Current Affairs
(Consolidation)

MARCH 2025
(Part – I)

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Polity and Governance

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Decline in MPLADS Funds

Why in News?

The latest data by **Ministry of Statistics and Programme Implementation (MoSPI)** on the **Members of Parliament Local Area Development Scheme (MPLADS)** indicates a **decline in the total funds released** by the central government for the **17th Lok Sabha (2019-2024)** compared to the **16th Lok Sabha (2014-2019).**

What are the Key Highlights of the MoSPI Data on MPLADS?

➢ **Decline in Funds:** The MPLADS funds for the **17th Lok Sabha (2019-2024)** totaled Rs 4,510 crore, a **65.2% decline from the 16th Lok Sabha**, primarily due to the **Covid-19 pandemic.**

➢ **Utilization of Funds:** In the 14th Lok Sabha, MPLADS funds saw **102% utilization,** while the **16th and 17th Lok Sabhas** recorded **99% and 98% utilization,** respectively.

➢ **Regional Disparities:** MPs from **Uttar Pradesh, Maharashtra, and West Bengal** received the **highest MPLADS funds**, while those from **Delhi, Haryana, and Punjab received the lowest.**

➢ **Sector-wise Fund Distribution:** During the 17th Lok Sabha period, Rs 1679 crore were allocated to infrastructure (**railways, roads, bridges**), followed by other public facilities and education.

What is MPLADS?

➢ **About:** MPLADS is a **Central Sector Scheme introduced in 1993** that enables the **Members of Parliaments (MP)** to recommend developmental **work in their constituencies** with an emphasis on creating durable community assets based on locally felt needs.

➢ **Implementation:** A state-level nodal department oversees MPLADS, while **district authorities sanction projects, allocate funds,** and ensure implementation.

Local area development

- ■ (light blue) Funds released by Central government
- ○ % of funds utilised
- ■ (dark blue) Unspent balance with district authority

MPLADS allocation dips 65% in 2019-24   *(in ₹ cr)*

14th Lok Sabha (2004-09)	102
15th Lok Sabha (2009-14)	102
16th Lok Sabha (2014-19)	99
17th Lok Sabha (2019-24)	98

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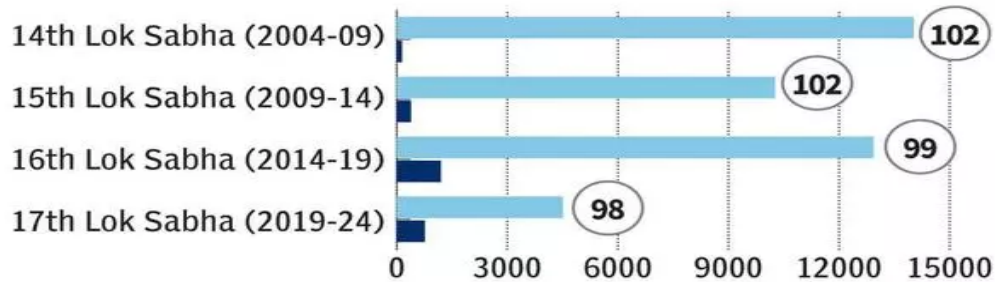
Large States receive more funding under the scheme

Top five   *(in ₹ cr)*

State	% utilised
Uttar Pradesh	91.5
Maharashtra	96.5
West Bengal	82.8
Bihar	99.3
Tamil Nadu	92.8

Scale: 0 100 200 300 400 500 600 700 800

Bottom five   *(in ₹ cr)*

State	% utilised
Telangana	78.9
Chhattisgarh	98.1
Punjab	87.2
Haryana	74.5
Delhi	109

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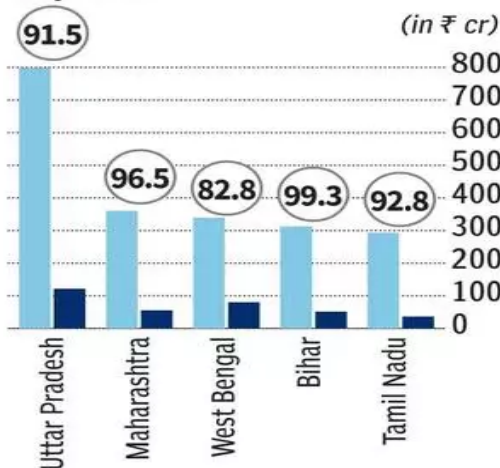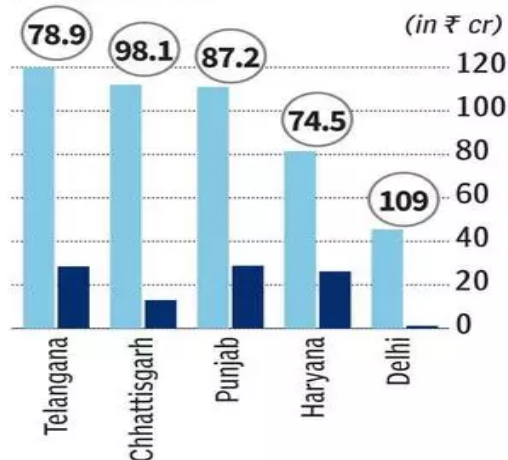
Public infra remains a priority sector
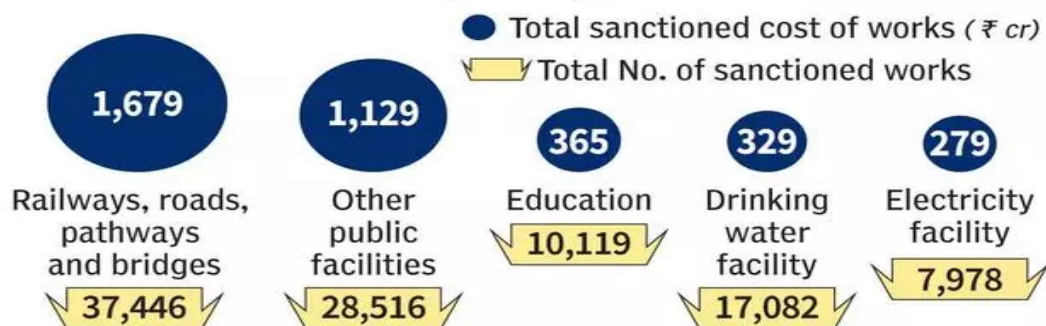
- ● Total sanctioned cost of works (₹ cr)
- ▽ Total No. of sanctioned works

Sector	Total sanctioned cost of works (₹ cr)	Total No. of sanctioned works
Railways, roads, pathways and bridges	1,679	37,446
Other public facilities	1,129	28,516
Education	365	10,119
Drinking water facility	329	17,082
Electricity facility	279	7,978

Source: MPLADS website

- ➤ **Funding Allocation:** Each **MP is allocated Rs 5 crore per year** since 2011-12. Funds are disbursed by the **Ministry of Statistics and Program Implementation (MoSPI)** to district authorities in two installments of Rs 2.5 crore each.
  - ○ **Nature of Funds:** Funds are **non-lapsable and carried forward if not utilised** in a given year. MPs must allocate a **minimum of 15% and 7.5% of their funds** to create assets for **Scheduled Castes (SCs)** and **Scheduled Tribes (STs),** respectively.
- ➤ **Special Provisions:** MPs can **allocate up to Rs 25 lakh annually outside their constituencies** or states for projects promoting national unity.
  - ○ For severe natural calamities, MPs can allocate up to Rs 1 crore for projects anywhere in India.
- ➤ **Projects Eligible Under MPLADS:** MPLADS funds can be **converged with the MGNREGS for durable asset creation** and integrated with the **Khelo India program for sports infrastructure development.**
  - ○ Infrastructure support is **permitted on lands owned by registered societies or trusts** engaged in **social welfare for at least three years,** but prohibited for societies where the MP or their family members are office-bearers.

How does MPLADS work?

Members of Parliament
- recommend works based on local needs of the selected constituency

District Authorities (District Collectors)
- sanction eligible works
- select implementing agency
- responsible for implementation

Ministry of Statistics and Programme Implementation (MoSPI) : Central Government
- formulates MPLADS Policy
- Releases ₹ 5 crore anually, in installments of ₹ 2.5 crore, directly to District Authority
- establishes monitoring mechanisms

Completed and Ongoing works listed at **DA's office** and on **www.mplads.gov.in**

Citizens can **file RTI** to know about status of works and funds

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What are the Main Arguments For and Against MPLADS?

Click Here to Read: Arguments For and Against MPLADS

Pashu Aushadhi Kendras under LHDCP

Why in News?

The government of India will launch **Pashu Aushadhi Kendras** under the **Livestock Health and Disease Control Programme (LHDCP)** to provide affordable **veterinary medicines** to people engaged in animal husbandry and dairying.

What are Pashu Aushadhi Kendras?

- ➤ **About: Pashu Aushadhi Kendras**, modeled after **Pradhan Mantri Bharatiya Janaushadhi Kendras (PMBJKs),** provide **"generic medicines" veterinary medicines** to improve **livestock health** and reduce **farmers' expenses**.
  - ○ Pashu Aushadhi Kendras will also **sell ethnoveterinary medicines**, which are based on traditional Indian knowledge and indigenous practices.
  - ○ Pashu Aushadhi initiative introduced under the **LHDCP,** has a Rs 75 crore allocation for veterinary medicines and sales incentives.

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- **Operation Model:** These stores will be run by cooperative societies and **Pradhan Mantri Kisan Samriddhi Kendras (PMKSKs).**
  - PMKSKs are one-stop-shops for farmers for multiple products such as seeds, fertilizers, pesticides etc.
- **Aim:** Prevent and treat livestock diseases such as **Foot and Mouth Disease (FMD), Brucellosis**, Peste des Petits Ruminants (PPR) **(also known as sheep and goat plague)**, Classical Swine Fever (CSF) (affecting pigs) and **Lumpy Skin Disease** (affects cattle).
- **Importance:** India's **20th Livestock Census (2019) reports around 536 million livestock,** including 303 million bovines. Diseases impact milk, meat yield, and farm income, with high medicine costs burdening farmers.
  - This initiative, alongside vaccination drives, aims to **reduce disease prevalence and financial strain.**

> **Note: "Generic medicines"** are basically **non-branded drugs**, which are marketed under a non-proprietary or approved name rather than a proprietary or brand name.

What is a Livestock Health and Disease Control Programme?

- **About:** The LHDCP is a Centrally Sponsored Scheme implemented by the **Department of Animal Husbandry and Dairying (DAHD)**, Ministry of Fisheries, Animal Husbandry, and Dairying.
  - LHDCP focuses on enhancing livestock health, productivity, and disease management, with a total outlay of Rs 3,880 crore from 2024-26.
- **Objective:** The program aims to eradicate **PPR by 2030, control CSF** through nationwide pig vaccination.
- **Components:** LHDCP consists of three components: **National Animal Disease Control Programme (NADCP), Livestock Health & Disease Control (LH&DC), and Pashu Aushadhi.**
  - LH&DC has three sub-components which are **Critical Animal Disease Control Programme** (targets PPR and CSF for eradication), **Establishment and Strengthening of Veterinary Hospitals and Dispensaries - Mobile Veterinary Unit** (supports doorstep livestock healthcare), and **Assistance to States for Control of Animal Diseases** (addresses state-prioritized diseases).

Livestock Sector in India

- **Growth and Contribution:** The livestock sector has grown at a **Compound Annual Growth Rate (CAGR) of 12.99% (2014-15 to 2022-23)**. It contributed **5.50%** of India's **total Gross Value Added (GVA)** in 2022-23.
  - The livestock sector contribution to **agriculture and allied sector GVA** increased from **24.38% (2014-15) to 30.23% (2022-23)**.
  - Livestock provides livelihood to **two-third of rural communities.** It also provides employment to about **8.8 % of the population in India.**
- **Milk, Meat, and Egg Production: India ranks 1st in milk production**, contributing **24.76% of global production**.
  - **Milk production** increased from **146.31 million tonnes (2014-15) to 239.30 million tonnes (2023-24)**, growing at a CAGR of **5.62%**.
  - **India ranks 2nd in egg production (1st China)** and **5th in meat production** globally (Food and Agriculture Organization, 2022).
    - **Egg production** grew from **78.48 billion (2014-15) to 142.77 billion (2023-24)** at a CAGR of **6.87%**.
    - **Meat production** increased from **6.69 million tonnes (2014-15) to 10.25 million tonnes (2023-24)** at a CAGR of **4.85%**.
- **Government Initiatives Driving Growth: Rashtriya Gokul Mission** promotes indigenous breed conservation. The **National Programme for Dairy Development** enhances milk processing, while the **National Livestock Mission** expands insurance and fodder production.
  - **Animal Husbandry Infrastructure Development Fund (AHIDF)** supports private investments in dairy, meat, and veterinary infrastructure.

Namami Gange Programme

Why in News?

The **Namami Gange Programme (NGP)** has marked significant progress in its mission to rejuvenate the **sacred River Ganga**.

- It was launched in **2014** with a **Rs 20,000 crore** budget until **2021**, and now extended to **March 2026** with **Rs 22,500 crore** (total: Rs 42,500 crore).

What is the Namami Gange Programme?

➢ **About:** It is a **flagship programme** for the **rejuvenation of the Ganga River** and its tributaries by **reducing pollution, improving water quality, and restoring the river's ecosystem.**

➢ **Implementation:** <u>Five-Tier Structure for Ganga Rejuvenation</u>.

Key Pillars of NGP

Sewerage Treatment Infrastructure
Managing wastewater effectively

River-Surface Cleaning
Removing solid waste and pollution

Afforestation
Planting trees and restoring green cover

Industrial Effluent Monitoring
Protecting the river from harmful discharges

River-Front Development
Creating public spaces for engagement

Biodiversity
Enhancing ecological health

Public Awareness
Educating citizens on conservation

Ganga Gram
Developing model villages along the river

➢ **Key Interventions:**
   ○ **Pollution Abatement (Nirmal Ganga):** Setting up **sewage treatment plants (STPs),** reducing **industrial and domestic waste discharge.**
   ○ **Improving Ecology and Flow (Aviral Ganga):** Restoring **natural flow and biodiversity,** implementing **water conservation measures.**
   ○ **Strengthening People-River Connect (Jan Ganga):** Promoting **community participation and awareness,** involving **local stakeholders in conservation efforts.**
   ○ **Facilitating Research and Policy (Gyan Ganga):** Supporting **scientific research and studies**, formulating **evidence-based policies.**

➢ **Implementation:** Under the <u>Hybrid Annuity Model (HAM)</u>, an <u>Special Purpose Vehicle (SPV)</u> by the winning bidder handles **STP development, operation, and maintenance**.
   ○ **40%** of costs are paid **post-construction**, **60%** over the project's **lifespan.**

➢ **Key Achievements:**
   ○ **Pollution Abatement**: Sewage treatment capacity **surpassed the pre-2014 capacity by over 30 times.**
   ○ **Improvement in Water Quality**: Water quality improved in **Uttar Pradesh** from BOD 10-20 mg/l (2015) to **3-6 mg/l (2022)**, in **Bihar** from 20-30 mg/l (2015) to **6-10 mg/l (2022)**, and in **West Bengal** from 10-20 mg/l (2018) to **6-10 mg/l (2022).**

- **Biochemical Oxygen Demand (BOD)** measures **oxygen needed** by microorganisms to **break down organic matter** in water. **Higher BOD** indicates **more pollution**; lower BOD means cleaner water.
  - ○ **Impact on Biodiversity:** The **Gangetic river dolphin** population increased from 3,330 in 2018 to **3,936 in 2024,** with sightings in new stretches like **Bithura to Rasula Ghat (Prayagraj)**, **Babai**, and **Bagmati Rivers**.
- ➢ **Global Recognition:** In December 2022, the **UN Decade on Ecosystem Restoration** acknowledged **NGP** as one of the **Top 10 World Restoration Flagship Initiatives**.
  - ○ The International Water Association awarded **NGP** the title of **Climate Smart Utility**.

> **Click Here to Read: What are the Challenges in the Namami Gange Programme?**

Importance of River Ganga
➢ **Lifeline of India**: Supports **47% of India's population** across **11 states**.
➢ **Agriculture & Economy**: **65.57% of the basin** is used for agriculture.
➢ **Cultural & Religious Significance**: Sacred to million people across different religions.
➢ **Water Scarcity**: The **Ganga River Basin** is the **second most water-stressed** in India, receiving only **39% of the average per capita annual rainwater input**.
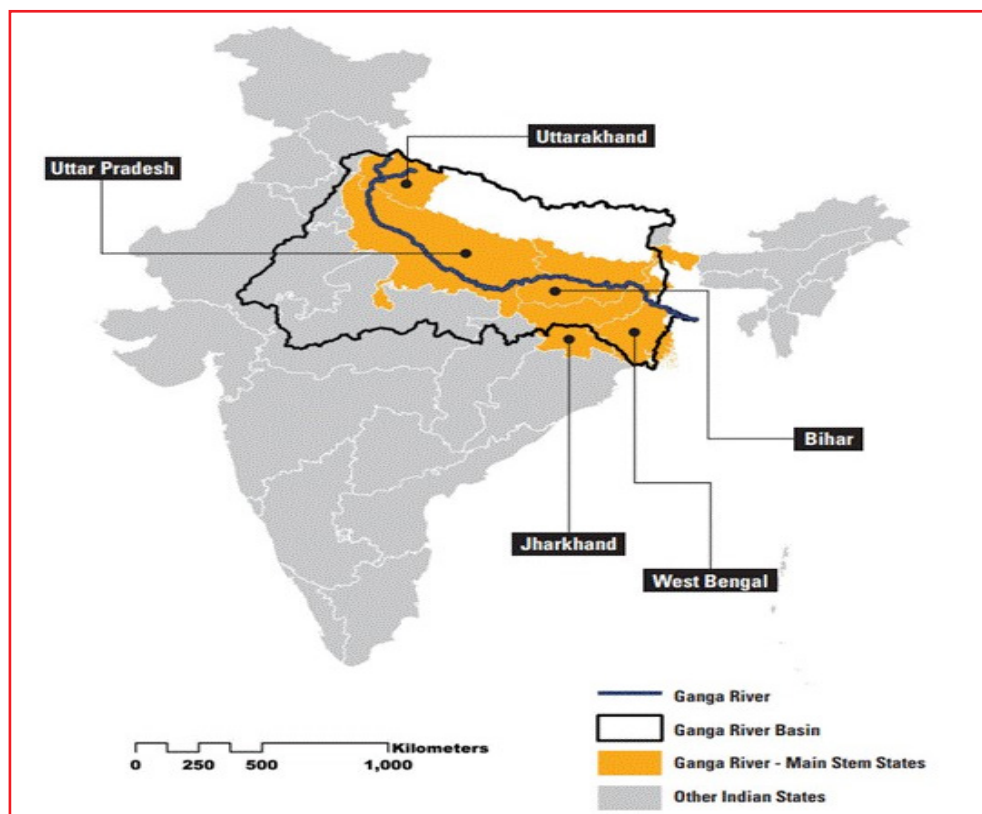
Electors Photo Identity Card Number

Why in News?

West Bengal Chief Minister has accused the **Election Commission of India (ECI)** of facilitating voter duplication by allowing the **same Electors Photo Identity Card (EPIC) numbers** for multiple voters across different states.

- The ECI has denied any electoral malpractice, attributing the issue to legacy data errors before the introduction of **ERONET (Electoral Roll Management System).**

What is an EPIC Number?

- **About:** The EPIC number, introduced in 1993 under the **Registration of Electors Rules, 1960**, is a **10-digit alphanumeric voter ID** number issued by the ECI to each registered voter. It is designed to **prevent voter impersonation and electoral fraud.**
- **Issuance and Digital Management:** The EPIC number is generated via **ERONET**.
  - ERONET is a **web-based platform for election officials** to manage registration, migration, and deletion of names from electoral rolls, automating the electoral roll process in multiple languages and scripts.

- **Importance:** It serves as a **unique identifier** linking a voter to their **photo, constituency, and polling station**.
  - A mismatch in EPIC records could lead to voter disenfranchisement or manipulation.
- **EPIC Duplication Issue:** ECI admitted that duplicate EPIC numbers occurred due to manual data entry and decentralized systems before ERONET.
- **ECI Stance on EPIC Issue:** ECI clarified that EPIC numbers alone don't determine voting eligibility, voters can only vote at their registered polling station. Even with identical EPIC numbers, demographic details, polling booths, and constituencies are unique across states.
  - The ECI assured that **ERONET 2.0** would be updated to eliminate duplicate EPIC numbers.

Electronic Voting Machine

EVM / VVPAT THE PRIDE OF INDIAN ELECTIONS

It's Robust, It's Secure

Control Unit (CU) • Voter Verifiable Paper Audit Trail (VVPAT) • Ballot Unit (BU)

VOTE CAST IN EVM/ VVPAT NEVER GETS INVALIDATED

340+ CRORE VOTERS
132 Assembly Elections — 4 Lok Sabha Elections
(used EVMs since 2004)

112+ CRORE VOTERS
26 Assembly Elections — 1 Lok Sabha Election
(used EVMs & VVPATs since December 2017)

HOW TO CAST YOUR VOTE

Ready to Vote — The Polling Officer 3 will enable the Ballot Unit while you enter the voting compartment. The 'Ready' light of BU will glow.

Cast your Vote — Press the Blue Button on the Ballot Unit against the name/ symbol of candidate of your choice.

See the Light — The red light against the name/ symbol of candidate chosen will glow.

Verify your Vote — The VVPAT will print & display the ballot slip containing Serial Number, Name and Symbol of the chosen candidate.

Beep Sound — The Beep sound from the Control Unit marks the proper registration of your Vote.

Election Commission of India
www.eci.gov.in

USED IN OVER 10 LAKH POLLING STATIONS IN LOK SABHA ELECTIONS, 2019

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> ➤ **EVM (Electronic Voting Machine)** is a device used to electronically record and count votes in elections. The Indian EVM, also known as **ECI-EVM,** consists of Ballot Unit (BU), Control Unit (CU) and the later added **Voter Verifiable Paper Audit Trail (VVPAT).**
>
> - ○ The CU, operated by polling officials, and the BU, where voters cast their votes. VVPAT is a system linked to the EVMs, allowing voters to verify that their vote has been correctly recorded.

Election Commission of India (ECI)

About
- Autonomous Constitutional Authority - Administers Union/state election
  - ○ LS, RS, State LA, the offices of the President and VP
- Estd - **25th Jan 1950** (National Voters' Day)

Constitutional Provisions
Part XV - Article 324 to 329

Structure
- 1 Chief Election Commissioner and 2 Election Commissioners **appointed by President**
- **Tenure- 6 years, or up to the age of 65 years,** whichever is earlier
- Retiring ECs – **eligible for further appointment by the govt.**
- **Removal of CEC-** Resolution on the **ground of proven misbehaviour or incapacity,** with majority of 2/3rd members present and voting, supported by more than 50% of the total strength of the house
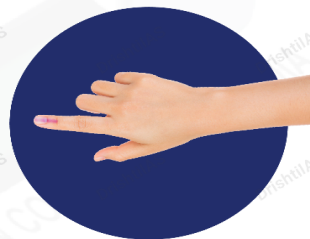
Major Roles and Responsibilities
- Determining Electoral Constituencies
- Preparing/Revising electoral rolls
- Notifying the schedules and dates of elections
- **Registering political parties and granting them the status of national or state parties**
- Issuing the Model Code of Conduct (MCC) for political parties
- Advising the President on **matters concerning the disqualification of MPs**

Challenges
- Truncated Tenure of CEC
- Executive Influence in Appointments
- Dependence on Centre for Finance
- Lack of Independent Staff

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Boosting R&D for India's Growth

Why in News?

India is the **2nd-largest** producer of **Science, technology, engineering, and mathematics (STEM)** graduates after China. Despite this achievement, **India ranks 39th** on the **Global Innovation Index 2024**, significantly behind **China (11th)** showcasing **low Research and development (R&D) funding** in India.

What are Key Highlights of the R&D Ecosystem?

➤ **R&D Funding Status:** India spent **only 0.65%** of its **GDP** on R&D in 2022, **China** spent **2.43%**, and **Brazil 1.15%**.

➤ **Need to Prioritize R&D:**
  ○ **Economic Growth:** R&D is crucial for India to **compete globally** and shed its **lower-middle-income status**, and achieve its **productivity potential.**
  ○ **Industrial Development:** Key sectors such as **pharma, chemicals, and automotive** require technological advancement to compete with developed nations and emerging economies.
    ● Also, R&D is needed for **deep-tech startups** involved in **quantum computing,** biotechnology, **robotics**, and **nanotechnology**.
  ○ **Labour-Intensive Sectors:** Rising labor costs demand **innovation** like **automated assembly lines**, integration of **AI & digital tools** for productivity, value, and exports.

➤ **Global R&D Scenario:**
  ○ **South Korea:** In 1970, South Korea was **poor but grew rapidly** over two decades, increasing R&D spending from **0.4% to 2.5% of GDP.**
    ● Between **1975 and 2005**, it became a **developed nation**, and R&D investment by its corporate sector **rose 800 times**.
  ○ **China:** R&D spending rose from **0.6% of GDP** in the late 1990s to **2.4% currently,** coinciding with its **best growth years.**

What are the Challenges in India's R&D Ecosystem?

➤ **Low Investment:** India's R&D spending is much lower than that of advanced economies such as the **US (3.46%), Japan (3.30%), Israel (5.56), and South Korea (4.93)**.

➤ **Government-Centric R&D:** Indian R&D still **relies heavily on government funding** and institutions. e.g., In **2020–21**, the **Private Sector Industry** contributed **only 36.4%** of R&D funding.

➤ **Weak Academia-Industry Link:** Indian research institutions and industries operate in **silos, reducing innovation potential,** and **interdisciplinary research**.
  ○ e.g., **Stanford University** played a central role in the early development of **Silicon Valley** but such coordination lacks in India.

➤ **Lack of Diversification:** India's R&D efforts have historically focused on a few priority sectors, particularly **defense and space** and ignored **industrial R&D**. e.g., more focus on **missiles (Agni, BrahMos),** at the cost of **semiconductors**.
  ○ Indian industries prefer **importing technology (risk averse)**, while **startups** and firms focus on **IT and e-commerce** over deep-tech innovation.

➤ **Hurdles in Technology Transfer:** Research conducted by **DRDO, ISRO,** and **BARC** often does not translate into **commercial products** due to bureaucratic hurdles.

What are India's Initiatives Related to R&D?
➤ **Vigyan Dhara Scheme**
➤ **Rashtriya Vigyan Puraskar (RVP)**
➤ **Science, Technology, and Innovation Policy 2020**
➤ **VAIBHAV Fellowship**

What Reforms Can Strengthen India's R&D Ecosystem?

➤ **Increased R&D Investment:** India should **increase R&D spending** over the next decade, with a **significant** share coming from the **private sector.**
  ○ Utilise **Anusandhan National Research Foundation (ANRF)** by encouraging **private sector and philanthropic investments** in research.
  ○ **Rs 1 lakh crore innovation fund** announced in the **union budget 2025–26** should be disbursed **within 3–5 years** to boost deep-tech R&D..

➤ **University-Led Research Model:** Indian **Higher Education Institutions (HEIs)** can carry out **upstream research** pushing forward the **frontiers of knowledge** and can help industry **commercialise mature technologies** for the market.

➤ **Efficient Project Management:** ANRF can follow the **US Defense Advanced Research Projects Agency (DARPA) model** with efficient programme managers, transparent funding, and a **CEO-led team**.

➤ **Risk Taking:** Early-stage research involves **open-ended exploration** that may not always succeed but leads to **future breakthroughs.**
  ○ The government should **track projects** while allowing some **risk-taking.**

One Candidate Multiple Constituencies

Why in News?

The debate on electoral reforms in India has gained momentum with the introduction of the **One Nation, One Election (ONOE) Bills.** This has also highlighted the issue of **One Candidate, Multiple Constituencies (OCMC)**, where a candidate contests elections from more than one constituency.

➤ This trend, while legally permitted, raises concerns about governance efficiency, public trust, and the financial burden of frequent elections.

What are the Provisions Regarding OCMC?

➤ **Representation of Peoples Act (RPA), 1951:**
  ○ **Before 1996:** No restriction on the number of seats a candidate could contest. Winners could vacate all but one.
  ○ **Post 1996:** Section 33(7) of the RP Act restricts candidates to contesting from a maximum of two constituencies at the same time in an election.
    ● If a person is elected to multiple seats in Parliament or a State Legislature, they must resign all **but one within the prescribed time.** Otherwise, **all their seats will be vacated** under **Section 70 of the RP Act.**
    ● **Bye-elections** held to fill vacated seats within six months (Section 151A).
➤ **Constitutional Provisions:** **Article 101** deals with the vacation of seats, disqualifications, and dual membership in Parliament.
  ○ **Article 101(1)** states that no person can be a member of **both Houses of Parliament,** and a law shall provide for vacating one seat if elected to both.
  ○ **Article 101(2):** No person can be a member of **both Parliament and a State Legislature.** If elected to both, they must resign from the State Legislature within the period specified by the President, or their **Parliament seat is vacated.**
➤ **Prohibition of Simultaneous Membership Rules, 1950:** A person cannot hold membership of both Parliament and a state legislature at the same time.

What are the Key Challenges Associated with OCMC?

➤ **Favors the Ruling Party:** Ruling parties, with control over state resources, gain an advantage in bye-elections, making it harder for opposition parties.
➤ **Financial Strain:** Frequent by-elections due to multiple-seat wins increase costs and burden **taxpayers.**
  ○ The 2024 Lok Sabha election cost Rs 6,931 crore, with by-elections adding Rs 130 crore.
    ● However, the larger concern is political party spending, estimated at Rs 1.35 lakh crore, raising questions about financial transparency and the possible influence of unaccounted funds (**black money**), ultimately impacting the public.
  ○ Additionally, defeated candidates must **recontest within months**, straining party resources and **hindering fair competition**.
➤ **Parachute Candidacy Issues:** A parachute candidate refers to a **candidate contesting elections in a constituency where they have little connection** or local presence.
  ○ In OCMC, parachute candidates often lack local engagement and accountability, sidelining grassroots leaders and causing party dissatisfaction.
➤ **Administrative Disruptions:** Frequent elections lead to the repeated enforcement of the **Model Code of Conduct (MCC),** delaying government policies and straining resources.
➤ **Breach of Voter Trust:** Elections should serve the people, but **OCMC prioritizes political interests**. It reduces accountability and favors politicians over the electorate, leading to **leader-centric politics** and undermining democratic processes.
➤ **Potential Violation of Fundamental Rights:** Could undermine **Article 19(1)(a)** (freedom of speech and expression) by depriving voters of their chosen representative.

Global Practices of OCMC

➤ **Australia:** A sitting legislator must resign before contesting for another parliamentary house.
➤ **European democracies:** The United Kingdom has banned OCMC since 1983, and most European democracies have phased it out to ensure clear representation and accountability.
➤ **Italy:** One cannot contest simultaneously for the Senate and the Chamber of Deputies.
➤ **Pakistan & Bangladesh:** Allow candidates to contest **multiple constituencies** but require them to vacate all but one.

What Reforms Can be Introduced to Regulate OCMC?

➤ **Banning OCMC:** The <u>Election Commission of India (ECI)</u> and the **255th Law Commission Report (2015)** recommended **banning multiple seat contests**.

   ○ This would **enforce "One Election, One Candidate, One Constituency (OCOC)"** strengthening democratic fairness.

ELECTORAL REFORMS IN INDIA

ELECTORAL REFORMS ARE CHANGES MADE TO IMPROVE THE ELECTION PROCESS AND ENSURE FAIRNESS.

Electoral Reforms Before 1996

- **Model Code of Conduct (1969):** Guidelines to regulate political parties and candidates prior to elections
- **61st Constitutional Amendment Act (1988):** Lowering of the voting age from 21 to 18 years
- **Electronic Voting Machines (EVMs) (1989):** Switched from individual colored ballot boxes to ballot papers, and later to EVMs
- **Booth Capturing (1989):** Provision for adjournment of poll or countermanding of elections in such cases
- **Elector's Photo Identity card (EPIC) (1993):** Electoral roll is the basis to issue EPIC to registered electors
- **ECI- A Multi-member Body (1993):** Election commissioners were appointed in addition to CEC

Electoral Reforms of 1996

- **Time-limit for By-elections:** Elections must occur within 6 months of any vacancy in a legislative house
- **Listing of Names of Candidates:** Contesting candidates categorized into 3 groups for listing
  - Recognised & registered-unrecognised political parties
  - Other (independent)
- **Disqualification for Insulting the National Honour Act, 1971:** Leads to election disqualification for 6 years upon:
  - Insulting the National Flag, Constitution of India or preventing the singing of National Anthem

Electoral Reforms After 1996

- **Vote Through Proxy (2003):** Service voters in Armed Forces & forces under Army Act can vote by proxy
- **Allocation of Time on Electronic Media (2003):** Equitable sharing of time on electronic media during elections to address the public
- **Introduction of Braille Signage Features in EVMs (2004):** To facilitate the visually impaired voters to cast their votes without an attendant

Electoral Reforms Since 2010

- **Voting Rights to Indian Citizens Living Abroad (2010)**
- **Online Enrollment in Electoral Roll (2013)**
- **Introduction of NOTA option (2014)**
- **VVPAT Voter Verified Paper Audit Trail (2013):** Introduction of VVPAT with EVMs to conduct free and fair elections
- **Photos of Candidates on EVMs and Ballot Papers (2015):** To prevent confusion in constituencies with namesake candidates
- **Introduction of Electoral bonds (2017 Budget):** An alternative to cash donations for political parties
  - Declared as unconstitutional by SC (2024)
- **Launch of Electronic EPIC (2021)**
- **Home Voting for People with Disabilities & Those Above 85 years of Age (2024)**

IMPORTANT COMMITTEES/ COMMISSION

Committees/ Commission	Year	Purpose
Tarkunde Committee	1974	By Jaya Prakash Narayan (JP) during the "Total Revolution" movement.
Dinesh Goswami Committee	1990	Electoral Reforms
Vohra Committee	1993	On the Nexus between Crime and Politics
Indrajit Gupta Committee	1998	State Funding of Elections
Second Administrative Reforms Commission of India	2007	Report on Ethics in Governance (Headed by Veerappa Moily)
Tankha Committee (Core Committee)	2010	To look into the whole gamut of the election laws & electoral reforms.

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- ➢ **Recover Bye-Election Costs:** Candidates who vacate a seat should bear the bye-election expenses to deter seat-hopping.
- ➢ **Delay Bye-Elections:** Extending the **cooling off period for bye-elections to one year** would allow defeated candidates more time to prepare while also reducing the ruling party's unfair advantage in such elections.
- ➢ **Mandatory Resignation:** Candidates should resign from their existing position before contesting another election to ensure commitment to their elected role.

Reasonable Classification Test

Why in News?

The *Anwar Ali Sarkar Case, 1952* is a landmark Supreme Court ruling that laid the foundation for the reasonable classification test under Article 14 of the Indian Constitution.

- ➢ This test has now become a **standard for evaluating** the constitutionality of laws.

What is a Reasonable Classification Test?

- ➢ **About:** It is a **legal principle** under **Article 14 of the Indian Constitution** that ensures **fair treatment** by permitting the grouping of **individuals or entities** based on **clear differences** that are logically linked to the law's objective.
  - ○ It **prevents arbitrary discrimination** while acknowledging that not all cases are identical.
- ➢ **Essential Features:**
  - ○ Classification must be based on a **clear and reasonable distinction**.
  - ○ The distinction must **logically connect** to the law's purpose.
  - ○ The classification should address **social or policy needs** without violating rights.
  - ○ Large groups **cannot be arbitrarily selected** for different treatment (no class legislation). It must ensure **justified**, not random, differences in treatment.
- ➢ **Significance:**
  - ○ **Support Specific Regulations:** It allows **tailored laws** for distinct societal conditions, ensuring **equal treatment doesn't lead to unfairness**.
    - It guides lawmakers and judges in **interpreting statutes** to prevent irrational outcomes.
  - ○ **Legitimacy Testing:** It assesses the legitimacy of laws, ensuring rationality and reducing legal challenges.
  - ○ **Standard for Judicial Review:** It offers a standard for courts to **review a**nd nullify irrational or arbitrary administrative actions, ensuring **legislative accountability.**
- ➢ **Limitations:**
  - ○ **Risk of Unjustified Differentiation**: If not applied properly, it can lead to **unjust differentiation** and potentially violate fundamental rights.
  - ○ **Subjectivity:** Classification factors (e.g., **age, gender, physical strength**) can be subjective, leading to inconsistent judicial interpretations of the doctrine.

What is the Anwar Ali Sarkar Case, 1952?

- ➢ **Background**: In 1950, **Anwar Ali Sarkar** was convicted under the **West Bengal Special Courts Act, 1950** by the **Alipore Sessions Court** that sentenced him to **transportation for life.**
- ➢ **SC Judgement (1952):** The SC **invalidated a law permitting the arbitrary referral of cases to special courts,** stating that the classification lacked a **logical connection** to a legitimate objective.
  - ○ The ruling **established the "reasonable classification" test**, which allows for **exceptions to equality under Article 14** under certain conditions.

Article 14 (Equality Before the Law)
➢ **About:** No person, whether a **citizen or foreigner,** can be denied **equality before the law or the equal protection of the laws** in India.   ○ **Equality Before the Law** ensures **no special privileges,** applying the same laws to all. **Equal Protection of the Laws** guarantees **equal treatment under similar circumstances.** ➢ **Reasonable Classification:** Article 14 forbids **class legislation** but allows **reasonable classification** based on **intelligible differentia** (distinguishable differences).

Judicial Stand on Doctrine of Reasonable Classification

➢ *Saurabh Chaudri Case, 2004*: Two key principles were laid down by the SC:
  ○ **Intelligible differentia**: The classification must be based on **clear and distinct reasons** for distinguishing a group.
  ○ **Rational nexus**: The classification must have a **logical connection** to the **objective of the law.**
➢ *Shri Ram Krishna Dalmia, 1958*: A law can be **constitutional** if it applies to a **specific individual** due to s**pecial circumstances**, treating them as a class.
  ○ There is a **presumption of constitutionality**, and the **burden of proof** is on **challengers** to show it violates constitutional standards.

Need for Balanced Cryptocurrency Regulation

Why in News?

The US administration has embraced **crypto assets**, solidifying their place in global finance. While countries like Vietnam push for clear regulations and the EU sets global standards with **MiCA**, **India still waits for a discussion paper**.

What is Cryptocurrency?

About

➢ A cryptocurrency is a **digital or virtual currency** that uses cryptography to secure transactions. It is a **decentralized currency (**not controlled by any government or institution).

CRYPTOCURRENCY

Cryptocurrency is a digital or virtual currency that employs cryptography for secure, decentralized transactions and operates on blockchain technology.

Features of Crypto

- Virtual money secured by cryptography
- Direct peer-to-peer transactions, eliminating the need for banks
- Entries recorded in a public ledger, not as physical cash
- Encrypted; advanced coding methods ensure high-level security
- Decentralised; not controlled by any government

Legal Status: Cryptocurrency

- **Declared Legal: El Salvador** (2021) and **Central African Republic** (2022); first and second countries to recognise Bitcoin as legal tender
  - Other Countries where Bitcoin is legal: US, UK, European Union, Canada, Australia, Japan, Switzerland
- **Declared Illegal:** China, Pakistan, Saudi Arabia, Tunisia, and Bolivia
- **Status in India:**
  - Not a legal tender but not banned either
  - **Taxation:** 30% tax on profits & 1% TDS on transfers (Budget 2022-23)
  - RBI launched its **CBDC - Digital Rupee** in 2022

Types of Cryptocurrency (Utility-based)

- **Utility Token:** Used to access services or features within a blockchain platform (Eg. Ethereum (ETH) & Ripple (XRP))
- **Transactional:** Tokens used for payments (Eg. Bitcoin (BTC))
- **Voting Token:** Tokens that provide voting rights on a blockchain (Eg. Uniswap)
- **Platform Based:** Tokens for utilizing a proof-of-stake mechanism to enable smart contracts (Eg. Solana)
- **Security:** Tokens representing asset ownership (Eg. Millennium Sapphire)
- **Stablecoins:** Created to reduce the volatility which is common in many cryptocurrencies

How Does It Work?

- **Mining:** Solves equations with computer power to validate transactions & earn rewards
- **Security:** Cryptography prevents manipulation
- **Blockchain:** Transactions are recorded on a distributed public ledger
- **Decentralization:** Verified & maintained by a global network of computers
- **Digital Wallet:** Stores keys for sending & receiving cryptocurrency

Benefits

- Decentralization
- Lower transaction fees
- Fast Transactions
- Security through cryptography
- Transparency
- Generates high returns

Challenges

- Pseudonymous transactions
- Price volatility
- Regulatory uncertainty
- Potential for criminal use
- Scalability Issues
- High energy use in mining

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➢ Transactions with cryptocurrency are recorded on a **public digital ledger** called blockchain.
  - This ledger is **maintained by a network of computers** around the world, and each new transaction is verified and added to the blockchain by these computers.

➢ The decentralization and use of cryptography make it **difficult for anyone to manipulate** the currency or the transactions recorded on the blockchain.

➢ Some examples of cryptocurrencies include **Bitcoin, Ethereum, and Litecoin.**

Difference Between Cryptocurrency, e-Money, Physical Currency

Category	Cryptocurrency	e-Money	Physical Currency (Rs)
Accessibility	Largely limited to Internet connection	Access to e-devices such as mobile phones and an agent network	Physical access to cash, ATMs, and bank branches
Value	Determined by supply, demand and trust in the system	Equal to amount of **fiat currency exchanged** into electronic form	Backed by the government, determined by monetary policy
Customer ID	Anonymous	Required adequate customer identification	Not required for transactions, but required for bank accounts
Production/ Issuer	Mathematically generated ("mined") by community of developers, called "miners"	Digitally issued against receipt of equal value of fiat currency of central authority by RBI	Central bank (RBI)
Regulator or Oversight	Mostly Unregulated	Central Bank/Board	Central Bank (RBI)

DIGITAL RUPEE

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- A digital version of Indian rupee
- Also known as e-rupee, Central Bank Digital Currency (CBDC)
- A centrally owned digital currency, **unlike privately owned cryptos**
- **Offline functionality proposed** - one can transact without the internet

Advantages

- **No or Minimal Disruption** to the financial system
- **Free of Risk:** Offers people the experience of dealing in currency in digital form, minus the risks seen with cryptos
- **Reasonable Anonymity:** Offers reasonable anonymity for small value transactions akin to physical cash

Issues

- Cyber security
- Privacy and issue of Data use
- Digital Divide
- Uncompetitive step vis-a-vis other market players like Visa, Mastercard, etc.

Roll Out Plan

- **Wholesale:** For restricted access to select financial bodies, also called **CBDC-W.**
  - Targets to make settlement systems more efficient and secure
  - It could be account-based
- **Retail:** It would be potentially available for use by all also called **CBDC-R.**
  - It could offer safer means of digital payment for citizens
  - This could likely be token-based, akin to cash

- **Ten countries have launched CBDC** (July 2022) First was Bahamian Sand Dollar in 2020 and the latest was Jamaica's JAM-DEX

Regulations

➢ **Global:** Most cryptocurrencies operate outside national government regulations, serving as **alternative currencies** beyond state monetary policies.

 ❍ **Switzerland** has embraced crypto with a well-defined regulatory framework, ensuring investor protection while fostering blockchain innovation.

 ❍ In September 2021, <u>El Salvador</u> became the first country to adopt Bitcoin as <u>legal tender</u>.

➢ **India: Cryptocurrency in India is unregulated** but not specifically banned.

Evolution of India's Regulatory Framework for Virtual Digital Assets(VDA)

2013–2017 — RBI expressed concerns about VDAs like Bitcoin

April 2018 — RBI issued a circular banning services to VDA businesses

2020 — Supreme Court overturned the RBI circular

2021 — Draft bill introduced to ban private cryptocurrencies

2022 — 30% tax on VDA transfers introduced

2023 — Virtual Asset Service Providers (VASPs) included as Reporting Entities under PMLA

Why Does India Need a Policy for Cryptocurrency?

➢ **Preventing Talent Exodus:** A blanket ban on cryptocurrencies could lead to a **significant brain drain,** along with the **flight of capital** as seen after the <u>RBI's 2018 ban</u>, with blockchain experts moving to crypto-friendly countries and halting blockchain innovation in India.

➢ **Integrating into the Global Financial Ecosystem:** By embracing cryptocurrency, India can position itself as a **key player in the global financial ecosystem,** attracting investments and fostering growth in crypto startups through initiatives like **'crypto export zones.'**

➢ **Leveraging New Technology and Services:** The growing demand for blockchain applications in **scalability, security, and analytics** presents an opportunity for India to **develop a large talent pool with expertise** in crypto technologies, driving technological advancement.

➢ **Encouraging Financial Innovation:** The dynamic nature of blockchain technology **offers vast potential for innovative business models** and applications, with long-term impacts that could revolutionize various sectors, necessitating a balanced regulatory approach.

- **Enhancing Investor Protections:** To safeguard investors, **India needs to implement robust education and guidelines** against mis-selling, regulate crypto assets as commodities, which can also **boost government tax revenues** by increasing tax base.
  - Stricter oversight is also needed to prevent their use in **sophisticated fraud schemes,** including **ransomware attacks** and investment scams.

What are the Challenges Cryptocurrency Poses?

- **Market Volatility:** Cryptocurrency is **highly speculative**, leading to significant **price fluctuations** and potential for substantial losses when investing large amounts.
- **Risk of Misuse:** The ease of transferring cryptocurrency across borders without accountability **increases the risk** of it being used for **money laundering** and **terror financing.**
- **Scalability Issues:** Blockchain's **growing data size limits capacity,** making rapid large-scale transactions challenging, especially during national emergencies.
- **Economic Imbalance:** The rise of the cryptocurrency market can **disrupt the circular flow of money** in the Indian economy, differing significantly from traditional cash creation processes.
- **Lack of Regulatory Oversight:** The absence of a dedicated forum or grievance redressal mechanism for crypto assets **leaves consumers vulnerable** to transactional and informational risks.

Preventive Detention

Why in News?

The **Supreme Court (SC) of India**, in *Mortuza Hussain Choudhury vs State of Nagaland, 2025,* reaffirmed that **preventive detention** is a draconian measure (severe) requiring strict adherence to constitutional and statutory safeguards.

- The ruling struck down Nagaland's detention orders for lacking proper justification and violating legal principles.

What is the SC Ruling Regarding Preventive Detention?

- **Case:** Two individuals were preventively detained under the **Prevention of Illicit Traffic in Narcotic Drugs and Psychotropic Substances Act, 1988 (PITNDPS Act)** after a drug seizure, based on police allegations of resumed trafficking if released, but without separate grounds.
- **SC Judgment:** The Supreme Court ruled that the detention orders violated **Section 6 of the PITNDPS Act by lacking separate, specific grounds.**
  - The SC noted that detainees, who did not understand English, were orally informed in Nagamese, but ruled this insufficient, citing the *Harikisan vs. State of Maharashtra (1962)* Constitution Bench ruling, which held that mere oral communication of detention grounds is inadequate.
  - The court stressed that **preventive detention affects fundamental rights** and must strictly comply with statutory norms. Consequently, the court quashed the detention orders.

What is Preventive Detention?

- **About:** It refers to detaining an individual **without trial** to prevent anticipated unlawful activities.
  - Unlike punitive detention, which follows **due process and conviction**, preventive detention **curtails individual liberty based on suspicion**.
- **Constitutional Provisions:** The protection against arrest and detention under **Articles 22(1) and 22(2) does not apply to individuals detained under preventive detention laws,** as stated in Article 22(3).
  - A person can be detained without trial for up to **three months** unless extended by an **Advisory Board** (consisting of persons qualified to be High Court judges).

○ The detainee must be **informed of the reasons for their detention** unless it harms public interest. They have the **right to legal representation**, although this right can be restricted in certain cases.

➢ **Key Laws Related to Preventive Detention:**

○ **National Security Act, 1980:** Allows detention to prevent threats to national security and public order.

○ **Unlawful Activities (Prevention) Act, 1967**: Prevents activities threatening India's sovereignty, security, and integrity.

○ **Public Safety Act, 1978:** Used in Jammu & Kashmir for preventive detention on grounds of public order and security.

➢ **Judicial Precedents:** In *Ameena Begum vs The State Of Telangana (2023),* the SC ruled that preventive detention is an exceptional measure and must not be used arbitrarily.

○ In the *Jaseela Shaji vs the Union of India case (2024)*, the Supreme Court ruled that detainees must be ensured a fair opportunity to challenge their detention.

PMMVY Implementation Concerns

Why in News?

Despite maternity benefits being a legal entitlement under the **National Food Security Act (NFSA), 2013**, the **Pradhan Mantri Matru Vandana Yojana (PMMVY)** faces significant implementation challenges, leaving millions of pregnant women without essential benefits.

What is PMMVY and its Concerns?

➢ **PMMVY:** The **PMMVY** is **Centrally Sponsored** scheme launched in 2017 under the **Ministry of Women and Child Development,** provides maternity benefits to eligible pregnant and lactating women.

○ However, government employees and those receiving similar benefits are not eligible.

➢ **Objectives:** PMMVY ensures maternal nutrition, promotes institutional deliveries, supports financial stability, and encourages the birth of girl children.

➢ **Key Features**: Provides **financial assistance** to support maternal health and nutrition.

○ **First child:** Rs 5,000 is provided, and additional benefits under **Janani Suraksha Yojana (JSY)** ensure that women receive around **Rs 6,000** in total.

○ **Second child (only if a girl):** Rs 6,000 is given to promote **gender equality** and discourage **female feticide**.

➢ **Concerns:**

○ **Restricted Coverage**: The scheme violates the **NFSA, 2013**, which mandates universal maternity benefits, by limiting benefits to only the **first two children**, with the second child covered only if it is a **girl**.

○ **Budget Cuts**: In **2023-24, the central government allocated just Rs 870 crore** for the scheme, only one-third of what was allocated in 2019-20.

● Covering **90% of births** at Rs 6,000 each would require at least **Rs 12,000 crore**.

○ **Poor Implementation**: The scheme's effective coverage dropped from **36% in 2019-20 to just 9% in 2023-24.**

○ **Bureaucratic and Digital Hurdles**: The scheme is plagued by **Aadhaar-based verification issues**, complex application processes and frequent software failures, making it difficult for **poor and digitally illiterate women** to access benefits.

Note: State-specific schemes outperform PMMVY, with Tamil Nadu (84%) and Odisha (64%) achieving higher coverage than PMMVY (<10%). They offer Rs 18,000 and Rs 10,000 per child, respectively, highlighting PMMVY's inefficiency.

What are the Provisions for Maternity Benefits Under NFSA?

➢ **NFSA 2013:** Aims to provide **food and nutritional security** by ensuring access to affordable food grains for a large section of India's population.

- ❍ The Act marks a shift from **welfare-based to rights-based food security,** making the [Public Distribution System (PDS)](#) more structured and legally binding.

➤ **Maternity Benefits Under the NFSA, 2013**: All pregnant women (except those in the formal sector) are entitled to **Rs 6,000 per child** as maternity benefits.
  - ❍ **Maternity benefits** help ensure **proper nutrition, healthcare, and rest** for pregnant women, which is crucial for maternal and child health.

> **Note:** Women in the **formal sector in India receive 26 weeks of paid maternity leave,** as per the **Maternity Benefit (Amendment) Act, 2017**.
>
> ➤ Globally, 51% of countries provide maternity leave of at least 14 weeks, the standard set by the [International Labour Organization (ILO)](#) Maternity Protection Convention, 2000.

NITI Aayog Calls for Quantum Strategy

Why in News?

A research paper titled *"Quantum Computing: National Security Implications & Strategic Preparedness"* by **NITI Aayog's Frontier Tech Hub (NITI-FTH)**, highlights the importance of [quantum computing](#) for India's security and economy, urging a multi-pronged approach to address **national security risks** from quantum advancements.

Quantum Computing
➤ It refers to a **class of technologies that leverage the principles of quantum mechanics** to perform computations and achieve capabilities not possible with traditional technology.
➤ It uses **qubits (quantum bits)**, which govern the behavior of matter at the atomic level. Unlike classical systems, which work in a **predictable way, qubits behave unpredictably,** enabling quantum computers to perform tasks that traditional technologies can't.

What are the Key Highlights of NITI Aayog's Report on Quantum Computing?

➤ **Global Quantum Investments:** Over **40 billion USD pledged by 30+ governments** worldwide. **China leads** with a **15 billion** USD investment, followed by the **US** and **Europe**.

➤ **India's Scenario:** The [National Quantum Mission (NQM)](#) was launched with a **budget allocation of Rs 6,003 crore** to **develop indigenous capabilities** in quantum technology and position India as a global leader in this emerging field.

➤ **Implications:** It has **dual-use applications** in the military and intelligence sectors, quantum technology can enhance **encryption, improve surveillance systems, and advance weaponry,** giving nations a technological edge in defense and national security.
  - ❍ Economically, they can drive innovation, create high-tech industries, and attract investment.

What are the Challenges Highlighted By Niti Aayog Report on Quantum Computing?

➤ **Lower Funding Compared to Global Peers:** India has allocated ₹6,003 crore (~USD 750 million) for the **NQM**, which is significantly **lower than that of other global players.** This **limits India's ability to compete in quantum infrastructure**, cutting-edge research, and talent acquisition.
  - ❍ **Funding gaps hinder large-scale commercialization**, delaying India's progress in building quantum supremacy.

➤ **Weak Domestic Supply Chain:** Quantum computing relies on highly specialized components, such as **Cryogenic systems for cooling quantum processors, High-purity materials** for building stable quantum circuits. India lacks indigenous manufacturing capabilities, leading to heavy dependence on foreign suppliers.

➤ **Limited Startup and Industry Participation:** Unlike the **US and Europe**, where **tech giants like Google, IBM, and Microsoft** drive quantum innovation, India's quantum ecosystem is **primarily driven by academia**.

○ Lack of private sector investment and venture capital funding limits the scalability and commercialization of Indian quantum innovations.

➤ **Cybersecurity Risks:** Quantum computers will eventually be capable of **breaking current encryption standards**, making **existing cybersecurity frameworks obsolete**.

○ **Sensitive government, military, financial, and personal data** stored using traditional encryption methods will be at risk.

○ Online banking, digital payments, and secure communications could be compromised, leading to economic instability and cyber fraud.

➤ **Intelligence & Espionage:** Quantum computing will significantly improve **Signals Intelligence (SIGINT)**, allowing nations to **decrypt intercepted communications at an unprecedented scale**.

○ Confidential diplomatic cables, military strategies, and classified intelligence could be exposed, posing serious risks to national security.

○ Nations with quantum decryption capabilities will gain a strategic advantage in intelligence gathering and cyber warfare.

○ **Adversaries equipped with quantum-powered defense systems** could gain an upper hand in military strategy and warfare technologies.

What is Quantum Technology?

➤ **Click Here Read More:** Quantum Technology

➤ **Click Here Read More:** Challenges and the Way Forward Related to Quantum Computing.

What is the National Quantum Mission?

➤ **About:** The Union Cabinet approved the National Quantum Mission (NQM) on 19th April 2023 for the period from **2023-24 to 2030-31.**

○ It aims to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology.

➤ **Key Objectives:**

○ **Development of Quantum Computers:** Create intermediate-scale quantum computers with **50-1000 physical qubits over 8 years,** using platforms like superconducting and photonic technologies.

○ **Secure Communications:** Satellite-based secure quantum communication between ground stations over 2000 km within India.

● Long-distance secure quantum communications with other nations.

○ **Quantum Sensing and Metrology:** Development of high-sensitivity magnetometers and **atomic clocks** for precision timing, communications, and navigation.

○ **Establishment of Thematic Hubs (T-Hubs):** Set up 4 T-hubs in top academic and national R&D institutes in the domains of:

● **Quantum Computing**

● **Quantum Communication**

● **Quantum Sensing & Metrology**

● **Quantum Materials & Devices**

NATIONAL QUANTUM MISSION

Aims to put India among the top six leading nations involved in the R&D in quantum technologies

■ *Presently, R&D works in quantum technologies are underway in the US, Canada, France, Finland, China and Austria* ■

- **Duration:** 2023-24 to 2030-31
- **Nodal Ministry:** Ministry of Science & Technology
- **Highlights of the Mission:**
  - Four Thematic Hubs (T-Hubs) in different domains across the country
  - Wide-scale applications ranging from healthcare and diagnostics, defence, energy and data security

- Strengthening of indigenously building quantum-based computer
- Help develop magnetometers with high sensitivity in atomic systems and atomic clocks
- Support design and synthesis of quantum materials

A huge boost to National priorities like digital India, Make in India, Skill India, Stand-up India, Start-up India, Self-reliant India and SDGs

Quantum Technology

Works by using the principles of quantum mechanics (the physics of sub-atomic particles), including quantum entanglement and quantum superposition

Quantum Superposition

- The ability of a quantum system to be in multiple states simultaneously
- While digital computers store data as bits (the ones and zeros of binary), quantum computers use qubits that exist as one, zero or both at the same time
- This superposition state creates a practically infinite range of possibilities, allowing for fast simultaneous and parallel calculations

Quantum Entanglement

- It means the two members of a pair (Qubits) exist in a single quantum state
- If you change the properties of one of them, the other changes instantly
- This can be used to create a secure encryption key in quantum cryptography
- If an eavesdropper tries to intercept the transmission, the entangled state of the particles will be disturbed, making the attempt detectable

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QUANTUM TECHNOLOGY

- Quantum Key Distribution
- Quantum Networks
- Quantum Simulators
- Post-Quantum Cryptography
- Quantum Sensors Particle Generators Atomic Clocks
- Quantum Cloud Computing
- Quantum Memories Quantum Repeaters Quantum Chips
- Quantum Software
- Quantum Computing Quantum Annealers
- Quantum Materials

What are the Recommendations Suggested by Niti Aayog on Quantum Computing?

➢ **Enhancing National Security Policy:** Establish a Task Force to continuously track global quantum advancements and assess potential threats.
  - ○ Develop an **Early Warning System to identify and mitigate emerging quantum threats** before they impact national security.
  - ○ Implement a **Post-Quantum Cryptography (PQC) Transition Plan** to secure government, financial, and industrial data against future quantum cyberattacks.

➢ **Boosting R&D:** Increase R&D funding to accelerate quantum startups and support indigenous hardware development.
  - ○ **Encourage private sector involvement** to bridge the gap between academia and industry for faster commercialization.

➢ **Strengthening Domestic Supply Chain:** Develop a robust domestic manufacturing ecosystem for critical quantum hardware components **such as cryogenic systems, high-purity materials, and specialized lasers.**
  - ○ Reduce dependency on foreign imports by investing in **quantum chip fabrication** and hardware production facilities.

➢ **Expanding Global Partnerships:** Forge bilateral agreements with **leading quantum nations** such as the **US, European Union, and Japan** to gain access to cutting-edge research, hardware, and expertise.
  - ○ **Advocate for relaxed export controls** on critical quantum components to **ensure uninterrupted access to essential technologies.**

Strengthening Tribunals in India

Why in News?

The **Supreme Court (SC)** is examining key issues affecting tribunals and reviewing the constitutional validity of the **Tribunal Reforms Act, 2021**.

➢ It underscored the importance of strengthening **tribunals** to ensure **efficient adjudication and maintain public confidence.**

What is the Tribunals Reforms Act, 2021?

About

➢ The **Act** was enacted to **streamline the functioning of tribunals** by **dissolving certain appellate tribunals** and transferring their functions to existing judicial bodies like the High Courts.

➢ It was introduced in **response to the Supreme Court's ruling in the case of** *Madras Bar Association vs. Union of India (2021),* which struck down certain provisions of the **Tribunal Reforms (Rationalisation and Conditions of Service) Ordinance, 2021.**

Key Provisions

➢ **Abolition of Tribunal:** The Act dissolves multiple appellate tribunals and shifts their functions to High Courts and other judicial bodies.

EIGHT TRIBUNALS DISSOLVED VIA BILL

Act under which Tribunal was set up	Abolished tribunal	Where disputes are heard after abolition
The Cinematograph Act, 1952	Film Certification Appellate Tribunal	High Court
The Trade Marks Act, 1999	Intellectual Property Appellate Board	High Court
The Copyright Act, 1957	Intellectual Property Appellate Board	Commercial Division of High Court
The Customs Act, 1962	Customs, Excise and Service Tax Appellate Tribunal	High Court
The Patents Act, 1970	Intellectual Property Appellate Board	High Court
The Airports Authority of India Act, 1994	Airports Appellate Tribunal	■ Central government (disposal of properties on airport premises left by unauthorised occupants) ■ High Court (appeals against eviction orders)
The Control of National Highways (Land & Traffic) Act, 2002	The National Highways Tribunal	Civil Court
The Geographical Indications of Goods (Registration and Protection) Act, 1999	Intellectual Property Appellate Board	High Court

drishti

- ➢ **Search-cum-Selection Committee:** It has been established to recommend the appointment of tribunal chairpersons and members.
  - ○ **For Central Tribunals:**
    - ● **Chairperson:** Chief Justice of India (CJI) or a Supreme Court judge nominated by the CJI (casting vote).
    - ● Two **Secretaries** nominated by the Central Government.
    - ● **Sitting/outgoing Chairperson of the tribunal**, or a retired Supreme Court judge, or a retired Chief Justice of a High Court.
    - ● **Non-voting member:** Secretary of the relevant Union Ministry.
  - ○ **For State Administrative Tribunals:**
    - ● **Chairperson:** Chief Justice of the respective High Court (casting vote).
    - ● **Chief Secretary** of the State Government.
    - ● Chairman of the **State Public Service Commission.**
    - ● **Sitting/outgoing Chairperson of the Tribunal** or a retired High Court Judge.
- ➢ **Tenure and Age Limits**: Tenure for Chairperson and Members **4 years**, with a **minimum age of 50 years**.
  - ○ The **maximum age limit** is **67 years for tribunal members** and **70 years for chairpersons**, or completion of the **4-year tenure, whichever is earlier**.
  - ○ Tribunal **Chairpersons and Members are eligible for reappointment**, with preference given to their past service.
- ➢ **Removal of Tribunal Members:** Central government on the recommendation of the Search-cum-Selection Committee can remove Chairperson or a Member.

What are Tribunals?

- ➢ **About:** A tribunal is a quasi-judicial body that deals with the resolution of disputes pertaining to **administration, taxation, environment, securities,** etc.
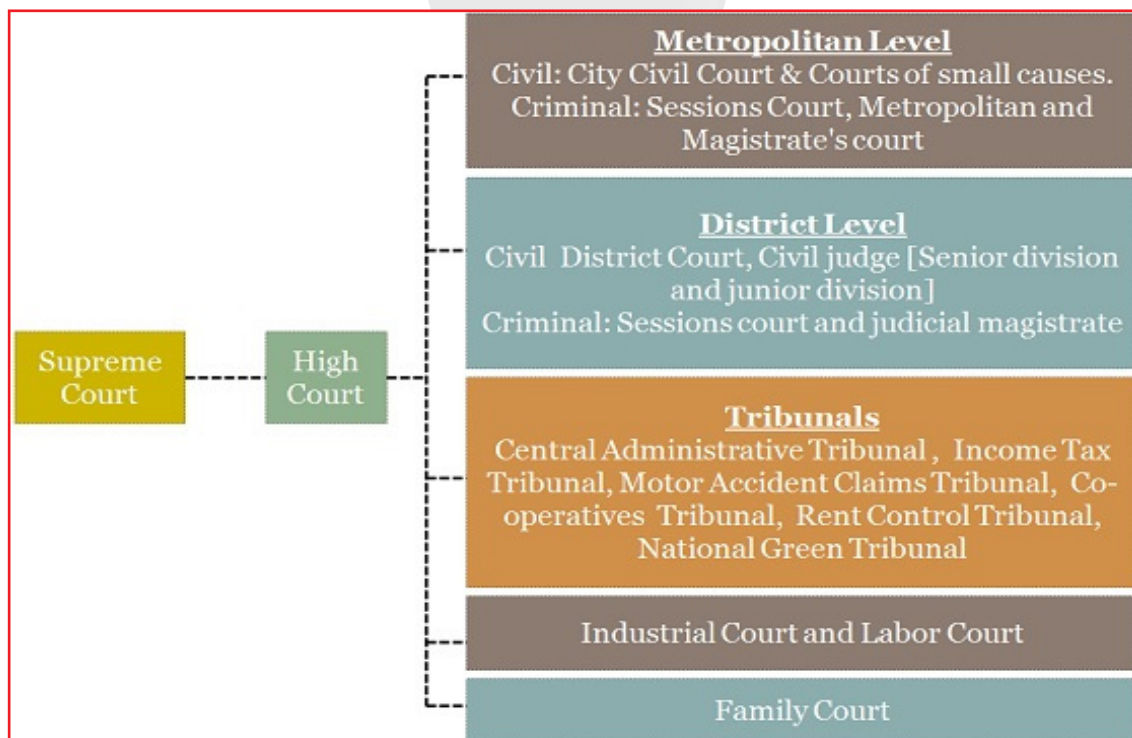
- ➢ **Functions:** It performs various functions, including **adjudicating disputes, determining rights between parties**, making administrative decisions, and reviewing existing administrative rulings.
- ➢ **Constitutional Provisions:** Tribunals were introduced in the Indian Constitution through the **42ⁿᵈ Amendment Act, 1976**, as they were **not part of the original Constitution.**
  - ○ **Article 323-A:** Deals with Administrative Tribunals for public service matters.
  - ○ **Article 323-B**: Provides for tribunals on various matters, including: Taxation, Foreign exchange, import and export, Industrial and labor disputes, Elections to Parliament and state legislatures, Food security.

Click Here to Read More: **What is the Difference Between Tribunal and Court?**

What are the Key Challenges Related to Tribunals?

- ➢ **Staff Shortage:** The **lack of presiding officers, judicial, and technical members** has increased case pendency and reduced tribunal effectiveness, such as in **Insolvency and Bankruptcy Code (IBC) cases**, as noted by the SC.

Vacancy of Members across Tribunal(s)
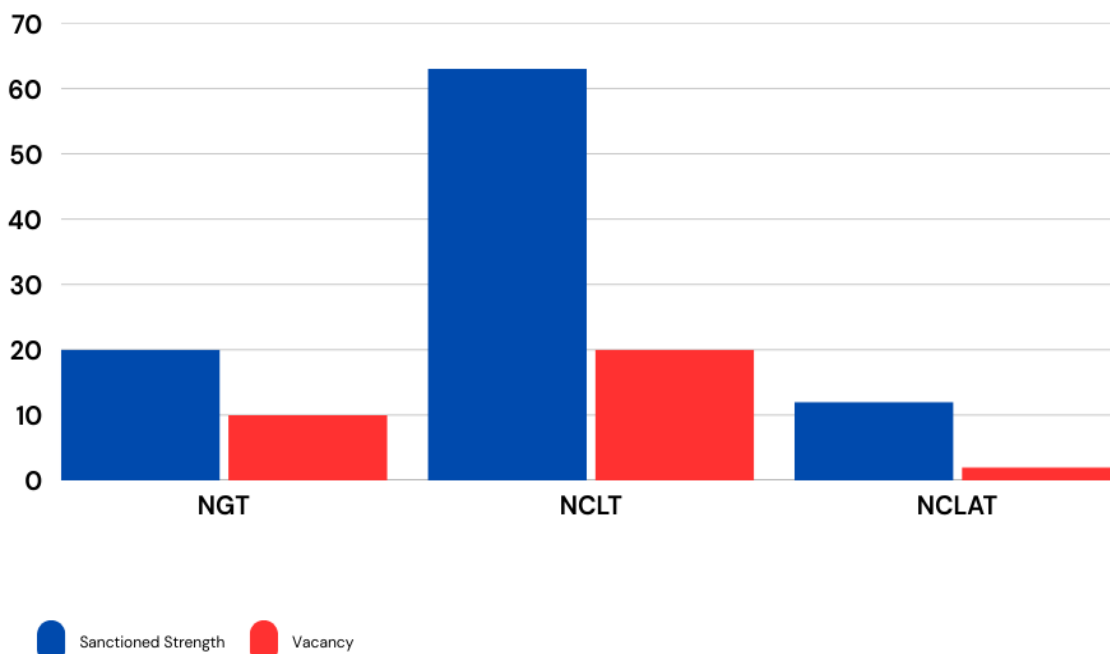
Source: MCA, Government of India answered on Tuesday, December 17, 2024/26 on a question titled "IBC cases in NCLT courts."; and NGT and NCLAT Vacancy Circluar dated June 14 and September 30, 2024, respectively.

- ➢ **Infrastructure Deficiencies:** Many tribunals, including the **NGT**, face inadequate **courtrooms, digital case management, and technical support**, affecting case efficiency. The **NGT's limited reach** in urban areas also **restricts access to justice for marginalized communities in environmental disputes.**

- Procedural Inefficiencies: Frequent adjournments, missed deadlines, and weak enforcement hinder tribunals' efficiency, leading litigants to higher courts.
  - For instance, the NCLT and NCLAT face severe delays, with 67% of insolvency cases exceeding the 330-day timeline under the IBC.
- Political and Administrative Indifference: Lack of commitment, budget constraints, and cost-cutting measures by the Finance Ministry hinder tribunal efficiency, affecting infrastructure and timely appointments.

State of Madras vs V.G. Row Case

Why in News?

The Supreme Court's ruling in *State of Madras vs V.G. Row, 1952,* established the test of reasonableness for laws restricting fundamental rights.

- It set a precedent for judicial review, ensuring that restrictions on civil liberties must be fair, just, and not excessive.

What is the State of Madras vs V.G. Row Case?

- Background: The case challenged the Criminal Law Amendment Act, 1950, which empowered the government to restrict associations deemed prejudicial to public order, under which the Madras government banned the People's Education Society in 1950.
  - V.G. Row, a member of the banned society, contended that the law violated Article 19(1)(c) (Right to Form Associations) and imposed an unreasonable restriction under Article 19(4).
- Supreme Court (SC) Ruling:
  - In 1952, the SC struck down the law as unconstitutional, ruling that excessive executive discretion in banning associations was arbitrary and violated Article 19(1)(c).
  - It emphasized that restrictions must be fair, just, and not excessive in relation to their objective.
  - SC laid out a framework to test reasonableness of restriction based on factors like the nature of the right infringed, purpose and extent of the restriction, proportionality to the issue addressed, and prevailing socio-political conditions.

- Significance:
  - Evolution of Constitutional Jurisprudence: The reasonableness test became foundational, evolving into the structured proportionality test used today to evaluate state actions that limit fundamental rights.
  - Impact on Modern Legal Frameworks: Laws like the Unlawful Activities (Prevention) Act (UAPA), Terrorist and Disruptive Activities (Prevention) Act (TADA), and Prevention of Terrorism Act (POTA) have been scrutinized under this to ensure they do not arbitrarily infringe on civil liberties.

> **Note:**
> - In *Anuradha Bhasin v. Union of India, 2020*, the SC ruled that restrictions on movement and communication must meet the test of proportionality.
>   - SC held that indefinite internet suspension violates Article 19(1)(a) & 19(1)(g) unless justified under Article 19(2) and must be necessary, proportionate, and subject to judicial review.
> - Article 19 of the Indian Constitution guarantees fundamental rights, including speech, assembly, and movement.
>   - Article 19(2) allows reasonable restrictions for specific purposes: protecting sovereignty, state security, diplomatic relations, public order, morality, judiciary (contempt of court) etc.

What are the Landmark Cases on Balancing Rights and Restrictions?

- *Kesavananda Bharati v. State of Kerala, 1973:* It established the basic structure doctrine.
- *Maneka Gandhi v. Union of India, 1978:* It expanded the scope of Article 21, requiring that any restriction must be fair, just, and reasonable.
- *Shreya Singhal v. Union of India, 2015:* Struck down Section 66A of the IT Act for being vague and overbroad.
- *Justice K.S. Puttaswamy v. Union of India, 2017*.

> Read more: Fundamental Rights (Part-1), Fundamental Rights (Part-2)

Champakam Dorairajan Case and Evolution of FRs and DPSPs

Why in News?

Champakam Dorairajan Case, 1951 presented the first instance of **conflict** between the **Fundamental Rights (FRs)** and **Directive Principles of State Policy (DPSPs)**.

What is Champakam Dorairajan Case, 1951?

➢ **Background of the Case:** In **1948**, the **Madras government** introduced the **Communal General Order (GO)**, which **reserved seats in educational institutions** based on **caste** and **religion.**

  ○ The government cited **Article 46**, which mandates promoting the **education and economy of SCs, STs, and weaker sections.**

  ○ **Champakam Dorairajan**, a **woman from Madras**, challenged the order in the **Madras High Court (HC)**, citing a violation of her **right to equality (Article 14).**

➢ **Madras High Court Verdict, 1950:** The Madras HC **struck down the Communal GO** as **unconstitutional** for using **caste and religion** as basis of classification, but the Madras government **appealed to the Supreme Court (SC).**

➢ **Supreme Court Verdict, 1951:** A five-judge Supreme Court bench **upheld the Madras HC ruling**, declaring the **Communal GO unconstitutional.**

  ○ The judgment stated that it **violated** fundamental rights under **Article 14** (Right to Equality) and **Article 15(1)** (Prohibition of Discrimination on Grounds of Religion, Race, Caste, Sex, or Place of Birth).

  ○ The SC ruled that **FRs prevail over DPSPs** and established that **Parliament can amend FRs** through constitutional amendments.

➢ **Impact of the SC Ruling:** The ruling struck down caste-based reservations in education, as the Constitution then allowed reservations **only in public jobs (Article 16(4)).**

○ This led to the **1st Constitutional Amendment Act, 1951** to restore education reservations.

➢ **1st Constitutional Amendment Act, 1951:** The government **amended Article 15** by introducing **Article 15(4)**, which allowed the state to make **special provisions** for the advancement of **socially and educationally backward classes (SEBCs)**, **Scheduled Castes(SCs)** and **Scheduled Tribes (STs)**.

  ○ This amendment provided the **constitutional basis for reservations in educational institutions.**

What are Key Constitutional Provisions for Vulnerable Groups?
➢ **Article 15(1)**: Prohibits discrimination **on grounds of religion, race, caste, sex, or place of birth**.
➢ **Article 15(4):** Allows **special provisions** for the **advancement of SEBCs, SCs, and STs**, thus enabling **reservations in educational institutions**.
➢ **Article 16(4)**: Permits **reservations in public employment** for **backward classes**.
➢ **Article 17**: Abolishes **untouchability**.
➢ **Article 46** (DPSP): Mandates the **promotion of educational and economic interests of SCs, STs, and weaker sections**.

What Provisions were Amended by the 1st Constitutional Amendment Act, 1951?

➢ **Fundamental Rights:**

  ○ **Article 15(4):** Allowed special provisions for **SEBCs, SCs,** and **STs.**

  ○ **Article 19:** Expanded **reasonable restrictions** on free speech (Article 19(2)), including **security of the state, public order, and incitement to offenses**.

    ● The State can set **professional qualifications** and **regulate or nationalize trade,** business, or industry through State-owned corporations.

➢ **Parliament and State Legislatures:**

  ○ **Article 85 & 174:** Ensured that the **gap** between two parliamentary or state legislative sessions **does not exceed six months**.

- **Article 87 and 176:** The President/Governor's **address to the legislature** was now required only **once after each general election and at the beginning of the first session each year.**
- **Land Reforms:**
  - **Article 31A:** Secured laws related to the **acquisition of estates and property** rights from being challenged under fundamental rights.
  - **Article 31B:** Created the **Ninth Schedule**, protecting listed laws from judicial review regarding **fundamental rights.**
- **SCs and STs: The President** was given authority to specify **SCs (Articles 341) and STs (Articles 342)** for each State separately.

What are Other Judgements on Conflict Between FRs and DPSPs

- **Golaknath Case, 1967:** The SC overturned its **Champakam Dorairajan** ruling, declaring that Parliament **cannot amend FRs,** ensuring their **absolute protection.**
- **Kesavananda Bharati Case, 1973:**
  - **Background:** **25ᵗʰ Constitutional Amendment Act, 1971** introduced **Article 31C**, which contained **two key provisions:**
    - Laws for implementing DPSPs on resource distribution (**Article 39(b) & (c)**) were shielded from **judicial review**, even if they violated FRs provided under **Article 14, 19, or 31.**
    - Any law designed to implement the **Article 39(b) & (c)** was **protected from judicial review,** even if it did not fully achieve its goals.
  - **Verdict:** The SC **upheld the first provision,** ensuring laws implementing **Article 39(b) and (c) remained valid** even if they conflicted with Fundamental Rights.
    - It **struck down** Article 31 C's **second provision** barring judicial review.
    - The SC also introduced the concept of **Basic Structure** that states that certain fundamental

principles of the Constitution **cannot be altered or destroyed** through amendments. E.g., **Judicial review, limited amending power** etc.

- **Minerva Mills Case, 1980:**
  - **Background:** **42ⁿᵈ Constitutional Amendment Act, 1976** extended Article 31C's protection to **all DPSPs, prioritizing them over FRs** under Articles 14, 19, and 31.
  - **Verdict:** The SC **struck down** the 42ⁿᵈ Amendment's expansion of **Article 31C**, ruling that there is a **harmonious construction between FRs and DPSPs** and **DPSPs cannot override FRs,** preserving the Constitution's balance.
- **Current Status: FRs take precedence over DPSPs,** but Parliament can amend Articles 14 and 19 to implement Articles 39(b) and 39(c).

Issue of Pradhan Pati in Panchayats

Why in News?

A panel constituted by the **Ministry of Panchayati Raj** in 2023 has submitted its report, *Transforming Women's Representation and Roles in Panchayati Raj Systems and Institutions: Eliminating Efforts for Proxy Participation,* recommending **"exemplary penalties"** to curb the practice of **'Pradhan Pati'.**

- The report suggests policy reforms, training, and technology-driven solutions to empower women leaders.

What are the Key Reforms Suggested by the Committee?

- **Strict Penalties for Proxy Leadership:** Enforcement of 'exemplary penalties' for proven cases of **male relatives acting as proxies for elected women representatives in Panchayati Raj Institutions (PRIs).**
- **Structural and Policy Reforms:** The committee recommends **gender-exclusive quotas** in panchayat subject and ward-level committees (like Kerala's model), **annual 'Anti-Pradhan Pati' awards** to recognize efforts against proxy leadership,

- ○ Proposes **appointment of women's ombudspersons** to handle related complaints. It also suggests **public swearing-in ceremonies** in Gram Sabhas to reinforce women pradhans' authority.
- ○ Suggests creation of a **federation of women panchayat leaders** for peer support and collective decision-making.
- ➤ **Technological Interventions:** The committee proposes **Virtual reality (VR) simulation training** to enhance governance skills, **Artificial intelligence (AI) powered query-driven guidance** in vernacular languages for real-time legal and governance support
  - ○ **WhatsApp groups** linking **Women Elected Representatives (WERs)** with officials for issue resolution.
  - ○ Additionally, the **Panchayat Nirnay Portal** will enable citizens to track pradhans' participation, ensuring transparency and accountability.
  - ○ The committee suggests **collaborating with prominent educational institutions** and international agencies for leadership programs.

What is the Issue of Pradhan Pati in PRIs?

- ➤ **Pradhan Pati:** Also known as **'Sarpanch Pati' or 'Mukhiya Pati,'** this practice involves the husbands of elected women panchayat leaders exercising power on their behalf.
  - ○ As a result, many WERs serve as **mere figureheads,** undermining their autonomy and leadership. It reinforces **patriarchy** and weakens the intent of the **73rd Constitutional Amendment.**
- ➤ **Menace of Pradhan Pati:** India has about **2.63 lakh panchayats** across three levels (Gram Panchayat, Panchayat Samiti, and Zila Parishad). Women make up **46.6% (15.03 lakh)** of **32.29 lakh** elected panchayat representatives.
  - ○ However, their **effective participation remains low,** especially in northern states like **UP, Bihar, Haryana, and Rajasthan**, where **male relatives often control decision-making**.
- ➤ **Challenges in Addressing Pradhan Pati:** Patriarchal norms and **bureaucratic neglect** undermine **women's authority,** often reducing them to figureheads.

- ○ **Threats, violence, and social pressure** discourage women from actively participating in governance.
- ○ The committee cautions that strict penalties may push the issue underground instead of addressing root causes like patriarchy.

> **Read more:** SC Calls for Reform to Empower Women Leaders

Governance of PRIs

- ➤ **State Subject:** Local governance falls under the jurisdiction of state governments, with PRIs operating as per respective **State Panchayati Raj Acts**.
- ➤ Constitutional Framework:
  - ○ **73rd Constitutional Amendment Act (1992)** established a **three-tiered Panchayat system** and mandated **1/3rd reservation for women**, later increased to **50% in 21 states and 2 UTs**.
  - ○ **Article 243D** provides for reservation for **Scheduled Castes, Scheduled Tribes, and Backward Classes** in PRIs.
  - ○ **Article 40** of the Constitution, a **Directive Principle of State Policy,** mandates the State to establish **village panchayats** and grant them the necessary **powers and authority** to function as **self-governing units**.
- ➤ The **Panchayats Extension to Scheduled Areas (PESA) Act, 1996,** grants **Gram Sabhas in Scheduled Areas** special powers to **manage natural resources** and protect **tribal culture and livelihoods**.

Poshan Abhiyan

Why in News?

Poshan Abhiyaan aims to improve **nutritional outcomes** through **technology, cross-sectoral convergence, and community involvement**.

What is Poshan Abhiyan?

- ➤ **About:** It is a flagship **initiative of the Ministry of Women and Child Development,** launched on 8th March 2018 in Jhunjhunu, Rajasthan. The program aims **to address the nutrition needs of adolescent girls, pregnant women, lactating mothers, and children** (0-6 years) through a targeted and convergent approach.

Beneficiaries
10,08,89,775

Children (0-6 Months)
47,53,831

Children (6 Months - 3 Years)
3,82,66,444

Children (3 - 6 Years)
4,49,14,794

Pregnant Women
55,41,417

Lactating Mothers
51,28,483

Adolescent Girls
22,84,806
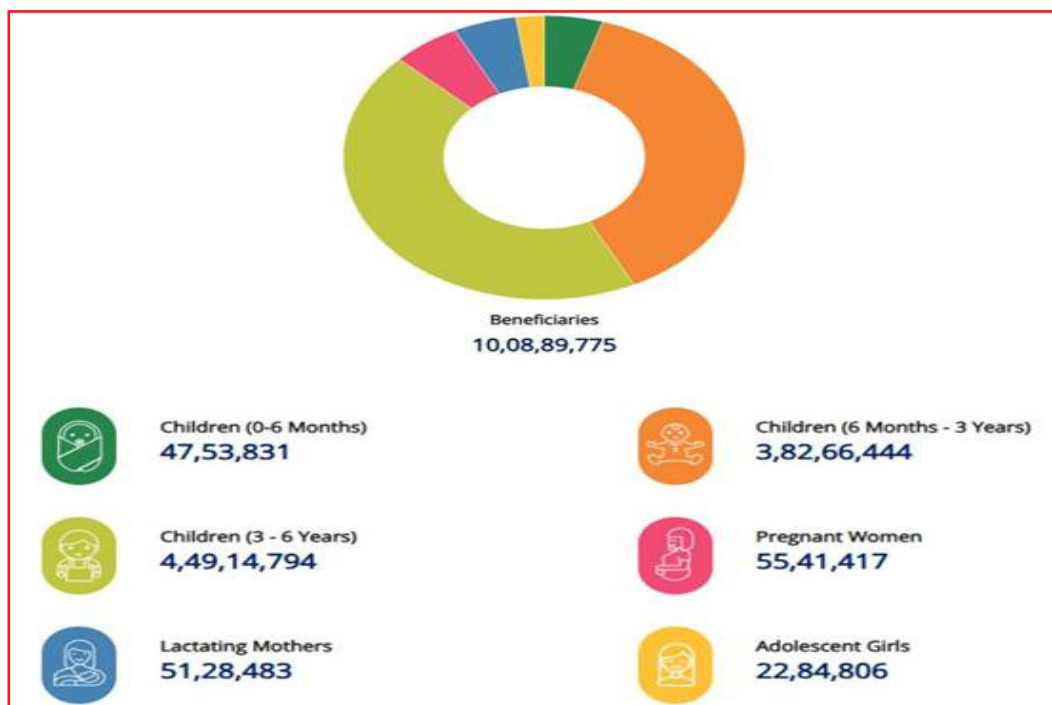
➢ **Objectives:** It aims to reduce **stunting, under-nutrition, anaemia (among young children, women and adolescent girls) and reduce low birth weight** by **2%, 2%, 3% and 2% per annum** respectively
➢ **Strategic Pillars:** It operates through **four strategic pillars:**
   ○ **Quality Services:** Strengthens health services via **ICDS**, **NHM**, and **PMMVY**, focusing on a child's first **1,000 days**.
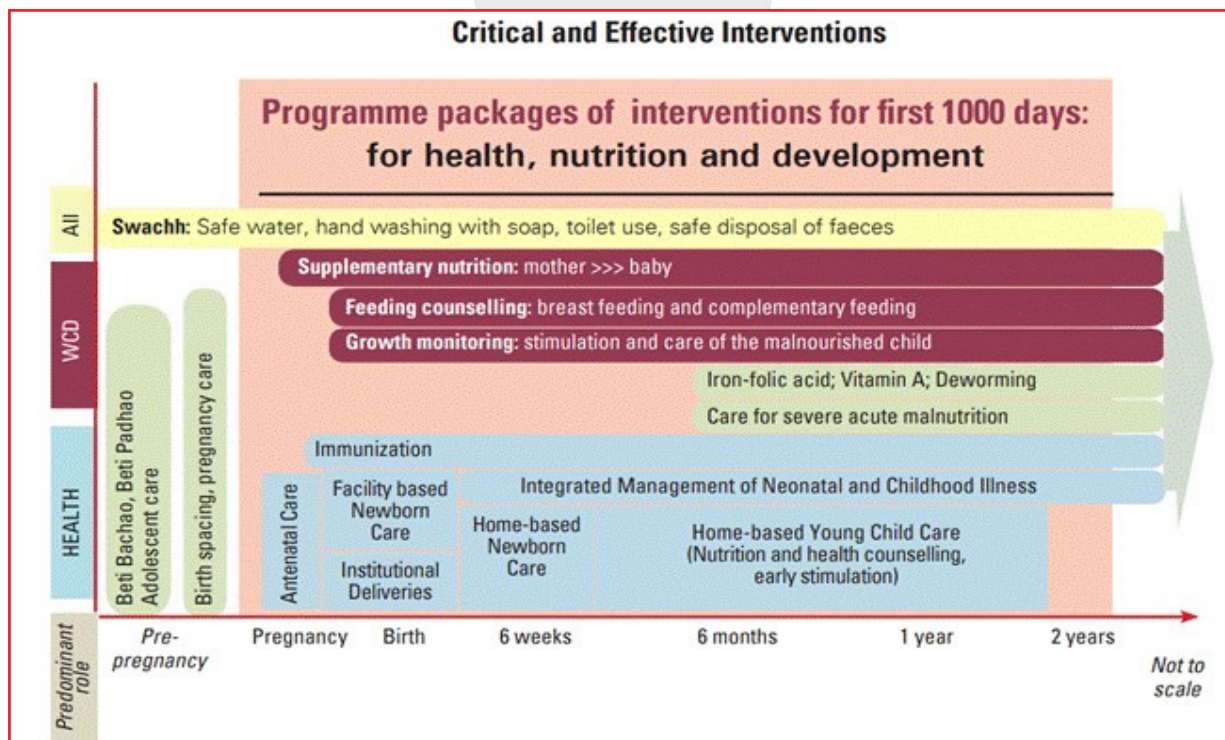
Critical and Effective Interventions

Programme packages of interventions for first 1000 days: for health, nutrition and development

- ○ **Cross-Sectoral Convergence:** Integrates ministries like **Water & Sanitation for holistic nutrition.**
  - ● The **National Council on India's Nutrition Challenges**, led by **NITI Aayog, guides policy and reviews** nutrition convergence quarterly.
- ○ **Technology:** Uses the **Poshan Tracker** for real-time data and monitoring and **ICDS-Common Application Software** to strengthen delivery of Anganwadi Services.
- ○ **Jan Andolan:** Promotes **community-led nutrition awareness** and behavioral change.
- ➢ **Nutritional Improvement:** As per the **NFHS-5 (2019-21)** for children under 5 years.

Indicator	NFHS-4 (2015-16)	NFHS-5 (2019-21)
Wasting (Low weight-for-height)	21%	19.30%
Undernutrition (Low weight-for-age)	35.70%	32.10%
Stunting (Low height-for-age)	38.40%	35.50%

- ➢ **Mission Saksham Anganwadi and Poshan 2.0:** It is also known as **Mission Poshan 2.0,** that fosters **health, wellness, and immunity** and infrastructure upgrades for **Anganwadi Centre (AWCs)** e.g., dedicated buildings, functional toilets, with drinking water access.

India's Nutritional Status as per Global Hunger Index 2024

India's GHI Indicators in 2024

Undernourishment
Improved food security in India

Child Stunting
Long-term malnutrition unchanged

Child Wasting
Highest malnutrition rate globally

Child Mortality
Slight decrease in child deaths
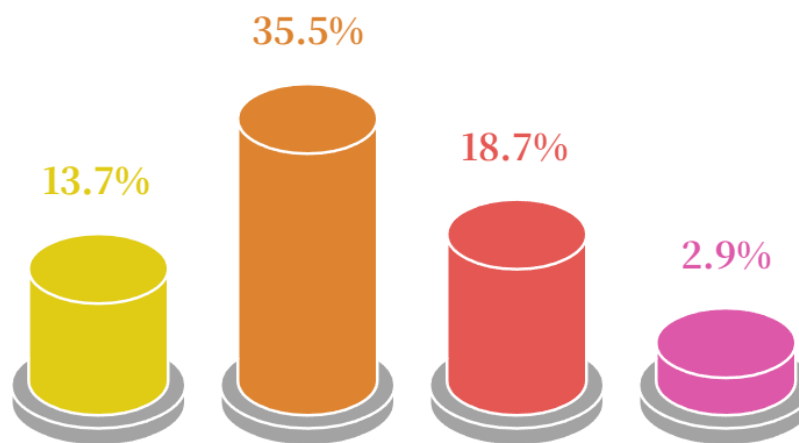
13.7% 35.5% 18.7% 2.9%

Economic Scenario

Highlights

- India's Pharma Industry
- District-Level GDP Estimation
- Strengthening India's Spice Industry
- Budgetary Dependence of CPSEs
- IMF Report on India's Financial System
- India's Textile Industry
- Enhancing India's Agri-Exports
- 12th Regional 3R and Circular Economy Forum
- India's Path to a High-Income Economy
- Agritourism in India
- Initiatives in India's Maritime Sector
- Tea industry and Jhumoir Dance
- Farmers' Earning in Agri Produce: RBI

India's Pharma Industry

Why in News?

The **Indian Pharmaceutical Alliance (IPA)** has proposed **zero customs duty** on US medicine imports to **prevent reciprocal US tariffs** and maintain **India's dominance** in the American pharmaceutical market.

Why is the IPA Advocating for Zero Import Duties?

- **Importance of US Market:** The **US imports USD 9 billion** worth of **pharmaceutical formulations** from India annually, making up **one-third o**f India's total pharma exports.
- **Zero Import Duties:** India has **minimized import duties** on life-saving medicines. A **zero-duty policy** helps counter **reciprocal US tariffs** and safeguard exports.
    - Lower duties **strengthen trade ties** and prevent **strict US measures** against Indian pharma like amending India's **Patents Act, 1970** to **dilute** its **Section 3(d)**.
- **Amending Patent Act, 1970:** The US and other western countries urge India to **remove or dilute Section 3(d)** of the Patents Act, 1970 which prevents evergreening of patents.
    - Amending **Section 3(d)** to allow easier patenting of modified drugs (evergreening of patents) could threaten Indian pharma companies by restricting **reverse engineering** and delaying **generic drug production**.

What is the Status of India's Pharmaceutical Industry?

- **About:** India **ranks 3rd globally** in pharmaceutical production by volume and **14th largest** in terms of value, supplying over **50% of global vaccine** demand and **40% of generic medicines** in the US.
- **Size:** India's pharmaceutical market for FY 2023-24 is valued at **USD 50 billion**, contributing around **1.72% to the GDP**, and is projected to reach **USD 130 billion by 2030.**
    - India's **biotechnology sector**, valued at **USD 137 billion in 2022**, aims for **USD 300 billion by 2030.**
- **Key Segments:**
    - **Generic Medicines**: India is the world's largest supplier, meeting **20% of global demand.**
    - **Active Pharmaceutical Ingredients (APIs)**: India produces over **500 APIs**, contributing **8%** to the **global API market.**
    - **Medical Devices**: The market is projected to grow from **USD 11 billion to USD 50 billion by 2030.**
- **Growth Drivers:**
    - **Affordable Pricing**: Indian drugs are **significantly cheaper** than Western alternatives.
    - **Government Support**: Policies such as the **Production-Linked Incentive (PLI) scheme** promote domestic manufacturing.
    - **Strong R&D Base**: India has a **large pool of scientists and engineers** driving innovation e.g., India now ranks 6th globally in terms of **patent applications**, with **64,480 patent filings in 2023.**

- ○ **Increasing Global Demand**: Rising chronic diseases and an **aging global population** fuel demand for cost-effective medicines.
- ➢ **Exports:** India exports medicines to **over 200 nations**, with FY24 exports reaching **USD 27.82 billion.**
  - ○ India ranks **12th globally** in medical goods exports, driven by rising demand for biosimilars and specialty drugs.
- ➢ **Government Initiatives:** Production Linked Incentive Scheme (PLI), Promotion of Bulk Drug Parks Scheme, National Medical Device Policy 2023.

Note: APIs are the **biologically active components** in a drug that produce the intended **therapeutic effect**. They are the key ingredients responsible for **treating or managing a medical condition.**

What Challenges Does the Pharma Industry Face?

- ➢ **Quality Issues:** Concerns over the **quality of Indian medicines** have emerged due to incidents like the **Gambia cough syrup deaths** in 2022**.**
- ➢ **Regulatory Hurdles**: Compliance with evolving Good Manufacturing Practice (GMP) and **quality control regulations** is costly.
- ➢ **Dependence on API Imports:** India imports **70% of APIs**, primarily from **China**, creating **supply chain vulnerabilities.**
- ➢ **Pricing Pressures:** Strict price controls under National List of Essential Medicines (NLEM), impact the profitability of pharma companies hindering innovation incentives for Industry.
- ➢ **Global Competition:** There is rising competition from **China, the US, and the EU** (highly sophisticated and well researched products), while **Vietnam and Indonesia** emerge as manufacturing hubs.
- ➢ **Skill Shortage:** There is a lack of **trained professionals in biotechnology, biosimilars, and drug discovery.**
  - ○ E.g., dependence on **generic drugs** rather than **innovative formulations** affects global competitiveness.

District-Level GDP Estimation

Why in News?

India's economic growth has long been assessed through **national and state-level Gross Domestic Product (GDP) estimates,** leaving **districts (District Domestic Product (DDP) Estimation)** overlooked in economic assessments.

- ➢ Prime Minister Narendra Modi has emphasized that to achieve the **USD 5 trillion economy target,** India must determine district-wise contributions and implement localized development strategies.

What is the Current GDP Estimation Methodology?

- ➢ **Current GDP Estimation Methodology:** India's GDP is estimated using a mix of **top-down** and **bottom-up** approaches, depending on the sector.
  - ○ The primary sector (agriculture, forestry, fishing, and mining) follows a **bottom-up** approach, aggregating data from the district level upwards.
  - ○ The secondary (manufacturing, construction) and tertiary (services, trade, banking) sectors follow a **top-down** approach, where national GDP is apportioned to **states and districts** based on indicators like employment levels and infrastructure presence, rather than measuring economic activity directly at the district level.
- ➢ **Limitations:** Current GDP Estimation method overlooks **local sectoral strengths**, particularly in the **secondary and tertiary sectors**.
  - ○ Economic growth varies across districts even within the same state, but a **lack of granular data leads to generic policies.**
    - The approach misses real-time activity, causing inaccuracies, while data gaps in the unorganised sector (unpaid labor (especially by women) weaken GDP estimates.
  - ○ The **State of Working India (SWI 2023) report** highlights that the link between GDP growth and employment is weak at the national level, and this issue is even more pronounced at the district level.

- Without employment-linked GDP data, development policies may focus solely on economic output rather than **job creation and social equity.**

Case Study

➢ During Covid-19, the **Ministry of Statistics and Programme Implementation (MoSPI)** applied a uniform GDP distribution, leading to discrepancies.

    ○ Uttar Pradesh (UP) objected, citing significant errors in its estimated **Gross State Value Added (GSVA)**. With **25% GSVA from agriculture** and **65% of its workforce in the sector**, UP argued that its economy was less affected than industrial states.

➢ The one-size-fits-all approach exaggerated UP's GDP decline, highlighting the need for a **bottom-up, district-level GDP estimation** for accuracy.

GDP AND RELATED TERMS

GROSS DOMESTIC PRODUCT (GDP):

- Total monetary value of all finished goods/services produced within a country in one year
- 3 methods to calculate GDP - expenditures, production, income Method
- Provides an economic snapshot to estimate a country's economy/growth rate
- GDP is not an accurate measure of the overall living standard/well-being of a country
- GDP = Goods and services consumed (C) + Investments (I) + Govt expenditures(G) + (Exports(X) – Imports(M))

GDP
- Measures economic activity within the physical borders of a country
- Producers can be native or foreign-owned entities

GNP
- Measures overall production of people/corporations native to a country
- Includes those based abroad (by natives) but not foreign-owned domestic production

GNI
- Sum of all income earned by citizens/nationals of a country (domestic + abroad)
- GNI = domestic income + indirect business taxes + depreciation + net foreign factor income

Nominal GDP (NGDP)
- GDP at current prices
- Includes inflation/pace of rising prices
- Used to compare different quarters of output (in same year)

Real GDP (RGDP)
- Inflation-adjusted GDP
- More accurate reflection of the output of an economy than NGDP
- Used to compare GDP of 2 or more years
- Calculated using a GDP Price Deflator

(RGDP = NGDP ÷ GDP Deflator)

GDP Price Deflator = (NGDP ÷ RGDP) * 100

$$GDP \xrightarrow[+d]{-d} NDP$$
$$+(NFIA) \qquad +(NFIA)$$
$$GNP \xrightarrow[+d]{-d} NNP$$

d = depreciation   NFIA = Net Factor Income from Abroad
NNP = Net National Product   NDP = Net Domestic Product

- **Factor Cost (FC)** = Total value of the inputs that go into manufacturing a good
  - **Market Price (MP)** = Factor Cost + Indirect Taxes – Subsidies
- GDP at FC = GDP at MP + Subsidies – Indirect Taxes
  - GDP at MP = GVA x MP
  - GDP at MP is the measure of GDP in India
- **Gross Value Added (GVA)** = GDP + subsidies on products – taxes on products

Example: Assume a country that only produces bread

Year 2021: It produced 100 units of bread @ price Rs 10 (each)
Then, GDP @ current price – Rs 1000

Year 2022: It produced 110 units of bread @ price Rs 15 (each)
Then, GDP @ current price – Rs 1650

RGDP for year 2022 (base year – 2021) = 110 × Rs 10 = Rs 1,100
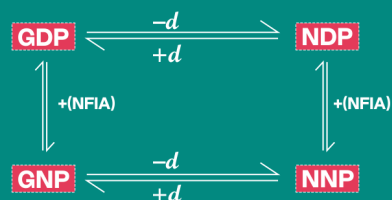Here, GDP Deflator would be – 1,650 ÷ 1,100 = 1.50 (or 150%)

Drishti IAS

What are the Challenges in Implementing District-Level GDP Estimation?

➢ **Informal Sector:** Regional units like **districts** face challenges in DDP estimation due to the **high reliance on informal labor and the unorganized sector,** leading to underestimation.

○ Additionally, the free movement of goods, services, and factor payments across district boundaries further complicates accurate assessment.

➢ **Financial & Logistical Barriers:** Setting up a **robust statistical framework** for district-level GDP estimation requires **significant investment** in **infrastructure, training, and digital tools**.

➢ **Inconsistent Data Collection**: Statistics under the **Concurrent List** creates fragmentation between the **Centre and States,** while the decentralized statistical system across ministries lacks uniformity, making **DDP estimation inconsistent.**

○ The absence of standardized district-level data collection leads to inaccuracies across states.

➢ **Lack of Standardized Methodology:** No internationally accepted framework, like the **System of National Accounts (SNA) 2008,** for estimating DDP.

○ Defining key metrics such as the **base year is challenging due to variations in economic activities across districts.**

➢ **Political and Administrative Hurdles**: States are responsible for compiling Sub-State/DDP but often fail to execute it effectively.

○ Variability in state policies and political priorities leads to delays and inconsistencies in data collection, affecting the uniformity and reliability of DDP estimation.

What are the Benefits of District-Level GDP Estimation?

➢ **Boosting Fiscal Federalism:** Decentralized economic data empowers district administrations to develop tailored strategies, ensuring **better resource utilization and targeted investments.**

➢ **Accurate Economic Analysis**: Helps assess how national or state-level policies impact different districts.

➢ **Equitable Growth**: Ensures **rural and underdeveloped districts** are included in the growth narrative, preventing economic disparities.

➢ **Policy Reforms:** The **15th Finance Commission** recommended **performance-based grants** for local governance, district GDP data can help allocate these resources effectively.

○ **State and national policies** should be adjusted based on **district-level economic insights**.

Strengthening India's Spice Industry

Why in News?

The **World Spice Organisation (WSO)** highlights that despite being the **largest spice producer,** India holds just **0.7% of the global seasoning market**, and calls for higher production, value addition, to achieve the USD 10 billion export target by 2030.

Note: The WSO, headquartered in Kochi, Kerala, is a **not-for-profit organisation** focused on food safety, sustainability, and biodiversity in the spice industry.

What is the Status of Spice in India?

➢ **Production:** In 2022-23, India produced **11.14 million tonnes of spices,** a slight increase from 11.12 million tonnes in 2021-22**.**

○ India produces **75 of 109 International Organization for Standardization (ISO)-listed spice varieties**, with **chilli, cumin, turmeric, ginger, and coriander** accounting for **76% of total production**.

○ In terms of production, garlic, ginger and chilli were the top three spices produced in FY23.

➢ **Largest Spices-Producing States:** Madhya Pradesh, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Maharashtra, Assam, etc.

➢ **Exports:** Major exports include **pepper, cardamom, celery, fennel, fenugreek, garlic, nutmeg, curry powder, and spice oils**.

○ In 2023-2024, India exported spices worth **USD 4.4 billion (nearly 14 lakh tonnes). Chilli is India's top exported spice,** accounting for 31% of total spice exports.

○ India exports spices to 200 destinations worldwide, with **China, Bangladesh, West Asian countries, and the US** being key markets.

EXPORT OF SPICES FROM INDIA DURING 2023-24 (VALUE)

Rs. in Lakhs

Chart values:
- CHILLI: 1,249,248
- CUMIN: 569,723
- SPICE OILS & OLEORESINS: 412,301
- MINT PRODUCTS: 343,920
- TURMERIC: 187,587
- CURRY POWDER/PASTE: 175,728
- CARDAMOM(S): 99,960
- CORIANDER: 94,821
- PEPPER: 73,649
- FENNEL: 66,961
- GINGER: 64,689
- GARLIC: 44,119
- OTHER SEEDS: 36,178
- NUTMEG & MACE: 28,688
- FENUGREEK: 26,613
- CARDAMOM(L): 14,815
- CELERY: 10,074
- OTHER SPICES: 186,808
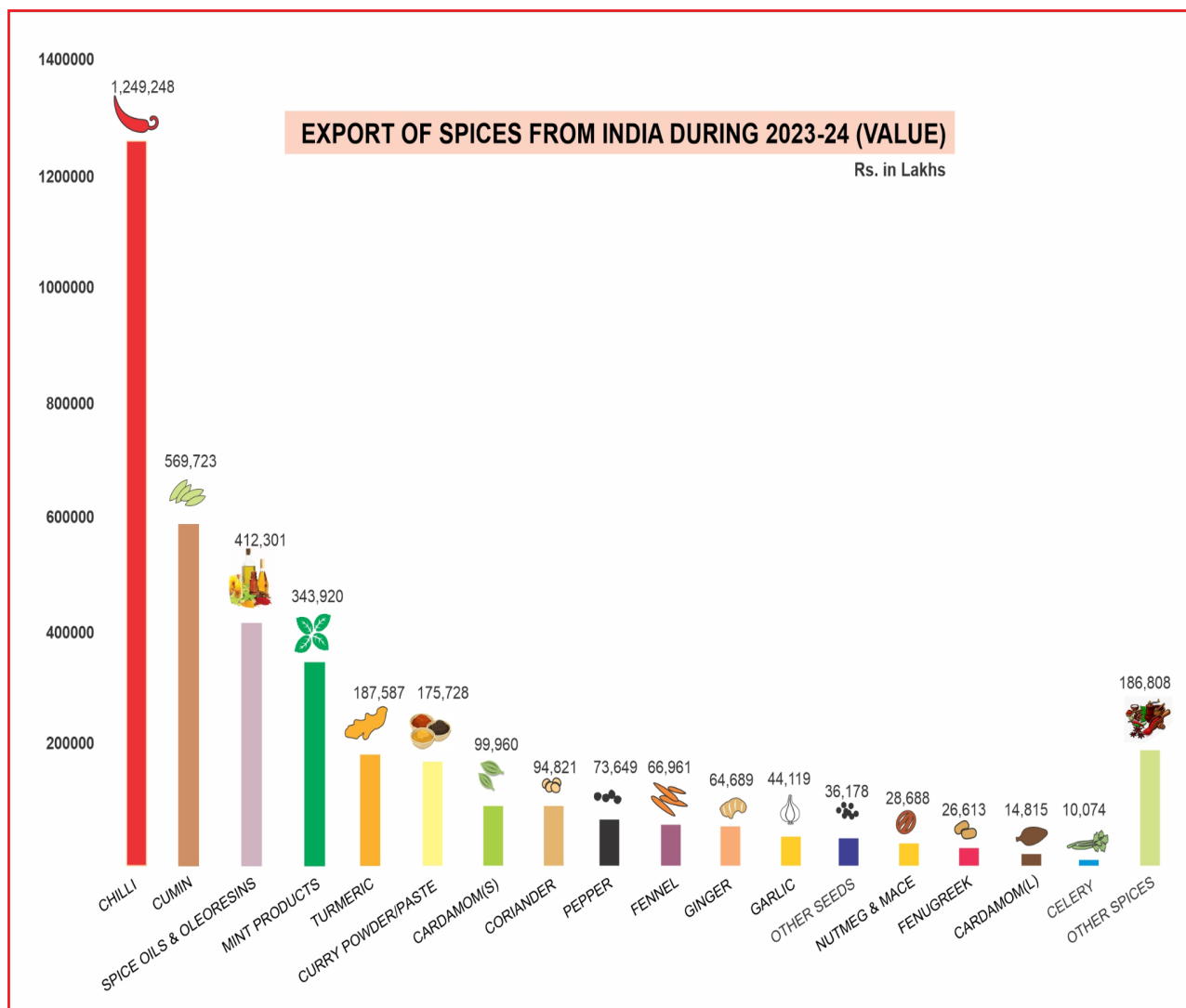
➢ **Concerns:** Despite being a leader in raw spice exports, India holds only **0.7% of the global seasoning market,** far behind China (12%) and the US (11%).

   ❍ This is due to **low value addition,** with only 48% of exports being processed products.

   ❍ Instances of **Adulteration** **and pesticide residues** have led to export rejections, tarnishing India's reputation in international markets.

   ❍ Growing competition from **Vietnam, Indonesia, Brazil, China,** and countries like Thailand, Sri Lanka, and Madagascar further challenges India's dominance.

   ❍ Heavy reliance on **traditional crop varieties,** poor processing, and inadequate post-harvest handling reduce quality and shelf life. Additionally, limited mechanization increases production costs and lowers efficiency.

➢ **Measures to Expand Market:** Country's share in value-added spices should rise up to 70%.

   ❍ India's 15 agro-climatic zones support diverse spice cultivation. Developing **high-yielding and climate-resistant varieties** can boost production and enhance exports.

Government Initiatives to Boost Spice Production & Exports

➤ **Spices Board of India (SBI):** Established under the **Spices Board Act 1986,** functions under the **Ministry of Commerce & Industry.**

○ **SBI**, headquartered in Kochi, Kerala, promotes cardamom and 52 spices, regulates quality, supports research, and links Indian exporters to global markets.

○ **National Sustainable Spice Program (NSSP)** under SBI and WSO unites stakeholders to address sustainability in India's spice industry.

➤ **Spices Parks**: SBI established **eight crop specific Spices Parks** across the country, to assist farmers in post-harvest handling, value addition, and better pricing.

➤ **Spice Complex in Sikkim**: Aimed at improving **spice processing and value addition** in the Northeastern region.

Budgetary Dependence of CPSEs

Why in News?

Concerns arise as **Central Public Sector Enterprises (CPSEs)** shift their **capital expenditure (capex)** strategy, relying more on **budgetary support** than self-financing or private investment.

➤ This shift has sparked debate on the long-term financial sustainability and autonomy of CPSEs.

What are the Concerns Regarding CPSEs?

➤ **Overdependence on Budgetary Support:** CPSEs are increasingly relying on **budgetary support (equity and loans from the government)** rather than their own **Internal and Extra Budgetary Resources (IEBR)**.

○ Budgetary support for CPSEs has **risen by over 150%** in five years, from Rs 2.1 lakh crore in FY20 to Rs 5.48 lakh crore in FY25 (Revised Estimate).

○ **IEBR,** which CPSEs use to finance their own capex, **has declined significantly** from **Rs 6.42 lakh crore in FY20** to **Rs 3.63 lakh crore in FY23** and estimated at **Rs 3.82 lakh crore in FY25**.

● The decline in IEBR **restricts CPSEs' financial flexibility** and forces greater dependence on government funding.

➤ **Reduced Private Sector Participation:** CPSEs' reliance on budgetary support has **deterred private investment.**

○ **National Highways Authority of India (NHAI)** was expected to raise 38% of its funding from private capital, but its **IEBR fell to nil in FY23-FY24** due to rising debt (Rs 3.48 lakh crore in 2022) and policy instability, discouraging private investment.

○ High debt **limits CPSEs' ability to raise capital independently** and weakens their financial health.

➤ **Policy Concerns:** The **Standing Committee on Transport (FY22)** noted that **high budgetary support alone may not meet CPSE investment needs**, urging private sector engagement.

○ If CPSEs continue relying on government support, it **could strain fiscal resources**, reducing funds available for social and developmental programs.

➤ **Pay High Dividends:** The government's pressure on CPSEs to **prioritize dividend payments over reinvestment limits** their ability to **expand, modernize, and make independent long-term growth decisions.**

➤ **Limited Financial Autonomy**: **CPSEs, unlike private firms, lack the flexibility to respond to market changes**, leading to slow decision-making.

○ Past **mergers and acquisitions** (e.g., acquisition of Hindustan Petroleum Corporation Limited (HPCL) by Oil and Natural Gas Corporation (ONGC)) **reduced CPSE cash reserves,** further restricting capex capabilities.

What are the Key Facts About CPSEs?

➤ **About:** CPSEs are companies where the **Central Government or other CPSEs hold at least 51%** stake.

○ The **Department of Public Enterprises (DPE)** oversees CPSEs' performance, finance, and policies under various ministries.

○ Post-independence, India's socialist model led to CPSEs in heavy industries, banking, oil & gas, steel, and power. The **1991 economic reforms** ushered in corporatization, heightened competition, and a sharper focus on profitability and efficiency in CPSEs.

➤ **Significance:** CPSEs play a crucial role in India's economic development, infrastructure creation, employment generation, and industrial growth.

➤ **Classification:** CPSEs are categorized into **Miniratna, Navratna, and Maharatna** based on size, financial performance, and strategic importance.

Classification of CPSEs			
Category	Launch	Criteria	Examples
Maharatna	○ **Maharatna Scheme** was introduced for CPSEs in May, 2010, in order to **empower mega CPSEs to expand their operations and emerge as global giants.**	○ Having **Navratna status.** ○ Listed on Indian stock exchange with minimum prescribed public shareholding under **Securities and Exchange Board of India (SEBI)** regulations. ○ An **average annual turnover of more than Rs. 25,000 crore** during the last 3 years. ○ An average annual **net worth of more than Rs. 15,000 crore** during the last 3 years. ○ An average **annual net profit after tax of more than Rs. 5,000 crore** during the last 3 years. ○ Should have **significant global presence/international operations.**	○ Bharat Heavy Electricals Limited, Bharat Petroleum Corporation Limited, Coal India Limited, GAIL (India) Limited, etc.
Navratna	○ **Navratna Scheme** was introduced in **1997** in order to identify CPSEs that enjoy comparative advantages in their respective sectors and **to support them in their drive to become global players.**	○ The **Miniratna Category – I and Schedule 'A' CPSEs, which have obtained 'excellent' or 'very good' rating** under the Memorandum of Understanding system in three of the last five years, and have composite score of 60 or above in the **six selected performance parameters,** namely, ○ Net profit to net worth. ○ Manpower cost to total cost of production/services. ○ Profit before depreciation, interest and taxes to capital employed. ○ Profit before interest and taxes to turnover. ○ Earning per share. ○ Inter-sectoral performance.	○ Bharat Electronics Limited, Hindustan Aeronautics Limited, etc.
Miniratna	○ **Miniratna scheme** was introduced in **1997** in pursuance of the policy objective **to make the public sector more efficient and competitive** and to grant enhanced autonomy and delegation of powers to the profit-making public sector enterprises.	○ **Miniratna Category-I:** The CPSEs which have **made profit in the last three years continuously,** pre-tax profit is Rs.30 crores or more in at least one of the three years and have a positive net worth are eligible to be considered for grant of Miniratna-I status. ○ **Miniratna Category-II:** The CPSEs which have **made profit for the last three years continuously and have a positive net worth** are eligible to be considered for grant of Miniratna-II status. ○ Miniratna CPSEs **should have not defaulted in the repayment of loans/interest payment on any loans** due to the Government. ○ Miniratna CPSEs **shall not depend upon budgetary support or Government guarantees.**	○ **Category-I:** Airports Authority of India, Antrix Corporation Limited, etc. ○ **Category-II:** Artificial Limbs Manufacturing Corporation of India, Bharat Pumps & Compressors Limited, etc.

○ In February 2025, **Indian Railway Catering and Tourism Corporation (IRCTC)** and **Indian Railway Finance Corporation (IRFC)** as the country's 25th and 26th Navratna companies respectively.

➤ **Current Status of CPSEs:** According to the **Public Enterprises Survey 2023-24,** as of March 2024, India has 448 CPSEs (only 272 operating in FY24).

➤ **Financial Performance of CPSEs:** Gross revenue of the operating CPSEs declined by 4.7% to Rs 36.08 lakh crore in FY24.

➤ **Contributions to the Economy:** CPSEs contributed Rs 4.85 lakh crore in FY 2023-24 to the Contribution to **Central Exchequer** (via taxes, duties, and dividends), marking a 5.96% increase from Rs 4.58 lakh crore in FY 2022-23.

○ In FY **2023-24**, all **CSR** eligible CPSEs spent **around 4,900 crore** on CSR activities, reflecting a **19.08% increase** from FY 2022-23**.**

○ CPSEs earned Rs 1.43 lakh crore in **foreign exchange reserves** in FY 2023-24, contributing to India's trade balance and global business engagement.

Note: Other types of public enterprises include **Public Sector Banks (PSBs)**, where the Central/State Government or other PSBs hold at least 51%, and **State Level Public Enterprises (SLPEs)**, where the State Government or other SLPEs hold at least 51%.

What Measures Can Address CPSEs' Concerns?

➤ **Disinvestment:** Under **Department of Investment and Public Asset Management (DIPAM)** and **New Public Sector Enterprise Policy, 2021** non-strategic CPSEs can be prioritized for privatization to attract private investment and reduce the fiscal burden, while strategic ones are retained.

   ○ Implement policy reforms to **reduce regulatory bottlenecks and financial risks** for private investors.

➤ **Raise Capital Independently:** Encourage CPSEs to **revive IEBR financing through bonds, external commercial borrowings (ECBs),** and partnerships with private players and reduce their dependence on budgetary support.

➤ **Digital Transformation:** CPSEs lag behind private companies in digital adoption, impacting operational efficiency. Integrating advanced digital infrastructure and **automation in sectors like railways**, power, and telecom can reduce operational costs.

➤ **Limiting High Dividend Payout:** As recommended by the **15th Finance Commission (2020-21),** CPSEs should balance their dividend payments with reinvestment in infrastructure expansion.

➤ **CPSE Performance Reviews:** The **2005 Sengupta Committee** recommended limiting CPSE performance reviews to twice a year for better efficiency.

IMF Report on India's Financial System

Why in News?

The **International Monetary Fund (IMF),** in its report titled *"India Financial System Stability Assessment"*, has flagged concerns about the stress in **Non-Banking Financial Companies (NBFCs)** and its potential risks to India's financial system.

INTERNATIONAL MONETARY FUND

- Estd. - 1944 (UN Bretton Woods Conference following Great Depression 1930s)
- Headquarters - Washington, DC, USA
- Functions -
  » Global financial assistance
  » Facilitate international trade
  » Financing for developing countries
  » Promotion of exchange rate stability
- Member States - 190 (India a founding member)

India's FM is the ex-officio Governor on the Board of Governors of IMF

- Special Drawing Rights (SDR) -
  » IMF's intl. reserve asset to supplement the official reserves of its member countries (not a currency)

  Currencies in SDR Basket - $, €, £, ¥ (Yen) and CN¥ (Renminbi)

- IMF Quotas -
  » Reflects a member country's relative position in world economy (India – 2.75%)
  » Denominated in SDRs
- Flagship Publications -
  » World Economic Outlook
  » Global Financial Stability Report
  » Fiscal Monitor
  » External Sector Report

What are the Key Highlights of the IMF Report on India Financial System?

➤ **NBFC Stress and Systemic Risk:** 63% of power sector loans in **FY 2024** were from the three largest **Infrastructure Financing NBFCs**, up from 55% in **2019-20**.

   ○ 56% of NBFC lending is financed by **market instruments** (mutual funds, and corporate bond markets), with the remaining from bank borrowings.

Non-Banking Financial Companies (NBFCs)

A Non-Banking Financial Company (NBFC) provides loans, acquires financial securities, and offers leasing & insurance services. However, it excludes companies primarily engaged in agriculture, industrial activities, trading, or real estate.

About:

About

- Do not have a banking license; not part of the payment system; cannot issue cheques
- Can accept public deposits for 12-60 months (no demand deposits)
- Registration→ Companies Act, 1956
- Insurance by Deposit Insurance & Credit Guarantee Corporation→ not available for NBFC depositors
- NBFCs require an investment-grade credit rating
- Key Services Offered- Personal loans, Home loans, Vehicle Financing, Gold Loans, Microfinance, Infrastructure Financing, Insurance Services, Investment Management

Classification:

Classification

By Major Activity:
- Asset Finance Company
- Investment Company
- Loan Company
- Infrastructure Finance Company
- Core Investment Company
- Infrastructure Debt Fund
- Micro Finance Institution (NBFC-MFI) → Malegam Committee Recommendation
- NBFC-Factors
- Mortgage Guarantee Companies
- Non-Operative Financial Holding Company

By Deposits:
- Deposit-taking NBFCs
- Non-deposit taking NBFCs-
  - Systemically Important (NBFC-NDSI)
  - Other non-deposit holding (NBFC-ND)

Systemically Important NBFCs
- Assets of ₹500 crores or more

Regulation:

Type of Institution	Regulatory Authority
NBFCs registered with RBI	RBI
Housing Finance Institutions	National Housing Bank
Merchant Banking Companies, Venture Capital Fund Companies, Stock Broking, Collective Investment Schemes (CIS)	SEBI
Nidhi Companies, Mutual Benefit Companies	Ministry of Corporate Affairs (MCA)
Chit Fund Companies	State Government
Insurance Companies	IRDAI
Non-Banking Non-Financial Companies	Statute- Companies Act 1956 Regulator- Ministry of Corporate Affairs Enforcement Agency- State Governments

Benefits of NBFCs:
- Financial Inclusion
- Innovative Products
- Liquidity
- Support for MSMEs

Challenges of NBFCs:
- Funding Constraints
- Asset Quality & Credit Risk
- Regulatory Compliance
- Corporate Governance

- State-owned NBFCs like **Indian Renewable Energy Development Agency (IREDA)** are at **higher risk** due to their exposure to the power sector which face delays, and financial stress. Without expected revenues, NBFCs **asset-liability mismatches that hinder repayments.**

- NBFCs can't accept demand deposits, lack deposit insurance, and have no direct **Reserve Bank of India (RBI)** liquidity access, making them vulnerable to financial stress.

➢ **Stagflation Risk and Impact on PSBs:** The report warns that **geopolitical risks and miscalculated monetary policies by major central banks** could lead to **rising interest rates and slow economic growth**, affecting both NBFCs and banks.

- IMF stress tests indicate that **Public Sector Banks (PSBs)** may struggle to maintain the 9% **Capital Adequacy Ratio (CAR)** if stagflation (slow growth + high inflation) occurs.

- **RBI mandates** 12% CAR for PSBs and 9% for scheduled commercial banks.

➢ **Financial Inclusion Growth:** Nearly **80% of Indian adults** have financial accounts, supported by an extensive banking network and digital infrastructure like **Unified Payments Interface (UPI).**

- The rapid rise of **retail investors in equities** has transformed India into one of the **world's largest equity options** trading markets.

➢ **Financial System Assets:** India's **financial system assets** (including banks, NBFCs, insurance companies, mutual funds, and pension funds) amount to nearly 190% of GDP, with banks holding 60% of total financial assets.

➢ **Recommendations For Financial Stability:** Instead of **paying dividends to the government**, PSBs should **retain earnings** to bolster their capital reserves and support economic recovery in case of downturns.

- Improve **data sharing on NBFC credit and exposure** to assess risks better.

  - IMF recommends **state-owned NBFCs should have the same regulatory burden** as **private sector NBFCs** to create a level playing field.

- IMF recommends **prioritizing financial stability** over aggressive lending for economic development.

India's Textile Industry

Why in News?

India's **textile industry** has the potential to become a global leader, driven by a growing domestic market, and rising global interest.

➢ However, key issues such as **high production costs, fragmented supply chains,** and sustainability challenges have slowed growth and exports.

What are the Key Facts About India's Textile Industry?

➢ **Economic Contribution:** The textile industry contributes **2.3% to India's Gross Domestic Product (GDP),** projected to reach 5% by 2030.

- As of FY24, it accounts for **13% of industrial production, 12% of exports,** and employs **4.5 crore workers**.

- In FY24 exports stood at USD 35.9 billion, with key markets in the US, EU, and UAE.

➢ **Position in Global Textile Trade:** India has the **2nd largest textile manufacturing capacity** globally and ranks as the **6th largest exporter of textiles and apparel in 2023** (accounting for 3.9% of global trade).

- **India is the 2nd largest producer of cotton in the world** (23.83% of world cotton production), with production expected to reach **7.2 million tonnes by 2030**.

- India is the **largest producer of jute in the world, and 2nd largest producer of man-made fibres (MMF)**, including polyester, viscose, nylon, and acrylic.

Share of India's textile exports
FY24

- 42.4% ■ Ready-Made Garments of all Textile
- 34.0% ■ Cotton Yarn/Fabs./Made-ups/Handloom Products
- 13.6% ■ Manmade Yarn/Fabs./Made-ups
- 5.3% ■ Handicrafts excl. Hand-made Carpet
- 3.9% ■ Carpet
- 0.8% ▪ Jute Mfg. including Floor Covering

Share of India's textile exports
FY24

- 42.4% ■ RMG of all Textiles
- 34.0% ■ Cotton Yarn/Fabs./Made-ups/Handloom Products
- 13.6% ■ Manmade Yarn/Fabs./Made-ups
- 5.3% ■ Handicrafts excl. Hand-made Carpet
- 3.9% ■ Carpet
- 0.8% ▪ Jute Mfg. including Floor Covering
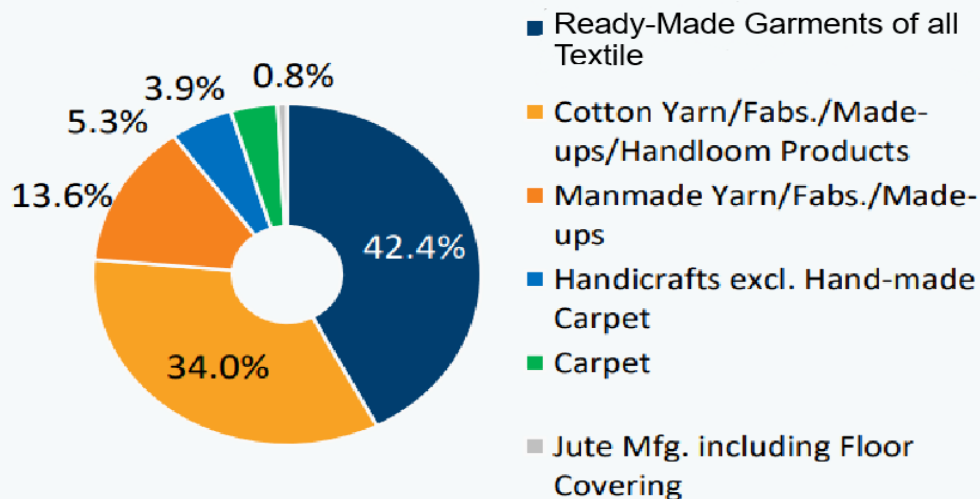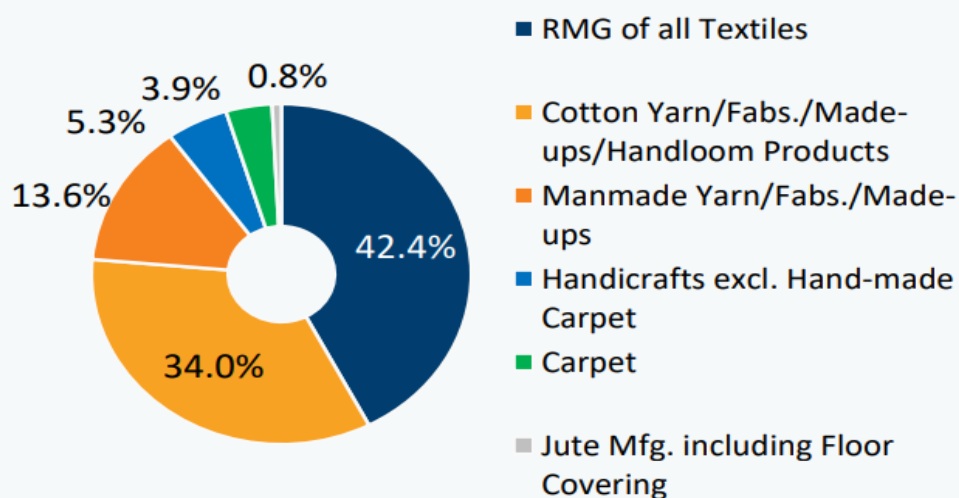
➢ **Market Growth Projections: India's textile and apparel market** is projected to reach **USD 350 billion by 2030**.

➢ **Government Initiatives:** PM Mega Integrated Textile Region and Apparel (MITRA) Parks, Production Linked Incentive (PLI) Scheme for Textiles, National Technical Textile Mission (NTTM).
   o **100%** Foreign Direct Investment (FDI) **allowed in textiles under the automatic route** to attract foreign investment.

What are the Key Challenges Facing India's Textile Industry?

➢ **Lack of Trade Agreements:** Countries like **Vietnam and China** benefit from **Free Trade Agreements (FTAs)** with major markets, making its exports more competitive.
   o India lacks similar FTAs in key textile-consuming regions like the US.

- ➢ **Stagnant Growth and Declining Exports:** Textile sector contracted by 1.8% annually (FY20-FY24), while **apparel sector shrank by 8.2% per year.**
  - ○ Apparel exports fell from **USD 15.5 billion in FY20 to USD 14.5 billion in FY24.**
- ➢ **Expensive Raw Materials**: Government-imposed **Quality Control Orders (QCOs)** restrict imports of polyester and viscose, forcing domestic yarn makers to rely on costlier local alternatives.
  - ○ **Polyester fibre in India is 33-36% costlier than in China**, while viscose fibre is 14-16% more expensive.
- ➢ **Low Export Competitiveness:** India's textile exports are costlier than those of China and Vietnam due to supply chain integration issues.
  - ○ **Unlike vertically integrated supply chains** (company takes ownership of suppliers) in China, India's fragmented supply chain spread across states and complex customs **increase logistics costs and reduce competitiveness.**
  - ○ Additionally, Bangladesh, as a **Least Developed Country (LDC),** enjoys **duty-free exports,** gaining a **cost advantage over India** in many markets due to preferential trade policies.
- ➢ **Sustainability Pressures:** Global brands are enforcing strict environmental norms, requiring higher **renewable energy use, waste recycling, and traceability of raw materials.**
  - ○ The **European Union** has implemented several regulations (2021-2024) covering the fashion industry, impacting nearly **20% of India's textile exports.**

> **Note:** The **global textile and garment sector** contributes **6-8% of global carbon emissions** (~1.7 billion tonnes/year).
> ➢ Textile production causes **20% of global water pollution** from dyeing and finishing and the textile sector was the **3rd largest source of water degradation and land use in 2020.**

Enhancing India's Agri-Exports

Why in News?

India's agricultural **exports** grew by **6.5**% to **USD 37.5 billion** (Apr-Dec 2024), while **imports** rose by **18.7% to USD 29.3 billion** that has reduced the **agricultural trade surplus.**

What are the Trends in India's Agricultural Exports?

- ➢ **Shift in Cotton Trade: India is now a net importer of cotton**, reversing its earlier status as an exporter.
  - ○ Once the 2nd-largest exporter after the US, India's **cotton exports fell** from USD 4.3 billion in 2011-12 to **USD 1.1 billion in 2023-24.**
- ➢ **Shrinking Agricultural Trade Surplus:** India's agricultural trade surplus peaked at USD **27.7 billion in 2013-14**, fell to **USD 16 billion in 2023-24**.
- ➢ **Impact of Global Commodity Prices:** Between 2013-14 and 2019-20, falling **global food prices** reduced India's agri-export competitiveness.
  - ○ Post **Covid-19** and the **Russia-Ukraine war**, prices surged, boosting exports to USD **53.2 billion in 2022-23**.
- ➢ **Major Export Commodities:**
  - ○ **Marine Products**: Export of marine products, **India's leading agri-export, declined** in 2023-24, with the downward trend continuing in 2024-25.
  - ○ **Sugar & Wheat:** Sugar and wheat exports **fell** in 2023-24 due to **government restrictions** aimed at controlling domestic **food inflation**.
  - ○ **Rice:** Rice exports, especially non-basmati, remained **strong** despite a ban on white rice and **export duty** on parboiled rice.
    - ● **Basmati rice, spices, coffee, and tobacco** exports are set to reach record highs in 2024-25.
  - ○ **Cash Crops:** Coffee and tobacco exports surged due to adverse weather affecting key producers like **Brazil, Vietnam, and Zimbabwe**.
  - ○ **Others:** India has also consolidated its position as the **world's leading exporter** of **chilli, mint products, cumin, turmeric, coriander, fennel,** etc.
- ➢ **Major Import Commodities:**
  - ○ **Edible Oil:** Edible oil **imports** in 2024-25 are projected to be the **highest** mainly due to **price hikes** caused by the **Russia-Ukraine war**.
  - ○ **Pulses:** Pulses imports averaged **USD 1.7 billion (2018-23)** due to **higher domestic pulses production** but are expected to surpass **USD 5 billion (2024-25)** due to low production in 2023-24.

➢ **Key Destinations:**
   ○ **Exports:**
      ● **Asia:** In 2023, India exported **USD 48 billion** in agri-products, with the **Global South (75%)** and **Asia (58%)** as key markets.
         ■ **China** and the **UAE** each imported **USD 3 billion** each in Indian agri-products, while Vietnam imported **USD 2.6 billion**.
      ● **Africa:** Africa accounted for **15%** of India's total agri exports.
      ● **US:** US accounts for **13.4%** of Indian agri exports primarily consisting of **rice** (Basmati & Non-Basmati), sesame seeds, and fresh fruits.
      ● **Europe:** Europe accounts for **12.6%** of Indian agri exports primarily consisting of **tobacco, fresh fruits and ornamental plants.**
   ○ **Imports:**
      ● **Global South:** The Global South supplies **48%** of India's agri-imports, led by **Brazil,** China, Mexico, Argentina and Indonesia**.**
      ● **Developed Economies:** Top three suppliers are the **US, the Netherlands, and Germany.**
➢ **Agricultural Start-ups:**

Figure 1: Distribution of Agriculture Start-ups in India across Sub-sectors

Others 13%
Organic agriculture 15%
Horticulture 3%
Food processing 17%
Fisheries 2%
Dairy farming 4%
Animal husbandry 3%
Agri-tech 43%
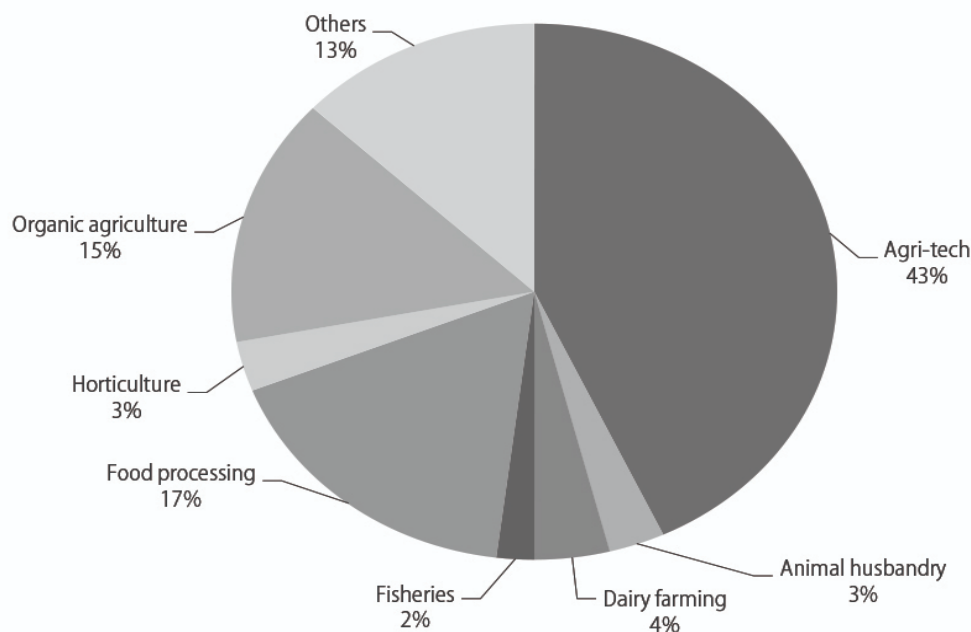
Source: Author's own analysis based on Startups India database, Department for Promotion of Industry and Internal Trade.

Click Here to Read: **What is Agricultural Export Policy?**

What are Challenges in India's Agricultural Exports?

➢ **Non-Tariff Barriers (NTBs):** Developed countries impose stringent **Sanitary and Phytosanitary (SPS)** and **Technical Barriers to Trade (TBT)** creating **trade barriers** for Indian agricultural exports. E.g.,
   ○ India's **basmati rice and tea** exports have faced European bans over **pesticide contamination.**

- ❍ Japan has banned imports of **cut flowers from India** over **zero-tolerance pest rules** in floricultural products, although such pests are found in Japan.

➢ **Unfair Level Playing Field:** Developed nations' **heavy farm subsidies** to their farmers and **high tariffs on Indian agri exports** create a disadvantage for Indian farmers.
- ❍ The US provides **USD 61,286 per farmer annually**, while **India** gives only **USD 282**, lowering global prices and hurting Indian farmers.

➢ **Challenges to India's MSP Policy:** Developed countries like the US, Canada, and Australia challenge **India's MSP** at the **WTO,** claiming it exceeds the **10% limit (Amber box)** under the **AoA,** risking dispute proceedings.
- ❍ India can provide **uncapped input subsidies** under the AoA's '**Development Box**' for developing nations, but developed countries seek limits that can threaten **small farmers' livelihoods** in India.

➢ **Challenges from FTAs:** India's **FTAs** with countries like Singapore, ASEAN, and Japan **lower tariffs on imported agri-products**, hinders farmers' adoption of **new technologies** and **investment in infrastructure**, reducing global competitiveness.

➢ **Frequent Export Restrictions:** India's export restrictions to control price shocks **deter foreign importers and domestic investment** in post-harvest management and food processing.
- ❍ **Frequent onion bans** disrupt supply chains and **reduce India's reliability in the global market,** prompting import partners to seek alternatives.

WTO AGREEMENT ON AGRICULTURE (AoA)

A WTO treaty negotiated during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT); formally ratified in 1994 at Marrakesh, Morocco; Came into effect in 1995

FEATURES

- Market access (Promote market access for agricultural products by reducing trade barriers)
- Domestic support (Subsidy Boxes are included in this)
- Export subsidies (Reduce the use of export subsidies, which can distort trade)

SUBSIDY BOXES

Amber Box Subsidies:
- ↠ Can distort international trade by making a country's products cheaper in comparison to those of other countries
  - » Examples: Subsidies for inputs such as fertilisers, seeds, electricity, irrigation, and Minimum Support Price (MSP)
- ↠ Amber box is used for all domestic support measures that are deemed to distort production and trade
  - » As a result, the signatories are required to commit to reducing domestic supports that fall into the amber box
- ↠ Members who do not make these commitments must keep their amber box support within 5-10% of their value of production. (Di Minimus Clause)
  - » 10% for developing countries
  - » 5% for developed countries
- ↠ India's MSP program remains under scrutiny, as it exceeds 10% ceiling

Blue box Subsidies:
- ↠ "Amber box with conditions" — designed to reduce distortion
- ↠ Any support that would normally be in the amber box is placed in the blue box if it requires farmers to limit production
  - » These subsidies aim to limit production by imposing production quotas or requiring farmers to set aside part of their land
- ↠ At present there are no limits on spending on blue box subsidies

Green Box Subsidies:
- ↠ Domestic support measures that don't cause trade distortion or at most cause minimal distortion
- ↠ These subsidies are government funded without any price support to crops
  - » Also include environmental protection and regional development programmes
- ↠ Allowed without limits (except in certain circumstances)

Drishti IAS

What are Government Initiatives to Boost Agriculture Exports?
➢ **Agricultural Export Policy (AEP), 2018**
➢ **APEDA (Agricultural and Processed Food Products Export Development Authority)**
➢ **PM Formalisation of Micro Food Processing Enterprises (PM-FME) Scheme**
➢ **Krishi Udan Yojana 2.0**
➢ **National Programme for Organic Production (NPOP)**

12th Regional 3R and Circular Economy Forum

Why in News?

India (Jaipur, Rajasthan) hosted the **12th Regional 3R and Circular Economy Forum in Asia and the Pacific** emphasising on sustainable waste management and **circular economy.**

➢ A circular economy focuses on **durable, reusable, and recyclable products**, ensuring materials are continuously **repurposed, remanufactured, or used** for various purposes.

What are the Key Highlights of the 12th Regional Forum Meeting?

➢ **About:** It is a regional platform that promotes **3R (Reduce, Reuse, Recycle)** principles and **circular economy** practices across the **Asia-Pacific region.**

  ○ It brings together **policymakers, industry leaders, researchers, and partners** to advance resource efficiency strategies.
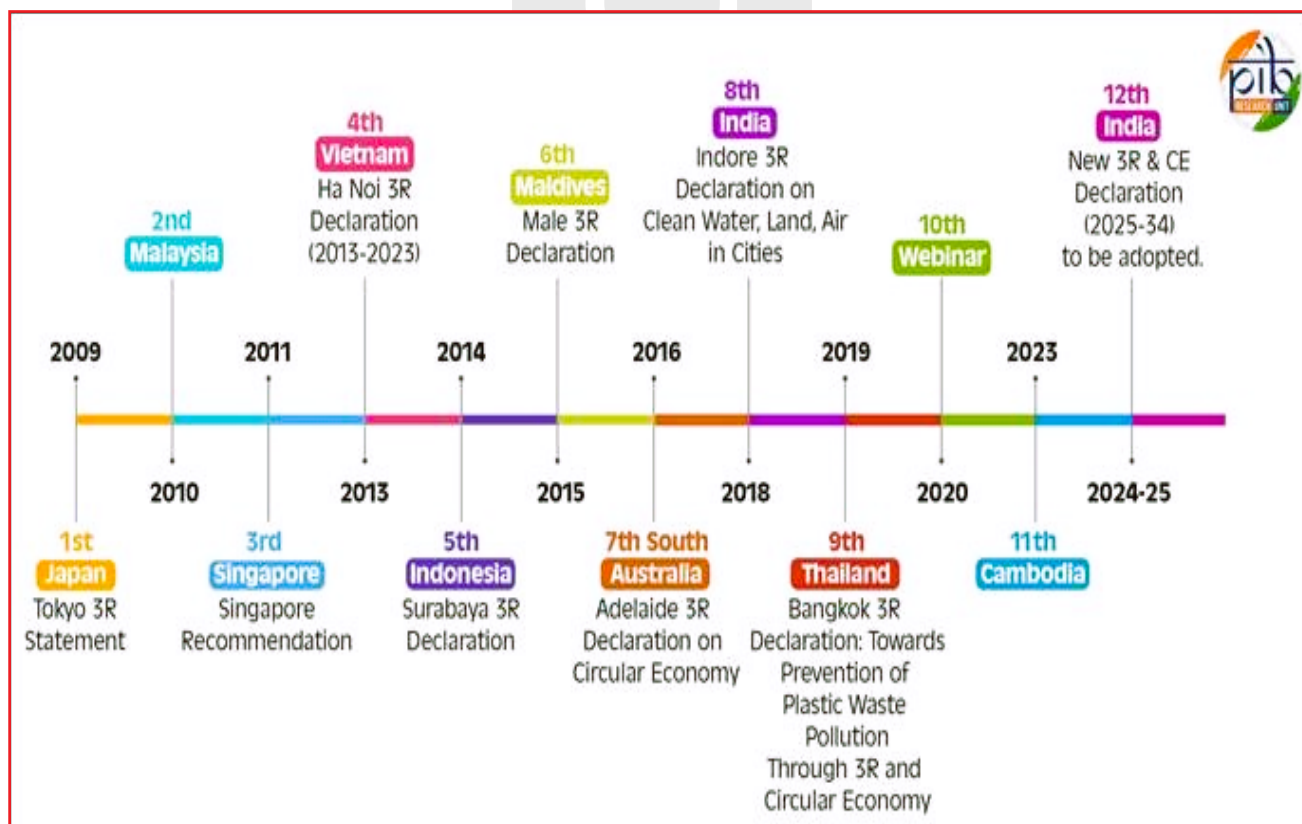
➤ **Historical Context:** It was **launched in 2009** to promote **3R principles** and resource efficiency.

  ○ The **Hanoi 3R Declaration (2013-2023)** set **33 voluntary goals** for a resource-efficient and circular economy.

➤ **Theme: Realizing Circular Societies Towards Achieving SDGs and Carbon Neutrality in Asia-Pacific.**

➤ **Objectives:** Discuss and agree a **voluntary, non-binding "3R and Circular Economy Declaration (2025-2034)"** for a resource-efficient, low-carbon, and resilient Asia-Pacific.

  ○ Discuss and pave way towards realization of a **Circular Economy Alliance Network (CEAN)** towards **Zero Waste Cities and Societies.**

  ○ Discuss circular economy strategies to achieve **net-zero targets and SDGs.**

➤ **Key Announcements:**

  ○ **P-3 (Pro Planet People) Approach:** India's PM advocated the **P-3 approach** for sustainable lifestyles and eco-friendly behavior.

  ○ **Cities Coalition for Circularity (C-3):** The C-3, a **global alliance** for city collaboration, knowledge-sharing, and private sector partnerships, was launched.

  ○ **CITIIS 2.0:** A key MoU for **CITIIS 2.0** (City Investments to Innovate, Integrate and Sustain) was signed that focuses on integrated **waste management and climate action.**

Click Here to Read: **What is a Circular Economy?**

India's Leadership in Circular Economy & 3R Policies

➤ **Swachh Bharat Mission-Urban (SBM-U):** Achieved **108.62%** of the household toilet construction target and successfully processed **80.29%** of solid waste.

➤ **GOBAR-Dhan Scheme: 1,008 biogas plants** are operational, covering **67.8%** of India's districts.

➤ **E-Waste Management Rules, 2022:** For **FY 2024-25, 5,82,769 MT** of e-waste was collected, with **5,18,240 MT** successfully recycled.

➤ **Plastic Waste Management (Amendment) Rules, 2021**: India banned single use plastic on 1st July 2022.

India's Path to a High-Income Economy

Why in News?

A **World Bank** report titled *"Becoming a High-Income Economy in a Generation"* highlights that India must achieve an average annual growth **rate of 7.8% over the next 22 years to reach high-income country (HIC) status by 2047.**

➤ The report stresses that ambitious reforms and their effective implementation will be necessary to meet this goal.

What are the Key Highlights of the Report on Becoming a High-Income Economy?

➤ **India's Economic Journey:** India's share in the **global economy has doubled** from **1.6% in 2000 to 3.4% in 2023**, making it the **5th largest economy** in the world.

  ○ For two decades before the pandemic, India's economy grew at an **average annual rate of 6.7%**, second only to China among major economies.

➤ **2047 High-Income Economy Goal:** India aspires to become a **HIC by 2047**.

  ○ To achieve this, its **gross national income (GNI) per capita** would have to increase by nearly **8 times from USD 2,540 in 2023** (currently India is in lower-middle-income category).

    • In 2023, the World Bank classified countries with **GNI per capita above USD 14,005** as **high income** and those between **USD 4,516– USD 14,005** as **upper middle income**.

➢ **Growth Scenarios:** The report outlines three possible scenarios for India's growth trajectory.

Scenario	Growth Rate (Real GDP)	Outcome
Slow Reforms	Below 6%	India remains upper-middle income, falls short of HIC.
Business as Usual	6.60%	India improves but does not reach high-income status.
Accelerated Reforms	7.80%	India will become a high-income country by 2047.

○ However, only few countries (Chile, Romania, Poland, Czech Republic, and Slovakia) have transitioned to **high-income status within 20 years,** while nations like **Brazil, Mexico, and Turkey** remain stuck in the **upper-middle-income category,** making this an ambitious but achievable target.

What are the Key Challenges in Achieving HIC Status?

➢ **Declining Investment Rate:** Investment-to-Gross Domestic Product (GDP) peaked at **35.8% in 2008** but fell to **27.5% in 2024**.

➢ **FDI Challenges:** India's **FDI-to-GDP ratio is just 1.6%,** far lower than **Vietnam (5%) and China (3.1%)**.

➢ **Declining Labor Force Participation:** India's labor force participation rate (LFPR) **is 55% in 2023**, lower than most emerging economies (China 65.8% in 2023).

➢ **Women in Workforce:** Female labor force participation (FLFP) has improved to **41.7% in 2023-24 (**global benchmarks is over 50%).

➢ **Issues in Job Creation: 45% of India's workforce is still in agriculture** (disguised unemployment), a sector with low productivity.

○ In contrast, the **share of manufacturing in total employment was around 11%** and modern market services accounted for only 7%, much lower than in East Asian economies.

○ In 2023-24, 73% of India's workforce is in **informal jobs,** compared to just **32.7% in other emerging economies**.

➢ **Declining Trade Openness:** India's **exports and imports make up 46% of GDP (2023), down from 56% in 2012**.

➢ **Low Global Value Chain (GVC) Participation:** India has made **significant gains in mobile phone exports**, but **high tariffs and non-tariff barriers** are limiting broader trade expansion.

● **India's services sector (IT & BPO) is strong,** but manufacturing lags.

What are the Key Reforms Needed for Achieving HIC Status?

➢ **Boosting Investment:** Increase **investment rate from 33.5% to 40% of GDP** by 2035. Strengthen **financial sector regulations** for better credit flow.

➢ **Boosting Credit Access & Debt Resolution:** Improve **Micro, Small and Medium Enterprises (MSME) access to formal credit**. Strengthen mechanisms for **bankruptcy resolution** and **bad debt recovery**.

➢ **Creating More and Better Jobs:** Raise **labor force participation** closer to economies like Vietnam (**73%**) and the Philippines (**60%**).

❍ Encourage private sector investment in **job-rich sectors** like **agro-processing, hospitality, transportation, and care economy**.

❍ Expand **skilled workforce** and improve **access to finance**. Strengthen **modern manufacturing and high-value services**.

➤ **Boosting Global Trade Competitiveness:** Invest in **export-oriented sectors** and **integrate into GVCs**.

➤ **Formalizing the Workforce:** Simplify labor laws to **reduce informal employment** and promote **better wage conditions**.

➤ **Strengthening Human Capital and Innovation:** Enhance **secondary school enrollment** and **vocational training** to match industry needs.

❍ Expand R&D investments in key sectors like **Artificial Intelligence, Biotechnology, and clean energy**.

Middle-income Trap

➤ **About:** The **Middle-Income Trap,** coined by the **World Bank (2007)**, refers to economies that grow rapidly but **fail to reach high-income status**. It applies to countries with a **GNI per capita between USD 1,000 - USD 12,000 (2011 prices)**.

❍ Countries in the **middle-income trap** struggle with **rising labor costs, weak innovation, income inequality, demographic challenges and overreliance on specific industries** further hinder growth

➤ **India's Risks of Falling into the Trap:** India is among the **most unequal countries in the world,** with the top 10% of the population holding 57% of the total national income. The **share of the bottom 50% has gone down to 13%.**

❍ High GST and corporate tax cuts benefit the wealthy, further widening the gap.

❍ In India, **stagnant or declining wages,** coupled with inflation, high household debt, and low savings, make the country vulnerable to the middle-income trap.

Agritourism in India

Why in News?

Himachal Pradesh (HP) is promoting **agri-tourism** to strengthen its economy where **tourism** contributes around **7%** to the State's GDP.

Agritourism Opportunities in HP

➤ **Orchards:** Himachal can grow high-value crops like **tulips (Kangra region), saffron, and medicinal herbs.**

➤ **Educational Agritourism:** Students can explore farms to learn about **food and sustainability**, while farmers can host educational tours for a fee.

➤ **Nutraceutical Farming:** Himachal can promote **Himalayan herbs**, attracting **nutraceutical tourism** focused on health and organic farming.

➤ **Cultural Connection:** Engage local youth to **share farm stories** and develop agritourism sites showcasing traditional farming and culture.

What is Agritourism?

➤ **About:** Agritourism is a form of **commercial enterprise** that connects **agriculture with tourism**, attracting visitors to **farms for education or entertainment** while providing **additional income** to farmers.

➤ **Benefits:**

❍ **Boosting Rural Economy:** It provides farmers with **alternative income** through **farm/home stays, tours, and hands-on experiences**, reducing reliance on uncertain crop yields and stabilizing finances.

● It creates jobs for **artisans, guides, cooks, and transport providers**, offering rural women and youth new employment opportunities.

❍ **Sustainable Tourism:** It promotes **organic farming, water conservation, and eco-friendly stays**, unlike mass tourism, which strains resources.

❍ **Preserving Agricultural Heritage:** It helps preserve **traditional farming, crafts, folk music, and indigenous knowledge**, allowing tourists to experience and support rural heritage.

- It preserves **folk arts, pottery, weaving, and traditional food processing/cuisine** and organic produce.
  - **Builds Social Capital:** It builds **social capital** by fostering connections between **rural and urban communities** through **shared experiences, knowledge exchange, and economic interactions.**
  - **Educational Experiences:** It educates visitors on **organic farming, animal husbandry, and environmental conservation**, with schools and universities organizing farm visits for hands-on learning.
  - **Aligning with Government Policies:** Schemes like **Dekho Apna Desh, and Agriculture Infrastructure Fund** support farmers in agri-tourism by improving infrastructure, marketing, and training.
- **State-Level Initiatives:**
  - **Maharashtra:** Maharashtra was the **first state** to promote agritourism, establishing the **Agro-Tourism Development Corporation (ATDC)** in 2005.
    - ATDC runs a 28-acre pilot project in **Baramati, Pune**, with **328 agritourism centers** across 30 districts.
    - E.g., **Vineyards (Nashik, Pune) and mango (Ratnagiri, Raigad)** orchards in Maharashtra.
  - **Karnataka**: Karnataka's Coorg offers **coffee plantation stays** where visitors experience coffee production from **picking to brewing.**
  - **Kerala**: Launched the **Kerala Agro-Tourism Network** that offers visitors a chance to explore **aromatic gardens**, learn about **spice cultivation**, and buy **organic spices.**
  - **Sikkim:** Sikkim, India's first organic state, offers agri-tourism with farm visits, **sustainable agriculture lessons,** and farmer interactions.
  - **Punjab: Tractor rides**, traditional meals **(sarson da saag and makki di roti)**, and folk performances showcase and preserve **rural culture.**

- **Potential:**
  - **Bihar:** Muzaffarpur's **litchi orchards** offer agri-tourism, while Nalanda's **organic farms** attract wellness tourists.
  - **Rajasthan:** Rajasthan's **desert agriculture, camel farming**, and Bishnoi village stays offer insights into rural life, sustainable farming, and wildlife conservation.
  - **North-East India:** North-East has **rich biodiversity and traditional farming** methods that can attract **eco-conscious travelers**.
    - E.g., **Wet Rice Cultivation** by Apatani tribe in **Ziro Valley** (Arunachal Pradesh)**, Bamboo Drip Irrigation** (Meghalaya).
  - **Chhattisgarh:** Tribal farm tourism in Bastar allows visitors to experience traditional **Mahua brewing and organic farming.**
  - **Gujarat:** Kutch's **Banni Grasslands** offer pastoral tourism with the **Rabari community**, while **Anand** features dairy tourism with **Amul.**
- **Government Policies & Initiatives:**
  - **Swadesh Darshan Scheme**: Develop **theme-based tourism circuits** to boost local economies by showcasing India's culture, heritage, and natural resources. E.g., **Tribal Circuit.**
  - **PMJUGA:** As a part of **Pradhan Mantri Janjatiya Unnat Gram Abhiyan (PMJUGA)**, **1,000 homestays** are being developed in tribal areas to **boost tourism and livelihoods.**
  - **Dekho Apna Desh Scheme:** It boosts domestic tourism, encouraging Indians to **explore lesser-known destinations**.
  - **National Strategy for Promotion of Rural Homestays, 2022:** Prepared by the Ministry of Tourism, it supports agritourism as part of the **Atma Nirbhar Bharat** initiative.
- **Agro-Tourism Destinations in India:**

Agro-Tourism Destinations

Vanila County
A scenic destination in Kerala.

Destiny Farmstay
A serene getaway in Ooty's hills.

Prakriti Farms
A farm experience in Punjab's countryside.

The Country Retreat
Relaxing farmstay in Rajasthan.

Bhavani Retreat
A retreat in Gujarat's Sabarkantha district.

Dudhsagar Plantation
A farmstay near the famous waterfall.

Green Dreams
Eco-friendly stay in Coorg's nature.

The Goat Village
Unique stay in Uttarakhand's mountains.

Citrus Country
A citrus farm experience in Punjab.

Mepra: The Hidden Roots
A hidden gem in Kerala's Kuttanad.

What Challenges are Associated with Agritourism?

➢ **High Competition:** Low awareness and competition from **eco, cultural, and adventure tourism** limit agro-tourism growth.

➢ **Poor Accessibility:** Poor **roads, transport, and healthcare** deter tourists, while financial limits hinder farmers' investment in accommodation, training, or marketing.

  ○ E.g., Agro-tourism sites in Uttarakhand remain **inaccessible during monsoons.**

➢ **Land Use Conflict:** Agri-tourism can divert land from farming, with farmers **prioritizing tourism over crop production** as **income from tourism through** homestays, resorts, and restaurants is **more profitable** and provides **immediate cash flow.**

➢ **Monoculture:** Monoculture dominated by **wheat and rice** in northern states like Punjab, Haryana, UP, MP etc **discourages agritourism** as tourists prefer **interactive farming activities** like **horticulture, floriculture,** and **livestock rearing**.

➢ **Seasonal Dependency:** Agri-tourism income **fluctuates with seasons,** peaking during crop harvests but declining in off-seasons or due to **harsh weather events**.

  ○ E.g., **Rajasthan**'s desert farms face **low summer tourism due to heat**, while **Assam's** tea estates see declines in **monsoons due to floods** and **roadblocks.**

➢ **Security Concerns:** Remote agro-tourism sites face risks like **theft, wild animals, and limited emergency services.** E.g., Wild elephant threats in Karnataka.

➢ **Lack of Skills:** Farmers and rural entrepreneurs **lack training in customer service, tour management, and accommodation**, making visitor engagement challenging.

  ○ **Poor planning** further hampers the balance between **farming and tourism**.

Initiatives in India's Maritime Sector

Why in News?

The **Ministry for Ports, Shipping and Waterways** launched major initiatives to modernize India's **maritime infrastructure.**

What are the Key Initiatives Taken to Modernize Maritime Infrastructure?

➤ **One Nation-One Port Process (ONOP):** Standardizes port operations, reducing **documentation inconsistencies.**

  ❍ Through the ONOP process, the Ministry standardized documentation, **reducing** container operation **documents by 33%** and **bulk cargo documents** by 29%.

➤ **Sagar Ankalan – Logistics Port Performance Index (LPPI) 2023-24:** Evaluates **port efficiency** based on turnaround time, berth idle time, and cargo handling.

➤ **Bharat Global Ports Consortium:** Expands India's **maritime reach** by integrating key stakeholders in **port operations, finance, and infrastructure development.**

  ❍ The consortium of **India Ports Global Ltd (operations), Sagarmala** Development Company Limited (finance), and Indian Port Rail & Ropeway Corporation Limited (infrastructure development) will drive port expansion, operations, and financing, strengthening India's role in global trade and logistics.

➤ **MAITRI Platform:** Master Application for International Trade and Regulatory Interface (**MAITRI**) to **digitize trade documentation,** reduce processing time, optimize trade flows, and contribute to sustainable development.

  ❍ It enables the **Virtual Trade Corridor (VTC)** between India and the UAE (under **IMEC**) and aims to expand to **BIMSTEC** and **ASEAN** using **AI** and **Blockchain** for efficiency and security.

➤ **NCoEGPS:** National Centre of Excellence in Green Port & Shipping (NCoEGPS) to promote **eco-friendly shipping** and **carbon footprint reduction.**

  ❍ It promotes **cleaner fuels and eco-friendly port management**, aiming to build a future-ready maritime ecosystem aligned with global environmental goals.

Initiatives for Maritime Sector in Union Budget 2025-26
➤ **Maritime Development Fund (MDF):** It is a **Rs 25,000 crore MDF** to support the maritime sector through **equity and debt financing.**
➤ **Ship Breaking Credit Note Scheme:** It incentivises ship scrapping by issuing a **credit note** of **40%** of the **scrap value** which can be reimbursed to **buy new Made in India ships.**
➤ **Infrastructure HML:** Large ships will be added to the **Infrastructure Harmonised Master List (HML)**, enabling long-term financing, tax incentives, private investment, and fleet modernization.

Tea industry and Jhumoir Dance

Why in News?

Prime Minister Narendra Modi attended **Jhumoir Binandini 2025,** a cultural event in Guwahati, Assam, celebrating 200 years of **Assam's tea industry** and its **Tea Tribe** through the traditional *Jhumoir dance.*

What is Jhumoir Dance?

➤ **About:** Jhumur, a traditional folk dance of **Assam's Adivasi tea tribes,** was brought by the tea garden community from **Jharkhand's Chotanagpur region.**

  ❍ It belongs to the **Sadan ethnolinguistic group (origins to the Chotanagpur region)** and is performed during harvest, weddings, and gatherings.

➤ **Performance and Style:** Jhumur is performed by men and women in a circular formation.

  ❍ It features rhythmic footwork, and lively music, accompanied by Madal, Dhol, Taal, and Flute.

➤ **Cultural Significance:** Jhumur dance reflects unity, pride, and the struggles of Assam's tea garden communities, with songs narrating migration, exploitation, and social struggles of the tea garden community.

Assam's Tea Tribe

➢ Assam's Tea Tribe or Tea Garden Communities refers to a multi-ethnic community of tea garden workers and their descendants.

➢ They migrated from **Central India** (Jharkhand, Odisha, Chhattisgarh, West Bengal) in the 19th century to work in British tea plantations.

  ○ Many were forcibly brought under exploitative conditions, facing harsh labor, low wages, and restricted mobility.

➢ The tea tribe community forms **17% of Assam's population** and influences around **40 out of 126 Assembly seats**. The community remains a crucial part of Assam's tea production and cultural fabric.

What are the Key Facts About Tea?

➢ **Origin of Tea in India:** Tea cultivation began in the early 19th century when the British discovered the **Singpo tribals** of Assam consuming a drink from wild tea bushes. Recognizing its potential, the British commercialized tea cultivation.

➢ **Characteristics of Tea Plants:** Tea belongs to the *Camelliaceae* family, with two main species *Camellia sinensis* (Short-leaved 'China' variety) and *Camellia assamica* (Broad-leaved 'Assam' variety).

  ○ It is an **evergreen shrub**, growing **up to 30 feet if unpruned**. Thrives in **sub-tropical climates**.

    ● Tea thrives in **16-32°C**, **150 cm annual rainfall**, and **80% humidity**. It requires a **frost-free** environment, and temperatures above 35°C and below 10°C are harmful for the bush.

    ● Tea grows best in **slightly acidic, well-drained soil** with **porous subsoil** for water percolation.

  ○ Fresh leaves contain **~4% caffeine**. **Tea seeds** yield **tea oil**, used for cooking but different from tea tree oil used for medicinal purposes.

➢ **Tea Varieties:** India holds **Geographical Indication (GI)** tags for **Darjeeling Tea**, Assam Orthodox Tea, Nilgiri Orthodox Tea and Kangra Tea.

  ○ Darjeeling tea, known for its unique aroma and flavor, was **India's first GI-tagged product**.

➢ **India's Tea Industry**: India has **39,700 tea estates** and employs over **one million workers**.

  ○ India is the **second-largest tea producer after China**, contributing 21% of global tea production and the **world's largest producer of black tea**.

  ○ India is the **4th largest exporter of tea.** In 2023-24, the tea export value stood at 781.79 Million USD.

    ● India exports tea to over 120 countries, the top importers are Iraq, UAE, Russia, US, UK, Germany.

  ○ India consumes **80% of its tea production** and **18% of global black tea**.

  ○ The tea industry directly employs **1.16 million workers** and indirectly supports an equal number.

  ○ **Small Tea Growers (STGs)** contribute **52% of total production**, with **2.3 lakh growers** involved.

➢ **Regional Production Trends:**

  ○ **North India (83% of total production):** Assam (Assam Valley, Cachar), West Bengal (Dooars, Terai, Darjeeling).

  ○ **South India (17% of total production):** Tamil Nadu, Kerala, Karnataka.

➢ **Tea Board of India (TBI):** The TBI is a **statutory body** established in 1954 under the **Tea Act, 1953,** under the Ministry of Commerce.

  ○ Headquartered in **Kolkata**, it also has overseas offices in London, Dubai, and Moscow.

  ○ The Board consists of 31 members, including the Chairman, and is reconstituted **every three years**.

Major Tea Producing States
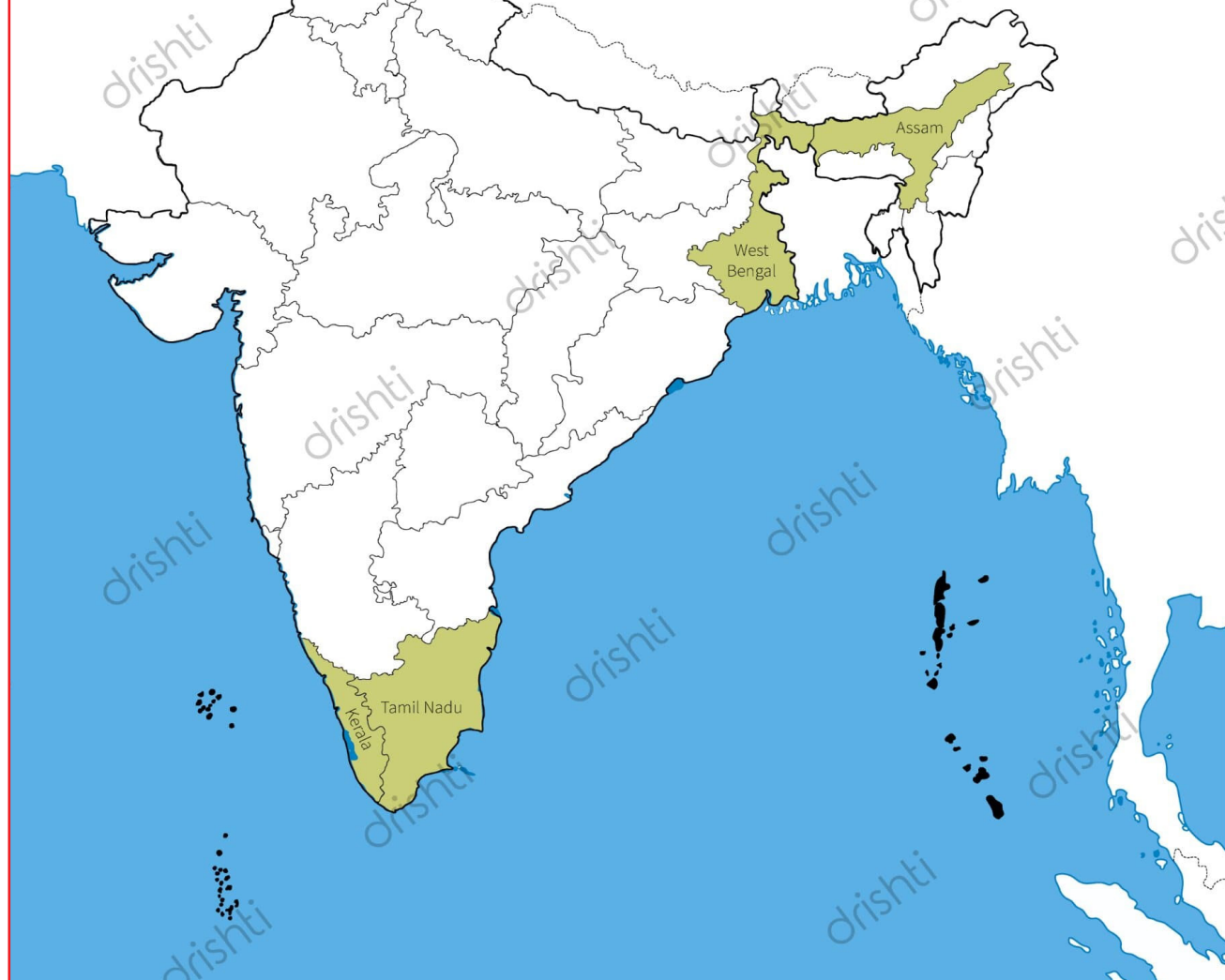
What are the Challenges in the Indian Tea Industry?

➢ **Declining Tea Production:** India's tea production fell by **66 million kg** in Jan-Oct 2024, with a further **45-50 million kg decline** expected.

    ○ Loss of **first and second flush crops** (which fetch the highest prices) is impacting revenue and pushing tea prices higher.

- ➤ **Impact of Climate Change:** Extreme temperature fluctuations, including **heat, rain deficits, and excess rainfall,** harm tea bushes, reducing **yield and quality.**
- ➤ **Pesticide Ban:** The ban on pesticides like Aldrin, and Captafol has increased **production costs** as growers seek alternatives, while demand for pesticide-free tea has risen in **Russia, Ukraine, and Central Asia,** growers struggle with pest control.
- ➤ **Wages of Tea Workers:** The **Comptroller and Auditor-General of India (CAG)** report highlights inadequate wages and lapses in labor law implementation for Assam's tea workers.
  - ○ **State-owned Tea Corporation workers** face delayed or irregular salary payments.
  - ○ **Lack of basic worker welfare measures,** including housing, healthcare, and retirement benefits.
- ➤ **Rising Costs and Market Pressures:** Production losses and rising costs are putting financial strain on **STGs** .
  - ○ **Competition from Kenya, Sri Lanka, and China** is making Indian tea exports less competitive.

Farmers' Earning in Agri Produce: RBI

Why in News?

The **Reserve Bank of India (RBI)** conducted a **pan-India survey** on **farmers's share in consumer prices in rabi crops.**

- ➤ It covered mandis and villages across **18 states** analysing **12 rabi crops** and including inputs from **farmers, traders and retailers.**

What are the Key Findings of the Survey on Farmers' Earning in Agri Produce?

- ➤ **Farmers' Share in Consumer Prices:** Farmers received **40-67%** of the final consumer price for major **rabi crops** surveyed.

- ○ **Wheat Farmers:** Wheat farmers received **67%** of the consumer price, the **highest** among surveyed crops, with **25%** selling at **MSP** for an assured market.
- ○ **Rice and Other Cereals: Rice farmers' share** in retail prices was **52% in 2024** that remained stable over the years i.e., **45% in 2022, and 49% in 2018.**
- ○ **Pulses and Oilseeds: Lentil (Masoor) farmers** received around **66%**, while **Gram (Chana) farmers** received **60%** of the consumer price.
  - ● **Mustard farmers** received **52%**, slightly lower than the **55%** recorded in a **2021 study.**
- ○ **Perishable Crops:** Farmers' share in **fruits and vegetables** ranged from **40-63%**, significantly lower than for cereals and pulses.
  - ● The **combined share of traders and retailers** in consumer prices was more than **50% for most perishable crops** (except tomatoes).
  - ● **Perishable crops (fruits and vegetables)** had a **lower farmers' share** compared to Non-perishable crops (such as wheat and pulses).
    - ■ Perishable products have **short shelf life, seasonal production, varied quality, special logistics, strict standards, demand fluctuations,** climate dependency, and supply chain uncertainties.
- ➤ **Digital Transactions: Cash** transactions still **dominate** agriculture, but **electronic payments** have **risen** significantly in the **2024** survey compared to 2018 and 2022.
- ➤ Supply Chain Challenges:
  - ○ An **unorganized supply chain** with **multiple intermediaries** limits transparency in **product movement, finances, and pricing**, reducing farmers' share of consumer prices.
  - ○ A lower farmers' share discourages **crop diversification** away from cereals.

> **Click Here to Read: Middlemen Gain as Farmers Earn Less in Agri Produce: RBI**

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International Relations

Highlights

- *India-Mauritius Relations*
- *India's Energy Strategy*

India-Mauritius Relations

Why in News?

During the **Prime Minister (PM)** of India's visit to Mauritius, both nations signed multiple agreements on **trade, maritime security, and defense**, emphasizing regional cooperation and elevating their ties to an **enhanced strategic partnership**.

➢ PM also received the highest national award of Mauritius, the **'Grand Commander of the Order of the Star and Key of the Indian Ocean.'**

What are the Key Outcomes of India's PM Visit to Mauritius?

➢ **Enhanced Strategic Partnership:** Both elevated their ties to an **Enhanced Strategic Partnership**, strengthening security, trade in local currencies, and development while reaffirming their commitment to a **free and secure** Indian Ocean.

    ○ Both countries agreed to ratify the **protocol** amending the **Double Taxation Avoidance Agreement (DTAA)** to align with **international treaty standards**.

➢ **'Mahasagar' Vision:** India introduced the **MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)** initiative for the Global South.

    ○ The MAHASAGAR vision **builds on SAGAR**, enhancing engagement with the Global South through **technology sharing, concessional loans, grants, trade, and mutual security cooperation**.

➢ **Security Cooperation:** India and Mauritius agreed to enhance the use of **Agalega Island's new runway and jetty**, developed by India.

    ○ India also reaffirmed support for Mauritius's sovereignty over the **Chagos Archipelago**.

    ○ Cooperation will be strengthened in **white shipping, blue economy, and hydrography.**

➢ **Developmental Support:** India announced its **first-ever rupee-denominated Line of Credit** to support Mauritius in replacing its water pipelines.

    ○ India will help Mauritius establish a **police academy and a maritime information-sharing center.**

    ○ The Mauritius President inaugurated the **Atal Bihari Vajpayee Institute of Public Service and Innovation**, a health center, and 20 Indian-funded community projects.

➢ **New Parliament Building:** India will construct a new Parliament building for Mauritius, which India described as a **gift from the "Mother of Democracy".**

➢ **Multilateral Engagements:** India reaffirmed its commitment to working with Mauritius in regional and international forums like the **Colombo Security Conclave, IORA, and the Indian Ocean Conference**.

Historical Connection Between India and Mauritius

➢ **Pre-Independence of India:** The first Indians in Mauritius arrived during **French colonial rule** (1700s) as **artisans and masons** from Puducherry (Mauritius was once a **French colony**, before being taken over by the **British**).

    ○ Under **British rule**, about **500,000 Indian indentured workers** migrated between **1834 and the early 1900s,** with **two-thirds settling in Mauritius.**

    ○ **Mahatma Gandhi** visited Mauritius in **1901**, advocating **education and political empowerment** for the Indian community.

    ○ As a tribute to Gandhi, Mauritius celebrates its **National Day on 12th March,** marking the **Dandi March**.

➢ **Post-Independence of India:** India and Mauritius established **diplomatic ties in 1948**, two decades before Mauritius gained independence (1968).

    ○ Mauritius' first Prime Minister, **Seewoosagur Ramgoolam**, was closely associated with Indian leaders like **Gandhiji, JL Nehru, and Netaji Subhash Chandra Bose.**

Why are India and Mauritius Important for Each Other?

Importance of Mauritius for India

➢ **Maritime Significance:** Mauritius' strategic location in the **western Indian Ocean** makes it a **key maritime partner** under India's <u>**SAGAR (Security and Growth for All in the Region)**</u> initiative (now **MAHASAGAR**).

➢ **Countering China's Presence:** With China's expanding presence in the Indian Ocean, India's strong ties with Mauritius help **safeguard** securing Sea lines of communication (SLOC) and India's **strategic interests**.

➢ **Economic Relations:** Mauritius is a **gateway for India's trade and investment in Africa**, being part of the <u>**African Continental Free Trade Area (AfCFTA)**</u>.

- ❍ India is one of Mauritius's **largest trading partners**, and Mauritius is the **2nd-largest FDI source** into India (FY 2023-24) after Singapore.
- ➤ **Cultural Links:** About **70%** of Mauritius population are of Indian origin that help promote **Indian culture, language, and heritage.**
  - ❍ Mauritius shares strong cultural ties with India, with grand **Maha Shivratri** celebrations and **Ganga Talao** as a revered Hindu pilgrimage site.

Importance of India for Mauritius

- ➤ **Leading Development Partner:** India has been Mauritius's **key development partner** since its independence (1968), providing **USD 1.1 billion** in the last decade alone.
  - ❍ India has supported Mauritius in implementing key infrastructure projects, including the **Metro Express, Supreme Court Building**, Hospitals, etc.
- ➤ **Maritime Security Assistance:** India is Mauritius's key security partner, supporting **EEZ** protection through **naval patrols, joint maritime surveillance, and hydrographic surveys**.
- ➤ **Disaster Assistance:** India has been Mauritius's first responder in crises, providing aid during **Cyclone Chido (2024), the Wakashio Oil Spill (2020),** and the **Covid-19 pandemic**.
- ➤ **Capacity Building:** Mauritius is a key beneficiary of India's **Indian Technical and Economic Cooperation (ITEC) program**, with 4,940 Mauritians trained since 2002.
  - ❍ India also offers customized training to **civil servants** of Mauritius through **National Centre for Good Governance (NCGG)**.

> **Click Here to Read:**
> - ➤ **What are the Key Facts Regarding the Chagos Archipelago?**
> - ➤ **What is Agelega Project?**

India's Energy Strategy

Why in News?

India has committed to increasing its oil and natural gas imports from the US, with energy trade expected to rise from **USD 15 billion to USD 25 billion** in the near future. This move is part of a broader goal to **double bilateral trade to USD 500 billion.**

- ➤ The decision enhances **India's energy security** while strengthening **economic ties amid global geopolitical shifts**.

Why is India Expanding Energy Trade with the US?

- ➤ **Energy Security:** India, the world's **3rd-largest oil importer and consumer**, relies on **imports for over 85% of its crude needs**. With **primary energy demand set to nearly double to 1,123 million tonnes of oil equivalent** by 2040 driven by a projected **Gross Domestic Product (GDP) rise to USD 8.6 trillion,** making supply stability crucial.
  - ❍ **Expanding energy trade with the US** reduces dependency on **West Asia and Russia**, while **diversifying sources** mitigates risks from geopolitical disruptions.
- ➤ **Bilateral Trade Growth:** Expanding **energy imports** helps balance **India's USD 45.7 billion trade surplus** with the US in 2024, while advancing the **'Mission 500' initiative** to double bilateral trade to **USD 500 billion by 2030**.
- ➤ **Infrastructure Boost:** Competitively priced **US crude and Liquefied Natural Gas (LNG)** aim to make the US a **leading supplier** to India, supporting **industrial growth, refining expansion, and petrochemical investments**.
- ➤ **Geopolitical Benefits:** Stronger US energy ties support **India's bid for full membership in the International Energy Agency (IEA)**.
  - ❍ Strengthened US-India ties in energy can **counterbalance China's influence in global energy markets**.

What is the State of India's Energy Consumption?

- ➤ Crude Oil:
  - ❍ **Total Imports (2023-24): 234.26 million tonnes** of crude oil.
  - ❍ **Import Dependence:** India's **crude oil import dependence increased to 87.8%** in 2023–24, with **domestic production meeting less than 13%** of the total demand.
  - ❍ **Future Projection:** Crude oil consumption is expected to grow at a **Compound Annual Growth Rate (CAGR)** of 4.59% to 500 million tonnes by FY40.

➢ **Petroleum Products and Diesel**:

Petroleum Products and Diesel

Exports

In 2022–23, 62.59 million tonnes of petroleum products was exported, maintaining India's role as a refining hub.

Refining Capacity

India plans to double refining capacity to 450-500 MTPA by 2030, (current 256.8 MMTPA) to meet domestic and export needs.

Imports

In 2022-23 48.69 million tonnes of petroleum products (LPG, fuel oil, petcoke) worth USD 22.93 billion.

Diesel Demand

Demand for Diesel in India is expected to double to 163 MT by 2029-30, with diesel and gasoline covering 58% of India's oil demand by 2045.

Note:
1. million tonnes per annum (MTPA)
1. Million Metric Tonne Per Annum (MMTPA)

➢ **Natural Gas and Cleaner Fuels:** India aims to increase **natural gas's share in the energy mix to 15% by 2030** (from the current ~6%).

   ○ **Total LNG Imports (2023-24): 31.80 billion cubic meters (bcm)** worth **USD 13.405 billion**.

   ○ **Ethanol Blending Target: Advanced to 20% by 2025-26** to reduce reliance on fossil fuels, with **ethanol production capacity** reaching around **1,600 crore litres** as of September 2024.

      ● The **Ethanol Blended Petrol (EBP)** programme has reduced CO_2 emissions by 544 lakh metric tons and substituted **181 lakh metric tons of crude oil.**

What is India Doing to Meet the Energy Needs?

➢ **Increasing Domestic Production:** India aims to **double its oil & gas exploration area** from **0.5 million sq. km by 2025** to **1 million sq. km by 2030**.

   ○ New projects in the **Krishna-Godavari (KG) Basin** and **offshore exploration** efforts are expected to boost output.

- ➤ **Global Energy Partnerships:** India's diversified import strategy from sources like **US, Russia, Brazil, Canada, and Africa** helps ensure supply security amid geopolitical disturbances, though it may **not fully shield against long-term price volatility.**

  - ○ Russia now supplies **40% of India's crude imports** (largest supplier of crude oil to India) (less than 1% before 2022).

  - ○ India is strengthening ties with **IEA, Organization of the Petroleum Exporting Countries (OPEC)+** for long-term contracts.

  - ○ The **Global Biofuel Alliance,** an initiative by **India** which intends to expedite the global uptake of biofuels.

- ➤ **LNG & Gas Pipeline Expansion:** The **Unified Pipeline Tariff** aims for "One Nation, One Grid, One Tariff," benefiting remote consumers and boosting gas market growth.

  - ○ India is expanding **city gas distribution networks, and import terminals** to support growing demand.

- ➤ **Strategic Petroleum Reserves (SPR):** SPR Program acts as a buffer against supply disruptions and price volatility in global markets.

  - ○ India aims to commercialize **50% of its SPR** to raise funds and build additional storage tanks to offset high oil prices.

- ➤ **Clean & Renewable Energy:** India targets **500 GW of renewable energy capacity by 2030** with expansion of **solar, wind, and hydro projects** to reduce reliance on fossil fuels.

  - ○ The government promotes **ethanol blending, biodiesel, and compressed biogas (CBG)** while announcing a **USD 67 billion investment in hydrogen energy projects in 2024.**

- ➤ **Policy Reforms:** The government allows 100% FDI under the automatic route for oil & gas PSUs and upstream and private sector refining projects, boosting investment and energy sector growth.

  - ○ The **Hydrocarbon Exploration and Licensing Policy** aims to increase domestic oil and gas production.

  - ○ Subsidies are provided for **electric vehicles (EVs), green hydrogen, and biofuels** to reduce dependence on crude oil.

■ ■ ■

Social Issues

Highlights

- *International Women's Day 2025*
- *Challenges in Slum Redevelopment*
- *SC Upholds Disability Rights as Fundamental*
- *Protein Deficiency in Rural India*
- *Rising Obesity Burden in India*

International Women's Day 2025

Why in News?

International Women's Day is celebrated globally on **8th March to** recognize women's achievements across **cultural, economic, and political spheres.**

➤ Additionally, the year 2025 is significant as it marks the **30th anniversary** of the **Beijing Declaration and Platform for Action (BPfA),** a landmark commitment to women's rights.

Key Areas for Women's Advancement

Economy
Promoting women's participation in economic activities

Poverty
Addressing economic disparities affecting women

Armed Conflict
Supporting women in war and post-conflict situations

Education
Providing learning and training opportunities for women

Violence
Combating and preventing abuse against women

Health
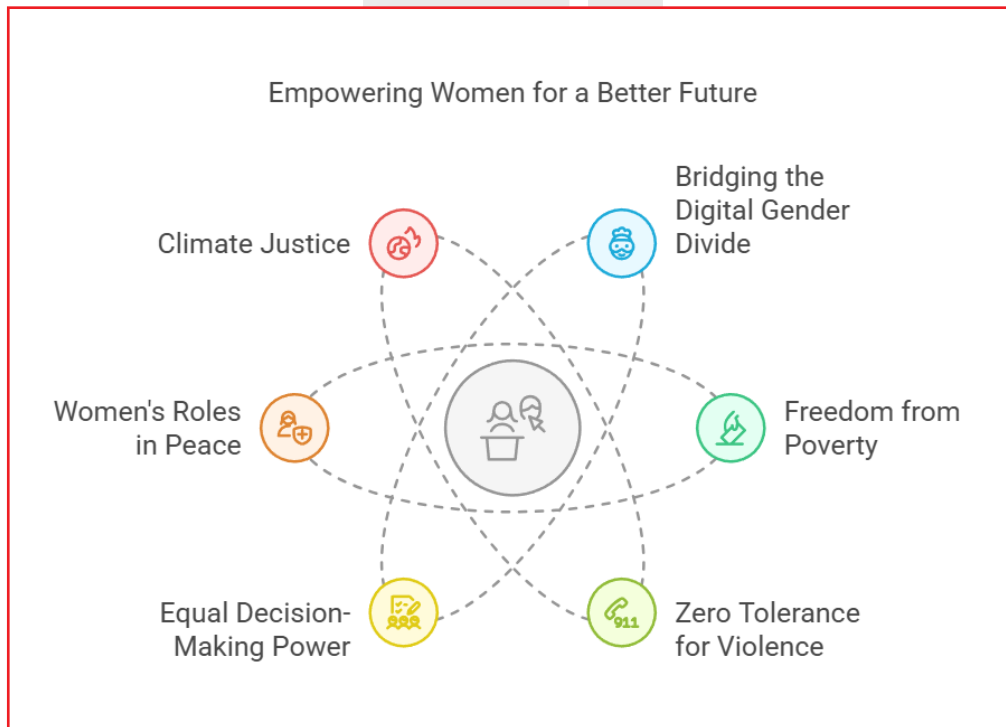Ensuring access to healthcare and wellness for women

What is International Women's Day?

➢ **About:** It is a special day dedicated to honoring **women's achievements** and highlights **gender disparities** and advocates for women's rights in politics, society, and the economy.
  ○ The theme for 2025 is **"For ALL Women and Girls: Rights. Equality. Empowerment"**.

➢ **History:** German activist **Clara Zetkin** proposed the idea, leading to the first celebrations in **1911 in the USA and Europe**.
  ○ In **1975**, the United Nations officially recognized **8th March** as International Women's Day.

➢ **Purpose:** It serves as a platform to discuss crucial issues such as **workplace equality**, **reproductive rights**, and **leadership representation.**
  ○ Governments and organizations use the day to promote policies for women's empowerment and **ending discrimination.**

What is the Beijing Declaration and Platform for Action?

➢ **About:** The **Beijing Declaration and Platform for Action (1995)** was adopted at the **4th World Conference on Women**, held in **Beijing, China, in 1995**.
  ○ It is a key blueprint for **women's and girls' rights**, promoting legal protection, service access, youth engagement, and social change.
  ○ **India** is a **signatory** to **BPfA**.

Empowering Women for a Better Future

- Climate Justice
- Bridging the Digital Gender Divide
- Women's Roles in Peace
- Freedom from Poverty
- Equal Decision-Making Power
- Zero Tolerance for Violence

➢ **Areas for Action:** It identified **12 key areas** for urgent action on gender equality and provided strategies for ensuring equal opportunities for all. **Prominent areas are:**

➢ **Beijing+30 Action Agenda:** It marks the **30th anniversary** (1995-2025) of the BPfA to **review and appraise** its implementation.
  ○ **It focuses on six key areas:**

What is the Current Status of Women in India?

➢ **Maternal Health:** Institutional deliveries have risen to **95%**, contributing to a decline in maternal mortality from **130 to 97 per 100,000 births (2014-2020)**.

○ Modern **contraceptive** use among married women stands at **56.5%**, enhancing reproductive health choices.

WOMEN
Reservation Act, 2023
(106th Constitutional Amendment Act)

OBJECTIVE

⊘ Reserve 1/3rd of total seats in LS and state Legislative Assemblies (LAs) for women

BACKGROUND

⊘ **Bill previously introduced in:** 1996, 1998, 2009, 2010, 2014
⊘ **Related Committees:**
  » Committee on the Status of Women in India (1971)
  » Committee under Margaret Alva (1987)
  » Geeta Mukherjee Committee (1996)
  » Committee on the Status of Women (2013)

Key Features

■ *Articles Inserted:*
  ⊘ **Article 330A -** Reservation for Women in LS
  ⊘ **Article 332A -** Reservation for Women in State LAs
  ⊘ **Article 239AA -** Reservation for Women in NCT of Delhi
  ⊘ **Article 334A -** Reservations to become effective after delimitation is undertaken and Census is conducted
■ *Time Period:*
  ⊘ Reservation to be provided for **15 years** (can be extended)
■ *Rotation of Seats Reserved:*
  ⊘ After each delimitation

NEED

⊘ **Political Underrepresentation:**
  » Only **82 Women MPs in LS (15.2%)** and 31 in RS (13%)
  » On avg, women constitute only **9% of the total members in State LAs**

ARGUMENTS

⊘ **In Favour:**
  » Vital step towards gender equality
  » Broader range of perspectives to the decision-making process
  » Helps eliminate discrimination against women in political/public life
⊘ **Against:**
  » Delimitation based on 2021 census (yet to be conducted) is mandatory
  » No women's reservation in RS and State Legislative Councils

STEPS AHEAD

⊘ Reservation for women within political parties
⊘ Independent political decision-making by women; **overcoming Sarpanch-patism**

Drishti IAS

- **Education & Skills:** Schemes such as <u>Beti Bachao Beti Padhao</u> have contributed to improving the sex ratio (**1020 females per 1000 males** as per <u>NFHS - 5</u>) and female higher school enrollment **(28% since 2014-15)**.
  - Similarly, <u>Vigyan Jyoti (2020)</u> aims to **encourage girls' participation in** <u>STEM education</u>, particularly in underrepresented regions.
- **Financial Inclusion: 100 million women** have gained **financial access** through <u>Self-Help Groups (SHGs)</u>, while <u>PMGDISHA</u> has trained **35 million rural women** in digital literacy.
  - **Gender-responsive budgeting** stands at **8.8% (2025-26)**, allocating **USD 55.2 billion** to gender-specific programs.
- **Addressing Gender-Based Violence: 770** <u>One Stop Centres</u> provide medical, legal, and psychological support to **women victims**. e.g., **Odisha's blockchain system** enables swift, confidential survivor support to women victims.
- **Political Representation:** The <u>Women's Reservation Act, 2023</u> secures 33% legislative representation for women, and India leads globally with **1.4 million women in local governance.**
- **Women in Science & Technology:** <u>Gender Advancement for Transforming Institutions (GATI)</u> supports women in STEM, while the **G20 TechEquity platform** trains thousands of young women in emerging technologies.

What are the Challenges to Women Empowerment?

- **Political Underrepresentation:** Women hold only **27% of parliamentary seats**, **36% of local government positions**, and **28% of management roles** that hinders **inclusive policy-making.**
- **Gender-Based Violence:** Despite **88%** of countries having **laws against violence against women,** conflict-related to **sexual violence** has risen by **50% since 2022**, with 95% of victims being women and girls.
- **Workplace Discrimination: 61%** of prime working-age **women** work, compared to **91%** of **men**, earning just 51% of men's income, deepening inequality.
- **Unpaid Care Work:** Women spend **2.3 times** more daily on unpaid care work than men. By 2050, they will still spend 9.5% more time, limiting education and job opportunities.

- **Barriers in Education & Food: 110 million girls and young women** may remain **out of school** by 2030.
  - By 2030, **24% of women and girls** may face <u>food insecurity</u>, while **only 44%** of nations are improving their **education and training.**
- **Legal Barriers:** In 28 countries, women **lack equal rights in marriage and divorce**, while 67 nations have no legal protections against gender-based discrimination **(UN Women Report).**

Challenges in Slum Redevelopment

Why in News?

Following a <u>Supreme Court</u> **(SC)** directive, the Bombay <u>High Court</u> **(HC)** has initiated a first-of-its-kind review of the **Maharashtra Slum Areas Act, 1971**.

- The review **aims to address systemic gaps** causing delays in slum redevelopment projects, which **violate slum dwellers'** <u>right to shelter (Article 21)</u> and livelihood.

Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971

- **Key Provisions of the Act:**
  - Empowers the Maharashtra government to declare an area as a <u>"slum area"</u> and can acquire (if needed).
  - Establishes the **Slum Rehabilitation Authority (SRA)** to oversee redevelopment via private developers.
- **Maharashtra Slum Rehabilitation Scheme 1995:**
  - Under it, private developers (in agreement with the slum dwellers) fund redevelopment and provide finished tenements free of cost.
  - In exchange, they receive some additional area for construction and selling in the open market.
  - Developers receive incentives like higher <u>Floor Space Index (FSI)</u> and saleable areas in exchange for free housing for slum dwellers.

What are Slums?

- **About:** According to the <u>United Nations</u>**,** a slum is **a run-down area** of a city characterized by **substandard housing and** <u>poverty</u> and lacking in tenure security.

○ **Slums are chaotic, overcrowded,** and neglected areas that have emerged as unplanned and unintended settlements due to urban development processes.

○ The slum population constitutes 17.4% of the total urban population of India (census 2011).

➢ **Reasons for Growth of Slums:**

○ **Population growth and poverty** drive the urban poor into expanding slums, with **40%** of the population **expected to live in urban areas by 2026,** creating high land demand.

○ **Climate-induced crises, such as food insecurity** and frequent disease outbreaks, can drive population growth in urban slums, **further exacerbating unplanned urbanization.**

○ **Regional development imbalances drive rural-to-urban migration** from less developed (Bihar and Odisha) to prosperous states like Maharashtra and Gujarat (**highest slum population** in **Maharashtra: 1.18 crore**).

○ **Inefficient urban local bodies,** unplanned city management, and a lack of political will to develop slums contribute to the worsening of slum conditions (**Dharavi,** India's largest slum in **Mumbai**).

What are the Issues Due to the Neglecting of Slum Development?

➢ **Illusion of Urban Opportunity:** Slums may lure the rural poor with the promise of better opportunities, but they often **mask the harsh realities** and challenges of life in urban slums.

➢ **Health Risks in Slum Areas:** Residents in slum areas **face significant health risks, particularly from waterborne diseases** like typhoid and cholera.

➢ **Exploitation of Vulnerable:** Women and children in slums are often victims of **prostitution, begging,** and **child trafficking**.

➢ **Crime and Social Neglect:** The slums are commonly believed to have **high incidences of crime** due to **inadequate government attention** to education, law enforcement, and public services.

○ This contributes to issues like **hunger, malnutrition, and limited access to education.**

What are the Challenges in Slum Rehabilitation?

➢ **Land and Legal Issues:** Land acquisition and legal clearances often hindered by **bureaucratic processes, and regulatory authorities** are major bottlenecks in slum redevelopment projects.

➢ **Financial Constraints:** Securing substantial financial investment for slum rehabilitation projects is challenging, as private developers are often reluctant due to low returns on investment.

➢ **Social and Cultural Barriers:** Rehabilitation in slum communities can face resistance as **slum dwellers fear losing their strong social and cultural ties.**

➢ **Environmental Considerations:** Environmental challenges in slum rehabilitation include **limited green spaces and waste accumulation**, as slums often lack proper waste management systems, leading to environmental degradation.

➢ **Implementation and Governance Issues:** Developers **delaying projects to inflate land costs hinder slum rehabilitation,** as seen in **Mumbai's SRA model,** criticized for slow execution and lack of transparency.

SC Upholds Disability Rights as Fundamental

Why in News

The Supreme Court has ruled that **visually impaired candidates** can participate in judicial service exams, affirming that the **right against disability-based discrimination** under the **Rights of Persons with Disabilities (RPwD) Act, 2016,** should be treated as a **fundamental right.**

What is the SC Ruling on Disability Rights in Judicial Services?

➢ **Striking Down Discriminatory Provisions:** The recent ruling came while deciding petitions concerning the *Madhya Pradesh Judicial Service Examination Rules, 1994*, and *Rajasthan Judicial Service Rules, 2010,* aligning them with the RPwD Act.

○ **Rule 6A** of the *MP Judicial Service Rules, 1994* was struck down as it excluded visually impaired candidates despite their educational qualifications.

- ➤ **Recognition of Disability Rights:** Any exclusion of visually impaired candidates from judicial services violates the **Constitutional right of equality (Article 14) and non-discrimination (Article 15).**

- ➤ **Affirmative Action:** The Court ruled that the State must adopt a **rights-based approach** rather than a **charity-based one**, ensuring equal access to employment.

  - ❍ The judgment reinforced that **reasonable accommodations** (bench cited the *Indra Sawhney judgment*, directing a separate cut-off for visually impaired candidates in the selection process**)**, as mandated by **United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)**, and the RPwD Act, 2016, must be provided to **persons with disabilities(PwDs).**

  - ❍ It allowed **relaxations in eligibility criteria**, similar to SC/ST candidates, when an adequate number of PwD candidates are not available.

Landmark Cases Related to PwDs

- ➤ *Suchita Srivastava v. Chandigarh Administration, 2009*: **The Supreme Court** upheld the reproductive rights of a **mentally retarded woman**.

- ➤ *Govt. of India v. Ravi Prakash Gupta, 2010:* The Supreme Court ruled that **predefined job criteria cannot be used to deny reservations** to visually impaired candidates, ensuring fair appointments.

- ➤ *Union of India v. National Federation of the Blind, 2013*: Clarified that 3% reservation applies to vacancies in total cadre strength, not just identified posts.

- ➤ *Deaf Employees Welfare Association v. UoI, 2013*: Directed equal transport allowance for **hearing-impaired government employees**, ensuring non-discrimination among disabled as well.

- ➤ *Om Rathod vs Director General of Health Services Case, 2024:* SC ruled that the **functional assessment of a candidate's abilities** should take precedence over rigid eligibility criteria.

What is the Status of PwDs in India?

- ➤ **About:** As per the **2011 Census**, persons with disabilities make up **2.21% (2.68 crore)** of the total population.

  - ❍ As per **RPwD Act, 2016**, there are **21 recognized types of disabilities**, including Visual Impairment, Hearing Impairment, Speech & Language Disability, Intellectual Disability, Multiple Disabilities, Cerebral Palsy, and Dwarfism, among others.

- ➤ **Constitutional Provisions for PwDs:**

  - ❍ **Fundamental Rights**: **Article 14, Article 19** and **Article 21.**

  - ❍ **DPSP: Article 41** (Advocates for public assistance in cases of unemployment, old age, sickness, and disability).

  - ❍ **Responsibilities of Panchayats and Municipalities**:

    - • **11ᵗʰ Schedule**: Focuses on social welfare, including that of persons with disabilities (Entry 26 of Article 243-G).

    - • **12ᵗʰ Schedule**: Ensures the protection of weaker sections, including persons with disabilities (Entry 9 of Article 243-W).

- ➤ **Laws Related to Disability Rights:**

  - ❍ **RPwD Act, 2016:** It aims to ensure equal opportunities, protect rights, and enable the full participation of persons with disabilities.

  - ❍ **National Trust Act, 1999:** This Act established a national body to address the welfare of persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities, among other matters.

  - ❍ **Mental Health Care Act, 2017:** This Act protects the rights and dignity of persons with mental illness.

What are the Challenges Faced by PwDs in India?

- ➤ **Social Barriers**: PwDs often face challenges in securing **employment, education, and adequate income,** which hinders their ability to fully exercise their rights.

  - ❍ **Stereotypes, stigma, prejudice**, and discrimination limit social integration and create a **cycle of exclusion and isolation.**

- ➤ **Transportation Barriers**: According to the **World Report on Disability,** inaccessibility in transportation systems, **the built environment,** significantly limits the ability of PwDs to function independently in society.

- ➤ **Communication Barriers**: PwDs related to hearing, speaking, reading, or writing face difficulties in effective communication due to non-effective communication channels such as absence of non-verbal communication skill.

- **Policy and Programmatic Barriers**: Challenges such as **inconvenient scheduling and lack of accessible equipment** hinder the delivery of essential public healthcare programs.
- **Intersectional Marginalization:** Women with disabilities face **dual discrimination** based on gender and disability, limiting their access to education, employment, and healthcare.
  - **Among the total disabled population 44% are females (Census 2011),** mostly live in rural areas and face greater exclusion.

What are India's Initiatives for the Empowerment of PwDs?
- **PM-DAKSH (Divyang Skill Development and Rehabilitation Scheme)** - **Accessible India Campaign** - **DeenDayal Disabled Rehabilitation Scheme** - **Assistance to Disabled Persons for Purchase/fitting of Aids and Appliances** - **National Fellowship for Students with Disabilities**

Protein Deficiency in Rural India

Why in News?

A recent study conducted by the **International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)** revealed that **rural Indians suffer from 'hidden hunger'** despite the availability and affordability of **protein-rich foods**.

> **Note:**
> - **Hidden Hunger:** It refers to a form of **malnutrition** where people consume sufficient calories but **lack essential micronutrients** and **macronutrients**, particularly **proteins**.
> - **International Crops Research Institute for the Semi-Arid Tropics (ICRISAT):**
>   - **Established:** 1972
>   - **Status:** Recognized as a specified **"International Organisation"** by the Government of India under Section 3 of the United Nations (Privileges and Immunities) Act, 1947.
>   - **Vision:** Achieving **prosperity, food security, and resilience in dryland tropics.**
>   - **Mission:** Alleviating poverty, hunger, malnutrition, and environmental degradation in dryland regions.

What are the Key Findings of the ICRISAT Study on Hidden Hunger?

- **Dominance of Cereal-Based Diets**: Rural diets are **heavily dependent on rice and wheat,** which **contribute 60–75% of daily protein intake**.
  - However, these cereals lack essential amino acids, leading to an imbalanced diet.
- **Underutilization of Protein-Rich Foods**: Despite the availability of protein-rich foods like pulses, dairy, and livestock products, their **consumption remains low due to cultural preferences,** limited nutritional awareness, and financial constraints.
- **Public Distribution System (PDS) Limitations**: While the PDS effectively ensures calorie intake, **it reinforces a cereal-heavy diet without incorporating sufficient protein-rich options,** exacerbating protein deficiency.
- **Education and Nutrition Link**: Women's education levels significantly influence household dietary patterns. **Better-educated women tend to ensure a more balanced and diversified diet** for their families.
- **Regional Variations in Protein Consumption**: Factors affecting **protein intake vary across states and districts**, highlighting the need for region-specific nutritional interventions.
  - Many wealthier families, despite economic capability, fail to consume adequate protein.

Click Here to Read: **Rising Obesity Burden in India**

What are the Consequences of Protein Deficiency in the Human?

- **Muscle Atrophy and Weakness:** Long-term protein deficiency leads to **muscle atrophy**, causing **weakness, fatigue,** and reduced mobility.
  - Severe cases result in frailty, impairing daily activities.
- **Weakened Immune System:** Protein is **essential for antibody and immune cell production**, and its **deficiency weakens immunity, increasing infection risk** and slowing recovery.
- **Stunted Growth and Developmental Delays:** In children, protein deficiency causes **stunted growth, cognitive impairment, and delayed puberty**.
  - If untreated, it leads to **permanent developmental issues**, impacting long-term health and productivity.
- **Organ Damage:** Protein deficiency strains the **liver and kidneys**, causing **metabolic imbalances, fatty liver, and renal dysfunction** over time.

What are the Key Recommendations as per ICRISAT Report?

➤ **Diversification of PDS**: Reform the PDS to include **pulses, millets, and protein-rich foods** while **expanding fortified food distribution** programs to enhance protein intake among vulnerable populations.

➤ **Nutrition Education**: Integrate nutrition education into **school curricula and public health initiatives** while **promoting community-based awareness programs** on balanced diets and protein consumption.

➤ **Empowering Women**: Enhance **women's education to improve dietary choices** and **strengthen self-help groups** to facilitate better access to protein-rich foods.

➤ **Diversified Farming Practices:** Provide incentives for cultivating **protein-rich crops like pulses and millets** while **promoting sustainable agriculture** models to ensure both food and nutrition security.

➤ **Targeted Regional Strategies**: Given that factors influencing protein consumption vary by region, **customized policies should be developed to address state-specific nutritional gaps.**

Rising Obesity Burden in India

Why in News?

The **Prime Minister** expressed concern over the **rising obesity**, especially among children, and urged people to adopt a **healthier lifestyle.**

> **Click Here to Read**: **Reevaluating Obesity Metrics**

What is Obesity?

➤ **About:** The **World Health Organization (WHO)** defines obesity as abnormal or **excessive fat accumulation** that poses health risks, with a **Body Mass Index (BMI) of 25 or above** classified as **overweight** and **30 or above as obese.**

○ BMI is a basic method to **assess** whether an adult has a **healthy weight,** calculated by dividing weight in kilograms by height in meters squared (kg/m²).

➤ **Obesity Statistics:**

○ India:

- **NFHS-5:** As per the **National Family Health Survey (NFHS)-5 (2019-21)**, **24%** of Indian **women** and **22.9%** of Indian **men** are **overweight or obese.**

  ■ As per NFHS-5 (2019-21), the percentage of **overweight children under five** increased to **3.4% from 2.1%** in NFHS-4 (2015-16) at the all-India level.

  ■ Overweight and obesity rates vary from **8% to 50% across states, genders, and rural-urban areas.**

○ **Global:** From **1990 to 2022**, obesity in children and adolescents (5–19 years) grew from **2% to 8%**, a fourfold increase.

- In **adults (18+ years)**, it more than doubled from **7% to 16%.**

➤ **Associated Health Risks:** Obesity, the **mother of all diseases,** significantly increases the risk of various **non-communicable diseases (NCDs).**

○ **Cardiovascular Diseases (CVDs):** Indians experience CVDs like heart attacks, and hypertension **at least 10 years earlier** than people in other countries.

○ **Diabetes:** India has the highest number of diabetes cases **(101 million)**, and obesity increases the risk of **Type 2 diabetes** by causing **insulin resistance**.

○ **Cancer:** Obesity is linked to cancer, with India's cases expected to rise from **14.6 lakh in 2022 to 15.7 lakh by 2025.**

○ **Joint Disorders:** Excess weight **strains joints**, increasing the risk of degenerative diseases like **knee osteoarthritis and back pain.**

○ **Psychosocial Impact:** Stigma and bullying cause **low self-esteem, depression, anxiety,** and impact school performance and quality of life in children.

➤ **Economic Implications:** In 2019, obesity cost India **USD 28.95 billion (Rs 1,800 per capita), or 1.02% of GDP,** due to healthcare expenses and lost productivity.

- By **2030**, India's obesity-related economic burden may rise to **Rs 4,700 per capita or 1.57% of GDP.**
- The Economic Survey 2024-25 recognizes obesity as a **health challenge** and suggests **higher taxes on ultra-processed foods (UPF).**

> **Click Here to Read**: **What are Overweight, Thinness, and Obesity?**

What are the Causes of Obesity?

➢ **Unhealthy Diets:** Increased consumption of **High Fat, Salt, and Sugar (HFSS) foods, and UPF** high in unhealthy fats.

➢ **Low Physical Activity:** According to The Lancet, sedentary lifestyles from **office jobs and screen time** leave nearly half of Indians insufficiently active.

➢ **Poor Urban Infrastructure:** Lack of safe **cycling lanes, shrinking green spaces**, and traffic congestion discourage active commuting and outdoor exercise.

➢ **Air Pollution:** It causes **inflammation,** raises cardio-metabolic risks, promotes **fat accumulation,** and discourages outdoor activities.

➢ **Socioeconomic Barriers:** Public distribution systems mainly provide **staple grains (rice and wheat)**, leading to **imbalanced diets** while high costs limit nutritious food (fruits, vegetables, and pulses) for low-income groups.

- India has moved from **'food or calorie deficit'** to becoming **'food or calorie sufficient (with inequitable distribution),** as 55% (78 crore) can't afford a healthy diet, and 40% lack adequate nutrients.

What are Government Initiatives for Obesity Prevention?
➢ **National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD)**
➢ **Ayush Holistic Wellness Centre** (Specialized Ayurvedic Care, Ayurswasthya Yojana,)
➢ **Mission Poshan 2.0**
➢ **Fit India Movement**
➢ **Eat Right Mela**

Science & Technology

Highlights

- India's AI Revolution
- Growth of India's Biotechnology Sector
- Space Debris Crisis
- HeroRATS for Tuberculosis Elimination

- Quantum Nature of Gravity
- National Science Day 2025
- Rise of India's Private Space Industry
- Ultra-Conserved Elements

India's AI Revolution

Why in News?

India is undergoing a holistic transformation in **Artificial Intelligence (AI)**, led by proactive government policies under the **IndiaAI Mission.**

➤ This initiative aligns with the **vision of Viksit Bharat by 2047,** positioning India as a global AI powerhouse.

How is India Transforming into a Global AI Powerhouse?

➤ **Strengthening AI Infrastructure:** The government is setting up a **high-end computing center** with **18,693 Graphics Processing Units (GPUs)**, nearly **9 times more than DeepSeek** and **two-thirds of ChatGPT's capacity**.

- ○ Open GPU Marketplace allows startups, researchers, and students to access affordable high-performance computing.
- ○ **India aims to develop its own GPUs within 3-5 years**, reducing dependency on foreign technology such as **Quantum chips.**
- ○ **IndiaAI Dataset Platform** provides **high-quality, anonymized datasets** for AI research and development.
- ○ India has established AI **Centres of Excellence(CoEs)** in Healthcare, Agriculture, and Sustainable Cities in New Delhi. **Union Budget 2025** allocated **Rs 500 crore** for a new AI CoE in Education.

➤ **AI Skilling: Five National AI Skilling Centres** will train youth for AI industries, aligning with Make for India, Make for the World vision.

- ○ **National Education Policy (NEP)** 2020 integrates AI education at all levels.
- ○ India ranks **1st in Global AI Skill Penetration (Stanford AI Index 2024)**, with 263% AI talent growth since 2016 and a **14 times rise in AI-skilled workforce (2016-2023).**
- ○ **India has around 520 tech incubators and accelerators**, making India **3rd largest startup ecosystem globally**.

➤ **Indigenous AI Models: BharatGen** world's **first government-funded multimodal Large Language Model (LLM) initiative** for AI-driven public services.

- ○ **Sarvam-1**, a **2-billion-parameter model** supporting **10 Indian languages** for translation and content generation.
- ○ **AI Kosha** is a government-backed platform designed to provide **non-personal datasets** to help businesses, researchers, and startups develop AI solutions.
- ○ **Digital India BHASHINI is an AI-powered language translation platform** for digital accessibility.
- ○ **Chitralekha** is an open-source **video transcreation tool** for Indic languages.

➤ **AI with Digital Public Infrastructure (DPI):** AI integrated with **Aadhaar, Unified Payments Interface (UPI), DigiLocker** to improve efficiency.

- ○ **AI-driven crowd monitoring** optimized railway passenger movement, and **MuleHunter.AI** developed by **Reserve Bank of India** to detect **mule bank accounts** used for fraud and money laundering.
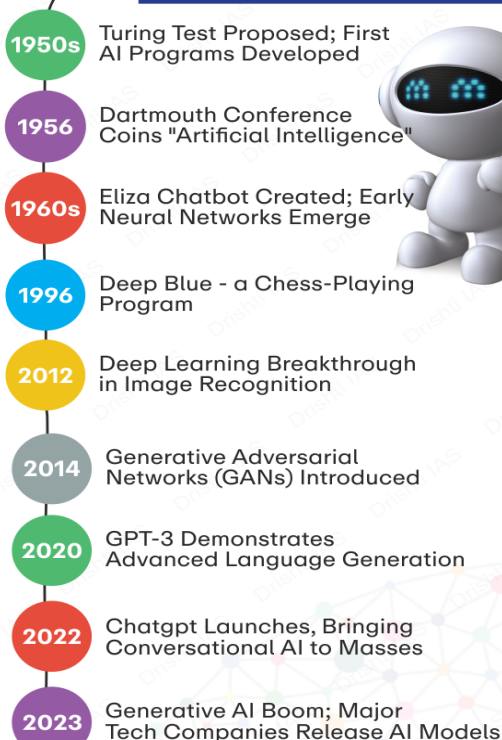
Artificial intelligence(AI)

AI is the simulation of human intelligence in machines programmed to think and learn like humans, capable of problem-solving, reasoning, and adapting to new information.

AI Timeline - Major Milestones

- **1950s** — Turing Test Proposed; First AI Programs Developed
- **1956** — Dartmouth Conference Coins "Artificial Intelligence"
- **1960s** — Eliza Chatbot Created; Early Neural Networks Emerge
- **1996** — Deep Blue - a Chess-Playing Program
- **2012** — Deep Learning Breakthrough in Image Recognition
- **2014** — Generative Adversarial Networks (GANs) Introduced
- **2020** — GPT-3 Demonstrates Advanced Language Generation
- **2022** — Chatgpt Launches, Bringing Conversational AI to Masses
- **2023** — Generative AI Boom; Major Tech Companies Release AI Models

Applications of AI

- **Healthcare:** Personalised medicine
- **Finance:** Algorithmic trading
- **Transportation:** Autonomous vehicles
- **Marketing & Customer Service:** Targeted advertising, chatbots
- **Education:** Adaptive learning systems, personalised tutoring
- **Agriculture:** Crop monitoring
- **Cybersecurity:** Threat detection
- **Energy:** Smart grid management, consumption forecasting

Concerns

- Deepfakes & misinformation
- Algorithmic bias
- Automation & job displacement
- Privacy issues
- Data ownership & liability issue
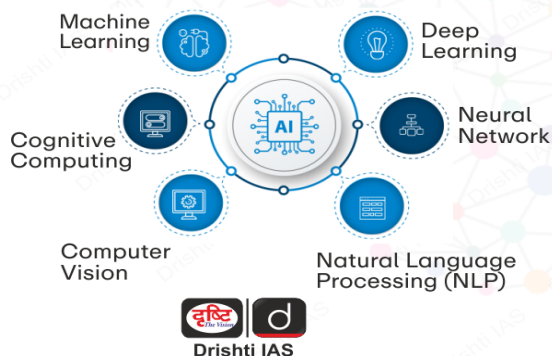- Ethical decision-making complexes

Regulating AI

- **Global Partnership on AI (GPAI)** launched in 2020
- **Bletchley Declaration (2023):** Enhance Global Collaboration on AI
- **G20 New Delhi Leaders' Declaration (2023):** Harnessing AI responsibly for good and for all
- **Hiroshima AI Process (2023)** by G7

India and AI

- **National Strategy For AI 2018**
- **AI For All:** Self-learning online program
- **GPAI Summit 2023** hosted by India
- **IndiaAI Mission 2024**
- **US India Artificial Intelligence (USIAI) Initiative:** AI cooperation in critical areas
- **AIRAWAT** (AI Research, Analytics and Knowledge Assimilation Platform): Supercomputer

KEY COMPONENTS OF AI

- Machine Learning
- Deep Learning
- Cognitive Computing
- Neural Network
- Computer Vision
- Natural Language Processing (NLP)

Drishti IAS

- ➤ **AI-Driven Economic Growth**: **80% of Indian companies** prioritize AI as a **core strategic goal**. 69% plan to increase AI investments in 2025.
  - ❍ **Indian Generative AI (GenAI) startup funding surged 6 times**, reaching **USD 51 million in FY2025** (NASSCOM Report).
  - ❍ India holds **16% of the world's AI talent**, driving **AI-powered automation, fintech, and healthcare**.

○ 78% of Small & Medium Businesses (SMBs) using AI reported revenue growth.

○ India's AI market is projected to grow at **25-35% Compound Annual Growth Rate (CAGR)**. AI talent demand is expected to reach 1 million by 2026.

➤ **AI Regulation:** India's AI regulation framework includes the **Information Technology Act of 2000**, **Principles for Responsible AI (2021)** and **National Artificial Intelligence Strategy (2018)** to ensure safety, transparency, and accountability.

○ India is **avoiding overregulation** while addressing risks like **deep fakes**, **privacy, and cybersecurity threats**.

➤ **Global AI Governance Leadership:** India is actively shaping international AI regulatory frameworks by hosting the **Global INDIAai Summit 2024** and showcasing its AI initiatives at G20, **Paris AI Summit 2025** and **Global Partnership on Artificial Intelligence (GPAI) Summit**.

> **What is IndiaAI Mission?**
>
> **Click here to Read: IndiaAI Mission**

What are the Concerns in India's AI Transformation?

➤ **Limited AI Hardware Capabilities:** India is still **dependent on foreign-made GPUs** and semiconductor technologies.

○ Many **AI startups depend on cloud computing services** from **global tech giants** (AWS, Google, Microsoft).

○ Limited Indian **AI chip manufacturing** means startups must rely on **foreign-made AI chips**.

➤ **Skilling Challenges:** While India leads in **AI skill penetration**, there is a shortage of highly specialized AI researchers. Most AI professionals are engaged in service-based roles rather than deep-tech innovation.

○ **Automation could displace up to 60 million workers** in India's **manufacturing sector** by **2030**. Uneven AI adoption in **rural and Tier-2/Tier-3 cities** is widening the **digital divide**.

➤ **Ethical Concerns:** Risks of **bias in AI models** due to **insufficiently diverse datasets**.

○ **No dedicated AI law** to regulate data usage, facial recognition, and deepfake risks.

➤ **Regulatory Uncertainty:** India lacks a **dedicated AI regulatory framework**, current policies are **fragmented across different ministries**.

○ Comprehensive AI ethics guidelines are absent, leaving bias, accountability, and transparency unaddressed.

➤ **Environmental Impact:** AI hardware and data centers contribute **1% of global GHG emissions,** expected to double by 2026. India lacks regulations on AI data centers' water usage and carbon footprint.

What Steps Can India Take to Address AI Transformation Challenges?

➤ **Strengthening AI Hardware:** Boost domestic AI chip manufacturing under **Semicon India Programme.** Incentivize **fabless chip design** startups and AI hardware R&D.

○ Support development of **quantum AI processors** through the **National Quantum Mission.**

➤ **AI Workforce:** Expand **FutureSkills Prime** to train young individuals in AI and digital technologies, reinforcing India's position as a **Digital Talent Nation.**

➤ **AI Regulatory Framework:** Enact a dedicated **AI & Quantum Act** to regulate AI development and its environmental impact, drawing inspiration from the **EU AI Act (2024)** and the **US Artificial Intelligence Environmental Impacts Act (2024).**

➤ **Ensuring Inclusive AI Growth:** Under **RAISE 2020,** promote AI as a tool for social transformation, inclusion, and empowerment through responsible development.

➤ **Sustainable AI Development:** Design AI algorithms and infrastructures that consume less energy and integrate AI into smart grids to optimize power use.

Growth of India's Biotechnology Sector

Why in News?

At the "**Emerging Innovations in Biochemistry and Biotechnology**" conference, the **Union Minister of Science & Technology** highlighted the **evolution of India's biotechnology sector** and biotechnology potential of the **Himalayan region,** especially **J&K**.
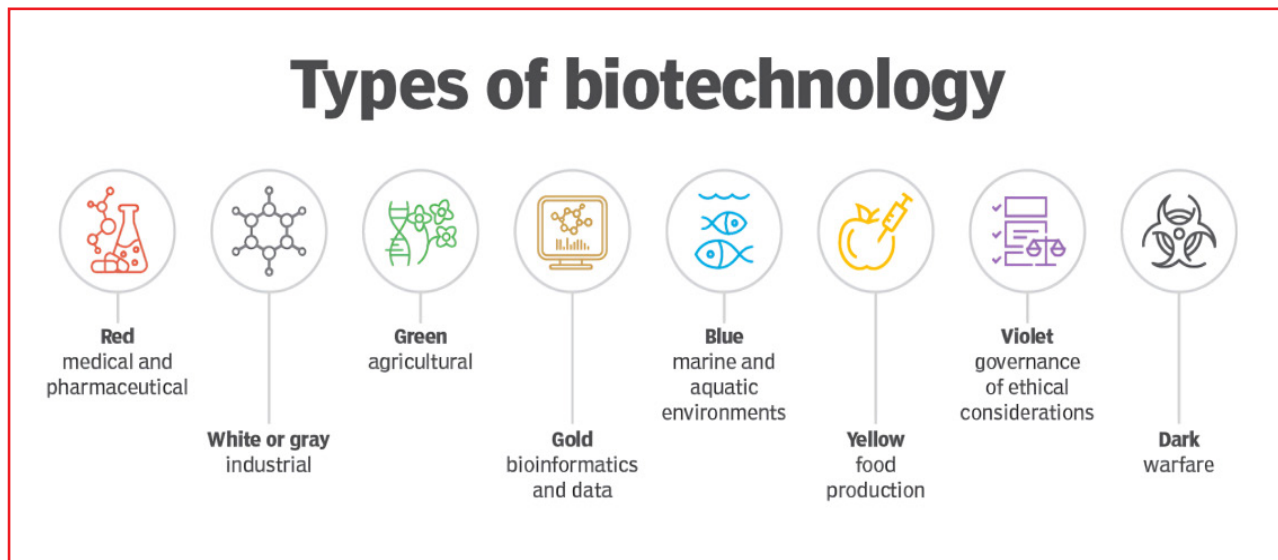
What are the Key facts Related to the Biotechnology Sector in India?

➢ **About:** It is the use of **biological systems, organisms, or their components** to create products and technologies that benefit **agriculture, medicine, industry, and sustainability**.

➢ **Types:**

Types of biotechnology

- **Red** medical and pharmaceutical
- **White or gray** industrial
- **Green** agricultural
- **Gold** bioinformatics and data
- **Blue** marine and aquatic environments
- **Yellow** food production
- **Violet** governance of ethical considerations
- **Dark** warfare

➢ **Growth & Potential: India's bioeconomy** grew over **10 times** in a decade (2014-24), rising from **USD 10 billion** in 2014 to **USD 130 billion** in 2024, with a target of **USD 300 billion by 2030.**

○ **Potential in J&K: Rich flora and medicinal plant** diversity offer potential for pharmaceutical and herbal industries.

- Biotechnological research can optimize high-altitude crops for climate resilience and productivity.
- **Aroma Mission**, **Floriculture Revolution** (commercial flower farming).

○ **Key Breakthroughs in 2024:** Development of the **world's first Human Papillomavirus (HPV) vaccine**.

- Discovery of '**Nafithromycin**,' a groundbreaking **indigenous antibiotic.**
- First successful gene therapy experiment for **Hemophilia**.

➢ **Government's Key Initiatives: BioE3 Policy, Anusandhan National Research Foundation (NRF), Bio-RIDE Scheme** **(2014: 50 biotech startups, 2025: 9,000).**

➢ **Progress in Global Innovation:** India improved its ranking from **80th in 2014** to **39th** in the **Global Innovation Index 2024**.

○ India ranks **3rd in the Asia-Pacific** and **12th globally** in biomanufacturing.

○ Over **5,352 Indian researchers** now feature in the world's **top 2% of scientist**s.

Aroma Mission (Lavender Revolution)
➢ **About:** Started in J&K, it boosts India's **aroma industry** by promoting aromatic crops and essential oil production.
➢ **Focus:** Cultivation of **lemongrass, lavender, vetiver, palmarosa** etc for fragrant oils used in **cosmetics, aromatherapy, and food flavoring**.
➢ **Nodal Agency:** CSIR-Central Institute of Medicinal and Aromatic Plants **(CSIR-CIMAP), Lucknow.**
➢ **Potential Impact:** Over 2000 tonnes of oils worth **Rs 300 crores yearly**, 60 lakh rural jobs, and **Rs 60,000–70,000 per hectare** annual farmer income.

Space Debris Crisis

Why in News?

A **500-kg metal object** crashed in **Kenya**, sparking concerns over **space debris** and highlighting the increasing global issues of **accountability and safety measures** for debris reentries.

What is Space Debris?

➤ **About:** According to the **UN Committee on the Peaceful Uses of Outer Space (COPUOS)** 'Space debris is **all man-made objects**, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are **non-functional'**.
   ○ It includes **defunct satellites, rocket stages, and fragments** from explosions or collisions.

➤ **Origin:** Most space debris comes from **on-orbit breakups** i.e., satellites or rocket stages explode, collide, or fragment in space.
   ○ NASA estimates **23,000 debris pieces** larger than a baseball, **500,000 marble-sized scraps**, and **100 million fragments** over one millimeter orbiting Earth.

➤ **Space Debris Destruction:** Debris loses altitude and **burns up on re-entry** due to atmospheric drag. It is **intensified by the 11-year solar activity cycle** that expands the atmosphere, **accelerating the decay** of low-orbit debris.

➤ **Associated Risks:**
   ○ **On-Orbit Risks:** Large debris can **destroy satellites**, while even **1 cm fragments** can disable spacecraft. **Millimeter-sized** particles **erode surfaces** and damage solar panels.
   ○ **Re-entry Risks:** Most debris burns up, but some large fragments may **reach Earth,** though the risk of injury is very low.
   ○ **Kessler Syndrome:** **Kessler Syndrome** is a **chain reaction** of debris collisions creating even more debris, potentially **making orbits unusable** for future space missions.

➤ **International Regulations:**
   ○ **Outer Space Treaty (1967): Article VI** of the treaty makes states **responsible for all national space activities,** including private ones, but **lacks enforcement mechanisms.**
   ○ **Convention on International Liability for Damage Caused by Space Objects (1972):** It imposes **absolute liability** for space object damage on Earth, requiring **no proof of negligence,** but enforcement is **weak.**
   ○ **Voluntary UN Guidelines on Deorbiting:** The UN recommends **deorbiting** satellites **within 25 years,** but compliance rate is only around **30%**.

➤ **Initiatives to Remove Space Debris:**
   ○ **Global:** ClearSpace-1 and Remove DEBRIS (by ESA), OSAM-1 (NASA).
   ○ **India:** Debris Free Space Mission (DFSM), **Network for Space object TRacking and Analysis (NETRA)**.

HeroRATS for Tuberculosis Elimination

Why in News?

A Tanzanian non-profit organization conducts research to **train African giant pouched rats, or HeroRATS,** to detect **Tuberculosis (TB).**

➤ These rats show high accuracy, especially in resource-limited areas. This research could help speed up **TB detection in countries like India.**

What are the Key Findings of the Research on HeroRATS?

➤ **HeroRATS:** These rats have an exceptional sense of smell due to their sensitive **olfactory receptors,** allowing them to detect diseases like TB.
   ○ HeroRATS undergoes a **training** program, learning to detect TB in sputum samples (thick mucus from lungs). They can screen **100 samples in just 20 minutes,** compared to **3–4 days** for traditional methods.
      ● Detected samples are then confirmed using *Ziehl-Neelsen and fluorescent microscopy*.

➤ **Increased Detection Rates:** HeroRATS **doubled TB detection rates** in children compared to conventional testing.
   ○ The rats were **six times more effective** at detecting TB in patients with a low bacillary load compared to those with a higher concentration of bacteria.
   ○ They outperformed traditional microscopy, which often fails in such cases.

Note: Earlier, Magawa, a Tanzanian-born African giant pouched rat, was trained to detect landmines and alert handlers for their safe removal.

How can HeroRATS Help India's TB Elimination Efforts?

➢ **Potential Benefits for India:** HeroRATS provide fast, cost-effective TB screening, **especially for children and smear-negative cases,** aiding early diagnosis and reducing transmission, thereby contributing to lowering the **TB burden in India.**

 ❍ Integrating rat-based TB detection into the **National Tuberculosis Elimination Programme (NTEP)** through a phased rollout, starting in high-TB burden states, can enhance case detection.

➢ **TB in India:** India has the **highest burden of TB** with **two deaths occurring every three minutes** from TB.

 ❍ NTEP, implemented under the aegis of the **National Health Mission**, aims to make India **TB-free by 2025**, ahead of the global 2030 target.

 ❍ TB incidence declined by **17.7% (237 to 195 per 100,000)** from 2015 to 2023, while TB deaths fell by **21.4% (28 to 22 per lakh).**

What are the Key Facts About Tuberculosis?

➢ **About:** TB is a bacterial infection *(Mycobacterium tuberculosis)* affecting the lungs, spreading through the air.

 ❍ Preventable and curable with antibiotics. About 25% of the global population is infected, but only **5–10% develop symptoms.**

Tuberculosis

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Tuberculosis (TB) is an infectious disease that affects the lungs. Tuberculosis is preventable and curable.

Prevention
- Seek medical intervention if symptoms persist
- If at a higher risk (HIV patients), get tested for TB.
- Practice good cough hygiene: Wear a mask and avoid contact

Causes:
- *Mycobacterium tuberculosis*
- Coughing droplets
- Prolonged exposure from a patient

Symptoms of TB:
Chest pain
Weakness
Weight loss
Fever
Night sweats
Prolonged cough

Facts
- 1.6 million deaths in 2021 Worldwide
- 13th leading cause of death
- India aims to achieve the UN's TB-related SDGs by 2025, five years ahead of the global target to end the TB epidemic by 2030.

#Tuberculosis

Ni-kshay Programme
- Nikshay Mitra are individuals or groups who adopt one TB patient for their treatment for a period of 6 months
- Provision of free drugs and diagnostics
- Ni-kshay Poshan Yojana for nutritional support to TB patients

➢ **Risk Factors:** Weak immune system, diabetes, malnutrition, tobacco, and alcohol use.

➢ **Diagnosis:** WHO recommends rapid molecular tests (Xpert MTB/RIF Ultra). Traditional methods struggle with low bacterial loads, especially in children difficult due to their inability to produce sufficient sputum for testing.

➢ **Prevention:** The **Bacille Calmette-Guérin (BCG) vaccine** is given to infants to prevent TB.

➢ **Treatment:** Standard TB treatment lasts 4-6 months. Incomplete treatment leads to drug-resistant TB.

➢ **Multidrug-resistant TB (MDR-TB):** It is resistant to *isoniazid and rifampicin* (medicines used to treat TB), treatable with costlier alternatives.

➢ **Extensively Drug-Resistant TB:** It is more severe, with limited treatment options.

➢ **TB and Human Immunodeficiency Virus (HIV):** HIV patients are 16 times more vulnerable to TB, a leading cause of their deaths.

Macromatic Species Used for Disease Detection

➢ **Macromatic Species:** These species have a highly developed sense of smell, unlike microsmatic species with a reduced olfactory ability. Few macromatic species are:

  ❍ **Dogs:** With 125–300 **million olfactory receptors** and a **special sensory organ called the Jacobson's organ,** they can detect diseases like **Parkinson's** and potentially lung cancer and diabetes.

  ❍ **Ants:** A French study found **ants can detect cancer cells** within three days using chemical cues, offering a faster, cheaper alternative to traditional diagnostics.

  ❍ **Honeybees:** Posses highly sensitive **olfactory antennal lobes,** can detect lung cancer, with 88% accuracy using synthetic biomarkers (artificial human breath that contains cancerous odours) in human breath.

➢ These highlight the growing field of **bio-detection,** where nature's instincts are harnessed for medical advancements.

Quantum Nature of Gravity

Why in News?

Scientists are **conducting experiments** with **nanocrystals** to explore **if gravity follows quantum principles**.

➢ This effort aims to **bridge the gap** between [General Relativity](#) (explains gravity at macroscopic scales) and [Quantum Mechanics](#) (governs atomic and subatomic interactions)**.**

  ❍ Since these theories are **fundamentally incompatible**, the research contributes to the pursuit of a **unified theory of quantum gravity.**

What is the Experiment Proposed to Test the Quantumness of Gravity?

➢ **About Experiment:** Scientists propose an experiment using **quantum superposition**, where **particles exist in multiple states until measured**.

  ❍ **Nanocrystals** will test if gravity follows quantum mechanics.

  ❍ A **test mass crystal** will be placed in **superposition** (existing in two places at once) while **another mass interacts with it via gravity**.

  ❍ After **measuring the second crystal,** scientists will **check if gravity causes the test mass to collapse into a definite state,** potentially indicating that gravity follows quantum principles.

➢ **Significance:**

  ❍ If successful, the experiment may prove that **gravity is not just a classical force but also exhibits quantum properties,** as current theories suggest that gravity should show quantum effects.

  ❍ Most **quantum gravity tests rely on strong gravity** (e.g., black holes), which is i**mpractical to test.**

    • This experiment proposes **studying weak gravity near small objects**, making quantum gravity testing more feasible.

➢ **Challenges:**

  ❍ The experiment requires **extreme precision** since even small disturbances (like **air molecules** or **seismic activity**) can affect the results.

  ❍ Scientists need to create a **near-perfect vacuum** and measure the **results very quickly.**

  ❍ The technology to perform this experiment is **still being developed.**

Read More: [What are the Key Features of Quantum Mechanics?](#)

What is Quantum Mechanics and General Relativity?

➤ **Quantum Mechanics:**
   ○ **About:**
      ● **Quantum mechanics** is the branch of physics that explains how **sub-atomic particles**, like electrons and photons, can behave **both as particles** (small bits of matter) **and waves** (energy disturbances).
      ● This concept is known as **wave-particle duality** and is a fundamental principle of quantum physics.
   ○ **Key Principles:**
      ● **Wave-particle Duality:** Particles can behave both as waves and particles.
      ● **Superposition:** A particle can exist in multiple states until measured.
      ● **Entanglement:** Two particles can be correlated in such a way that the state of one instantly affects the other, even across vast distances.
      ● **Uncertainty Principle:** The position and momentum of a particle cannot both be precisely measured at the same time.

QUANTUM MECHANICS VS GENERAL RELATIVITY

⚛ Quantum Mechanics	$E=MC^2$ General Relativity
Quantum Mechanics is the theoretical basis of modern physics that describes the weird behavior of photons, electrons, and other particles that make up the universe.	General Relativity is the geometric theory of gravitation published by Albert Einstein in 1915 and is the cornerstone of modern physics.
Explains the behavior and nature of matter and energy on the atomic and subatomic levels.	The theory of relativity is central to our understanding of many areas of astrophysics and cosmology.
Events are the results of the fundamental interaction between subatomic particles that occur in a very short span of time, at a localized region of space.	Events are continuous and deterministic, meaning what you observe and measure about an event depends on your own point of view as well as the event itself.

➤ **General Relativity:**
   ○ **About:** It is the **modern theory of gravity** proposed by **Albert Einstein in 1915** as an extension of **Newton's law of universal gravitation.**
      ● It describes **gravity not as a force**, **but as the curvature of spacetime** caused by mass and energy.
   ○ **Key Principles:**
      ● **Space-time curvature:** Massive objects like the Sun bend space-time, causing planets to orbit.
      ● **Time Dilation:** Time moves slower in stronger gravitational fields (e.g., near black holes).
      ● **Equivalence Principle:** Acceleration and gravitational forces are indistinguishable in a closed system.

National Science Day 2025

Why in News?

India celebrates <u>National Science Day (NSD)</u> on **28th February annually** to honor **Sir Chandrasekhara Venkata (CV) Raman's** discovery of the <u>Raman Effect</u> **in 1928**.

➤ The **2025 theme**, *"Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat"*, highlights the role of **scientific innovation and youth leadership** and aligns with the **Viksit Bharat 2047 vision**.

Note: In 1986, the Government of India designated **28th February** as **National Science Day**, which was first celebrated in 1987.

What are the Key Facts About CV Raman?

➤ **Early Life:** CV Raman was born on 7th November 1888, in Tiruchirappalli, Tamil Nadu. He earned his M.A. in Physics from Presidency College, Madras and contributed significantly to atomic physics and optics.

  ○ He founded the **Raman Research Institute (1948), Indian Journal of Physics (1926), and Indian Academy of Sciences (1934).**

  ○ His research spanned **optics, light scattering, X-rays, acoustics, and sea colors**, leading to the discovery of the **Raman Effect**.

➤ **Honors & Recognition:** Knighted in 1929 by the British government, CV Raman won the **1930 <u>Nobel Prize</u> in Physics** for Raman Effect, making him the **first Asian to receive a Nobel Prize in science.**

  ○ He was also honored with the **Bharat Ratna in 1954,** India's highest civilian award.

➤ **Raman Effect:** It refers to the phenomenon where **incoming excitation light** interacts with a sample, undergoes a **change in wavelength**, and generates **scattered light** due to interactions with molecular vibrations. This phenomenon is known as **Raman scattering.**

  ○ **Applications of Raman Effect:** It forms the basis of <u>Raman Spectroscopy</u> (analyzing molecular vibrations), widely used to study material properties.

    ● Its applications expanded after the advent of **lasers** in the 1960s, aiding **chemical analysis** by identifying substances without breaking them.

    ● It also helps **forensic science** detect drugs in sealed evidence bags and enables safe **nuclear waste analysis** using **fiber-optic** probes.
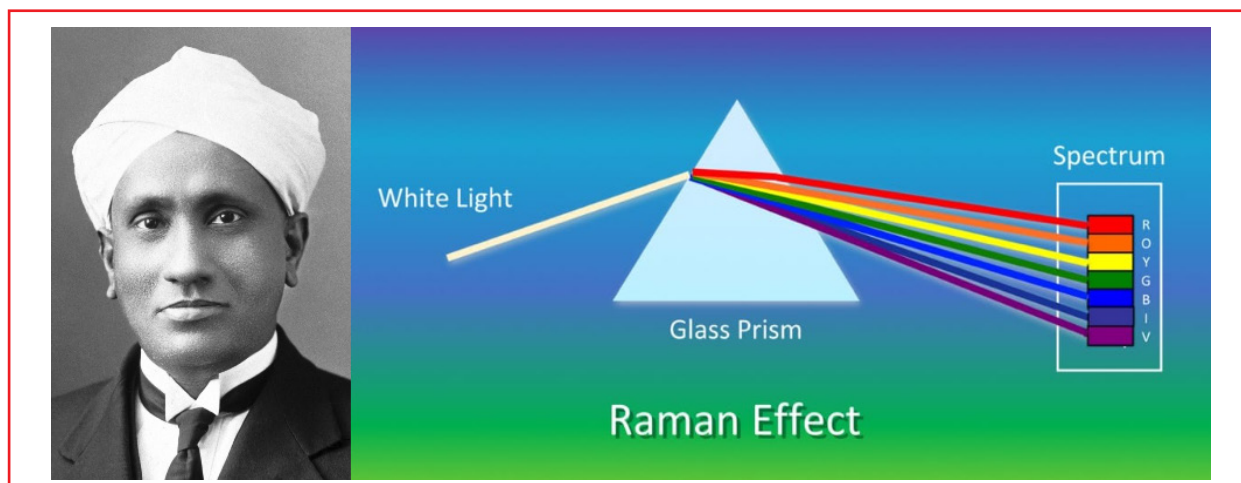
India's Advancements in Science and Technology in 2024

➢ **Innovation and IP:** India ranked **39th** in the **Global Innovation Index 2024** and **6th** in global **Intellectual Property (IP) filings** (**World Intellectual Property Organisation 2024 Report**).

○ The **Network Readiness Index 2024** saw India rise to **49th** from **79th (2019)**, highlighting progress in **ICT and digital transformation**.

➢ **Anusandhan National Research Foundation (ANRF):** Launched under the **ANRF Act 2023**, boosts India's **R&D ecosystem** with key programs like **promoting electric vehicles (EVs) in India.**

➢ **National Quantum Mission (NQM):** Aims to position India as a leader in **quantum computing, communication, sensing, and materials**.

➢ **National Supercomputing Mission (NSM):** A total of **33 supercomputers** with a combined computing capacity of 32 **petaflops** have been deployed in the country under NSM.

○ Future plans aim to **increase capacity to 77 PetaFlops** using indigenous technology.

➢ **Artificial Intelligence:** The **BharatGen** initiative is developing India's first **multimodal, multilingual Large Language Model (LLM)** for **Generative AI (GenAI).**

➢ **Geospatial Science: Geospatial technology** adoption has increased through Spatial Thinking Programs in Schools, covering 116 schools across seven states.

➢ **Climate Research:** India has strengthened climate resilience by launching **four Centres of Excellence** for **flood and drought risk mapping**, enhancing disaster preparedness and adaptation strategies.

Rise of India's Private Space Industry

Why in News?

The rise of **private participation in India's space sector**, driven by the **Space Sector Reforms of 2020,** has accelerated innovation and investment by opening the industry to private players.

➢ **Indian Space Research Organisation's (ISRO)** continued achievements, along with **India's space tech startups**, are driving rapid advancements in space technology, exploration, and commercialization.

How Has India's Private Space Industry Grown?

➢ **Private Participation:** Over **200 space startups** are now active in India, leveraging ISRO's facilities (ISRO's testing, launch, and ground station facilities).

○ **Indian National Space Promotion and Authorisation Centre (IN-SPACe)** has provided regulatory and financial support (with a Rs. 1,000 crore **Venture Capital (VC) Fund**) to accelerate the growth of India's space sector.

○ **Antrix Corporation,** ISRO's commercial arm, has played a key role in facilitating satellite launches and technology transfers to private players.

○ The **POEM (PSLV Orbital Experimental Module) program** has carried an increasing number of startup payloads, from **6 in 2022 to 24 in 2024**.

➢ **Private Investment:** Private funding is gaining momentum and drives the space economy.

○ **MountTech Growth Fund – Kavachh (MGF-Kavachh)** is boosting domestic investments through venture capital funding, with startups securing **Rs 2,500 crore in the past 3 years**.

● MGF-Kavachh is a **Securities and Exchange Board of India (SEBI)** registered **Alternative Investment Fund (AIF) under Category II.**

➢ **Indian Startups Advancements:** GalaxEye achieved the **world's first fusion of Synthetic Aperture Radar (SAR) with optical imagery**, enabling rapid data compression.

○ **Pixxel** is developing world's most advanced **hyperspectral satellite constellations (Firefly)**, while InspeCity (IIT Bombay) is working on in-orbit docking for satellite repair and refueling.

● **Skyroot and Agnikul** are pioneering private launch vehicles for cost-effective satellite deployment.

Space Sector Reforms 2020

➤ India's **Space Sector Reforms 2020** expanded private participation across all space activities, including satellite design, launch vehicle manufacturing, and ground station services, to enhance India's global space economy share.

➤ **IN-SPACe** was established as a regulatory body to **facilitate and promote private sector participation** and enables **non-government private entities (NGPEs)** to engage in space-based activities rather than being just vendors for ISRO.

➤ The reform has also encouraged **technology transfer** from ISRO to private entities through **NewSpace India Limited (NSIL)**.

What are the Challenges Facing India's Space Industry?

➤ **Funding and Investment Gaps:** While venture capital interest is rising, **early-stage funding remains limited**, making it difficult for startups to scale.

➤ **Talent Shortage:** The **lack of specialized educational institutions** and courses in space technology hinders talent development.

   ○ Only one Indian Institute of Space Technology (IIST) exists, creating a need for more institutions and industry-academia collaborations.

➤ **Global Competition:** Nations like the **US, China, and Russia have advanced space programs**, including reusable spacecraft, space tourism, and extensive satellite constellations.

   ○ India is catching up, but **longer R&D cycles and limited high-end capabilities** pose hurdles.

➤ **Foreign Launch Vehicles:** While India has developed launch capabilities, **many startups still rely on foreign rockets like SpaceX's Falcon-9** due to cost and schedule constraints.

   ○ Developing **more efficient and reusable launch vehicles** is essential for reducing dependence.

Ultra-Conserved Elements

Why in News?

A study found that **Ultra-Conserved Elements (UCEs)** in the *Tra2b* **(Transformer-2 beta) gene** have remained unchanged for **80 million years** due to their role in **preventing infertility** by regulating protein levels.

What are Key Findings of the Study on Ultra-Conserved Elements?

➤ **Findings of the Study:** Deleting the UCE in mouse testes caused excess Tra2β protein, sperm cell death, and infertility.

   ○ A UCE in the *Tra2b* gene regulates Tra2β protein production by acting as a **poison exon**.

      ● When **Tra2β protein** levels are too high, the **UCE triggers an extra exon** in the gene's RNA, introducing a **stop codon** that halts protein synthesis, preventing overproduction.

   ○ Mutations disrupting **UCE's protein-limiting function** cause **infertility**, preventing inheritance. Thus **Natural selection** has preserved UCEs across species for **millions of years.**

➤ **Ultra-Conserved Elements:** UCEs are **Deoxyribonucleic acid (DNA)** sequences of at least 200 base-pairs that have remained **completely unchanged** across multiple species for **80 million years or more**.

   ○ These sequences are found in humans, mice, rats, chickens, and even fish, indicating their **critical biological importance**.

      ● Across the human **genome** (an entire set of DNA instructions found in a cell), there are nearly **500 UCEs.**

   ○ **Characteristics of UCEs:** UCEs exhibit nearly **identical DNA sequences across diverse species,** even those that are evolutionarily distant.

   ○ **Functions of UCEs:** They do not usually **code for proteins** but are involved in gene regulation.

DNA to Protein Conversion

➢ **DNA Structure:** DNA is a **double-helix molecule**, with each strand consisting of four bases that pair up to hold the strands together.

➢ **Gene:** A gene is a **short segment of DNA**, typically a few thousand base-pairs long, that carries instructions for making proteins.

➢ **Transcription:** When a gene is **expressed** (information encoded in a gene is turned into a function), the cell **transcribes** its DNA sequence into **messenger RNA (mRNA)**.

  ○ **Ribosomes** read the **mRNA sequence** and assemble **amino acids** to form a protein (**Protein Synthesis).** The process **halts at a stop codon**, signaling the completion of protein synthesis.
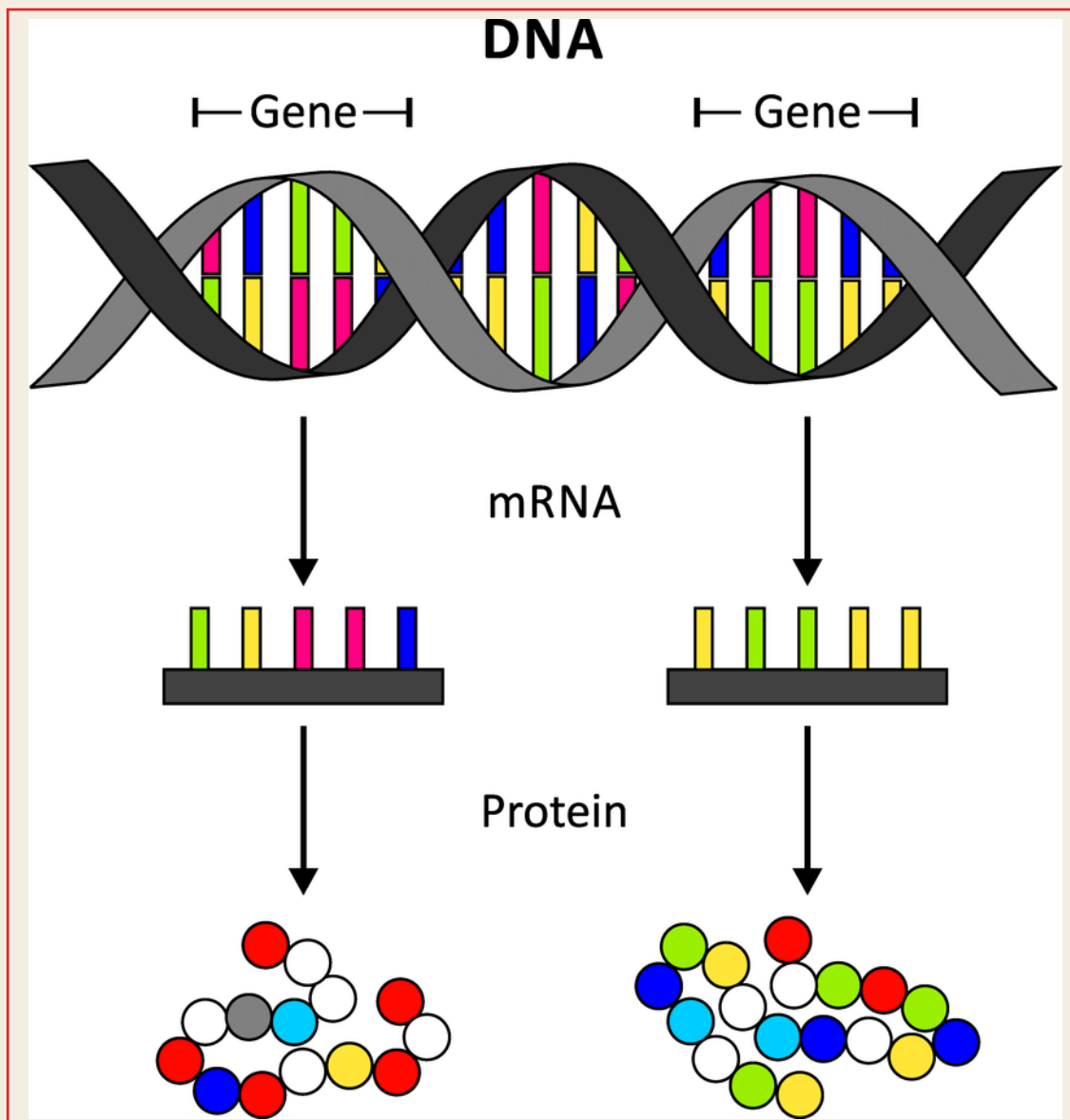
Environment and Ecology

Highlights

- *World Air Quality Report 2024*
- *Seagrass Conservation*
- *Concerns with Great Nicobar Island Project*
- *NBWL and Wildlife Conservation*

World Air Quality Report 2024

Why in News?

The **World Air Quality Report 2024,** released by Swiss company IQAir, ranked **India as the 5th most polluted country** globally.

What are the Key Findings of the World Air Quality Report?

➤ **India:** India is the **5th most polluted country in 2024**, improving slightly from 3rd place in 2023.

   ○ **Polluted Cities:** Delhi remains the **most polluted capital** globally with a Particulate matter (PM) 2.5 concentration of 91.6 **µg/m³** (micrograms per cubic metre).

      ● 6 of the world's 10 most polluted cities and 13 of the top 20 are in India, with **Byrnihat** (Assam-Meghalaya border) topping the list at a **PM2.5 concentration** of **128.2 µg/m³**.

        ■ Other polluted cities include **Mullanpur** (Punjab), Gurugram, **Faridabad**, Bhiwadi, and **Noida**.

   ○ **PM2.5 Reduction**: India saw a **7% decrease** in PM2.5 levels, averaging **50.6 µg/m³** in 2024, down from **54.4 µg/m³** in 2023.

      ● However, this is still **10 times higher** than the **World Health Organization (WHO's) recommended safe limit** of **5 µg/m³**. **35% of Indian cities** reported PM2.5 levels exceeding this limit.

   ○ **Pollution Sources**: Major contributors include **vehicle emissions, industrial pollution**, and the **burning of biomass.**

      ● **Northern India faced extreme pollution levels** with crop stubble-burning contributing to **60% of PM2.5 levels.**

➤ **Global:** The most polluted countries by annual average PM2.5 levels are Chad (91.8 µg/m³), Bangladesh (78 µg/m³), Pakistan (73.7 µg/m³), and Congo (58.2 µg/m³).

   ○ The report highlights that **most of the global population** is breathing polluted air, with **only 12 countries, regions, or territories** reporting PM2.5 concentrations below the **WHO's recommended limit**.

Air Pollution

➤ Air pollution is the contamination of air by **chemical, physical, or biological agents that alter its natural composition.**

   ○ Major sources include combustion, vehicles, industries, and fires. Pollutants like PM, CO, O_3, NO_2, and SO_2 cause respiratory diseases and high mortality.

➤ WHO reports that **99% of the global population breathes polluted air, with low- and middle-income countries most affected.**

   ○ Prolonged PM2.5 exposure **cuts life expectancy by 5.2 years in India,** linked to **1.5 million annual deaths between 2009–2019,** as per *the Lancet Planetary Health Study.*

➤ **WHO Air Quality Guidelines (AQG)** aim to help governments reduce air pollution and improve public health.

Recommended 2021 AQG levels compared to 2005 air quality guidelines

| Pollutant	Averaging Time	2005 AQGs	2021 AQGs
$PM_{2.5}$, $\mu g/m^3$	Annual	10	5
	24-hour[a]	25	15
PM_{10}, $\mu g/m^3$	Annual	20	15
	24-hour[a]	50	45
O_3, $\mu g/m^3$	Peak season[b]	-	60
	8-hour[a]	100	100
NO_2, $\mu g/m^3$	Annual	40	10
	24-hour[a]	-	25
SO_2, $\mu g/m^3$	24-hour[a]	20	40
CO, mg/m^3	24-hour[a]	-	4

Air Pollutants

Sulphur Dioxide (SO_2)
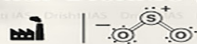
It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

Impact: Causes respiratory problems.

Ozone (O_3)
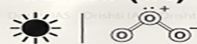
Secondary pollutant formed from other pollutants (NOx and VOC) under the action of the sun.

Impact: Irritation of the eye and respiratory mucous membranes, asthma attacks.

Nitrogen Dioxide (NO_2)

Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

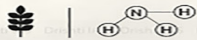**Impact:** Chronic lung disease.

Carbon Monoxide (CO)

It is a product of the incomplete combustion of carbon-containing compounds.

Impact: Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

Ammonia (NH_3)

Produced by the metabolism of amino acids and other compounds which contain nitrogen.

Impact: Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

Lead (Pb)

Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

Impact: Anemia, weakness, and kidney and brain damage.

Particulate Matter (PM)

PM10: Inhalable particles, with diameters that are generally 10 micrometers and smaller.
PM2.5: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.
Source: Emitted from construction sites, unpaved roads, fields, fires.
Impact: Irregular heartbeat, aggravated asthma, decreased lung function.

Note: These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.

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Seagrass Conservation

Why in News?

A study in *Nature* reports that <u>seagrasses</u> are declining **at a rate of 1–2% annually,** with nearly **5%** of species endangered due to human activities, highlighting the **need to protect 30%** of seagrass by **2030** to preserve biodiversity.

What are Seagrasses?

➢ **About:** Seagrasses are **submerged, flowering marine aquatic plants** that grow in **shallow coastal waters** such as **bays** and **lagoons**.

○ They possess small flowers and strap-like or oval leaves, forming dense underwater meadows.

➢ **Classification:** Seagrasses belong to the order *Alismatales* and are classified into **4 families with around 60 species**.

○ Some of the important seagrasses are <u>**Sea Cow Grass**</u> *(Cymodocea serrulata)*, **Thready Seagrass** *(Cymodocea rotundata)*, **Needle Seagrass** *(Syringodium isoetifolium)*, **Flat-tipped Seagrass** *(Halodule uninervis)*, etc.

➢ **Key Features:**

○ Like terrestrial plants, seagrasses conduct **photosynthesis** and <u>**support marine biodiversity**</u> and **enhance oceanic oxygen levels.**

○ Seagrasses **reproduce both sexually and asexually**.

● In **sexual reproduction**, submarine **pollination transfers male pollen to female flowers underwater.** Asexually, they **propagate through rhizomes-horizontal underground stems,** that enable regeneration after disturbances like grazing or storms.

➢ **Threats to Seagrass:**

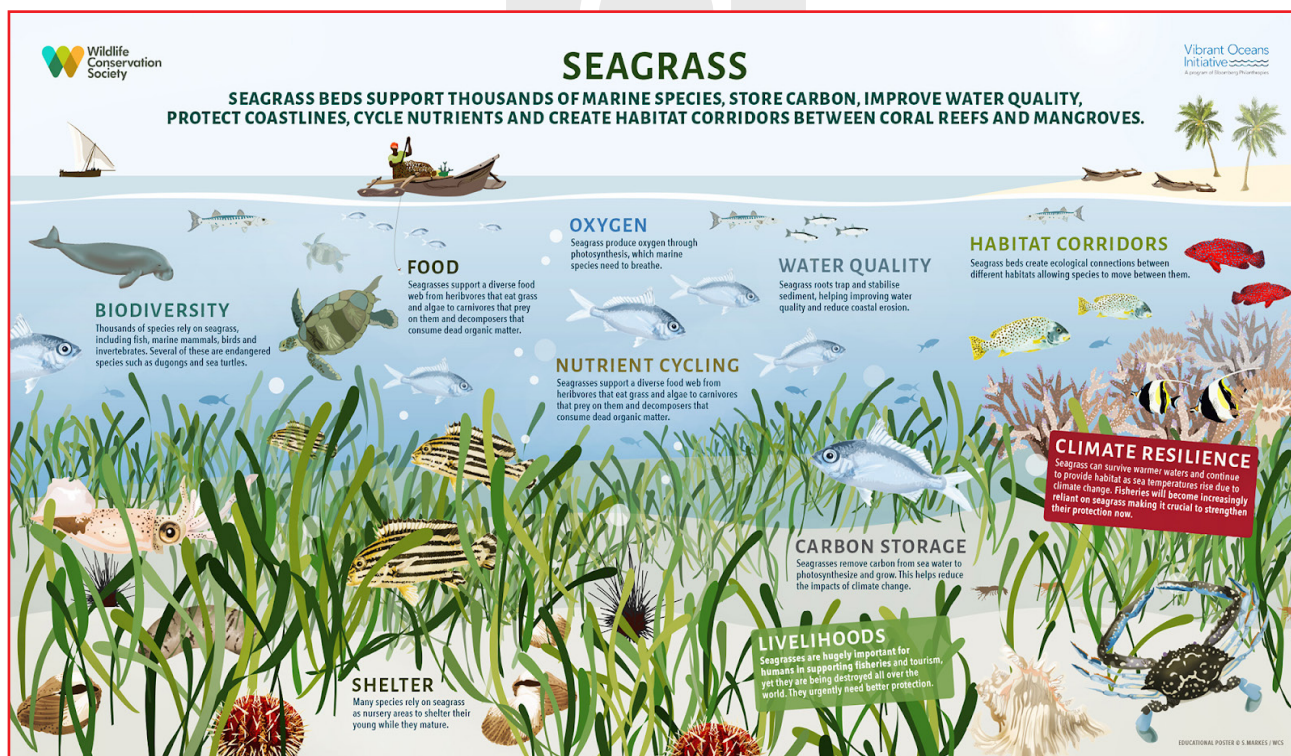○ **Pollution:** Industrial, agricultural, and urban waste degrade seagrass meadows.

○ **Coastal Development:** Tourism and infrastructure projects disturb fragile ecosystems.

○ **Climate Change:** Rising temperatures and ocean acidification threaten seagrass survival.

○ **Weak Enforcement:** Despite existing laws, conservation efforts lack strict implementation.

What is the State of Seagrass Conservation?

➢ **Current Status:** Seagrass covers **0.1% of the ocean floor** but supports marine life, major fisheries, and thrives in **tropical and temperate coastlines.**

➢ **Seagrasses in India:** India's seagrass meadows span **516.59 sq km**, sequestering **434.9 tonnes of CO_2 per sq km** annually, with major concentrations in the <u>**Gulf of Mannar**</u>, <u>**Palk Bay, Andaman & Nicobar, Lakshadweep,**</u> and the <u>**Gulf of Kutch**</u>.

➢ **Conservation Efforts**:

○ **India's Initiatives**

● **2011-2020: 14 acres** of seagrass restored in the **Gulf of Mannar & Palk Bay** (85-90% success rate).

● **Community-led projects** using **bamboo frames & coconut ropes** for transplantation in **Palk Bay**.

○ **Global Efforts:**

● **23.9% of seagrass areas** fall under <u>**Marine Protected Areas (MPA)**</u>. Successful restoration in **Virginia, USA** (1,700 hectares of Zostera marina).

What is the Significance of Seagrasses?

➢ **Carbon Sequestration:** Seagrasses **store 11% of oceanic organic carbon** and **absorb 83 million tonnes of atmospheric carbon** annually, **sequestering carbon 35 times faster** than rainforests.

SEAGRASS

SEAGRASS BEDS SUPPORT THOUSANDS OF MARINE SPECIES, STORE CARBON, IMPROVE WATER QUALITY, PROTECT COASTLINES, CYCLE NUTRIENTS AND CREATE HABITAT CORRIDORS BETWEEN CORAL REEFS AND MANGROVES.

➢ **Biodiversity Hotspot:** It supports marine species, including **endangered <u>dugongs (sea cow)</u> and green turtles**, and sustains commercially important species like **squids and cuttlefish.**

- ➤ **Ecological Importance:** Seagrass meadows support **750 fish species** and **121 threatened marine species** including **endangered dugongs (sea cow), green turtles, squids** and **cuttlefish.**
  - ❍ These ecosystems contribute to **20% of global fishery landings**.
- ➤ **Coastal Protection:** They **improve water clarity** by **trapping sediments, filter land-based pollutants**, and **prevent coastal erosion** by stabilizing the seabed with their root systems.
- ➤ **Livelihoods & Fisheries:** Seagrasses provide **safe breeding grounds for juvenile fish** and **shield marine organisms from strong currents and predators**, supporting ecosystems essential for **fisheries and global food security.**

Concerns with Great Nicobar Island Project

Why in News?

The proposed **Rs 80,000 crore** mega infrastructure project on **Great Nicobar Island (GNI)** has raised **serious concerns** among environmental activists.

- ➤ The project, spearheaded by **NITI Aayog**, includes a **transshipment terminal** in **Galathea Bay**, an **greenfield airport**, a **greenfield township**, and a **tourism project with a gas-powered plant.**

> **Click Here to Read:**
> - ➤ **What is the Great Nicobar Island Project?**
> - ➤ **What is Great Nicobar Island?**

What Concerns are Associated with the Great Nicobar Island Project?

- ➤ **Environmental Concerns:**
  - ❍ **Massive Deforestation:** The project will destroy **130 sq km of primary tropical rainforest,** leading to **biodiversity loss** and ecological imbalance.
    - ● Initial estimates of **tree cutting (8.65–9.64 lakh)** have been found to be significantly lower than actual numbers, potentially exceeding **10 million trees.**
  - ❍ **Impact on Wildlife:** The project threatens species like the nesting **leatherback sea turtle** in **Galathea Bay Wildlife Sanctuary** (WLS).

- ● The **Galathea Bay WLS**, designated for marine turtle conservation in **1997**, was **denotified in 2021** for the port, contradicting **India's Marine Turtle Action Plan (2021).**
  - ❍ **Compensatory Afforestation Issues:** The diversion of pristine Nicobar forests is being **"compensated"** by land in **Haryana and Madhya Pradesh**, which does not replicate the **biodiversity lost.**
  - ❍ **Coral Reef Destruction:** The coastline falls under **Coastal Regulation Zone (CRZ 1a)**, making ship-repair and other industrial activities a **threat to marine ecosystems.**
- ➤ **Legal Concerns:**
  - ❍ **Violation of SC Orders:** The SC appointed **Shekhar Singh Commission 2002 report** recommended a **total ban on tree felling in tribal reserves and national parks** and **afforestation before felling,** a rule not being followed.
  - ❍ **Lack of Tribal Consultation:** The project **disregards** the rights and survival of indigenous communities like the **Shompen**, whose existence is deeply tied to these forests.
  - ❍ **Lack of Transparency:** The government **withheld environmental clearance details** citing national security, but experts argue only the airport has a defense link, not the entire project.
- ➤ **Government Stand:**
  - ❍ **Contradictory Stance:** The Ministry of Home Affairs cites **security concerns** to withhold **project details,** while the **Ministry of Shipping** promotes **high-end tourism,** creating a strategic contradiction.
  - ❍ **Unplanned Additions:** New additions like **cruise terminals, shipbuilding, and EXIM ports** can create additional pressure on the environment.
  - ❍ The transshipment terminal's cost rose by **20% from 2021 to 2024**. With new additions like a cruise terminal and ship-repair facilities likely to **raise it further.**

> **Note: CRZ 1A**, a subcategory under the **Coastal Zone Management Plan 2019**, includes ecologically sensitive coastal areas e.g., **presence of coral reefs** vital for biodiversity and stability.
> - ➤ The **Shekhar Singh Commission Report (2002)** assessed the environmental and socio-cultural impacts of developmental activities in the **Andaman and Nicobar Islands**.

Source: "Holistic Development of Great Nicobar Island at Andaman & Nicobar Islands": Pre-feasibility report (March 2021)

Campbell Bay National Park

Township and Area Development

GREAT NICOBAR ISLAND

Campbell Bay

3

Galathea National Park

Joginder Nagar

Power Plant

4

2

International Airport

International Container Transshipment Terminal

1

Galathea Bay

Indira Point
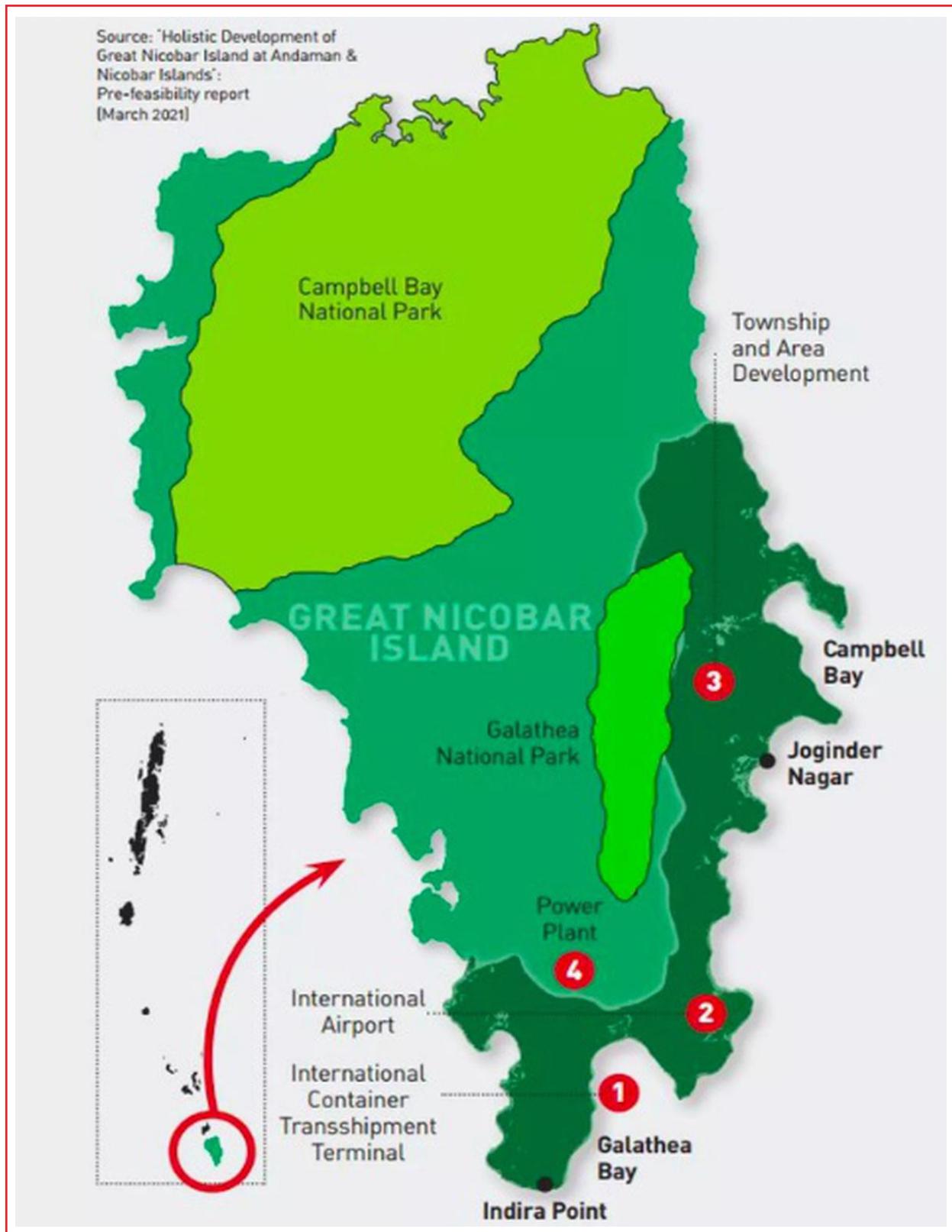
What is the Significance of the Great Nicobar Island Project for India?

➤ **Strategic Importance:** Nicobar's strategic location near the <u>Malacca</u>, **Sunda, and Lombok Straits** allows India to monitor key sea routes vital for **global trade and energy supply**.

  ○ It is aligned with India's <u>Act East Policy 2014</u> and the <u>QUAD's Indo-Pacific strategy</u>, reinforcing regional security.

  ○ A greenfield airport will speed up **defense deployment**, strengthening India's ability to **monitor Chinese naval activity**.

➤ **Economic Significance:** The <u>International Container Transshipment Terminal (ICTT)</u> is expected to reduce India's reliance on foreign ports like Singapore and Colombo and position India as a **global transshipment hub**, attracting ships and investment.

  ○ It is part of <u>Maritime India Vision 2030</u> and **Amrit Kaal Vision 2047**, supporting India's long-term economic strategy.

➤ **Sustainable Development:** It can boost **high-end tourism** like Singapore and the Maldives while ensuring sustainable development.

  ○ A new township will attract businesses, **improve living standards** with better infrastructure, and promote **renewable energy** and sustainable housing with minimal environmental impact.

NBWL and Wildlife Conservation

Why in News?

The **Prime Minister** chaired the **7th meeting** of the <u>National Board for Wildlife (NBWL)</u> at the <u>Gir National Park</u> (Junagadh, Gujarat) on the occasion of the World Wildlife Day (3rd March) and announced several **initiatives** for wildlife conservation.

What is World Wildlife Day?

➤ **About:** It is observed annually on 3rd **March** (adopted <u>CITES</u> in **1973**) to highlight the urgent need to protect biodiversity amid the **triple planetary crisis** of climate change, biodiversity loss, and pollution.

➤ **Origin:** It was established by the **UN General Assembly (UNGA)** in **December 2013**.

➤ **Theme 2025: Wildlife Conservation Finance: Investing in People and Planet.**

  ○ It emphasizes the importance of **financial investment in wildlife conservation** to ensure a sustainable future.

What are the Key Announcements During the 7th meeting of NBWL?

➤ **New Initiatives:**

  ○ **Great Indian Bustard Conservation:** A **National <u>Great Indian Bustard</u> Conservation Plan** was announced to address the declining population of this **critically endangered** species.

  ○ **Gharial Conservation:** A new <u>Gharial</u> conservation initiative was launched to arrest the **dwindling population of gharials.**

  ○ **Centre for Human-Wildlife Conflict:** The Centre for Excellence in <u>Human-Wildlife Conflict</u> Management was announced and it will be located at the Wildlife Institute of India's **Coimbatore campus.**

    ● It will equip **rapid response teams** with advanced **tracking and surveillance,** deploy detection systems in conflict zones, and train field staff and communities in mitigation.

    ● PM emphasized using <u>AI, ML</u>, <u>remote sensing</u>, and <u>geospatial mapping</u> to tackle forest fires and human-animal conflicts.

    ● WII and <u>Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N)</u> will collaborate to tackle human-wildlife conflict.

  ○ **National Referral Centre for Wildlife:** PM laid the foundation stone for the **National Referral Centre for Wildlife in Junagadh**, a hub for **wildlife health and disease management.**

  ○ **New Task Forces:** New task forces were formed for the conservation of Indian <u>Sloth Bear</u>, Gharials, **and Great Indian Bustard.**

➤ **Expansion of Project Cheetah:** The government announced <u>Project Cheetah</u>'s expansion to <u>Gandhi Sagar Wildlife Sanctuary</u> (Madhya Pradesh) and <u>Banni Grasslands</u> (Gujarat).

➤ **Strengthening Project Lion:** The government extended the <u>Project Lion</u> for 10 years to expand Asiatic Lions' range across **Gujarat's Saurashtra region.**

  ○ The **16th Asiatic Lion population** estimation will be conducted in **May 2024** that is conducted every **five years** (last done in 2020).

➤ **Riverine Dolphin Estimation:** India's **1st Riverine Dolphin** Estimation Report was released that revealed **6,327 dolphins** in the Ganga, Brahmaputra, and Indus river basins.

➤ **Traditional Knowledge in Wildlife Conservation:** Modi urged NBWL and the ministry to collect **traditional knowledge and manuscripts** on forest and wildlife conservation for research and development.

WILDLIFE CONSERVATION INITIATIVES

Constitutional Provisions for Wildlife

- **42nd Amendment Act, 1976:** Forests & Protection of Wild Animals and Birds (moved from State to Concurrent List)
- **Article 48 A:** State shall endeavor to protect & improve environment and safeguard forests and wildlife of country
- **Article 51 A (g):** Fundamental duty to protect & improve natural environment including forests and Wildlife

Legal Frameworks

- Wildlife (Protection) Act, 1972
- Biological Diversity Act, 2002

Major Conservation Initiatives

- **Integrated Development of Wildlife Habitats (IDWH):**
  - Financial assistance provided to State/UT Governments for protection and conservation of wildlife
  - A Centrally Sponsored Scheme
- **National Wildlife Action Plan (2017-2031)**
- **Guidelines for Eco-tourism in Protected Areas**
- **Human-Wildlife Conflict Mitigation**
- **Wildlife Crime Control Bureau:** To combat wildlife-related crimes
- **Wildlife Division (MoEFCC):**
  - Policy and law for conservation of biodiversity and Protected Area network
  - Technical and financial support to the State/ UTs under IDHW, Central Zoo Authority and Wildlife Institute of India

Wildlife Crime Control Bureau (WCCB):
Collection, collation of intelligence & its dissemination, establishment of centralized Wild Life crime databank, coordination etc.

Wildlife Crime Control:
- Operation Save Kurma
- Operation Thunderbird

Species-Specific Initiatives
- Protection and conservation of Greater Adjutant in Gangetic riverine tract
- Dolphin Conservation in Non-Protected Area Segment of Ganga River
- Conservation Breeding Centre for Wild water buffalo (2020)
- Recovery programme for Snow leopard (2009)
- Recovery programme for Vultures (2006)
- Project Elephant (1992)
- Project Tiger/National Tiger Conservation Authority (NTCA) (1973)

India's Collaboration with Global Wildlife Conservation Efforts

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- Convention on Biological Diversity (CBD)
- World Heritage Convention
- Ramsar Convention
- The Wildlife Trade Monitoring Network (TRAFFIC)
- United Nations Forum on Forests (UNFF)
- International Whaling Commission (IWC)
- International Union for Conservation of Nature (IUCN)
- Global Tiger Forum (GTF)

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➤ **Community Participation:** He emphasized **community involvement** in wildlife conservation, forest fire management, and sustainable coexistence

  ○ E.g., Role of **Maldhari community** in lion conservation.

Click Here to Read: Who are Maldharis?

What is NBWL?

➤ **About:** NBWL is a **statutory body** constituted under the **Wild Life (Protection) Act, 1972** (WPA, 1972). It is the **apex body** on wildlife conservation and development.

➤ **Composition:** The **NBWL** is a **47-member committee** headed by the **Prime Minister**, who serves as the **ex-officio Chairperson**, while the **Minister of Environment, Forest, and Climate Change** serves as the **Vice-Chairperson**.

○ **Its members include:**

- Officials involved in wildlife conservation
- The **Chief of Army Staff**, **Defence Secretary**, and **Expenditure Secretary.**
- **Ten eminent conservationists, ecologists, and environmentalists** nominated by the central government.

➤ **Functions:** It is **mandated** to promote **conservation and development of wildlife and forest**.

➤ **Role in Tiger Reserves:** It ensures that **no tiger reserve is diverted to unsustainable use** without its approval, with advice from the **National Tiger Conservation Authority (NTCA)**.

■■■

Art and Culture

Highlights

- *Amir Khusrau and Sufism*

Amir Khusrau and Sufism

Why in News?

The **Prime Minister** praised **Amir Khusrau** and **Sufism**, highlighting it as India's **pluralistic heritage**.

Who is Amir Khusrau?

- **About:** He was a **13th century Sufi poet** and **musician** who was bestowed with the title of *Tuti-yi-Hind*, the 'Parrot of India'.
  - His real name was **Abu'l Hasan Yamin ud-Din Khusrau** and was born in **Patiali, Etah** district of **Uttar Pradesh**.

- **Contributions:** He made lasting contributions to Indian **classical music, Sufi qawwali, and Persian literature.**
  - **Language:** He is credited for developing *Hindavi*, a precursor to modern Hindi and Urdu.
    - His literary works blended **Persian, Arabic, and Indian traditions**, enriching **Indian linguistic heritage.**
    - His literary works include *Divans* **(poetry collections)**, *Mathnawis* **(narrative poetry)**, and **treatises**.
  - **Music:** He is credited with creating **new ragas** and developing musical forms like **Khayal** (a form of classical **Hindustani music**), **and** *Tarana* (a rhythmic, fast-paced vocal composition),
    - It is said that Amir Khusrau was one of the **first expounders** of the art of making *Ghazal* **and** *Qawwali* (devotional Sufi music traditions).
    - He is believed to have invented musical instruments such as the *sitar* and *tabla***.**
- **Role in the Delhi Sultanate:** He served at least **five Sultans** i.e., **Muiz ud din Qaiqabad, Jalaluddin Khalji, Alauddin Khalji, Qutbuddin Mubarak Shah, and Ghiyasuddin Tughlaq,** and many other powerful patrons **over five decades**.
  - Sultan **Jalaluddin Khalji** honored him with the title of *Amir* in recognition of his literary excellence.
- **Sufi Influence:** Amir Khusrau was the beloved disciple of **Nizamuddin Auliya** and drew spiritual inspiration from him, shaping his **poetry and music.**

What is Sufism?

- **About: Sufism** is the **mystical and spiritual dimension of Islam**, focusing on **inner purification, love,** and direct connection with God (*Allah*).
  - It emerged in the **7th and 10th centuries CE** against the **rigidity of institutionalised religion** and emphasizes **devotion, self-discipline, and renunciation of materialism** to attain spiritual enlightenment.

- It ran **parallel** to the **spiritual Bhakti movement in Hindu tradition** emphasizing **devotion (*bhakti*), love, and inner realization** over ritualistic practices.
- ➤ **Core Practices:** Sufis organized themselves into communities centered around **khanqahs (hospices)**, led by a **master (*shaikh or pir*).**
  - Sufis established *silsilas (Orders of Sufi)* linking disciples to the **God,** and **Sufi tombs (*dargahs*)** became pilgrimage sites for spiritual blessings.
  - Sufis practice **self-mortification,** *zikr* **(remembrance of God),** *sama* **(musical recitals), and** *Fana-o-Baqa* **(dissolution of self for union with God)** to induce mystical states of ecstasy.
- ➤ **Sufism in India: Al-Hujwiri** was the earliest prominent Sufi in India, settled in **Lahore,** and authored *Kashf-ul Mahjub.*
  - The **13th and 14th centuries** marked the growth of Sufism, spreading messages of compassion and love for all, known as *sulh e-kul.*
- ➤ **Sufi Orders in India:** By the 12th century, the Sufis were organised in **12 orders or Silsilas.** Major Sufi Orders are:
  - **Chishti Order:** It is the **most influential** Sufi order in India and was founded by **Khwaja Moinuddin Chishti** in Ajmer.
    - Key persons associated with it were **Akbar** (follower of Salim Chishti), Qutbuddin Bhaktiyar Kaki, **Baba Farid, Nizamuddin Auliya, and Amir Khusrau.**
  - **Suhrawardi Order:** It was founded by **Bahauddin Zakaria** in Multan and embraced **luxury and state support.**

- It combined **religious knowledge with mysticism,** stressing personal experience and inner purification for **divine knowledge.**
- **Naqshbandi Order:** It emphasised the **primacy of *Shariat*** and opposed innovations **(*biddat*)** and **rejected** Sufi traditions like **musical assemblies *(sama)* and pilgrimages to saints' tombs.**
  - Mughal emperor **Aurangzeb** followed the Naqshbandi Order.
- **Rishi Order (Kashmir):** It was established by **Shaikh Nuruddin Wali** and flourished in Kashmir during the **15th and 16th centuries..**
  - It draws inspiration from the popular **Shaivite bhakti tradition** and being rooted in the **socio-cultural milieu of the region.**
- ➤ **Impact:**
  - **Religious:** Emphasized **personal devotion,** *tawhid* (oneness of God), and equality, fostering **Hindu-Muslim coexistence.**
    - The Chishti order welcomed **all faiths.**
  - **Social:** Attracted marginalized groups, **weakened caste hierarchies,** and established *khanqahs* **and** *madrasas* as learning centers.
  - **Cultural:** Influenced Indian music, notably *qawwali,* and enriched **vernacular literature** through poets like **Bulleh Shah** and **Sultan Bahu.**
  - **Political:** Inspired *Sulh-i-Kul,* shaping Akbar's **religious tolerance policies.** Rulers patronized Sufis to reinforce authority and manage religious diversity

Similarities Between Bhakti and Sufi Movements

Aspect	Bhakti Movement	Sufi Movement
Core Belief	Devotion to a **personal God (Saguna/ Nirguna Bhakti)**	Love for **God (Ishq-e-Haqiqi)** and inner purification
Rejection of Rituals	They **opposed Brahminical dominance,** and **elaborated rituals.**	**Provided alternative to orthodox Islamic legalism.**
Emphasis on Love and Devotion	**Bhakti** as a path to **liberation (Moksha)**	Love as a way to unite with God **(Fana – merging with God)**
Simple Language for Masses	Used **vernacular languages** (Hindi, Marathi, Tamil, etc.)	Composed poetry in **Hindavi, Persian, and Urdu**
Music and Poetry	**Bhajans and Kirtans** (Mirabai, Tulsidas)	**Qawwalis and Sufi poetry** (Amir Khusrau, Rumi)

■■■

Geography

Highlights
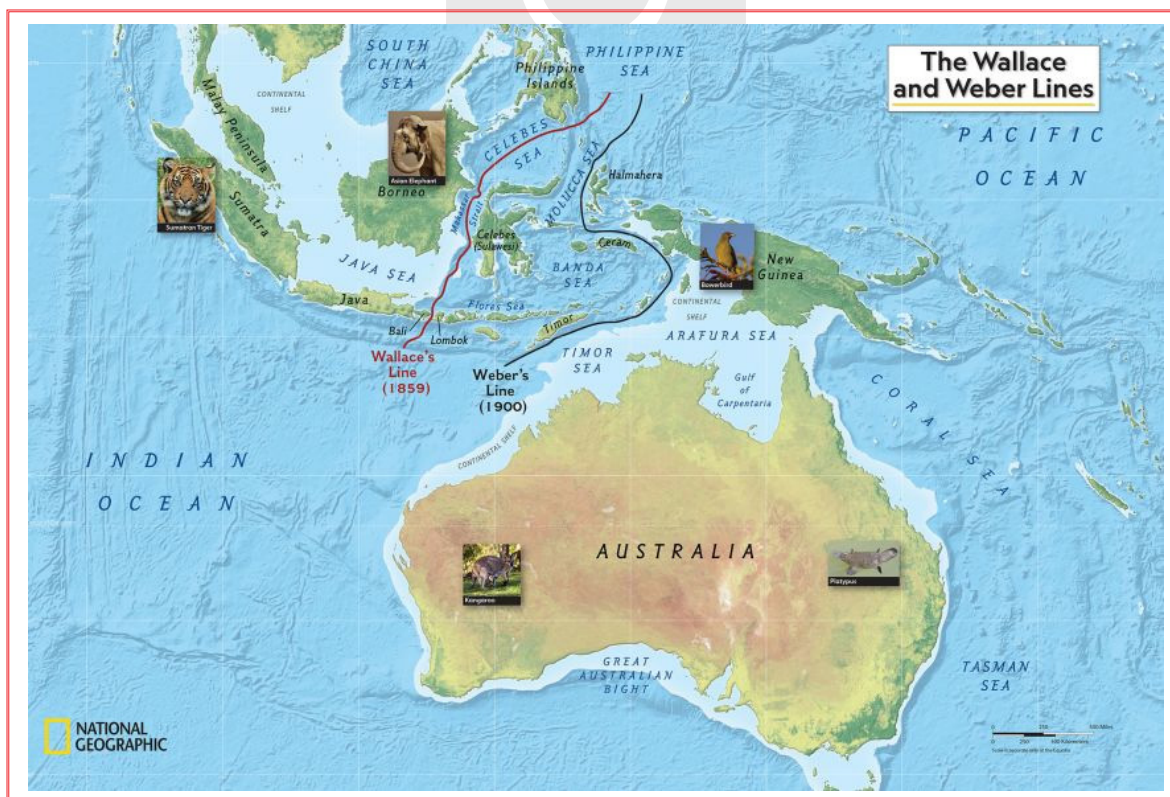
- *Wallace Line*
- *Rising Avalanche Risks*

Wallace Line

Why in News?

In the 19th century, **Alfred Wallace** observed a **change in species composition** between **Asia and Australia**. This difference in species composition later developed as the **Wallace Line**.

What is the Wallace Line?

➢ **About:** The Wallace Line is an **imaginary boundary** separating the distinct **faunal regions of Asia and Australia.**
  ❍ It marks a major **biogeographical division** with stark species differences on either side of the line.
➢ **Geographical Location**: It runs through the **Makassar Strait**, which lies between the east coast of **Borneo** and the western coast of **Sulawesi.**
  ❍ It extends between **Bali and Lombok**, separating the **Sunda and Sahul continental shelves.**

- ➢ **Species Distribution**: **West** of the Wallace Line (**Bali, Borneo, Java, and mainland Asia**), fauna consists of **monkeys, apes, rhinos, squirrels, tigers, and hornbills**, which are characteristic of the Asian ecosystem.
  - ○ **East** of the Wallace Line (**Lombok, Sulawesi, Timor, and Australia**), fauna includes tree **kangaroos, cockatoos, and honeyeaters**, linked to the Australian ecosystem.
- ➢ **Wallacea Region**: The region between the **Wallace Line and the Weber Line** (another faunal boundary to the east) is known as **Wallacea** and includes islands like **Sulawesi, Flores, Lombok, and Timor.**
  - ○ Isolated Wallacean islands have **lower biodiversity** than nearby continents but host **unique species** like the **Komodo dragon, babirusa, and giant bees**.
  - ○ Sulawesi is home to **both Asian species** like tarsiers and anoas, and **Australian marsupials** like the dwarf cuscus.
- ➢ Reason for Formation:
  - ○ **Continental Drift:** About **85 million years ago**, Australia **separated** from Antarctica and **drifted** northward, **isolating species** and driving independent evolution.
  - ○ **Deep Oceanic Barriers:** It aligns with deep waters like the **Makassar Strait**, which remained **submerged** even during **ice ages**, **limiting species movement** between Asia and Australia.
  - ○ **Geological Climate Change: Asian and Australian species**, suited to their respective climate, struggled **to migrate either side of the line**.

Rising Avalanche Risks

Why in News?

A massive **avalanche** occurred in Uttarakhand's Chamoli district, burying people and properties under **snow and debris.**

- ➢ **Warmer temperatures**, **more rain, and less snowfall** are altering snow conditions, increasing avalanches in the Himalayas.
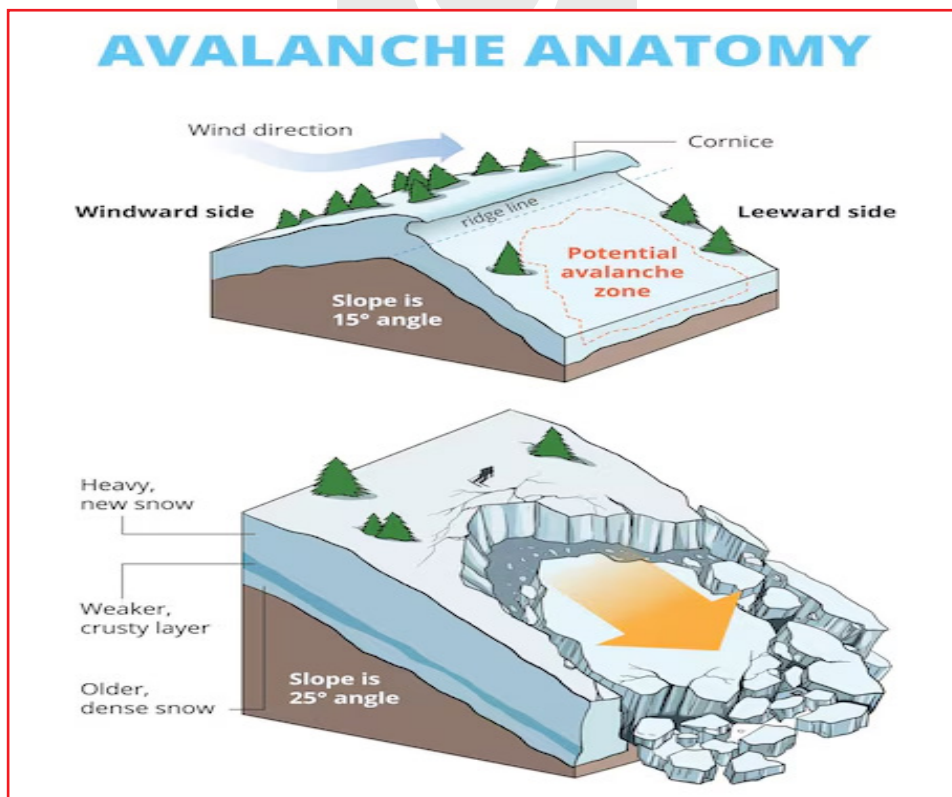
AVALANCHE ANATOMY

What is an Avalanche?

➢ **About:** An **avalanche** is the rapid flow of **snow, ice, and debris** down a mountain slope. It often carries **earth, rocks, and rubble**, causing destruction.
  ❍ Avalanche risk peaks from **December to April** due to heavy **winter snowfall (snow accumulation)** and **spring thaw** (weakening snow layers).
➢ **Types:**
  ❍ **Loose Snow Avalanche:** It starts from a **single point** where snow is **not well bonded,** spreads in an **inverted V-shape** as snow particles fall, and is **less dangerous** due to lower volume and speed.
  ❍ **Slab Avalanche:** It occurs when a **cohesive snow slab breaks away** from underlying layers, often reaching speeds of **50–100 km/h** and causing significant destruction.
  ❍ **Gliding Avalanche:** The snowpack **slides down a smooth surface, like grass or rock slabs**, leaving a broad fracture line separating it from stationary snow.
  ❍ **Wet-Snow Avalanche:** A wet-snow avalanche is naturally triggered by **rising temperatures or rain,** as meltwater weakens the snow layer bonds.

What are the Causes of Avalanche?

Natural

➢ **Snow Accumulation:** Continuous or excessive **snowfall increases the weigh**t of the snowpack, leading to instability. E.g., **Himachal Pradesh avalanche (January 2020).**
  ❍ **Windy conditions** on fresh snow slopes can enhance instability.
➢ **Weak Snow Layers:** Temperature changes weaken the snowpack, e.g., **fresh snow over a weak base** may lead to an avalanche.
  ❍ **Sudden warming** weakens the snowpack, leading to **wet-snow avalanches.**
➢ **Earthquakes:** Seismic activity can destabilize snow layers. E.g., Nepal earthquake 2015 triggered avalanches in the **Langtang Valley, Nepal.**

Human-Induced

➢ **Deforestation:** Tree roots stabilize slopes, but **deforestation**, like in Himalayan road projects, **raises avalanche** and landslide risks.
➢ **Adventure Tourism:** Skiing, snowboarding, and mountaineering can trigger avalanches by **disturbing the snowpack**. E.g., In February 2024, skiers in **Gulmarg** triggered an avalanche by skiing in a **non-ski zone.**
➢ **Global Warming:** Rising global temperatures cause **frequent freeze-thaw cycles**, increasing avalanche risks.

How Avalanche Differ from Landslides?

Basis	Avalanche	Landslide
Definition	A type of landslide that occurs in **snowy regions**, involving the movement of snow and air.	A form of mass wasting where a **large area of land** moves under the force of **gravity.**
Causes	Heavy snowfall, Unstable snowpack, **ice** pellets, Strong winds depositing snow on slopes, **Temperature fluctuations**	Earthquakes, **Volcanic eruptions, Heavy rains and floods**, Deforestation, Wildfires
Flowing Matter	Composed of **snow and air.**	Consists of **soil, rocks, or mud.**
Occurrence	Occurs in snowy regions where snowpacks are **weakly held by snow layers.**	Happens on land with **steep slopes.**
Speed of Movement	**Very fast** (up to 250 miles per hour in extreme cases)	Can be **fast** like avalanches or **slow-moving** over time

Why are Himalayas More Prone to Avalanches?

➢ **Rising Temperatures:** The **Himalayas** are **warming faster than average**, causing glacier melt and **retreating snow lines**.

    ○ Avalanches in the western Himalayas have increased significantly since the **1970s.**

➢ **Wetter Snow:** Warmer temperatures cause **rain instead of snow**, making the snowpack **wetter and unstable.**

    ○ Rainwater percolating into the snowpack weakens its structure, **reducing friction** between snow layers and increasing avalanche risks.

➢ **Permafrost Melting:** The **melting of** permafrost causes **water accumulation** at their base, making ice layers **more prone to sliding.**

➢ **Increased Wind Speeds:** Rising temperatures are causing **higher wind speeds**, which increase snow transport and make fresh snow layers more unstable.

➢ **Steep Slopes:** The **steep and rugged terrain** of the Himalayas makes it **easier for snow to slide down** due to gravity.

➢ **Earthquakes:** The Himalayas lie in a **seismically active zone**, and **earthquakes** can trigger avalanches by shaking the unstable snow layers.

Karakoram Anomaly
➢ The **Karakoram Anomaly** refers to the **unusual behavior** of glaciers in the **Karakoram Range**, where they have either remained **stable or experienced slight mass gains, contrary** to the widespread trend of **glacier retreat** observed globally due to climate change.   ○ **Karakoram Range** is a mountainous region spanning **Pakistan, India, Afghanistan, Tajikistan, and China.**

How to Mitigate Avalanche Risk?

➢ **Early Warning Systems (EWS):** EWS can reduce avalanche risk by monitoring snow conditions (using **sensors and satellites**), issuing **alerts** (weak snow layers), and aiding **rescue efforts** (timely preventive action).

    ○ E.g., In **2022**, India's **first avalanche monitoring radar** was installed in **Sikkim** that can detect avalanches within **3 seconds of trigger.**

➢ **Snow Test:** Snow tests can be conducted regularly to **assess the stability of the snowpack** and predict avalanche risks.

➢ **Defensive Structures: Snow sheds** can be constructed over **transportation routes** to shield vehicles from falling snow.

    ○ **Wall reinforcement** and **splitting wedge** can help strengthen structures and **deflect avalanches** away from buildings.

➢ **Dual-Purpose Infrastructure:** Build dams to **protect against flooding and debris flows** after snowmelt, ensuring **year-round disaster mitigation**.

➢ **Artificial Avalanche Triggering:** Controlled explosions trigger **small avalanches** to **prevent larger ones,** protecting roads, settlements, and ski slopes.

➢ **Afforestation:** Encouraging forest growth can help in **natural avalanche control** over time.

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Security

Highlights

- *India 2nd Largest Arms Importer: SIPRI*
- *North Sea*

India 2nd Largest Arms Importer: SIPRI

Why in News?

India's share of global arms imports fell to 8.3% in 2020–24, making it the **2nd-largest arms importer, after Ukraine,** as per the **Stockholm International Peace Research Institute (SIPRI)** report.

What are the Key Findings of the Report on Arms Trade?

➢ **India:** India's arms imports declined by 9.3% compared to 2015-19. Russia remained India's top supplier, but its share dropped from 72% (2010-14) to 36% (2020-24).
- ○ France emerged as **India's second-largest supplier** (28% of its total exports went to India).
➢ **India's Neighbors:** Pakistan's Arms Imports Grew by 61%. China supplied 81% of Pakistan's total arms imports.
- ○ For the first time since **1990-94**, China dropped out of the **top 10 arms importers** as its **arms imports declined by 64%**, reflecting a stronger **domestic defense industry**.
➢ **Asia and Oceania:** India, Pakistan, Japan, and Australia ranked among the 10 largest arms importers globally in 2020-24.
➢ **US:** Retains position as the largest arms exporter, supplying weapons to Ukraine, **North Atlantic Treaty Organization (NATO)** allies, and Asia-Pacific nations.
➢ **Europe:** European arms imports surged by 155%, as countries increased defense spending in response to Russia's invasion of Ukraine.
- ○ **France overtakes Russia as the 2nd-largest arms exporter**, with India (28%) as the top buyer, followed by Qatar.

- India procured **Rafale jets and Scorpene submarines** from France.
- ○ **Ukraine** saw a 100-fold increase in arms imports due to the **war with Russia.** It received 8.8% of global arms imports, with the US, Germany, and Poland as top suppliers.
➢ **Russia:** Russia's global arms exports dropped by **64%**, falling to 7.8% of global exports (third place) due to **Western sanctions and production constraints.**
- ○ However, **India (38%),** China (17%), and Kazakhstan (11%) remained its top buyers.
➢ **Middle East**: Arms imports fell by 20%, but the region remains a major importer, with Qatar becoming the 3rd-largest arms importer globally.
➢ **Global Arms Transfers**: Global arms transfers remained stable compared to 2015–19 and 2010–14, but were 18% higher than 2005–09, with rising imports in Europe and the Americas offset by decreases in other regions like China.

What are India's Initiatives to Reduce Arms Imports?

➢ **Budget:** Rs 6.21 lakh crore allocated for defence in **Budget 2024-25,** with 75% of capital procurement reserved for **domestic manufacturers.**
- ○ **Self-Reliant Initiatives through Joint Action (SRIJAN)** portal launched to facilitate procurement from Indian vendors.
➢ **Production:** India's defence production reached a record value of Rs 1.27 lakh crore in 2023-24, a 174% rise from 2014-15.
- ○ The top three destinations for India's defence exports in 2023-24 were the **US, France, and Armenia.**
➢ **Positive Indigenization Lists:** **Five 'Positive Indigenization Lists'** comprising defence items have been released. These lists place an **embargo on the import of these items,** ensuring they are produced within India.

- **Defence Acquisition Procedure (DAP) 2020:** Prioritizes domestic procurement over foreign purchases.
  - Introduced categories like **"Buy (Indian-IDDM)" (Indigenously Designed, Developed, and Manufactured).**
  - Promotes **Make-I** and **Make-II** projects to encourage private-sector participation in defence manufacturing.
- **Defence Industrial Corridors (DICs):** Two corridors established in **Uttar Pradesh and Tamil Nadu** to boost defence manufacturing.
- **Private Sector & FDI Participation: 74% Foreign Direct Investment (FDI) via the Automatic Route** and **100% via the Government Route** in defence manufacturing.
  - 21% of India's total defence production now comes from the private sector.
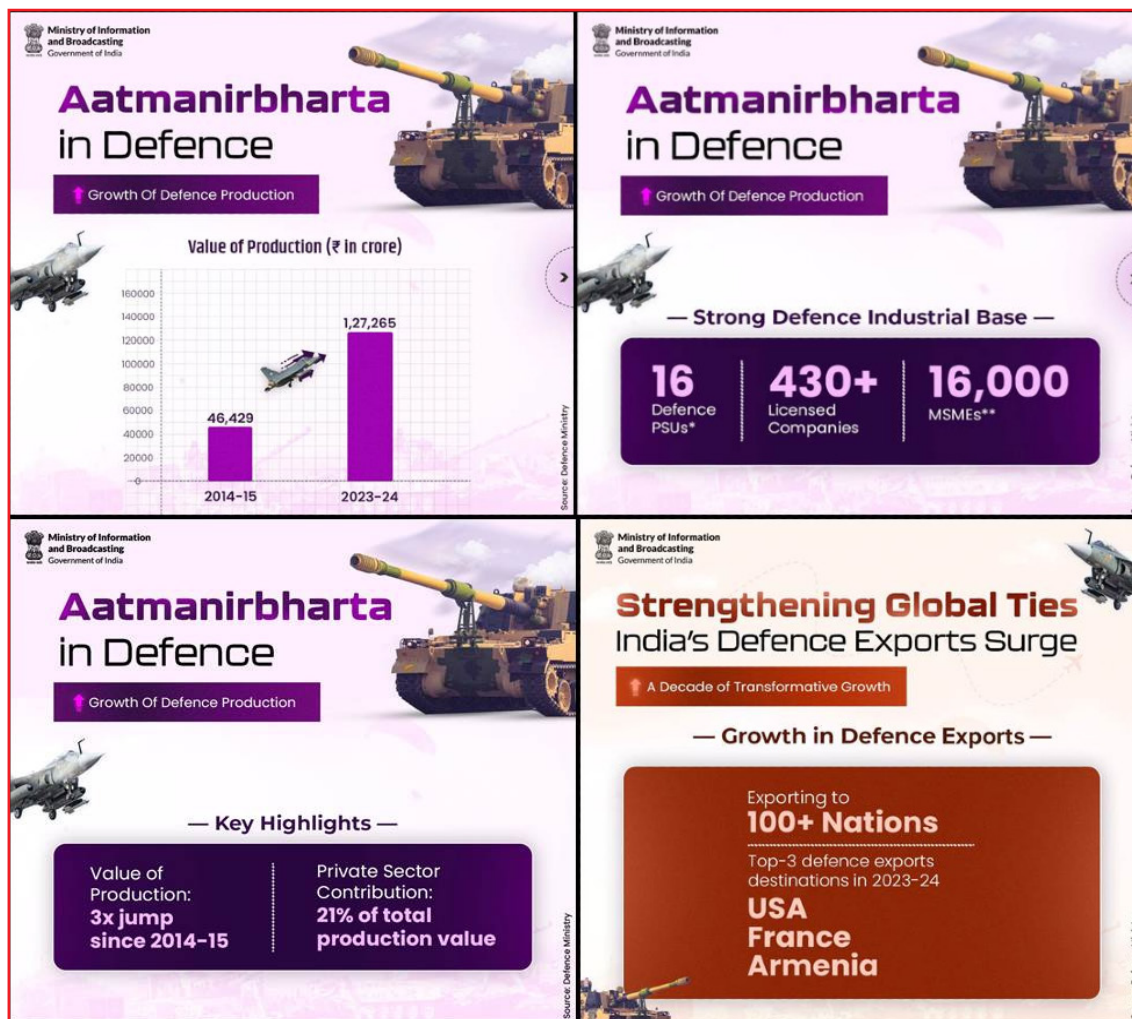
- **Defence Public Sector Units (DPSUs):** India has 16 DPSUs, including **Hindustan Aeronautics Limited (HAL),** Bharat Electronics Ltd (BEL), and Mazagon Dock Shipbuilders.
  - Major indigenization projects led by DPSUs include **INS Vikrant** (India's first indigenous aircraft carrier**), LCA Tejas** (advanced fighter jet developed by HAL).
- **R&D & Innovation: iDEX (Innovations for Defence Excellence)** initiative promotes startups and MSMEs in developing cutting-edge military technology.
- **Future Goals**: India is aiming for Rs 1.75 lakh crore worth of defence production in 2025, with a target of Rs 3 lakh crore by 2029.

North Sea

A cargo ship carrying toxic chemicals collided with a US military-chartered oil tanker in the <u>**North Sea.**</u>

North Sea:

➢ **Location:** A shallow, northeastern arm of the Atlantic Ocean between the British Isles and mainland northwestern Europe.
  ❍ It is connected to the **Atlantic by the Strait of Dover and the English Channel** and to the **Baltic Sea through the Skagerrak and Kattegat**.
  ❍ The deepest point in the North Sea is the Norwegian Trench (725 meters).
➢ **Borders:** Surrounded by the United Kingdom, Norway, Denmark, Germany, the Netherlands, Belgium, and France.
➢ **Economic Importance:** Major trade route for Europe, linking key ports in the UK, Scandinavia, and mainland Europe.
  ❍ The **1958 Geneva Convention on the Continental Shelf** established countries' rights over adjacent shelves, enabling North Sea exploration, which is rich in oil and gas with extensive offshore drilling.

Read more: <u>UK's North Sea Drilling</u>

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Miscellaneous

Highlights

- *Linguistic Diversity and Education*

Linguistic Diversity and Education

Why in News?

A **United Nations Educational, Scientific and Cultural Organization (UNESCO)** report, titled *"Languages Matter: Global Guidance on Multilingual Education,"* released on the **25th anniversary of International Mother Language Day**, highlights the impact of language barriers on global education outcomes.

What are the Key Highlights of the UNESCO Report on Language?

➤ **Language Barrier in Education: 40% of the global population** lacks access to education in a language they **speak or understand**. In **low- and middle-income countries**, this percentage **rises to 90%**, affecting **over 250 million learners**.

  ○ Migration is **increasing linguistic diversity,** with over 31 million displaced youth facing language barriers in education.

➤ **Legacy of Colonialism**: Many **post-colonial nations** continue to use non-native languages as the **medium of instruction**. Local languages remain **undervalued in formal education**, disadvantageing native speakers.

➤ **Immigration and Education**: Immigration has led to **linguistically diverse classrooms**, especially in **high-income countries**. These countries struggle with **language acquisition support, inclusive curricula, and fair assessments**.

  ○ **Policy responses vary**, some countries promote bilingual education, while others prioritize quick immersion in the dominant language.

➤ **Challenges in Implementation**: Despite growing awareness, challenges like **limited teacher capacity, lack of materials, and community opposition** hinder the adoption of multilingual education.

➤ **Policy Recommendations**: The report calls for context-specific language policies and curriculum adjustments.

  ○ Support for teacher training, multilingual materials, and inclusive learning environments.

  ○ Focus on fostering inclusion through school leadership and community collaboration.

Note: International Mother Language Day was proposed by **Bangladesh,** approved during the **1999 UNESCO General Conference**, and has been observed globally on 21st February since 2000.

➤ The day also honors **Bangladesh's struggle to protect its mother language, Bangla.**

➤ UNESCO advocates for cultural and linguistic diversity to promote sustainability, tolerance, respect, and peace.

How Has India's Linguistic Landscape Evolved?

➤ **Prehistoric Times:** While human habitation in India predates Sanskrit, **no written records exist from prehistoric times**, making it difficult to reconstruct early languages.

➤ **Indus Valley Civilization:** The **Indus script (2600–1900 BCE) remains undeciphered**, making it unclear whether it represents an early form of Dravidian, Indo-Aryan, or another language family.

➤ **The Rise of Sanskrit, Prakrits, and Tamil**: Writing appeared in India **24 centuries ago**, mainly through **inscriptions and manuscripts**.

  ○ **Sanskrit and Prakrits: Sanskrit** emerged as a dominant **literary and scholarly language**, while **Prakrits** (a group of vernacular classical Middle Indo-Aryan languages) coexisted with it.

  ○ **Tamil:** Tamil developed as an **independent classical language**, with the **Sangam literature (3rd century BCE – 3rd century CE)** marking its rich literary tradition.

- ➢ **Influence of Foreign and Regional Languages**:
  - ○ **Foreign Languages:** With the spread of **Islamic rule**, **Persian and Arabic influenced Indian languages**, leading to linguistic amalgamations like **Urdu**.
    - ● Over the last 5,000 years, India absorbed languages like **Avestan, Austro-Asiatic, Tibeto-Burman, and Indo-Aryan,** creating a rich linguistic legacy.
  - ○ **Dravidian and Tibeto-Burman Growth:** The **Dravidian languages** (Tamil, Telugu, Kannada, Malayalam) and **Tibeto-Burman languages of the Northeast** flourished with **regional literature and administrative use**.
- ➢ **Printing Revolution:** The **use of paper and later printing** transformed literacy, leading to **mass production of books** in regional languages.
- ➢ Post-Colonial Language Shift:
  - ○ **Colonial Impact:** English became a **language of administration, education, and economic opportunity** under British rule.
  - ○ **Decline of Persian and Sanskrit:** As English gained prominence, **Persian declined in administration** and **Sanskrit remained confined to religious and scholarly use**.

- ➢ **Emergence of Modern Indian Languages:** Regional languages like **Hindi, Tamil, Bengali, Kannada, Marathi, and Telugu** gained **literary and political recognition**.
  - ○ Languages in the **Eighth Schedule of the Indian Constitution** see higher speaker numbers, whereas languages not included face decline.
    - ● Many languages spoken by **Adivasi communities**, especially from the Austro-Asiatic and Tibeto-Burman families, face extinction due to demographic shifts.
  - ○ Despite the rise of **print capitalism** and **digital technology**, the growth of English poses a challenge to Indian languages, especially in urban areas.

Note: The **Right to Education (RTE) Act, 2009,** and **National Education Policy (NEP) 2020** both emphasize the importance of mother tongue in education.
- ➢ **NEP 2020** recommends using the **home language/mother tongue** as the medium of instruction till Grade 5, preferably till Grade 8, to promote regional languages and ensure effective, inclusive learning through multilingual education.

Rapid Fire Current Affairs

Highlights

- *Railways' Work Under Mission Amrit Sarovar*
- *PM-YUVA 3.0*
- *Mycelium Bricks*
- *APAAR ID*
- *Cassava*
- *Water Ice Beyond Lunar Poles*
- *Turning Animal Liquid Waste into Fertilizer*
- *Solar Maximum Spurs Solar Missions*
- *Kyrgyzstan & Tajikistan Border Deal*
- *Hantavirus*
- *6th Edition of Exercise Dharma Guardian*
- *Ancient Stone and Bone Tools*
- *Hydrogen Peroxide*
- *Smooth-coated Otters*
- *55th Anniversary of NPT*
- *Govind Ballabh Pant*
- *Exercise KHANJAR-XII*
- *KVIC's Honey Mission*
- *Order of Freedom of Barbados*
- *Vanuatu's Citizenship By Investment Program*
- *Madhav National Park*
- *US Withdrawal from Loss and Damage Fund*
- *Pelican and Painted Stork*
- *Bangus Valley*
- *Gut Bacteria and Vitiligo*
- *Jan Aushadhi Diwas*
- *Dramatic Performances Act, 1876*
- *Empowering Women PRIs Leaders*
- *Planetary Parade*
- *Endogamy*
- *Starlink and Eutelsat*
- *Dholavira*
- *Carbon Intensity*
- *Colossal A23a Iceberg Stuck*
- *Taiwan's Geopolitical Significance*
- *Crop Contingency Plan for Kashmir*
- *Blue Ghost Mission 1*
- *Narwhals*
- *SPHEREx Mission*
- *Oscars Awards 2025*
- *India's Exploration of Critical Minerals*
- *Morarji Desai*
- *Aditya-L1 Mission Captures Solar Flare*
- *State of India's Digital Economy Report 2025*
- *Algal Blooms in River Thames*
- *Red Color of Mars*
- *CPI for Agricultural and Rural Labourers*
- *Cape Vultures Spotted in South Africa*

Railways' Work Under Mission Amrit Sarovar

The **Indian Railways** has been integrated into the **Mission Amrit Sarovar** initiative to aid in **water conservation** by constructing and rejuvenating ponds across the country.

➢ Indian Railways will **desilt, excavate, or create water bodies** near railway lines in coordination with district authorities and the **Ministry of Rural Development.**

About Mission Amrit Sarovar: It was launched in **April 2022** to construct or rejuvenate **75 ponds per district**. As of **October 2024**, over **68,000 ponds** have been completed.

➤ It ensures long-term water availability through **community participation,** and climate resilience to secure **sustainable water resources.**

➤ It is an initiative of the **Ministry of Rural Development** and **Bhaskaracharya National Institute for Space Application and Geo-informatics (BISAG-N)** is the Mission's technical partner.

➤ It is implemented through convergence with schemes like **MGNREGA,** **15th Finance Commission Grants, PMKSY,** and state programs.

Read More: Mission Amrit Sarovar

PM-YUVA 3.0

The **Ministry of Education** launched **PM-YUVA 3.0 (Young, Upcoming and Versatile Authors)**-Prime Minister's Scheme for Mentoring Young Authors.

➤ It aims to train **young authors (below 30 years)** to promote **reading, writing, and book culture** while projecting **Indian literature globally.**

➤ **Themes:**
  ○ Contribution of **Indian Diaspora** in Nation Building
  ○ Indian Knowledge System
  ○ Makers of Modern India (1950-2025)

➤ **National Book Trust (NBT),** under the Ministry of Education, is the **implementing agency.**
  ○ Books to be published by **NBT** and translated into **multiple Indian languages** under **Ek Bharat Shreshtha Bharat.**

➤ It aligns with **NEP 2020** to support **empowerment of young minds** and prepares future leaders.

Read More: YUVA Scheme for Young Writers

Mycelium Bricks

In the face of **climate change,** the construction industry is seeking **low-carbon alternatives,** and **mycelium bricks** have emerged as a promising innovation.

➤ **Mycelium Bricks:** Created from **fungal spores,** husk, and sawdust, **mycelium bricks form a lightweight, fibrous structure** with a low environmental impact compared to traditional fired clay bricks, which emit nearly **300 million tonnes of CO₂ annually.**

  ○ They are **biodegradable, fire-resistant, lightweight, and good heat insulators,** making them suitable for interior panelling, filters, and electronics.

  ○ Potential applications include interior panelling, liquid filters, sports equipment, and electronic components.

➤ **Challenges Hindering Adoption**: Mycelium bricks have low **load-bearing capacity, high moisture absorption,** and a **short lifespan** due to biodegradability and vulnerability to **termites,** making them less durable than **concrete.**

  ○ **Tropical weather conditions**, **high humidity**, and **lack of infrastructure** in India make large-scale **manufacturing expensive and impractical**.

➤ **Potential Solutions: Flame retardants and Ultra Violet Coatings** can improve fire resistance and durability, while **R&D and policy support** can enhance competitiveness with **clay bricks**.

Read more: Energy Efficiency in Construction Sector

APAAR ID

The **Automated Permanent Academic Account Registry (APAAR) ID**, aims to **standardize student records.** However, concerns over **implementation, data privacy** have sparked debates among activists.

- **APAAR ID:** Introduced under the **National Education Policy 2020** and aligned with the **National Credit Framework**, it aims to establish a **"One Nation, One Student ID"** system to streamline academic records and facilitate transitions between educational levels.
  - APAAR assigns a **12-digit ID**, linking academic records to **DigiLocker** and **Academic Bank of Credits** for storage and verification.
  - **Schools** record data, while **Higher Education Institutions & Skill Institutes** access verified academic records for admissions and recruitment.

- **Concerns About APAAR ID:** APAAR's Aadhaar linkage is causing issues due to spelling mismatches, necessitating updates.
  - While the Education Ministry claims APAAR is voluntary, **Central Board of Secondary Education's push for 100% enrolment of APAAR raises** concerns of implicit mandates, contradicting the Supreme Court ruling in *Justice (Retd.) K.S. Puttaswamy v. Union of India (2019),* which held that Aadhaar cannot be required for basic education access.
  - The Advocacy groups are concerned about **risks in handling minors' sensitive personal** data without robust data protection.
    - The **Data Protection Act, 2023** (not yet enforced) mandates that consent **must be free, informed, and unambiguous**, which activists argue is being ignored.

Read more: **APAAR: One Nation One Student ID Card**

Cassava

Indigenous farming has preserved cassava's **genetic diversity** and earned the title of the **'bread of the tropics'** for feeding nearly a billion people.

About Cassava: Cassava (Yuca or Manioc) is a **starchy root vegetable** and the source of **tapioca** (a starch used in **bakery products, paper, and adhesive industries**).

- It is native to **South America** and widely cultivated in tropical regions (Africa, Asia, and Latin America) for its resilience to **drought and poor soils**.
  - Cassava cultivation in India is mostly confined to Kerala, Tamil Nadu, Andhra Pradesh and North-Eastern States.
- It is grown through **stem cuttings**, but **Brazil's Kukurro tradition** promotes genetic diversity by encouraging **seed-based reproduction.**
- It supports **gut health**, regulates blood sugar, controls appetite, and **lowers type 2 diabetes risk.**
- It is used in the production of **bioethanol and biodegradable plastics**, while its peels and leaves serve as **animal fodder.**

Read More: **Genetically Modified Organism (GMO)**

Water Ice Beyond Lunar Poles

Recent **Chandrayaan-3's** ChaSTE (Chandra's Surface Thermophysical Experiment) data suggests that **water-ice** may exist **outside the Moon's polar regions**, particularly in **high-latitude areas.**

- ➤ **ChaSTE** is a sort of a **thermometer** that measures **surface and sub-surface temperatures** near the Moon's poles.
- ➤ **ChaSTE** data suggests **shaded lunar slopes** may resemble polar regions, potentially **hiding subsurface water-ice**.
- ➤ **Colder slopes** away from the Sun may **trap water-ice**, extending its presence **beyond polar craters** for easier access in **future missions**.
- ➤ Lunar water can support **drinking, oxygen production**, and splitting it into hydrogen and oxygen enables **fuel production for deep-space missions**.
- ➤ **Chandrayaan-3** soft-landed near the **Moon's south pole** on **23rd August, 2023**, at a site later named **'Shiv Shakti Point'**.

CHANDRAYAAN 3

India's 3rd lunar mission; a successful attempt at achieving a soft landing on lunar south

BRIEF HISTORY

Lunar Mission	Aim	Launch Vehicle	Success
Chandrayaan1 (2008)	Create a 3D atlas of moon & Mineralogical mapping	PSLV – C11	Detection of water and hydroxyl on lunar surface
Chandrayaan2 (2019)	Exploring lunar south pole	GSLV MkIII-M1	Lander and rover crashed but orbiter successfully collected data

COMPONENTS

- Lander - **Vikram**; Rover - **Pragyan** (same as Chandrayaan 2)
  - ▶ Both designed to last for 14 days; not supposed to come back to the earth
- Spectro-polarimetry of Habitable Planet Earth **(SHAPE)**
  - ▶ An experimental payload in propulsion module
  - ▶ Study spectro-polarimetric signatures of Earth (near-infrared wavelength range)

ASPECTS TO STUDY

- Lunar quakes
- Thermal properties of lunar surface
- Changes in plasma near the surface
- Accurately measuring distance b/w Earth and the moon

MISSION LIFE

- 1 lunar day (~14 Earth days)

LAUNCH VEHICLE

- LVM3 - M4

India became the 1st country to successfully land on Lunar south pole and 4th to achieve soft-landing on Lunar surface (after US, Russia and China)

Why Chandrayaan 3 Succeeded?

- A "failure-based design", unlike the "success-based design" of Chandrayaan-2
  - ▶ Even if all the sensors failed and engines stopped, **Vikram was sure to make the landing**
  - ▶ Provision of **multiple attempts** for landing if attempt 1 failed
- Developed accordingly to **rule out the scenario of crash landing**
  - ▶ Expanded landing area for more flexibility to land safely
  - ▶ Equipped with more fuel to enable longer-distance travel

Importance of Lunar South Pole

- Vastly different, more **challenging terrain** compared to lunar equatorial region
- Potential repositories of valuable **information about early Solar System**
- Impact **future deep space exploration** significantly
- **Water may be concentrated** in the moon's southern hemisphere

Drishti IAS

Read More: Chandrayaan-3

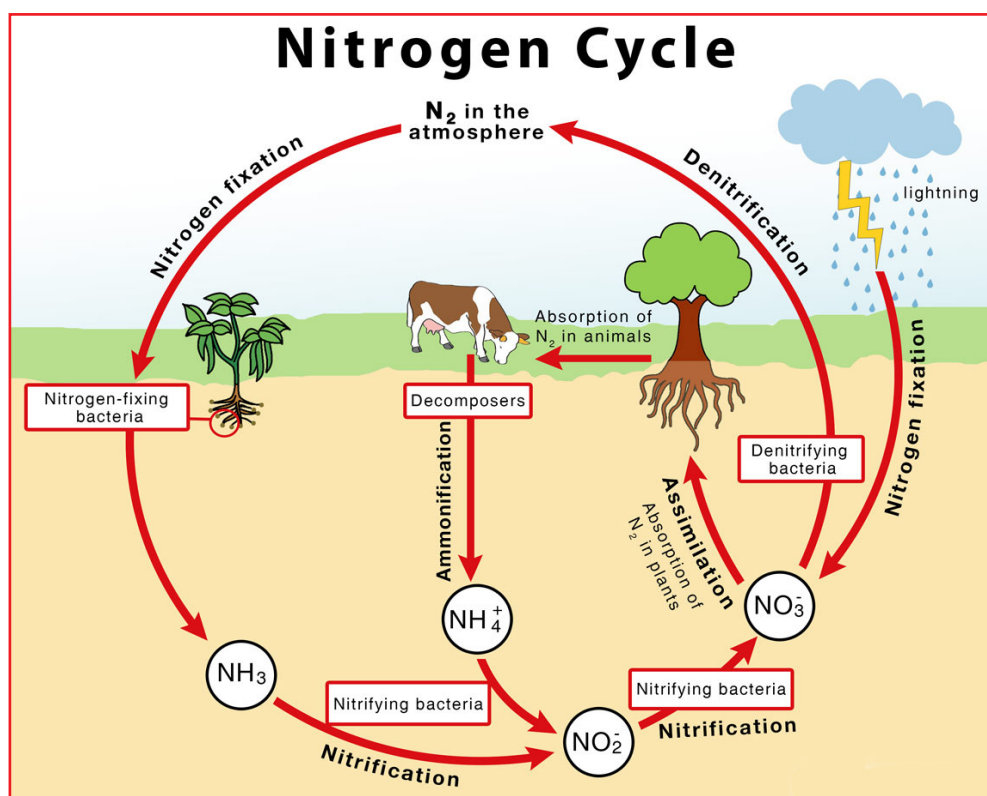drishti

Turning Animal Liquid Waste into Fertilizer

Scientists have developed an innovative **electrochemical technique** to **extract urea from urine**, transforming it into a **fertilizer** while addressing **wastewater treatment** challenges.

➢ The **new electrochemical process** converts urine's urea into **Percarbamide**, a **crystalline peroxide derivative** that can be used as **fertilizer**.

  ○ It has achieved nearly **100% purity** in extracting **percarbamide** from both human and animal urine.

  ○ The extracted Percarbamide **gradually releases nitrogen**, enhancing crop growth and **completing the nitrogen cycle.**

➢ Urine contains essential nutrients like **phosphorus, potassium, and nitrogen (urea)**, making it a potential **natural fertilizer.**

➢ An adult produces **450–680 liters** of urine annually that can produce **4 kg nitrogen, and 0.3 kg phosphoru**s, enough to grow wheat for a daily loaf of bread for a year.

➢ It can help in achieving **ODF++ status** under the **Swachh Bharat Mission-Urban (SBM-U)** that involves **solid and liquid waste management** and the **dairy sector** to reduce **GHG emissions**.

Nitrogen Cycle

- N_2 in the atmosphere
- Nitrogen fixation
- Denitrification
- lightning
- Absorption of N_2 in animals
- Nitrogen-fixing bacteria
- Decomposers
- Nitrogen fixation
- Denitrifying bacteria
- Ammonification
- Assimilation Absorption of N_2 in plants
- NH_4^+
- NO_3^-
- NH_3
- Nitrifying bacteria
- Nitrifying bacteria
- Nitrification
- NO_2^-
- Nitrification

Read More: Swachh Bharat Mission-Urban

Solar Maximum Spurs Solar Missions

NASA's **PUNCH mission**, aimed at studying the Sun's corona, is the **third major solar mission since 2023**, reflecting a rise in solar missions linked to the **solar cycle**, which is nearing its **solar maximum**.

Solar Cycle:

➢ The **solar cycle** is an **11-year period** during which the **Sun's magnetic field flips**, causing the **north and south poles to switch places**.

➢ During the **solar maximum** (when the Sun is most active), **solar activity**—such as **sunspots, solar flares, and coronal mass ejections**—increases, impacting **satellite communications** and **power grids**.

  ○ **Sunspots** are **small, dark, and cooler areas** where the magnetic field is particularly strong.

➢ The cycle ends with the **solar minimum** (when sunspot activity is at its lowest), leading to a decline in solar activity until the **next cycle begins**.

  ○ The **solar cycle is tracked** by counting **sunspots**.

Surge in Solar Missions:

➢ The increased number of **solar missions** is due to the **Sun approaching its solar maximum (2022-2024)**, providing the best opportunity to study its behavior.

  ○ The next peak in **solar activity** is expected **after 2035-2036**.

➢ **Earlier Solar Missions:** **Aditya L1 (India)**, **Proba-3 (European Space Agency)**

  Read More: NASA's Punch Mission - Drishti IAS

Kyrgyzstan & Tajikistan Border Deal

Kyrgyzstan and Tajikistan have agreed to **exchange disputed lands**, improving access to farmland and water resources, bringing an **end to their long-standing border conflict.**

Reasons for Conflict:

➢ The conflict arises from border disputes due to **differing maps and the arbitrary division of the Fergana Valley**, leading to ethnic tensions **among Kyrgyz, Tajiks, and Uzbeks.**

Kyrgyzstan and Tajikistan: Both are **Central Asian nations,** gained independence from the **Soviet Union** in 1991.

➢ **Kyrgyzstan** borders **Kazakhstan, China, Tajikistan, and Uzbekistan**, with **Bishkek** as its capital.

➢ **Tajikistan** shares borders with **Afghanistan, China, Kyrgyzstan, and Uzbekistan**, with **Dushanbe** as its capital.

➢ Both share the **Fergana Valley with Uzbekistan.**

Kyrgyzstan-Tajikistan border disputes continue for 31 years

Borders drawn by the former Soviet Union regardless of ethnic, political, economic, and cultural factors caused critical issues between the newly independent Central Asian countries Kyrgyzstan and Tajikistan

BATKEN REGION

Has natural underground and water resources

Population of around 500,000

There are enclaves in **the Batken region,** with one belonging to **Tajikistan (Vorukh), the other to Uzbekistan (Shakhimardan, Sokh)**

BORDER DISPUTE BETWEEN KYRGYZSTAN, TAJIKISTAN

Total border length **970 kilometers (602.7 miles)**

Only **503 km (312.5 mi)** of the border between Kyrgyzstan and Tajikistan is clear

150 conflicts recorded at the border in the **last 10 years**

FERGANA VALLEY

The valley, where these countries' borders intersect, is **the main factor in border disputes**

Fergana Valley includes **Fergana, Namangan, Andijan in Uzbekistan, Khujand in Tajikistan, Osh, Jalalabad, and Batken in Kyrgyzstan**

RECENT BORDER CONFLICT

The conflict, which began **on Sept. 14** on the Kyrgyz-Tajik border, **lasted for 10 hours**

It was reported by the Kyrgyz side that **24 were killed and about 90 injured** in the incident

Kyrgyzstan declared a state of emergency in **the Batken region on Sept. 17**

The two countries established **a cease-fire on Sept. 16**

September 17, 2022

Read More: India Central Asia Relations

Hantavirus

Hantavirus is a rare but severe virus that spreads through the urine, droppings, and saliva of **rodents (mammals of the order Rodentia, such as rats),** causing life-threatening illnesses like **Hantavirus Pulmonary Syndrome (HPS) and Hemorrhagic Fever with Renal Syndrome (HFRS).**

➢ **Transmission:** Spread primarily through **aerosolization** of rodent waste, **direct contact**, or **rarely through bites**. **Human-to-human transmission is extremely rare.**

- ➢ **Symptoms:**
  - ❍ **Prodromal Phase (1-8 weeks after exposure): Flu-like symptoms** (fever, chills, muscle aches, fatigue, nausea, vomiting, and diarrhea).
  - ❍ **Severe Phase (HPS onset): Shortness of breath, coughing, chest tightness, fluid buildup in the lungs, and potential heart failure**.
- ➢ **High-Risk Groups: Farmers, construction workers, hikers, campers**, and those handling rodent-infested areas.
  - ❍ **Children under five, pregnant women, and immunocompromised individuals** should avoid contact with pet rodents.
- ➢ **Treatment:** No specific **antiviral treatment**, management includes **oxygen therapy and intensive care for severe cases**.
- ➢ **Prevention:** Keeping homes and workplaces rodent-free by sealing entry points, and wear protective gear when cleaning areas with rodent activity can significantly reduce the risk.

> **Read more: HMPV Virus**

6ᵗʰ Edition of Exercise Dharma Guardian

The 6ᵗʰ edition of **Exercise Dharma Guardian,** a bilateral military exercise between **India and Japan,** successfully concluded in Japan enhancing defense and interoperability cooperation.

- ➢ **Exercise Dharma Guardian:** It is an **annual exercise conducted alternately in India and Japan**, enhancing **combat readiness** through **counter-terrorism training in urban terrain** and including **United Nations Peacekeeping Operations (UNPKO)** and Humanitarian Assistance and Disaster Relief (HADR) drills.
- ➢ **India-Japan Multilateral Exercises: Veer Guardian (air force), SHINYUU Maitri (air force), JIMEX (naval)**, and **Malabar (naval) (along with Australia and the US)**.

> **Read more: India-Japan Forum 2024**

Ancient Stone and Bone Tools

A recent study found that **ancient ancestors** used **bone tools 1.5 million years ago**, nearly **a million years earlier** than believed, **challenging** the idea that toolmaking was **unique to humans.**

➤ **Origin of Toolmaking:** The earliest **stone tools** (**3.3 million years**) and **bone tools (1.5 million years)**, indicating that tool use **predates Homo** and was likely practiced by **earlier hominins.**

○ It is argued that toolmaking required **conceptual thought** and was **unique to humans.**

➤ **Fossil of Human Evolution:** Discovered in **1974**, Lucy, a **3.2-million-year-old human ancestor**, played a key role in evolution, possibly **using her hands for tools**.

➤ **Stone Tools in India's Human History:**

Period	Tools & Technology	Key Sites
Lower Palaeolithic (600,000 – 150,000 BCE)	**Hand axes**, cleavers, choppers (for cutting, chopping, skinning)	Bori (Maharashtra), **Son & Sohan valleys (Punjab)**, Didwana (Rajasthan), Bhimbetka (MP)
Middle Palaeolithic (150,000 – 35,000 BCE)	**Flakes, blades, points,** borers, scrapers (from small stone pieces)	Narmada valley, **Belan valley (UP)**, Tungabhadra region (South India)
Upper Palaeolithic (35,000 – 10,000 BCE)	**Blades, burins, scrapers** (more refined and diverse)	**Bhimbetka (MP)**, Karnataka, Maharashtra, Gujarat sand dunes
Mesolithic Age (9000 – 4000 BCE)	**Microliths** (tiny stone tools, often used as composite tools)	Bagor (Rajasthan), **Adamgarh (MP),** South of Krishna River
Neolithic Age (7000 – 5500 BCE)	**Rectangular axes**, polished stone axes	**Mehrgarh (Balochistan),** Burzahom (Kashmir), Gufkral (Kashmir), Senuwar (Bihar)

Read More: Wooden Artifacts of Stone Age

Hydrogen Peroxide

Researchers have developed an **efficient, eco-friendly, and energy-saving** method to synthesize **hydrogen peroxide (H_2O_2).**

➤ **About Hydrogen Peroxide (H_2O_2)**: It is a **colorless liquid** with a **bitter taste** at room temperature, highly **unstable**, and **decomposes into oxygen and water**, releasing heat.

➤ **Uses: Antiseptic** for wounds (diluted solutions), disinfectant in hospitals and clinics.

○ **Industrial Uses: Bleaching agent** in paper, textile, and cosmetic industries.

○ **Rocket Propulsion:** High-concentration H_2O_2 used as a **propellant**.

○ **Chemical Applications:** Employed in **food processing** for sterilization.

○ **Hazards:** It is a **strong oxidizer** and may cause **spontaneous ignition** with combustible materials.

➤ Peroxide chemicals are **organic compounds** that contain a peroxide functional group (**two linked oxygen atoms**).

Read More: Explosive Substances Act and Peroxide Chemicals

Smooth-coated Otters

Two **smooth-coated otters** (*Lutrogale perspicillata*) were brought to the **Delhi zoo** after two decades.

➤ **About Smooth-coated Otters:** They are a species of **otter** found in **freshwater habitats** across South and Southeast Asia.

➤ **Physical Traits:** They have **smooth, velvety fur**, a **round head with a prominent naked nose**, a **flattened tail**, and **webbed feet**.

➤ **Behavior:** They are **social animals** and hunt fishes in **groups.**

➤ **Protected Areas:** **Corbett** and **Dudhwa Tiger Reserves**, Katerniaghat Wildlife Sanctuary, **Kaziranga National Park**, **Periyar Tiger Reserve** and the **Nagarhole National Park**.

➤ **Conservation Status:**

  ○ **IUCN:** Vulnerable.

  ○ **WPA, 1972:** Schedule I.

  ○ **CITES:** Appendix I

Read More: Eurasian Otters in Kashmir Valley

55ᵗʰ Anniversary of NPT

The **Nuclear Non-Proliferation Treaty (NPT)** marks **55 years on 5ᵗʰ March, 2025**.

➤ It was **approved** by the UN General Assembly on **12ᵗʰ June, 1968** and came into **force** on **5ᵗʰ March, 1970.**

➤ **About NPT:** It is the **only multilateral binding treaty** for Nuclear-Weapon States (NWS) to disarmament while promoting **peaceful nuclear energy use.**

➤ **Key Provisions:** It defines **NWS** as countries possessing nuclear weapons before **1st January , 1967** (USA, UK, France, China, and USSR/Russia).

  ○ **Non-nuclear states** agree **not to develop** nuclear weapons, while nuclear states pledge **not to transfer them**.

  ○ It allows **peaceful use** of nuclear energy and provides a **withdrawal option** if national security is threatened.

➤ **Membership: 191 members** with 5 NWS (US, Russia, UK, France & China).

  ○ **India** is **not a member.**

➤ **Monitoring:** **International Atomic Energy Agency (IAEA)** monitors compliance.

➤ **India and NPT:** India opposes the **NPT**, calling it **discriminatory**, as it **legitimizes** nuclear weapons for **five countries** while **denying the same right to others**.

  ○ India follows a **"No First Use" (NFU) policy** and is committed to **global nuclear disarmament.**

Treaties Against Nuclear Weapons
Part - I

Nuclear Weapons

- The most dangerous weapons on earth; a **bomb or missile that uses nuclear energy to cause an explosion.**
- Nuclear weapons release energy either by **nuclear fission (atomic bombs) or nuclear fusion (hydrogen bombs).**
- Even a single weapon is potent of **destroying a whole city**, potentially **killing millions, jeopardising the natural environment** and lives of future generations.
- They were used for the **first and last time in WW-II** by the US in 1945 **on Hiroshima and Nagasaki.**

Treaty on the Non-Proliferation of Nuclear Weapons (NPT 1970)

- **Objective:**
  ○ Prevent the spread of nuclear weapons and its technology
  ○ Foster peaceful uses of nuclear energy
  ○ Further the goal of nuclear disarmament
- **Member States:**
  ○ 191 with **5 nuclear-weapon states (NWS)** (US, Russia, UK, France & China)
- **Nuclear-Weapon States:**
  ○ Those who **manufactured & exploded** a nuclear weapon or nuclear explosive device **before 1st January 1967**
- **Significance:**
  ○ **Only binding treaty** to the goal of disarmament by the NWS
- **India and NPT:**
  ○ India (along with Pakistan, Israel, North Korea, and South Sudan) is **not a member**
  ○ Opposes it as a **discriminative disarmament policy**
  ○ India's policy - **No First Use against NWS** and **no use against non-NWS**
- **NPT Review Conference:**
  ○ **Undertakes review** of the treaty's implementation **quinquennially**

Drishti IAS

Read More: **Nuclear Disarmament**
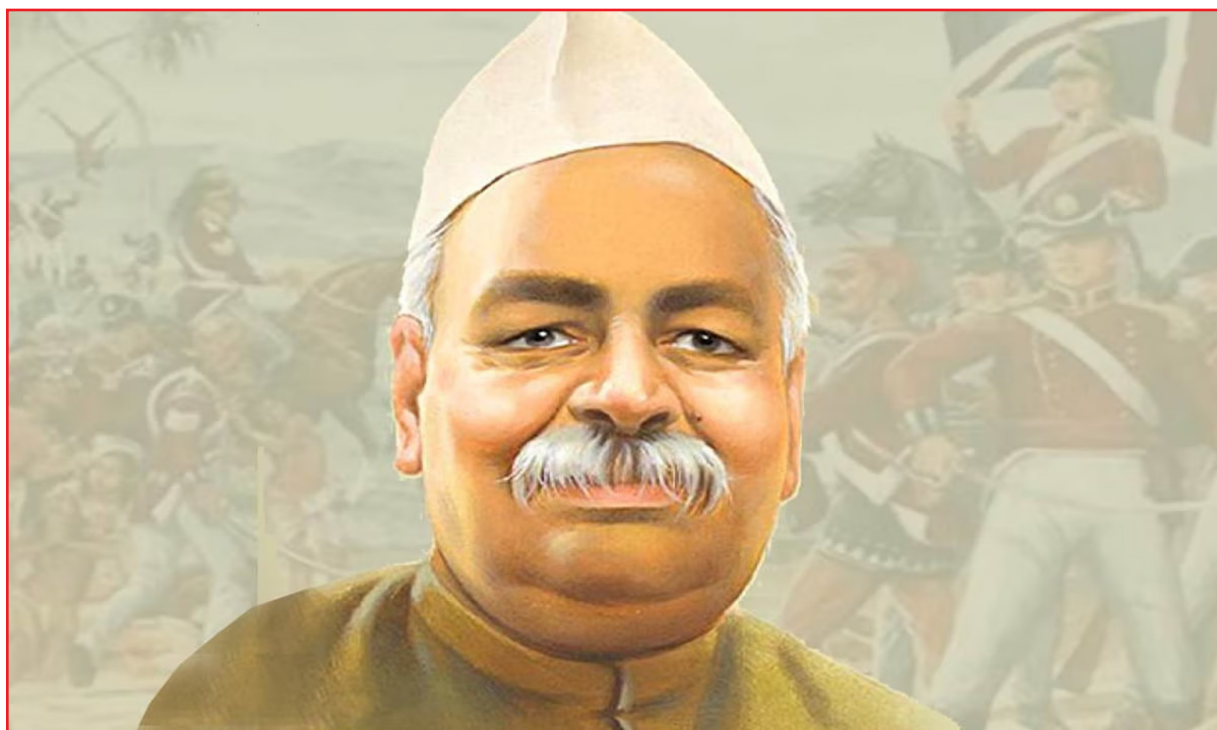
Govind Ballabh Pant

Uttar Pradesh Chief Minister paid tribute to **Govind Ballabh (G.B.) Pant (1887-1961),** a revered freedom fighter and the **1st chief minister (CM) of the Uttar Pradesh (UP)** on his death anniversary (7th March)

➢ **GB Pant Early Life:** Born in Almora, Uttarakhand, Pant was inspired by Gopal Krishna Gokhale and Madan Mohan Malaviya.

➢ **Role in the Freedom Movement:** Active participant in the **Salt March(1930)** and **Civil Disobedience Movement(1930)** and **Quit India Movement (1942).**

➢ **Political Journey:** Became a member of the **Constituent Assembly,** contributing to the framing of the Indian Constitution.

   ○ GB Pant as **CM of UP** worked towards **Zamindari abolition** and emphasized modernization.

   ○ GB Pant was appointed as **Union Home Minister** by **Jawaharlal Nehru** in 1955, he was instrumental in establishing **Hindi as one of the official languages of India.**

➢ **Honour and Legacy:** In 1957, he was conferred with the Bharat Ratna. His political legacy includes **mentoring UP leaders** like **Chaudhary Charan Singh.**

Read more: **Pandit Govind Ballabh Pant**

Exercise KHANJAR-XII

The **12th edition** of the **India-Kyrgyzstan Joint Special Forces Exercise KHANJAR-XII** is being held in **Kyrgyzstan.**

➢ **Initiated in 2011,** it is an **annual exercise** conducted **alternately** in both countries.

➢ The Indian Army's **Parachute Regiment (Special Forces)** and Kyrgyzstan's **Scorpion Brigade** are participating.

➢ The exercise aims to enhance cooperation in **counter-terrorism and special operations** in **urban and high-altitude terrain**.

➢ Key areas of focus include **sniping, building intervention, and mountain warfare**. Additionally, cultural exchanges, including Kyrgyz festival **Nowruz celebrations**, will strengthen bilateral ties.

➢ This exercise reinforces **India-Kyrgyzstan defence cooperation**, addressing **regional security challenges** like **terrorism** and **extremism,** while promoting peace and stability in the region.

➢ **Kyrgyzstan**, located in Central Asia, shares the **Fergana Valley** with **Uzbekistan and Tajikistan**. The region is rich in **hydrocarbons**, making it crucial for India's energy security.

Read More: India-Kyrgyzstan

KVIC's Honey Mission

The **Khadi and Village Industries Commission (KVIC)** has distributed **bee boxes, honey colonies, and toolkits** to beekeepers under the '**Honey Mission**' to spread the **Sweet Revolution.**

➢ **Honey Mission (2017):** It is an initiative of **KVIC** that promotes **beekeeping and honey production (apiculture)**, and integrates **bee farming with agriculture** for additional income.

  ❍ Apiculture products include **honey, royal jelly, beeswax, pollens** that are widely used in **pharmaceuticals, food, beverages, beauty**, and other industries.

➢ **KVIC:** It is a **statutory body** established under the **Khadi and Village Industries Commission Act, 1956** and functions under the **Ministry of MSME**.

❍ It **plans, promotes, and implements** programs for Khadi and village industries, coordinating with rural development agencies.

> **Note:** Like KVIC's Honey Mission, the **Ministry of Agriculture and Farmers Welfare** implements the **National Beekeeping & Honey Mission (NBHM)**, a **Central Sector Scheme** aimed at promoting **scientific beekeeping** to promote the **Sweet Revolution** in India.
>
> ➢ **Sweet revolution** promotes **apiculture** (beekeeping) to boost the **production of high-quality honey** and other bee-derived products.

> **Read More: Honey Mission and Sweet Revolution**

Order of Freedom of Barbados

India's Prime Minister has been conferred the **'Honorary Order of Freedom of Barbados'** in recognition of his **strategic leadership** and support during the **Covid-19** pandemic.

➢ It was **announced** during a meeting with India's PM in November, 2024, in **Guyana** during the **India-CARICOM Summit**.

➢ India and Barbados established **diplomatic ties in 1966**.

➢ In 2021, Barbados officially **removed Queen Elizabeth II** as its head of state and became the **world's newest republic** with **Dame Sandra** as the **first head of state (President)** of the Republic of Barbados.

❍ Barbados got **independence** from Britain on **30th November, 1966**.

➢ Barbados is a **Caribbean island** in the North **Atlantic Ocean**, northeast of **Venezuela**.


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➢ PM Modi's list of international awards now includes **19 prestigious recognitions.** Notable awards include Russia's **"Order of St. Andrew the Apostle"** and the US's **"Legion of Merit."**

Read More: Barbados: World's Newest Republic

Vanuatu's Citizenship By Investment Program

Vanuatu's **citizenship-by-investment (CBI) program**, commonly known as the **"golden passport**, allows wealthy individuals to purchase its passport, raising concerns over **security and transparency**.

➢ **Vanuatu's CBI Program:** Allows individuals to acquire citizenship in a country by making significant financial contributions to its economy.

 ❍ As per the Henley Passport Index 2025, **Vanuatu's passport ranks 53rd,** granting **visa-free access to 113 countries,** ahead of **China (59)** and **India (80).**

 ❍ As a tax Haven, Vanuatu has no personal income tax, capital gains tax, inheritance tax, making it **attractive for high-net-worth individuals.**

➢ **Vanuatu:** An island nation in the South Pacific, consists of 83 islands and lies to the east of Australia and the north of New Zealand. Its capital is **Port Vila**.

 ❍ It is home to active volcanoes like **Mount Yasur,** Vanuatu experiences frequent volcanic activity.

➢ **Concerns:** Criminals, and fraudsters acquire Vanuatu citizenship to evade scrutiny and access global markets.

 ❍ Countries like the UK and EU have called the scheme a potential gateway for money laundering and tax evasion.

➢ **Citizenship in India:** The **Indian Constitution (Articles 5-11) defines citizenship**. India does not grant citizenship solely based on financial contributions.
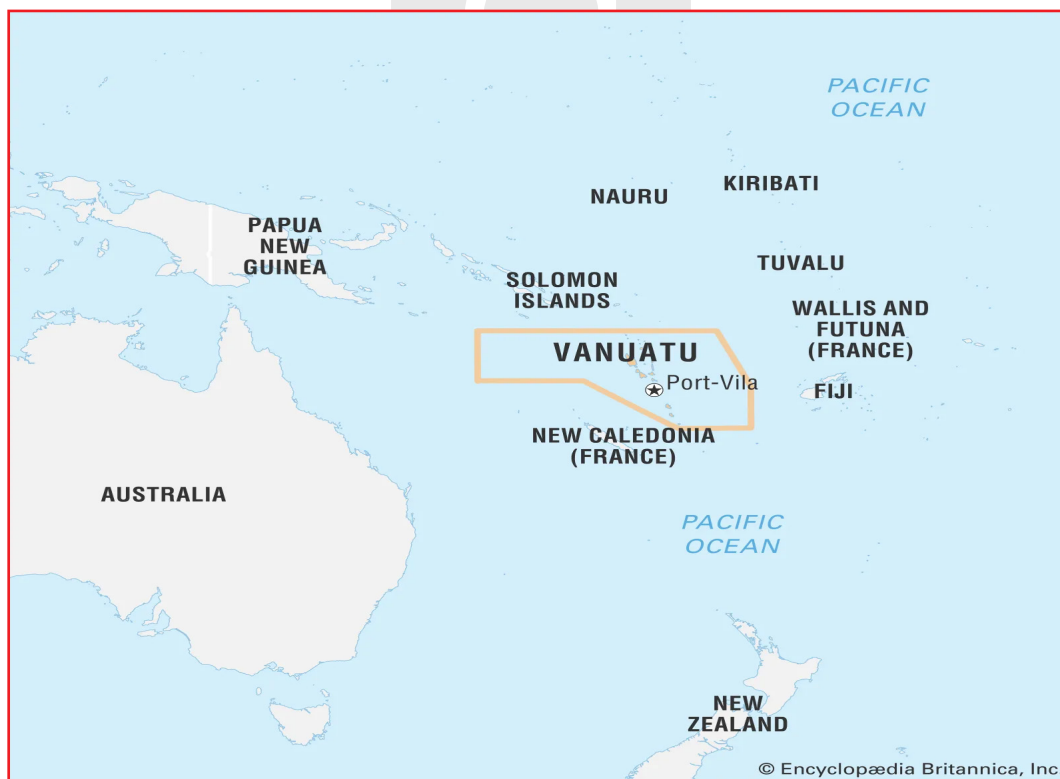
Read more: Cyprus as a Tax Haven

Madhav National Park

Madhav National Park, located in the **Chambal region** of **MP**, has been declared **India's 58th Tiger Reserve (9th Tiger Reserve of MP)**. The reserve currently houses 5 tigers.

Madhav National Park:

➢ Located in **Shivpuri District**, it is part of the **upper Vindhyan hills** and was historically a **hunting ground for Mughal emperors** and the **Maharaja of Gwalior**.

➢ It was designated a **National Park** in **1959**.

➢ The park has a rich ecosystem, including **lakes**, **dry deciduous**, and **dry thorn forests**, and is home to species like **tigers**, **leopards**, **Nilgai**, **Chinkara**, **Chousingha**, and various deer species.

➢ It is part of one of India's **32 major tiger corridors**, operationalized through the **Tiger Conservation Plan** under the **Wildlife (Protection) Act, 1972.**

➢ As of 2022, India's tiger population was estimated to range between **3167- 3925,** growing by **6.1% annually**, and now holds **75%** of the world's tigers.

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

Threats

▣ Habitat loss

▣ Poaching and illegal trade

▣ Human-Wildlife conflict

Read More: Project Tiger

US Withdrawal from Loss and Damage Fund

The US has withdrawn from the **Loss and Damage Fund (LDF)**, furthering its disengagement from global climate commitments like the **Paris Agreement** and **Green Climate Fund.**

➢ **LDF:** Created at **UN Climate Change Conference COP 27 in Egypt**, the **LDF** supports **developing and small island nations** facing climate-induced losses like **rising sea levels, heatwaves, and extreme weather**, with contributions from **developed nations.**

    ❍ The **LDF** is managed by a **Governing Board**, with the **World Bank** as its interim trustee.

    ❍ Nearly **USD 750 million** pledged under **LDF**, with the **US contributing USD 17.5 million** before withdrawing.

CLIMATE FINANCE

Climate finance refers to local, national or transnational financing—drawn from public/ private/alternative sources of financing—to support mitigation and adaptation actions against climate change.

PRINCIPLES OF CLIMATE FINANCE

- Polluter Pays
- Common but Differentiated Responsibility and Respective Capability (CBDR–RC)

Multilateral Climate Funds Coordinated by UNFCCC

- **Global Environment Facility (GEF):** Operating entity of financial mechanism (1994)
- **Kyoto Protocol (2001):**
  - **Adaptation Fund (AF):** Gives developing countries full ownership of adaptation projects
  - **Clean Development Mechanism (CDM):** To carry out emission-reduction projects in developing nations
- **Green Climate Fund (GCF):** estd. - 2010 (COP 16)
  - Funds under it - **Least Developed Countries Fund (LDCF)** and **Special Climate Change Fund (SCCF)**
- **Long-Term Climate Finance:**
  - **Cancun Agreements (2010):** Mobilize and provide scaled-up funds in short and long term
  - **Paris Agreement (2015):** Developed nations agreed to establish new collective goal of at least $100 billion/year by 2025
- **Loss and Damage Fund (2023) (COP27 & COP28):** Financial assistance to nations most vulnerable and impacted by effects of climate change

Climate Investment Funds (CIFs) under World Bank

- Clean Technology Fund
- Strategic Climate Fund

INDIA'S INITIATIVES REGARDING CLIMATE FINANCE

Fund	Objective
■ **National Adaptation Fund for Climate Change** (NAFCC) (2015) ■ **National Clean Energy Fund** (2010-11) ■ **National Adaptation Fund** (2014) ■ **Intended Nationally Determined Contributions** (INDCs) (2015) ■ **Climate Change Finance Unit (2011)**	■ For vulnerable Indian states ■ Advancing clean energy (started with initial carbon tax on industrial coal use) ■ Bridging gap between required and available funds ■ Nationally binding targets adopted under UNFCCC ■ Leads on global climate finance issues

Challenges to Climate Finance

- Gap between national needs and climate finance under NDCs
- Least Developed Countries receive much less approved funding in per-capita terms from the multilateral climate funds
- Slow rate of approvals
- Failure in securing viability-gap funding

Drishti IAS

➢ **Implications of US Withdrawal:** Vulnerable nations, including **India (which alone faced USD 56 billion in weather-related damages (2019 - 2023))**, face growing uncertainty in climate aid, further straining North-South climate negotiations.

Read more: Loss and Damage Fund

Pelican and Painted Stork

Pelicans and **painted storks** were sighted at the **Indira Gandhi Zoological Park** in Visakhapatnam.

➢ **About Pelicans:** Pelicans (genus Pelecanus) are **large water birds** known for their **long beaks** and **large throat pouches** used for catching fish.

❍ Pelicans are **highly social birds**, living in colonies of hundreds.

❍ They are **carnivores**, primarily eating fish but also consuming **amphibians, crustaceans, insects, birds,** and **small mammals.**

❍ They inhabit **all continents except Antarctica,** preferring **warm coastal and inland waters** like lakes and rivers.

➢ **About Painted Stork (Mycteria Leucocephala):** It is a large bird inhabiting **South and Southeast Asian wetlands**, featuring **bright pink flight feathers**, a white body, and black markings.

❍ They are predominantly **non-migratory** and most make only local movements and are **social in nature**.

❍ **IUCN** Status: Near threatened.

Read More: Siberian Cranes, Flamingos and Great White Pelicans

Bangus Valley

The **Jammu and Kashmir** government aims to promote **Bangus valley** as an **ecotourism destination.**

➢ Bangus Valley is located near the **Line of Control (LoC) in north Kashmir's Kupwara district.**

❍ It consists of two **bowl-shaped valleys**, known as **Bodh Bangus (Big Bangus)** and **Lokut Bangus (Small Bangus).**
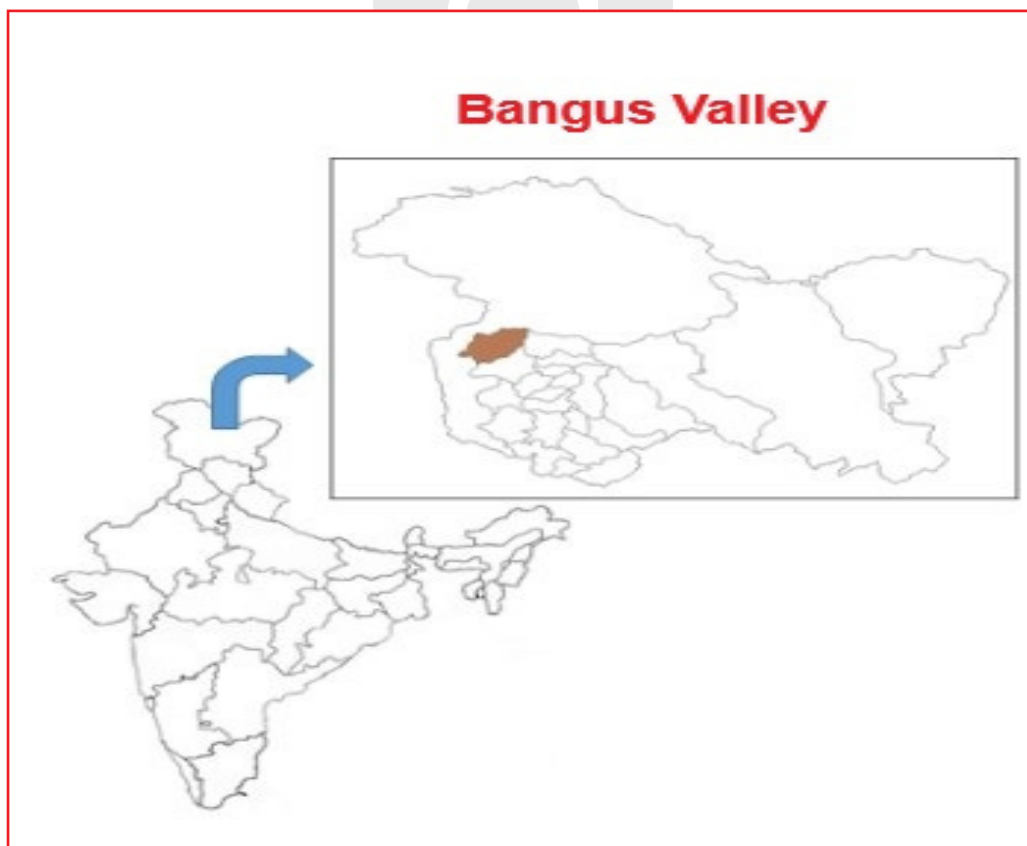
Bangus Valley

- It is surrounded by **Rajwar and Mawar Mountains in the east, Shamasbury and Dajlungun in the west,** and **Chowkibal and Karnah Guli in the north.**
- The landscape includes **grasslands at lower altitudes and dense coniferous forests** (Taiga biome).
- It offers **lush green meadows, low-lying mountains covered with dense forests,** and a serene environment.

Read More: Agritourism in India

Gut Bacteria and Vitiligo

Research suggests that gut-friendly bacteria could play a crucial role in treating vitiligo.

➢ The treatment **suppresses harmful T cells** that attack pigment and boosts **protective regulatory T cells.**

➢ **About Vitiligo: Vitiligo** is a **skin condition** where the skin **loses its pigment (melanin),** leading to **white patches.** It is an autoimmune disorder.

- **Causes:** It results from **melanocytes (pigment-producing cells)** destruction due to autoimmune responses, **genetic mutations,** stress, or environmental triggers.
- **Affected Population:** Vitiligo affects **0.5%–2%** of the global population, with India's prevalence ranging from **0.25% to 4%.**

➢ **About Gut-Friendly Bacteria (Probiotics):** They are **beneficial microorganisms** that help maintain a **healthy gut microbiome.** E.g.,

- **Lactobacillus:** Aids lactose digestion, prevents diarrhea.
- **Bifidobacterium:** Enhances gut health, reduces inflammation, boosts immunity.
- **Saccharomyces Boulardii:** Probiotic yeast that prevents diarrhea, supports gut balance.

Read More: Microbiome Link to Autism

Jan Aushadhi Diwas

Every year, **March 7th is celebrated as Jan Aushadhi Diwas** to raise awareness about affordable generic medicines under the **Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP).**

➢ **Jan Aushadhi Diwas:** Initiated on **7th March 2019,** under the PMBJP. The initiative includes a week-long celebration, **'Janaushadhi Week,'** from 1st-7th March across the nation.

➢ **2025 Theme:** *"Daam Kam - Dawai Uttam,"* emphasizing affordable and high-quality medicines for all.

➢ **PMBJP:** The PMBJP was originally launched in 2008 as the **Jan Aushadhi Scheme** under the **Ministry of Chemicals & Fertilizers** to provide affordable medicines through outlets called **Pradhan Mantri Bhartiya Janaushadhi Kendras (PMBJKs).**

- In 2015, the scheme was revamped as the **Pradhan Mantri Jan Aushadhi Yojana,** and in 2016, it was renamed as the PMBJP**.**

➢ **Features of PMBJP:** Jan Aushadhi Kendras offer **medicines at 50-80% lower prices** than branded alternatives.

- A one-time Rs 2.00 lakh incentive is given to PMBJKs in targeted regions or opened by women, ex-servicemen divyang, a person from SC and ST.
- Suvidha Sanitary Napkins launched in 2019 at Rs 1 per pad, reached 72 crore in sales by January 2025.
- The **Jan Aushadhi SUGAM App** locates nearby Kendras, compares prices, and suggests affordable alternatives.

Read more: Credit Assistance Program for Jan Aushadhi Kendra

Dramatic Performances Act, 1876

Recently, the **Prime Minister,** while highlighting the government's efforts to repeal archaic and obsolete laws, referenced the **Dramatic Performances Act, 1876.**

- This law was among those **enacted by the British to clamp down on the budding Indian nationalist sentiment**.

- **Article 372** of the Constitution **allows pre-independence laws to remain in force,** but colonial laws **lack the presumption of constitutionality,** requiring government defense when challenged.

- **Dramatic Performances Act, 1876,** gave the government (British) powers to "prohibit public dramatic performances which are scandalous, defamatory, seditious or obscene".

  ○ The Act had been declared unconstitutional by the Allahabad **High Court** in *State versus Baboo Lal And Ors Case, 1956*. The law was formally repealed in 2018 as part of the government's exercise to weed out obsolete laws.

- The **Vernacular Press Act, 1878,** and the **sedition law of 1870** were among the harsh laws enacted during this period to **suppress nationalist activities** and stifle opposition to colonial rule.

Read more: Press and Registration of Periodicals Bill, 2023

Empowering Women PRIs Leaders

The **Ministry of Panchayati Raj** has launched the **Sashakt Panchayat-Netri Abhiyan** and **Model Women-Friendly Gram Panchayats (MWFGP)** to advance **gender-sensitive governance** at the grassroots level.

- **Sashakt Panchayat-Netri Abhiyan:** It is a nationwide **capacity-building** initiative aimed at strengthening the leadership skills of **Women Elected Representatives (WERs)** of Panchayati Raj Institutions (PRIs).

  ○ **Objective:** Strengthening leadership, decision-making, and **active participation of WERs** in rural governance.

- **MWFGP:** It aims to establish at least **one Model Women-Friendly Gram Panchayat in each district,** serving as a beacon for gender-sensitive and **girl-friendly governance practices.**

- **Addressing Gender Violence:** A comprehensive **"Primer on Law Addressing Gender Based Violence and Harmful Practices"** for panchayat elected representatives was also introduced.

- Over **1.4 million women** elected in PRIs, with states like **Bihar (50%)** witnessing higher representation **beyond quotas (not less than 33%).**

- The ministry also stressed eliminating **"Mukhiya Pati"** or **"Sarpanch Pati"** culture, ensuring WERs independently exercise authority.

Read More: Issue of Pradhan Pati in Panchayats

Planetary Parade

The **Planetary Parade** is a **rare** celestial event where seven planets- **Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune**, align on one side of the Sun.

- This occurs because **planets orbit** the Sun along a **flat, disc-shaped path** called the ecliptic plane.

- **Occurrence:** Such planetary alignments are **extremely rare**, occurring only once in a few decades. The **next occurrence** is expected in **2040.**

- **Visibility:** Mercury, Venus, Mars, Jupiter, and Saturn can be seen with the **naked eye**, while **Uranus and Neptune** require **telescopes** due to their distance and faintness.
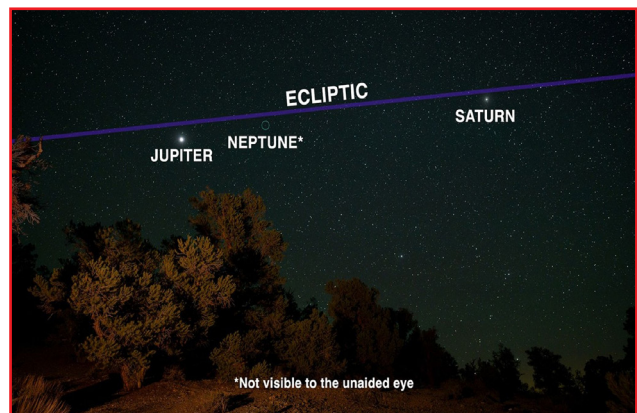
Read More: Rare Planetary Alignment

Endogamy

A study highlights how **endogamy** has contributed to **population-specific genetic diseases and variations in drug metabolism** in India.

➢ **Key Findings of the Study:** Indian communities show higher prevalence of genetic disorders due to inbreeding (breeding of individuals that are closely related genetically).

　○ For example, high incidence of **ankylosing spondylitis** (type of arthritis) found in the Reddy community of Andhra Pradesh.

➢ **Endogamy:** The practice of marrying **within a specific ethnic, cultural, social, religious, or tribal group** to preserve identity, wealth, and traditions, unlike **exogamy**, which involves marrying outside one's social group.

➢ **Negative Impacts of Endogamy:**

　○ **Limited Gene Pool:** Reduced genetic diversity in endogamous groups limits adaptability to changing environmental conditions.

　○ **Social Consequences:** Leads to restrictive societal practices such as **honor killings and rigid caste-based hierarchies.**

Read more: **Consanguinity**

Starlink and Eutelsat

Ukraine's military and civilians rely on **Starlink for communication,** but SpaceX's restrictions on its **use for attack drones** have raised concerns. As a result, **Eutelsat,** a European satellite company, is being considered as an alternative.

➢ **Starlink:** Developed by **SpaceX**, it is a **satellite-based internet service** designed to provide **high-speed, low-latency** connectivity, especially in remote areas.

　○ Starlink's around 7,000 **low-earth orbit (LEO) satellites** form a **mega-constellation**, ensuring global coverage.

　○ India has **not approved Starlink** due to **security, privacy, and pricing concerns**, along with opposition from the **local telecom and satellite industry**.

➢ **Eutelsat:** Eutelsat, Starlink's closest competitor, operates 630 LEO satellites and 35 geostationary satellites, offering speeds up to 150 Mbps.

➢ **India lacks widespread commercial satellite internet**, but the **Telecommunications Act, 2023** provides for the **assignment of spectrum through an administrative process for satellite-based services,** whereas terrestrial spectrum is allocated through auctions.

Read more: **Starlink Project**

Dholavira

The **President of India** visited **Dholavira**, appreciating the technological advancements of the **Harappan civilization.**

➢ **Harappan (Indus Valley) Civilization:**

　○ It was an **urban civilization** that flourished along the **Indus River** from around **3300-1300 BCE.** It was **discovered** by **John Marshall** in the 1920s.

　○ **Major sites of the Harappan civilization** include **Harappa, Mohenjo-daro, Banawali, Dholavira, Lothal, and Ropar.**

➢ **Dholavira:**

　○ It is located in **Kutch (arid island of Khadir), Gujarat,** is a significant archaeological site inhabited from **3000 BCE to 1800 BCE.**

　　● It was discovered by **Jagatpati Joshi** in **1968.**

　○ It is the **fifth-largest site of the Indus Valley Civilization** and lies between two seasonal streams, **Mansar** and **Manhar.**

　○ Archaeological findings include **terracotta pottery, seals, ornaments**, and evidence of **metallurgy.** It was a **trade hub for copper, jewelry, and timber,** with inscriptions in Indus Valley script.

　　● **No human remains** have been found at the site.

　○ Dholavira features a **walled city with a fortified castle**, **middle and lower towns,** and a **cemetery**.

　　● Its **advanced water system** includes **16 reservoirs and step wells**.

○ It was declared a **UNESCO World Heritage Site** in **2021.**

Read More: India's 40th World Heritage Site: Dholavira

Carbon Intensity

Carbon intensity measures the amount of **carbon dioxide (CO_2) emitted per unit of output in a specific sector or economy.** It helps track progress in **reducing emissions** while accounting for economic growth or production levels.

➢ For example, the carbon intensity of the steel sector can be measured as the number of tonnes produced per tonne of CO_2 emitted.

➢ **National Carbon Intensity:** A country's **carbon intensity** is measured by **dividing Gross domestic product (GDP) growth per capita by CO_2 emissions.**

➢ **Significance for India & Climate Goals:** Carbon intensity plays a crucial role in assessing climate commitments under the **Paris Agreement (2015)** and reducing **Emissions Intensity of its GDP by 45% by 2030,** from 2005 level.

○ Carbon intensity supports sustainable economic growth while lowering environmental impact.

CARBON FOOTPRINT

Carbon footprint refers to the total amount of greenhouse gas emissions that are directly or indirectly caused by an individual, organization, or product.

Units: Carbon footprint is usually measured in terms of carbon dioxide equivalent (CO2e), which is a standard unit used to express the total amount of greenhouse gas emissions.

Scope: Carbon footprint measures the impact of our daily activities on the environment.

Impact: Reducing carbon footprint can help to reduce the total amount of greenhouse gas emissions associated with an individual, organization, or product.

Two important concepts in the context of climate change.

By reducing our carbon footprint, we can reduce the overall carbon intensity of the systems and products we use.

Vary between and within countries and are affected by a range of factors such as income, demographics, settlement structures, and lifestyles

Reducing both carbon footprint and carbon intensity is crucial to mitigating the impacts of climate change.

CARBON INTENSITY

Carbon intensity measures the amount of carbon dioxide emitted per unit of economic activity. It is a measure of the efficiency of an economy or a sector in terms of its greenhouse gas emissions.

Units: Carbon intensity is usually measured in terms of tonnes of CO2e per unit of GDP or per unit of energy use.

Scope: Carbon intensity measures the overall efficiency of a system or product. In other words, it considers the larger picture of emissions and looks at ways to reduce them on a larger scale.

Impact: Reducing carbon intensity can help to improve the efficiency of an economy or a sector.

Read more: **India's Carbon Market: A Green Leap Forward**

Colossal A23a Iceberg Stuck

The world's largest iceberg, **Colossal A23a** (3,672 sq. km), is stuck about 70 km from **South Georgia Island**, likely avoiding ecological harm to its wildlife habitats.

➢ A23a **broke** from the **Filchner Ice Shelf (Antarctica) in 1986** and remained stuck in the **Weddell Sea** for over 30 years and started **drifting north in 2020 towards** South Georgia Island.

➢ **Nutrients released** from the iceberg's grounding and melting **may boost marine food availability**, supporting the **regional ecosystem.**

➢ **South Georgia Island**: The **UK** administers South Georgia (also **claimed by Argentina**) as a **British overseas territory.**

➢ **Icebergs: Icebergs** are **large floating masses of freshwater ice** that break off (calve) from **glaciers or ice shelves** and drift in oceans or seas.

   ❍ Since ice is **less dense than water**, **90%** of an iceberg stays submerged, with only the top visible.
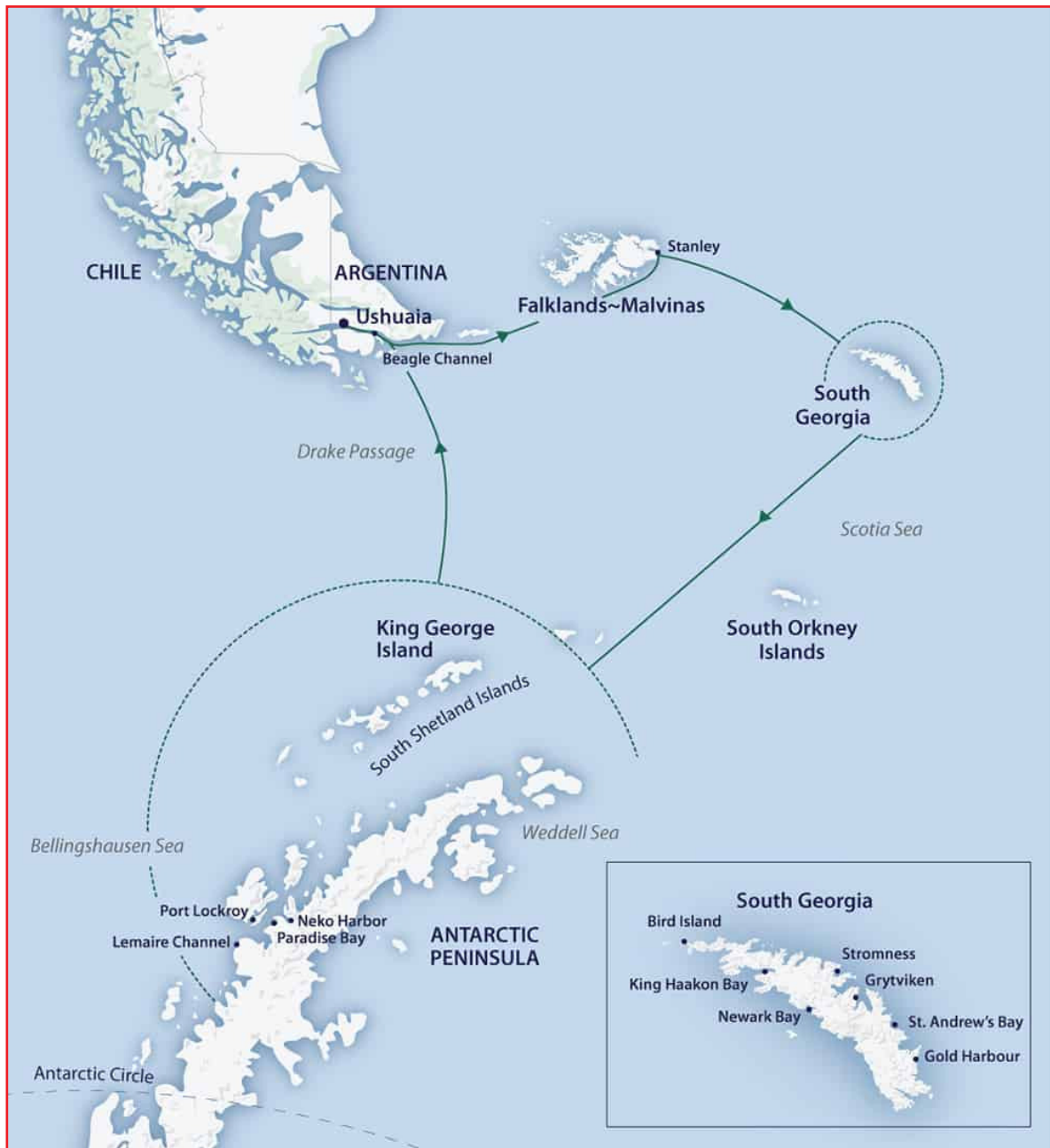
Read More: Iceberg A68a

Taiwan's Geopolitical Significance

The US revised its Taiwan factsheet, omitting **"we do not support Taiwan independence"** and **backing Taiwan's global participation,** drawing Taiwan's support but China's opposition.

➢ **Taiwan Relations Act (1979):** Promotes US-Taiwan ties, ensuring trade, cultural exchange, and defensive arms sales despite Beijing's objections.

➢ **Significance of Taiwan:** Taiwan located in the <u>East China Sea,</u> is crucial for regional trade, with the **Taiwan Strait** being a key global shipping route.

  ○ Additionally, Taiwan manufactures over **60% of the world's <u>semiconductors</u>** and around 90% of the most advanced chips, making it a critical player in the global tech supply chain.

➢ **China and Taiwan:** China follows the **One China Policy**, asserting that **Taiwan is an inseparable part of China** and must eventually reunite.

  ○ However, Taiwan sees itself as a **self-governing democracy** with its own constitution and elected leaders.

➢ **India's Stand One China Policy:** India follows the One China Policy, in 2003 India signed a joint declaration with China recognizing **Tibet Autonomous Region as part of the territory of China.**

Read more: <u>China-Taiwan Conflict</u>

Crop Contingency Plan for Kashmir

The **Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST)** has devised a **Crop Contingency Plan** to tackle the **drought-like conditions** expected in Kashmir due to **an 80% rainfall deficit** in winter 2024.

➢ **Key Components of Crop Contingency Plan:**

○ **Alternative Crop Promotion**: Instead of water-intensive rice, SKUAST promotes **drought-resistant maize hybrids (SMC-8, SMH-5) and pulses**, which require less water.

● Recommends heat-tolerant crops like **cowpea**, which can withstand dry conditions.

○ **Water Conservation Strategies:**

● **Mulching**: Covering topsoil with organic materials to **retain moisture and improve soil health**.

● **Micro-Irrigation**: Encourages **drip irrigation** and **mist sprayers** for optimal water use.

■ Recommends **micro-sprinkler systems and organic soil amendments** to sustain vegetable farming.

● **Anti-Transpirant Agents**: Applying chemicals to **reduce water loss from plants (Transpiration).**

○ **Resilient Farming Practices:** Recommends the use of **growth regulator sprays** to prevent early blooming and anti-transpirants in fruit crops to conserve moisture.

○ **Pest Control:** Rising temperatures have made pests like **aphids and leaf miner blotch** more invasive. SKUAST is **issuing advisories on chemical pest control measures.**

Read more: Climate Resilient Agriculture

Blue Ghost Mission 1

A US company, **Firefly Aerospace**, successfully landed its **Blue Ghost Mission 1** on the Moon, marking the **2ⁿᵈ private lunar landing** and the **1ˢᵗ to land upright.**

➢ The mission is nicknamed **"Ghost Riders in the Sky",** and was launched in **January, 2025**, aboard a **SpaceX Falcon 9 rocket**.

➢ It landed (lander name: **Golden**) near **Mons Latreille**, a volcanic formation on the Moon's **northeastern near side**.

➢ It is part of NASA's collaboration with industry to **reduce costs and support the Artemis Program,** the mission to return **astronauts to the Moon**.

➢ **Upcoming Lunar Missions:**

○ **IM-2 mission:** Intuitive Machines' IM-2 mission, featuring its lander **Athena,** will be launched in **March 2025.**

● In February 2024, Intuitive Machines became the **first private company** to achieve a **soft lunar landing** and the first US landing since **Apollo 17** in 1972.

○ **NASA's CLPS Program:** The US aims to establish **routine private lunar missions** through NASA's USD **Commercial Lunar Payload Services (CLPS) program.**

Read More: Challenges in Lunar Landing Missions

Narwhals

Scientists have recorded **narwhals (often referred as Sea unicorns)** using their **tusks for hunting** for the first time, offering key behavioral insights and adaptation in a **warming Arctic.**

➢ **About Narwhals (*Monodon monoceros*):** They are **medium-sized toothed whales** found in the **deep Arctic waters**.

○ **Physical Features:** Males have long, spiral **tusk (up to 3m)**, which is an **elongated upper left tooth.**

● It is **different** from all other toothed **whales** in that it has **no teeth in its mouth.**

● Some narwhals have up to **two tusks**, while others have **none**.

● They use their tusks to **stun and manipulate prey**, especially **Arctic char,** and competition for mates.

- ○ **IUCN Status:** Least Concern.
- ○ **Social Behavior:** Highly **social species**, found in **pods of 2-25 individuals.**
- ○ **Migration:** Unlike some whales, **narwhals do not migrate long distances.**
- ○ **Diet:** Feed on **Greenland halibut, Arctic and polar cod, squid, and shrimp.**

Read More: Arctic Warming

SPHEREx Mission

NASA is set to launch **SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer) space telescope** to study the early universe, explore the **universe's origins** and **trace the formation of life.**

SPHEREx Mission

➢ SPHEREx will map **450 million galaxies** over 2 years, creating a **3D sky map in 102 color bands (wavelengths of light)** using **spectroscopy**.
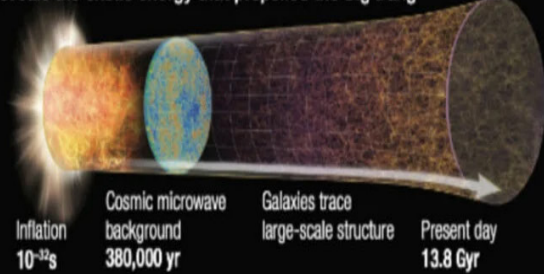- ○ **Spectroscopy** is the study of the **absorption and emission of light** and **other radiation** by matter.

➢ It will study **cosmic inflation**, the rapid expansion of the universe after the **Big Bang (13.8 billion years ago)**, and analyze **molecular clouds** to detect **water, carbon dioxide, and carbon monoxide**.

➢ It will measure the **collective glow of light** from intergalactic space to identify unknown cosmic phenomena.

➢ The **Big Bang Theory** explains the universe's origin as a singular, hot, and dense point that expanded around **13.8 billion years ago**, leading to its continuous expansion.

SPHERE^x Addresses NASA's Three Core Astrophysics Goals

Read More: Space Missions in 2024

Oscars Awards 2025

The **97th Oscars Awards** (**Academy Awards**) were held in **Los Angeles**. Film **'Anora'** by Sean Baker secured the most 5 Oscars including **Best Film, Best Director, Best Actress, Best Original Screenplay,** and **Best Film Editing.**

THE 97th ACADEMY AWARDS 2025

and the Oscar goes to...

Best Picture
Anora

Director
Sean Baker, Anora

Actor
Adrien Brody, The Brutalist

Actress
Mikey Madison, Anora

Supporting Actor
Kieran Culkin, A Real Pain

Supporting Actress
Zoe Saldaña, Emilia Pérez

Animated Feature Film
Flow

Animated Short Film
In the Shadow of the Cypress

International Feature Film
I'm Still Here (Brazil)

Original Screenplay
Anora, Sean Baker

Adapted Screenplay
Conclave, Peter Straughan

Production Design
Wicked

Cinematography
The Brutalist, Lol Crawley

Costume Design
Wicked, Paul Tazewell

Film Editing
Anora, Sean Baker

Documentary Feature Film
No Other Land

Documentary Short Film
The Only Girl in the Orchestra

Original Score
The Brutalist, Daniel Blumberg

Original Song
El Mal, from Emilia Pérez

Makeup and Hairstyling
The Substance

Live Action Short Film
I'm Not a Robot

Sound
Dune: Part Two

Visual Effects
Dune: Part Two

KBK Infographics

About Oscar Awards

➤ The **Awards** were established in **1929** are **prestigious annual honors** recognizing excellence in the global film industry.

➤ They are presented by the **Academy of Motion Picture Arts and Sciences (AMPAS)**, a professional organization with over **9,000 members**.

○ The ceremony is traditionally held in **late February or early March**.

A Brief History of Indian Oscar Triumphs

Indian winners at the Academy Awards

Best Costume Design
Bhanu Athaiya
"Gandhi"
1983

Best Documentary (Short Subject)
Guneet Monga
"Period. End of Sentence."
2019

Best Sound Mixing
Resul Pookutty
"Slumdog Millionaire"
2009

Best Documentary (Short Subject)
Kartiki Gonsalves, Guneet Monga
"The Elephant Whisperers"
2023

Best Original Song (Jai Ho)
A.R. Rahman, Gulzar
"Slumdog Millionaire"
2009

Best Original Song (Naatu Naatu)
M.M. Keeravani, Chandrabose
"RRR"
2023

Best Original Score
A.R. Rahman
"Slumdog Millionaire"
2009

Excluding honorary awards and awards for technical achievements
Source: The Academy of Motion Picture Arts and Sciences

statista

India's Exploration of Critical Minerals

India is **expanding global partnerships** in **Africa, South America, and Australia** to secure **critical minerals**.

➢ The government has allocated **Rs 4,000 crore** for **domestic and international mineral exploration** under the **National Critical Minerals Mission.**

Key Highlights:

➢ India secured **9,000 sq km in Zambia** for **copper-cobalt exploration**, led by **Geological Survey of India (GSI)**, with mining rights expected in **2-3 years.**

○ **Zambia** ranks **7th in copper** and **14th in cobalt production** (2023) with existing investments by Canada and China.

➢ India is engaging with **Democratic Republic of the Congo, Tanzania, Mozambique, and Rwanda** to acquire **critical mineral assets**.

➢ India is already active in **South America (Argentina, Chile)** and **Australia**, where **Khanij Bidesh India Ltd (KABIL)** is exploring **lithium and cobalt assets**.

Critical minerals are minerals that are vital to a country's economy and national interest.

➢ India has identified **30 key minerals**, including **lithium, cobalt, graphite, nickel,** and **rare earth elements (REEs).**

Read More: National Critical Mineral Mission, India's Critical Minerals Roadmap .

Morarji Desai

Lok Sabha Speaker paid tributes to **Morarji Desai,** former Prime Minister of India, on his birth anniversary.

➢ **About Morarji Desai:** He was born on **29th February 1896** and served as the **4th Prime Minister** of India (1977 to 1979) during the **6th Lok Sabha**.
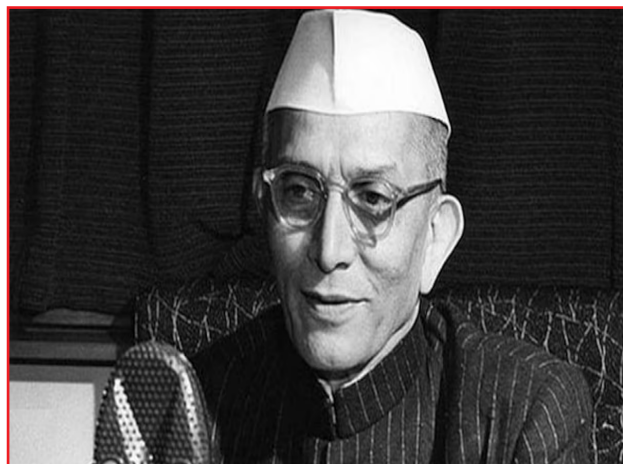
○ **Role in Freedom Struggle:** He resigned as **Deputy Collector in 1930** after 12 years in British service to join India's independence movement.

● He was detained during **Individual Satyagraha (1941)** and arrested during **Quit India Movement (1942)**.

○ **Post Independence:** He became **Commerce and Industry Minister** in 1956, and took over the **Finance portfolio** in 1958.

● He resigned from the **Union Cabinet** under the **Kamaraj Plan (1963)** that urged the **senior Congress leaders** holding government positions to **voluntarily resign** to focus on **grassroots strengthening**.

● He was appointed **Chairman of the 1st Administrative Reforms Commission (1966)** to restructure the government administration.

● He led the **Janata Party** to a landslide victory in the **1977 Lok sabha elections** and became **Prime Minister**. During his tenure, the **44th Amendment Act, 1978** was enacted to uphold the rule of law.

Read More: Shri Morarji Desai Birth Anniversary

Aditya-L1 Mission Captures Solar Flare

The **Aditya-L1 mission** has captured the **first-ever image of a solar flare** '**kernel**' in the lower solar atmosphere using the **Solar Ultraviolet Imaging Telescope (SUIT) payload**.

➢ **Solar Observation:** SUIT detected an **X6.3-class solar flare**, one of the most intense solar eruptions, in the **Near Ultraviolet (NUV) wavelength (200-400 nm)**.

➢ **Solar Flares:** Solar flares are massive explosions on the Sun's atmosphere that release **energy, light, and high-speed particles** into space, often linked to **coronal mass ejections (CMEs).**

○ Solar flares are classified into **A, B, C, M, and X categories**, with each class increasing 10-fold in energy. **X-class flares are the most powerful.**

➢ **Aditya-L1:** It is India's first **space-based solar observatory**, designed to study the Sun from the **Lagrange Point 1 (L1)** in a halo orbit. This is ISRO's second astronomy observatory-class mission after **AstroSat (2015).**

drishti

ADITYA–L1 MISSION

ABOUT
- India's 1st scientific expedition to study the Sun
- To be placed at halo orbit around **L1 Lagrange point**
- Launch date - 02 Sept, 2023
- Time to reach - **4 months**; Mission Life - **5 years**

FIELDS OF STUDY:
- **Sun's corona** (Visible and Near-infrared rays), **photosphere** (soft and hard X-ray) and **chromosphere** (UV)
- Solar emissions, solar winds and flares and **Coronal Mass Ejections** (CMEs)
- Carry out round-the-clock imaging of Sun

SIGNIFICANCE
- Solar weather/environment affects the weather of entire solar system
- Solar events help **understand space weather**
- **Tracking Earth-directed storms** can help predict their impact
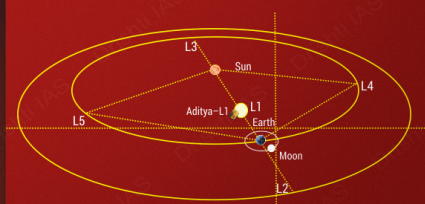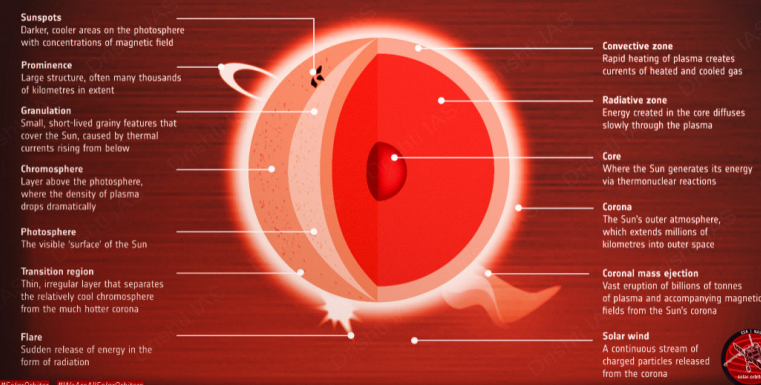
LAUNCH VEHICLE
- PSLV-C57

PAYLOADS:
- Visible Line Emission Coronagraph (**VLEC**) (primary payload)
- Solar Ultraviolet Imaging Telescope (**SUIT**)
- Solar Low Energy X-ray Spectrometer (**SoLEXS**)
- Aditya Solar wind Particle Experiment (**ASPEX**)
- High Energy L1 Orbiting X-ray Spectrometer (**HEL1OS**)
- Plasma Analyser Package for Aditya (**PAPA**)
- Advanced Tri-axial High Resolution Digital Magnetometers

What are Lagrange Points?
- Named after Italian-French mathematician Josephy-Louis Lagrange
- Positions in space where gravitational forces of a two-body system (e.g. Sun & Earth) produce enhanced regions of attraction and repulsion
- Spacecrafts placed at L points consume lower fuel to remain in position
- L1 will provide ISRO continuous view of Sun without any occultation/ eclipses

ANATOMY OF THE SUN

Sunspots Darker, cooler areas on the photosphere with concentrations of magnetic field

Prominence Large structure, often many thousands of kilometres in extent

Granulation Small, short-lived grainy features that cover the Sun, caused by thermal currents rising from below

Chromosphere Layer above the photosphere, where the density of plasma drops dramatically

Photosphere The visible 'surface' of the Sun

Transition region Thin, irregular layer that separates the relatively cool chromosphere from the much hotter corona

Flare Sudden release of energy in the form of radiation

Convective zone Rapid heating of plasma creates currents of heated and cooled gas

Radiative zone Energy created in the core diffuses slowly through the plasma

Core Where the Sun generates its energy via thermonuclear reactions

Corona The Sun's outer atmosphere, which extends millions of kilometres into outer space

Coronal mass ejection Vast eruption of billions of tonnes of plasma and accompanying magnetic fields from the Sun's corona

Solar wind A continuous stream of charged particles released from the corona

Illustration of all five Lagrange points of Sun–Earth System. Aditya– L1 will be placed around Largrange point 1

#SolarOrbiter #WeAreAllSolarOrbiters

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Read more: Aditya-L1 Mission, Solar Coronal Holes

State of India's Digital Economy Report 2025

A **State of India's Digital Economy (SIDE) Report, 2025**, report by **Indian Council for Research on International Economic Relations (ICRIER)** highlights that while **India is the 3rd- largest global economy,** it ranks only **28th in digital user spending,** reflecting a gap in per capita digital adoption.

➢ The report uses the **Connect-Harness-Innovate-Protect-Sustain (CHIPS) framework** to measure digitalisation, focusing on **technological, economic, and societal factors**.

- ➤ **Key Findings:**
  - ○ **Rapid Digital Growth**: India's **digital economy is growing twice as fast** as its overall economy and is projected to contribute **20% of GDP by 2029**.
  - ○ **Internet vs. Digital Spending**: While India has **strong internet penetration**, actual digital spending remains **lower than global standards**, highlighting an economic participation gap.
  - ○ **India's AI Positioning:** India is 11th in AI research and 16th in AI infrastructure.
    - The **US, China, South Korea, Singapore, and the Netherlands** lead in AI innovation.
    - When considering both economic size and digital user economy, India ranks 8th globally.
- ➤ **ICRIER:** It is an **independent** Indian think tank, providing policy research on **economic growth, trade, digital economy, and climate change** to support India's development.

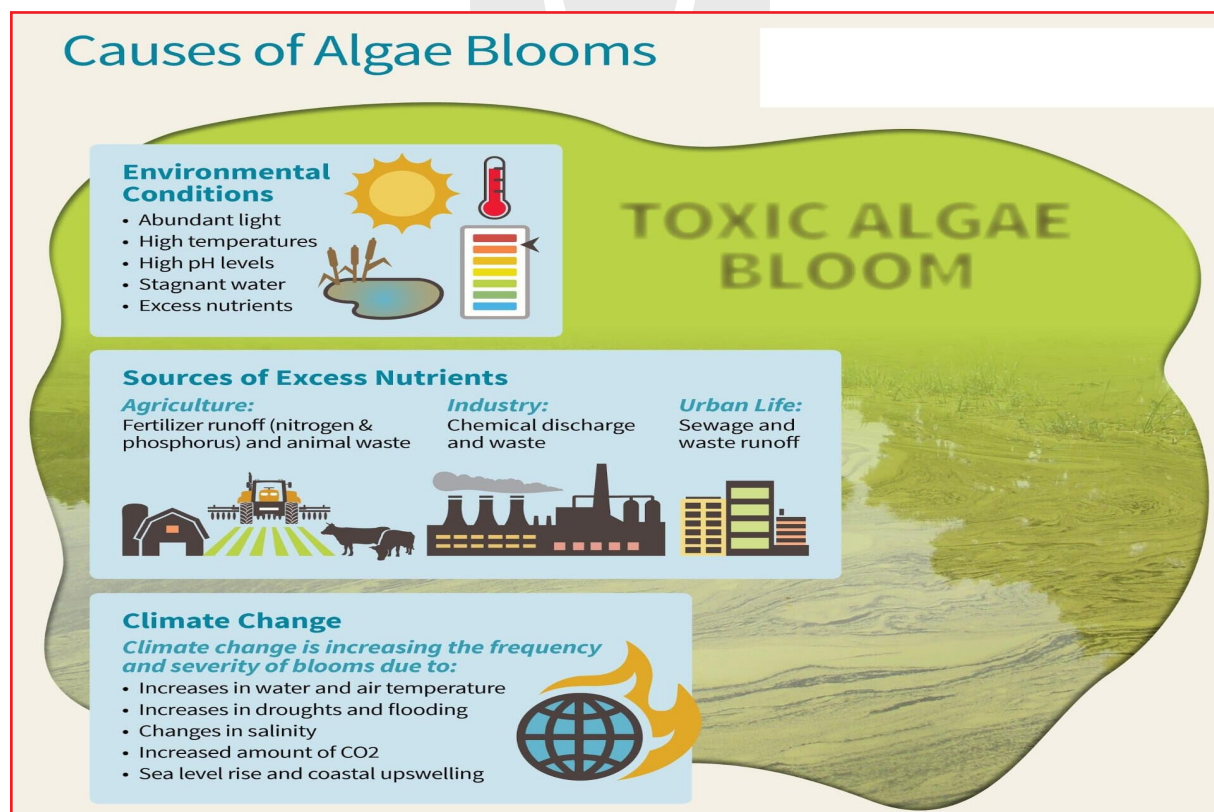> **Read more:** [Navigating India's Digital Growth](#)

Algal Blooms in River Thames

A study has revealed that [climate change](#) is increasing the risk of [algal blooms](#) in the [River Thames (England)](#) despite an **80% reduction in phosphorus loads** over four decades.

- ➤ An **algal bloom** is the **overgrowth of microscopic algae** or algae-like bacteria in **fresh, salt, or brackish waters.**

Key Findings

- ➤ **Rising river temperature** is driving the growth of **spring diatom blooms** and **summer [cyanobacterial](#) (blue-green algae) blooms**, which **deplete oxygen**, harm aquatic life, and increase drinking water treatment costs.
  - ○ **Algal blooms** also restrict **recreational activities** like fishing and swimming.

Causes of Algae Blooms

TOXIC ALGAE BLOOM

Environmental Conditions
- Abundant light
- High temperatures
- High pH levels
- Stagnant water
- Excess nutrients

Sources of Excess Nutrients

Agriculture: Fertilizer runoff (nitrogen & phosphorus) and animal waste

Industry: Chemical discharge and waste

Urban Life: Sewage and waste runoff

Climate Change
Climate change is increasing the frequency and severity of blooms due to:
- Increases in water and air temperature
- Increases in droughts and flooding
- Changes in salinity
- Increased amount of CO2
- Sea level rise and coastal upswelling

- Despite an **80% reduction** in **phosphorus** since 1985, its concentration remains **above safe limits**, sustaining **algal growth.**
  - **Excess nitrogen and phosphorus block sunlight** and deplete oxygen, threatening marine ecosystems.

River Thames

- It is **346 km** long **(Longest in England**, second longest in the UK after **River Severn)**.
- It originates from **Thames Head, Gloucestershire**, and drains into the **North Sea via the Thames Estuary**, with **Nore sandbank** at its mouth.
  - **London is on the bank of Thames**.
- It supplies **two-thirds of London's drinking water** and has been a **vital trade route**.

Read More: Red Tide, Plankton Crash

Red Color of Mars

The study, based on data from several space missions and ground-level observations, suggests that **Mars' red color is primarily due to Ferrihydrite—a water-formed iron oxide—rather than the previously assumed Hematite.**

- **Ferrihydrite forms in cool, water-rich conditions**, whereas **hematite forms in dry, warm conditions.**
  - It suggests that **Mars once had liquid water,** potentially supporting life. Additionally, **the study revealed hydrogen bound to iron-rich minerals**, further indicating past interactions with liquid water on Mars.

Mars: Mars is the **4th planet from the Sun** and the **second-smallest in the Solar System after Mercury.**

➢ About **half Earth's size**, it hosts **Olympus Mons (largest volcano)**, and has 2 moons (Phobos and Deimos**).**

➢ Mars **completes a rotation every 24.6 hours**, making its day **nearly identical in length to Earth's (23.9 hours)**. Martian days are called **sols.**

    ○ A year on Mars lasts **669.6 sols,** which is the same as **687 Earth days**.

➢ Its axis is tilted at **25 degrees** relative to its orbit, similar to **Earth's axial tilt of 23.4 degrees**.

    ○ Mars experiences **seasons like Earth,** but they are l**onger in duration.**

➢ **Important Mars Missions:**

    ○ **NASA's Mars Mission**, **India's MOM**, **UAE's Hope**

    ○ **Tianwen-1: China's Mars Mission**
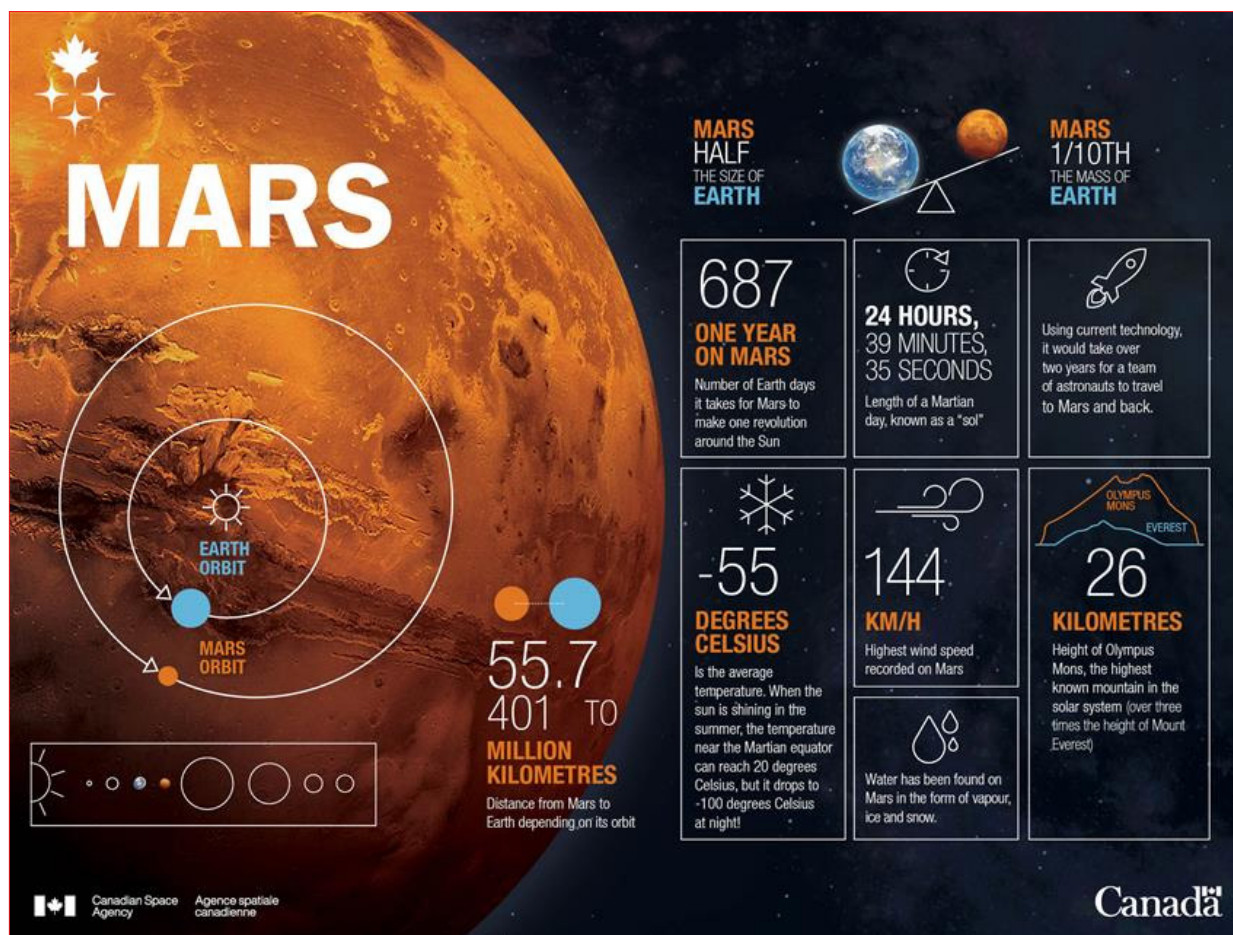
Read More: NASA's Mars Sample Return Program

CPI for Agricultural and Rural Labourers

The **Labour Bureau**, Ministry of Labour & Employment has released the **All-India Consumer Price Index for Agricultural Labourers (CPI-AL)** and **Rural Labourers (CPI-RL)**.

➢ The **CPI-AL and CPI-RL series** is presently compiled **monthly for 20 states and at the All-India level**.

- It recorded **inflation rates of 4.61% and 4.73% in January 2025** respectively, marking a **notable decline**, indicating reduced price pressures on essential goods and services in rural India.
- **CPI-AL:** It measures changes in **cost-of-living** for **rural agricultural laborers** and is used to adjust **minimum wages** for agricultural workers across different states.
  - CPI(AL) is a **subset of CPI(RL)**.
- **CPI-RL:** It measures the changes in the cost of living for **rural laborers**.
  - The base year for both CPI-AL and CPI-RL is **1986-87**.
    - The base year is a **reference point** for **comparing** statistical changes over time. E.g., **GDP, inflation** etc.

INFLATION AND RELATED TERMS

INFLATION
- Rise in goods/services prices; corresponding decline in purchasing power
  - Creeping Inflation: Mild/moderate inflation where price level persistently rises over a period of time at a mild rate (single digit inflation rate)
  - Galloping Inflation: Occurs when mild inflation is not checked/controlled (inflation in double/triple digits – 20/100/ 200% annually)
  - Hyperinflation: Prices rise a million or even a trillion percent annually (witnessed by Germany in 1920s)

CORE INFLATION
- Change in costs of goods/services but excluding those from food/energy sectors (due to price volatility)

HEADLINE INFLATION
- Headline Inflation – Change in value of all goods in the basket (including food and energy)

Core = Headline – Food & fuel items

STAGFLATION
- When Inflation, unemployment and economic stagnation /recession occur simultaneously; most difficult type of inflation to manage
  - Witnessed by developed countries in the 1970s (US, UK) when world oil prices rose dramatically

DEFLATION
- Reverse of inflation – a sustained decline in price of goods/services
  - Here, annual inflation rate falls below 0% resulting in an increase in the real value of money (Japan suffered for almost a decade in 1990s)
  - Can worsen into recession/depression; hence, more dangerous than inflation

DISINFLATION
- When inflation rate decelerates
  - Implies that prices are rising (inflation is happening) but at a slower rate each passing month

Deflation is decline in prices, whereas disinflation is a decline in inflation rate

Inflation V/s Disinflation V/s Deflation

REFLATION
- Typically follows deflation
  - Policymakers try to stimulate economic activity by producing inflation (more govt spending, reduced interest rates etc.)

SKEWFLATION
- Skewness of inflation among different sectors of the economy – some sectors facing huge inflation while some none and some even deflation

GREEDFLATION
- Where (corporate) greed is fuelling inflation; companies increasing their prices beyond just covering costs to maximise profits

SHRINKFLATION
- Hidden form of inflation; often leads to customer frustration/dissatisfaction
  - Practice of reducing the size of a product while maintaining its sticker price

2 liters → Shrinkflation → 1.75 liters
$5 — $5

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Read More: Consumer Price Index for Industrial Workers

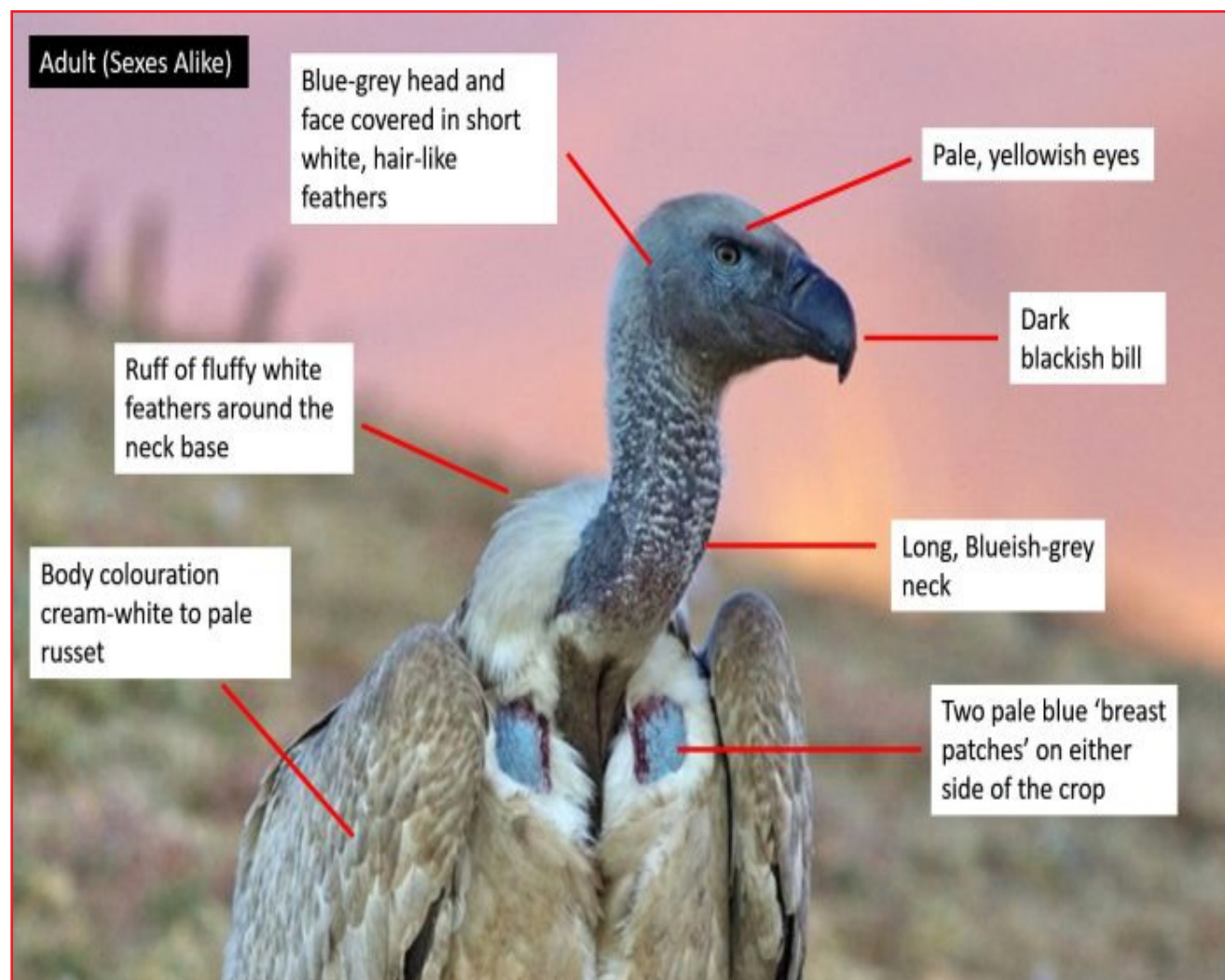drishti

Cape Vultures Spotted in South Africa

After 30 years, the **Cape Vulture (Gyps coprotheres)** has been sighted in South Africa's Eastern Cape province near Mountain Zebra National Park.

➢ **About Cape Vulture:** It is **exclusive to Southern Africa** and found in **South Africa, Lesotho, Botswana, and Mozambique**.

　❍ It has **creamy-buff plumage** with dark flight and tail feathers, **honey-colored eyes, a bluish throat,** and a black bill.

Adult (Sexes Alike)

Blue-grey head and face covered in short white, hair-like feathers

Pale, yellowish eyes

Dark blackish bill

Ruff of fluffy white feathers around the neck base

Long, Blueish-grey neck

Body colouration cream-white to pale russet

Two pale blue 'breast patches' on either side of the crop

　❍ It feeds only on **carrion, lives in groups**, and is monogamous i.e., **raising one chick per season.**

　❍ It is listed as **vulnerable** in the **IUCN** Red list.

　❍ **Only three species are exclusive to Africa** i.e., White-headed Vulture, Hooded Vulture, and Cape Vulture.

➢ **Global Vulture Distribution: 23 species** are found worldwide, divided into:

　❍ **Old World vultures (16 species, found in Africa, Europe, Asia)**

　❍ **New World vultures (7 species, found in the Americas and Caribbean).**

Himalayan Griffon Vulture

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Scientific Name: Gyps Himalayensis

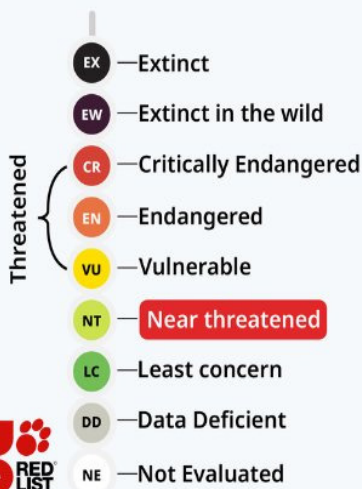**Family Accipitridae which also includes**

- Eagles
- Kites
- Buzzards
- Hawks

🦅 It has a typical bald white head, very broad wings, and short tail feathers.

🦅 It has a white neck ruff and yellow bill, and the whitish body with dark brown greater vcovert feathers.

EX	—Extinct
EW	—Extinct in the wild
CR	—Critically Endangered
EN	—Endangered
VU	—Vulnerable
NT	—Near threatened
LC	—Least concern
DD	—Data Deficient
NE	—Not Evaluated

Threatened { CR, EN, VU }

RED LIST

Distribution Range:
An Old-World vulture

They are found in the higher regions of the **Himalayas, Central Asian mountains** and the Tibetan plateau at an elevation range of 1,200 – 5,500 metres.

Kazakhstan
Mongolia
Uzbek
Kyrgyzstan
Tajikistan
Iran
China
Afghan
Nepal
Pakistan
Bhutan
India

Read More: Vultures at Risk in Protected Areas

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