable access for **poor patients**; the **absence of green corridors** hampers **swift organ transport**; and **low awareness,** along with **misconceptions** about organ donation, discourage public participation.
- **Ethical and Legal Challenges: Organ trafficking**, **commercialisation of organ donation**, and a **black market for organs** persist despite strict laws like the **Transplantation of Human Organs and Tissues Act, 1994** (THOT Act, 1994).
  - **Consent issues** in **brain-death certification** and **criminal activities** exploiting organ demand undermine **legitimate donation processes.**



Alcohol Regulation in India

Why in News?

India is witnessing a steady rise in **alcohol** consumption, which, despite its well-documented links to **health risks, violence, crime, suicides,** and financial distress, remains unregulated by a unified national strategy, prompting urgent calls for a comprehensive **National Alcohol Control Policy and Programme.**

What are the Key Driving Factors for Alcohol Consumption in India?

- **Alcohol Prevalence in India:** As per the **NFHS-5**, **14.6% of people** aged **10–75 (16 crore)** consume alcohol in India with **23% of men** and **1% of women**.
  - India ranks among the **highest globally in heavy episodic drinking**, with **2.6 million DALYs (Disability-Adjusted Life Years)** and a **societal cost of Rs 6.24 trillion** (2021).
  - **High-use States**: Chhattisgarh, Tripura, Punjab, Arunachal Pradesh, Goa; **High disorder prevalence** (>10%): Tripura, Andhra Pradesh, Punjab, Chhattisgarh, Arunachal Pradesh.
- **Key Driving Factors:**
  - **Biopsychosocial Determinants:** Alcohol use is driven by **genetic predisposition**, as it activates the **brain's reward system**, making it addictive like nicotine or cocaine.

- **Psychologically**, it is used to cope with **stress, anxiety**, or to seek **euphoria**.
- **Socially**, factors like **urban lifestyle**, **peer pressure**, and **glamorized media portrayals** have normalised its use.

❍ **Commercial Determinants:** Alcohol use is promoted through **surrogate advertising, influencer marketing**, and **OTT content**.
- **Product innovations** like **pre-mixed drinks and flavoured spirits** attract youth.
- **Easy availability** via retail outlets, online delivery, and **attractive packaging** enhances visibility. **Low-cost Indian Made Indian Liquor (IMIL)** targets the rural poor, while **rising urban incomes** increase affordability.

❍ **Policy Gaps: Regulatory loopholes**, **State dependence on excise revenue**, and lack of a **unified national policy** enable harmful alcohol consumption to persist unchecked.

What are the Key Regulations Related to Alcohol Usage in India?

➢ **State Level: Alcohol regulation** falls under the **State List of the Seventh Schedule of the Constitution,** giving States exclusive authority over its **production, sale, and distribution**, resulting in wide inter-State legal variations.
❍ States like **Bihar, Gujarat, Nagaland, and Mizoram** enforce prohibition, while others have experimented with bans.
❍ **Some states exploring for online alcohol delivery** via platforms like Swiggy and Zomato **contradicts access restrictions.**
❍ **Legal drinking age** varies from **18 to 25 years**; **pricing regulations** exist in only 19 States/UTs.

➢ **National Level:** It includes:
❍ **National Action Plan for Drug Demand Reduction (NAPDDR) 2021-22** under **Nasha Mukta Bharat Abhiyan** addresses alcohol regulation.
❍ **National Mental Health Policy (2014)** links alcohol to mental illness.
❍ **National Health Policy (2017)** and **National Suicide Prevention Strategy (NSPS) 2022** recommend control measures.
❍ **National Action Plan and Monitoring Framework for Prevention and Control of Noncommunicable Diseases (NMAP) 2017-2022** advocates for a **national alcohol policy**.
❍ **Excise Act, 1944** regulates the production and distribution of alcohol, including penalties for illegal manufacturing.
❍ **Article 47 (DPSP) provides** that the State shall endeavour to **prohibit the consumption of intoxicating drinks and drugs injurious to health** and to **improve public health and nutrition**.

What are the Key Challenges to Alcohol Regulation in India?

➢ **Fragmented & Inconsistent Policies**: Alcohol being a **State subject** leads to **divergent policies**, with no **unified national framework**, causing inconsistent regulation, conflicting approaches, and weak coordination across States and Ministries.
❍ Also, poor monitoring enables **illicit liquor trade**, **underage drinking**, and non-compliance with licensing and pricing norms, especially in rural and peri-urban areas.

➢ **Revenue Dependency of States**: **High revenue dependency** on alcohol excise duty, which is **outside the GST ambit, i**ncentivizes States to **prioritize liquor sales over stricter regulation or prohibition**. This creates a **conflict between fiscal interests and public health objectives**, hindering effective alcohol control policies.

➢ **Regulatory Gaps & Evasion**: **Surrogate advertising**, **celebrity endorsements**, and **digital influencers** exploit loopholes in advertising laws, while **online delivery** increases access despite restrictions.

➢ **Political-Bureaucratic Nexus:** Political protection and bureaucratic complicity in the **illegal liquor trade**, aided by **corruption and bribery**, weaken enforcement and allow bootleggers to operate with impunity.

➢ **Low Public Awareness and Health Literacy**: Limited awareness of alcohol's link to **mental illness, NCDs, cancer**, and **socioeconomic harms** (like poverty and domestic violence) hampers public demand for regulation and behaviour change.

FRA Cells Setup to Facilitate Forest Right Act

Why in News?

The **Union Ministry of Tribal Affairs**, under the has sanctioned the setting up of 324 **district-level Forest Rights Act (FRA) cells** across 18 States/UTs to facilitate the implementation of the **Forest Rights Act (FRA), 2006** under **Dharti Aba Janjati Gram Utkarsh Abhiyaan (DAJGUA).**

What are District-Level Forest Rights Act (FRA) Cells?

- **About: District-level FRA Cells** are **administrative support units** established under the **DAJGUA** scheme to facilitate the implementation of the **Forest Rights Act (FRA), 2006**.
  - These cells are **centrally funded** via **Grants-in-aid** by the **Union Ministry of Tribal Affairs.**
- **Objective:** To **assist tribal claimants and Gram Sabhas** in **preparing and submitting forest rights claims**, especially in tribal-dominated districts, aiming to **reduce delays and rejections** by improving documentation, field facilitation, and data management.
- **Legal Basis:** These cells **operate under DAJGUA guidelines**, not the FRA Act itself.
- **Key Functions:**
  - **Facilitate demarcation of vested forest land** and conversion of forest habitations and un-surveyed villages into revenue villages.
  - **Support digitisation and timely uploading of FRA record**s to State and Central portals.
  - **Coordinate** with State Tribal Welfare Departments, local administration, and Gram Sabhas **to streamline FRA processes.**
- **Key Concerns Related to New FRA Cells:**
  - Creation of FRA Cells **might lead to the formation of a parallel system** outside the **Forest Rights Act's statutory framework**, resulting in **confusion regarding roles and responsibilities**.
  - There is a risk that **FRA Cells may overlap with existing statutory bodies** like **Gram Sabha Forest Rights Committees (FRCs), Sub-Divisional Level Committees (SDLCs), District Level Committees (DLCs)** and **State Monitoring Committees** in roles such as **claimant assistance, documentation, coordination, and record-keeping** leading to **confusion about responsibilities** and hinder smooth implementation.
  - **Structural issues** like **irregular meetings of SDLCs and DLCs** and **delays by Forest Departments in implementing approved claims** are **unlikely to be resolved by the new FRA Cells alone.**

What is the Forest Rights Act (FRA), 2006?

- **About:** The **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** or **Forest Rights Act (FRA)**, seeks to correct historical injustices faced by **forest-dwelling Scheduled Tribes (STs)** and **Other Traditional Forest Dwellers (OTFDs)** who **lacked legal ownership over forest land and resources.**
- **Objectives**: To **vest forest land rights in eligible forest-dwelling communities,** ensuring **livelihood security, community-based forest governance**, and **legal protection against evictions.**
- **Key Provisions:**
  - **Ownership Rights:** Grants ownership over Minor Forest Produce (MFP). Allows collection, use, and disposal of forest produce.
    - **MFP** refers to all non-timber forest products of plant origin, including bamboo, brushwood, stumps, and canes.
  - **Community Rights:** Includes traditional usage rights such as **Nistar (a type of Community Forest Resource).**
  - **Habitat Rights**: Protects the **rights of primitive tribal groups and pre-agricultural communities** to their traditional habitats.
  - **Community Forest Resource (CFR):** Enables communities to **protect, regenerate, and sustainably manage forest resources** they have traditionally conserved.

- The Act facilitates the **diversion of forest land for public welfare projects** managed by the government, **subject to Gram Sabha approval.**

➢ **Decentralised Framework:** FRA follows a **bottom-up governance model**, empowering the **Gram Sabha** to initiate and verify claims.

- **Forest Rights Committees (FRCs)** are formed by the Gram Sabha to process claims at the village level.
- These claims are reviewed by **Sub-Divisional Level Committees (SDLCs)** and approved by **District Level Committees (DLCs)**. **State Monitoring Committees** oversee overall implementation.

What is the Significance of the Forest Rights Act (FRA), 2006?

➢ **Recognition of Historical Rights:** FRA, 2006 corrects **historical injustice** by legally recognizing the **individual rights** (up to 4 hectares for eligible STs and OTFDs) and **community rights** (grazing, fishing, minor forest produce, water bodies, etc.) of **Scheduled Tribes (STs)** and **Other Traditional Forest Dwellers (OTFDs)** over **forest land and resources**, overlooked under colonial and post-colonial forest laws.

- It also recognizes **habitat rights** of **PVTGs** and **seasonal access** for nomadic groups.

➢ **Empowerment through Decentralized Governance:** The Act empowers the **Gram Sabha** to verify claims, manage **Community Forest Resources (CFRs)**, **conserve biodiversity**, and oversee **sustainable forest governance**, promoting **decentralized, participatory decision-making**.

➢ **Protection from Eviction and Right to Development:** Along with the **Land Acquisition Act, 2013**, it safeguards forest dwellers from **eviction without rehabilitation**, and permits **allocation of forest land** for essential **community infrastructure** like education, health, and housing.

➢ **Inclusive and Sustainable Conservation:** Assigns **responsibility** to rights holders and Gram Sabhas for **conservation of forests, wildlife, water sources, and ecological zones**, blending **traditional knowledge** with **sustainable use**, especially for **PVTGs** and **vulnerable forest communities**.

More on Forest Rights Act, 2006

What are the Key Challenges Related to Implementation of the Forest Rights Act, 2006?

Click to Read: Key Challenges Related to Implementation of the FRA 2006

What Steps Should be Taken for Strengthening Forest Rights Act Implementation?

Click to Read: Steps for Strengthening Forest Rights Act Implementation

Performance Grading Index 2.0

Why in News?

The **Ministry of Education** released the **Performance Grading Index (PGI) 2.0 report** for the years **2022–23 and 2023–24,** assessing the performance of states and Union Territories (UTs) in school education.

What is the Performance Grading Index (PGI) 2.0?

➢ **About**: The **Performance Grading Index (PGI) 2.0** is an **evidence-based framework** developed by the **Ministry of Education**, to assess the **school education system** across all States and UTs through a **structured and data-driven approach.**

➢ **Launched in:** PGI was originally launched in 2017 and was revamped as **PGI 2.0 in 2021** to align with the **National Education Policy (NEP) 2020** and **Sustainable Development Goals (SDGs).**

- **Indicators & Grading Mechanism:** PGI 2.0 assesses school education through **73 indicators** across **2 categories** (Outcomes and Governance & Management) which are further divided into **6 domains.**

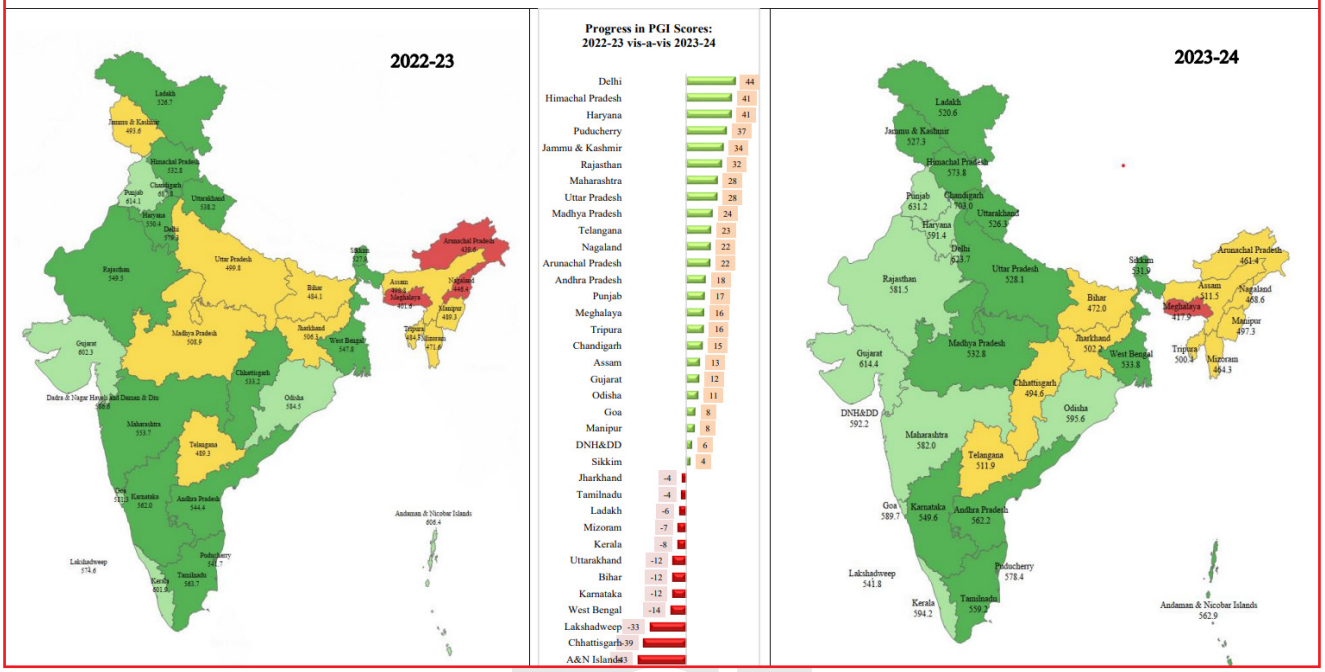
Categories	Domain	Indicators	Total Weight
1. Outcomes	Learning Outcomes and Quality (LO)	12	240
	Access (A)	7	80
	Infrastructure & Facilities (IF)	15	190
	Equity (E)	16	260
2.Governance Management (GM)	Governance Processes (GP)	15	130
	Teacher Education & Training (TE&T)	8	100
Total		**73**	**1000**

  - PGI 2.0 scores are graded on a **scale of 1,000 points**, classified into **10 performance levels**, ranging from **Daksh (highest)** to **Akanshi-3 (lowest)**.
- **Data Sources:** Based on data from the **National Achievement Survey (NAS) 2021**, **Unified District Information System for Education Plus (UDISE+)**, and information on the **mid-day meal programme (PM-POSHAN).**

What are the Key Findings of Performance Grading Index (PGI) 2.0 for 2023–24?

- **Top Performers: Chandigarh** topped with a score of **703**, followed by **Punjab (631.1)** and **Delhi (623.7)**.
  - **Chandigarh** maintained top rank for **3 consecutive years**.
  - Other high performers scoring in the **581–640** range include **Kerala, Gujarat, Odisha, Haryana, Goa, Maharashtra**, and **Rajasthan**.
- **No State in Top Grade:** No State/UT scored in the **highest performance band (761–1,000 points).**
- **Bottom Performers: Meghalaya** ranked lowest with a score of **417.9**, followed by **Arunachal Pradesh (461.4)**, **Mizoram (464.2)**, **Nagaland (468.6)**, and **Bihar (471.9)**.
- **Middle Performers:** States scoring in the **521–580** range include **Uttar Pradesh, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Madhya Pradesh, Himachal Pradesh**, and **Uttarakhand**.
- **Improvement Trend**: 25 out of 36 States/UTs improved their PGI scores in 2023–24 compared to 2022–23.
- **Widening Inter-State Disparity:** A **gap of over 300 points** between the highest (719) and lowest (417) scores highlights **wide disparities** in school education performance across States/UTs.
- **Best Improvements in Access: Bihar and Telangana** showed the **highest improvement** in the **Access to Education** domain (enrolment, retention, transition, out-of-school children).
- **Best Improvements in Infrastructure: Delhi, Jammu & Kashmir, and Telangana** registered the **highest gains** in **Infrastructure & Facilities** (toilets, clean water, electricity, digital resources, etc.).

Map 4.2: Grades attained by States/UTs – 2022-23 and 2023-24



What are the Government Initiatives Related to School Education?

- National Education Policy, 2020
- Samagra Shiksha
- Mid Day Meal Scheme
- Eklavya Model School and Rajiv Gandhi National Fellowship Scheme
- National Programme on Technology Enhanced Learning.
- Sarva Shiksha Abhiyan
- PRAGYATA
- PM SHRI Schools

Reforming Subordinate Judiciary

Why in News?

The subordinate judiciary, which handles **87.5% of India's cases**, forms the **backbone** of our **legal system** but suffers from **vacancies**, **case backlogs**, and **outdated processes** hampering India's economic growth.

- **Reforms** in this vital **pillar** can spur **faster socio-economic growth**, as seen in **Singapore** and **Kenya**, where **judicial efficiency** has driven **economic progress**.

What is the Economic Impacts of Judicial Backlog at Subordinate Judiciary?

- **Macroeconomic Impact:** India's **district courts** are burdened with **45 million pending cases**, causing a **silent economic drain** of about **0.5% of GDP annually** (roughly **Rs 1.5 trillion**).
  - According to the **World Bank**, reducing **judicial vacancies** from **25% to 15%** could boost **investment** and **business confidence**, while the **IMF** estimates that **efficient courts** could raise **GDP per capita growth** by **0.28 percentage points.**
- **Stifled Business Growth & Investment: Land lease disputes** hinder **business growth** and discourage **MSMEs** by increasing **operational risks** and weakening **investor confidence.**
  - **Judicial vacancy** fuels **case backlogs**, deterring **investors** and contributing to its **163rd rank** in the **World Bank's Ease of Doing Business 2020.**

- **Fiscal Drain & Opportunity Costs: Pending cases** lock **land**, **capital**, and **labor** in **unproductive litigation** (such as **property disputes**).
  - **Inefficient dispute resolution** weakens **tax compliance**, while slow **contract enforcement** drives businesses to avoid **formal agreements**, fueling the **shadow economy.**

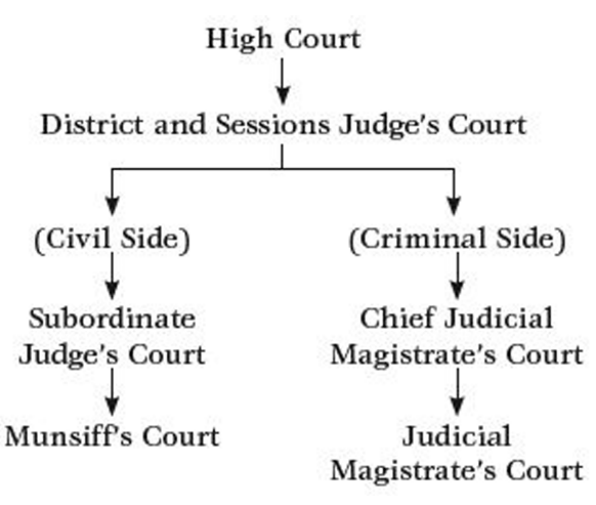
What are the Challenges in India's Subordinate Judiciary?

- **Judicial Vacancies and Overburdened Judges:** There are **5,388 vacancies** in the **lower courts**, where judges handle **746 cases annually**, far exceeding the global best practice of **200–300 cases**.
  - This **vacancy crisis** burdens judges, causes **delays in justice delivery**, and weakens confidence among **small businesses and entrepreneurs**, adding to case pendency.
- **Outdated Systems and Inadequate Digitisation:** Lack of **integrated digital platforms** and **fragmented digitisation** hinders the potential of **e-Courts**, **AI**, and **analytics**, while hybrid systems (digital filing and manual tracking) create barriers for **small businesses** and **rural litigants**.
  - Moreover, with only **6.7% of district courts** being **women-friendly**, the participation of **women litigants** and **professionals** remains limited.
- **Flawed Recruitment Policies:** The **3-year practice requirement** for **district judge** appointments limits diversity, as only **15% of practising lawyers** are women, reducing the talent pool.
  - Decentralised recruitment causes **uneven judicial service quality** across states, and the lack of an **All India Judicial Service (AIJS)** hinders standardised appointments and delays filling vacancies with qualified candidates.
- **Inefficient Case Management:** The **lack of robust case management systems** and dominance of **manual processes**, with **underused digital tools**, contribute to prolonged delays.
  - The absence of a **unified platform** linking **police**, **forensics**, and **courts** has stalled progress under **e-Courts reforms.**
- **Risk of Exclusion & Digital Divide: Digital reforms** risk creating a **digital divide**, excluding **rural** and **less-educated litigants** as rapid digitalisation without support leaves behind those lacking **technological access** or **literacy**.
  - India's **linguistic** and **educational diversity** requires careful implementation of tech reforms to ensure **inclusivity** for all.

What is Subordinate Judiciary?

- **About: Subordinate courts** are the **lower courts** in a state's judicial structure, functioning under the **supervision of the High Court** and they perform their duties at the **district and lower levels**.
- **Constitutional Basis: Articles 233 to 237 of Part VI** of the Constitution deal with the **organization and independence** of subordinate courts and ensure **judicial independence from the executive.**
- **Appointment of Judges: District Judges** are **appointed, posted, and promoted** by the **Governor** in consultation with the **High Court.**
  - **Other judicial service appointments** (below district judge) are made by the **Governor** after consulting the **State Public Service Commission** and the High Court.
- **Eligibility of District Judge:** A **district judge** must **not** be in **Central or State government service**, must have been an **advocate or pleader for at least 7 years**, and must be **recommended by the High Court.**
- **Control: Control over subordinate courts** (postings, promotions, leave of judicial officers below district judge) lies with the concerned **High Court.**
- **Structure & Jurisdiction:** The structure, jurisdiction, and titles differ **state to state**, but the basic **three-tier system** exists:
  - **District & Sessions Court:** It is the **highest judicial authority** at the district level and exercises both **original** and **appellate jurisdiction** in **civil** and **criminal matters**.
    - A **Sessions Judge** can impose **life imprisonment** or **death sentence**, but the **death penalty** requires **High Court confirmation.**

- **Subordinate Civil & Criminal Courts:** On the **civil side**, a **Subordinate Judge** has **unlimited pecuniary jurisdiction**, while a **Munsiff** deals with cases of **limited pecuniary jurisdiction.**
  - On the **criminal side**, the **Chief Judicial Magistrate** handles cases punishable with up to **7 years of imprisonment**, and the **Judicial Magistrate** deals with offences punishable up to **3 years.**
- **Special Courts:**
  - **Metropolitan Areas**: In some metropolitan cities, **city civil courts** (headed by **chief judges**) handle civil cases, while **metropolitan magistrate courts** deal with criminal cases.
  - **Small Causes Courts**: Some states have established small causes courts to handle **low-value civil cases** summarily; their decisions are **final**, but subject to **High Court revision.**
  - **Panchayat Courts:** In some states, **Panchayat Courts** (e.g. **Nyaya Panchayat**, **Gram Kutchery**) handle **petty civil and criminal cases.**



- **Appeal Mechanism:** The **District Judge/Sessions Judge** exercises both **original** and **appellate jurisdiction**, while **appeals from subordinate courts** are heard by the **High Court.**

Note: District Judges include a **judge of a city civil court, additional district judge, joint district judge, assistant district judge, chief judge of a small cause court, chief presidency magistrate, additional chief presidency magistrate, sessions judge, additional sessions judge and assistant sessions judge**.

- **Judicial service** means a service consisting **exclusively of persons** intended to fill the post of **district judge** and **other civil judicial posts inferior to the post of district judge**.

PM-WANI Scheme

Why in News?

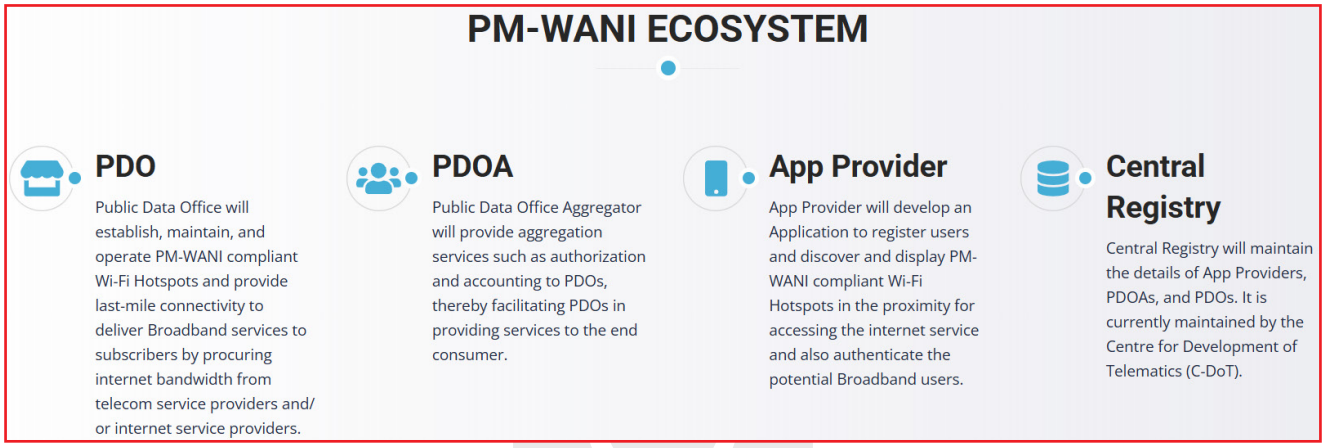
The **Telecom Regulatory Authority of India (TRAI)** has prescribed a **cap on tariffs charged** to **Public Data Offices (PDOs)** under the **PM-WANI scheme**, in order to keep public **Wi-Fi affordable,** while also providing **reasonable compensation for the broadband connection to service providers.**

- TRAI has mandated that **Internet Service Providers (ISPs) and Telecom Service Providers (TSPs)** cannot charge PDOs more than twice the retail broadband tariff for plans up to 200 Mbps.

What is the PM-WANI Scheme?

- **About:** The **Prime Minister's Wi-Fi Access Network Interface (PM-WANI)**, launched by the **Department of Telecommunications (DoT)** in **2020**, aims to **expand the availability of public Wi-Fi hotspots across India**, with a focus on **strengthening digital communication infrastructure in rural and underserved areas.**
  - The scheme is designed to **provide affordable internet access** to the **urban poor and rural population** while **boosting employment for small and micro-entrepreneurs** through the establishment of Wi-Fi service outlets, supporting the goals of the **National Digital Communications Policy, 2018.**
- **Access Mechanism:** Users can access PM-WANI services by **downloading the PM Wani application in the mobile phone,** selecting a listed hotspot, and making a **digital payment to use the internet.**

- **PM-WANI Ecosystem:** The scheme comprises 4 key stakeholders:
  - **Public Data Office (PDO):** Sets up Wi-Fi hotspots and provides internet services to users.
  - **Public Data Office Aggregator (PDOA):** Facilitates **authentication, accounting,** and aggregation of multiple PDOs.
  - **App Provider:** Develops and manages mobile applications that show accessible Wi-Fi hotspots.
  - **Central Registry:** Maintained by the **Centre for Development of Telematics (C-DoT)**, it holds records of all PDOs, PDOAs, and App Providers.
    - Established in **1984, C-DoT** is an **autonomous telecom R&D centre under the DoT**. It functions as a **registered society** under the **Societies Registration Act, 1860.**



- **Key Features:**
  - **No licence or registration fee** required for Public Data Offices (PDOs), promoting participation by small vendors and entrepreneurs.
  - **Utilises local infrastructure** (e.g., shops, kirana stores, tea stalls) to enable last-mile internet connectivity.
- **Key Benefits:**
  - Enhances **digital inclusion** and narrows the **urban-rural digital divide**.
  - Facilitates **affordable internet access** and supports the **Digital India** mission.
  - Stimulates **employment generation** in the informal sector through entrepreneurship.
  - Improved internet access can contribute to **GDP growth** by enabling digital services in **education, health, governance, and commerce.**

What are the Government Initiatives for Enhancing Broadband Connectivity?

- **National Broadband Mission (NBM)**: It is a flagship initiative to **expand and strengthen digital infrastructure** across India.
  - **National Broadband Mission (NBM 1.0)** launched in **2019** focused on **expanding broadband access to all villages** by 2022 and **fiberizing existing telecom towers to enhance connectivity.**
  - **National Broadband Mission 2.0 (2025-30)** builds on the achievements of **NBM 1.0** and aims to **accelerate India's digital transformation**, strengthen digital infrastructure, and enhance global competitiveness.
- **Gati Shakti Sanchar Portal:** **Gati Shakti Sanchar Portal** was launched in **2022** to streamline the approval process for laying **Optical Fiber Cable (OFC)** and installing telecom infrastructure.

- **Telecommunications Act, 2023 & Right of Way Rules, 2024**: Telecommunications Act, 2023 & Right of Way Rules, 2024 aims to **simplify and expedite the deployment of broadband infrastructure** across the country.
- **Amended BharatNet Program (2023):** Amended BharatNet Program aims to p**rovide optical fiber (OF) connectivity to 2.64 lakh GPs** in **ring topology** (a network design where connected devices form a circular data channel) and **OF connectivity to non-GP villages on demand.**
  - It focuses on **remote and underserved areas**, including the **North-East, Islands, LWE-affected regions, Aspirational Districts, and border villages**.
- **Submarine OFC Connectivity:** High-speed connectivity has been extended to island territories through the laying of **submarine optical fiber cables** between **Chennai–Andaman & Nicobar Islands** and **Kochi–Lakshadweep**, enhancing digital access in coastal and remote regions.
  - As of May 2025, the Submarine OFC project connecting **Chennai to Port Blair and other islands of the Andaman and Nicobar Islands** is **fully operational,** with current bandwidth utilization at 243.31 Gbps.

Telecom Regulatory Authority of India (TRAI)

- **About:** The **Telecom Regulatory Authority of India (TRAI)** is an **independent statutory body** established in **1997 under Telecom Regulatory Authority of India Act, 1997** to **regulate the telecommunications sector in India**
- **Composition:** Comprises a Chairperson, not more than two whole-time Members, and not more than two part-time Members.
- **Key Functions:**
  - **Regulate telecom services**, including **tariff fixation and revision**.
  - **Ensure quality of service**, **fair competition**, and **consumer protection**.
  - **Promote transparency and efficiency** in telecom operations.
  - **Advise the Government** on policy and licensing matters in telecom and broadcasting (recommendations are **advisory**, not binding).
  - **Foster a level playing field** and issue **regulations** to ensure orderly sectoral growth and India's global digital competitiveness.
- **Appellate Authority:**
  - An amendment to the **TRAI Act**, effective from **24th January 2000**, led to the establishment of the Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT) to handle **adjudicatory and dispute resolution functions**, which were earlier under the purview of TRAI, thereby separating regulatory and judicial roles.

Bureau of Civil Aviation Security and India's Aviation Sector

Why in News?

The Bureau of Civil Aviation Security (BCAS), under the **Ministry of Civil Aviation,** has cancelled the license of **Celebi Aviation**, a **Turkish airport ground-handling firm** operating at major Indian airports citing **'national security concerns'.**

- The move followed **Turkey's support for Pakistan** after India's Operation Sindoor, launched in response to the Pahalgam terror attack.

Legal Framework for Civil Aviation License

- Under the Aircraft Rules, 1937 (framed under the Bharatiya Vayuyan Adhiniyam, 2024), **Rule 92** mandates **government clearance for ground-handling agencies**.
- Under Aircraft Security Rules, 2022 **(Rules 11 & 12),** the **Director General, BCAS can suspend or cancel this clearance for non-compliance or national security concerns.**

What is the Bureau of Civil Aviation Security (BCAS)?

- **About:** BCAS is the **national regulator for civil aviation security** in India headquartered at Delhi and

headed by an officer of the rank of **Director General of Police**.

- **Established**: It was originally established as a cell within the Directorate General of Civil Aviation (DGCA in **January 1978,** following the recommendations of the **Pande Committee,** and was later reorganized as an **independent department under the Ministry of Civil Aviation in 1987.**
  - The DGCA **regulates air transport services** to, from, and within India. It also **enforces civil air regulations, air safety,** and airworthiness standards.
- **Key Functions:** It sets aviation security standards aligned with **Annex 17 to the** Chicago Convention of International Civil Aviation Organization (ICAO), oversees implementation and training, and conducts surprise checks and mock drills to ensure preparedness and vigilance at airports.

What is the ICAO & Chicago Convention?

- The International Civil Aviation Organization (ICAO) is a specialized UN agency established by the **Chicago Convention in 1944** to regulate global civil aviation.
- It sets international standards and procedures for the **safe, secure, efficient, and environmentally sustainable** development of air transport.
- The Convention defines rules on **airspace sovereignty, aircraft registration, safety**, and grants **5 core air freedoms** (later expanded to 9) for international flights.
  - It also provides for **tax exemptions on aviation fuel**.
- ICAO is headquartered in **Montreal, Canada**, with **India as one of its 193 member states**.

What are the Key Initiatives Related to the Aviation Industry?

- National Civil Aviation Policy 2016
- Regional Connectivity Scheme-Ude Desh Ka Aam Naagrik (UDAN)
- **FDI Policy:** 100% Foreign Direct Investment(FDI) is allowed in aviation sectors like air transport and Maintenance, Repair, and Overhaul (MRO).
- **Infrastructure Modernization:** Digi Yatra and NABH Nirman to enhance operational efficiency and passenger experience.
- **Sustainability Efforts:** Airports like Delhi and Mumbai achieved Level 4+ Carbon Accreditation and 73 airports fully use green energy, with solar energy, and new greenfield airports prioritize net-zero emissions.

What is the State of India's Aviation Sector?

- India is the **3rd-largest domestic aviation market** after the US and China, accounting for **69% of South Asia's airline traffic**, and is projected to become the **3rd-largest air passenger market globally by 2030**.
- As of **FY25 (till Sept 2024)**, total passenger traffic stood at **196.91 million**. The sector directly employs **369,700 people**, contributing **USD 5.6 billion**, and supports **7.7 million jobs** and **USD 53.6 billion** (1.5% of GDP) including tourism-linked sectors.
- The number of **operational airports rose from 74 (2014) to 157 (2024)**, with a target of **350-400 by 2047**.

Read More: International Civil Aviation Organisation, Bharatiya Vayuyan Vidheyak Bill 2024, In-Flight Unruly Behaviour of Passengers.

Economic Scenario

Highlights

- *19th Statistics Day and Contribution of PC Mahalanobis*
- *Nano Fertiliser*
- *India's Mining Sector Reforms*
- *RBI's Monetary Policy*
- *GDP Base Year Revised to 2022-23*

19th Statistics Day and Contribution of PC Mahalanobis

Why in News?

The **19th Statistics Day** was celebrated on **29th June**, marking the **132nd birth anniversary** of **Prasanta Chandra Mahalanobis**, with the theme **'75 Years of National Sample Survey'**, highlighting **NSS's key role** in strengthening **India's statistical system.**

- To commemorate 75 years of NSS, the government launched the **GoIStat app**, conferred the **2025 Prof. C.R. Rao Award** to **Dr Prajamitra Bhuyan** for excellence in statistics, and released the **SDG National Indicator Framework Progress Report, 2025.**

What is National Statistics Day and Contribution of PC Mahalanobis?

- **About National Statistics Day:** Initiated by the Government of India in 2007, **National Statistics Day** is observed on **June 29** to honour **Prasanta Chandra Mahalanobis** and raise awareness about the role of **statistics in policy-making, development**, and **governance.**
- **About PC Mahalanobis: PC Mahalanobis (1893–1972)** was an **eminent Indian scientist and statistician**, born in **Calcutta (present-day Kolkata)**. **His key contributions are:**
  - **Mahalanobis Distance**: It is a way to measure **how far a point is from the average** in **multi-dimensional data.**
    - E.g., in **face recognition**, it helps check if a **new face matches a known person** by seeing **how far** it is from the **average face.**
  - **Indian Statistical Institute**: Established in **1931** in **Kolkata**, it became a global hub for **statistics**, **economics**, and **data science**.
    - He also founded **Sankhya**, the first Indian statistical journal, in **1933**.
  - **Second Five-Year Plan (1956–61)**: In 1955, **PC Mahalanobis** was appointed to the **Planning Commission** by **Prime Minister Nehru** and advised on **industrialization**, emphasizing **heavy industries** through the **Mahalanobis Model.**
  - **National Sample Survey**: It was launched in **1950** based on the recommendation of **Professor P. C. Mahalanobis**, then **Statistical Adviser to the Cabinet.**
  - **Feldman-Mahalanobis Model**: An **economic growth strategy** adopted by **developing nations.** It **prioritises** investment in **heavy industries** (like **steel, machinery, and capital goods**) to create a **strong industrial base** for long-term **self-reliance.**
- **About National Sample Survey:** Since **1950**, the former **National Sample Survey Organisation (now National Statistical Office)** has conducted large-scale **sample surveys** across India, typically in **year-long rounds**.
  - It collects data through **nationwide household surveys**, the **Annual Survey of Industries (ASI)**, **rural and urban prices**, and supports **crop statistics** by supervising **area and crop estimation surveys**.
  - It also maintains a **sampling frame** for **urban surveys.**

- **About MoSPI:** The **Ministry of Statistics and Programme Implementation (MoSPI)** was established as an **independent ministry** on **15th October 1999**, following the **merger** of the **Department of Statistics** and the **Department of Programme Implementation.** The Ministry has two wings, namely, **Statistics and Programme Implementation.**
  - The **Statistics Wing**, known as the **National Statistical Office (NSO)**, includes the **Central Statistics Office (CSO)** and **National Sample Survey Office (NSSO).**
  - **The Programme Implementation (PI) Wing consists of three divisions** i.e., **Central Twenty Point Programme (TPP)**, **Infrastructure and Project Monitoring (IPM**), and **Members of Parliament Local Area Development Scheme (MPLADS)**.
  - Additionally, the ministry oversees the **National Statistical Commission (NSC)**, established by a Government Resolution, and an autonomous institute—**Indian Statistical Institute (ISI)**—declared an **Institute of National Importance** by an Act of Parliament.

Nano Fertiliser

Why in News?

Indian Farmers Fertiliser Cooperative (IFFCO) is setting up its **first overseas nano fertiliser plant** in **Brazil** through a joint venture, following successful exports to over **40 countries**, including the **US**, **Brazil**, and **Nepal.**

- It will be located in **Curitiba (Parana, Brazil)** with an **annual production capacity of 4.5 million litres.**

Note:

- **Brazil**, a major producer of **corn, soybean, sugarcane**, and **coffee**, has seen a **20% cut in urea and DAP usage**, a **10% yield increase** in corn and soybean, and a **7% rise** in sugarcane output with the use of **Indian nano fertilisers**.
  - As a result, **Brazilian farmers** are increasingly interested in **boosting productivity** while **reducing fertilizer use.**

What is Nano Fertiliser?

- **About:** Fertilisers coated with **nanomaterials** (particles ranging from **1 to 100 nanometres**) are known as **nanofertilisers**.
  - These nanomaterials enable the **controlled release of nutrients**, improving their **availability to plants over a longer period.**
- **Nanomaterial Components:**
  - **Inorganic Materials:** Metal Oxides (e.g., **Zinc oxide (ZnO), titanium dioxide (TiO_2)**, **Silica Nanoparticles** and **Hydroxyapatite Nanohybrids**.
  - **Organic Materials: Chitosan** (**natural biopolymer** derived from **chitin** found in **crustacean exoskeletons**), Carbon-based Nanomaterials (e.g., **carbon nanotubes (CNTs)**, **fullerenes**, and fullerols).
- **Types of Nanofertilizers:**
  - **Nanoscale Coating Fertilisers:** It uses **nanoparticle coatings** for **controlled nutrient release**.
  - **Nanoscale Additive Fertilisers:** It binds nutrients to **nano-sized adsorbents** for **gradual availability**.
  - **Nanoporous Materials:** It enables **slow nutrient release**, enhancing **plant absorption.**
- **Nano Fertiliser Adoption in India: Nano Urea** (2021) and **Nano DAP** (2023) are witnessing steady adoption, with **FY25 sales** reaching **26.5 million bottles** of Nano Urea Plus and **9.7 million bottles** of Nano DAP.
  - **IFFCO** also plans to launch **Nano Zinc** and **Nano Copper**.
- **Need of Nano Fertilisers in India:** India's heavy subsidies on conventional fertilisers (from **0.6%** in FY14 to **0.9%** in FY23 % of GDP), have led to a **Rs 1.67 trillion subsidy burden** in 2025–26, straining public finances.

- **Nano fertilisers** offer a sustainable solution by **reducing import dependency** (e.g., DAP) and delivering nutrients more efficiently—**500 ml Nano Urea equals 45 kg conventional urea**—boosting efficiency.

➢ **Challenges with Nano Fertiliser Adoption:**

- **Limited Farmer Awareness: Skepticism and resistance** from farmers used to traditional methods hinder adoption of nano fertilisers.
- **Inconsistent Results:** A **Department of Fertilizers audit** reported **25–50% variation** in nitrogen savings, raising scientific skepticism about nano urea's quality and effectiveness.
- **Food Chain Risks: Nanoparticles** may **bioaccumulate** in plants, posing risks to the **food chain**, **human health**, and the **environment**.

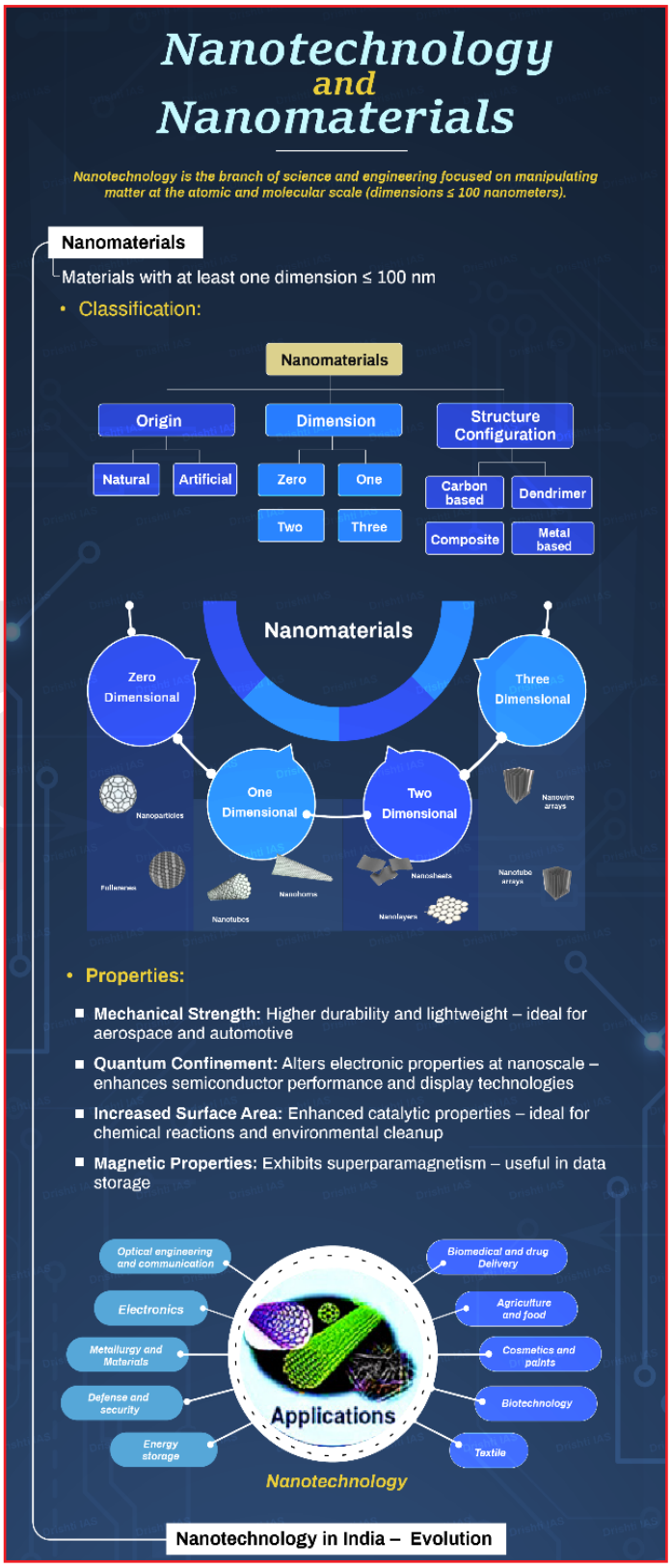
Indian Farmers Fertiliser Cooperative (IFFCO)

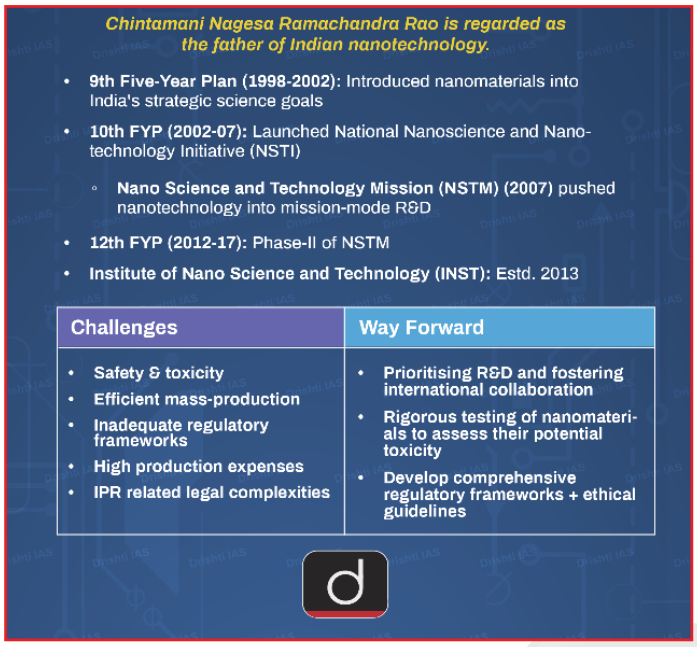
➢ **IFFCO**, established in **1967** and headquartered in **New Delhi**, is one of the **largest cooperatives in the world**. It began with just **57 member cooperatives** and has grown into a network of over **36,000 Indian cooperatives**, serving more than **50 million farmers**.

➢ Wholly **owned by Indian cooperatives**, IFFCO operates **five fertiliser plants** and over **20 state offices** across India.

- It has also expanded globally through **joint ventures** such as **JIFCO (Jordan)**, **KIT (Dubai)**, **OMIFCO (Oman)**, and **ICS (Senegal)**.

➢ While its core focus remains on **fertiliser production and marketing**, IFFCO has also diversified into sectors like **general insurance** and **rural telecommunications.**





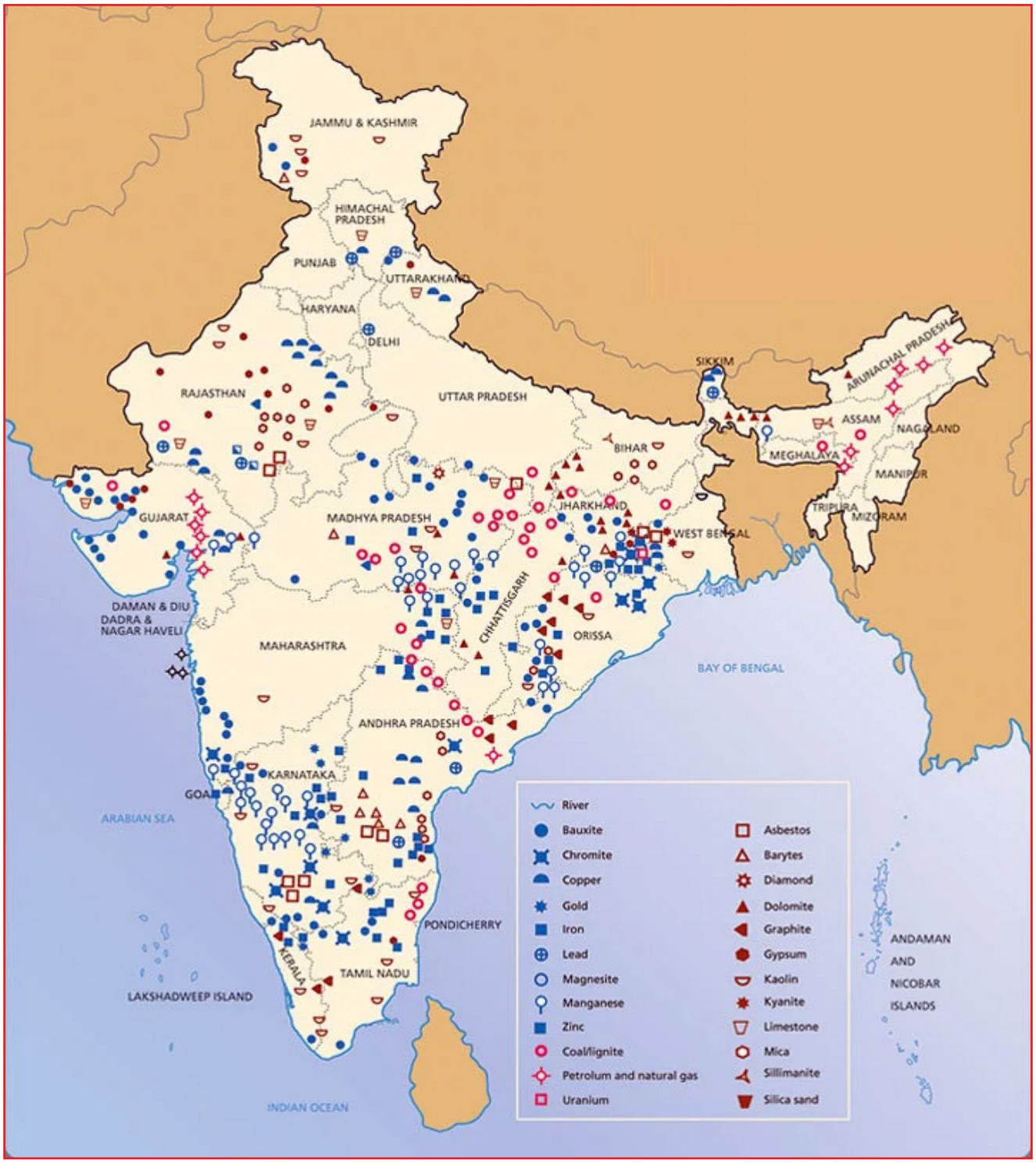
India's Mining Sector Reforms

Why in News?

In **May 2025**, India **auctioned its first potash block**, marking a milestone in **mining sector reforms** aimed at transforming India's mining sector and driving **economic growth.**

What Reforms Have Been Taken to Transform India's Mining Sector?

- **Legal Reforms:** **Mines and Minerals (Development and Regulation) Amendment Acts, 2015** introduced **auction-based allocation** to replace the discretionary system, ensured **automatic extensions for captive mines**, and created the **District Mineral Foundation (DMF)** for **local area development.**
  - The **2021 Amendment** removed **end-use restrictions** to enable **commercial coal mining**, increased lease terms to **50 years**, and introduced a **Composite License for Exploration-Cum-Mining (CEMP)** to attract **private investment.**
- **National Mineral Policy (NMP) 2019:** The **National Mineral Policy (NMP) 2019** focuses on **sustainable mining, private sector participation, ease of doing business,** adoption of **AI, drones, blockchain** for transparency, and promotion of **downstream industries** for **value addition.**
- **Coal Sector Reforms: Coal sector reforms** allowed **commercial coal mining (2020)** by private players, promoted **coal gasification and liquefaction for cleaner coal technologies**, and ensured **faster environmental approvals** through the **single-window clearance (PARIVESH Portal).**
- **Technological Advancements: Satellite imagery** monitors **illegal mining** and ensures compliance, while the **Khanan Prahari App** lets citizens report such activities.
  - The **National Geoscience Data Repository (NGDR)** offers **12,000+ geological reports** for public access, while **drone surveys, Mining Tenement System (MTS)**, and **faceless filings** improve **efficiency** and **transparency**.
- **Exploration Reforms:** The **National Mineral Exploration Trust (NMET)** funds **exploration projects**, with **private sector participation** and the **Exploration Licence (EL)** regime creating opportunities for **MSMEs** and **startups**.
  - The **National Critical Minerals Mission (NCMM)** was launched to secure **lithium, cobalt, nickel**, and **rare earth elements** vital for the **energy** and **tech sectors.**
  - **Offshore mineral mining** initiated, expanding India's role in the **global resource supply chain.**
- **Sustainable Mining Initiatives:** The **Star Rating System** rates **mines** on **sustainable practices, mine closure plans** are mandatory for **environmental rehabilitation**, and use of **M-Sand (manufactured sand)** is promoted to reduce **river sand mining**.



What is the Significance of India's Mining Sector?

- **Economic Growth Driver: India's mining sector** contributed **1.97%** to GVA in 2023-24, generating **Rs 4 lakh crore** for states through **auctions** and **royalties** that fund **infrastructure** and **welfare schemes.**

- **Odisha** led with a **44.9% share**, followed by **Chhattisgarh (13.9%)**, **Jharkhand (4.1%)**, and **Maharashtra (3.9%).**

- **Industrial & Infrastructure Foundation: India produces 95 minerals** including **fuel**, **metallic**, **non-metallic**, **atomic**, and **minor minerals**.
  - **Metallic minerals** (90.3%) like **iron ore**, **bauxite**, and **copper** support **steel**, **aluminum**, and **electronics**, while **non-metallic minerals** (9.7%) like **limestone** and **phosphates** aid **cement**, **fertilizers**, and **chemicals.**
- **Employment & Rural Development: DMF Trusts** use **mining revenues** to support **healthcare**, **education**, and **livelihoods** in **mining-affected regions**, while **exploration licenses** for **MSMEs** and **startups** create jobs in **mineral-rich states.**
- **Energy Transition: Critical minerals** (**lithium**, **cobalt**, **rare earths**) exploration reduces **import dependence** for **EV batteries**, **renewables**, and **defense technology.**
  - **Potash mining** boosts **fertilizer self-sufficiency**, enhancing **food security.**
- **Global Competitiveness: Auction reforms** and **offshore mining** attract **private investment**, positioning **India** in the global **critical minerals supply chain.**
  - **KABIL's overseas acquisitions** (e.g., **Argentina for lithium**) secure **strategic resources.**

What are the challenges in India's Mining Sector?

- **Regulatory & Bureaucratic Hurdles: Delays in clearances** for **environmental**, **forest**, and **wildlife approvals**, along with **land acquisition issues** involving **tribal rights** under the Forest Rights Act, 2006 and local resistance, slow down projects.
  - **Frequent policy changes** like **iron ore export bans** and shifts in **royalty rates** create regulatory **uncertainty** for investors.
- **Illegal & Unsustainable Mining: Rampant illegal mining** due to weak enforcement, especially in **Jharkhand**, **Rajasthan**, and **Goa**, along with **unregulated mining** like **rat hole mining**, causes **deforestation**, **water pollution**, and **soil erosion.**
  - A **nexus of politicians**, **bureaucrats**, and **mining mafias** fuels **corruption** and disrupts **legal operations.**
- **Low Exploration:** Only **10% of India's Obvious Geological Potential (OGP)** has been explored, with under **1% of the global exploration budget** spent in India, while reliance on **obsolete mining techniques** over **automation**, **AI**, and **drone surveys** lowers efficiency.
- **Logistics Bottlenecks: Poor transport connectivity** in mining belts (e.g., **Odisha**, **Chhattisgarh**), **port constraints**, and **power shortages** raise costs, cause delays, and disrupt mining operations.
- **Dependence on Imports for Critical Minerals:** In **2020**, India imported **100% of its lithium, cobalt, nickel**, and **60% of its graphite**, all crucial for **EVs** and **renewables**, with heavy reliance on **Chinese processed minerals**.
  - In **2025**, **China's export controls** on rare earth elements (REEs) and **magnets** hampered Indian industries dependent on these imports.
- **Social & Environmental Conflicts: Mining in forest areas** like **Niyamgiri Hills** faces **tribal displacement** protests, causes **water scarcity** and conflicts with **farmers**, and suffers from poor **DMF fund implementation** for community **rehabilitation.**
  - **Poor working conditions** with frequent **accidents** (e.g., **Meghalaya** rat-hole mining **deaths**) and a **skilled labour shortage** hinder adoption of **modern mining technology.**

RBI's Monetary Policy

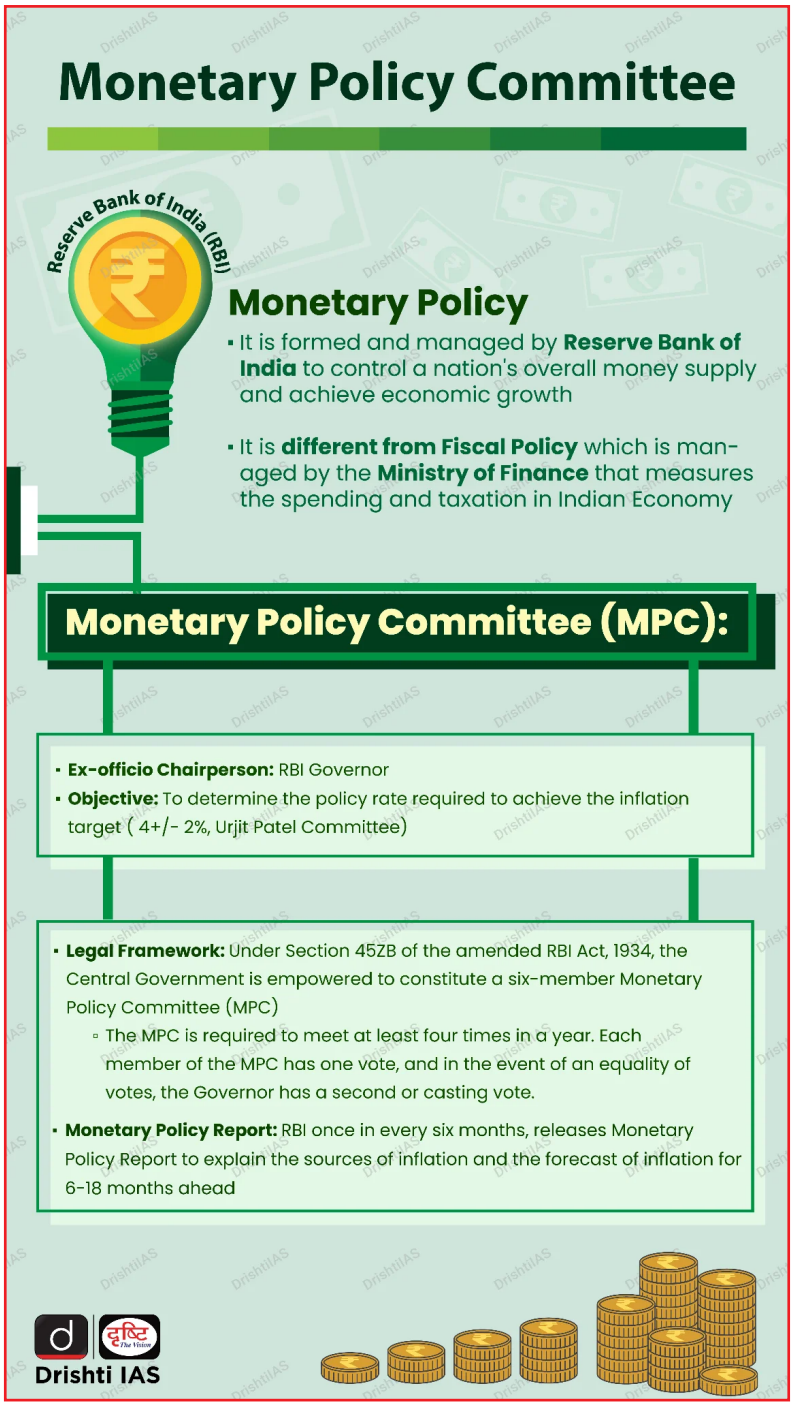
Why in News?

In the June 2025 Monetary Policy Committee (MPC) meeting, the Reserve Bank of India (RBI) **Governor** highlighted the fragility of the **global economy**, noting that despite 100 bps rate cuts since February 2025, monetary policy has **limited space to support growth**. Given the slow pace of inflation reduction and external uncertainties, a **shift from an accommodative to a neutral stance** was deemed appropriate.

Note: An **accommodative stance** means the RBI **lowers or maintains low policy rates** to **boost growth, increase liquidity, and encourage investment** during slow growth or low inflation.

- A **neutral stance** gives the RBI flexibility to **raise or cut rates depending on evolving inflation or growth risks,** aiming for a balanced policy approach.

What is the Monetary Policy Committee (MPC)?



What is Monetary Policy?

- **About: Monetary policy** is the process through which the **RBI regulates the money supply** in the economy by using various **monetary instruments** under its control to achieve the objectives outlined in the **RBI Act, 1934**.
- **Objectives:** The **primary objective** is **price stability**, with **inflation targeting** as the primary focus. The target is **CPI (Combined)** inflation within the **2-6% range**, set by the **Government in consultation with the RBI**.
  - Other objectives include **promoting growth**, **generating employment**, and ensuring **exchange rate stability**.
- **Tools of Monetary Policy:**
  - **Quantitative Tools**
  - **Reserve Ratios:**
    - **Cash Reserve Ratio:** The **percentage of a bank's Net Demand and Time Liabilities (NDTL)** that must be maintained as **cash reserves with the RBI.**
    - **Statutory Liquidity Ratio:** Banks are required to hold a fixed portion of their **NDTL** as **liquid assets** such as **cash**, **gold**, and **unencumbered securities.**
  - **Open Market Operations (OMO):** Purchase and sale of government securities.
  - **Repo & Reverse Repo Rate:**
    - **Repo Rate:** It is the rate at which the **RBI offers overnight liquidity** to banks in exchange for **government and other approved securities as collateral.**
    - **Reverse Repo Rate:** It is the rate at which the **RBI absorbs overnight liquidity** from banks in exchange for **eligible government securities as collateral.**
  - **Bank Rate:** It is the rate at which the **Reserve Bank** is willing to **purchase or rediscount bills of exchange or other commercial papers.**
    - The **bank rate** is the interest rate at which the **RBI lends long-term, unsecured funds** to commercial banks, without collateral. The **repo rate** is the rate at which the **RBI lends short-term funds** to banks against **collateral** to manage **liquidity**.
  - **Marginal Standing Facility (MSF):** It is the **amount of overnight funds** that **scheduled commercial banks** can borrow by utilizing their **SLR portfolio up to a specified limit**, at a **penal interest rate.**
  - **Liquidity Adjustment Facility (LAF):** It consists of **overnight as well as term repo auctions.**
  - **Market Stabilisation Scheme (MSS):** **MSS bonds** are special bonds issued by the **RBI on behalf of the government** to **absorb excess liquidity** when regular government bonds are insufficient.
    - These bonds generally have a **short tenure of less than six months**, though the maturity period may vary as per requirements.

Qualitative Tools

- **Margin Requirement:** It is the **difference** between the market value of the assets and its maximum loan value.
  - It helps control **speculative lending** and is adjusted under **selective credit control**.
- **Consumer Credit Control:** Setting rules on **down payments** and **maximum repayment periods** for **installment credit** used to purchase goods.
- **Rationing: Regulation of credit** by commercial banks, e.g., RBI may limit loans to sectors like real estate to **check excessive lending.**
- **Moral Suasion:** A **request by the RBI** urging **commercial banks** to adopt specific measures in line with **economic trends**.
- **Direct Action:** Steps taken by the **RBI** against banks that **fail to meet specified conditions or requirements.**

Achieving Self-Sufficiency in Pulses

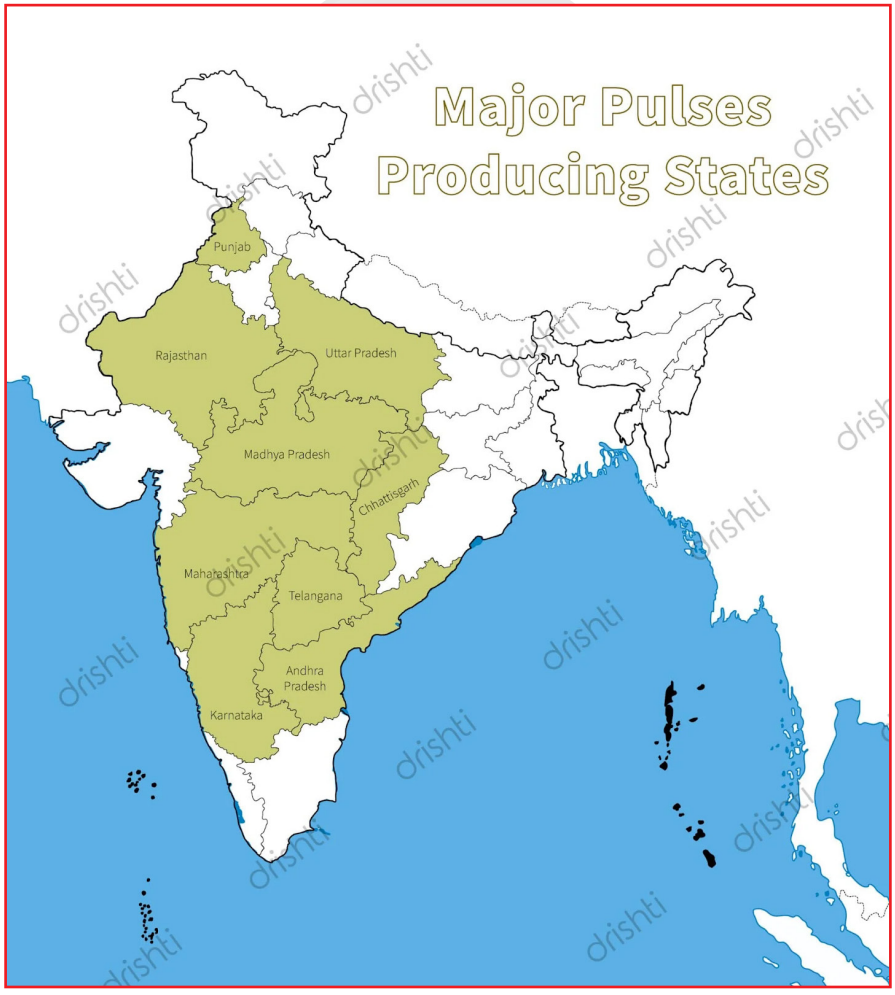
Why in News?

Farmers are **forced to sell** **pulses** in the **open market at low prices** despite the government's **Minimum Support Price (MSP)**, due to inadequate procurement.

- This reflects a deeper crisis — Indian pulses farmers **face neglect in MSP procurement** while **record imports flood the market,** further depressing domestic prices.

What are Key Facts About Pulses?

- **About:** Pulses are **edible seeds of leguminous plants**, harvested solely for their **dry grains**, and belong to the **Leguminosae (Fabaceae) family.**
  - Pulses are **high in protein, fiber, and nutrients**, **low in fat**, act as **nitrogen-fixing crops** that improve soil fertility, and have a **long shelf life when dried**.
- **Climatic Conditions:** Pulses require **20–27°C temperature**, **25–60 cm rainfall**, and **sandy-loamy soil**, and are cultivated year-round.
  - **Rabi Pulses (contribute over 60%)**: Gram (chickpea), Chana (Bengal gram), Masoor (lentil); they need **mild cold for sowing, cold for growth, and warm for harvest**.
  - **Kharif Pulses**: Moong (green gram), Urad (black gram), Arhar (pigeon pea); they need a **warm climate throughout their growth cycle.**
- **India's Production Status:** India is the **largest producer (25%)**, **consumer (27%)**, and **importer (14%)** of pulses globally. Top producing states are **Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh**, and **Karnataka.**
  - Pulses cover **20% of food grain area** but contribute only **7–10% of total production**, with **gram (40%)** as the dominant crop, followed by **Tur/Arhar (15–20%)** and **Urad/Black Matpe and Moong (8–10% each)**.



- **India's Pulses Import Status:** In 2024-25, pulses imports hit an **all-time high of 7.3 mt worth USD 5.5 billion in 2024-25**, surpassing the **2016-17 record of 6.6 mt and USD 4.2 billion.**
  - The major sources of pulses for India were **Canada, Russia, Australia, Mozambique, Tanzania, Myanmar, and the US.**
  - After 2017-18, imports had dipped to an average **2.6 mt (USD 1.7 billion)**, but **El Niño-induced drought in 2023-24** reversed self-sufficiency, with production falling to **24.2 mt**, and partly recovering to **25.2 mt in 2024-25.**

What are the Key Reasons Behind Low Pulses Production in India?

- **MSP & Policy Bias:** Government **MSP policies** favor **wheat and rice**, while **subsidies on water, electricity, and fertilizers** promote water-intensive crops like **paddy**, causing farmers to **shift away from pulses**.
  - Unlike rice and wheat, **pulses procurement is inconsistent**, further discouraging their cultivation.
- **Climatic Vulnerabilities:** Pulses are mostly grown in **rain-fed areas**, making them **highly dependent on monsoon rains**.
  - They are **less resilient to extreme weather** than wheat and rice, and suffer frequent damage from **droughts, unseasonal rains, and erratic monsoons.**
- **Low Productivity & Stagnant Yields:** The **average yield of pulses in India is 660 kg/ha**, below the **world average of 909 kg/ha**, due to **poor seed quality**, **lack of HYVs**, and **limited adoption of improved techniques**.
  - Research and development in pulses has seen **slow growth compared to cereals like rice and wheat .**
- **Fragmented Farming:** Most pulse farmers are **small and marginal (owning <2 hectares)**, leading to **low economies of scale** and difficulty in investing in **better seeds, irrigation, and fertilizers.**
- **Soil & Pest Challenges:** Pulses, being **high in proteins, amino acids, and micronutrients**, are **more prone to pest infestations** and attract **more pests and diseases** than many other crops.
  - They also face challenges like **soil salinity**, **nutrient deficiencies**, and **limited use of crop protection technologies** due to cost constraint.

What are India's Initiatives to Boost Pulses Production?

- National Mission on High Yielding Seeds
- National Food Security Mission (NFSM)-Pulses
- Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA) Scheme
- National Mission on Sustainable Agriculture (NMSA)
- Rashtriya Krishi Vikas Yojana

GDP Base Year Revised to 2022-23

Why in News?

The **Ministry of Statistics and Programme Implementation (MoSPI)** announced that the government is revising the **Gross Domestic Product (GDP)** **base year** from **2011-12** to **2022-23**. The revised data will be released on **27th February 2026**.

- The base year for Index of **Industrial Production (IIP)** will also be revised to **2022-23** while the base year for **Consumer Price Index** will be revised to **2023-24**.

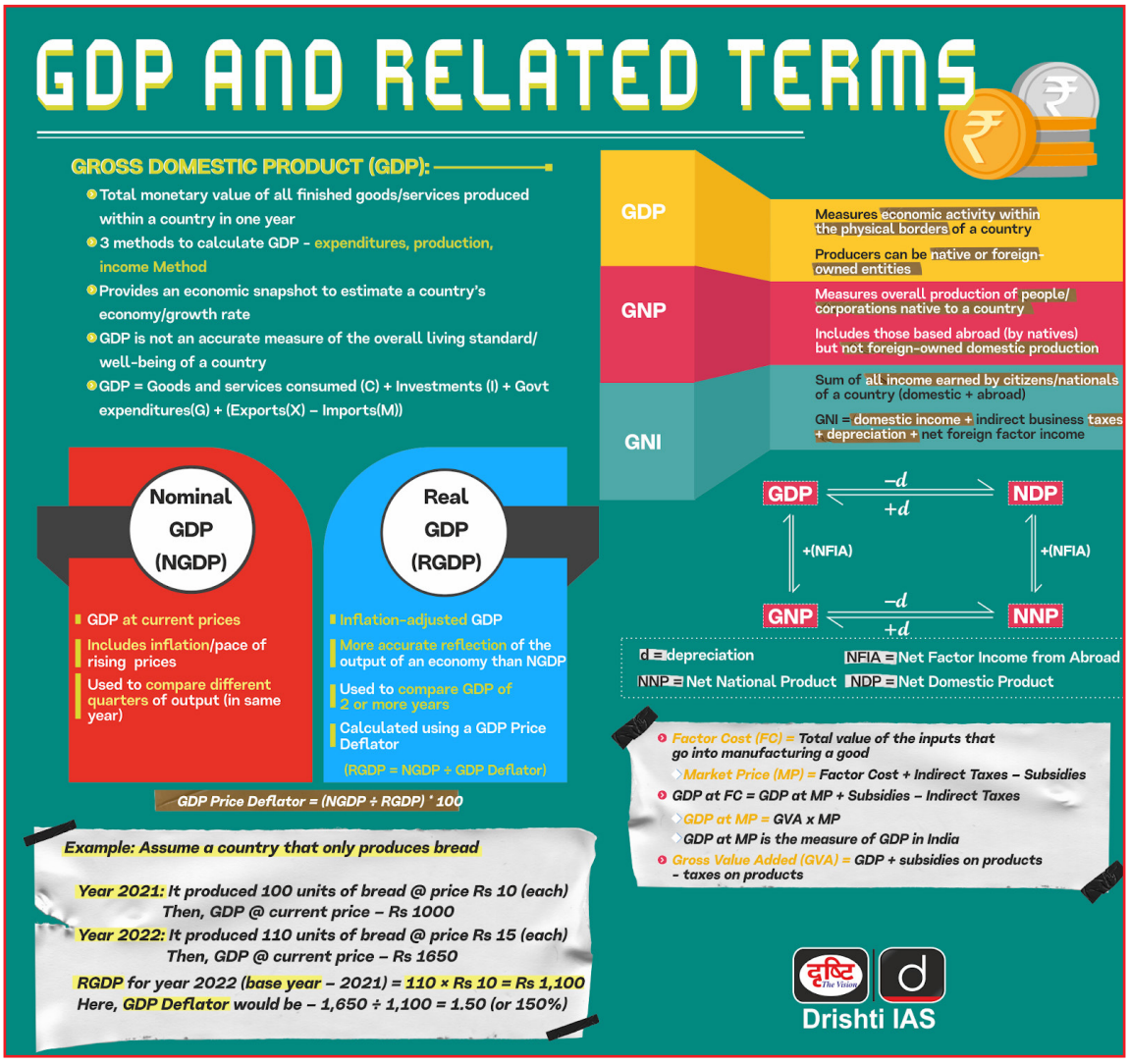
Note: In June 2024, MoSPI set up a **26-member Advisory Committee on National Accounts Statistics (ACNAS)** to decide the **base year for GDP data**, under the chairmanship of **Biswanath Goldar.** It also focused on aligning **GDP** with other key **macro indicators** such as the **WPI**, **CPI**, and **IIP.**

What is the GDP Base Year?

- **About GDP Base Year: GDP** is the key metric for measuring a country's **annual economic growth** or its **overall economic size**, and the **"base year"** serves as the **reference point** for these calculations.
  - Currently, **2011-12** is the base year, meaning the **GDP of 2011-12** is used as the benchmark to compute the **growth of subsequent years**.
- **Need:** The **base year revision** ensures the inclusion of **new industries**, removal of **outdated ones**,

adoption of **better data sources** and methods, and more **accurate measurement of real economic growth** after adjusting for **inflation**.

- **Features:** The **base year** should be a **normal year** i.e., it **must not** experience any **abnormal incidents** such as **droughts**, **floods**, **earthquakes**, **pandemic**, etc. Also, it should not be too **distant in the past**.
  - The **base year** should ideally be updated every **5 to 10 years** to ensure national accounts reflect the **most recent data**.
- **Frequency of GDP Base Year Revision:** The upcoming **2026 revision** will be the **eighth base year update**, following seven earlier revisions, starting from **1948-49 to 1960-61** in **August 1967** and most recently from **2004-05 to 2011-12** on **30th January 2015**.
  - The first **national income estimates** for India were compiled by the **National Income Committee** (chaired by **P.C. Mahalanobis**) in **1949**.
- **2017-18 Base Year Update Deferred:** The plan to revise the base year to **2017-18** was dropped due to:
  - Data quality concerns in **Periodic Labour Force Survey (PLFS)** (showed 45-year high unemployment).
  - Rejection of **Consumer Expenditure Survey (CES) 2017-18** data (indicated rising poverty).
  - Impact of **demonetisation (2016)** and **Goods and Services Tax (GST) introduction (2017)** and **Covid-19** made the subsequent years **abnormal** for **economic assessment.**



What is the Rationale Behind GDP Base Year Revisions?

- **Reflects Structural Changes in the Economy:** India's economy has shifted from **agrarian-dominated (pre-1990s)** to **services-led** (now **55% of GDP**), requiring a new **base year** to reflect these changes.
  - It ensures inclusion of **emerging sectors** like **digital services**, **gig economy**, **renewable energy**, and reassessment or exclusion of **declining industries** like **traditional manufacturing.**
- **Improves Data Accuracy & Methodology: Better data sources**, such as **MCA-21** for the corporate sector, replace outdated surveys, and updates align with **UN System of National Accounts (SNA) guidelines.**
  - **Informal sector estimates** (e.g., **small traders**, **MSMEs**) are revised using fresh **NSSO** and **PLFS** data.
- **Removes Inflation Distortions:** A new **base year** applies updated **price weights** to separate **real growth** from **inflation effects**. Using outdated prices (e.g., **2011-12**) can overweight sectors like **IT** that were cheaper then.
  - It also ensures **GDP growth rates** remain **comparable over time** by anchoring estimates to a recent **"normal" year.**
- **Policy & Investment Decisions:** Accurate **GDP data** guides **fiscal policies** on **taxation** and **spending**, while businesses depend on **GDP trends** for **expansion plans**.
  - It also strengthens **global credibility**, as bodies like the **International Monetary Fund (IMF)**, **World Bank**, and **rating agencies** assess India's economy using this data.
- **Corrects Past Anomalies:** The **2015 revision** drew criticism for **overestimating growth** due to methodological changes like greater reliance on **corporate data**, while delays since **2011-12** (skipping **2017-18** due to **demonetisation/GST disruptions**) make this update essential.
  - The new **2022-23 base year** will reflect **Covid-19 impacts** (e.g., healthcare's rising GDP share) and **policy changes** like **GST formalisation** and **Production Linked Initiative (PLI) schemes.**

What are the Key Challenges in GDP Base Year Revision?

- **Methodological Concerns:**
  - **Over Reliance on Corporate Data:** The **2015 GDP revision shifted to using the MCA-21 database for Private Corporate Sector (PCS) GDP**, mostly discarding the **IIP** and **ASI.**
    - This led to **under coverage as many registered companies (especially in services) don't file audited balance sheets**, and created a **large firm bias by overstating big firms' profits while missing smaller enterprises**.
    - It overlooked actual **value-added** by small producers, despite **93% of India's workforce** being in the **informal sector** (Economic Survey 2018-19), where data is patchy (e.g., street vendors, small workshops).
  - **Single vs. Double Deflation Debate: India** uses a **single deflator** (adjusting **nominal GDP** via **CPI/WPI**) rather than **double deflation** (adjusting **output** and **input prices** separately), which may **distort real GDP growth**, especially in **manufacturing** where **input costs** like **oil** and **metals** vary sharply.
- **Data Discrepancies Issues:** While **GDP growth appears robust**, **private consumption remains sluggish** due to possible **underreporting** and **incorrect inflation adjustments** in GDP deflators.
- **Back Series & Historical Comparisons:** Revising past GDP data to align with the new base year is technically complex, as seen with the **2018 back series** that faced criticism for **understating growth** under the previous governments.
  - New revisions risk **disrupting long-term trend analysis** and **fueling political debates.**
- **Credibility & Global Perception:** The **2015 revision** faced criticism from experts**,** who argued that **methodological changes inflated growth rates**.
  - Improper weighting of the **digital economy or corporate profits** could harm **India's GDP credibility**, deterring **FDI** and triggering **market turmoil.**

How to Make India's GDP Base Year Revision More Reliable?

- **Adopt a Hybrid Data Approach:** Balance corporate and survey data by **combining MCA-21 with ASI, IIP, NSSO surveys**.
  - Strengthen data sources through **annual enterprise surveys for MSMEs/unorganized sectors** and **big data analytics from digital platforms** like **e-commerce** and the **gig economy.**
- **Coverage of Informal Sector:** Expand survey coverage by **increasing sample size and frequency of PLFS and CES** and using **Aadhaar-linked data** to track informal employment and income.
  - Integrate alternative data like **UPI transactions**, **GST compliance rates**, and **EPFO records** to better estimate informal GDP contributions.
- **Shift to Double Deflation:** Adopt **double deflation** to adjust output and input prices separately, especially for **manufacturing** and **agriculture** sectors.
  - Ensure GDP estimation aligns with **UN System of National Accounts (SNA 2008)** standards.
- **Enhance Transparency:** Publish a **technical white paper** detailing sectoral weight changes, deflator choices, back-series methodology, and addressing past criticisms like the **2015 corporate data bias**.
  - Ensure **independent peer review** by involving the **IMF**, **World Bank**, and academic experts to validate the revisions.
- **Institutionalize Regular Revisions:** Avoid delays in base year revisions (like **2017-18 revision**).
  - Invest in **AI-driven GDP tracking** using high-frequency indicators like **electricity demand** and **freight movement** for timely and accurate estimates.
- **Address Sectoral Gaps:** Properly weight **digital services** (UPI, OTT platforms), **renewables**, and **startups**, while recalibrating **outdated industries** like **traditional textiles** and **print media** for accurate GDP estimation.

International Relations

Highlights

- *Securing the Indian Ocean Region*
- *51st G7 Summit*
- *Operation Sindhu for Evacuation from Iran*
- *Iran-Israel Conflict*

Securing the Indian Ocean Region

Why in News?

The **report of the Parliamentary Standing Committee on External Affairs** highlights that the **growing presence of extra-regional players** in the **Indian Ocean Region (IOR)**, particularly **China's increasing foothold**, poses a significant **strategic challenge for India.**

How is China Expanding Strategic Presence in the Indian Ocean Region?

- **Dual-Use Infrastructure:** China is investing in **dual-use (civilian and military)** infrastructure like **ports**, **airports**, and **logistics hubs** across **IOR littoral states**, forming a **naval support network**—examples include **Hambantota (Sri Lanka, leased for 99 years)**, **Gwadar (Pakistan, part of CPEC)**, and **Chittagong (Bangladesh)** & **Kyaukpyu (Myanmar)**, near **India's maritime boundaries**.
  - China's **String of Pearls** strategy envisions a **naval logistics network** that facilitates **swift troop deployment** in times of conflict.
- **Military Expansion & Naval Deployment:** China has significantly increased its **naval presence in the IOR** through the **Djibouti Military Base (2017)** enabling **sustained naval operations** along with **increased warship deployments** including **submarines**.
  - It also sends **"scientific" research vessels (e.g., Xiang Yang Hong 3)** for **oceanographic surveys**, aiding **submarine operations** and **maritime domain awareness.**
- **Debt-Trap Diplomacy:** China's **Belt and Road Initiative (BRI) projects** often involve **unsustainable loans**, creating **debt traps**—as seen in **Sri Lanka's Hambantota Port crisis** and the **Maldives' infrastructure loans**, increasing dependence on **Beijing**.
  - By leveraging **economic vulnerabilities**, China pressures **IOR nations** to align with its **strategic interests**, often at the cost of **regional stability.**
- **Diplomatic & Security Partnerships:** China conducts **joint naval exercises** with **Pakistan, Bangladesh, Myanmar, Iran, and Russia**, strengthening its **maritime military ties**. Politically, it backs **pro-China leaders**, such as the **Maldives' President Muizzu**, to expand its **influence in the region.**
  - Additionally, the launch of the **"China-Indian Ocean Region Forum"** highlights Beijing's growing **strategic and economic interests** in the region.

China's "String of Pearls" Strategy

- The **String of Pearls** is a **geopolitical theory** that refers to **China's increasing efforts** to develop and expand its **ports and naval bases** throughout the **Indian Ocean Region**, from the **Strait of Malacca** to the **Horn of Africa**.
- The theory suggests that **China** is seeking to establish a series of **strategic naval bases** and **commercial ports** along key **sea-lanes** in the **Indian Ocean**, to protect its **vital energy imports** and enhance its **maritime influence**.
- These **"pearls"** include ports such as **Gwadar** in **Pakistan**, **Hambantota** in **Sri Lanka**, and **Djibouti** in **Africa**, which provide **China** with greater **access and influence** in the region.

How China's Presence in the Indian Ocean Region Threatens India's Interest in Region?

- **Military and Security Threats:** China's strategic ports—**Gwadar, Hambantota, Djibouti, and Coco Islands**—enable the **Chinese Navy** to **deploy warships**, **monitor Indian naval activity**, and potentially **blockade key sea lanes** like the **Malacca Strait** and **Strait of Hormuz.**
- **Economic and Strategic Threats:** With **80% of India's oil imports** passing through the **IOR**, China could **disrupt trade routes** during conflict, threatening **India's energy security.**
  - Through Chinese **debt-trap diplomacy**, India risks **losing traditional allies**, **diplomatic leverage** in **SAARC** and **BIMSTEC**, and faces increased **Chinese naval access** near its shores via **client states.**
- **Intelligence & Surveillance Threats: Chinese spy ships** like **Xiang Yang Hong 03** and **electronic surveillance bases** in **Gwadar** enhance China's **monitoring of Indian naval activity**, while **suspected undersea sensor networks** aid **submarine detection**.
  - This poses a threat to **India's naval secrecy** and undermines its **nuclear deterrent**, especially the operations of **Arihant-class SSBNs** ("Ship, Submersible, Ballistic, Nuclear).

- **Diplomatic & Geopolitical Threats:** China's expanding influence in **Nepal**, **Maldives**, and **Bangladesh**, combined with **military partnerships** like **China-Pakistan naval drills** and **China-Iran-Russia cooperation**, threatens to **isolate India in its own neighborhood**, weaken its **strategic autonomy**, and heighten **reliance on the US and Quad** for regional balance.
- **Threat to Indo-Pacific Stability:** China's **military expansion in the IOR** is part of a broader strategy to **dominate the Indo-Pacific**.
  - This **upsets the strategic balance** and may provoke **military confrontations** involving **extra-regional players** like the **US, Japan, and Australia**—putting **India in a volatile environment.**

What is the Significance of the Indian Ocean Region for India?

- **Strategic Maritime Security**: India sees itself as a **net security provider**, reflected in the launch of **INS Vikrant (2022)** and **17 multilateral** & **20 bilateral naval exercises** annually.
  - The **Information Fusion Centre – Indian Ocean Region (IFC-IOR, 2018)** enhances **maritime domain awareness** and coordination.
- **Economic Lifeline**: **80% of India's external trade** and **90% of energy trade** pass through the Indian Ocean. These routes handle **70% of global container traffic**.
  - Ports like **Vizhinjam (Kerala)** aim to boost **transshipment share**. The **Blue Economy** is expected to contribute **4% to GDP**.
- **Geopolitical Influence:** The **ocean** is central to countering China's **"String of Pearls" strategy**, prompting **India** to deepen ties with **Seychelles**, **Mauritius**, and the **Maldives**.
  - Through initiatives like **"Act East"**, **"Neighbourhood First"**, and active participation in **Indian Ocean Rim Association (IORA)**, India is enhancing **maritime connectivity** and **regional influence**.
- **Environmental and Disaster Management**: India's **11,098 km coastline** faces threats from **sea-level rise** and **extreme weather**, with the **Indian National Centre for Ocean Information Services (INCOIS)** providing vital **monitoring and early warning**.
  - India's leadership in the **Coalition for Disaster Resilient Infrastructure (CDRI)** and **humanitarian aid**, such as to **Mozambique after Cyclone Idai (2019)**, strengthens its **soft power.**
- **Scientific Research and Exploration:** The **Indian Ocean supports India's technological advancement** through initiatives like the **Deep Ocean Mission**, featuring **Matsya 6000**, a manned submersible for deep-sea exploration.
  - India's **polymetallic nodule exploration** in the **Central Indian Ocean Basin (75,000 sq km)** positions it as a **pioneer in deep-sea mining**.

51st G7 Summit

Why in News?

India's Prime Minister attended the **51st G7 Summit at Kananaskis, Canada**. Though India is **not a part** of the G7 grouping, it has been **invited** for the global summit each year for the **last six years** and twelve times in total as an **outreach country**.

- The **President of the European Commission** was invited to attend the G7 Summit for the **first time.**

What are the Key Outcomes of the G7 Summit?

- **Kananaskis Wildfire Charter:** It commits to addressing **wildfire threats** through **science-based**, **local actions** and **nature-based solutions**, aligning with the goal to **halt and reverse deforestation and land degradation by 2030** under the **Glasgow Leaders' Declaration (2021).**
- **G7 Critical Minerals Action Plan:** It focuses on **diversifying critical mineral production**, boosting **investment and local value creation**, and **promoting innovation**, building on the **2023 Five-Point Plan for Critical Minerals Security** (also endorsed by **India**).
  - The G7 also committed to strengthening the **World Bank-led Resilient and Inclusive Supply Chain Enhancement (RISE) Partnership.**
- **Condemned Transnational Repression (TNR):** The **G7 condemned Transnational Repression (TNR)**, which refers to **aggressive foreign interference**

where states or their proxies seek to **intimidate, harass, harm, or coerce individuals or communities beyond their own borders.**

- **Prevent Migrant Smuggling:** G7 committed to **preventing** migrant smuggling through the **G7 Coalition to Prevent and Counter the Smuggling of Migrants** and the **2024 G7 Action Plan** targeting this issue.

What is G7?

- **About:** The **G7 (Group of Seven)** is an informal forum of the world's most advanced economies — **France, Germany, Italy, the UK, Japan, the US, and Canada**.
  - The **European Union (EU)** participates as a **non-enumerated member**, with leaders from the **International Monetary Fund (IMF)**, **World Bank**, **and United Nations (UN) often invited** to its meetings.
- **Origin & Evolution:** The **G7 was formed in 1975** as the **G6 (US, UK, France, West Germany, Japan, Italy)** in response to the **1973 oil crisis and financial turmoil**, with Canada joining in 1976 to make it G7. The year 2025 marked the **50th anniversary of the G7.**
  - It became **G8 in 1997 with the inclusion of Russia**, but reverted to G7 in **2014 after Russia's expulsion** over the annexation of Crimea.

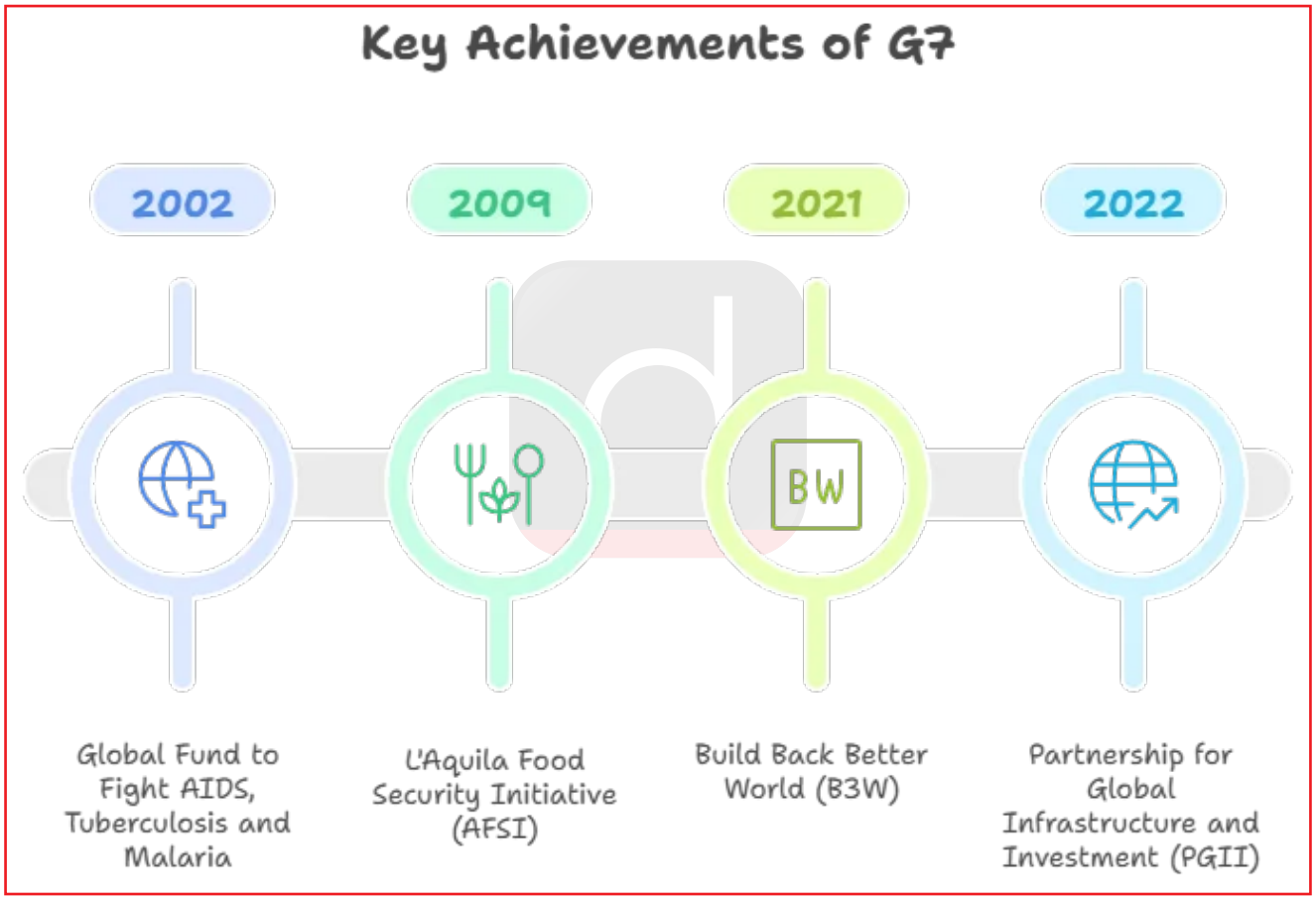
- **Nature of G7:**
  - **Informal grouping**: No formal treaty, **no permanent secretariat** or bureaucracy.
  - **Rotating Presidency**: Each member hosts and leads discussions in turn.

- **Decisions by consensus**: **No binding laws** (no legislative authority), but significant global influence due to members' economic and political strength.

➢ **Economic Significance:**

- **40%** of the **global economy** and **10%** of the **world's population** live in G7 countries.
- **36%** of global **power generation capacity**.
- **30%** of global **energy demand**.
- **25%** of global energy-related **carbon dioxide (C02) emissions**.

➢ **Key Achievements:**



Operation Sindhu for Evacuation from Iran

Why in News?

India announced launching **'Operation Sindhu'** to evacuate **Indian nationals** from **Iran** through **Armenia** as fears of an all-out **Israeli-American military strikes** on **Iran** increased.

➢ It highlighted **Armenia's crucial role** as a **strategic and viable evacuation route**, thanks to its **geographic position** and **strong diplomatic ties** with **India.**

- **Iran** borders **Armenia**, **Azerbaijan**, and **Turkmenistan** to the **north**. It shares borders with **Afghanistan** and **Pakistan** to the **east**, **Iraq** to the **west**, **Turkey** to the **northwest**, and has a southern coastline along the **Persian Gulf** and **Gulf of Oman.**

What Makes Armenia Strategically Important for Operation Sindhu?

- **Geostrategic Location: Armenia's 44-km border with Iran** and the **Nurduz-Agarak crossing**, linked to **Tehran** by a **730 km highway**, provide the most practical and safe land route for swift Indian evacuation.
- **Limited Alternatives:** Other borders pose challenges**:**
  - **Pakistan**: **Geopolitical tensions** (post-Operation Sindoor) made the **Iran-Pakistan border inaccessible.**
  - **Turkey** & **Azerbaijan**: Both support **Pakistan**, making their **borders with Iran unfavorable for India**.
  - **Afghanistan**: No **diplomatic ties** with Taliban**-ruled Afghanistan**.
  - **Iraq** & **Turkmenistan**: **Iraq** is an **active conflict zone** with **airports closed**, while **Turkmenistan's border** is **remote** and **underdeveloped.**
- **Strong Diplomatic Relations:** Armenia's support for India at international fora (e.g. **Kashmir issue**, UNSC **seat**).
  - In 2022, **India surpassed Russia** as **Armenia's top military supplier** with a **USD 250 million deal** for PINAKA rocket launchers, Akash-1S air defense, and other weapons.

- **Regional Connectivity:** Armenia is integral to the International North-South Transport Corridor, aligning with India's broader strategy to secure trade and evacuation routes through the **Caucasus region.**

What are Other Key Indian Evacuation Operations?

Operation	Year	Location	Context
Operation Kaveri	2023	Sudan	Evacuation during violent military clashes
Operation Ajay	2023	Israel	Evacuation during the **Israel–Hamas conflict**
Operation Ganga	2022	Ukraine	Evacuation during the **Russia-Ukraine war**
Operation Devi Shakti	2021	Afghanistan	Evacuation after **Taliban** takeover
Operation Samudra Setu	2020	Various (via sea)	Evacuation during **Covid-19** pandemic (Vande Bharat Mission)
Operation Raahat	2015	Yemen	Evacuation during civil conflict
Operation Safe Homecoming	2011	Libya	Evacuation during civil war in **Arab Spring**

Iran-Israel Conflict

Israel, under **"Operation Rising Lion"**, launched airstrikes and drone attacks on Iran's nuclear and military sites — including **Tehran**, the **Natanz uranium enrichment facility**, a **nuclear research centre**, **two military bases in Tabriz**, and an **underground missile storage site in Kermanshah** — to prevent Iran from advancing towards building an atomic weapon.

- In retaliation, **Iran launched waves of ballistic missiles** at Israel under **"Operation True Promise 3"**, causing **explosions over Jerusalem and Tel Aviv**.

What are the Reasons for the Iran-Israel Conflict?

- **Historical Roots:** The relationship between **Iran and Israel** has been marked by deep hostility since the 1979 Iranian Revolution, which transformed Iran from a close ally of Israel under the Shah to an **Islamic Republic openly antagonistic towards the Jewish state.**

- **Religious and Ideological Divide:** Iran, governed by **Shia Islamic principles**, and Israel, a **predominantly Jewish state**, are divided by stark **religious and ideological differences**.
  - These fundamental disparities have fueled **mutual distrust and animosity** over the decades.
- **Iran's Support for Anti-Israel Groups:** Iran has been a **staunch backer of Palestinian causes**, including providing support to **Hamas** and **Hezbollah**, both of which are labeled as **terrorist organisations by Israel**.
  - The rivalry plays out through **proxy conflicts**, with Iran supporting forces such as **Hezbollah in Lebanon** and **Shia militias in Iraq**, all seen by Israel as direct threats to its security.
  - Iran's vocal calls for **Israel's destruction** have further **intensified tensions.**
- **Geopolitical Rivalry:** Iran and Israel are locked in a **struggle for regional dominance**, with opposing interests in conflicts such as the **Syrian civil war** and the **Yemen crisis**.
  - Iran backed the **Assad regime in Syria** and the **Houthi rebels in Yemen**, while Israel works to **counter Iranian influence** in these areas.
- **Iran's Nuclear Ambitions:** Israel views Iran's **nuclear programme** as a serious threat, fearing the development of **nuclear weapons** that could endanger its existence.
  - Israel has been a **fierce critic of the Iran nuclear deal (Joint Comprehensive Plan of Action)** and has undertaken both **overt and covert actions** to disrupt Iran's nuclear progress.

What are the Implications of the Iran-Israel Conflict on India?

- **Hampering India's Energy Security:** For India, which imports nearly **2 million barrels of oil daily** through the crucial **Strait of Hormuz**, any instability would mean **supply shortages, spiraling energy costs, rising inflation**, and **constraints on economic growth.**
  - India is highly vulnerable to **global oil price volatility**; a sustained surge from **regional conflict** could trigger **higher inflation**, strain the **fiscal balance**, slow **economic growth**, and shift **investor sentiment** towards **bonds** and **gold**, as reflected in weaker **Sensex** and **Nifty** openings.
- **Impact on Indian Diaspora:** Over **66% of India's 1.34 crore NRIs** live in the **Middle East**, mainly in the **UAE, Saudi Arabia, Kuwait, Qatar, Oman**, and **Bahrain**. The large **Indian diaspora in West Asia**, especially the **Persian Gulf**, could face risks from regional tensions, making their **safety a key priority for New Delhi.**
  - India has a history of conducting **mass evacuations** — notably during the **Kuwait crisis (1990-91 Gulf War)**, and more recently from **Libya** and **Ukraine**.
- **Disruption to Strategic Connectivity:** India's key **connectivity projects** like the **Chabahar port in Iran**, which links it to **Afghanistan and Central Asia**, could be affected by regional turmoil.
  - The **India-Middle East-Europe Economic Corridor (IMEC)** faces risks from the conflict, threatening its progress and impacting **bilateral trade** and **regional economic dynamics.**
  - Furthermore, **shipping disruptions** in the **Red Sea** and surrounding waters could cause **delays, higher shipping costs**, and lead to **instability in global trade routes.**
- **Diplomatic Tightrope for India:** India has built **robust relations with Israel**, especially in areas like **defence, technology, and innovation**. However, as tensions escalate, India could find itself in a **challenging position**, facing pressure to **take sides** — an outcome it would prefer to avoid.
  - A **worsening Israel-Iran conflict** risks **disrupting India's delicate diplomatic balance**, which it has effectively maintained over the past decade with **Israel, Iran, and the Gulf Arab nations**.

Science & Technology

Highlights

India Sends Second Astronaut to Space

Why in News?

India achieves a historic milestone as **Group Captain Shubhanshu Shukla** becomes the **second Indian to travel to space**, after **Rakesh Sharma in 1984**, and the **first Indian to set foot on the International Space Station (ISS)**.

- He is part of the **Axiom-4 (Ax-4) mission**, a commercial spaceflight to the **ISS.**

What is the Axiom-4 Mission?

- **About: Axiom Mission 4 (Ax-4)** is the **fourth private spaceflight** to the **International Space Station (ISS)**, operated by **Axiom Space**, a US-based space infrastructure company. It marks the **fourth collaboration between NASA and Axiom Space**, following the successful **Ax-1, Ax-2, and Ax-3 missions**.
- **Crew Composition:**
  - **Peggy Whitson (USA)**: Mission Commander and former NASA astronaut with **675+ days in space**.
  - **Group Captain Shubhanshu Shukla (India)**
  - **Sławosz Uznański-Wiśniewski (Poland)**: **ESA reserve astronaut**.
  - **Tibor Kapu (Hungary)**: **Payload specialist**.
- **Key Objectives of Axiom-4:**
  - **Commercial Space Initiatives:** Promotes **space tourism** and **private research** in **Low Earth Orbit (LEO)**, supporting Axiom Space's goal of building the **first commercial space station** and transitioning operations from the **ISS** to **private infrastructure**.
  - **Scientific Research & Experiments:** Enables **microgravity research** in **materials science**, **biology**, **Earth observation**, and **space agriculture**. Key studies include:
    - **Human factors:** Impact of screen exposure in microgravity.
    - **Astrobiology:** Survival of **tardigrade** **(water bears)** in space.

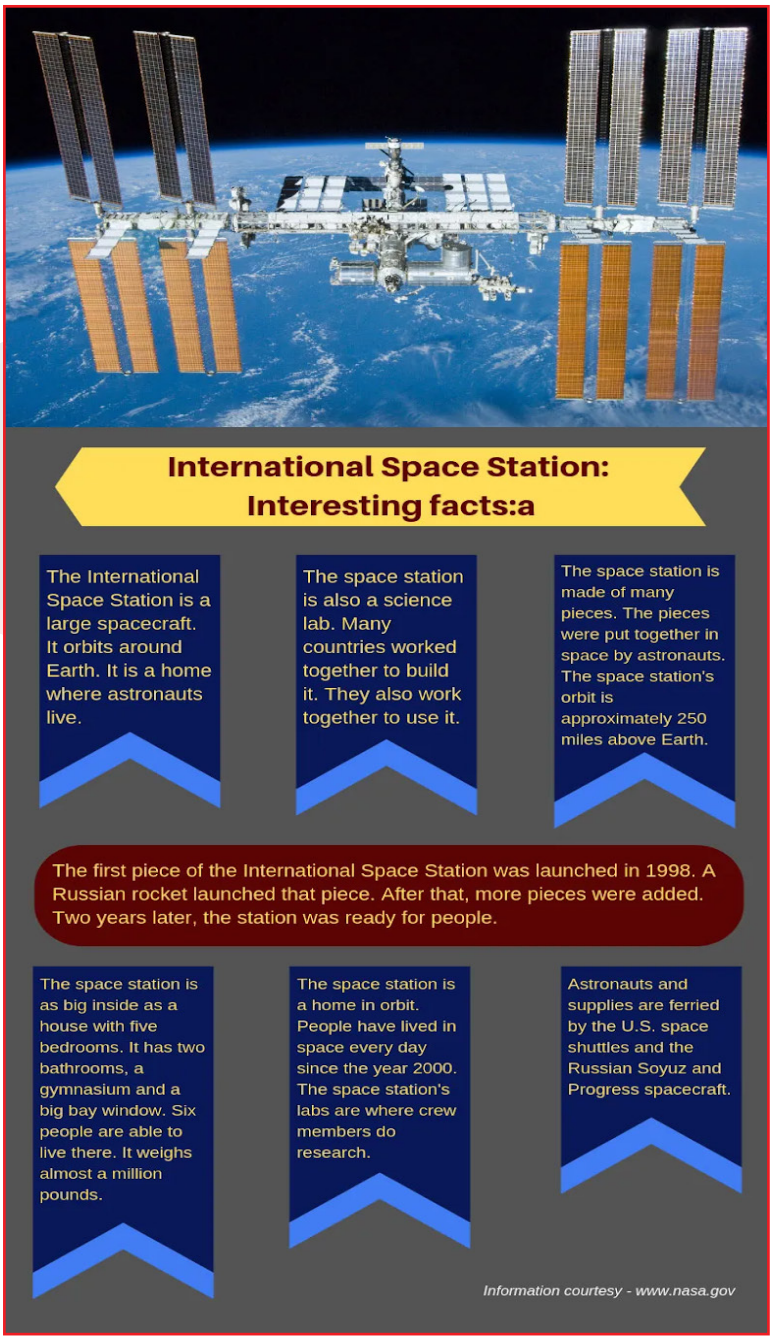
    - **Space agriculture:** Effects on **six crop varieties** (including **moong dal**) and **cyanobacteria**, relevant to **life support systems**.
  - **Global Collaboration:** Features **60 experiments** from **31 countries** (including India, USA, Poland, Hungary), making it the **most research-intensive Axiom mission** and highlighting international cooperation in space science.

What is the Significance of the Axiom-4 Mission for India?

- **Support for Gaganyaan:** Axiom-4 provides critical **hands-on experience** for India's planned **Gaganyaan mission**, especially in **crew operations**, **microgravity research**, and **space biology**, laying the groundwork for future **independent human space missions**.
- **Strategic & Technological Edge:** Human spaceflight is a key **strategic capability** for future missions to the **Moon, Mars, and beyond**. India's role in **Axiom-4** strengthens its position in the **global space arena**, supporting long-term goals like an **Indian space station by 2035** and a **human lunar mission by 2040**.
- **Global Standing & Economic Growth:** ISRO's **active partnership** in mission planning and execution showcases India's **technological competence** and boosts its **international standing**.
  - It also opens avenues for **private sector participation** and **foreign investments**, vital for expanding India's **share in the global space economy**.
- **Youth Engagement and STEM Promotion:** The mission inspires the youth, promotes **STEM education**, and helps build a **skilled talent pipeline** for India's expanding space sector, ensuring sustained innovation and national capacity building.

What are the Key Facts Related to the International Space Station (ISS)?

- **About**: The **International Space Station (ISS)** is the **largest habitable artificial satellite** in **Low Earth Orbit (LEO)**, functioning as a unique **space laboratory** for scientific research and international cooperation.
- **International Collaboration**: A **joint venture of 15 countries**, led by 5 space agencies (**NASA**, **Roscosmos**, **European Space Agency**, **JAXA**, and **Canadian Space Agency**).
- **Microgravity Laboratory**: The **ISS** hosts **3,000+ experiments** from **108+ countries**, enabling research in **science, medicine, and Earth observation**. Its **microgravity** aids in studying **human adaptation** and developing **Earth-relevant innovations**.



Insect-Based Livestock Feed

Why in News?

India is promoting **insect-based livestock feed** as a sustainable and climate-friendly alternative to **conventional animal feed**, aiming to combat **antimicrobial resistance (AMR)** and reduce the **environmental footprint** of animal farming.

- It has been initiated by **ICAR** in partnership with research institutes like **Central Institute of Brackishwater Aquaculture (CIBA) & Central Marine Fisheries Research Institute.**

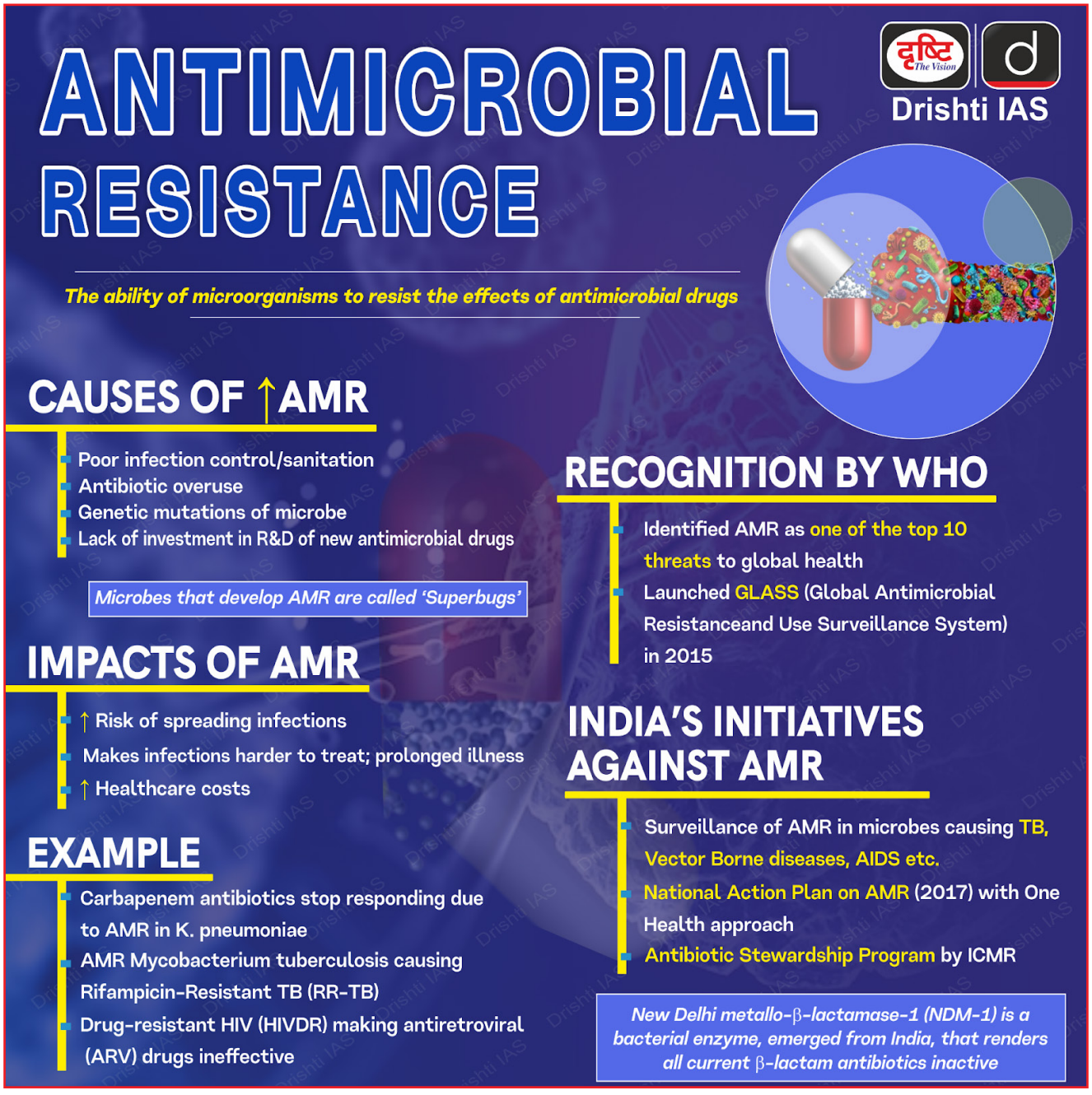
What is Insect-Based Feed?

- **About:** Insect-based livestock feed is a **protein-rich alternative** derived from insects such as **black soldier flies** *(Hermetia illucens)*, **crickets**, small mealworms (Alphitobius) and Jamaican field crickets (*Gryllus assimilis*).
  - It is used in **livestock and aquaculture** as a **sustainable and circular** source of nutrition.
- **Working Principle:** Insects such as **black soldier fly larvae** rapidly **convert agro and food waste** into **high-protein biomass** (up to 75% protein) within **12–15 days**, enabling quick and cost-effective feed production.
  - The resulting proteins **enhance gut health in animals**, reducing the need for antibiotics and helping combat **antimicrobial resistance (AMR).**
  - The leftover **frass** serves as an **organic fertiliser**, supporting **closed-loop, sustainable farming**.
- **Significance:**
  - **Nutritional and Economic Value:** Insect-based feed is rich in **up to 75% protein**, along with **essential fats, zinc, calcium, iron**, and **fibre**.
    - It offers **better digestibility** than soy or fishmeal, while being **cost-effective** and suitable for **large-scale livestock and aquaculture** due to **lower land, water, and input requirements**.
  - **Supports Food Security and Fights AMR:** With **meat production expected to double by 2050**, insect-based feed aligns with **FAO's projection of a 70% rise in global food demand**. Its gut-health benefits **reduce dependence on antibiotics**, helping to tackle **antimicrobial resistance (AMR)** in animal farming.
  - **Promotes Environmental Sustainability:** Insect farming results in **lower greenhouse gas (GHG) emissions**, **reduces land degradation**, and has a **smaller environmental footprint** compared to conventional feed sources.
    - It supports **climate-smart agriculture** and helps conserve natural resources.
  - **Drives Circular Economy:** Insects are reared on **organic waste** (e.g., agro and food waste), converting it into **high-quality protein and fats**.
    - The leftover **frass** serves as an **organic fertiliser**, enabling a **closed-loop, zero-waste production model**.
  - **Global Acceptance and Indian Push:** Insect-based feed is already **approved in over 40 countries** for use in **poultry, aquaculture, and livestock**.
    - In India, **ICAR and startups** like **Loopworm** and **Ultra Nutri India** are piloting it for **shrimp, seabass, poultry, and cattle**, reflecting growing **domestic scalability and adoption**.

What is Antimicrobial Resistance (AMR)?

- **About AMR:** AMR occurs when **bacteria**, **viruses**, **fungi** and **parasites** no longer respond to **antimicrobial medicines.**
  - This makes **antibiotics and other treatments ineffective**, leading to infections that are harder to treat, and increasing the risk of **severe illness, disability, and death**.
- **Prevalence of AMR:** AMR is among the **top global health and development threats**. In 2019, bacterial AMR caused **1.27 million deaths** and contributed to **4.95 million deaths** globally.
  - According to the **WHO,** AMR may result in an **additional USD 1 trillion** in healthcare costs by 2050, and cause **USD 1–3.4 trillion in annual GDP losses** by 2030.

- **Common Drug-Resistant Pathogens in India:**
  - **E. coli (gut infections):** Resistance rising; susceptibility to **carbapenem** dropped from **81.4% (2017)** to **62.7% (2023)**.
  - **Klebsiella pneumoniae (pneumonia/UTI):** Resistance to two key carbapenems fell from **58.5% to 35.6%**, and **48% to 37.6%** (2017–2023).
  - **Acinetobacter baumannii (hospital infections):** Already **highly drug-resistant**; shows **no major change** but remains difficult to treat.



Rare Donor Registry Integrated with e-Rakt Kosh

Why in News?

The **Union Health Ministry** is integrating the **Rare Donor Registry of India (RDRI)** with **e-Rakt Kosh** to enable real-time access to **rare blood types** (such as **Bombay, Rh-null, P-Null**) and improve nationwide coordination among blood banks.

What is Rare Donor Registry of India (RDRI)?

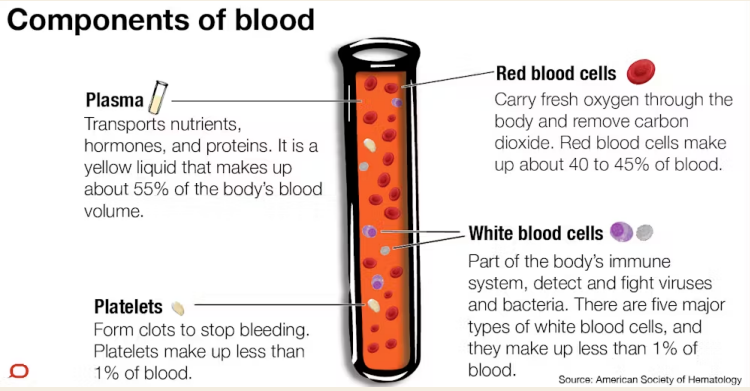
- **About:** The **Rare Donor Registry of India (RDRI)** is a **national database** of rare blood group donors.
  - It was developed by the **Indian Council of Medical Research–National Institute of Immunohaematology (ICMR-NIIH)** in collaboration with leading medical institutes.
- **Purpose and Need:** RDRI supports patients who require **specially matched transfusions**, particularly those suffering from **thalassemia**, **sickle cell disease**, and other rare conditions.
- **Scope & Coverage**: The registry includes **over 4,000 screened donors**, tested for more than **300 rare blood markers**.
  - It focuses on blood groups that either **lack high-frequency antigens** or have **uncommon antigen combinations**.
- **Significance for People with Rare Blood Types:** Rare blood groups are difficult to match. Transfusing incompatible blood may cause **alloimmunisation**, where the patient **develops antibodies against transfused blood**, complicating future treatments.

What is e-Rakt Kosh?

- **About: e-Rakt Kosh** is a centralized **digital blood bank management system** developed by **CDAC** under the **National Health Mission**.
  - It provides **real-time information on blood availability, donation camps,** and **blood bank**s across India.
  - The platform **connects donors, hospitals, and blood banks**, enabling efficient tracking and safe transfusions.

Blood

- **About:** Blood is a **vital fluid** that transports **oxygen, nutrients, hormones, and waste** throughout the body.
  - Produced in the **bone marrow**, blood also aids in **immunity, healing**, and **waste removal** via the liver and kidneys. An average adult has about **5 litres** of blood.
- **Components**: It consists of **45% cells (red blood cells, white blood cells, and platelets)** and **55% plasma**, a fluid that carries proteins, vitamins, and minerals.



- **Blood Types or Groups:** There are **4 main blood groups/ types of blood:** A, B, AB and O.

	Type A	Type B	Type AB	Type O
Antigen (on RBC)	Antigen A	Antigen B	Antigens A + B	Neither A or B
Antibody (in plasma)	Anti-B Antibody	Anti-A Antibody	Neither Antibody	Both Antibodies
Blood Donors	Cannot have B or AB blood Can have A or O blood	Cannot have A or AB blood Can have B or O blood	Can have any type of blood Is the universal recipient	Can only have O blood Is the universal donor

What is Bombay Blood Group?
Click Here to Read: Bombay Blood Group

Unique Stellar Chemistry of Star A980

Why in News?

Scientists at the **Indian Institute of Astrophysics (IIA), Bengaluru** identified a **rare helium-rich star (A980)** exhibiting a rare **chemical composition**, challenging existing models of **stellar evolution and nucleosynthesis**.

What are the Key Facts Related to Star A980?

- **About Star A980:** A980 is a cool **Extreme Helium (EHe) star,** a rare class of evolved stars made **almost entirely of helium with little to no hydrogen**, typically formed through the merger of a **helium-rich and a carbon-oxygen rich white dwarf.**
  - A980 lies in the **Ophiuchus constellation,** about **25,800 light years** from Earth.
  - It shows the **first-ever detection of singly-ionized germanium (Ge II)** in an EHe star, with **germanium levels eight times higher than in the Sun**.
- **Stellar Models and Star A980:** Stellar models explain **how stars form, evolve, and create elements.** They suggest heavy elements like **germanium** form in **supernovae or AGB stars**, not in **Extreme Helium (EHe) stars.**
- However, Star A980, an EHe star, shows **unusually high germanium levels, challenging these models.**
- It suggests that element formation may happen during white **dwarf mergers**, a process not well covered in current theories, indicating the **need to revise stellar evolution models.**

Indian Institute of Astrophysics (IIA)

- **IIA** is a premier research institution under the **Department of Science & Technology (DST)**, dedicated to **astronomy, astrophysics, and related physical and engineering** sciences.
- It traces its origins to the **Madras Observatory** established in 1**786,** which was later relocated to **Kodaikanal in 1899.** It was **renamed as IIA in 1971** and shifted its **headquarters to Bengaluru in 1975.**

What is Stellar Nucleosynthesis?
Click Here to Read: Stellar Nucleosynthesis

Ultra-Secure Communication Using Quantum Technology

Why in News?

Scientists from **IIT Delhi** and **DRDO** have successfully demonstrated an **ultra-secure communication system** using **entanglement-based free-space quantum secure communication.**

- This method uses **light particles (photons)** and the principle of **quantum entanglement** to transmit information through **air,** ensuring that **any attempt to intercept the communication is immediately detectable.**
- It marks a significant step forward in India's efforts to build quantum-secure networks under the **National Quantum Mission (2023–2031)**.

What are the Key Highlights of DRDO-IIT-Delhi Breakthrough in Quantum Communication?

- Scientists demonstrated **entanglement-based Quantum Key Distribution (QKD)** over a **1 km free-space link**, **transmitting quantum keys** through **air**, recording a **secure key rate of 240 bps (bits per second)**, showing resilience to **atmospheric turbulence, detector noise, and artificial lighting**.
  - Earlier, in **2022**, India's first **intercity quantum link** (Vindhyachal–Prayagraj) was set up using commercial-grade fibre.
  - In **2023**, QKD was extended to **380 km** over standard telecom fibre (**QBER 1.48%**), followed by a **100 km demo** in **2024**.

What is Quantum Communication and Quantum Entanglement?

- **Quantum communication** is the **transmission of secure information** using **principles of quantum mechanics,** particularly **quantum entanglement**.

- It includes protocols like **Quantum Key Distribution (QKD), quantum teleportation,** and **dense coding** and techniques such as **free-space communication, quantum repeaters,** and **decoherence-free subspaces** to enable **secure, long-distance transmission.**
- It holds strategic value for **defence and cybersecurity.**

➢ **Quantum Entanglement** is a phenomenon in quantum physics where **two or more particles become linked** in such a way that the **state of one instantly determines the state of the other,** regardless of the distance between them.

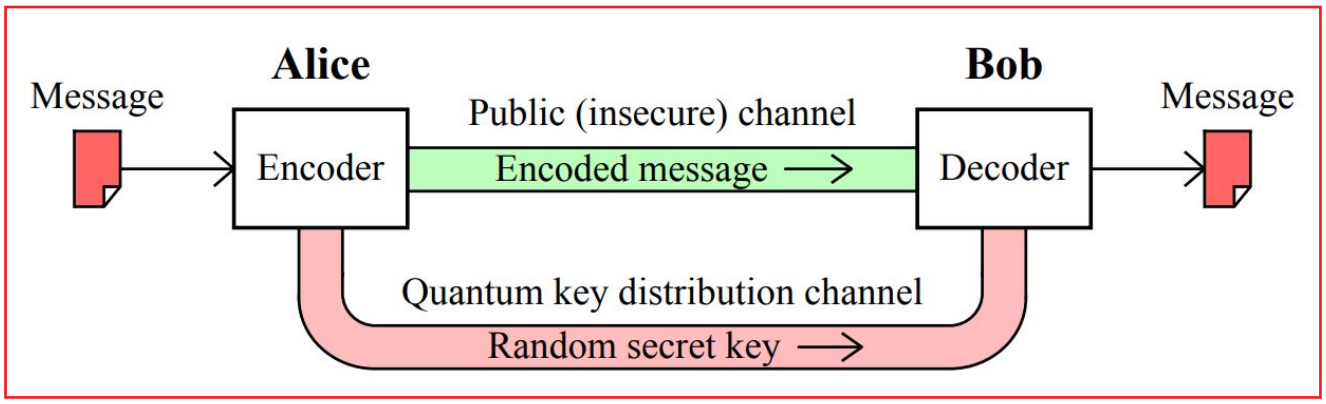
- It **defies classical physics** and enables applications like **quantum communication**, **quantum cryptography**, and **quantum computing**.

What is Quantum Key Distribution (QKD)?

➢ **About: Quantum Key Distribution (QKD)** is a **secure communication method** that uses the principles of **quantum mechanics** to **generate and share cryptographic keys** between **two parties.**

➢ **Working:**

- QKD use**s qubits (quantum bits),** transmitted through optical fibres based on **total internal reflection**, to securely exchange encryption keys between two users.
  - Unlike classical bits, qubits are encoded on **photons** and are highly sensitive to disturbance.
- QKD enables two distant users, who do not initially share a secret key, to generate a **common, random secret key**. These interactions must be **authenticated** using classical cryptographic methods.
- If an eavesdropper tries to intercept the communication, it disturbs the qubits, causing **transmission errors** that alert the legitimate users. Thus, QKD transforms an authenticated classical channel into a **secure quantum channel**, ensuring **tamper-evident encryption**.



➢ **Types of QKD:**

- **Prepare-and-Measure QKD:** One party **prepares photons in specific quantum states,** and the **other measures them**. Any interference alters the state, revealing intrusion.

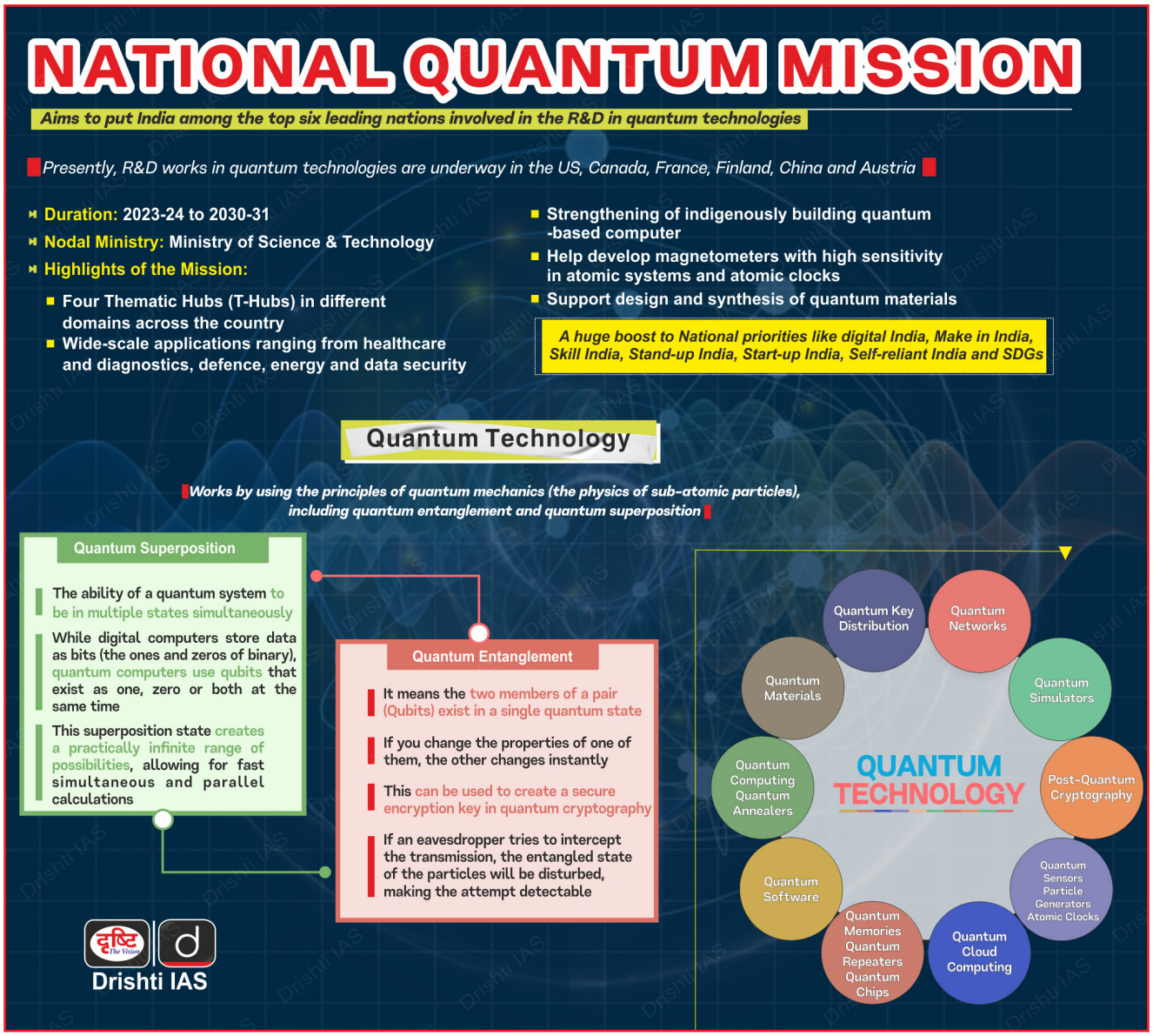
- **Entanglement-Based QKD:** A **source generates entangled photon pairs** and **sends one to each party.** The entangled nature ensures that the **measurement outcomes are correlated and secure.**

What is the National Quantum Mission (NQM)?

- **About:** The **National Quantum Mission (NQM)** is a strategic national initiative aimed at **advancing India's capabilities** in **quantum technologies**.
  - It is one of the **9 key missions under the PM-STIAC (Prime Minister's Science, Technology, and Innovation Advisory Council).**
  - It seeks to position India as a **global leader in quantum science** by fostering innovation in **quantum communication, quantum computing, and precision sensing**.
  - It was approved by the Union Cabinet **in 2023** for the period **2023–24 to 2030–31**.
- **Significance:** Crucial for advancing India's position in the global quantum race, with applications in **defence, cybersecurity, space, banking**, and **telecommunications**.
- **Key Objectives:**
  - **Quantum Computing**: Develop **intermediate-scale quantum computers** with **50–1000 physical qubits** using platforms such as **superconducting and photonic technologies** over the next eight years.
  - **Secure Quantum Communication**:
    - Enable **satellite-based quantum communication** between Indian ground stations over distances exceeding **2000 km**.
    - Facilitate **long-distance secure quantum links** with **international partners**.
  - **Quantum Sensing and Metrology**: Develop **high-sensitivity magnetometers** and **atomic clocks** to enhance precision in **navigation, communication, and timing applications**.
  - **Thematic Hubs (T-Hubs)**: Establish **four T-Hubs** at premier academic and national R&D institutions focused on:
    - Quantum computation
    - Quantum communication
    - Quantum Sensing & Metrology
    - Quantum Materials & Devices
- **Key Initiatives Under NQM:**
  - **DRDO Initiatives**: DRDO is developing and testing **quantum-resilient security protocols** and **quantum-safe symmetric and asymmetric cryptographic algorithms** to protect defence and strategic communications.
  - **SETS (Society for Electronic Transactions and Security):** Under the Principal Scientific Adviser (PSA), SETS is advancing **Post-Quantum Cryptography (PQC)** research and has implemented PQC for **FIDO authentication** and **IoT security** applications.
  - **C-DoT (Centre for Development of Telematics)**: Under the Department of Telecommunications (DoT), C-DoT has developed cutting-edge solutions, including **Quantum Key Distribution (QKD)**, **Post-Quantum Cryptography**, and **Quantum-Secure Video IP Phones**.

Related Government Initiatives on Quantum Technology

- Quantum-Enabled Science & Technology (QuEST)
- National Mission for Quantum Technologies and Applications (NM-QTA)
- Quantum Key Distribution (QKD) solution.



Reforming Civil Liability for Nuclear Damage Act, 2010

Why in News?

India is considering **easing** Civil Liability for Nuclear Damage Act, 2010 (CLNDA 2010) to reduce **accident-related penalties on suppliers,** addressing foreign firms' concerns over **unlimited liability.** The step aims to **revive stalled nuclear projects** and advance **India's clean energy targets.**

What is Civil Liability for Nuclear Damage Act, 2010?

➢ **About:** The **Civil Liability for Nuclear Damage Act (CLNDA), 2010** is India's nuclear liability law ensuring **compensation for victims** and defining **responsibility for nuclear accidents.**

- It aligns with the Convention on Supplementary Compensation (CSC, 1997), adopted post-**Chernobyl** to set global minimum compensation standards; **India ratified CSC in 2016.**
  - It follows the nuclear liability principles of the **Vienna Convention 1963**, **Paris Convention 1960**, and **Brussels Supplementary Convention 1963**.
- The Act imposes **strict, no-fault liability** on operators, caps operator liability at **Rs 1,500 crore**.
  - If damage claims **exceed Rs 1,500 crore,** the CLNDA expects the government to intervene.
  - The **government's liability is capped** at the rupee equivalent of **300 million** Special Drawing Rights (SDRs), roughly Rs 2,100 to Rs 2,300 crore.
- The Act also establishes a **Nuclear Damage Claims Commission** to ensure fair compensation and **resolve conflicts.**

➢ **Supplier Liability:** India's **CLNDA is unique** as it introduces **supplier liability** under **Section 17(b)**, enabling operators to seek recourse against suppliers—unlike global frameworks like the **CSC**, which place liability solely on the operator.

- Unlike **CSC**, which allows recourse only for **contractual breaches** or **intentional acts**, **CLNDA** broadens supplier accountability to cases where a **nuclear incident results from a supplier's or their employee's act**, including the **supply of defective equipment, materials**, or **sub-standard services.**

What is the Convention on Supplementary Compensation for Nuclear Damage (CSC), 1997?

➢ **About:** The **Convention on Supplementary Compensation for Nuclear Damage (CSC)** is an **international treaty** established in **1997** under the International Atomic Energy Agency (IAEA) to create a **global liability regime** for **nuclear damage**.

- It **supplements existing national and international compensation mechanisms** by providing **additional funds** in case of a **major nuclear accident.**

➢ **Eligibility for Membership:**

- **Primary Eligibility Criteria:** The **CSC** is open to all **IAEA member states** and to countries that are parties to either the **Vienna Convention on Civil Liability for Nuclear Damage (1963)** or the **Paris Convention on Third Party Liability in the Field of Nuclear Energy (1960)**.
- **Special Case (Non-Party States):** A country not party to the **Vienna** or **Paris Conventions** (e.g., **India**) can join the **CSC** if its **national nuclear liability laws align with CSC principles** and it **declares compliance at the time of ratification.**

➢ **India's Participation in the CSC:** India signed the **CSC** in 2010 based on its **Civil Liability for Nuclear Damage (CLND) Act, 2010**, and ratified it in **2016**, becoming a **State Party** despite not being part of the **Vienna** or **Paris Conventions.**

What are the Key Concerns Regarding the Civil Liability for Nuclear Damage Act, 2010?

➢ **Supplier Liability Concerns:** Foreign and domestic suppliers fear **unlimited liability** due to **unclear insurance rules**, **ambiguous "nuclear damage" definition**, and the risk of **civil suits under Section 46 of CLNDA**.

- While the government claims alignment with **CSC**, experts note that **Section 17(b)** still exposes suppliers to lawsuits for **defective equipment** or **intentional acts**, deepening liability concerns.

➢ **Deterring Foreign Investment in India's Nuclear Sector:** India's nuclear liability laws were initially seen as an **obstacle to the implementation of nuclear deals** with countries like the United States.

- Critics argue that the **liability clauses and restrictions** may hinder foreign investments and

collaborations in the nuclear energy sector, especially when compared to **international frameworks** like the Convention on Supplementary Compensation for Nuclear Damage (CSC), which has **broader provisions.**

- **Challenges to India's Clean Energy Goals:** The **CLNDA 2010 liability clause** has hurt **investor confidence**, created **uncertainty**, and slowed **nuclear energy growth** in India, crucial for the **500 GW non-fossil fuel target by 2030**.
  - With nuclear power contributing just **3% of total power**, delays in projects like **Jaitapur (9.6 GW)** are hindering **decarbonization efforts**.

What Measures can be Adopted to Revamp Civil Liability for Nuclear Damage (CLND) Act, 2010?

- **Legislative Reforms:** Amend **Section 17(b)** to **limit supplier liability** to cases of **intentional wrongdoing or gross negligence**, aligning it more closely with international norms. This would help **alleviate concerns** over unlimited liability and **encourage foreign suppliers** to participate in the nuclear sector.
  - Also, amend the **Atomic Energy Act** to enable **private sector participation**, especially in Small Modular Reactors (SMRs).
- **Financial Safeguards:**, and create an **international insurance consortium** to address supplier liability concerns.
  - Additionally, explore **alternative funding models** like **nuclear risk-sharing funds** to reduce the burden on taxpayers.
- **Diplomatic & Bilateral Solutions:** India could **sign intergovernmental agreements (IGAs) with key partners (US, France, Japan)** to clarify liability terms and set up a **dispute resolution mechanism** for cross-border claims, while using **diplomatic assurances** to revive stalled projects like **Jaitapur** and **Kovvada.**
- **Strengthening Regulatory & Safety Framework:** Strengthen the role of independent regulatory bodies like the Atomic Energy Regulatory Board (AERB) to ensure rigorous oversight of **nuclear safety, operations, and adherence to standards** and mandate **third-party safety audits** for all nuclear plants to ensure stringent safety standards.
  - Fast-track **nuclear disaster response protocols** to strengthen **public confidence** in nuclear energy.
- **Offer Financial Incentives to Encourage Investment:** Provide **tax incentives** and **subsidies** for nuclear energy investments with **risk mitigation measures** to boost **private participation** and accelerate **nuclear power growth** in India.
  - Consider introducing **low-interest loans or grants** for nuclear power projects to ensure that the **costs of insurance and risk management** don't deter investments.

Status of India's Nuclear Energy Sector:

- As of May 2023, nuclear energy contributes **1.6% to India's energy generation**, with plans to grow from **7.5 GW to 100 GW by 2047**, aiming to supply **25% of electricity by 2050**.
- Key developments like the **Fast Breeder Reactor** at Kalpakkam highlight India's growing nuclear capabilities. The **2025-26 Budget** allocates **Rs 20,000 crore for Small Modular Reactors (SMRs),** with five indigenously designed SMRs planned by 2033.
  - India has **22 operational nuclear reactors**, all run by **NPCIL**, with over a dozen new projects planned, but key ventures like **Jaitapur (France's EDF)** and **Kovvada (US firms)** remain stalled due to liability concerns

DNA Identification Techniques

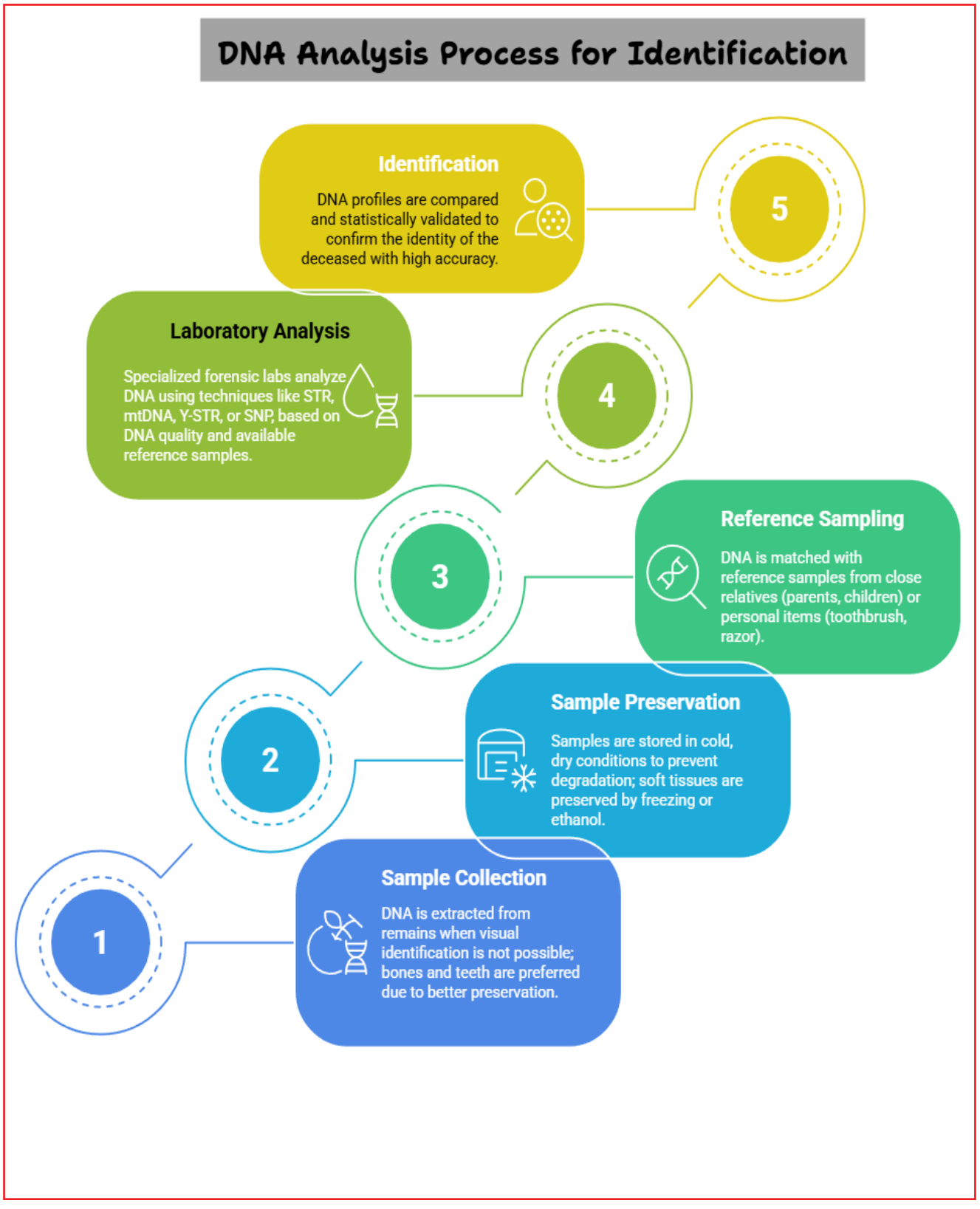
Why in News?

After the **Air India Boeing 787 Dreamliner** crash in Ahmedabad, authorities used **DNA identification** to confirm the identities of the victims.

- With body remains severely damaged, **DNA analysis** has become the gold standard for identifying individuals in mass fatality events, such as this one.

What is DNA Analysis Techniques and its Application in Disaster Victim Identification?

- **About: DNA Analysis Techniques** refer to scientific methods used to examine an **individual's genetic material (DNA)** for the purpose of **identification, relationship testing, or detecting genetic traits.**
  - **DNA profiling** is used to **identify individuals by examining specific regions of their DNA.**
  - **DNA (Deoxyribonucleic Acid)** is the hereditary material found in the **nucleus of eukaryotic cells** and the **cytoplasm of prokaryotic cells**.
  - It is a **genetic blueprint unique to each individual,** except **identical twins**, and is present in almost every cell of the human body.
  - While **99.9% of human DNA is identical** across individuals, the remaining 0.1% contains variations, particularly in regions called **Short Tandem Repeats (STRs),** that make **each person's DNA profile unique.**
- **Techniques of DNA Analysis:**
  - **Short Tandem Repeat (STR) Analysis:** STR analysis is the **most commonly used** method in forensic DNA identification. It e**xamines short, repeating sequences in nuclear DNA** that differ significantly among individuals.
    - **Analyzing 15 or more STR loci** can confirm identity with **high accuracy.** However, **its reliability decreases if the nuclear DNA is badly degraded.**
  - **Mitochondrial DNA (mtDNA) Analysis:** Used when **nuclear DNA is absent or degraded**, mtDNA analysis focuses on **maternally inherited genetic material.**
    - Since mtDNA **exists in multiple copies per cell**, it has **higher survivability in degraded remains**.
    - Identification is done by **matching with maternal relatives** such as the mother, maternal siblings, or maternal uncles and aunts.
  - **Y-Chromosome STR Analysis:** This method **examines STRs on the Y chromosome,** which is inherited along the paternal line from father to son.
    - It is **particularly useful for identifying male victims** by comparing their DNA with that of **paternal male relatives.** It is also effective when **only distant male relatives are available for reference.**
  - **Single Nucleotide Polymorphism (SNP) Analysis:** SNP analysis is used when **DNA is highly degraded** and other methods are not viable.
    - It **identifies variations at single base pairs** in the genome. Though less discriminatory than STR analysis, SNPs are **useful when only limited reference material or personal items** are available for identification.



MAKING A DNA PROFILE

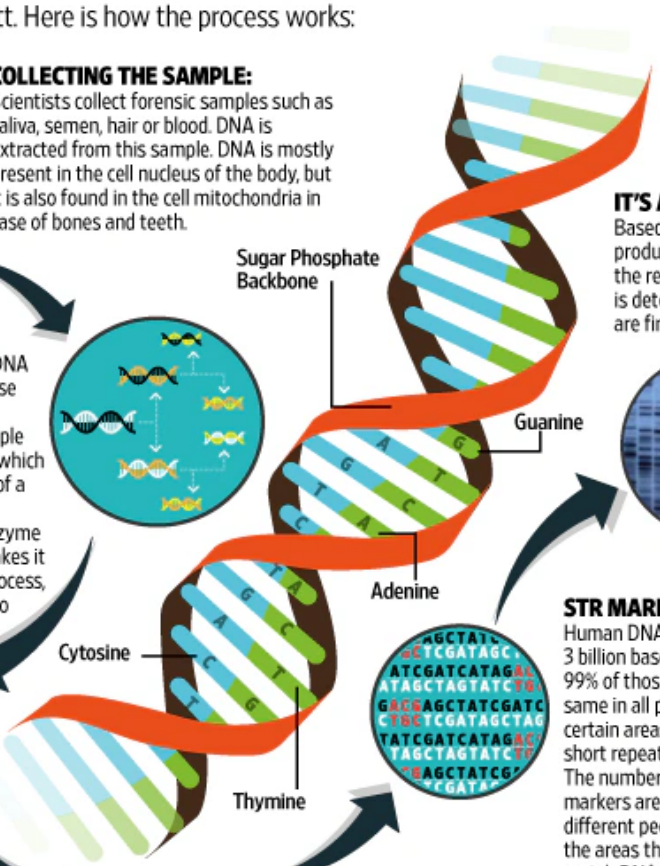
The STR (short tandem repeat) technique used today can make a DNA profile using, say, saliva on a cigarette butt. Here is how the process works:

COLLECTING THE SAMPLE:
Scientists collect forensic samples such as saliva, semen, hair or blood. DNA is extracted from this sample. DNA is mostly present in the cell nucleus of the body, but it is also found in the cell mitochondria in case of bones and teeth.

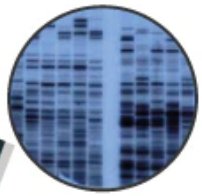
MULTIPLYING DNA SEGMENTS:
Next, scientists multiply the DNA segment by using a polymerase chain reaction (a laboratory technique used to make multiple copies of a segment of DNA) which can make a large sample out of a tiny one. This is done using a process involving a special enzyme that binds to the DNA and makes it multiply. By the end of this process, scientists have enough DNA to work with.

FRAGMENTING DNA:
During the reaction, markers are added to 13 areas of STRs, which are later analysed. A machine called capillary electrophoresis then cuts the DNA into fragments at specific base points.

GENETIC CODE:
DNA is a double helix structure in which the backbone is made of sugar and phosphate and information is stored as a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). The genetic code is made up of the sequence of the bases on the two strands.



IT'S A MATCH!
Based on the picture produced by a computer, the repetition of patterns is detected and samples are finally matched.



STR MARKERS:
Human DNA consists of about 3 billion bases, and more than 99% of those bases are the same in all people. There are certain areas in the DNA with short repeat units called STRs. The number of repeats in STR markers are different in different people, and these are the areas that are analysed to match DNA profiles.

FAMOUS CASES AND DNA PROFILING

FIRST CASE:
The first time DNA profiling was used to solve a case was when two teenage girls were found raped and murdered in Narborough, Leicestershire, in the UK, in 1983 and 1986 (the same person was responsible for both murders). Alec Jeffreys at Leicester University, who had developed a technique for creating DNA profiles, helped solve the case when his technique showed that the prime suspect the police had was innocent. Eventually, the murderer was found and his DNA profile matched with the one at the murder scene.

40-YEAR NAZI HUNT:
After nearly 40 years of hunting Nazi prison doctor Joseph Mengele who escaped from the Allies after World War II, police received a tip that Mengele had drowned and was buried in Brazil. DNA samples were taken from the decomposed remains and blood samples from Mengele's wife and son were used to confirm his identity.

9/11 REMAINS:
After the attack on the World Trade Centre in New York City on 11 September 2001, DNA profiling techniques were used to identify body parts belonging to more than 2,000 people who died in the attacks.
DNA profiling has also been used for the identification of victims after the tsunami in 2004 and the 2013 Uttarakhand floods.

Source: Mint research

More on DNA Profiling:

What are the Legal Provisions Regarding DNA Profiling in India?

Click Here to Read: Legal Provisions Regarding DNA Profiling in India

What are the Limitations of DNA Profiling?

Click Here to Read: Limitations of DNA Profiling

Black Box

Why in News?

The **Aircraft Accident Investigation Bureau (AAIB)** recovered **"black boxes"**, from the crash site of **Air India Flight Boeing 787-8 Dreamliner** airline in Ahmedabad.

What are Black Boxes and How do they Work?

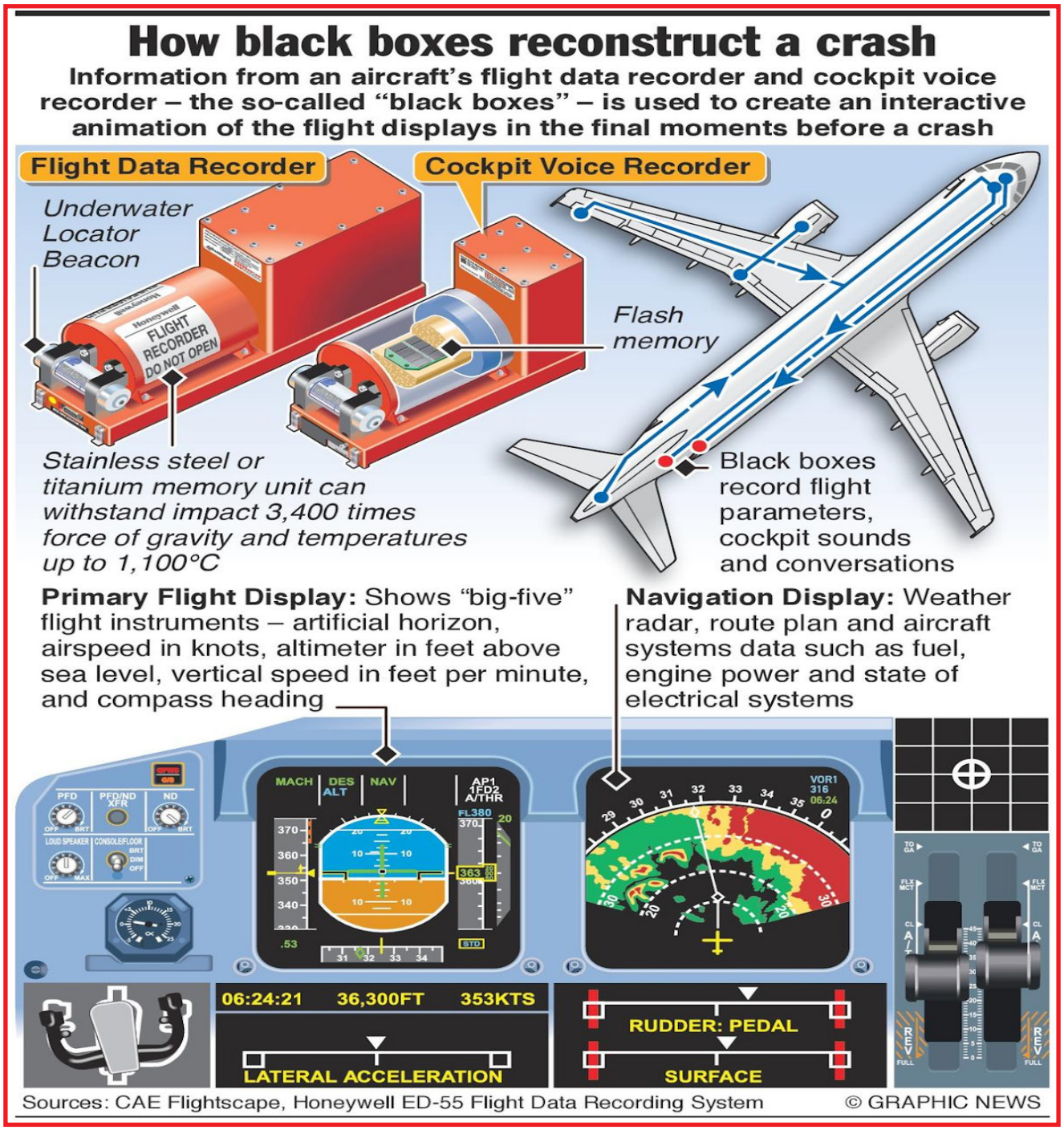
- **About: It was invented in 1954** by Australian scientist **Dr. David Warren,** it **became mandatory in 1960**.
  - Black boxes in aviation are composed of two primary devices: **Digital Flight Data Recorder (DFDR)** and **Cockpit Voice Recorder (CVR) which continuously record data** during flight.
- **Key Features:** Despite its name suggesting black, it is painted **bright orange (**with **reflective tape** for visibility**), rectangular in shape** and **crash-resistant devices, designed to survive extreme impact and fire.**
  - It is made of strong substances such as **steel or titanium** and **placed towards the tail end of the aircraft**, where the impact of a crash is usually the least.
- **Working Mechanism: DFDR** records **important flight parameters** like **speed, altitude, engine performance, heading, and flight control movements** and stores data for the **last 25+ hours** of flight.
  - **CVR records audio from the cockpit**, including **conversations between pilots, alarms, and ambient sounds** and stores data for **at least 2 hours**.
    - This data is crucial for **identifying anomalies or failures** that may not be immediately obvious.
- **Limitations:** While black boxes are crucial in aviation accident investigations, they are **not infallible.**
  - In the case of **Malaysia Airlines Flight MH370 (2014)**, the **absence of detectable signals from the black box** hindered the search and investigation efforts.
  - Moreover, **black boxes lack video recording capability**, limiting a complete understanding of cockpit events.

Historical Evolution of Flight Recorders

- **1950:** First generation **Flight Data Recorders (FDRs)** used metal foil to log data.
- **1953**: First commercial FDR sold by General Mills to Lockheed.
- **1954:** Dr. **David Warren (Australia)** invented the **modern FDR** after investigating Comet jet crashes.
- **1960:** FDRs and CVRs made mandatory in aircraft.
- **1965:** Mandated to be painted **bright orange/ yellow for visibility.**
- **1990: Solid-state memory** replaced magnetic tapes for better durability.

Key Advancements in Flight Recorder Technology

- **Automatic Deployable Flight Recorders:** These units, placed in the t**ail section, combine voice and data recorders** with an **emergency locator transmitter (ELT)**.
  - They **deploy automatically during a crash, float on water, transmit location,** and aid faster search and rescue.
- **Autonomous Distress Tracking: New-generation ELTs** providing **real-time location tracking during distress**, reducing the risk of aircraft becoming untraceable.
- **Combined Voice & Data Recorders (CVDR):** In compliance with ICAO's mandate to extend **voice recording from 2 to 25 hours**, modern aircraft now use CVDRs that **store both flight and cockpit data**.



What is the Aircraft Accident Investigation Bureau (AAIB)?

- **About:** Established in **2012** under the **Ministry of Civil Aviation**, the **AAIB investigates aircraft accidents and serious incidents** in Indian airspace.
  - It ensures **independent, unbiased probes**, **separating investigation from regulation,** which was earlier handled by the **Directorate General of Civil Aviation (DGCA).**

- **Key Functions and Mandate:** As per the **Aircraft (Investigation of Accidents and Incidents) Rules, 2017**, AAIB i**nvestigates all civil aircraft accidents and serious incidents** involving aircraft **over 2250 kg** or those with **turbojet engines**.
  - It may also take up **other cases in the interest of public or aviation safety**.
  - Its core functions include **collecting and analysing evidence (e.g., black boxes, witness accounts), determining probable causes, issuing safety recommendations**, and **publishing final reports.**
  - Under **Rule 3**, the sole objective of AAIB investigations is **accident prevention, not assigning blame or liability.**

Read More bout Flight Operations:

What is the Principle of Aircraft Flight Operation?

Click Here to Read: Principles of Aircraft Flight Operations

What is the Impact of High Temperatures on Aircraft Operation?

Click Here to Read: Impact of High Temperatures on Aircraft Operation

Environment and Ecology

Highlights

- *3rd UN Ocean Conference*
- *Biopesticide for Cardamom Thrips*
- *Global Science-Policy Panel on Chemicals, Waste, and Pollution*
- *10th Sustainable Development Report 2025*
- *Revised Green India Mission*

3rd UN Ocean Conference

Why in News?

The **2025 UN Ocean Conference (UNOC3)**, held in **Nice, France**, adopted the declaration **"Our Ocean, Our Future: United for Urgent Action"**, reinforcing global commitments to **Sustainable Development Goals (SDG) 14 (Life Below Water)**.

- Indigenous leaders called for a **binding plastics treaty** ensuring **justice for vulnerable communities**, with **95 countries** supporting regulation of plastics **from production to disposal.**
- The declaration aims to tackle the **triple planetary crisis** of **climate change**, **biodiversity loss**, and **pollution** that threatens the world's **oceans.**

Triple Planetary Crisis

- The **Triple Planetary Crisis** refers to the three interconnected global environmental threats i.e., **climate change**, **biodiversity loss**, and **pollution & waste**.
  - **Climate change** is driven by **greenhouse gas emissions**, causing **global warming**, **extreme weather**, rising seas, and threats to food security and ecosystems.
  - **Biodiversity loss** results from **deforestation**, **pollution**, **habitat destruction**, and **overexploitation**, leading to mass species extinction and weakened ecosystems.
  - **Pollution and waste** — from **plastics**, **chemicals**, and **air/water contamination** — harm human health, marine life, and ecosystems, and contribute to climate and biodiversity crises.
- These crises are **deeply linked — climate change accelerates species loss, pollution worsens climate impacts**, and degraded ecosystems **reduce carbon absorption** — requiring **urgent, integrated global action.**

What is the United Nations Ocean Conference?

- **About: UNOC** is a **high-level global summit** convened by the **UN** to **accelerate action** toward **SDG 14** (**Life Below Water**), which aims to **conserve** and **sustainably use oceans, seas, and marine resources**.
- **Theme:** Accelerating action and mobilizing all actors to conserve and sustainably use the ocean.
- **Purpose:** It aims to address **critical ocean challenges** like **climate change (ocean warming, acidification, sea-level rise), marine pollution** (plastics, **oil spills**, chemical waste), **overfishing** and IUU **(Illegal, Unreported, Unregulated) fishing**, and **biodiversity loss** (**coral bleaching**, habitat destruction).
  - The objectives of UNOC3 was to establish the **"Nice Ocean Agreements"** as an international pact aligned with the **UN's 2015 SDGs**, and to advance the **Agreement on Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ Agreement)** by securing **ratification from 60 countries** to regulate the **high seas.**
- **Major Outcomes in Past:**
  - **2017 (New York)**: **"Call for Action" declaration**; focus on **marine pollution** and **overfishing**.
  - **2022 (Lisbon)**: **Renewed pledges** for **30% marine protection by 2030 (30x30 target)**.

What are the Key Outcomes of the Third UN Ocean Conference?

- **Strengthening Global Ocean Governance:** The declaration urged the **full implementation** of key agreements, including the **Convention on Biological Diversity**, the **Kunming-Montreal Global Biodiversity Framework**, and the **Agreement on Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ)**.
- **Addressing Climate Change and Ocean Acidification:** The declaration called for **enhanced global action** to **minimize climate change impacts**, including **ocean acidification**, and stressed the need to **adapt to unavoidable climate effects** while **protecting marine ecosystems.**
  - The conference expressed **concern over plastic pollution** and its environmental harm, while reaffirming the **commitment to prevent and reduce marine pollution of all kinds**.
- **Sustainable Ocean-Based Economies:** The declaration recognized the **economic potential of sustainable ocean activities**, particularly for **small island developing states (SIDS)** and **least developed countries (LDCs)**, and highlighted tools like **sustainable ocean plans** for the **effective management of ocean resources.**
- **Indigenous Knowledge, and Ocean Mapping**: The declaration emphasized that **ocean action** should be guided by **scientific research**, **traditional knowledge**, and the expertise of **Indigenous Peoples**.
  - It also highlighted the importance of **national ocean accounting** and **mapping marine ecosystems** to support **better policy making.**

Key Ocean Conservation Initiatives Announced at UNOC3

- **European Commission**: Announced a **1 billion Euro investment** to promote **ocean conservation**, advance **marine science**, and support **sustainable fishing practices**.
- **French Polynesia**: Pledged to create the **world's largest marine protected area** — covering its entire **exclusive economic zone (5 million sq km)** to safeguard marine biodiversity.
- **Spain**: Announced the creation of **five new marine protected areas**, enhancing its network of safeguarded marine zones.
- **Indonesia & World Bank**: Introduced a **'Coral Bond'** — an innovative financial tool to **fund reef conservation** and restoration efforts in Indonesia.
- **High Ambition Coalition for a Quiet Ocean**: A **37-country coalition** led by **Panama and Canada**, focused on tackling **underwater noise pollution** to protect marine life.

How the Triple Planetary Crisis is Harming Oceans and Marine Ecosystems?

- **Climate Change Impacts: Oceans absorb 90% of excess heat** from global warming, causing **thermal expansion**, **increased salinity**, and disruption of **marine ecosystems**.
  - They also absorb **23% of anthropogenic CO_2 emissions**, making oceans **30% more acidic** since pre-industrial times and harming **shell-forming organisms** and **coral reefs**.
  - **Warmer waters** hold less oxygen, creating **dead zones**, while **melting polar ice** and **glacier calving** are rising **sea levels**, threatening **coastal cities** like **Mumbai**, **Chennai**, and **Kolkata.**
- **Coral Reef Destruction: Rising temperatures** trigger **coral bleaching**, as corals expel **symbiotic algae (zooxanthellae)**, turning white and often leading to mass die-offs.
  - The **4th Global Mass Bleaching Event (2023–2025)** affected **84% of the world's coral reefs** across **82 countries**, causing severe damage to **marine biodiversity hotspots.**
- **Overexploitation of Marine Resources: Overfishing** has caused **significant decline** in key species e.g., a **75% drop in oil sardine catch** along the **Kerala coast** in 2021, while projects like **Vadhavan Port** face criticism for displacing **fishing communities** and harming the **marine ecosystem**.
  - **Bottom trawling** and plans to **mine the ocean floor** for metals threaten to destroy **coral**, **sponge habitats**, and **undiscovered species**, creating **underwater dust clouds** that could suffocate marine life over vast areas.

- **Plastic & Chemical Pollution: Millions of tons of plastic** enter oceans each year, causing harm to **marine life** through **ingestion** and **entanglement**.
  - **Oil spills**, **ship accidents**, and **industrial runoff** introduce toxic chemicals, as seen in the **recent sinking of a Liberian-flagged vessel near the Kochi coast**, threatening the region's rich **biodiversity** and nearby communities, prompting the **Kerala government** to declare it a **state disaster.**
- **Habitat Destruction:** **Mangrove forests**, vital coastal nurseries for fish, are being cleared for **shrimp farms** and **resorts**, while **coastal development** builds over **turtle nesting beaches** for hotels.

What is the Need of Safeguarding Oceans?

- **Ecological & Biodiversity Significance:** **Phytoplankton**, producing over **50% of Earth's oxygen**, and **plankton** form the foundation of marine food webs that sustain **fish**, **marine mammals**, and **seabirds**.
  - **Oceans**, the largest ecosystem, support **94% of all life** and nearly a **million known species**, with **coral reefs** and **mangroves** serving as vital biodiversity hotspots. E.g., **Ocean currents** create **fertile fishing grounds** (e.g., **Newfoundland's Grand Banks**) by bringing nutrient-rich waters to the surface.
- **Climate Regulation: Oceans regulate global temperatures** and play a key role in **climate balance** by absorbing and redistributing heat through **currents** like the **Gulf Stream**.
  - They drive the **hydrological cycle**, influencing **rainfall**, **monsoons**, **weather systems**, and ensuring **freshwater availability**. Oceans also act as the world's largest **carbon sink**, absorbing vast amounts of CO_2 to help **mitigate climate change**.
- **Economic & Livelihood Support:** Over **3 billion people** rely on **seafood** as a primary protein source, with **fisheries** and **aquaculture** supporting millions of jobs, while **continental shelves** hold vast reserves of **oil** and **natural gas** (e.g., **Gulf of Mexico**, **Persian Gulf**, **Bombay High**).
  - **Oceans** are vital to the **global economy**, enabling **90% of trade** through shipping routes and supporting **multi-billion-dollar coastal tourism** in regions like the **Caribbean** and **Mediterranean**.
- **Scientific & Medicinal Value: Marine organisms** have contributed to **medical breakthroughs**, including **anticancer compounds** from **coral** and **algae**.
  - **Deep-sea exploration** enhances understanding of **Earth's geology**, **climate history**, and the potential for **new resources.**

Biopesticide for Cardamom Thrips

Why in News?

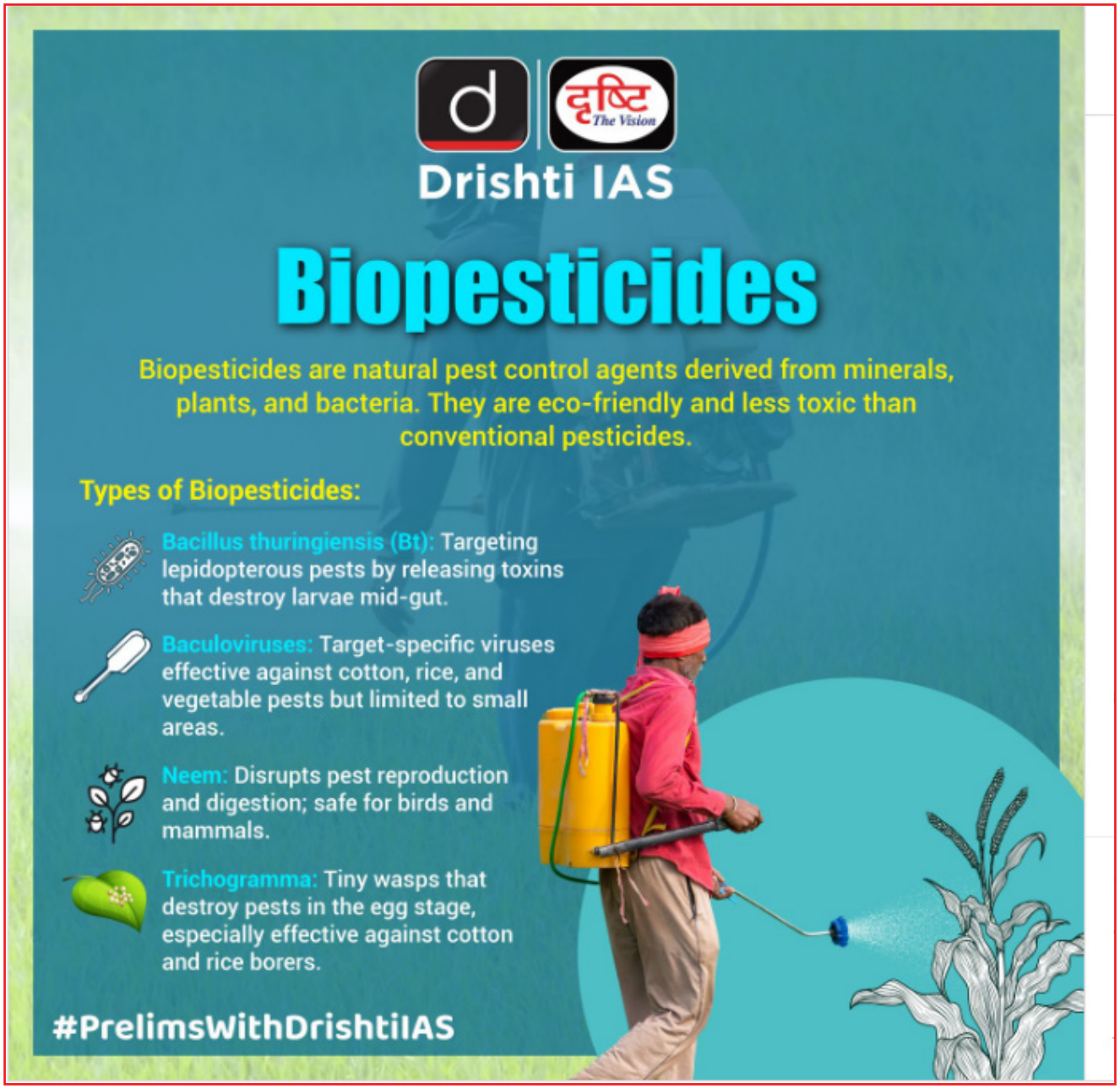
The **ICAR-Indian Institute of Spices Research (ICAR-IISR), Kozhikode,** has developed an **eco-friendly biopesticide** using the entomopathogenic fungus *Lecanicillium psalliotae* to effectively control **cardamom thrips**, a major pest affecting **cardamom plantations**.

What is Lecanicillium psalliotae-Based Biopesticide?

- **About:** A **granular biopesticide** has been developed using *Lecanicillium psalliotae*, a **naturally occurring entomopathogenic fungus** isolated from **cardamom thrips (*Sciothrips cardamomi*)**.
  - It infects pests by penetrating their outer layer and feeding internally, effectively targeting **larvae, pupae, and adults**. It acts on contact and belongs to the same group as *Beauveria bassiana* and *Metarhizium anisopliae*, widely used in **biological pest control**.
- **Application and Benefits**: The biopesticide is **mixed with farmyard manure (FYM)** and applied **3–4 times** to **plant basins**.
  - It is **cost-effective**, reduces **chemical pesticide dependence**, and promotes **root growth** and **soil nutrient availability**.
- **Significance:** It is **eco-friendly** and **non-toxic**, reducing environmental impact and health risks. It supports **Integrated Pest Management (IPM) strategies**, promotes **sustainable agriculture**, and ensures compliance with **international residue standards** in export-oriented crops like **cardamom**.

Note:

- **Granular biopesticides** are formulations in which the **active ingredient**, typically derived from **natural sources** such as **microorganisms** or **plants**, is **embedded in or coated onto solid granules** for easy application and controlled release.



What are the Key Facts Related to Cardamom?

- **About: Cardamom (*Elettaria cardamomum*),** popularly called the **"Queen of Spices"**, is a highly aromatic spice from the **Zingiberaceae (ginger) family**.

- It is **indigenous to the evergreen rainforests of the Western Ghats.**

- **Climatic Conditions:** Requires **1500-4000 mm of rainfall**, temperatures between **10°C to 35°C**, and thrives at **altitudes of 600–1500 meters**.
  - Grows well in **acidic, loamy, humus-rich soils** with a pH of **5.0–6.5**.
- **Production:** As of 2025, the top cardamom-producing countries are **Guatemala (1st), India (2nd), and Sri Lanka (3rd).**
  - **Kerala contributes 58% of India's cardamom production** along with Karnataka and Tamil Nadu as other major cultivating states.
- **Newly Identified Species:** *Elettaria facifera* (**Periyar Tiger Reserve, Idukki)** and *Elettaria tulipifera* (**Agasthyamalai hills**, Thiruvananthapuram and Munnar, Idukki).

Global Science-Policy Panel on Chemicals, Waste, and Pollution

Why in News?

The **Global Science-Policy Panel on Chemicals, Waste, and Pollution** has been established at **Punta del Este, Uruguay**, under the **UN Environment Programme (UNEP).**

What is the Global Science-Policy Panel on Chemicals, Waste, and Pollution?

- **About:** This panel complements the **IPCC** (climate change) and **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)** (biodiversity), forming a **trifecta of intergovernmental science-policy bodies** that address the **triple planetary crisis** (**climate change, biodiversity loss, and pollution**).
  - It fills a key gap in global environmental governance by focusing specifically on pollution and waste.
- **Objective**: It aims to **strengthen global efforts** in tackling **pollution, managing hazardous chemicals and waste, and safeguarding environmental and human health** through evidence-based policymaking.
- **Key Functions:**
  - Provide **independent, policy-relevant scientific advice** on chemicals, waste, and pollution.
  - Conduct **scientific assessments**, identify **research gaps**, and support **evidence-based policymaking**.
  - Promote **capacity building** for developing countries to implement effective pollution control measures.
  - Engage in **horizon scanning** to detect emerging threats and guide preventive action.
  - Foster collaboration between **scientists and policymakers** to ensure informed decision-making.
- **Significance:**
  - Rising and unregulated **chemical use** in daily life has increased health and ecological risks.
  - **Municipal solid waste** is projected to grow from **2.1 billion tonnes in 2023** to **3.8 billion tonnes by 2050**.
  - **Pollution-related deaths** have surged by **66%** over the past two decades.

IPCC

- **Intergovernmental Panel on Climate Change (IPCC)** is the **United Nations (UN)** body for assessing **science related to climate change.**
- Established in **1988** by the **World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP)**, it provides **regular scientific assessments** on the causes, impacts, and risks of climate change, along with options for **adaptation and mitigation**.
- Its reports guide **global climate policy** and are key inputs in **international climate negotiations**.
- The **IPCC** publishes comprehensive **Assessment Reports** every 6–7 years (e.g., **AR6, 2021–2023**) through three Working Groups and a Synthesis Report.
  - It also releases **Special Reports** (e.g., on **1.5°C**, **Land**, **Cryosphere**) and **Methodology Reports** for GHG inventories (e.g., 2006 Guidelines, updated 2019).

IPBES

- **IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services),** established in **2012**, is an **independent intergovernmental body** with nearly **150 member countries**, including **India.**
- It provides **scientific assessments** on **biodiversity, ecosystems, and their contributions to people**, along with tools for their **sustainable use and protection**.
- Though **not a United Nations body**, it is supported by the **United Nations Environment Programme (UNEP)**, which hosts its **secretariat in Bonn, Germany**.
  - **UNEP** also hosts the secretariats of key international chemicals agreements, including the **Stockholm Convention on Persistent Organic Pollutants**, the **Minamata Convention on Mercury**, and the **Global Framework on Chemicals (GFC)**.

UN Environment Programme (UNEP)

- UNEP, established in **1972** and headquartered in **Nairobi**, is the **UN's leading agency on environmental issues**.
- Governed by the **UN Environment Assembly (UNEA)**, it supports global action on **climate**, **ecosystem restoration**, **clean seas**, and **SDGs**, and publishes key reports like the **Emissions Gap Report** and **Global Environment Outlook**.

10th Sustainable Development Report 2025

Why in News?

According to the **UN Sustainable Development Solutions Network's 10th Sustainable Development Report (SDR) 2025**, India ranks **99th in the Sustainable Development Goals (SDG) Index**, marking its **first time** in the **top 100** out of 167 countries with a **score of 67.**

- **The score measures progress on a scale of 0 to 100 where 100 indicates a country has achieved all 17 goals and 0 means no progress** has been made.
- This shows a **significant improvement** from its previous rankings (e.g.,**109th in 2024, 112th in 2023**) in the **Sustainable Development Goals (SDG) Index.**

What are Key Findings of the 10th Sustainable Development Report (SDR) 2025?

- **Global SDG Progress Status:** Projections show that **only 17% of SDG targets are on track** to be met by 2030, highlighting a significant slowdown in global progress.
  - This stagnation is driven by **conflicts**, **structural vulnerabilities**, and **limited fiscal space**, which continue to hinder effective SDG implementation.
- **Top Performers:** Nordic countries lead the SDGs rankings, with **Finland (1st)**, **Sweden (2nd)**, and **Denmark (3rd)**; notably, **19 out of the top 20 countries are European.**
  - **East and South Asia** have shown the **fastest regional progress since 2015**—**India** ranks ahead of **Bangladesh (114th)** and **Pakistan (140th)** but trails **Bhutan (74th)**, **Nepal (85th)**, **Sri Lanka (93rd)**, and **Maldives (53rd)**.
- **Successes & Setbacks in SDGs:** Most countries have made strong progress on **basic services and infrastructure**—notably in **mobile broadband** and **internet use (SDG 9)**, **electricity access (SDG 7)**, and reducing **under-five** and **neonatal mortality (SDG 3)**.
  - However, **five targets** have seen significant reversals since 2015: **obesity rate (SDG 2)**, **press freedom (SDG 16)**, **nitrogen management (SDG 2)**, **Red List Index (SDG 15)**, and **corruption perception (SDG 16)**.

- **Ranking on Multilateralism: Barbados**, **Jamaica**, and **Trinidad & Tobago** are the top 3 countries most committed to **UN multilateralism**.
  - **Brazil** ranks highest among G20 nations (25th), and **Chile** leads Organisation for Economic Co-operation and Development (OECD) countries (7th), while the **United States** ranks **last (193rd)** for the second consecutive year due to its opposition to the **SDGs** and withdrawal from the **Paris Agreement** and World Health Organization (WHO).
- **Strong Commitment to SDGs:** A decade into Agenda 2030 (2015-25), **190 of 193 UN member states** have participated in the **Voluntary National Review (VNR)** process, sharing their SDG progress and priorities.
  - Only **Haiti, Myanmar**, and the **United States** have not participated.
- **Global Financial Architecture:** The report criticizes the **broken Global Financial Architecture (GFA)**, highlighting that **capital disproportionately flows to rich nations**, neglecting **emerging and developing economies (EMDEs).**

What are Sustainable Development Goals?

- **About:** The **Sustainable Development Goals (SDGs)** comprise **17 interconnected goals (169 targets)** aimed at tackling major global challenges such as **poverty, inequality, climate change, and environmental degradation**.
  - They were **adopted in 2015** by **193 UN Member States** as part of the **2030 Agenda for Sustainable Development**.
- **Aim:** The SDGs aim to foster **peace, prosperity, and sustainability by 2030** through **global cooperation**.
- **Historical Background:** The concept of **sustainable development** was first defined in the 1987 Brundtland Commission Report as development that meets **present needs without compromising future generations**.
  - In **2000**, the **Millennium Development Goals (MDGs)** were adopted to tackle **poverty, hunger, disease, illiteracy**, environmental degradation, and gender inequality, with targets set for **2015** based on **1990 levels**.
  - In **2002**, the **Johannesburg Declaration** at **Rio+10** reviewed the outcomes of the 1992 Rio Earth Summit.
  - In **2012**, the **Rio+20 Summit** laid the foundation for the **Sustainable Development Goals (SDGs)** and a more comprehensive global development agenda.
- **Core Principles of SDGs:**
  - **Universality**: Applicable to **all countries**, **developed and developing**.
  - **Integration**: Goals are **interlinked**; **progress in one** supports others.

- **Leave No One Behind**: Prioritizes **marginalized** and **vulnerable groups**.
- **Multi-Stakeholder Approach**: Requires **collective action** by **governments**, **businesses**, **civil society**, and **citizens.**

➢ **Monitoring**: The **Global Sustainable Development Report (GSDR)** assesses progress every **4 years.**

➢ **Supporting Agreements:**

- Sendai Framework for Disaster Risk Reduction strengthens **disaster resilience**
- Addis Ababa Action Agenda for **financing sustainable development**
- Paris Agreement on Climate Change for **combating climate change.**gle

Which Initiatives have Contributed to India's Improved Ranking in SDG Performance?

SDG	Goal Title	Key Government Initiatives
SDG 1	No Poverty	Pradhan Mantri Awas Yojana (PMAY) for affordable housing for the poor MGNREGA for guaranteed rural employment **PM Jan Dhan Yojana (PMJDY)** for financial inclusion
SDG 2	Zero Hunger	Poshan Abhiyaan to tackle malnutrition National Food Security Act (NFSA) for subsidized food grains PM Garib Kalyan Anna Yojana (PMGKAY) for free food during Covid-19
SDG 3	Good Health & Well-being	Mission Indradhanush for child & maternal immunization Ayushman Bharat (PM-JAY) provide **Rs 5 lakh health cover** National Health Mission (NHM) 2013 for improved health
SDG 4	Quality Education	Samagra Shiksha Abhiyan for holistic school education National Education Policy (NEP), 2020 for digital & skill-based education DIKSHA Platform for online learning
SDG 6	Clean Water & Sanitation	Swachh Bharat Mission helped achieve ODF status Jal Jeevan Mission provide piped water supply Namami Gange for Ganga river rejuvenation
SDG 7	Affordable & Clean Energy	UJALA Scheme for LED distribution Saubhagya Scheme for universal electricity access
SDG 8	Decent Work & Economic Growth	Make in India boosts manufacturing **Startup India** promotes innovation **Skill India Mission** provides vocational training PM Internship Scheme offers **internships to 1 crore students** over **5 years**
SDG 11	Sustainable Cities & Communities	**Smart Cities Mission** to develop 100 sustainable cities **AMRUT** for urban infrastructure improvement
SDG 13	Climate Action	**National Action Plan on Climate Change (**e.g., **Green India Mission)** **International Solar Alliance (ISA)** NITI Aayog SDG India Index
SDG 15	Life on Land	**Project Tiger & Project Elephant** for Wildlife protection **CAMPA** – Compensatory afforestation fund **Soil Health Card Scheme** for soil conservation **National Afforestation Programme (NAP)** for eco-restoration of degraded forests **Biological Diversity Act, 2002** to conserve **biological resources**, ensure their **sustainable use**

SDG 16	Peace, Justice & Strong Institutions	**Digital India** and Police Modernisation for transparent governance
SDG 17	Partnerships for the Goals	**International Big Cat Alliance** to protect and conserve **seven major big cat species** **CDRI (Coalition for Disaster Resilient Infrastructure)** to **promote resilient infrastructure** development **Quad Cancer Moonshot** for cervical cancer prevention and treatment.

What Factors are Responsible for the Slow Progress in Achieving SDGs?

- **Global Conflicts:** Ongoing conflicts in **Ukraine, Gaza, Sudan**, and other regions have triggered the largest global displacement crisis, with over **120 million people forcibly displaced**, significantly undermining progress toward **SDG 16 (Peace, Justice, and Strong Institutions)**.
- **Climate Finance Gap:** The **UNFCCC** estimates that developing nations require **USD 6 trillion by 2030** to meet climate goals; however, a severe funding shortfall threatens to derail progress on **SDG 13 (Climate Action)**.
- **Pandemic Setback:** The **Covid-19 pandemic** severely **disrupted global development**, reversing progress on **poverty eradication** (**SDG 1**), weakening **healthcare systems** (**SDG 3**), and halting **education access** (**SDG 4**).
  - It also slowed **clean energy investments** in developing nations, hindering progress on **SDG 7 (Affordable and Clean Energy).**
- **Environmental Pressures:** Escalating challenges such as **climate change**, **biodiversity loss**, and **deforestation** are threatening ecosystems, with the **IPCC warning** that up to **99% of coral reefs could be lost** at **2°C warming**, severely impacting **SDG 14 (Life Below Water).**
- **Disasters:** Frequent **natural disasters**—including **floods**, **heatwaves**, and **droughts**—are taking a heavy toll, with **Least Developed Countries (LDCs)** and and landlocked developing countries (LLDCs) bearing **6.9% of global economic disaster losses** between **2015 and 2022**, further **worsening poverty and vulnerability**, thereby hindering progress on **SDG 1 (No Poverty).**

Revised Green India Mission

Why in News?

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** released the **revised Green India Mission (GIM) plan** for **2021–2030** on **World Day to Combat Desertification and Drought**, observed on **17th June** 2025.

World Day to Combat Desertification and Droughts

- **It is** observed **annually** by the **UN** on **17th June** to raise awareness on **desertification and drought, promoting sustainable land management.**
- It marks the adoption of the **United Nations Convention to Combat Desertification (UNCCD)** in **1994**, the **only global legally binding agreement** linking **environment, development, and sustainable land management**.
- The theme for **2025** is **'Restore the Land. Unlock the Opportunities'.**

What is the Green India Mission (GIM)?

- **About**: The **Green India Mission (GIM)** is one of the **8 missions** under India's **National Action Plan on Climate Change (NAPCC)**, launched in **February 2014**.
  - It aims to respond to climate change through a combination of **mitigation and adaptation strategies**, primarily focusing on **forest-based ecosystem restoration**.
- **Progress & Challenges:**
  - As of **2023**, India's forest cover is gradually increasing, with **11.22 million ha** brought under plantations between **2015–16 and 2020–21** through **GIM and related initiatives**.

- However, challenges include **funding gaps**, **invasive species plantations**, and **inadequate protection of old-growth forests**.
- GIM's effective implementation is crucial for achieving **33% forest cover**, as per national policy, and meeting **India's 2030 climate commitments**.

Aspect	Green India Mission (GIM) 2014	Revised GIM Plan (2021–2030)
Vision & ObjectivesA	➢ Aimed to protect, **restore and enhance forest cover** and respond to climate change via adaptation and mitigation.	➢ Retains core objectives, now aligned with **India's NDC** targets under the **Paris Agreement**, aiming to create a **2.5–3.0 billion tonnes CO_2-equivalent carbon sink by 2030**. ➢ It focuses on a **micro-ecosystem approach** targeting vulnerable landscapes such as **Aravallis, Western Ghats, Indian Himalayan Region, Mangroves, Arid regions of Northwest India.**
Targets	➢ Afforestation on **5 million ha of non-forest** land. ➢ Improve forest quality on another **5 million ha.** ➢ CO_2 sequestration of 50–60 million tonnes annually.	➢ Afforestation/restoration over **24–25 million ha** (via GIM and convergence). ➢ GIM to directly treat **1 mha** by 2030. ➢ Estimated carbon sink: **up to 3.39 billion tonnes CO_2.**
Sub-Missions	**5 components:** ➢ Forest cover improvement ➢ Ecosystem restoration ➢ Urban greening ➢ Agro/social forestry ➢ Wetland restoration	**3 components:** ❍ Forest quality & ecosystem services ❍ Afforestation & ecosystem restoration ❍ Livelihood enhancement for forest-dependent communities
Monitoring & Evaluation	➢ Ground-level surveys ➢ Remote sensing via **Forest Survey of India (FSI)** ➢ Social audits planned	**5-tier monitoring** system including: ➢ **National-level monitorin**g via a dedicated cell using GIS and the National Afforestation Dashboard to track all plantation activities (Govt, private, NGOs). ➢ **Self-monitoring** by implementing agencies. ➢ **Social audits** by Gram Sabhas. ➢ Satellite-based monitoring by **Forest Survey of India (FSI) and expert agencies.** ➢ **Third-party evaluation**s of intervention sites for accountability and transparency.

National Action Plan on Climate Change (NAPCC)

- **NAPCC** is India's **overarching policy framework** to **address the challenges of climate change** while ensuring **sustainable developmen**t.
- It was launched in **2008** with the aim to promote **low-carbon, climate-resilient growth** through a strategic and multi-sectoral approach.
- It comprises the following **8 national missions**, collectively addressing **key sectors** such as **energy, water, agriculture, ecosystems, and urban habitats**, with the goal of achieving **inclusive and sustainable climate resilience.**

- National Solar Mission
- National Mission for Enhanced Energy Efficiency
- National Mission on Sustainable Habitat
- National Water Mission
- National Mission for Sustaining the Himalayan Ecosystem
- National Mission for A Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change

What are the Government Initiatives to Enhance Forest Cover?

- National Afforestation Programme (NAP), launched in **2000** by MoEFCC to **regenerate degraded forests and adjoining areas**, has now been merged with the **Green India Mission** for unified implementation.
- Nagar Van Yojana (NVY), launched in **2020**, the scheme targets the creation of **600 Nagar Vans** and **400 Nagar Vatikas** in urban and peri-urban areas by **2024–25**.
- Compensatory Afforestation Fund (CAMPA has been implemented to **offset the diversion of forest land** for development projects.
  - Under the CAMPA mechanism, **90% of the funds** are allocated to the **States/UTs**, while **10% is retained by the Centre**.
- **Multi-Departmental and Convergent Approaches** for afforestation is also undertaken through convergence with other schemes such as Mahatma Gandhi National Rural Employment Guarantee Scheme, National Bamboo Mission, and Sub-Mission on Agroforestry.
  - **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)**
  - **National Bamboo Mission**
  - **Sub-Mission on Agroforestry**
  - Contributions by **State Governments, NGOs, civil society, and corporate entities** under CSR.

Art and Culture

Highlights

- *11th International Yoga Day 2025*
- *Sahitya Akademi Yuva & Bal Sahitya Puraskar 2025*

11th International Yoga Day 2025

Why in News?

The **11th** International Yoga Day **(IYD)** is celebrated worldwide on **21st June** with the theme **'Yoga for One Earth, One Health'.**

What is International Yoga Day?

- **About: International Yoga Day**, celebrated to raise awareness about yoga's benefits for **health, well-being, and peace**.
  - Its objectives are to **promote physical, mental, and spiritual health**, **spread awareness of yoga as a gift of ancient Indian tradition**, and **encourage global harmony and peace** through its practice.
- **Origin & UN Declaration:** It was proposed by **India at the 69th UN General Assembly (2014)**, leading to declaration of **21st June as International Day of Yoga (IDY)**.
  - The first IDY was celebrated in **2015** with the theme **"Yoga for Harmony and Peace"**.
- **Significance of 21st June: International Yoga Day** on **21st June** coincides with the Summer Solstice — the **longest day** in the **Northern Hemisphere** — when the sun's rays fall directly on the Tropic of Cancer, bringing **maximum daylight** and marking a transition to **spiritual awakening** in **yogic traditions**.
- **Global Recognition:** UNESCO inscribed **Yoga** as an Intangible Cultural Heritage of Humanity in **2016**.
  - The World Health Organization (WHO) recognizes **Yoga** as a tool for **mental and physical well-being**, **combating** non-communicable diseases (NCDs), and included it in its **Global Action Plan (2018–30)**.
  - In **2015**, **India's Ministry of Youth Affairs & Sports** classified **Yoga** as a **'Priority' sports discipline.**

What is Yoga?

- **About: Yoga**, derived from Sanskrit **"Yuj"** (to unite), symbolizes **mind-body harmony**.
  - It traces its roots to the Indus Valley Civilization through seals **(yogic posture on Pashupati seal)** and fossils, is mentioned in the **Vedas**, and was systematically compiled in **Patanjali's Yogasutra (2nd century BC)**.
  - Yoga is one of the **six orthodox schools of** Indian philosophy (along with **Nyaya, Vaisheshika, Sankhya, Mimamsa, Vedanta**).
- **Modern Relevance:** Yoga promotes **holistic health** by enhancing **physical flexibility**, **mental clarity**, and **stress relief**; it was used for Covid-19 **psycho-social rehabilitation**, and is **globally popular** in forms like **Hatha, Ashtanga**, and **Iyengar**.
- **India's Initiatives Related to Yoga:** M-Yoga App, Vocational Education Courses in Yoga, Part of Fit India Movement.

INDIAN SCHOOLS OF PHILOSOPHY (ORTHODOX)

Indian Philosophy refers to traditions of philosophical thought, originated in the Indian subcontinent. It is divided into 2 schools of thought: Orthodox and Heterodox

Orthodox school believed that Vedas were the supreme revered scriptures that hold the secrets to salvation.

Samkhya School

- Founded by Kapil Muni.
- Oldest school of philosophy.
- Postulates that reality stems from purusha (self, soul or mind) and prakriti (matter, creative agency, energy).
- **It went through two phases of development:**
  - Original Samkhya (Materialistic Philosophy)
  - New Samkhya (Spiritual Philosophy)

Yoga School (Union of two major entities)

- Founded by Patanjali.
- Humans can achieve salvation by combining meditation and physical yogic techniques.

Means of Achieving Freedom	*Ways of Achieving*
Yama	Practicing self-control
Niyama	Observation of the rules governing one's life
Pratyahara	Choosing an object
Dharna	Fixing the mind (over the chosen object)
Dhyana	Concentrating on the (above-mentioned) chosen object
Samadhi	It is the merging of the mind and the object and that leads to the final dissolution of the self

Nyaya School

- Founded by Gautama rishi.
- Everything should be in accordance with reason and experience.
- **Means of Attaining Knowledge:** perception, inference, comparison, and verbal testimony.

Vaisheshika School

- Founded by Kanada rishi.
- Everything is created by fire, air, water, earth and ether (sky).
- Developed atomic theory (all material objects are made of atoms).
- **Reliance:**
  - God is the guiding principle.
  - Laws of Karma guide this universe.

Mimamsa School/ Purva Mimamsa

- Founded by Kanada rishi.
- Vedas are eternal and possess all knowledge.
- Religion means the fulfilment of duties prescribed by the Vedas.

Vedanta School (End of the Vedas/Upanishads)

- Philosophical teachings of the Upanishads (mystic/spiritual contemplations within Vedas).
- **Sub-schools:**
  - Advaita (Adi Shankara): Both the individual self (Atman) and Brahman are same.
  - Visishtadvaita (Ramanuja): All diversity is subsumed to a unified whole.
  - Dvaita (Madhvacharya): Brahman and Atman as 2 different entities.
    - Bhakti is route to salvation.
  - Dvaitadvaita (Nimbarka): Brahman is the highest reality.
  - Shuddhadvaita (Vallabhacharya): God and the individual self are the same.
  - Achintya Bheda Abheda (Chaitanya Mahaprabhu): Individual self (Jīvatman) is both different and not different from Brahman.

Drishti IAS

Sahitya Akademi Yuva & Bal Sahitya Puraskar 2025

Why in News?

The **Sahitya Akademi (India's National Academy of Letters)** announced the **Yuva Puraskar for 23 writers** and **Bal Sahitya Puraskar for 24 authors** across 24 Indian languages for 2025.

What is Sahitya Akademi Yuva Puraskar & Sahitya Akademi Bal Sahitya Puraskar?

Sahitya Akademi Yuva Puraskar

- **About**: Instituted in **2011**, this annual award recognises **young Indian writers aged 35 or below** for their **original literary works** in any of the **24 Indian languages**, including **English**, recognised by the Sahitya Akademi.
- **Award Components**: **Rs 50,000** cash prize, an **engraved copper plaque**, and a **citation**.
- **Eligibility Criteria**: Work must be **original** (creative or critical), published within the **last 5 years**, and at least **49 pages** long.
  - Award is given **once per author per language**.
  - **Ineligible works** include translations, abridgements, theses, e-books, posthumous publications, and works by **NRIs, PIOs, or dual citizens**.
- **Selection Process**: Public call for entries → Preliminary evaluation by referees → Final selection by a three-member language jury → Approval by Executive Board → Winners announced at a special function.

Sahitya Akademi Bal Sahitya Puraskar

- **About**: Instituted in **2010**, it is awarded annually to honour **outstanding children's literature** meant for readers aged **9 to 16 years**, in the **24 Indian languages** recognised by the Akademi.
- **Award Components**: **Rs 50,000**, an **engraved plaque**, a **shawl**, and a **citation**.
- **Eligibility Criteria**:
  - Work must be **original and creative**, published within the **preceding 5 years**.
  - **At least 3 eligible books** are required in a language for the award to be considered.
    - **Myth adaptations** are allowed.
    - **Posthumous works** are eligible if the author passed away within the 5-year window.
  - **Ineligible works** include translations, anthologies, abridgements, theses,and works by **Board members, Fellows, or Bhasha Samman awardees**.

What is Sahitya Akademi & Its Awards?

- **About Sahitya Akademi: It is** an **autonomous organisation** established in **1952 and formally inaugurated in 1954,** dedicated to the **promotion of literature in the languages of India.** It was registered as a society in **1956** under the **Societies Registration Act, 1860.**
  - It has its **head office in Delhi** and **regional offices** in **Kolkata, Bangalore, Mumbai, Chennai**, and **Agartala**.
- **Functions:**
  - Encourage **inter-lingual literary dialogue**, **mutual translations**, and **publication** of literary works.
  - Produces **journals, monographs, anthologies, encyclopedias, bibliographies**, and **histories of literature**.
- **Awards & Honours**: The Akademi confers **24 Annual Literary Awards** (one in each recognised language) and **24 Translation Awards** for works translated **from and into Indian languages**.
  - It also presents the **Bhasha Samman** for contributions to **unrecognised languages** and **classical/medieval literature**.
  - Eminent writers are honoured through **Fellowships** (such as the **Anand Coomaraswamy** and **Premchand Fellowships**) and are elected as **Fellows and Honorary Fellows** of the Akademi.
- **Sahitya Akademi Awards:** Established in **1954,** these **annual literary honours** conferred by the **Sahitya Akademi** for **outstanding books of literary merit** in any of the **22 languages listed in the 8th Schedule of the Constitution,** as well as in **English** and **Rajasthani.**
  - It is the **second-highest literary honour** by the Government of India, after the **Jnanpith award**.

Security

Highlights

- *Strait of Hormuz*

Strait of Hormuz

Why in News?

Under **Operation Midnight Hammer**, the US targeted three key **Iranian nuclear facilities** (Natanz, Isfahan, and Fordow). In retaliation, Iran's parliament approved a proposal to close the Strait of Hormuz.

- The US strike utilized **B-2 Stealth Bombers**, **GBU-57 bunker buster bombs (Massive Ordnance Penetrators)**, and **Tomahawk missiles**.

What are Key Facts About the Strait of Hormuz?

- **About:** It is a **narrow sea passage (55–95 km wide)** between **Iran** and the Arabian Peninsula, connecting the Persian Gulf to the **Gulf of Oman** and the **Arabian Sea**.
  - It serves as a **vital transit route for global oil and liquefied natural gas (LNG) shipments** from **Persian Gulf countries**.

- **Global Energy Dependence:** It is a critical artery for **global oil transit**, carrying about **20-25% of the world's total oil supply**. In **2024**, approximately **20 million barrels per day** passed through it.
  - **Major oil exporters** using the Strait include **Saudi Arabia, Iran, Iraq, Kuwait, UAE**, and **Qatar**, while over **80% of this oil is destined for Asian markets**, primarily **India, China, Japan**, and **South Korea.**
- **India's Dependence:** Approximately **40% of India's crude oil imports** and around **54% of its LNG imports** pass through this strategic passage.
- **Historical Flashpoints:** While a **complete shutdown of the Strait of Hormuz has no historical precedent**, the region has witnessed significant disruptions.
  - During the **Iran-Iraq War (1980–88)**, both sides attacked **oil tankers and cargo ships** in the Gulf region dubbed as **Tanker War**.
    - In **2019**, Iran seized a **British tanker** and has **repeatedly threatened to block the Strait** during geopolitical tensions, notably in **2011–12** and after **US sanctions post-2018.**
- **Alternate Routes and Pipelines:** **Saudi Arabia** (via **ARAMCO**) and the **UAE** have pipelines bypassing the Strait, while **Iran** uses the **Goreh-Jask pipeline** and **Jask terminal** to export oil directly to the **Gulf of Oman.**

B-2 Stealth Bombers

- **About: It** is a **US Air Force strategic stealth bomber**, renowned for its **long range (6,000 miles)**, **low observability**, and **precision strike capabilities**.
  - It remains the **most advanced and expensive aircraft** ever built, with a unit cost exceeding **USD 2 billion.**
- **Development & Induction:** The B-2, developed by **Northrop Grumman**, took its **maiden flight in July 1989** and entered **operational service in 1997.**
  - A total of **21 B-2 bombers** were produced, with **19 currently in active service.**
  - Its **bat-like flying wing design** reduces detection and **evades enemy air defenses.**
- **Combat Use & Strategic Role:** First used in the **1999 Kosovo War**, the B-2 has been deployed in **Iraq, Afghanistan, Libya, Yemen**, and **Iran**.

Massive Ordnance Penetrators (GBU-57)

Rapid Fire Current Affairs

Highlights

- *RGI Directives on Birth Certificates*
- *Bonnet Macaque*
- *Kolhapuri Chappals*
- *CRISPR Technology for Climate-Resilient Crops*
- *India–South Africa Submarine Cooperation Agreements*
- *Impact of Climate Change on Global Food Production*
- *Review of Project Elephant*
- *Male Mahadeshwara Hills Wildlife Sanctuary*
- *Sagarmala Finance Corporation Ltd (SMFCL)*
- *Rhone Glacier*
- *Dual-Faced Lamp Depicting Shiva-Vishnu Syncretism*
- *Favipiravir Shows Promise Against Chandipura Virus (CHPV)*
- *International Day Against Drug Abuse and Illicit Trafficking 2025*
- *Fungicides Linked to Fungal Drug Resistance*
- *Enhanced Rock Weathering*
- *MSC Certification for Chilka Lake's Mud Crab Fishery*
- *India's First Household Income Survey in 2026*
- *Dharti Aaba Janbhagidari Abhiyan*
- *State of Climate in Asia 2024 Report*
- *Thirst Waves*
- *NAVYA Initiative*
- *Croatia*
- *Rice Yellow Mottle Virus*
- *Subarnarekha River*
- *Spinal Muscular Atrophy*
- *Turning Lead into Gold*
- *Nothopegia Fossil Leaves*
- *Magna Carta: Blueprint for Democracy*
- *Skin Diseases as Global Public Health Priority*
- *Mount Denali*
- *India's First 3nm Chip Design Centres*
- *King Cobra*
- *Jumping Spider*
- *Lamarckian Inheritance and Epigenetics Evolution*
- *Hydraulics System and its Applications*
- *NISAR and Synthetic Aperture Radar*
- *8th Edition of Exercise Shakti*
- *Tea Board of India*
- *Electricity Derivatives*
- *NISHAD Designated as Global Rinderpest Holding Facility*
- *Shipki La Pass*
- *India's PM Historic Visit to Cyprus*
- *50 Years of Crocodile Conservation Project and World Crocodile Day*
- *Regulation of Maritime Accidents*
- *Sighting of Eurasian Otter in Kashmir*
- *GFW 2024 Report on Indian Forests*
- *Boko Haram*

RGI Directives on Birth Certificates

The Registrar General of India **(under the Ministry of Home Affairs)** has directed all **States** to ensure **birth certificates** are issued **within 7 days of registration**, preferably **before discharging newborns from hospitals**, especially in **government facilities**, which account for over **50% of institutional births** in India.

- **Birth registration:** Birth registration in India has increased from **86% (2014)** to **over 96% (2024)**.
- **Legal Framework for Birth Registration:** It is governed by the Registration of Births and Deaths (RBD) Act, 1969, with **no fee** if done within **21 days**.
  - Legal provisions now ensure registration of **adopted**, **orphaned**, **abandoned**, **surrendered**, and **surrogate children**, as well as those of **single parents** or **unmarried mothers.**
  - The 2023 amendment made digital registration **mandatory** and recognized **electronic documents** as official.
- **Governance Implications:** From **1st October 2023**, **digital birth certificates** became the **sole proof of**

date of birth for **school admissions**, **government jobs**, **marriage registrations**, and issuance of **driving licenses** and **passports**.

- The **Central Civil Registration System (CRS) portal** was developed to **centralize registration data** that will feed into the **National Population Register (NPR),** **ration cards**, **property registrations**, and **electoral rolls**, aiming to strengthen **governance.**

- **Global Commitments:** It aligns with **United Nations' Economic and Social Commission for Asia and the Pacific (ESCAP)'s Civil Registration and Vital Statistics Decade (2014–2024)** goal to "**Get everyone in the picture**" and supports **SDG Target 16.9**: "**By 2030, provide legal identity for all, including birth registration**."

Read More: Registration of Births and Deaths in India

Bonnet Macaque

Kerala is considering **mass sterilisation of Bonnet Macaques (Macaca radiata)**, a widespread primate species, to **manage their rising population** and **minimise human-wildlife conflicts.**

- **About:** It is an **Old-World monkey** native to the **Oriental region**, especially **southern India**, and is known for the **bonnet-like whorl of hair** on its head.
  - It inhabits **evergreen and dry deciduous forests** of the **Western Ghats** and also thrives in **urban, suburban, and agricultural areas**.

- **Reproduction and Lifespan:** They live in **multi-male, multi-female groups**. **Females mature by 3 years**, give birth at 4, with a **gestation of around 24 weeks**, and **infants nurse for 6–7 months**, staying close to their mothers for about a year.
- **Behavior:** They are **arboreal (spend most of their time in trees) and terrestrial quadrupeds (walks on four limbs), active during the day** and living in **troops of around 30**.
- **Communication:** They use **visual (grinning, clicking), tactile**, and **vocal communication**, including **alarm calls** to signal predators.
  - They can also **recognize alarm calls** of **sympatric primates** like **Hanuman langurs** and **lion-tailed macaques.**
- **Conservation Status:**
  - **Wildlife Protection Act, 1972: Schedule I**.
  - **IUCN: Vulnerable**
- **Feeding Habits:** They are **omnivorous**, feeding on **fruits, leaves, insects, bird eggs**, and **lizards**. Near **human settlements**, they often **raid food offerings, trash**, and **gardens.**

Read More: World Monkey Day

Kolhapuri Chappals

Italian luxury fashion brand **Prada has acknowledged that its men's footwear design was inspired by traditional Indian handcrafted footwear**, after facing backlash for the sandals' strong resemblance to **GI-tagged Kolhapuri chappals**, which artisans argue constitutes **cultural appropriation** and a **violation of the GI tag**.

- **Cultural appropriation** in **fashion** is when **designers** use **elements from another culture** without **credit** or claiming they didn't know the **origin.**

Kolhapuri Chappals

- **Origin & Geography: It is handcrafted** in **Kolhapur (Maharashtra)** and nearby districts like **Sangli, Satara, and Solapur**, dating back to the **12th–13th century**, and was originally made for **royalty.**
- **Craftsmanship**: **It is made using vegetable-tanned leather** from **cow, buffalo, or goat**, and is **fully handmade** without **nails or synthetic components**

- **Design Features**: It is recognised for its **T-strap shape**, **detailed braiding**, and **open-toe design**, mostly in **tan** or **deep brown** shades.

- **GI Tag Recognition:** It was granted Geographical Indication (GI) status in **2019**, covering **eight districts** in **Maharashtra and Karnataka**.

GI Tag

- A **GI tag** identifies products with a specific **geographical origin** and ensures only **authorised users** from that region can use the name.
  - It protects against **imitation**, is valid for **10 years**, and is overseen by the **Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry.**

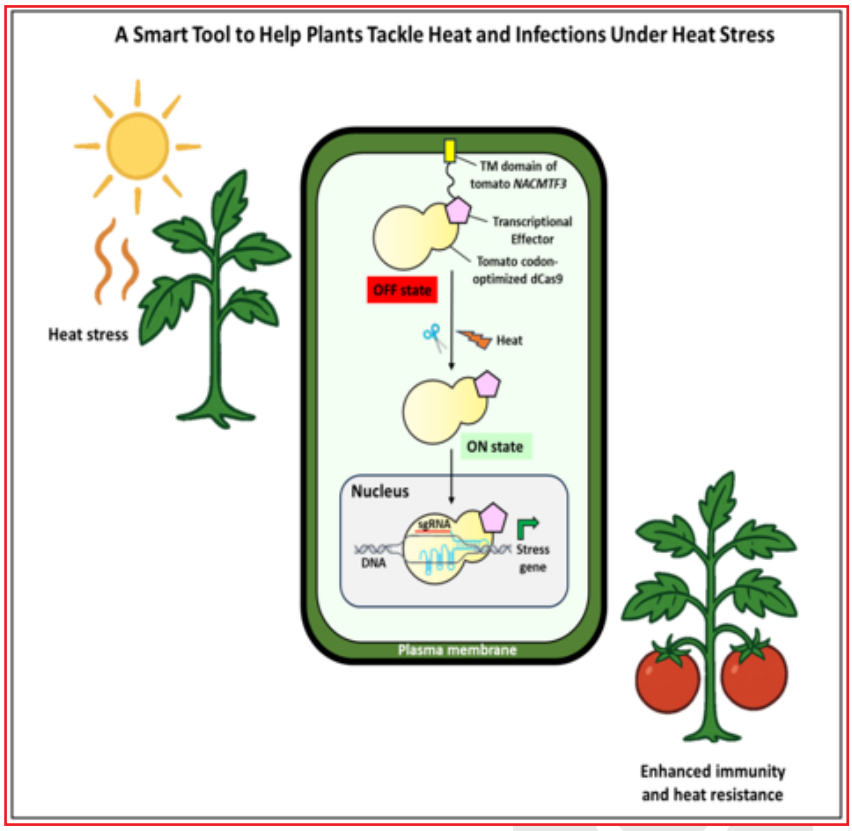
Read More: Intellectual Property Rights

CRISPR Technology for Climate-Resilient Crops

Scientists from the **Bose Institute,** under the **Department of Science and Technology (DST),** have developed a **novel CR-9ISPR-dCas9-based molecular tool** that **enhances plant resistance** to **heat stress and pathogen attacks**.

CRISPR-dCas9-Based Molecular Tool

- **CRISPR-dCas9:** It is a **modified version of the CRISPR-Cas9 gene-editing tool.** In this version, the **Cas9 protein is made inactive**, meaning it can **no longer cut DNA.** However, it still uses a **guide RNA (gRNA)** to find and attach to specific DNA sequences.
  - While regular CRISPR-Cas9 works by cutting DNA to make changes in the gene, **CRISPR-dCas9 does not cut the DNA**. Instead, it **acts like a gene switch** by **turning specific genes on or off without changing the DNA itself.**
  - This makes it **useful for safely controlling** when certain genes, like **stress-response genes** in plants, are activated, only when needed, **saving energy and improving efficiency.**
    - CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a gene-editing technology that uses the **Cas9 protein** and a **guide RNA (gRNA)** to act as **genetic scissors**, enabling precise **cutting, removal, addition, or alteration** of DNA sequences in living organisms.
- **Working Mechanism:** Plants often **face stress due to extreme weather or pathogen attacks**, which **reduces their productivity and growth.**
  - **CRISPR-dCas9** helps plants **respond only when under stress** using a **transmembrane (TM) domain from a tomato protein (NACMTF3)** to keep a modified protein, **dCas9**, **outside the nucleus under normal conditions**.
  - During stress (like **heat** or **pathogen attack**), the TM domain **releases dCas9**, which then enters the **nucleus** and activates specific **defense genes**.
    - **Under pathogen attack (e.g., *Pseudomonas syringae*),** it activates **CBP60g** and **SARD1 immune response genes**, boosting immune responses, and **under heat stress,** it activates **NAC2** and **HSFA6b**, improving **water retention**, **leaf greenness**, and **thermotolerance**.
- **Application:** Tested on **tomato, potato, and tobacco**, it showed the **highest effectiveness in tomato plants**.



Read More: First Successful Use of Customised Base Editing

India–South Africa Submarine Cooperation Agreements

India and South Africa signed **two agreements on submarine cooperation** during the **9th Joint Defence Committee (JDC)** meeting held in **Johannesburg**.

India-South Africa Joint Defence Committee (JDC)

- These are **bilateral institutional mechanisms** established under the **2000 MoU on Defence Cooperation** to strengthen defence ties.
  - Relations are rooted in a **shared anti-colonial struggle**, with formal **defence cooperation** beginning in **1996** through an MoU on **Defence Equipment**.
- Co-chaired by the **Defence Secretaries of both countries**, the JDC serves as a **high-level platform** to **review ongoing collaboration and identify new areas of mutual interest**, including **defence policy, military training, defence production,** and research.
- It also oversees two sub-committees on defence cooperation and acquisitions, while **facilitating structured dialogue,** maritime security, and India's strategic outreach to Africa.

South Africa

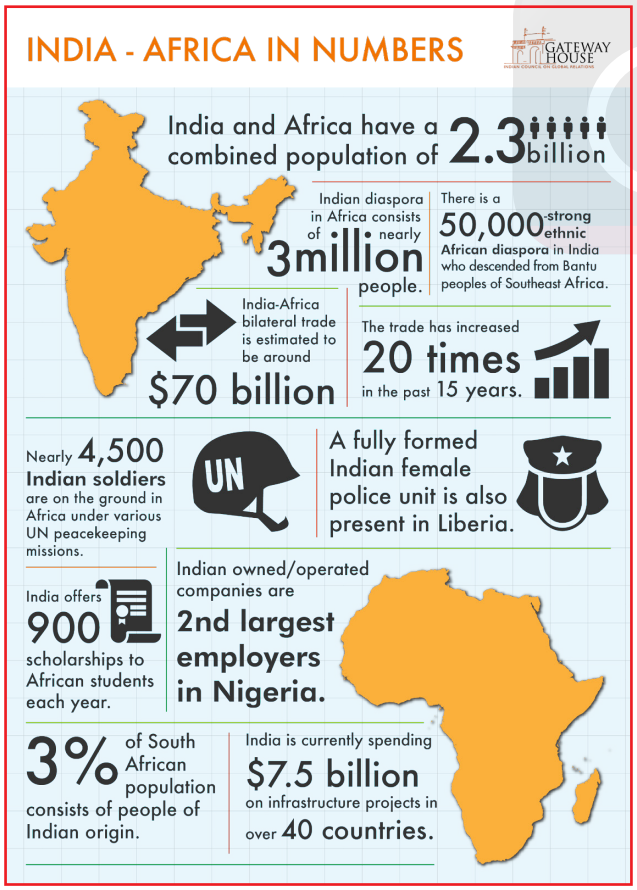
- It is the **southernmost country of Africa,** bordering **Namibia, Botswana, Zimbabwe (North), Mozambique, Eswatini (Northeast & East), and Lesotho (enclave).**
- It has **3 capitals:** Pretoria (Executive), Cape Town (Legislative), Bloemfontein (Judicial).
- South Africa shares **maritime boundaries with the Indian and Atlantic Oceans**.
  - Major physical features include the **Drakensberg Mountains**, **Limpopo** and **Orange rivers**, and landforms like the **Highveld** (grassland plateau), **Bushveld** (tree-dotted plains), and the **Great Escarpment** (mountainous rim).

India's Initiatives to Support Africa

- **Infrastructure & Training Support:** Set up **Rural Technology Parks**, **Food Testing Labs**, **Vocational Training Centres**; provided training in **crop processing**, **composting**, **irrigation**, and **mechanisation**.
- **Trilateral Cooperation:** Partnered with **FAO**, **USAID**, **and SITA (Supporting India's Trade Preferences for Africa)** to deploy

agri-experts and support **food security** and **irrigation planning** in African nations.

- **3A Framework:** Promotes **Affordable, Appropriate, Adaptable** agricultural technologies tailored to Africa's local conditions.



Read More: Evolving India-Africa Partnership

Impact of Climate Change on Global Food Production

A **study** warns that every **1°C rise in global temperatures** will lead to a **4% reduction in per capita calorie availability** by **2100**, severely impacting **staple crops** like **wheat**, **rice**, **maize**, and **soybean.**

- The study differs from previous research by **factoring in farmer adaptation**, including the **use of** heat-resistant crop varieties and **adjustments to sowing and watering schedules.**

Key Findings

- **Farmer adaptation** through measures like **heat-resistant crops** and **adjusted sowing/irrigation** could reduce losses by **23% (2050)** and **34% (2100)**, but **losses** remain **severe**, except for **rice.**
- Between **2050–2100**, **wheat yields** may drop by **30–40%** in **China, Russia, the US, and Canada**, with **northern India** worst affected.
- **Rice** may see **mixed effects** in **India and Southeast Asia**, but over **50% losses** in **Sub-Saharan Africa** and **Europe**, while **maize and soybean** face **significant global declines.**
- Losses affect not only **poor countries** but also **modern breadbaskets** like the **US, Europe, and China**, highlighting the urgent need for **innovation**, **cropland expansion**, and **climate-resilient practices.**

Read More: Climate Resilient Agriculture

Review of Project Elephant

The **Union Environment Ministry** reviewed key initiatives under Project Elephant (1992) , highlighting the **completion of Phase-I of the synchronized** elephant **population** estimation in **Northeastern states.**

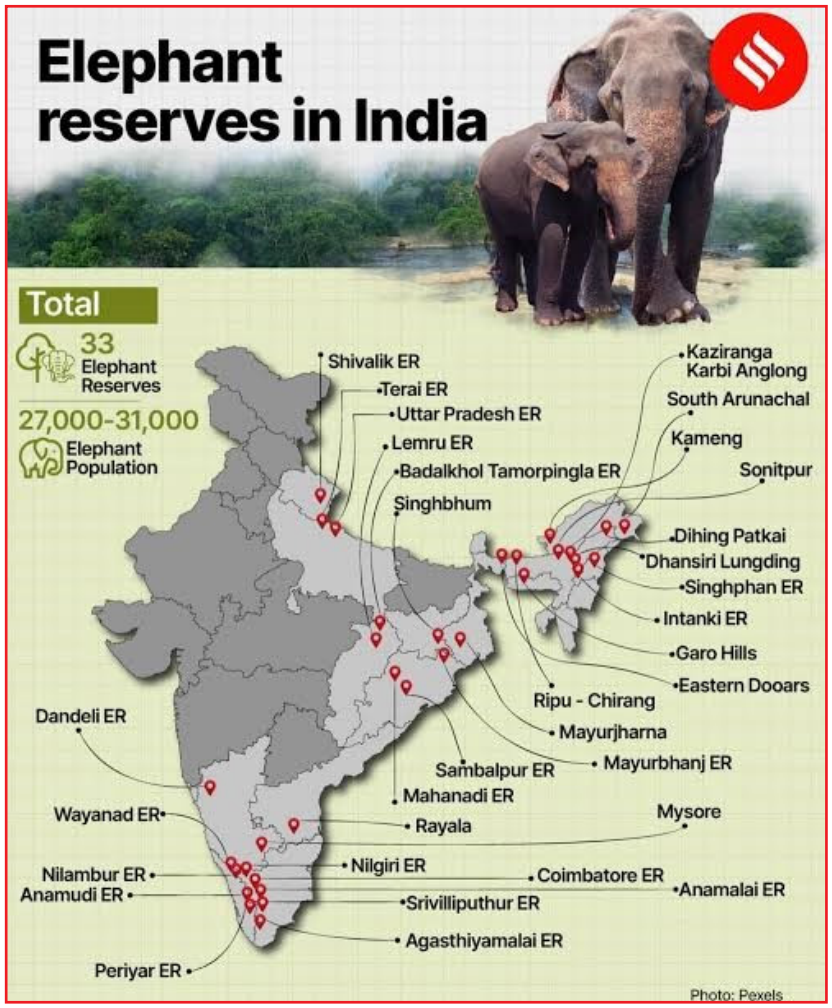
- In another development, the National Board for Wildlife committee recommended the inclusion of the Sloth bear and Gharial in the Species Recovery Programme.

Key Highlights of Project Elephant Review

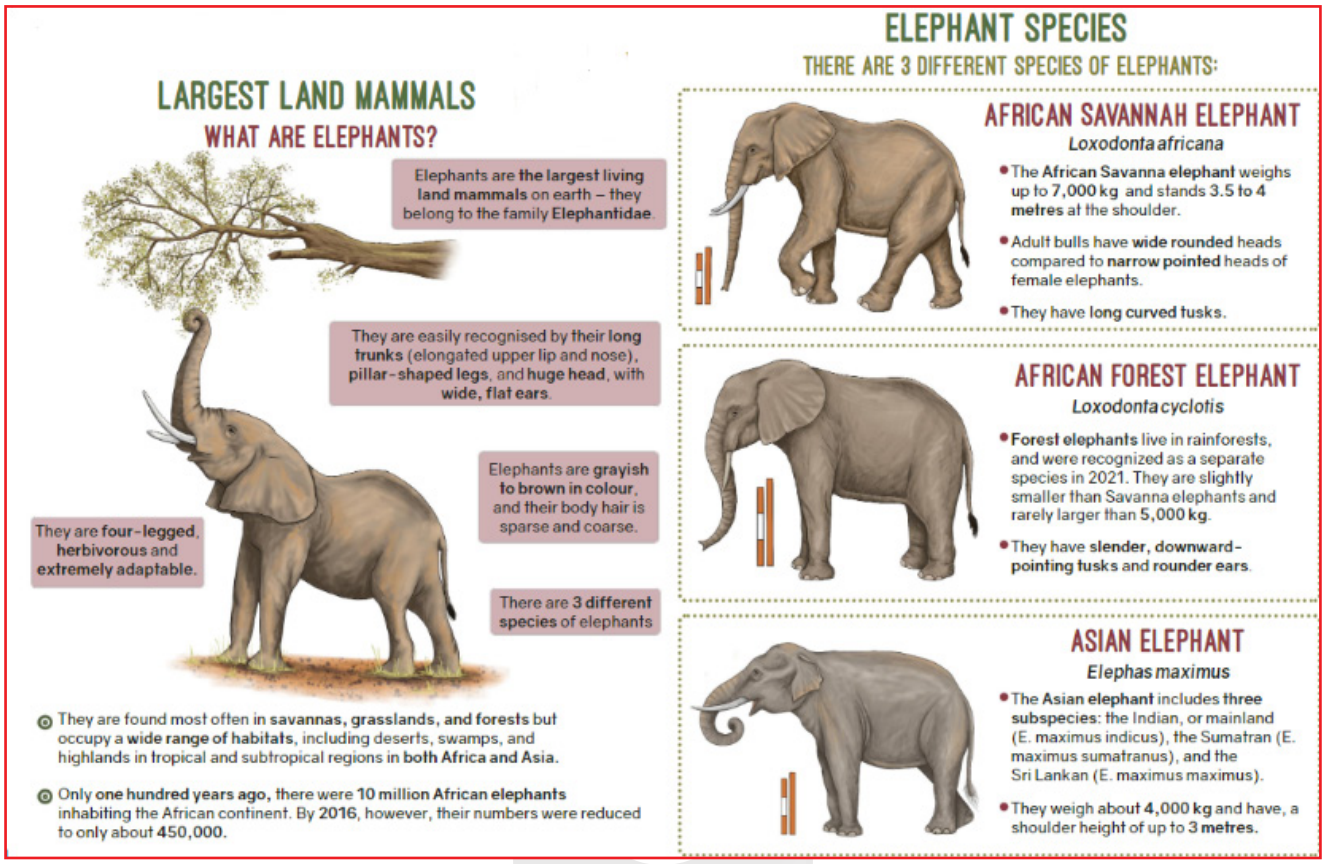
- **Mortality Mitigation Measures: Railway tracks were surveyed to identify high-risk zones** for mitigating elephant-train collisions, which have **resulted in 73 elephant deaths between 2019 and 2024.**
- **Genetic Profiling & Conservation:** Created a **genetic profile of captive elephants**.
- **Conflict Management: Regional action plans** to prevent **human-elephant conflict** in Southern and Northeastern India by protecting **elephant corridors**.

Elephants

- **About:** Elephants, **India's National Heritage Animal,** are **matriarchal** and live in **female-led groups.**
  - As **keystone species** and **ecosystem engineers,** they maintain forest health by **dispersing seeds and creating water access** for other species.
- **Species:**
  - **Asian Elephant** (*Elephas maximus*)
  - **African Elephants**:
    - **Savannah Elephant** (*Loxodonta africana*)
    - **Forest Elephant** (*Loxodonta cyclotis*)
- **Population in India:** Indian elephants (*Elephas maximus indicus*), a subspecies of Asian elephants, account for **around 60% of the global Asian elephant population**.
  - As per the **2017 census**, India hosts approximately **29,964 elephants**.
  - **Karnataka** recorded the highest elephant population, followed by **Assam** and **Kerala**.
  - In terms of **protected areas**, Sathyamangalam forest division has the highest number of elephants.



- **Conservation Status:**
  - IUCN Red List: Endangered
  - Wildlife (Protection) Act, 1972: Schedule I
  - CITES: Appendix I
- **Key Initiatives:**
  - **India:** Project REHAB, Elephant Reserves & Corridors, Gaj Yatra, DNA Profiling of Elephants
  - **Global:** World Elephant Day, MIKE Programme



Read More: Elephant Poaching in Tamil Nadu

Male Mahadeshwara Hills Wildlife Sanctuary

A **tigress and her four cubs** were found dead in **Karnataka's** Male Mahadeshwara Hills (MM Hills) Wildlife Sanctuary, suspected to have been **poisoned** amid escalating human-wildlife conflict.

Male Mahadeshwara Hills Wildlife Sanctuary

- **About:** It is located in **Chamarajanagar district**, **southeast Karnataka**, near the **Tamil Nadu border**, and was **declared a wildlife sanctuary in 2013**.
  - Its **topography** includes mainly **dry deciduous forests**, along with patches of **moist deciduous**, **semi-evergreen**, **evergreen**, and shola forests at varying altitudes.
- **Ecological Importance:** It is **contiguous with Biligiri Rangaswamy Temple (BRT) Tiger Reserve** and **Cauvery Wildlife Sanctuary** in **Karnataka**, and Sathyamangalam Tiger Reserve in **Tamil Nadu**, forming a **critical** tiger **corridor** between the two states.
  - It is home to **tigers, leopards, elephants,** apart from a rich density of prey species.
- **Tiger Reserve Status:** The **proposal to upgrade MM Hills to a** Tiger Reserve has been **pending for nearly 15 years**. If approved, **Chamarajanagar** will become the **first district in India** to host **3 tiger reserves—Bandipur**, **BRT**, and **MM Hills**.

- **Karnataka** has the **second-largest** tiger population in India (**563 tigers**) after **Madhya Pradesh (785 tigers)**.

➢ **Human Settlements:** The region is home to two dominant communities: the **Soligas**, indigenous former **hunter-gatherers**, and the **Lingayats**, **temple priests from Mysore** engaged in **temple management.**

TIGER

Royal Bengal Tiger (Panthera Tigris) is the National animal of India.

Subspecies of Tiger

- The continental *(Panthera tigris tigris)*
- The Sunda *(Panthera tigris sondaica)*

Habitat

Tropical rainforests, evergreen forests, temperate forests, mangrove swamps, grasslands, and savannas

Countries Where Tiger Population Is Found

- Found only in **13 Tiger Range countries-** India, Nepal, Bhutan, Bangladesh, Myanmar, Russia, China, Thailand, Malaysia, Indonesia, Cambodia, Laos, and Vietnam
  - As per the latest report by IUCN, tiger has gone extinct in Cambodia, Laos, and Vietnam

Protection Status

- **IUCN Red List:** Endangered
- **CITES:** Appendix I
- **WPA 1972:** Schedule I

Threats

- Habitat loss
- Poaching and illegal trade
- Human-Wildlife conflict

Conservation Efforts

- **International Big Cats Alliance (IBCA):** For conservation of seven big cats namely Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar and Puma (launched by India)
- **Tx2 campaign:** Launched by WWF; stands for 'Tiger times 2' signaling the goal to double the tiger population by 2022
- **National Tiger Conservation authority (NTCA):** Constituted under the WPA, 1972
- **Project Tiger:** Launched in 1973
- **Tiger Census:** Every 4 years

Tigers In India

- India has the **largest** population
  - As of 2022, India has 3167 tigers
  - Largest population has been found in Central Indian Highlands & Eastern Ghats Landscape
- **Tiger Reserves:** India now has 53 tiger reserves
  - **Ranipur in UP** is the latest
  - **Nagarjun Sagar** (Andhra Pradesh) **is the largest** while Orang (Assam) **is the smallest** (Core area)

Drishti IAS

Read More: Human-Animal Conflict

Sagarmala Finance Corporation Ltd (SMFCL)

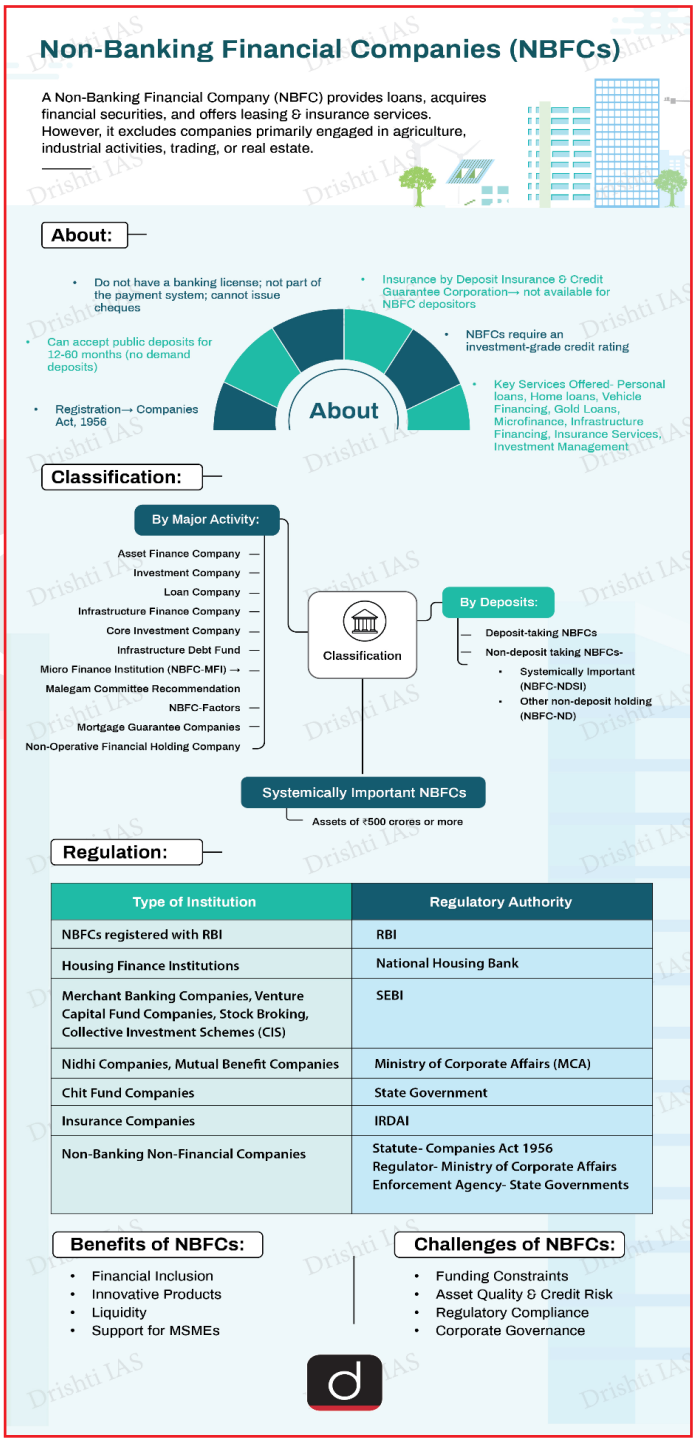
Sagarmala Finance Corporation Limited (SMFCL) has been established as **India's first maritime sector-specific Non-Banking Financial Company (NBFC)** aimed at **strengthening financial access across India's maritime ecosystem.**

Sagarmala Finance Corporation Limited (SMFCL)

- **About:** SMFCL is a **Mini Ratna (Category-I) Central Public Sector Undertaking (CPSU)** under the **Ministry of Ports, Shipping and Waterways**.
  - It was formerly known as **Sagarmala Development Company Ltd**.
- **Mandate and Beneficiaries:**
  - SMFCL provides short, medium, and long-term **customized financing** to stakeholders such as **port authorities, shipping companies, shipbuilding and logistics firms,** MSMEs, maritime startups, barge operators, cruise and fishing vessel owners, and **maritime educational and research institutions**.
  - It also supports critical areas like **cruise tourism, maritime education, shipbuilding**, and **renewable energy**, while aiming to **bridge financing gaps** and **accelerate maritime infrastructure development**.
- **Policy Alignment:** SMFCL aligns with the Maritime Amrit Kaal Vision 2047, aiming to make India a **global maritime power**.
  - It complements the Sagarmala Programme and reinforces the **National Blue Economy Strategy** for sustainable and integrated maritime growth.

NBFC

- A **NBFC** is a financial institution registered under the **Companies Act, 1956 or 2013**, engaged in activities such as **lending, investment in securities, leasing, hire purchase, and insurance.**
- Unlike banks, NBFCs **do not hold a banking licence** and **cannot accept demand deposits** (e.g., savings or current accounts).
- NBFCs are regulated by the **Reserve Bank of India (RBI)** under the **RBI Act, 1934.**



Read More: RBI to Review NBFCs.

Rhone Glacier

Climate change is making some of Switzerland's **glaciers** resemble **Swiss cheese**, full of **collapsing holes** that threaten their stability. In **May 2025**, an **avalanche** from Birch Glacier submerged parts of the **valley village of Blatten.**

- **Location:** It is located in the **southern Swiss Alps** near the **Furka Pass** and the **Italian border**, and serves as the **source of the Rhône River**, which flows into the **Mediterranean Sea.**
  - The Rhone river flows through **Switzerland and France**.
- **Features:** It is the **most accessible** and **most extensively studied glacier** in Switzerland, and is currently the **fifth largest** in the country.
  - Its surface is characterized by **crevasses (deep cracks on the surface of glaciers)** and **ice caves.**
- **Glacial Retreat:** It has **rapidly shrunk since the 19th century** and is **expected to vanish by the end of the 21st century.**
  - The **Alps** and **Switzerland**, which host **more glaciers than any other European country**, have been experiencing **glacial retreat for nearly 170 years.**
- **About Alps:** The **Alps**, Europe's **highest and most extensive fold mountain range**, stretch across **eight countries**: France, Switzerland, Italy, Liechtenstein, Austria, Germany, Slovenia, and Monaco. The **highest peak** is **Mont Blanc**, located on the **France-Italy border**.

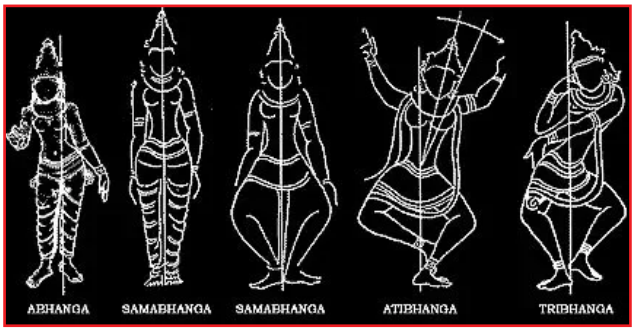
Read More: Changing Landscape of Alps: Europe

Dual-Faced Lamp Depicting Shiva-Vishnu Syncretism

A **rare 15th-century dual-faced lamp**, intricately showcasing the **syncretic fusion** of Shaiva and Vaishnava traditions has been discovered at the **Perdoor Anantapadmanabha Temple** in **Udupi district, Karnataka**.

Key Points

- **Dual Religious Significance**: The lamp uniquely blends depictions of **Shiva (as Nataraja)** and **Vishnu (as Anantapadmanabha)**, reflecting rituals of both **Shaiva and Vaishnava cults**.
- **Historical Donation**: **Inscribed records** reveal the lamp was donated in **1456 CE.**
- **Narrative Sculptures:**
  - **First Face**: Depicts **Shiva's Pralaya Tandava** (destructive dance) with **Parvati**, **Ganapati**, drummer **Bringi**, and **Khadga Ravana** is seen seated on a standing woman, identified as **Goddess Mari**, in **Vismaya Mudra**.
    - **Vismaya Mudra** is a **one-handed gesture** that expresses a sense of **wonder**. The **palm faces inward** toward the body, with the **fingers spread apart** and **open.**
  - **Second Face**: Shows **Brahma**, **Indra**, **Anantapadmanabha**, **Agni**, and **Varuna** pleading with **Vishnu** to pacify **Shiva's destructive dance**, symbolizing **cosmic harmony**.
- **Artistic Details:** Figures are in **Samabhanga pose** (**equal distribution of the body limbs** on a central line, whether standing or sitting) with distinct **headgear.**
- **Cultural Continuity:** The presence of **Khadga Ravana-Mari worship** in the temple's **outer prakara** highlights the **survival of ancient folk-deity traditions** alongside **mainstream Hinduism.**



Read More: Nataraja Artistry of Lord Shiva

Favipiravir Shows Promise Against Chandipura Virus (CHPV)

The ICMR-National Institute of Virology (NIV), Pune has identified **Favipiravir** as a **potential therapeutic drug** against Chandipura virus (CHPV). In **preclinical mouse studies**, it showed **reduced viral load** and **improved survival**, but the results are **preliminary**. Further **animal model validation** is required before progressing to **human clinical trials**.

Chandipura Virus (CHPV)

- **About:** The **Chandipura virus (CHPV)** is a **neglected** arbovirus classified under the **Vesiculovirus genus** of the **Rhabdoviridae family**.
  - It is a **cytoplasmic, negative-sense, single-stranded RNA virus**, known for its ability to cause **rapid-onset encephalitic illness**, particularly in children.
  - It is a **neurotropic virus** capable of affecting the central nervous system.
- **Epidemiology and Endemicity:** CHPV was first detected in **1965 in Maharashtra**. Major outbreaks occurred in **2003 in Telangana** (300+ cases, >50% fatality) and in **2024 in Gujarat and Maharashtra**.
  - It is now **endemic to central India**, especially **rural and tribal areas**, with outbreaks **peaking during monsoon** due to increased **sandfly breeding**.
- **Transmission and Vectors:** It is transmitted primarily by **Phlebotomine sandflies**, including *Phlebotomus papatasi*, and, in some cases, by **Aedes aegypti mosquitoes** (vectors for **dengue**).
  - The virus resides in the **salivary glands** of these insects and is spread through their **bites**.
- **Vulnerable Population:** The infection **predominantly affects children under 15 years**.
- **Symptoms:** Early symptoms mimic **influenza**, such as **fever, headache, and body aches**. Severe cases may progress to **encephalitis**, causing **seizures, altered mental status, respiratory distress, anaemia**, and **bleeding tendencies**.
  - The virus can cause **rapid neurological deterioration** and high fatality rates if untreated.
- **Current Treatment Status:** There is **no specific antiviral drug or vaccine** for CHPV. **Management is symptomatic and supportive**.

Favipiravir

- **Favipiravir** is a **broad-spectrum antiviral drug** originally developed in Japan for the treatment of **influenza**.
- It functions by **inhibiting RNA-dependent RNA polymerase (RdRp)**, an enzyme essential for the replication of RNA viruses.
- As an oral drug, it has been repurposed for use against several **emerging RNA viruses**, including Ebola, Lassa fever, Zika, and SARS-CoV-2 (Covid-19) in emergency settings.

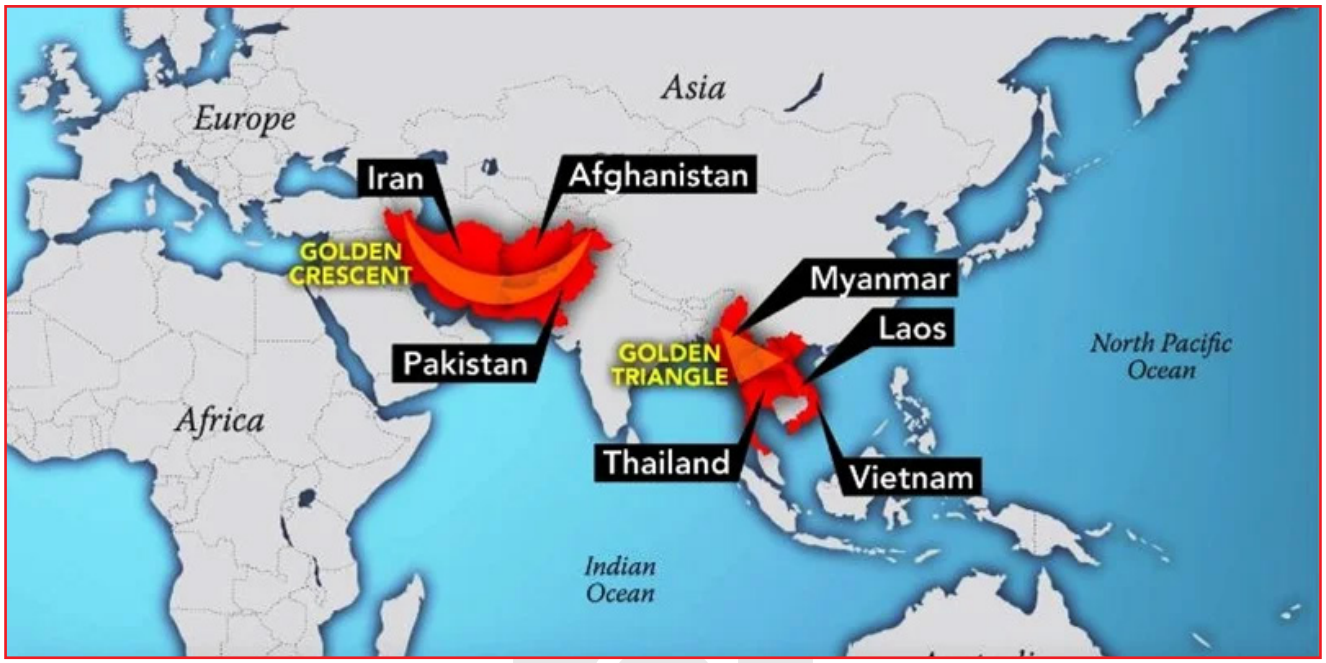
Read More: Chandipura Virus Infection, Antiviral Drug Umifenovir

International Day Against Drug Abuse and Illicit Trafficking 2025

The **Ministry of Social Justice and Empowerment (MoSJE)** organized a national event On **26th June 2025**, to commemorate the International Day against Drug Abuse and Illicit Trafficking **(World Drug Day)**.

- **About:** It was **declared by the** UN General Assembly in **1987** to promote **global cooperation** for a **drug-free world**.
  - The **2025 theme**, "**Break the Cycle. #StopOrganizedCrime**," calls for long-term, targeted action against **organized drug networks.**
- **Drug Abuse:** According to the United Nations Office on Drugs and Crime (UNODC), **292 million people** used drugs globally in **2022**, marking a **20% increase** over the past decade and highlighting growing global concern.
  - **UNODC**, established in **1997**, tackles **drug control**, **crime**, and **international terrorism**, and releases the **World Drug Report** annually on **26th June.**

- **Drug Affected Regions: Triple Frontier area** (Argentina, Brazil and Paraguay), Golden Crescent (Iran, Afghanistan, and Pakistan) and Golden Triangle (Laos, Myanmar and Thailand).



- **Common Drugs:** Cannabis, followed by **opioids**, **amphetamines**, **cocaine**, and **ecstasy**, are among the most commonly used drugs.
  - **Cannabis** is legal in **Canada**, **Uruguay**, and **27 US jurisdictions**. Its **psychoactive effects** are mainly due to **THC (delta-9-tetrahydrocannabinol).**
- **India's Drug Control: MoSJE** is the **nodal agency** for **drug demand reduction**, **prevention**, **treatment and rehabilitation**, and **nationwide awareness campaigns.**
  - Nasha Mukt Bharat Abhiyaan (NMBA) is India's **flagship anti-drug campaign**, active in **all districts** that features via the **NMBA App** for real-time tracking of Abhiyaan activities.
  - NIDAAN and NCORD **Portals** are digital platforms that store comprehensive **databases of drug offenders.**

Read More: Rising Drug Abuse Among Youth

Fungicides Linked to Fungal Drug Resistance

A study reveals that the **agricultural fungicide tebuconazole** is driving **increased resistance in *Candida tropicalis* (**a **fungal pathogen)** by causing **unexpected genetic changes** that make the **strains resistant to commonly used antifungal drugs** like **fluconazole** and **voriconazole.**

- *Candida tropicalis* is responsible for **severe fungal infections**, with a **mortality rate of 55-60%.**

Tebuconazole

- **About: Tebuconazole** is a **systemic, broad-spectrum fungicide** used widely in agriculture to **control fungal diseases** in crops like **wheat, barley, rice, fruits, vegetables, and turf**.

- **Working: Tebuconazole**, similar to medical antifungals like **fluconazole** and **voriconazole**, works by **inhibiting ergosterol biosynthesis**, essential for fungal cell membrane formation, giving it both **preventive and curative properties**.
  - It is widely applied as a **seed treatment, soil drench, or foliar spray**, offering versatile crop protection. However, its **overuse in agriculture** has raised concerns due to its role in promoting **antifungal resistance**.
- **Impact of Overuse**: Overuse of the fungicide **tebuconazole** in agriculture promotes **cross-resistance** in *Candida tropicalis* by inducing **aneuploidy** i.e. changes in chromosome number that lead to the **overexpression or deletion of resistance-related genes**.
  - Strains with **altered ploidy grow slower without drugs** but survive better when exposed to antifungals.
  - Some strains became **haploid (having only one set of chromosomes and the ability to mate),** potentially **spreading resistance further.**
    - **Ploidy** refers to the number of complete chromosome sets in a cell. **Diploid (2n)** has two sets (common in human cells), **haploid (1n)** has one set (seen in sperm and egg), and **triploid (3n)** has three sets.

Fungicides

- These are crop protection **chemicals (pesticides)** used to control the spread of fungal diseases in plants. It includes **Chlorothalonil, dithiocarbamates** (e.g. **mancozeb, maneb, zineb**), **sulfur derivatives** etc.

Read More: Pesticide Poisoning

Enhanced Rock Weathering

Enhanced Rock Weathering (ERW), a promising technique to **combat climate change**, involves **spreading crushed basalt on agricultural lands** to speed up **carbon dioxide capture** from the atmosphere.

- This method is **drawing attention** from tech giants and industries seeking to offset their emissions.

Enhanced Rock Weathering

- **About:** ERW **accelerates** the natural process of **weathering**, where rocks like **basalt break down and lock away carbon dioxide** in the form of **bicarbonate**, eventually turning into **limestone**. This process is turbocharged by grinding the rocks finely to increase their **surface area**.
- **Carbon Sequestration:** By using **finely ground rock** to increase surface area, **ERW enhances the rate of geological carbon sequestration**, making the process significantly **faster than it occurs naturally**.
- **Additional Benefits:** ERW **enhances soil alkalinity**, improving **crop yield** and **fertility**, while also **reducing downstream CO_2 emissions** by **neutralizing soil acids** before they reach **rivers and oceans.**
- **Debatable Effectiveness:** As a new technology, **ERW** shows **mixed results** in carbon removal.
  - While some studies report up to **10.5 tonnes of CO_2 per hectare over four years**, others show **lower rates**, underscoring the need for **accurate measurement** and **further research**.
- **Risk and Challenges:** While **ERW is generally safe**, some quick-weathering rocks may release **harmful heavy metals**.
  - The main concern is **overestimating carbon capture**, which could inflate **carbon credits** and lead to **higher emissions.**
- **Global Implementation:** ERW is being **trialled worldwide**, from **Darjeeling tea estates** to **US soy and maize farms**, with **Brazil issuing the first verified ERW carbon credits.**
- **Growing Investor Interest: Google** signed the **largest ERW deal** for **200,000 tonnes** of credits. Also, **Mati Carbon (India startup)** won the **USD 50 million X Prize** for carbon removal.

GEO-ENGINEERING

Geoengineering means manipulating the earth's climate to lower its temperature to counter global warming

TYPES OF GEO-ENGINEERING

CARBON DIOXIDE REMOVAL

Technology/ Method Proposed	*Proposed Effects/actions*	*Potential Side Effects*	*Feasibility/Cost Effectiveness*
Land Use Management	Afforestation/ Reforestation	Minimum Side Effects	High feasibility, Low Cost
Bio-energy with carbon capture and storage (BECCS)	Biomass harvested and used as fuel	Potential land use conflict	Comparatively expensive
Direct CO_2 Capture	Industrial Process	Minimal	High technical feasibility
Fertilization of the ocean	Increased CO_2 absorption by promoting algae growth	High potential for adverse side effects	Feasible but not cost-effective
Accelerated Weathering	Pulverization of silicate rocks	Potential respiratory health impact	Could be combined with crop production, a feasible option at scale

SOLAR RADIATION MANAGEMENT

Stratospheric aerosol Injection	For reflecting sunlight back into space	Likely impact on the hydrological cycle	Feasible and potentially highly effective
Marine cloud brightening	Seeding of marine clouds with seawater aerosol	Likely impact on precipitation pattern	Low to medium cost and feasible at scale
Giant deflectors in outer space	Mirror placed in near earth orbit	Regional climate effects	Capital-intensive and long gestation
Surface albedo approaches	Painting the roof of the building bright white, Installing desert reflector	Major Impact on Desert Ecosystem	High labor and maintenance cost

REGULATION

- No specific international or Indian regulations on geoengineering.

INDIA'S EFFORTS

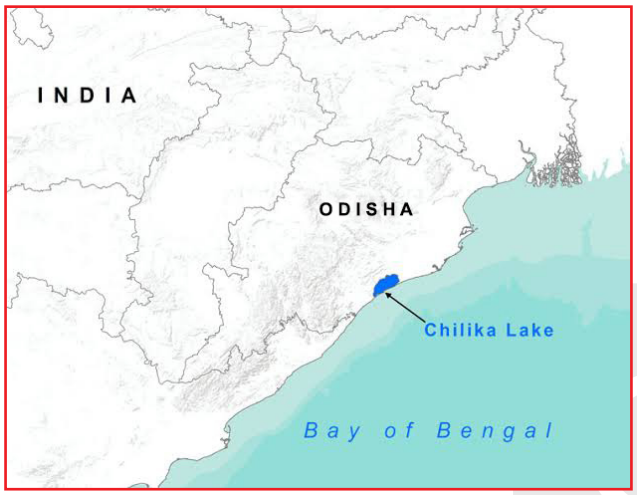
- **Department of Science and Technology:**
  - Geoengineering climate-modelling research programme (since 2013)
- **IISc:**
  - Initiative to understand the implications of solar geoengineering for developing countries
  - Scientists simulated injecting 20 million tonnes of sulphate aerosols into the Arctic stratosphere

Drishti IAS

Read More: Carbon Sequestration

MSC Certification for Chilka Lake's Mud Crab Fishery

To boost India's inland fisheries, a joint initiative led by **ICAR-CIFRI (Central Inland Fisheries Research Institute)** and **Chilika Development Authority (CDA)** aims to secure **Marine Stewardship Council (MSC)** certification for **Chilika Lake's mud crab fishery**.



MSC Certification

- The **Marine Stewardship Council (MSC)** is an **international non-profit organisation** promoting **sustainable fishing** through its **eco-label and certification programme**.
- **MSC certification** is a **globally recognised eco-label** for **wild-capture fisheries** that ensure **sustainable fish stocks**, **low environmental impact**, and **adaptive, effective management**. It promotes **responsible fishing** to secure **healthy oceans** and **sustainable seafood** for future generations.
- The certification enhances **export value**, supports **biodiversity conservation**, and ensures **livelihood security**.
- The **Chilika mud crab** is India's **first inland fishery** nominated for **MSC's sustainability certification**.

State of India's Fisheries Sector

- India is the **second-largest fish producer**, contributing **8% to global output and 4% in global fisheries exports**. It ranks **second in aquaculture**, **first in shrimp production**, and **third in capture fisheries**.
- **Inland fisheries** account for over **75% of total production**.
- Key fish-producing states include **Andhra Pradesh, West Bengal**, and **Karnataka**.
- **Government's Initiatives:**
  - **Pradhan Mantri Matsya Sampada Yojana**
  - **Fisheries and Aquaculture Infrastructure Development Fund (FIDF)**
  - **Marine Products Export Development Authority**

Read More: Coastal States Fisheries Meet 2025

India's First Household Income Survey in 2026

The **Ministry of Statistics and Programme Implementation (MoSPI)** will conduct India's **first comprehensive Household Income Survey** in **2026**, through the **National Sample Survey (NSS).**

- The **NSS is conducted by the Field Operations Division** of the **National Statistical Office (NSO)**, earlier known as the **National Sample Survey Office (NSSO)**.

All India Household Income Survey

- **About: Household Income Survey** is a **large-scale statistical exercise** aimed at collecting reliable data on **income earned by households** from various sources such as **wages, salaries, business, agriculture, property, and remittances**.
  - It aims to address the historic **income-consumption mismatch** by **adopting global best practices** from the **USA's Current Population Survey, Canadian Income Survey, and Australia's Survey of Income and Housing**.
  - For the **first time in India**, it will assess the **impact of technology on wages**, with a special focus on **informal sector earnings** and **technology-driven income generation**.
- **Objective:** The **Survey** aims to capture **accurate data on income levels, distribution patterns, and**

structural disparities to aid **economic policymaking and welfare planning**.

- **Background:** Since 1950, India has not conducted a nationwide income survey due to **operational challenges** and **data inconsistencies**, particularly the mismatch between **reported income** and **consumption-savings data**.

National Statistical Office (NSO)

- NSO is the central statistical agency under **MoSPI**, formed in **2019** by merging the **Central Statistics Office (CSO)** and **National Sample Survey Office (NSSO)**.
- NSO conducts key **socio-economic surveys like the PLFS and Consumer Expenditure Survey, and prepares National Accounts Statistics.**

Read More: Basic Economic Data, Strengthening India's Statistical System

Dharti Aaba Janbhagidari Abhiyan

The **Ministry of Tribal Affairs has launched the Dharti Aaba Janbhagidari Abhiyan (DAJA),** the **largest-ever tribal empowerment campaign**, reaching over **1 lakh tribal villages** across 31 States/UTs, including **207 PVTG districts.**

- It follows a **camp-based, community-driven model,** involving district administrations, youth volunteers, CSOs, and tribal leaders.

Dharti Aaba Janbhagidari Abhiyan (DAJA)

- **About:** A **nationwide tribal empowerment campaign** under **Janjatiya Gaurav Varsh,** for tribal **communities**, especially in remote and PVTG habitations.
  - **November 15th** was designated as **Janjatiya Gaurav Divas** in 2021 to honor tribal freedom fighter Birsa Munda and commemorate his 150th birth anniversary.
  - Additionally, **Janjatiya Gaurav Varsh (15th November 2024–15th November 2025)** has been launched as a year-long celebration of tribal pride, identity, and progress
- **5 Pillars of DAJA:**
  - **Janbhagidari:** Community-led participation
  - **Saturation**: Universal coverage of entitlements
  - **Cultural Inclusion**: Tribal languages, arts, and traditions integrated
  - **Convergence**: Coordination among ministries, CSOs, youth groups
  - **Last-Mile Delivery**: Reaching remote tribal habitations
- **Objective**: Achieve **saturation of all central government welfare schemes** like **Aadhaar, Ayushman Bharat, PM-Kisan, PM Ujjwala Yojana, Jan Dhan**, and tribal-specific entitlements.
  - It also supports key initiatives like **PM-JANMAN and Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DAJGUA).**
- **Cultural Emphasis**: Celebrates tribal heritage and honours **Birsa Munda (Dharti Aaba)**, a symbol of tribal pride and resistance.

Other Schemes for Tribal Welfare:

- Eklavya Model Residential Schools (EMRS)
- Janjatiya Gaurav Diwas
- Van Dhan Vikas Kendras

Read More: Launch of Tribal Welfare Projects Under DAJGUA, EMRS and PM-JANMAN

State of Climate in Asia 2024 Report

The World Meteorological Organization (WMO) released the State of Climate in Asia **2024** report that revealed **Asia** warmed nearly **twice as fast** as the **global average** in **2024,** marking its **hottest** or **second-hottest year on record.**

- **Key Findings:**
  - **Unprecedented warming**: **Asia's 2024 temperature** was **1.04°C above** the **1991–2020 average**, with **warming rates doubling** since **1961–1990**.
  - **Heatwaves:** In **India**, extreme heat waves claimed over **450 lives**, pushed temperatures to **45–50°C**,

and, along with storms, caused around **1,300 deaths** due to **lightning.**

- Marine heatwaves impacted **around 15 million sq km**, particularly the **northern Indian Ocean and seas near Japan, China.**

❍ **Tropical Cyclones:** In **Asia**, 29 **tropical cyclones** struck in 2024, with the deadliest being Cyclone Yagi (**Philippines**, **Vietnam**, **Hong Kong**, **Macau**, **China**, **Laos**, **Thailand**, and **Myanmar**)

- The **Indian subcontinent** was hit by Cyclones Remal, **Fengal**, Dana and Asna.

❍ **Glacial Retreat: Glaciers** continued to lose mass, as **23 out of 24 glaciers** in **High Mountain Asia** (**Himalayas**, **Pamir Mountains**, **Karakoram**, and Hindu Kush) showed decline, with **Urumqi Glacier No. 1** (Tian Shan) recording its highest melt since **1959.**

➢ **WMO**, headquartered in **Geneva**, is an intergovernmental body with **193 Member States and Territories**, including **India**.

❍ It evolved from the **International Meteorological Organization (IMO)**, founded after the **1873 Vienna Congress.**

Read More: State of the Global Climate 2023: WMO

Thirst Waves

Global warming is making the air **thirstier**, causing higher **evaporative demand** that dries out **land** and **plants**—a phenomenon called **thirst waves**.

Thirst Waves

➢ **About: Thirstwave**, a term coined by researchers **Meetpal Kukal** and **Mike Hobbins**, refers to a period of **three or more consecutive days** with extreme **atmospheric evaporative demand**—reflecting how "thirsty" the air is for moisture.

➢ **Causes: Thirst waves** are influenced by **temperature**, **humidity**, **solar radiation**, and **wind speed**, unlike heatwaves, which are mainly driven by **temperature** and **wind.**

➢ **Measurement:** It is measured through **Short-crop evapotranspiration** that measures water loss from a well-watered **12-cm grass surface**.

❍ Rising **evapotranspiration** indicates **higher temperatures**, **lower humidity**, and increased **wind speed** and **solar radiation**.

➢ **Impact:** Stronger **thirst waves** lead to **faster soil moisture loss**, greater **irrigation requirements**, and a higher risk of **crop stress** and **yield reduction.**

➢ **Thirstwaves & India:** Studies show that **evaporative demand** is increasing in parts of **India**, including **Northern India** and the **Western/Eastern Himalayas**, driven by **agricultural expansion** and **vegetation growth**.

❍ While in the past, higher **humidity** helped offset the impact of rising **temperatures**, future **warming** is expected to further raise **evaporative demand.**

Read More: Heatwaves as a Notified Disaster

NAVYA Initiative

The Government of India launched **NAVYA (Nurturing Aspirations through Vocational Training for Young Adolescent Girls)** to provide **vocational training** to adolescent girls aged **16–18 years** with **at least a Class 10 qualification**, especially in **non-traditional job roles**.

➢ **About: It is** a **joint pilot initiative** by the **Ministry of Women and Child Development (MWCD)** and the **Ministry of Skill Development and Entrepreneurship (MSDE)**.

➢ **Coverage**: **27 districts** across **19 States**, including **Aspirational Districts** and those in the **North-Eastern region**.

➢ **Convergence**: Draws on schemes like **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)** and **PM Vishwakarma Yojana,** formalizing inter-ministerial coordination.

➢ **Significance:** It aligns with the **Viksit Bharat@2047** vision and promotes **women-led development** and reinforces the Government's commitment to building a **skilled, self-reliant, and inclusive workforce**, positioning young girls as **agents of socio-economic transformation**.

Other Initiatives for Adolescent Girls in India

➢ Beti Bachao Beti Padhao (BBBP)

➢ Mahila Shakti Kendra (MSK)

- Sukanya Samriddhi Yojna (SSY)
- Nirbhaya Fund Framework
- One Stop Centres (OSCs)
- Constitution (106th Amendment) Act, 2023

Read More: WHO Study on Adolescent Girls

Croatia

The **Prime Minister** of India met with the **Croatian** President as part of his 3-nation tour (**Cyprus, Canada & Croatia)** following his attendance at the **2025 G7 Summit in Canada**.

Croatia (Republic of Croatia)

- **Location:** It lies at the **junction of Central and Southeast Europe**, along the **Adriatic Sea**.
  - It shares land borders with **Slovenia, Hungary, Serbia, Bosnia & Herzegovina, Montenegro**, and a maritime boundary with **Italy**.
  - **Historically,** Croatia was part of **Yugoslavia** until it gained **independence in 1991**, followed by **reconstruction and democratic reforms**.
- **Geography & Climate:** It features **fertile plains**, **hilly and mountainous terrain** (including the **Dinaric Alps** with **Dinara Peak – 1,831 m**), and a rugged **coastal region**.
  - It has a **continental climate** inland with **hot summers and cold winters**, and a **Mediterranean climate** along the coast with **mild winters and dry summers**.

- **Rivers and Lakes:** Major rivers include the **Danube**, **Sava**, **Drava**, **Krka**, **Kupa**, **Una**, and **Cetina,** and major lakes are **Plitvice Lakes** (a **UNESCO World Heritage Site**) and **Lake Vrana**.
  - Its **capital Zagreb**, situated on the **Sava River**, is the administrative and economic centre.
- It is a member of both the **European Union** and **NATO**.

Read More: India-Croatia Relations

Rice Yellow Mottle Virus

Rice Yellow Mottle Virus (RYMV), a highly contagious plant disease, is ravaging **rice crops across Africa**, leading to major **yield losses** and posing a serious threat to **food security**.

Rice Yellow Mottle Virus

- **Origin & Spread:** It originated in the **Eastern Arc Mountains of Tanzania** in the 1800s from **wild grasses**, spreading to the **Kilombero Valley** and **Morogoro (Tanzania)** before expanding across **Sub-Saharan Africa**.
  - Though **endemic to Africa**, it has also been reported in **Turkey.**
- **Causal Agent & Transmission:** The virus is a member of the **Sobemovirus** known for its **high genetic variability**, allowing it to **evolve rapidly**.
  - **Vectors** include **beetles (Chrysomelidae)**, **grasshoppers**, **cows**, **rats**, and **donkeys**.
  - It spreads through **insect vectors**, **mechanical means (sap or water contact)**, and **root injuries**, but is **not seed-borne.**
- **Symptoms:** Yellow-green streaks appear on **young leaves**, leading to **mottling** and **leaf twisting**. Plants show **stunted growth**, **poor panicle formation**, **sterility**, and may eventually **die.**
- **Impact on Rice Production:** Yield losses range from **10% to 100%**, with **early infection** causing **greater damage.**

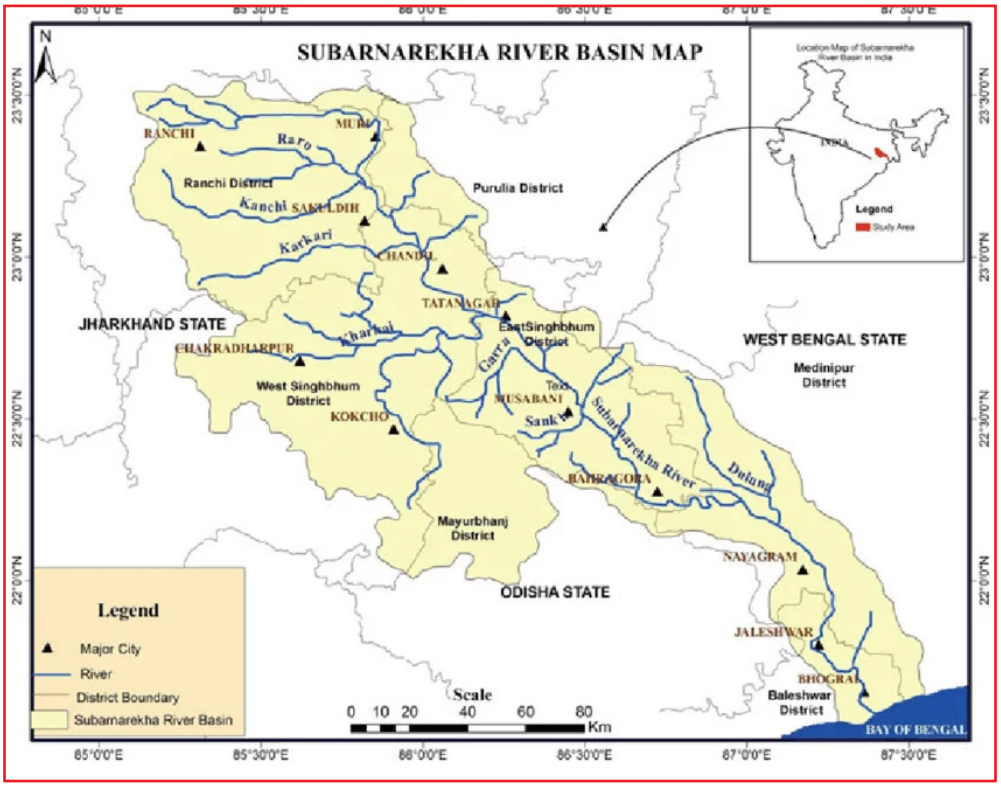
Read More: Cucumber Mosaic Virus and RNA Silencing

Subarnarekha River

Balasore district in **Odisha** was flooded after water from **Chandil Dam**, built across the **Subarnarekha River** in **Jharkhand**, was allegedly released without prior **intimation to Odisha.**

About Subarnarekha River

- **Origin & Course:** It originates near **Nagri village** in Ranchi district, Jharkhand and covers about **395 km** before emptying into the **Bay of Bengal**, forming an **estuary between the Ganga and Mahanadi deltas.**
- **Tributaries: Kharkai** (joins at **Sonari/Domuhani near Jamshedpur**), **Kanchi**, **Karkari**, **Roro**, **Harmu Nadi**, **Damra**, **Singaduba**, **Dulunga**, and others.
- **Basin & Geography:** It spreads across **Jharkhand, Odisha, and West Bengal**, bounded by the **Chota Nagpur Plateau (north & west)**, **Baitarani basin (south)**, **Bay of Bengal (south-east)**, and **Kasai Valley (east)**.
  - The river forms **Hundru Falls** along its course.
- **Dams & Reservoirs:** Getalsud Reservoir, **Chandil Dam, Galudih Barrage**, Icha Dam, and Kharkai Barrage.



Read More: Drainage Patterns and Drainage Systems of India

Spinal Muscular Atrophy

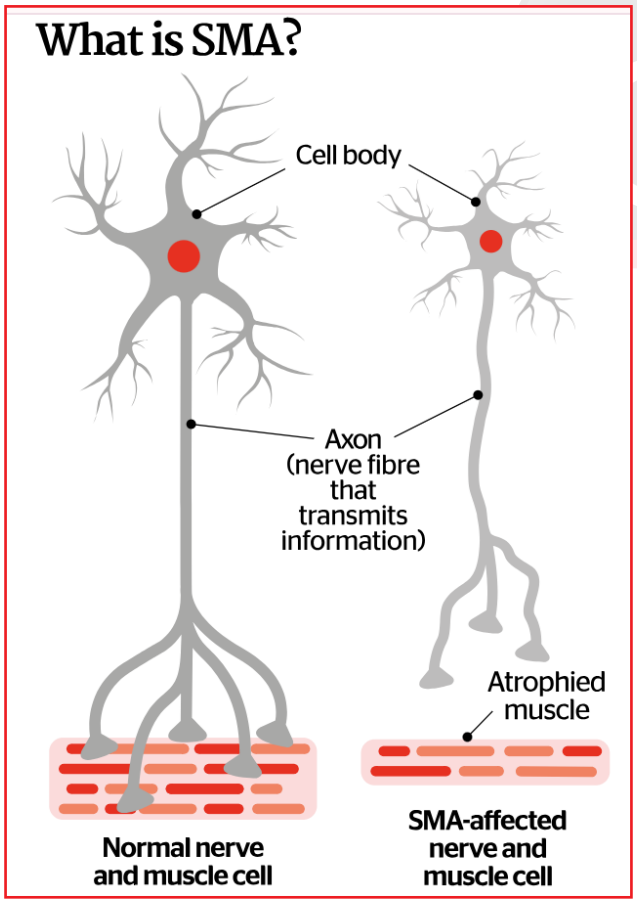
In a **first-of-its-kind** medical intervention in India, a **newborn with the SMN1 gene mutation for** Spinal Muscular Atrophy (SMA) is receiving **presymptomatic treatment** using **Risdiplam**, a rare disease-modifying drug given to **prevent motor neuron degeneration.**

Spinal Muscular Atrophy

- **About:** It is a genetic disorder caused by an **SMN1 gene mutation** and **protein deficiency**, leading to the **progressive weakening of muscles** due to damage to motor neurons.

- Genetic disorders are caused by **abnormalities in genes or chromosomes**, either **inherited** or due to **DNA mutations.**

- **Occurrence:** It affects **one in every 10,000 births** and is a **major genetic cause of infant and child mortality.**
- **Gene Transfer:** SMA occurs when **both parents pass on SMN1 gene mutations**, though they are typically **carriers without showing symptoms.**
- **Impact:** It mainly affects **muscles that fail to receive signals from nerve cells.**
- **Symptoms:** It causes **weakness in voluntary muscles** like the **shoulders, hips, and thighs**, along with **breathing and swallowing difficulties**, while **involuntary muscles** (heart, blood vessels, digestive tract) remain **unaffected.**

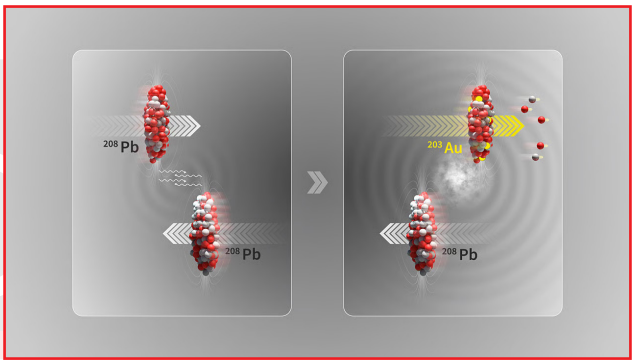


Read More: Genetic Disorders

Turning Lead into Gold

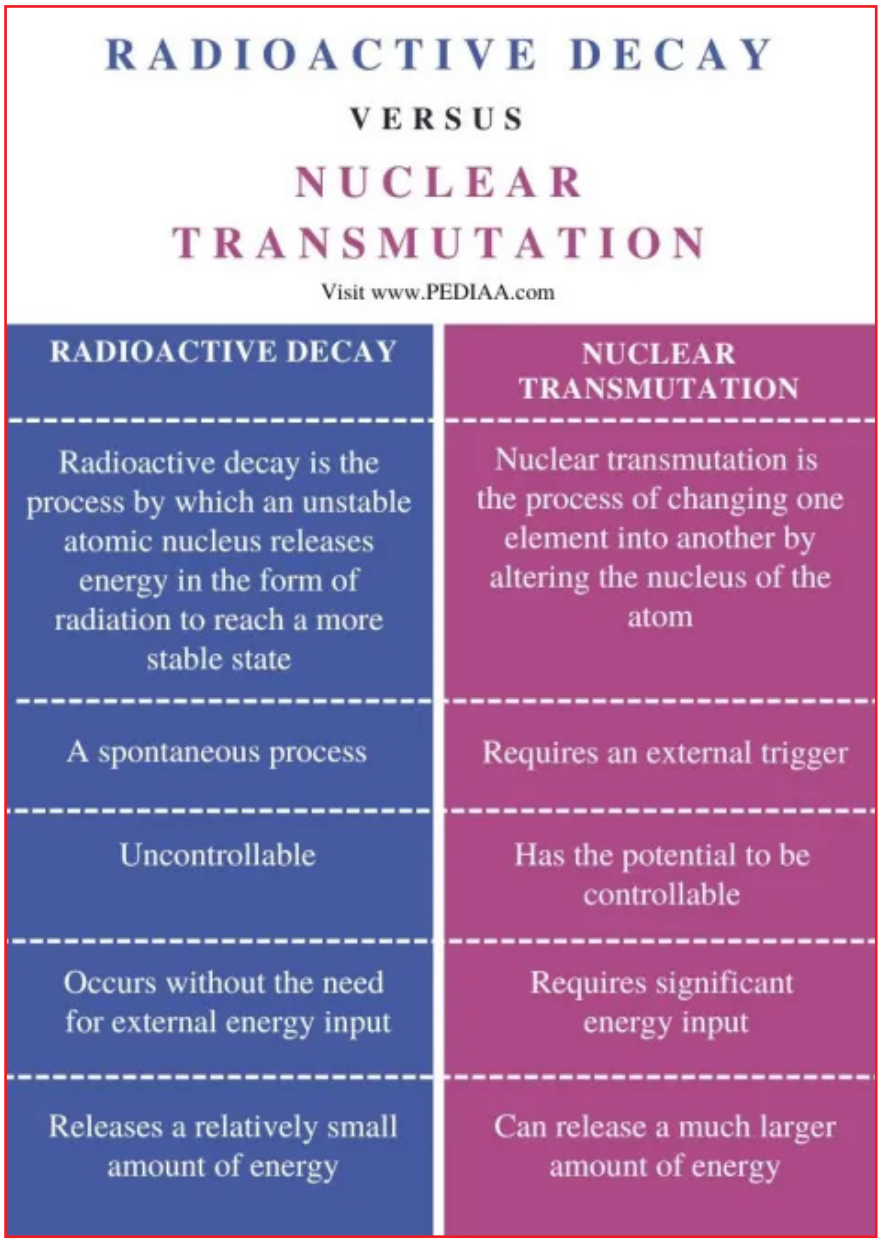
Scientists at **CERN** briefly **transformed lead (Pb) into gold (Au)** (just a nanosecond) in **tiny amounts** using **high-energy particle collisions** inside the **world's most powerful particle accelerator,** Large Hadron Collider (LHC).

- This was achieved **not by direct collisions** but through **ultra-peripheral "near-miss" interactions** between accelerated **lead nuclei (atomic number 82),** demonstrating **nuclear transmutation**.
  - **Nuclear transmutation** is the process of **changing one element into another by altering the number of protons or neutrons in an atom's nucleus**.



Ultra-Peripheral Collisions

- At CERN's LHC, **ultra-peripheral collisions** occur when **lead nuclei** pass very close **without direct contact.**
  - Their **electromagnetic fields** interact, emitting **high-energy photons** that trigger **electromagnetic dissociation**- a process where **protons and neutrons are ejected** from the nucleus.
- In such events, **removal of 3 protons** from **lead (atomic number 82)** results in the formation of **gold (atomic number 79)** and depending on the number of protons lost, elements like **thallium and mercury** were also created.
  - The experiment offers a **striking example of how extreme physics can alter the identity of matter**, showcasing modern **artificial nuclear transmutation** and deepening our understanding of atomic interactions under extreme conditions.



Read More: Hadron Collider Run 3

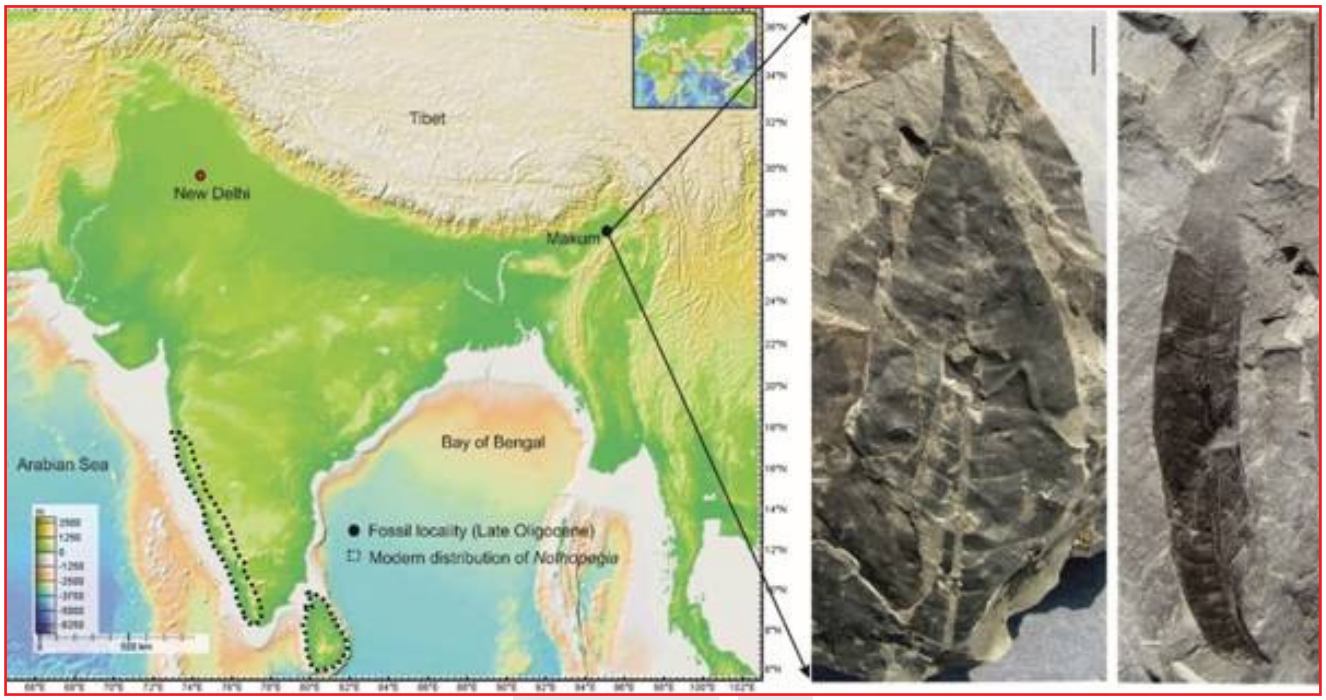
Nothopegia Fossil Leaves

Fossilized leaves of *Nothopegia*, dated to **24–23 million years ago (late Oligocene epoch),** were discovered in **Assam's Makum Coalfield.**

- Researchers used **morphological comparison with modern species, cluster analysis for identification,** and **CLAMP (Climate Leaf Analysis Multivariate Program)** to identify the fossils and reconstruct the ancient climate of the region.

Nothopegia

- **About:** ***Nothopegia*** is a genus of flowering plants belonging to the ***Anacardiaceae*** **family**, which also includes **mango**.
  - It comprises several tropical tree species valued for their ecological and medicinal significance.
- **Present Distribution:** Currently, *Nothopegia* is found exclusively in the **Western Ghats**, a **UNESCO-recognized biodiversity hotspot** in peninsular India.
- **Botanical Features:** These leaves are **broad with reticulate venation** and are typically adapted to **warm, humid tropical climates**.
  - The fossils show a **strong resemblance to current *Nothopegia* species** in the Western Ghats.
- **Cause of Extinction in the Northeast:**
  - The **tectonic uplift of the Himalayas** led to major climatic shifts in the region.
  - Alterations in **temperature, rainfall, and wind patterns** made the Northeast unsuitable for tropical species like *Nothopegia*.
  - As a result, the genus became **extinct in the Northeast but survived in the climatically stable Western Ghats**, showcasing an example of **climate-driven species migration.**



Makum Coalfield

- Located in **Margherita, Tinsukia district of Assam,** it is the **only coal-producing region in Northeast India.**
- It is also a **significant paleobotanical site**, rich in **Tertiary-period fossil records.**

Read More: World's Oldest Lifeforms

Magna Carta: Blueprint for Democracy

The Magna Carta **(1215)** remains a **cornerstone of constitutional governance** even **810 years after its signing**, with its **rediscovery at Harvard University** sparking renewed discussions on its lasting impact on human rights and the rule of law across the world.

Magna Carta

- **About:** The **Magna Carta** (Latin: Great Charter), signed on **15th June 1215** at **Runnymede Meadows** near **London** by **King John of England**, established the principle that the **king is not above the law** and **limited his arbitrary powers.**
- **Origin:** It was triggered when the barons rebelled against **King John's arbitrary rule**, demanding **formalized rights** in response to his **high taxes** and **military failures** (such as the **loss of Normandy, 1204** and the **Battle of Bouvines, 1214**).
  - Barons received **land grants** from kings in exchange for **loyalty** and providing **knights** during **wars.**
- **Supremacy of Law:** Despite its limitations (protecting primarily **elite men, not serfs or women**), Magna Carta introduced **the principle of rule of law — even the king was subject to the law.**
- **Provisions:** The document set out **63 clauses**, including:
  - **Clause 39:** Protection from **arbitrary arrest, imprisonment, and exile**, ensuring action only by **lawful judgment** of peers or the law of the land.

- **Clause 40:** Assurance that **justice will not be sold, denied, or delayed.**

➢ **Legacy:** Inspired habeas corpus and safeguards against arbitrary detention.

- Influenced the **US Constitution and Bill of Rights** during the **American Revolution**.
- Continues to symbolise resistance to tyranny and the assertion of **individual rights under law.**

Read More: Salient Features of Indian Constitution

Skin Diseases as Global Public Health Priority

The **78th** World Health Assembly (WHA), for the **first time**, recognised **skin health** as a **global priority** by adopting the resolution **'Skin diseases as a global public health priority'.**

➢ This resolution was led by countries like **Côte d'Ivoire, Nigeria, and Togo**, redefining **skin health** as a **global public health, equity, and dignity issue**, shifting it beyond **cosmetic concerns** and spotlighting a burden affecting **1.9 billion people**, especially in low- and middle-income nations (LMICs).

Key Highlights of WHA Resolution on Skin Health

➢ **Global Action Plan:** A **Global Action Plan** will be developed by **WHA-80 (2027)** with a focus on **prevention, early detection, treatment, and enhancing environmental resilience.**

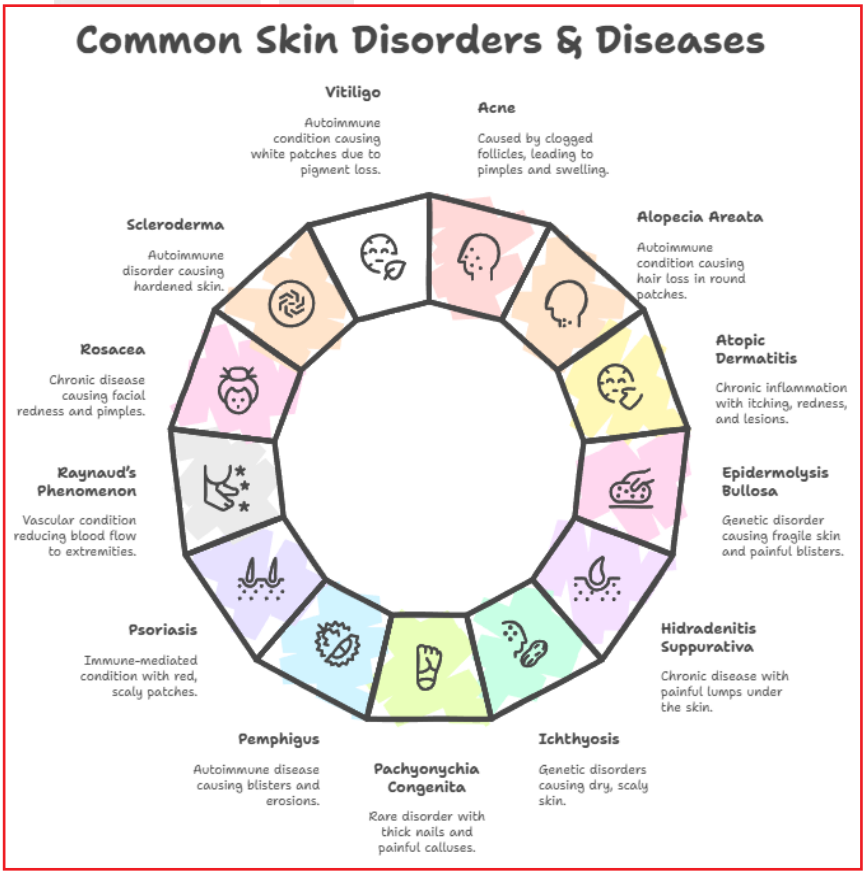
➢ **Surveillance & Diagnostics**: Emphasises strengthening **disease surveillance, diagnostic capacity**, and addressing Antimicrobial resistance (AMR) and **climate-linked skin conditions.**

➢ **Global Cooperation**: WHO **resolution** urges **integration of skin disease care** into **primary health systems**, promotion of **inclusive research** (especially for **skin of colour** and **neglected diseases**), improved **access to treatments**, and development of **national registries** and **frontline capacity**.

- **India**, with its **high skin disease burden**, can leverage this to strengthen **public dermatologic care**, boost **research**, expand **primary care training**, and advocate for **insurance coverage**.

World Health Assembly (WHA)

➢ It is the **decision-making body of** WHO which meets **annually in Geneva** to set policies, oversee **financial administration**, and approve the **programme budget**, playing a vital role in shaping **global health priorities** and coordinating **international health responses**.



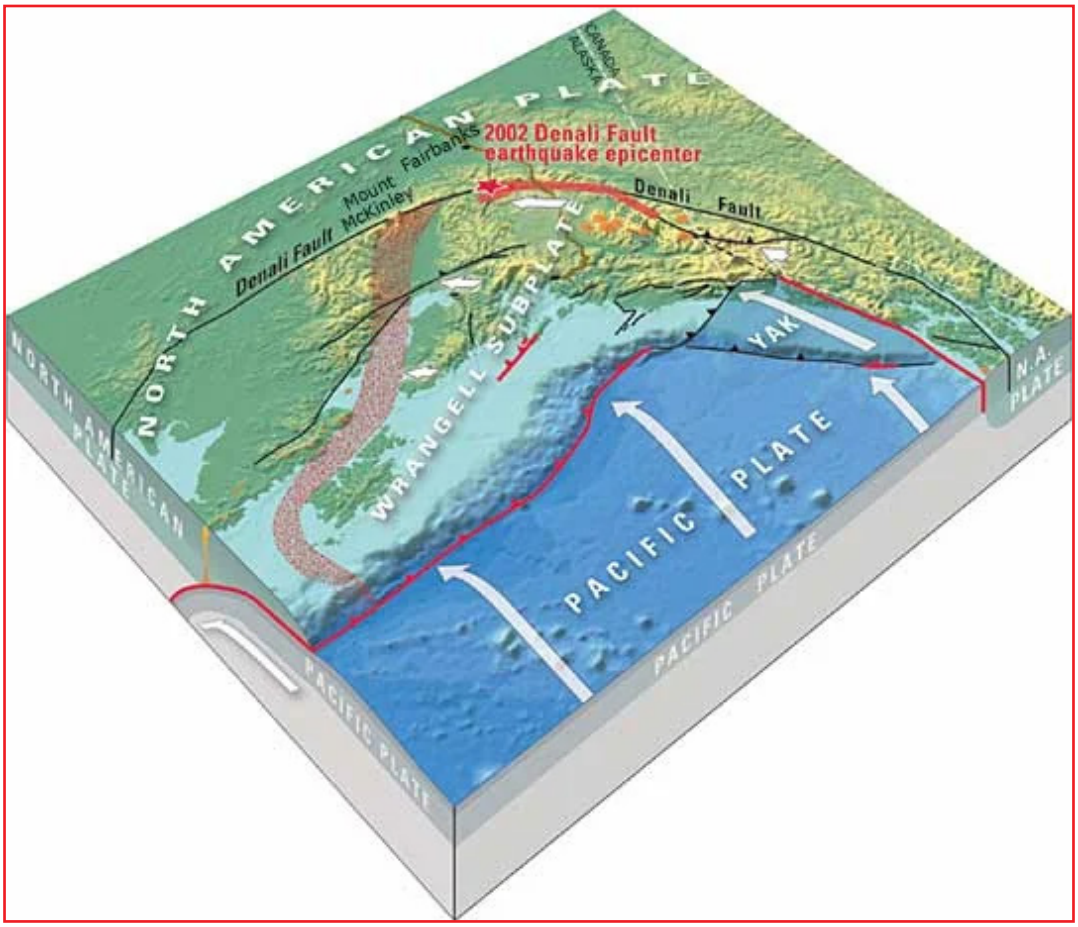
Read More: 76th Annual World Health Assembly

Mount Denali

A **mountaineer from Kerala and his team** became stranded on Mount Denali, known for its **severe weather and steep vertical climbs**, during their mission to **display a banner honouring the armed forces for** Operation Sindoor**.**

Mount Denali (Mount McKinley)

- **About:** It is the **highest peak (6,190 meters)** in North America (part of the **Alaska Range, US)** and is the central feature of **Denali National Park and Preserve.**
  - Denali is the **3rd-highest** of the **Seven Summits** (the tallest peaks on all seven continents).
- **Geological Features:** It is a **massive granite block**, formed from the collision of the **Wrangellia Composite Terrane (oceanic plate)** with the **North American Plate**, and uplifted by **tectonic activity** starting about **60 million years ago.**



- **Physical Characteristics:** It has **two major summits**, with the **southern peak** being higher, and its **upper half is covered by permanent snowfields**, feeding glaciers like **Kahiltna, Muldrow, Peters, Ruth, and Traleika.**
- **Naming:** Formerly called **Mount McKinley**, it was renamed **Denali** in 2015 to honor the **indigenous Koyukon people**, but in **2025**, the US President restored the name **Mount McKinley.**

Read More: Denali Fault

India's First 3nm Chip Design Centres

The **Union Minister for Electronics and Information Technology** launched India's first **3-nanometre (3nm) chip** design centres in **Noida and Bengaluru,** positioning the country among a select few nations at the forefront of **chip technology.**

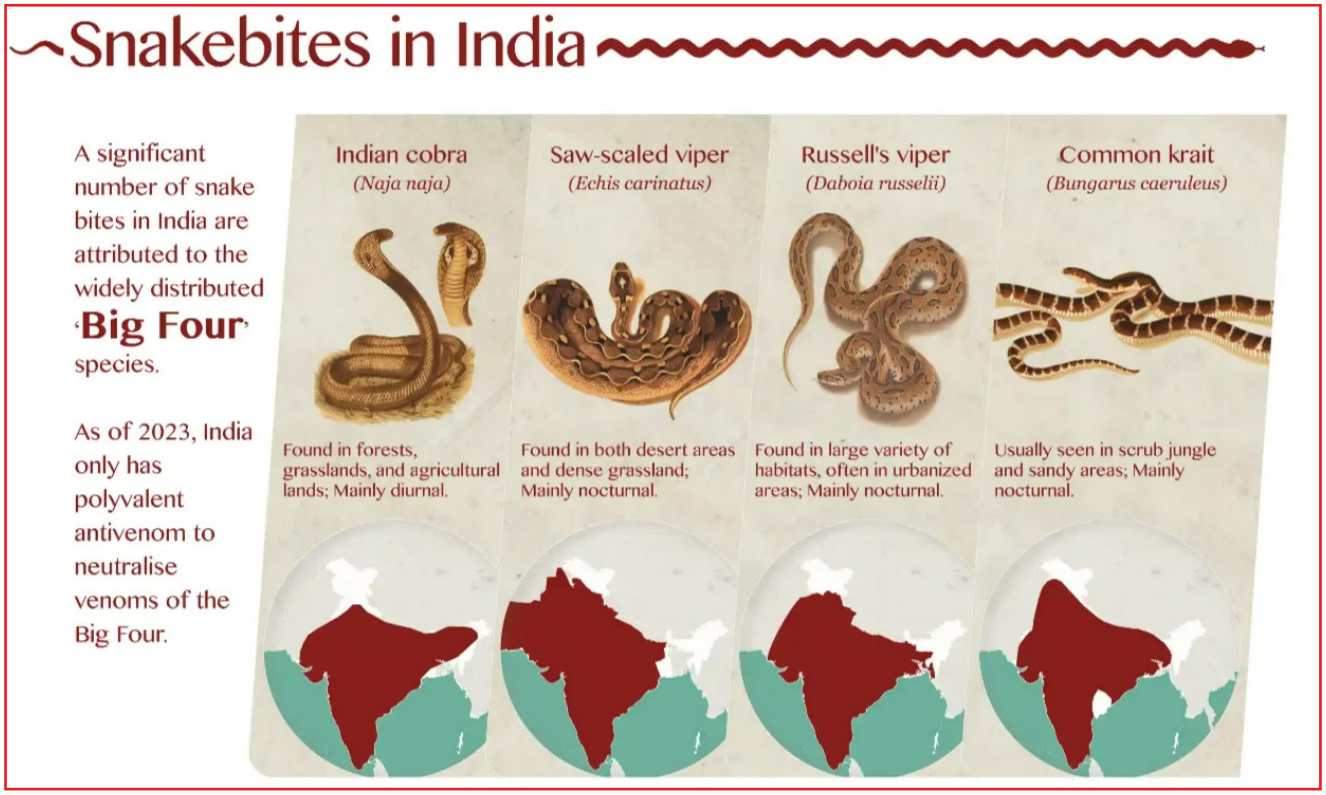
- In another development, the Union Cabinet has approved the establishment of a **display driver chip** manufacturing unit in **Jewar, Uttar Pradesh (UP).**
  - This is the **first semiconductor fabrication unit in UP** and the **6th approved** under **Phase I of the Indian Semiconductor Mission (ISM),** with production set to begin by **2027.**
- The launch of a new **semiconductor learning kit** designed to strengthen practical hardware skills among engineering students was also announced.
  - Over 270 academic institutions, which have already received access to advanced **Electronic Design Automation (EDA)** software tools through the **India Semiconductor Mission,** will also receive these hands-on kits.
- **Other Initiatives:**
  - **Chips to Startup (C2S) Programme**
  - **Production Linked Incentive scheme (PLI)**
  - **Digital RISC-V (DIR-V) program**
  - **Modified Special Incentive Package Scheme (M-SIPS) for Semiconductors.**
- **3nm Chip Technology: 3nm chip technology** incorporates more **transistors** than **5nm** and **7nm chips,** offering **higher performance, improved energy efficiency, and lower heat generation**, making them crucial for **advanced computing, AI,** and **mobile devices.**

Read More: Semiconductor Chip Manufacturing Technology.

King Cobra

A king cobra from **Karnataka's Pilikula Biological Park**, brought to **Bhopal's Van Vihar National Park** under an **animal exchange programme** (**2 tigers for 2 cobras**) to introduce the species in **Madhya Pradesh**, has died.

- **About King Cobra (*Ophiophagus hannah*):** It is the **world's longest venomous snake**, with **neurotoxic venom** that causes **muscle paralysis** by blocking nerve signals.
  - **Biological & Behavioral Traits:** It is **oviparous**, the **only snake that builds and guards its nest** until eggs are hatched, and its **venom** is used to produce pain relievers like **Cobroxin** and **Nyloxin.**
    - It is part of the **big four** responsible for **most snakebite deaths** in India (with Russell's viper, saw-scaled viper, common krait).



  - **Diet:** It **primarily preys on other snakes** (such as **rat snakes**, **dhamans**, and **cobras**) and is **diurnal**, meaning it is **active during the day.**
  - **Habitat:** It is **found in rainforests, bamboo thickets, mangroves, high-altitude grasslands, and near rivers**, with a **range spanning India, southern China, and Southeast Asia.**
  - **Conservation Status:**
    - **IUCN Red List: Vulnerable**
    - **CITES: Appendix II**
    - **Wildlife Protection Act (1972): Schedule II**

- **About Van Vihar National Park: Van Vihar National Park**, located in Bhopal (Madhya Pradesh), lies next to the **Upper Lake (Bada Talab)**, a Ramsar Site and part of the **Bhoj Wetland.**
  - It serves as a **rescue centre** for **lions, tigers, sloth bears**, and other animals saved from circuses and conflict zones.
  - The park is also a **Conservation Breeding Centre** for the **Hard Ground Barasingha** and **Gyps vultures.**

Read More: Ophiophagus Kaalinga

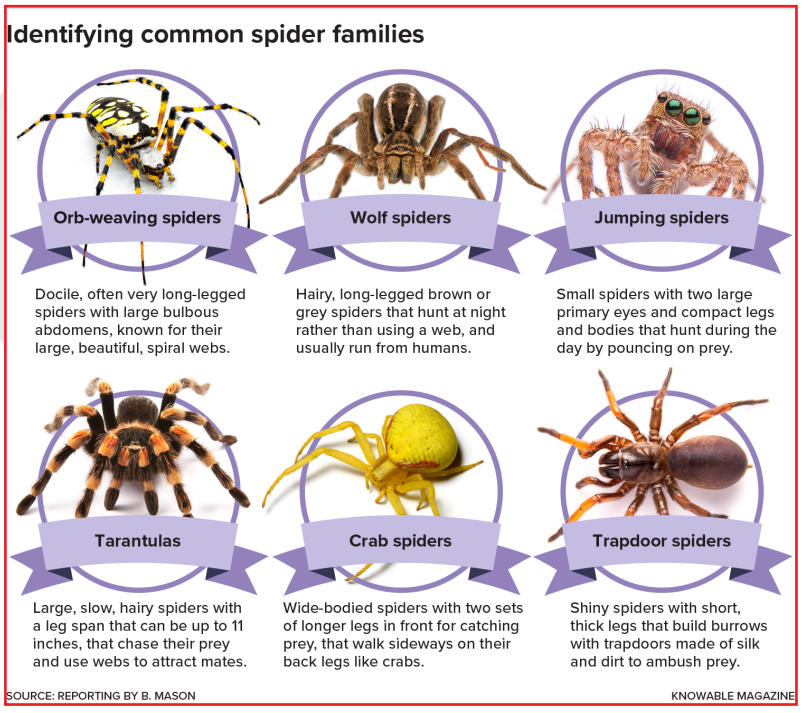
Jumping Spider

Spartaeus karigiri, a newly discovered **jumping spider species** from Karnataka, marks the first recorded presence of the ***Spartaeus* and *Sonoita* genera (**part of the **Spartaeinae subfamily of Salticidae family)** in India, previously known only from **Southeast Asia and Africa**.

- The species is named after **Karigiri**, or **Elephant Hill of Karnataka.**
- ***Sonoita cf. lightfooti,*** previously thought to be **confined to Africa,** was discovered in **Karnataka,** suggesting a **possible range extension or introduction**.

Jumping Spiders (Spartaeus karigiri)

- **Distribution**: Found globally across America, Europe, Asia, Africa, and Australia with **abundance in tropical regions.**
- **Biodiversity**: **Salticidae** is the largest **spider family** with **5,000+ species** under **Order *Araneae* and Class *Arachnida*.**
- **Physical Traits: Small, fuzzy** spiders **(<0.5 inch)** with **8 eyes, two large front-facing eyes** provide **high-resolution vision for hunting, navigation, and courtship**.
  - Capable of **running, climbing, and jumping**, uses a **silk dragline for safe landing.**
- **Hunting Behavior: Active carnivores** that **prey on small insects** using **stalking, mimicry (e.g., ant-like appearance)**, and **camouflage**, some species also **consume pollen and nectar opportunistically.**
- **Jumping Mechanism**: Jump over **50 times body length** via **hydraulic leg pressure**, not muscles.
- **Reproduction**: Females guard **silk-encased egg sacs**, spiderlings molt into adults.
- **Notable Species:** *Euophrys omnisuperstes* (Himalayan jumping spider), found at **22,000 ft** on **Mount Everest**, highest known spider habitat.



Read More: New Genus of Jumping Spiders

Lamarckian Inheritance and Epigenetics Evolution

The recent discovery of **heritable cold tolerance** in **rice plants** through **epigenetic changes** marks a historic validation of **Jean-Baptiste Lamarck's theory** that **environmental influences** can affect **heredity** — a concept once dismissed but now supported by **modern science**.

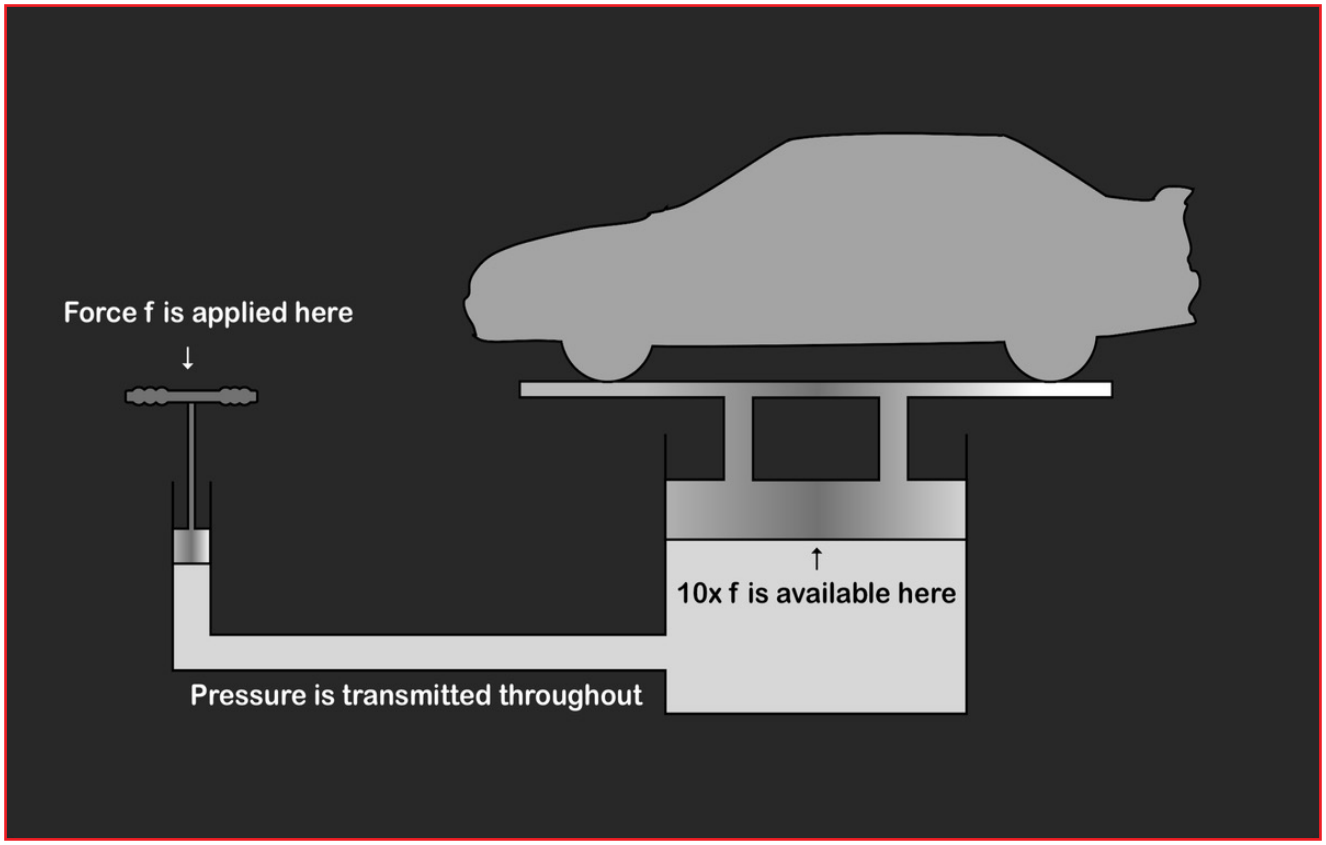
- **Epigenetics** refers to **heritable changes in gene expression** caused by **external factors** that switch genes on or off **without altering the DNA sequence.**
- **Lamarck's Theory (1809):** It proposed that **traits acquired** during an organism's lifetime through **use, disuse, or environment could be inherited**.
  - It was dominant until **Darwin's natural selection (1859)** and **Mendel's laws of inheritance** disproved it.
  - A study showed that **exposing rice plants to cold triggered epigenetic changes in the gene,** which conferred **cold tolerance and was heritable** for five generations.
- **Scientific Challenges to Lamarck:**
  - **Darwin's Natural Selection (1859)**: It argued **genetic variations** (not **acquired traits**) drive **evolution** via **"survival of the fittest."**
  - **Weismann's Experiment (1890s)**: **Tailless mice** produced **normal-tailed offspring**, disproving **inheritance of acquired traits**.
  - **Gregor-Johann Mendel:** It showed **genes (DNA)** are the **stable units of heredity**, not **environmental adaptations.**
- **Epigenetics Emerges:**
  - **Royal Brink's Maize Study (1956):** It revealed that **gene expression**, not just **DNA sequence**, could be **heritable**, demonstrating **non-DNA-based inheritance.**
  - **Arthur Riggs' Hypothesis (1975):** It **proposed epigenetic marks** (**chemical tags on DNA**) could pass **traits** across **generations** without changing their DNA sequence. It is **easier** to change **epigenetic marks** than to **mutate DNA**.

Read More: eDNA Challenging Genetics Principles

Hydraulics System and its Applications

From **towering cranes** to **aircraft landing gears**, **hydraulic systems** power some of the most critical **mechanical operations** to convert **small inputs** into **massive force outputs.**

- **About Hydraulic Systems:** A **hydraulic system** is a technology that uses **incompressible fluid (usually oil)** to transmit **force and motion**.
  - A **small force** applied at **one end** generates a **much larger force at the other end** by increasing the **contact area** while **pressure** remains **constant.**
- **Working:** It works on **Pascal's law**, which states that pressure applied to a fluid is **transmitted equally in all directions,** enabling heavy loads to be moved with small input force.
  - **Pressure** is the **force applied per unit area** on the surface of an object. It indicates **how much force** is acting on a **specific area.** Its **SI unit** is **Pascal (Pa)**, where **1 Pascal = 1 Newton per square meter (N/m^2)**.



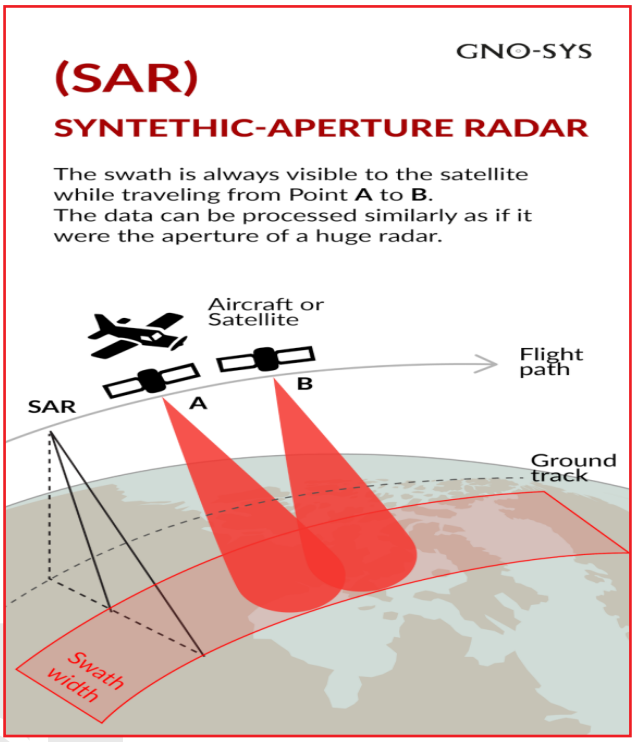
- **Applications: Hydraulic systems** are widely used in **construction equipment** (excavators, bulldozers, cranes), **automotive systems** (brakes, clutches), **aircraft** (landing gear), **industrial machinery** (presses, lifts), and **agriculture** (tractors, harvesters)
- **Advantages:** Smooth movements, High power-to-weight ratio, Better heat dissipation, Smooth, and **High precision** in applications.

Read More: India's Deep Drill Mission

NISAR and Synthetic Aperture Radar

The NASA-ISRO SAR (NISAR) satellite has arrived at **ISRO's spaceport in Sriharikota** for launch and will **scan nearly all land and ice surfaces twice every 12 days**, delivering **unprecedented data on Earth's environment**.

- **About NISAR Mission:** It is a **collaborative Earth-observation mission** between **NASA (US)** and **ISRO (India)**, aimed at studying Earth's land and ice surfaces in unprecedented detail.
  - It **integrates** two advanced radar systems—**NASA's L-band radar and ISRO's S-band radar**—marking it as the **first satellite to carry both**.
- **About Synthetic Aperture Radar (SAR):** SAR is an **active remote sensing technology** that transmits microwave pulses and records echoes to create images.
  - **Unlike optical cameras** (which rely on sunlight), SAR works **day and night** and in **all weather conditions**, as microwaves **penetrate clouds, smoke, and light rain.**
- **Working of SAR: SAR** sends **microwave pulses** and records **echoes** from Earth's surface, using platform movement (e.g., satellite or aircraft) to simulate a **large antenna** and produce **high-resolution images.**
- **Applications of SAR:**
  - **Environmental monitoring**: Mapping wetlands, tracking oil spills in marshes.
  - **Cryosphere studies**: Monitoring icebergs and ice sheets (e.g., Antarctica).
  - **Disaster management**: Detecting floods, landslides, and changes in terrain.
  - **Agriculture & forestry**: Assessing soil moisture, vegetation health, and deforestation.



Read More: NISAR Satellite

8th Edition of Exercise Shakti

The **8th edition of Exercise Shakti**, a **joint military exercise** between **India** and **France**, is scheduled from **18th June to 1st July 2025** at **La Cavalerie, France**.

- It is a **biennial training engagement** between the **Indian and French Armies**, aimed at enhancing **interoperability**, **operational coordination**, and **military-to-military connect**.
- This edition will focus on **joint operations** in a **sub-conventional environment** under **Chapter VII of the United Nations Charter**, with training being conducted in **semi-urban terrain.**
  - **UN Chapter VII** authorizes **military/non-military actions** (**sanctions**, **blockades**, **troop deployment**) for **international peace enforcement.**
- Other **joint exercises** between **France** and **India**: **Exercise Varuna** (**Navy**), **Exercise Garuda** (**Air**), and **Exercise Desert Knight** (**India**, **France**, and **UAE**).

Read More: India-France Relations

Tea Board of India

The Tea Board of India has amended the **pan-India auction rules** under the **Bharat Auction model**, based on key recommendations of the **Ramaseshan Committee**, aiming to enhance **price discovery** and protect **seller interests** in the tea sector.

- **Ramaseshan Committee** report pertains to improving price discovery and market structure in the tea industry.
- **Bharat Auction model** is a **pan-India electronic auction system** introduced by the **Tea Board of India** in which **bids are placed prior to the lots going live.**
- **About Tea Board of India:**
  - **Establishment**: It was **established in 1953** and is **headquartered in Kolkata**. It has **17 offices across India**.
    - It also has overseas offices like in **London, Moscow and Dubai**.
  - **Statutory Body**: It was set up under **Section 4 of the Tea Act, 1953**.
  - **Regulatory Authority**: It **regulates** various entities including **tea producers, manufacturers, exporters, tea brokers, auction organisers, and warehouse keepers**.
  - **Functions**: It conducts **market surveys**, **analyses**, **identifies**, **tracks consumer behaviour**, and provides **relevant and accurate information** to **importers and exporters.**

Key Agricultural Boards in India:

Board	Constituted Under	Headquarters
Tea Board	Tea Act, 1953	Kolkata
Coffee Board	Coffee Act, 1942	Bangalore
Rubber Board	Rubber Act, 1947	Kottayam, Kerala
Spices Board	Spices Board Act, 1986	Kochi, Kerala
Tobacco Board	Tobacco Board Act, 1975	Guntur, Andhra Pradesh
National Turmeric Board	Not a statutory body	Nizamabad, Telangana
Makhana Board	-	Bihar (Proposed)

Read More: Need of Reforms in Tea Industry

Electricity Derivatives

The Securities and Exchange Board of India (SEBI) has approved the launch of **electricity derivatives on Multi Commodity Exchange (MCX)** to enhance electricity price risk management, and support the integration of renewable energy (RE).

- **Electricity derivatives** are financial instruments that help **Gencos, Discoms, and large industrial consumers** hedge against fluctuations in power prices by trading on future electricity output.
  - **Electricity futures contracts, options, and swaps** will enable players to hedge risks, ensure supply certainty, and improve demand forecasting—key for deploying **energy storage systems (ESS)**.
  - It will **boost liquidity**, allow participation by **hedgers, speculators, and investors**, and separate financial settlement from physical delivery—deepening the short-term power market.
- The move supports India's broader clean energy vision—**over 50% (500 GW non-fossil fuel) of installed capacity from RE by 2030** and **net-zero emissions by 2070**, needing **USD 250 billion investment annually till 2047.**

Derivatives are **contracts** whose **value depends on underlying assets or indicators** such as **currencies**, **stocks**, or **commodities**, and include instruments like **forwards**, **futures**, and **options**.

- A **futures contract** is a **legal agreement** obligating the **buyer** and **seller** to transact an **asset** at a **predetermined price** on a **specific future date**, regardless of **market price** at expiry.
- An **option** gives the **holder** the **right**, but not the **obligation**, to **buy (call)** or **sell (put)** an **asset** at a **specified price** before or at a **certain date**, for a **premium**.
- A **swap** is a **private agreement** to **exchange cash flows** or **financial instruments** over a **specified period**, e.g., **interest rate**, **currency**, or **commodity/electricity swaps**.

Read More: Options Writing

NISHAD Designated as Global Rinderpest Holding Facility

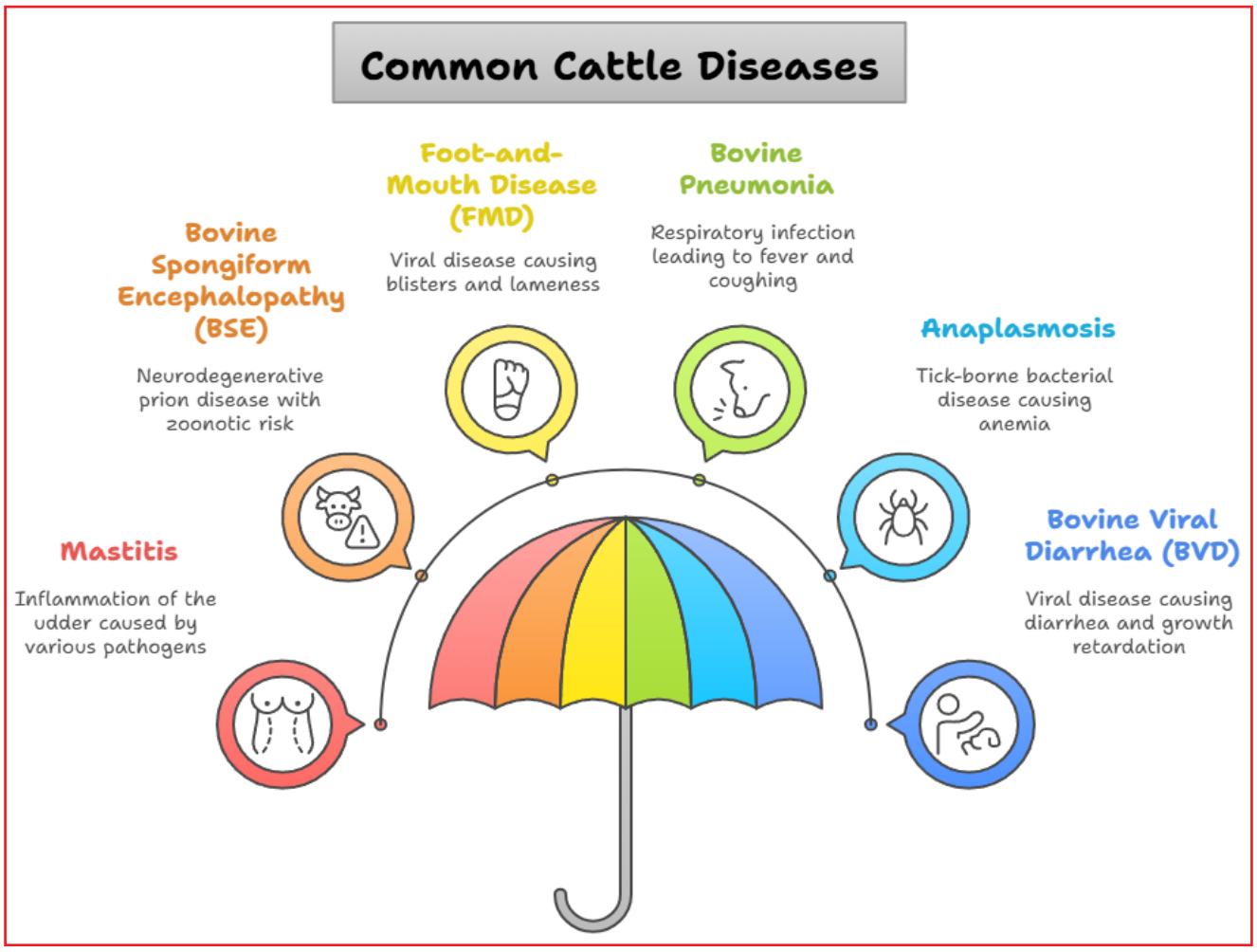
ICAR-NIHSAD, Bhopal, has been designated a **Category A Rinderpest Holding Facility** by World Organisation for Animal Health (WOAH) and the Food and Agriculture Organization (FAO) , making India one of 6 countries globally entrusted with **securely holding Rinderpest Virus-Containing Material.**

- **Rinderpest:** Rinderpest (cattle plague) was a **highly contagious and deadly viral disease, globally eradicated in 2011**, that affected **cattle, buffaloes, and some wild ruminants** caused by the ***Rinderpest virus*** **(a *Morbillivirus* related to measles)**.
  - It **spread via contact** with **infected secretions or contaminated feed/water.** Symptoms included **high fever, mouth ulcers, diarrhoea, and rapid death**.
  - It caused **massive livestock losses across Africa, Asia, and Europe,** leading to economic collapse and food insecurity.
- The **virus of this disease is still stored** in a **few high-security laboratories,** and any accidental or intentional release could lead to its re-emergence.

- Therefore, **FAO and WOAH strictly regulate the storage and handling of Rinderpest Virus-Containing Material (RVCM)**.

NIHSAD(National Institute of High Security Animal Diseases)

- NIHSAD is India's premier **Biosafety Level-3 (BSL-3) facility** high-containment lab for research on **exotic and emerging animal pathogens**, disease diagnosis, and bio-containment of high-risk organisms.
  - Established in **1984** as **High Security Animal Disease Laboratory (HSADL)** and later renamed, it serves as a **reference lab for avian influenza, Newcastle disease**, and other **transboundary and zoonotic diseases** under the **One Health** framework.
- It functions under **Indian Council of Agricultural Research (ICAR)**, **Ministry of Agriculture & Farmers' Welfare.**



Read More: Lumpy Skin Disease

Shipki La Pass

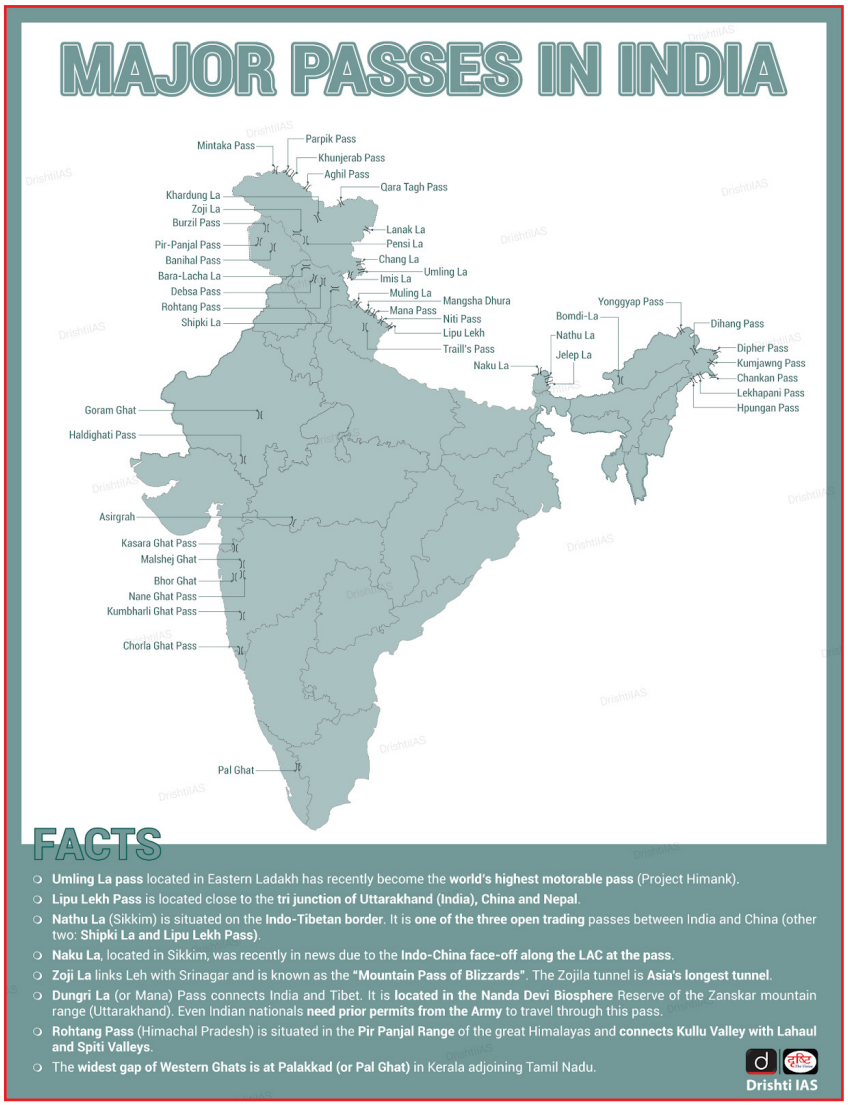
Shipki La Pass (3,930m) in Himachal's Kinnaur district, along the **India-China border** has been **opened to domestic tourists** to **boost borderland economies,** enhance strategic connectivity, and promote cultural tourism.

Shipki La Pass

- **Shipki La** is a **motorable mountain pass** which marks a **boundary post** on the **Line of Actual Control (LAC)** and is among **India's highest motorable passes.**
- The **Sutlej River (Langqen Zangbo** in Tibet) enters India through this pass, which historically served as a **key Indo-Tibetan trade route**.
- The pass was earlier known as **Pema La** or **Shared Gate** and was renamed **Shipki La** by the **Indo-Tibetan Border Police (ITBP)** after 1962.
- It has been a vital trade route since the **5th century,** which ceased after the **1962 Sino-India War, post-Doklam standoff** and **Covid-19**.
- Shipki La facilitated **India-Tibet trade**, with **imports like wool, livestock, yak products, religious items, and minerals,** and exports of grains, spices, tobacco, timber, and metal tools.

Mountain Passes

- **Passes** are **natural low points or gaps** in **mountain ranges** that facilitate the movement of people, goods, and armies across otherwise difficult terrain.
- They are f**ormed by erosion, glaciation, or tectonic activity** and serve as **connectors between valleys** or **regions**, historically enabling **trade, migration, and military movement**, with strategic, **economic, and cultural significance.**



Read More: China and Bhutan Meet to Delimit Boundary

India's PM Historic Visit to Cyprus

India's Prime Minister's visit to Cyprus — the **first by an Indian Prime Minister in 23 years** — marks a significant step in **bolstering bilateral relations**, with a focus on **energy security**, **counterterrorism cooperation**, and **India-EU strategic alignment**.

- **About Cyprus:**
  - **Location:** Cyprus is a **Eurasian island country** located in the northeast **Mediterranean Sea** at the **crossroads of Europe, Asia, and Africa**.
    - It is the **3rd largest Mediterranean island** after Sicily and Sardinia.

- **Historical Background:** Cyprus gained **independence from Britain in 1960**, but the **1974 Turkish invasion** led to its partition into the **Turkish-controlled north** (recognized only by Turkey) and the **Republic of Cyprus in the south**.
  - The **UN patrols the Green Line**, maintaining peace between the divided regions.
- **Political Division:** It is politically divided between the **Republic of Cyprus** (internationally recognized and an **European Union (EU) member**) and the **Turkish Republic of Northern Cyprus**.
- **Geography:** It has a **Mediterranean climate** with **hot, dry summers and wet winters** and rainfall critical for agriculture.

➢ **India-Cyprus Relation: India and Cyprus** established **diplomatic ties in 1962**. India supports a **bi-zonal, bi-communal federation** for the **Cyprus issue**, in line with **UNSC resolutions**, and **international law**.

- **Archbishop Makarios (Cyprus's first President)** and **Pandit Nehru** were pioneers of the **Non-Aligned Movement (NAM).**
- Cyprus's consistent support for **India's UNSC bid, NSG membership, and stance on Kashmir and terrorism** makes India's engagement with Cyprus a **strategic counterbalance** to growing **Turkey-Pakistan military ties.**

Read More: Cyprus as a Tax Haven

50 Years of Crocodile Conservation Project and World Crocodile Day

On World Crocodile Day (17th June), India commemorates 50 years of its **Crocodile Conservation Project (CCP) (1975–2025),** with Odisha emerging as the epicentre of this pioneering ecological effort.

- **Odisha** is the **only Indian state to host wild populations** of all three native crocodilian species **(Gharial** (*Gavialis gangeticus*), **Mugger crocodile** (*Crocodylus palustris*) **and Saltwater crocodile** (*Crocodylus porosus*)).
- **Crocodile Conservation Project:** India launched its CCP at Odisha's Bhitarkanika National Park with support from United Nations Development Programme **and the** Food and Agriculture Organisation.
  - It adopted the **"rear and release"** method, created protected habitats like Bhitarkanika and Satkosia Tiger Reserve, and promoted captive breeding and community awareness, making it a national model for crocodilian conservation.
- **Crocodiles**: They are the **largest surviving reptiles**, primarily inhabit freshwater swamps, lakes, and rivers, with one saltwater species.
  - They are **nocturnal** and **poikilothermic** (also known as **ectotherms** or cold-blooded animals, are characterized by their body temperature fluctuating with the surrounding environment).
  - Their survival is threatened by habitat destruction, egg predation, poaching, dam construction, and sand mining.
- **Population:** India hosts nearly 80% of the global wild gharial population, with around 3,000 individuals across sites like National Chambal Sanctuary, **Katarnia Ghat, and Son Gharial Sanctuary.**
  - The saltwater crocodile population has recovered to about 2,500, mainly in **Bhitarkanika, Andaman & Nicobar Islands, and the Sundarbans.**

CROCODILE SPECIES IN INDIA

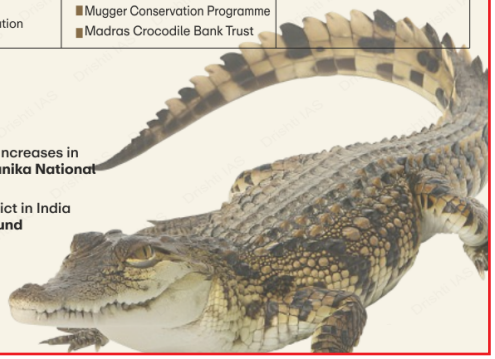
India harbours three diverse crocodile species—Mugger, Saltwater, and Gharial-found in distinct habitats nationwide.

Aspects	Gharial	Mugger/Indian Crocodile	Saltwater Crocodile
Scientific Name	*Gavialis Gangeticus* 	*Crocodylus Palustris* 	*Crocodylus Porosus* 
Distribution: India	**Viable Population:** National Chambal Sanctuary (U.P, Raj, M.P) **Small Non-Breeding Population:** Son, Gandak, Hooghly, Ghagra & Satkosia WLS (Odisha)	Throughout India	East Coast (Odisha's Bhitarkanika WLS, Andaman & Nicobar Islands coast & Sundarbans)
Distribution: Neighbourhood	Brahmaputra of Bhutan & Bangladesh& Irrawaddy River	Extinct in Bhutan and Myanmar	Across Southeast Asia
Special Feature	Longest of all Crocodile, Long and thin Snout	Egg-laying, Hole-nesting, Wide & U-shaped Snout	Largest living reptile, Pointed & V-shaped Snout
Habitat	Freshwater	Freshwater	Saltwater, Brackish & Wetlands
IUCN Status	CR	VU	LC
CITES Status	Appendix I	Appendix I	Appendix I
CMS Status	Appendix I	-	Appendix II
WPA,1972 Status	Schedule I	Schedule I	Schedule I
Threats	Dams, Pollution, Sand mining	Habitat Destruction	Hunted for its skin and Habitat loss
Government Initiatives	Odisha: Rs. 1000 award to conserve Gharial in Mahanadi River Basin Indian Crocodile Conservation Project,1975	Indian Crocodile Conservation Project,1975 Mugger Conservation Programme Madras Crocodile Bank Trust	Indian Crocodile Conservation Project,1975

MISCELLANEOUS FACTS

- **17th June:** World Crocodile Day
- **Annual Reptile Census, 2023:** Marginal Increases in number of saltwater crocodiles **(Bhitarkanika National Park and its nearby areas)**
- **Odisha's Kendrapara District:** Only district in India where **all three species of crocodiles found**

Drishti IAS



Read more: World Crocodile Day

Regulation of Maritime Accidents

Recent **maritime accidents** off **Kerala's coast** (**fire** and **sinking** of merchant vessels) highlight urgent concerns about the **liability framework** in **global trade.**

- **Global shipping is regulated** primarily by the International Maritime Organization (IMO) through conventions on **pollution, safety, and liability**, which member countries, including India, adopt into domestic laws.

- **India's Status in Key Conventions: India** has **not ratified** key conventions like the **2004 Ballast Water Convention** and the **2010 Hazardous and Noxious Substances (HNS) Convention**, limiting its ability to claim compensation for environmental damage.
- **Flags of Convenience (FOC):** Ships are often owned by **companies** in countries like **Greece** and **China**, but registered in nations such as **Liberia** and the **Marshall Islands** for easier operations and less scrutiny called **Flags of Convenience (FOC)**, despite being governed by **IMO norms**.
- **Liability for Loss and Environmental Damage: Liability for both loss of cargo and environmental damage** rests with the **ship owner**, usually covered by insurance through **Protection and Indemnity (P&I) Clubs,** a group of insurers sharing the risk**.**
  - While liability for **cargo loss** is **capped** by international conventions, compensation for **environmental damage** (e.g., oil pollution) is **uncapped** (**no limit**) and follows the **polluter pays principle** under the **International Convention for the Prevention of Pollution from Ships (MARPOL).**
- **Ship salvage responsibility** lies with the **ship owner**, under the **Nairobi Convention on the Removal of Wrecks, 2007**, to which **India is a signatory**.

Read More: Developments in India's Maritime Sector

Sighting of Eurasian Otter in Kashmir

Eurasian Otter or **Common Otter (**locally known as **Vuder in Kashmir**) has been sighted in Kashmir after 25-30 years. It has been historically found in **Dachigam, Dal Lake** tributaries, **Rambiara stream**, and **Lidder river** (in **Pahalgam**).

Eurasian Otter (Lutra lutra)

- **About**: It is a **semi-aquatic carnivorous mammal** native to **Eurasia.**
  - It is a **keystone species** in river ecosystems as its presence is an indicator of **clean water** and **healthy aquatic biodiversity.**
  - Other species in India include **smooth-coated Otter (throughout India),** and **Small-clawed Otter (Himalayas and southern India).**
- **Taxonomy**: It belongs to the genus *Lutra*, family *Lutrinae*, order *Carnivora*.
- **Diet:** Mainly **feeds on fish, crustaceans,** and **amphibians** and occasionally eats **reptiles, birds, eggs, insects, and worms.**
- **Habitat & Behaviour:**
  - Found in the **Himalayas, northeast India,** and **Western Ghats.**
  - It prefers **clean freshwater ecosystems** such as **rivers, lakes, streams, and wetland** and is also found in **coastal areas**.
  - It is **mostly active at night**, **builds dens (holts) near water,** and **lives mostly solitary,** though **mothers** are sometimes seen with their cubs.
- **Conservation Status:**
  - **IUCN: Near threatened**
  - **Wildlife Protection Act, 1972: Schedule II**
  - **CITES: Appendix I**

Read More: Eurasian Otter Radio-Tagged in Satpura Tiger Reserve

GFW 2024 Report on Indian Forests

The Global Forest Watch (GFW), an open-source **forest monitoring platform** developed by the US-based research organisation World Resources Institute (WRI), has recently released data highlighting **India's deforestation and forest degradation trends** from **2001 to 2024.**

Key Findings of the WRI Report on India's Forests:

- **Extent of Forest & Tree Cover Changes (2001–2024):**
  - Between **2001 and 2024,** India **lost 2.31 million hectare**s of tree cover, a **7.1% decline** since 2000, causing **1.29 gigatonnes of CO_2 emissions**.
    - **In 2024 alone,** India lost 150,000 hectares of natural forest, resulting in approximately **68 million tonnes of CO_2 emissions.**
    - **Primary forest loss increased** from 17,700 hectares in 2023 to 18,200 hectares i**n 2024.**
  - Between **2002 and 2024,** 348,000 hectares **(5.4%) of humid primary forests** (mature tropical forests not recently cleared) **were lost**, accounting for **15%** of total tree cover loss.
  - Tree cover loss due to **fires** amounted to **36,200 hectares from 2001 to 2024,** peaking at **2,770 hectares in 2008**.

- Despite losses, India **gained 1.78 million hectares of tree cover** between **2000 and 2020**, contributing **1.4% to global net gains (Top 3 Gainers: Russia, Canada, US).**

➢ **Key Drivers of Deforestation:**

- **Northeastern states** lead in **forest loss due to shifting cultivation**, logging, and infrastructure. **Central India suffers from mining,** while the **Western Ghats face road, tourism, and plantation** pressures.
  - Globally, **India ranked second in deforestation** (2015–2020), losing 668,000 ha/year (FAO).

Read More: Reviving India's Forests, 18th India State of Forest Report 2023

Boko Haram

Nigeria is witnessing a **renewed insurgency** led by **Boko Haram**, threatening its national security.

Boko Haram:

➢ Boko Haram is an Islamic sectarian movement that emerged in **northeastern Nigeria in 2002, founded by Mohammed Yusuf.**

- They mainly inhabit areas in the northern states of Nigeria, specifically **Yobe, Kano, Bauchi, Borno and Kaduna.**

➢ **Boko Haram** meaning **'Western education is forbidden'** opposes **Western-style education and secular governance** and aims to establish an **Islamic state.**

➢ It emerged in Nigeria in the **mid-1990s** as a **moderate Islamic group**, influenced by **post-Biafran War** grievances **(1967–70)**, which saw over **2 million deaths** amid government suppression backed by **Western powers and oil interests.**

➢ They operate across borders in **Nigeria, Niger, Chad, and Cameroon**, and remain one of the **deadliest terrorist groups in Africa** despite efforts to suppress it.

Nigeria:

➢ Nigeria (also known as **Giant of Africa**) is a country in **West Africa** shares borders with **Niger, Chad, Cameroon, Benin,** and the **Gulf of Guinea.**

➢ It has the **largest population in Africa** and the **6th largest in the world**, in addition to being the **4th largest economy in Africa.**

➢ It gained **independence from Britain in 1960**, with **Abuja** as its capital.

➢ The country features the **Cameroonian Highlands** and is **rich in natural resources,** especially **petroleum** and **natural gas.**

Read More: Boko Haram, Nigeria as 9th BRICS Partner Country