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**Current  
Affairs  
(CONSOLIDATION)**

**APRIL 2024  
(PART – I)**

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# Polity and Governance

## Highlights

- Curative Petition
- First General Election 1951-52
- Right to Privacy for Election Candidate
- SC Concerned by Growing States' Appeals Against Centre
- Expanding the OCI Card Scheme
- Voter Verified Paper Audit Trail (VVPAT)
- District Election Management Plan
- Constitutional Morality
- Preventive Detention
- Authority of High Court Benches
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- Internet Freedom
- Debate on Post-Retirement Appointments for Judges
- SC Halts Implementation of Amended IT Rules
- Asia Development Outlook Report 2024

## Curative Petition

### Why in News?

In a significant move, the **Supreme Court of India** has exercised its “extraordinary powers” through a **curative petition** to overturn its previous judgement from 2021.

- This judgement overturns an arbitral award of nearly Rs 8,000 crore that the **Delhi Metro Rail Corporation (DMRC)** was ordered to pay to **Delhi Airport Metro Express Private Limited (DAMEPL)**, led by Reliance Infrastructure Ltd-consortium.

### What is Delhi Metro Rail Corporation Ltd. v Delhi Airport Metro Express Pvt. Ltd. Case, 2024?

#### ➤ Background:

- In 2008, the DMRC partnered with DAMEPL to construct, operate, and maintain the Delhi Airport Metro Express.
- Disputes led to the termination of the agreement by DAMEPL in 2013, citing safety concerns and operational issues.
- Legal battles ensued, resulting in an arbitration panel ruling in favour of DAMEPL, ordering DMRC to pay nearly Rs 8,000 crore. However, the Delhi High Court directed DMRC to deposit 75% of the amount in an escrow account. The government appealed, and in 2019, the High Court’s decision was overturned in favour of DMRC.
- DAMEPL then approached the Supreme Court, which initially upheld the arbitral award in 2021.

#### ➤ Judgement:

- Recent judgement of the **SC ruled in favour of DMRC, citing a “fundamental error” in its previous judgement.**
- The SC’s decision is **significant as it highlights the importance of curative petitions**, provides clarity on legal frameworks for **public-private partnerships** in infrastructure projects, and demonstrates the court’s willingness to correct errors and ensure justice, even years after a final verdict.

### What is a Curative Petition?

- **Definition:** A curative petition is a legal recourse available after the dismissal of a review plea against a final conviction.
  - Constitutionally, a final ruling of the Supreme Court can typically be challenged only through a review petition, and even then, only on narrow procedural grounds.
    - However, the curative petition serves as a sparingly used judicial innovation to **rectify a grave miscarriage of justice.**

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- **Objective:** It aims to prevent **miscarriage of justice and deter abuse of the legal process.**
- **Decision Process:** Curative petitions are typically decided by judges in chambers, though **open-court hearings** may be granted upon specific request.
- **Legal Basis:** Principles governing curative petitions were established by the Supreme Court in the case of ***Rupa Ashok Hurra Vs Ashok Hurra & another Case, 2002.***
- **Criteria for Entertaining a Curative Petition:**
  - **Violation of Natural Justice:** It must be demonstrated that there was a **breach of principles of natural justice**, such as the petitioner not being heard before the court passed an order.
  - **Apprehension of Bias:** It may be admitted if there are grounds to suspect bias on the part of the judge, such as failure to disclose relevant facts.
- **Guidelines for Filing a Curative Petition:**
  - **Certification by Senior Advocate:** The petition must be accompanied by a certification from a senior advocate, highlighting substantial grounds for its consideration.
  - **Initial Review:** It is first circulated to a bench comprising the three senior-most judges, along with the judges who passed the original judgement, if available.
  - **Hearing:** Only if a majority of the judges deem it necessary for a hearing, it is listed for consideration, preferably before the same bench that passed the initial judgement.
- **Role of Amicus Curiae:** The bench may appoint a senior counsel to assist as **amicus curiae at any stage of the consideration of the curative petition.**
- **Cost Implications:** If the bench determines that the petition lacks merit and is vexatious, it may impose exemplary costs on the petitioner.
- **Judicial Discretion:** The Supreme Court emphasises that curative petitions **should be rare and reviewed with caution to maintain the integrity of the judicial process.**

#### Other Cases Related to Curative Petition

- ***Union of India v Union Carbide Case (Bhopal Gas Tragedy):***
  - The Union Govt. filed a curative petition in 2010 for more compensation for the Bhopal Gas Tragedy victims. In 2023, a 5-judge Bench rejected the petition, stating that the **previously decided compensation was sufficient.**

- The Bench emphasised that a **curative petition can only be entertained in cases of gross miscarriage of justice, fraud, or suppression of material facts**, none of which were present in this case.

#### ➤ ***Navneet Kaur v State of NCT of Delhi Case, 2014:***

- This case marked a shift in capital punishment cases. The petitioner, sentenced to death, successfully argued through a curative petition that **mental illness and an unreasonably long wait for a mercy petition** constituted grounds for commuting the sentence to life imprisonment.

### What are the Special Powers of the Supreme Court of India?

- **Dispute Resolution:** **Article 131 of the Indian Constitution** gives the Supreme Court exclusive original jurisdiction in disputes between the **Government of India and one or more States, or between States themselves**, involving legal rights.
- **Discretionary Jurisdiction:** **Article 136** of the Indian Constitution grants the Supreme Court the power to **grant special leave to appeal** from any judgement, decree, or order made by any court or tribunal in India.
  - This power does **not apply to military tribunals and court-martials.**
- **Advisory Jurisdiction:** The Supreme Court has **advisory jurisdiction under Article 143** of the Constitution, where the President of India can refer specific matters to the Court for its opinion.
- **Contempt Proceedings:** Under **Articles 129 and 142** of the Constitution, the Supreme Court has the authority to punish for **contempt of court**, including contempt of itself, either **suo motu** or petition by the **Attorney General**, Solicitor General, or any individual.
- **Review and Curative Powers:**
  - Article 145 gives the Supreme Court authority, with the **President's approval**, to **make rules for regulating the practice and procedure of the Court**, including rules for persons practising before the Court, hearing appeals, enforcing rights, and entertaining appeals.
  - It also includes rules for reviewing judgments, determining costs, granting bail, staying proceedings, and conducting inquiries.

Note:

## First General Election 1951-52

### Why in News?

As India gears up for the **2024 general election**, the historic importance of the **country's first Lok Sabha election in 1951-52** is gaining attention. This inaugural election was a pivotal moment in **India's democratic evolution**.

### What are the Key Facts About India's First General Elections?

- **Historic Vote:**
  - Independent India's first general elections were held between 25<sup>th</sup> October 1951 and 21<sup>st</sup> February 1952. It was a humongous exercise in which a **sixth of the world's population was going to vote**, making it the largest election conducted in the world at the time.
    - Ultimately, 17.32 crore voters from across the country (excluding Jammu and Kashmir) were enrolled, and **45% were women**.
  - This was the first time such a massive exercise of universal adult franchise was undertaken, with **176 million electors above the age of 21 (the voting age was brought to 18 only in 1989, the Constitution (Sixty-first Amendment) Act, 1989)**, of whom 82% were unlettered.
- **Legal Framework:**
  - The Parliament enacted the **Representation of the People Acts of 1950 and 1951** laying down the groundwork for voter qualifications, election machinery, and other electoral processes.
  - The **Election Commission of India (ECI)** was set up in January, 1950, with **Sukumar Sen as the Chief Election Commissioner**.
- **Election Machinery:**
  - **Coloured ballot boxes and ballot papers the size of a Re 1 currency note** were used to aid the largely illiterate electorate.
    - **In 1951, India's low literacy rate of 18.33%** led to the idea of using different coloured ballot boxes for each candidate, but this was deemed impractical. Instead, it was decided to

use separate ballot boxes for each candidate at all booths, with the candidate's election symbol on it.

- The **ballot papers pink in color**, with "Election Commission India" and a serial number with two letters denoting the state - HY for Hyderabad State, BR for Bihar, AS for Assam, etc.

### ➤ Political Landscape and Party Participation:

- There were **53 political parties, of which 14 were national**. These included the Indian National Congress, the Communist Party of India, the Socialist Party, the Kisan Mazdoor Praja Party, and Akhil Bharatiya Hindu Mahasabha, among others.

### ➤ Election Outcome:

- The **Indian National Congress**, led by Jawaharlal Nehru, **emerged as the dominant political force**, securing 318 out of 489 Lok Sabha seats, consolidating its position as the ruling party.
  - The **Communist Party of India (CPI) emerged as the runner-up** in the first Lok Sabha election, followed by the Socialist Party and other political parties.

## Right to Privacy for Election Candidate

### Why in News?

Recently, the **Supreme Court of India** in its recent judgment has ruled that every candidate contesting in the elections need not declare each and every movable asset it possesses.

- The Court ruled that Candidates too have a **Right to Privacy** from the voters and they cannot lay their life out thread-bare for examination.

### What are the Key Facts About the Case?

- The SC was hearing a petition filed by an MLA from Arunachal Pradesh challenging a 2023 Guwahati **High Court** judgment that declared his **election null and void for not declaring three vehicles as his assets** in his affidavit filed in the form appended to the **Conduct of Election Rules, 1961**.
- The petition said that the electoral candidate committed a **"corrupt practice" under Section 123**

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of the **Representation of People Act (RPA), 1951** by not declaring the ownership of said vehicles.

- The Supreme Court said that a **candidate's choice to retain his privacy** on matters that were of no concern to the voters or were irrelevant to his candidature for public office did not amount to a "corrupt practice" under **Section 123** of the **RPA, 1951**.
  - Also, such non-disclosure would not amount to a "defect of a substantial nature" under **Section 36(4) of the 1951 Act**.
- The court said that voters have a right to the disclosure of information which was essential for choosing the candidate for whom a vote should be cast.

#### What is the Right to Privacy?

- The right to privacy is a **fundamental right**, which protects the inner sphere of the individual from interference from both State and non-state actors and allows the individuals to make autonomous life choices.
- The Supreme Court described privacy and its importance in the landmark decision of **K.S. Puttaswamy vs Union of India** in 2017 that the right to Privacy is a fundamental and inalienable right and attaches to the person covering all information about that person and the choices that he/she makes.
- The right to privacy is protected as an **intrinsic part of the right to life and personal liberty under Article 21**.

#### What is RPA 1951 and the Corrupt Practices under the Act?

- **About:**
  - The RPA of 1951 governs the conduct of elections and the qualifications and disqualifications of elected representatives.
- **Provisions:**
  - It regulates the **conduct of elections**.
  - It specifies the **qualifications and disqualifications for membership** in the parliament of legislative houses,
  - It provides provisions to curb corrupt practices and other offenses.

- It lays down **the procedure for settling doubts** and disputes arising out of elections.
- **Section 36(4) in the Act of 1951** mentions that the returning officer shall not reject any nomination paper on the grounds of any defect that is not of a substantial character.

#### ➤ Corrupt Practices under RPA, 1951:

- **Corrupt Practices: Section 123 of the Act** defines 'corrupt practices' to include **bribery, undue influence, false information, and promotion** of "feelings of enmity or hatred between different classes of the citizens of India on grounds of religion, race, caste, community, or language" by a candidate for the furtherance of his prospects in the election.

- **In Abhiram Singh versus C. D. Commachen Case (2017)** SC ruled that candidates are **prohibited from appealing for votes not only based on their own religion but also on that of the voters**.

- **Undue Influence:** The section defines **undue influence as any direct or indirect interference**, including threats, that hinders the free exercise of electoral rights.

- **Disqualification:** Section 123(4) allows **disqualification of an elected representative for certain offenses**, corrupt practices, failure to declare election expenses, or having interests in government contracts or works.

#### ➤ Significance:

- The act is significant for the smooth functioning of Indian democracy as it bars the entry of persons with criminal backgrounds into representative bodies, thus **decriminalizing Indian politics**.
- The act requires every **candidate to declare his assets and liabilities** and maintain an account of election expenses.
  - This provision ensures the **accountability and transparency** of the candidate in the use of public funds.
- It **prohibits corrupt practices** like booth capturing, bribery or promoting enmity etc., which ensures the **legitimacy and free & fair** conduct of elections.

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## SC Concerned by Growing States' Appeals Against Centre

### Why in News?

The **Supreme Court of India** has expressed concern over a growing trend of **States being compelled to approach it against the Centre**.

### What Instances Prompted the SC's Caution?

- **Tamil Nadu:**
  - Tamil Nadu accused the Centre of neglecting the State's needs by delaying disaster relief funds worth nearly Rs. 38,000 crore.
- **Kerala:**
  - Kerala filed a suit directly in the **Supreme Court**, blaming the Centre for interfering in its '**Net Borrowing Ceiling**' (quantified as **3% of its projected Gross State Domestic Product for 2023-24**, pushing the State to a **financial emergency**).
- **Karnataka:**
  - Karnataka's request for ₹18,171.44 crore under the **National Disaster Response Fund (NDRF)** to address a humanitarian crisis has been unanswered for six months.
  - The state argues that the Centre's inaction violates not only the statutory provisions of the **Disaster Management Act, 2005** but also **fundamental rights** of the people of the state, **guaranteed under the Constitution of India**, including the **right to equality and the right to life**.

- The State faces severe drought conditions, with a significant deficit in rainfall, affecting the lives of its people.

### What are the Constitutional Provisions for States' Borrowing Power and Dispute Settlement with the Centre?

- **Article 293:**
  - The executive power of a **State extends to borrowing** within India's territory, secured by the **Consolidated Fund** of the State.
  - The Government of India may make loans to States or provide guarantees, subject to conditions set by Parliament.
  - States cannot raise loans without the consent of the Government of India if any part of a **previous loan from the Government of India remains outstanding**.
    - Consent for borrowing may be granted by the Government of India with imposed conditions if necessary.
- **Article 131:**
  - It deals with the **original jurisdiction of the Supreme Court**. This means it **empowers the Supreme Court to directly hear and decide disputes** between:
    - The Central Government and one or more State Governments
    - Two or more State Governments
  - Essentially, it acts as a referee in disagreements between the central government and state governments, or between different state governments themselves.

Centre-State Relations in India's Governance

Aspect	Constitutional Provisions	Key Features
<b>Legislative Relations</b>	Articles 245 to 255	<ul style="list-style-type: none"> <li>➤ Parliament has overriding legislative powers over state legislatures.</li> <li>➤ Delineation of subjects in <b>Union List, State List, and Concurrent List</b>.</li> <li>➤ Parliament's residuary powers to legislate on any subject not mentioned in the lists</li> </ul>
<b>Administrative Relations</b>	Articles 256 to 263	<ul style="list-style-type: none"> <li>➤ States required to follow laws made by Parliament</li> <li>➤ Concept of "<b>cooperative federalism</b>" in administrative matters.</li> <li>➤ Centre's power to give directions to states on certain matters</li> </ul>
<b>Financial Relations</b>	Articles 264 to 293	<ul style="list-style-type: none"> <li>➤ Division of taxation powers between Centre and States.</li> <li>➤ Rules for imposing and sharing taxes.</li> <li>➤ Provisions for <b>financial grants and resources transfers to States</b>.</li> </ul>

Note:

### **What is the Central Government's Role in Disaster Recovery Plans for States?**

#### ➤ **Disaster Management Act, 2005:**

- The Disaster Management Act, 2005 lays down the institutional, legal, financial, and coordination mechanisms at the national, state, district, and local levels for disaster management.
  - The act mandates the establishment of various authorities and committees, such as the **National Disaster Management Authority (NDMA)** and State and District Disaster Management Authorities to oversee and implement disaster management efforts.
- The act empowers the **central government to issue directions to the NDMA, state governments/SDMAs, or any of their officers/employees to facilitate or assist in disaster management.**
- The **Finance Commission** recommends the creation of funds for disaster mitigation along with disaster response, which will now together be called **National Disaster Risk Management Fund (NDRMF)** and **State Disaster Risk Management Funds (SDRMF)**.
  - The 15<sup>th</sup> Finance Commission recommended the **National Disaster Mitigation Fund (NDMF)** for the period 2021-26, alongside the NDMF, the **State DMFs** have been set up.
  - The SDMFs are contributed by both the Central Government and the State Governments, with a **75:25 ratio for general states and a 90:10 ratio for northeastern and Himalayan states.**

#### ➤ **State Disaster Response Fund (SDRF):**

- The **SDRF**, constituted under the Disaster Management Act, 2005, is the primary fund available with State Governments for responses to notified disasters.
  - The **Central Government contributes 75% of SDRF allocation** for general category States/UTs and 90% for special category States/UTs (NE States, Sikkim, Uttarakhand, Himachal Pradesh, Jammu and Kashmir).
- The annual central contribution is released in two equal instalments as per the recommendation of the Finance Commission.
- SDRF shall be used only for meeting the expenditure for providing immediate relief to the victims.

- **Disasters covered under SDRF: Cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloudburst, pest attack, frost and cold waves.**

#### ➤ **National Disaster Response Fund (NDRF):**

- The NDRF, established under Section 46 of the Disaster Management Act, 2005, is a fund managed by the **Central Government to address emergency response**, relief, and rehabilitation during threatening disaster situations or disasters.
  - **It supplements the SDRF of a State, in case of a disaster of a severe nature**, provided adequate funds are not available in the SDRF.
- The fund is placed in the **"Public Account"** of the Government of India under **"reserve funds not bearing interest,"** enabling the government to utilise it without parliamentary approval.
  - NDRF is financed through a **cess levied on specific items** subject to excise and customs duty, approved annually through the Finance Bill.
- Additional funding requirements beyond NDRF allocations are met through **general budgetary resources**, ensuring continuous support for disaster relief efforts.
- The fund's utilisation is overseen by the **National Executive Committee (NEC)** of the NDMA, with annual audits conducted by the **Comptroller and Auditor General (CAG)** to ensure transparency and accountability.

### **What are the Challenges faced by States Regarding Disbursement of Financial Aids?**

#### ➤ **Delayed and Insufficient Disaster Relief:**

- Lack of coordination between the Centre and states in the disbursement of disaster management funds (NDRF and SDRF).
  - Concerns over the **Centre's unilateral decision-making** in determining the quantum of disaster assistance.
- Lack of clear, transparent, and objective criteria for the Centre to determine the **quantum of disaster relief and rehabilitation assistance to states.**
- Absence of enough institutionalised mechanisms for states to challenge the Centre's decisions on disaster aid.

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- **Imbalance in the Centre-State Disaster Management Framework:**
  - Perceived **over-centralisation of disaster management powers** and decision-making authority with the Centre.
  - Concerns over the **NDMA being overly dependent on the Centre and lacking effective representation of states.**
  - Lack of flexibility for states to customise disaster response and mitigation measures as per their local contexts and priorities.
- **Centralised Planning:**
  - Centralised planning may not always take into account the unique needs and circumstances of each state, leading to inefficiencies in the response to disasters or other situations requiring aid.
- **Political Dynamics:**
  - Political dynamics and **relationships between the central government and the states can influence aid distribution**, sometimes leading to allegations of bias or favouritism.
- **Lack of Consultation:**
  - The **Centre is often accused of not adequately consulting the states** while formulating policies and schemes, leading to implementation challenges.
  - Instances of the Centre unilaterally imposing decisions on the states without their consent have been a source of friction.
  - **Lack of effective institutional platforms for regular dialogue** and dispute resolution between the Centre and states.
  - Weakening of federal spirit and collaborative approach in the face of growing competitive and adversarial politics.

## Expanding the OCI Card Scheme

### Why in News?

Recently, India has been contemplating **extending the Overseas Citizenship of India (OCI) Card privileges to overseas Indians in Fiji and other nations** after relaxing the rules for Suriname.

- In 2023, India announced an extension of the eligibility criteria for OCI card of the original Indian immigrants

in Suriname, **from the fourth generation to the sixth generation.**



### What is Overseas Citizenship of India (OCI) Card?

#### ➤ About:

- The concept of OCI was introduced in response to demands for dual citizenship by the Indian diaspora, particularly in developed countries.
- The **Ministry of Home Affairs** defines an OCI as a person who:
  - Was a citizen of India on or after 26th January 1950; or
  - Was eligible to become a citizen of India on 26th January 1950; or
  - Is a child or grandchild of such a person, among other eligibility criteria.
  - According to **Section 7A** of the OCI card rules, an applicant is not eligible for the OCI card if he, his parents, or grandparents have ever been a citizen of Pakistan or Bangladesh.
- The category was introduced by the government in 2005. The Government of India via the **Citizenship (Amendment) Act, 2015** merged the **Person of Indian Origin (PIO) category** with the OCI category in 2015.

#### ➤ Historical Background:

- The OCI Card scheme was launched during the **Pravasi Bharatiya Divas** in 2005.

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- It was introduced as an **acknowledgment** of the persistent emotional attachment of the Indian diaspora to their country of origin.
- **Limitations and Restrictions:**
  - They do not have the right to vote.
  - They cannot hold constitutional offices or government jobs.
  - They cannot purchase agriculture or farmland.
- **OCI Card and Civil Rights:**
  - The OCI Card does not confer political rights.
  - Holders cannot participate in elections or hold public office, reflecting the government's stance on maintaining clear boundaries between citizenship and overseas citizenship.
- **Benefits of the OCI Card:**
  - Multiple entry, multi-purpose lifelong visa to visit India.
  - Exemption from registering with the Foreigners Regional Registration Office (FRRO) regardless of the duration of their stay.
  - Parity with **Non-Resident Indians (NRIs)** in financial, economic, and educational fields.
- **Current Scenario:**
  - The OCI card scheme has been a key element of the Indian government's effort to deepen its relationship with its **diaspora**.
  - As of March 2020, the Home Ministry had issued over 3.5 million OCI cards. According to the **Ministry of External Affairs (MEA)**, this number had exceeded 4 million by early 2022.
    - The **vast majority were issued to foreign nationals** in the United States, United Kingdom, Australia, and Canada.
  - The focus on expanding the OCI card scheme **highlights India's efforts to engage with and support its overseas Indian communities** around the world.

#### Person of Indian Origin (PIO)

- **PIO refers to a foreign citizen** (except a national of Pakistan, Afghanistan Bangladesh, China, Iran, Bhutan, Sri Lanka and Nepal) **who:**
  - at any time held an Indian passport or

- who or either of their parents/ grandparents/ great grandparents were born and permanently resident in India as defined in Government of India Act, 1935 and other territories that became part of India thereafter or
- is a spouse of a citizen of India or a PIO.

## Voter Verified Paper Audit Trail (VVPAT)

### Why in News?

Recently, the **Supreme Court** announced that it would soon address petitions for 100% verification of **Voter Verified Paper Audit Trail (VVPAT)** slips, just ahead of the first phase of voting on 19<sup>th</sup> April 2024.

### What is a VVPAT Machine?

- **About:**
  - The **VVPAT machine** is attached to the **ballot unit** of the **Electronic Voting Machine (EVM)**, and provides visual verification for the vote cast by a voter by printing a slip of paper with the voter's choice on it.
  - The slip of paper with the candidate's details is **briefly displayed** for verification behind a glass window, giving the voter 7 seconds, before dropping into a compartment below.
  - Voters are **not allowed** to take the VVPAT slip home as it is **used to verify votes in five randomly selected polling booths**.
  - The concept aims to **enhance trust** in the voting process by enabling **physical verification** of electronically cast votes, reassuring both voters and political parties about the accuracy of their votes.
- **Reason for Introduction:**
  - The concept of the VVPAT machine was **initially proposed in 2010** during a meeting between the **Election Commission of India (ECI)** and **political parties** to enhance **transparency** in the EVM-based polling process.
  - Following prototype preparation, **field trials were conducted** in Ladakh, Thiruvananthapuram, Cherrapunjee, East Delhi, and Jaisalmer in **July 2011**.
    - It led to the **approval of VVPAT** by an expert committee of the ECI in **February 2013**.

Note:

### ➤ Legal Aspect:

- In 2013, the **Conduct of Elections Rules, 1961** were amended to allow for a **printer with a drop box** to be attached to the EVM.
  - The **VVPAT** was first used in all 21 polling stations of the **Noksen Assembly** constituency of Nagaland in 2013, leading to its phased introduction decided by the ECI, with **100% adoption by June 2017**.
- **Supreme Court's Views on VVPAT:**
  - In **Subramanian Swamy vs Election Commission of India Case, 2013**, the Supreme Court mandating VVPATs for transparent elections, compelling **government funding** for their implementation.
  - In 2019, a petition was moved to the SC asking for a minimum 50% randomised VVPAT slips to be counted.

- However, the Election Commission of India (ECI) raised concerns regarding the challenges posed by counting 50% of VVPAT slips, including a potential delay of 5-6 days in declaring election results and infrastructure limitations such as the availability of manpower.

#### What Does the Statistical Data Say About VVPAT Slips?

- Initially the **Election Commission** used to match VVPAT **paper slips of 4,125 electronic** voter machines under the one EVM per assembly segment rule.
  - This was based on the result of the request made by the EC, in 2018 to the **Indian Statistical Institute (ISI)** to determine a sample size for the **internal audit** of VVPAT slips with EVM results that is mathematically sound, statistically robust, and practically cogent.
    - **As per ISI's calculations**, even counting **slips from 479** randomly selected VVPATs across the country **would guarantee over 99% accuracy**.
- However, the **Supreme Court** ruled in 2019 that **VVPAT slips of five electronic voting machines in every constituency should be counted** instead of just one EVM for the **greatest degree of accuracy**, and satisfaction in the election process.
  - These five polling stations are **selected by a draw** of lots by the Returning Officer concerned, in the presence of candidates/ their agents.

- With the Supreme Court ruling, the ECI has to **now count VVPAT slips of 20,625 electronic voting machines**.

#### Indian Statistical Institute (ISI)

- The **Indian Statistical Institute (ISI)** is a prestigious institution in India, recognised as an **Institute of National Importance** by the 1959 act of the Indian parliament.
- It was registered on 28<sup>th</sup> April 1932 as a **non-profit** distributing learned society under the **West Bengal Societies Registration Act, 1860**.
- It was founded by **Professor Prasanta Chandra Mahalanobis** in Kolkata.
- ISI engages in extensive research, with contributions to various fields and collaboration with governmental and industrial entities.
  - It comes under the **Ministry of Statistics and Program Implementation**.

## District Election Management Plan

### Why in News?

In light of the upcoming Lok Sabha elections, the conduct of elections has become increasingly complex and multifaceted, requiring meticulous planning and execution to ensure a free, fair, and inclusive electoral process.

- A cornerstone of this planning process is the **District Election Management Plan (DEMP)**.

### What is the District Election Management Plan (DEMP)?

- **About:**
  - The **DEMP** is a comprehensive document that uses statistics and analysis to ensure the smooth conducting of elections in districts.
- **Preparation:**
  - According to the directives of the **Election Commission of India**, the **DEMP** must be formulated at least six months before the tentative date of polling.
  - The dynamics of the electoral process often necessitate periodic reassessment and modification of the plan after the official announcement of elections.

Note:

- The effective execution of the DEMP entails a coordinated endeavour involving **electoral officials, administrative bodies, law enforcement agencies,** and other pertinent stakeholders.
- Scheduled engagements with political entities and media outlets are also arranged to provide them with comprehensive briefings on electoral regulations and procedures.

### What are the Elements of DEMP?

#### ➤ District Profile:

- It is the foundational element of the electoral strategy, incorporating a political map delineating **constituencies**, pertinent **demographic and infrastructure statistics**, and an overview of the district's administrative structure and socio-economic characteristics.

#### ➤ Polling Station Infrastructure:

- Detailed strategies are devised to enhance the availability and accessibility of polling stations, ensuring essential amenities such as ramps, electricity, lighting, drinking water, toilets, and internet connectivity.
  - Special provisions are made for voters with **disabilities** and senior citizens, including the establishment of help desks, 24/7 control rooms, home voting options, and advanced postal ballot voting for essential service personnel.

#### ➤ EVM Management:

- **Electronic Voting Machine (EVM)** management is crucial for maintaining the integrity of the electoral process, with plans necessary for secure storage and availability of EVMs and **Voter Verifiable Paper Audit Trails (VVPATs)**, including plans for their transportation and maintenance.

#### ➤ Systematic Voters' Education and Electoral Participation (SVEEP) Plan:

- It focuses on augmenting electoral participation by analysing voter turnout data to identify polling stations with subpar or notably low participation rates.
- It involves leveraging social media platforms, engaging with diverse community and youth organisations, and organising awareness-raising events leading up to the polling day.

#### ➤ Personnel Planning and Training:

- The DEMP outlines a comprehensive strategy for the recruitment, training, welfare, and deployment of election personnel.
- It emphasises the necessity of establishing a robust database of poll personnel, categorising them by cadre and group, and assessing their deployment requirements while devising strategies to bridge gaps in personnel across various election roles.
- The plan incorporates training programs for district-level teams to enforce the **Model Code of Conduct (MCC)** and provides comprehensive training for all election personnel to ensure they possess the requisite skills and knowledge for their respective roles.

## 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 - **25<sup>th</sup> 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



Drishti IAS

Note:

## Constitutional Morality

### Why in News?

The recent arrest of a serving chief minister on corruption charges raises legal, political, and constitutional concerns and poses questions about its consistency with **constitutional morality**, especially in a parliamentary democracy like India.

### What is Constitutional Morality?

#### ➤ About:

- Constitutional morality (CM) is a concept that refers to the **principles and values underlying a constitution that guide the actions** of both the government and the citizenry.
  - The concept of constitutional morality was propounded by the British Classicist George Grote in the 19<sup>th</sup> century.

#### ➤ He described CM as a “paramount reverence for the forms of the Constitution” of the land.

- In India, the term was first used by **Dr. B.R. Ambedkar**.

#### ➤ Pillars of Constitutional Morality:

- **Constitutional Values:** Upholding the core values enshrined in the Constitution, such as justice, liberty, equality, fraternity, secularism, and the dignity of the individual.
- **Rule of Law:** Upholding the supremacy of the law where everyone, including government officials, is subject to and accountable under the law.
- **Democratic Principles:** Ensuring the functioning of a **representative democracy** where citizens have the right to participate in decision-making processes and hold their elected representatives accountable.
- **Fundamental Rights:** Respecting and protecting the fundamental rights guaranteed by the constitution, such as the **right to equality, freedom of speech and expression, right to life and personal liberty**, etc.
- **Separation of Powers:** Maintaining the separation and balance of powers between the **legislative, executive, and judicial branches** of government to prevent any one branch from becoming too powerful.
- **Checks and Balances:** Establishing mechanisms and institutions that provide checks and balances to prevent abuse of power and protect the rights of individuals.

- **Constitutional Interpretation:** Interpreting the constitution in a manner that **promotes its underlying principles** and values while adapting to changing societal needs and circumstances.
- **Ethical Governance:** Ensuring **ethical conduct in governance**, transparency, accountability, and integrity in public service.

#### ➤ Conditional Morality and Indian Constitution:

- The term “constitutional morality” is not explicitly mentioned in the Indian Constitution.
  - However, the concept is inherent in the document’s core principles, emphasising values like justice, equality, and liberty.
  - These principles are found throughout the constitution, including the **Preamble, Fundamental Rights, and Directive Principles of State Policy**.
- Its essence is also reflected in various Supreme Court judgements.

#### ➤ Judgments Upholding Constitutional Morality:

- **Kesavananda Bharati v. State of Kerala, 1973:** This case established the “**basic structure doctrine**,” which essentially limits Parliament’s power to amend the Constitution and ensures its core principles remain intact.
  - This can be seen as an early instance of the court upholding the spirit of the Constitution.
- **SP Gupta Case (First Judges Case), 1982:** The Supreme Court labelled a constitutional breach as a severe violation of constitutional morality.
- **Naz Foundation v. Government of NCT of Delhi, 2009:** This judgment decriminalised consensual same-sex relationships between adults.
  - The court emphasised that “**constitutional morality**” should prevail over societal perceptions of morality, upholding individual rights.
- **Manoj Narula v. Union of India, 2014:** SC stated that “**Constitutional Morality means to bow down to the norms of the Constitution** and not act in a manner which would become violative of the rule of law of action in an arbitrary manner.
- **Indian Young Lawyers Association v. State of Kerala (Sabarimala Case), 2018:** The court struck down the practice of excluding women of a certain age group from the Sabarimala temple.
  - It emphasised that “constitutional morality” includes principles of justice, equality, liberty,

Note:



and fraternity, which outweighed religious customs restricting women's entry.

- **Navtej Singh Johar v. Union of India, 2018:** This case read down **Section 377** of the Indian Penal Code, which criminalised homosexuality.
- **Challenges to Constitutional Morality in India:**
  - **Political Interference:** One of the significant challenges is political interference in the functioning of constitutional bodies and institutions.
    - This interference can **undermine the autonomy and impartiality of these institutions**, affecting their ability to uphold constitutional values.
    - For example, there has been criticism surrounding the recent changes to the **appointment committee for the Election Commission of India** and the **amended IT Rules 2023**.
  - **Judicial Activism vs. Judicial Restraint:** Balancing judicial activism with judicial restraint is another challenge.
    - While judicial activism can promote the protection of rights and enforcement of constitutional values, **excessive activism can encroach upon the domain of the executive and legislature**.
  - **Enforcement and Compliance:** Despite having a robust constitutional framework, ensuring effective enforcement and compliance remains a challenge.
    - **Implementation gaps, delays in justice delivery**, and lack of awareness about constitutional rights among the general populace contribute to this challenge.

#### Do Chief Ministers in India Lack Immunity from Arrests?

- Constitutionally, only the **President of India and Governors of states** enjoy immunity from civil and criminal proceedings until the conclusion of their terms.
  - **Article 361** of the Constitution stipulates that these officials are not liable to any court for acts performed in the discharge of their official duties.
- However, this **immunity does not extend to Prime Ministers or Chief Ministers**, who are subject to the principle of equality before the law as advocated by the Constitution.
  - Despite this, arrest alone does not warrant disqualification.

## Preventive Detention

### Why in News?

Recently, the **Supreme Court** has held that advisory boards under preventive detention laws should not behave like mere "rubber-stamping authorities" for the government,

- They should act as safety valves that stand between the capricious use of power by the state and the right to personal liberty.

### What is Preventive Detention?

#### ➤ Background:

- Laws authorising **preventive detention** existed in **British colonial rule** in India since **1818**.
- The **Defence of India Act of 1915** was passed on the outbreak of the **First World War**, and the same was repeated in connection with emergency regulations made during the **Second World War**.
  - Both have provisions of preventive detention i.e., **detention of a person without trial and conviction**.

#### ➤ About:

- **Preventive detention** means the detention of a person **without trial and conviction** by a court. Its purpose is not to **punish a person** for a past offence but to prevent him from committing an offence in the near future.
- The detention of a person cannot exceed **three months** unless an advisory board reports sufficient cause for extended detention.
- **Grounds for Preventive Detention:**
  - State security
  - Public order
  - Foreign Affairs, etc.

#### ➤ Two Types of Detentions:

- **Preventive detention** is when a person is held in **police custody** only on the basis of a suspicion that they would conduct a criminal act or cause harm to society.
  - The police have the authority to hold anyone they suspect of committing a criminal offence and also to make arrests without a warrant or a magistrate's authorisation in certain cases.

Note:

- **Punitive detention** which means detention as a punishment for a criminal offence. It occurs after an offence is actually committed, or an attempt has been made towards the commission of that crime.
- **Protection:**
  - **Article 22** grants protection to persons who are **arrested or detained**.
    - It has two parts—the first part deals with the cases of **ordinary law** and the second part deals with the cases of **preventive detention law**.
    - The article makes it mandatory for preventive detention laws to form **advisory boards** consisting of persons qualified to be **High Court judges**.
    - Under different laws, review boards must assess detention orders **every three months** to determine if there's enough reason for preventive detention. They examine evidence, request more information if needed, listen to the person detained, and then report if the detention was justified or not.
  - **Safeguards Available to the Detained Person:**
    - A person may be taken to **preventive custody** only for **3 months**.
- The period of detention may be extended beyond **3 months**, only after approval by the **Advisory Board**.
  - The detainee has the **right to know the grounds** of his/her detention.
- However, the state may **refuse** to tell the grounds if it is necessary to do so in the public interest.
  - The detainee is provided an opportunity to **challenge** his/her detention.
- **The Relative Preventive Laws:**
  - **Public Safety Act (PSA)**.
  - **Narcotic Drug and Psychotropic Substance Act (NDPS), 1985**.
  - **National Security Act:** The **NCRB** data showed that the number of people arrested under the **National Security Act (NSA)** had dipped significantly compared to 2020.
    - Preventive detentions under the **NSA** peaked in **2020** at **741**. This number dropped to **483** in **2021**.
- **Issues Relate to Preventive Detention:**
  - **Dent to Democracy:** No democratic country in the world has made preventive detention as an integral part of the Constitution as has been done in India.

- **Extra Judicial Authority:** Governments occasionally leverage such laws to exert extrajudicial authority, raising concerns about arbitrary detentions.
- **Misuse of other Acts:** There are several laws like the **Unlawful Activities (Prevention) Act, 1967** which have potential to be misused for preventive detentions.
- **Manipulation by Government Officials:** District magistrates and the police also often make preventive detentions to control law and order in emerging communal clashes or clashes between any two communities, even when it might not always lead to public disorder.

#### Supreme Court on Preventive Detention:

- **Ameena Begum Case, 2023:** The Supreme Court held that **preventive detention is an exceptional measure** meant for emergency situations and **should not be used routinely**.
  - The **objective of preventive detention is not to punish but to prevent** anything prejudicial to the security of the state.
- **Ankul Chandra Pradhan Case, 1997:** This case emphasised that the purpose of preventive detention is to **prevent harm to the security of the state, rather than to impose punishment**.

#### What is Public Order and Law & Order?

- **About:**
  - **Public order** refers to the maintenance of peace, stability, and harmony within society, ensuring that activities and behaviours do not disrupt the overall well-being or safety of the community.
  - **Public order** is also one of the grounds for restricting **free speech** and other **fundamental rights**.
- **Power to Maintain Public Order:**
  - Under **Entry 9 of List I (Union List)**, the Constitution of India provides the Parliament with the **exclusive power** to enact a law for preventive detention for the reasons connected with defence, foreign affairs, or security of India.
  - Under **Entry 3 of List III (Concurrent List)**, both Parliament and State Legislature have powers to enact such laws for the reasons related to the maintenance of **public order** or the maintenance of supplies or services essential to the community.
  - According to **State List (List 2)** of the **Seventh Schedule** of the Constitution, the power to legislate on aspects of public order rests with the states.

Note:

### ➤ Distinction Between Public Order and Law & Order:

- The Supreme Court distinguished between '**public order**' and '**law and order**'.
- In **Ram Manohar Lohia vs State of Bihar Case, 1965**, the **Supreme Court** held that the problem of '**law and order**' affected only a few individuals, but an issue of **public order** influenced the community or the public at large or even the country.
  - The difference between '**law and order**' and '**public order**' lies in the degree and extent of their scope.
- The SC clarified that to bring the activities of a person within the expression of "**acting in any manner prejudicial to the maintenance of public order**" the activities must be of such a nature that the ordinary laws cannot deal with them or prevent subversive activities affecting society.

## Authority of High Court Benches

### Why in News?

Recently, the Madras **High Court** (principal seat) has reinstated the Madurai Bench's authority to adjudicate on all types of **public interest Litigation (PIL)**, including those involving matters concerning the entire State, rather than just the 13 districts within its territorial jurisdiction.

**Note:** The Madras High Court's **principal bench** in Chennai has a **permanent bench** in **Madurai**, which exercises jurisdiction in all matters **except original jurisdiction**, mirroring the principal bench.

### What is the Ruling of the Madras Court?

#### ➤ Issue:

- A judgement passed by the former **Chief Justice** of the Madras **High Court** had emphasised the need to file PILs regarding temple interests statewide at the **principal seat** of the court, rather than the **Madurai Bench**, focusing on district-specific cases.

#### ➤ Judgement:

- However, in the recent judgement, the rights of the Madurai Bench of Madras High Court have been **restored to hear all kinds of PILs** including those that concern issues related to the entire State, and not just the 13 districts under its **territorial jurisdiction**.

- The court stated that while the **Chief Justice can transfer** a case from principal bench to the permanent bench if necessary, a **blanket order requiring all pan-state matters** to be filed only at the principal seat would not be suitable for the Madurai Bench's functioning.

#### ➤ Legal Basis of Judgement:

- The court relied on the **presidential notification** issued in **2004** for the constitution of the Madurai Bench that **had not imposed any such restriction**.
- The court also noted that a full Bench ruling in **B. Stalin versus Registrar, 2012** clarified that there were **no restrictions** on the types of PILs that could be filed and heard at the Madurai Bench, although it affirmed the **Chief Justice's authority to transfer cases** between the principal seat and the Madurai Bench.

### What is the Process of Establishment of High Court and Permanent Benches?

#### ➤ Establishment of High Court Benches:

- **Article 214** of the constitution of India provides that there shall be a High Court for each state.
- However, **Section 51 of the States' Reorganisation Act, 1956** provide for setting up benches away from the principal seat.

#### ➤ Justice Jaswant Singh Commission:

- In 1981, a commission was appointed to consider demands for High Court Benches in Western districts of Uttar Pradesh.
- Terms of reference were later expanded in 1983 to examine the general question of establishing Benches of High Courts at places other than their principal seats.

#### ○ Recommendations:

- The commission **recommended criteria** including characteristics of the region, population size, area, means of travel and communication, distance for litigants, pendency rates, infrastructure availability, and legal talent.

#### ➤ Supreme Court's Position:

- In a writ petition, the **Supreme Court** examined the demand for establishing High Court Benches at centres other than the principal seat, emphasising that decisions should be based on rational, not emotional, sentimental, or parochial considerations.

Note:

- The consensus among the State Government, the Chief Justice of the concerned High Court, and the Governor is necessary for setting up Benches.
- **Role of Union Government:**
  - The government considers proposals for setting up benches only after receiving a **complete proposal** from the **State Government**, with the consent of the Chief Justice and the **Governor**.
  - The State Government is responsible for providing **infrastructural facilities** and bearing the entire expenditure of the High Court and its Bench.
  - The **Chief Justice** manages the **day-to-day administration** of the High Court and its Bench, deputing Judges from the Principal Seat to the Bench as needed.
  - A **consultative approach** requiring **consensus** among the State Government and the High Court is adopted for deciding on setting up Benches.

#### THE CONSTITUTION OF INDIA



#### PART VI | THE STATES | THE HIGH COURTS

#### ARTICLES:

**Article 215** High Courts to be courts of record

**Article 222** Transfer of a Judge from one High Court to another

**Article 225** Jurisdiction of existing High Courts

**Article 226** Power of High Courts to issue certain writs

**Article 230** Extension of jurisdiction of High Courts to Union territories.

**Article 231** Establishment of a common High Court for two or more States.

#### What is Public Interest Litigation?

- The concept of Public Interest Litigation (PIL) **originated** and **developed** in the **USA** in the **1960s**.
- In India, the PIL is a product of **judicial activism**. **Justice V.R. Krishna Iyer** and **Justice P.N. Bhagwati** were the pioneers of the concept of PIL.
- The introduction of PIL in India was facilitated by the **relaxation** of the **traditional rule** of '**locus standi**'. According to this rule, only that person **whose rights** are **infringed** alone can move the court for the remedies, whereas, the **PIL is an exception** to this traditional rule.

- The Supreme Court has defined the **PIL** as "**a legal action initiated in a court of law for the enforcement of public interest** or general interest in which the public or a class of the community have pecuniary interest or some interest by which their legal rights or liabilities are affected.
- Public interest litigation is **not defined** in any **statute** or in any **act**. It has been interpreted by judges to consider the intent of the public at large.
- Some of the **matters** that are entertained under PIL are:
  - Bonded Labour matters
  - Neglected Children
  - Non-payment of minimum wages to workers and exploitation of casual workers
  - Atrocities on women
  - Environmental pollution and disturbance of ecological balance.

## Industrial Alcohol Regulation

### Why in News?

The **Supreme Court**, led by the **Chief Justice of India (CJI)**, is currently hearing a case with a **9-judge Constitution Bench**. The case pertains to the question of whether states have the authority to regulate and impose excise duty on **industrial alcohol**.

#### Note:

- Industrial alcohol, unlike alcoholic beverages, is **not meant for human consumption (denatured)**. It finds applications in various sectors, including manufacturing pharmaceuticals, disinfectants, chemicals, and even biofuels.

### What is the Constitutional Debate Regarding Industrial Alcohol?

- **Constitutional Framework:**
  - **State List (Entry 8):** Entry 8 in the State List under the **Seventh Schedule of the Indian Constitution** pertains to the power of state governments to legislate on the production, manufacture, possession, transport, purchase, and sale of **intoxicating liquors**.
  - **Union List (Entry 52):** Confers upon Parliament the authority to **legislate on industries** deemed expedient in the public interest.

Note:



- **Concurrent List (Entry 33):** Allows **both states and the Centre** to legislate on industries, with the caveat that state laws cannot contradict central laws.
- Industrial alcohol falls under the **Industries (Development and Regulation) Act, 1951 (IDRA)**, which lists it as a subject of regulation. This act of Parliament provides the central government with the power to regulate industrial alcohol.
- **Key Issue:**
  - The central question is whether states have the autonomy to regulate industrial alcohol or if exclusive control lies with the Centre.
- **Legal Interpretation:**
  - Subjects in the **Concurrent List can be regulated by both states and the Centre**, but state laws cannot conflict with central legislation.
    - The IDRA, 1951, which lists industrial alcohol, **implies central control over the subject matter.**

### What are the Arguments of the States?

- **Interpretation of Entry 8:**
  - It is argued that the phrase “intoxicating liquors” in Entry 8 of the State List **encompasses all liquids containing alcohol.**
    - Emphasis is placed on the historical usage of terms such as ‘liquor’, ‘spirit’, and ‘intoxicant’ in pre-constitutional excise laws.
- **Scope of Union’s Power:**
  - The contention is made that **Entry 52 of the Union List does not extend** to the regulation of “finished products” like industrial alcohol post-denaturation.
    - It is asserted that such control falls under **Entry 33 of the Concurrent List.** To exercise exclusive authority over industrial alcohol regulation, the **Centre would need to issue an order under Section 18-G of the IDRA.** Without such an order, states retain jurisdiction.
    - The term ‘denatured alcohol’ refers to **alcohol products adulterated with toxic and/or bad tasting additives** (e.g., methanol, benzene, pyridine, castor oil, gasoline and acetone), **making it unsuitable for human consumption.**
- **Preservation of States’ Powers:**
  - Caution is expressed against **diminishing states’ authority.** Citing the **ITC Ltd v Agricultural Produce Market Committee Case, 2002**, which emphasises states are not subordinate to the Centre.

- It stresses the need to uphold states’ constitutional powers and avoid interpretations that weaken their autonomy.

### What are the Other Similar Cases?

- **Synthetics & Chemicals Ltd v. State of Uttar Pradesh Case, 1989:**
  - A **7-judge Constitution Bench** held that states’ powers, as per Entry 8 of the State List, were limited to regulating “intoxicating liquors” which are **different from industrial alcohol.**
    - Essentially, the SC said that **only the Centre can impose levies or taxes on industrial alcohol**, which is not meant for human consumption.
  - The SC failed to consider its own prior Constitution Bench decision in **Ch Tika Ramji v State of UP Case, 1956.**
- **Ch Tika Ramji v State of UP Case, 1956:**
  - The SC upheld Uttar Pradesh’s legislation regulating the sugarcane industry against a challenge claiming exclusive central jurisdiction under **Section 18-G of the Industries (Development and Regulation) Act, 1951 (IDRA).**
    - The ruling affirmed states’ authority to legislate in industries even in the presence of central laws, setting a crucial precedent for federal governance.

### What is Excise Duty?

- Excise duty is an **indirect tax imposed on goods for their production**, licensing, and sale. It is paid to the Government of India by producers of goods and applies to **domestically manufactured goods**, unlike **Customs duty which is levied on goods coming from outside the country.**
  - Previously, excise duty at the central level was levied as **Central Excise Duty, Additional Excise Duty**, etc. However, the introduction of **Goods and Services Tax (GST) in July 2017** combined many types of excise duty. **Currently, excise duty is only applicable to petroleum and liquor.**
    - Excise duty was imposed on **manufactured goods** at the time of their removal, while GST was imposed on the **supply of goods and services.**
- **Excise duty levied on alcohol is a key component of a state’s revenue**, with states often adding excise duty on alcohol consumption to drive its income up.
  - For example, in 2023, Karnataka hiked the Additional Excise Duty (AED) on Indian Made Liquor (IML) by 20%.

Note:

Feature	Absolute Alcohol	Denatured Alcohol
Composition	Pure ethanol (C <sub>2</sub> H <sub>5</sub> OH) with minimal or no additives/denaturants	Ethanol (C <sub>2</sub> H <sub>5</sub> OH) with a high concentration of additives/denaturants
Safety	Drinkable but should be consumed with extreme caution	Poisonous and unfit for consumption
Additives	May contain trace amounts of impurities	Contains high amounts of additives like methanol, which make it toxic.
Applications	Laboratory use (e.g., disinfecting surfaces, extracting chemicals), medical applications (e.g., sterilising instruments)	Industrial use (e.g., fuel, cleaning solvents), cannot be used in medical or laboratory settings due to toxicity
Smell & Taste	Characteristic alcoholic odour, slightly sweet taste	Foul odour, bitter taste
Taxation	May be subject to higher taxes due to its purity	Lower tax rate or tax-exempt due to its unsuitability for drinking

## UP Board of Madarsa Education Act, 2004

### Why in News?

The Allahabad High Court (HC) has struck down the Uttar Pradesh Board of Madarsa Education Act, 2004, as unconstitutional.

### What is the Uttar Pradesh Board of Madarsa Education Act, 2004?

#### ➤ Overview of the Act:

- The Act aimed to regulate and govern the functioning of **madrasas (Islamic educational institutions)** in the state of Uttar Pradesh.
  - It provided a framework for the establishment, recognition, curriculum, and administration of madrasas across Uttar Pradesh.
  - Under this Act, the **Uttar Pradesh Board of Madarsa Education** was established to oversee and supervise the activities of madrasas in the state.

#### ➤ Concerns Regarding the Act:

- **Constitutional Violation:**
  - The act has been deemed **unconstitutional by the Allahabad HC**, as it **promotes education segregated along religious lines**, contradicting the **principle of secularism** enshrined in the Indian Constitution and **fundamental rights**.
  - The Act's provisions were criticised for failing to **ensure quality compulsory education up to the age of 14 years**, as mandated by **Article 21 A of the Constitution**.

- Concerns were raised regarding the exclusion of madrasas from the **Right to Education (RTE) Act, 2009** potentially depriving students of **universal and quality school education**.

#### ○ Limited Curriculum:

- Upon examination of madrasa syllabi, the court noted a curriculum **heavily focused on Islamic studies**, with limited emphasis on modern subjects.
- Students were required to **study Islam** and its doctrines to progress, **with modern subjects** often included as optional or offered minimally.

#### ○ Conflict with Higher Education Standards:

- The Act was deemed to conflict with **Section 22 of the University Grants Commission (UGC) Act, 1956**, raising questions about its compatibility with **higher education standards**.

#### ➤ High Court Ruling:

- The Allahabad HC declared the **Uttar Pradesh Board of Madarsa Education Act, 2004** unconstitutional due to violations of secular principles and fundamental rights.
  - It directed the **state government to accommodate madrasa students in recognised regular schools** and raised concerns about the limited curriculum focused on Islamic studies.
- The ruling highlighted potential adverse effects on students' access to quality education and prompted legal arguments regarding constitutional violations.

Note:

### What are the Constitutional Provisions Regarding Education in India?

Provisions	Article
The State shall endeavour to <b>provide early childhood care and education for all children</b> until they complete the <b>age of six years</b>	Article 45
The <b>86<sup>th</sup> Constitutional Amendment Act of 2002</b> , provided the Right to Education as a fundamental right in Part III of the Constitution and made education a fundamental right for children <b>between the ages of six and fourteen</b> .	Article 21A
<b>Promotion of education and economic interests of Scheduled Castes, Scheduled Tribes, and other weaker sections of the people.</b>	Article 46
<b>Freedom to attend religious education</b> in certain educational institutions established under an <b>endowment or trust and administered by the state</b> .	Article 28
<b>Education of minorities, protection of interests of minorities</b>	Article 29
<b>Right of minorities to establish and administer educational institutions</b>	Article 30
<b>Parents and guardians must provide educational opportunities</b> for their children between the <b>ages of 6 and 14</b> .	Article 51A(k)

### What are the Initiatives Related to Education?

- [Sarva Shiksha Abhiyan \(SSA\)](#)
- [Rashtriya Madhyamik Shiksha Abhiyan.](#)
- [Rashtriya Uchhattar Shiksha Abhiyan \(RUSA\)](#)
- [National Programme on Technology Enhanced Learning.](#)
- [PRAGYATA](#)
- [Mid-Day Meal Scheme](#)
- [Beti Bachao Beti Padhao](#)
- [PM SHRI Schools](#)

## Internet Freedom

### Why in News?

For five straight years, India has topped the global list of countries imposing internet bans, with about 60%

of all blackouts recorded in **the world, between 2016 and 2022** having been in India.

- State imposed shutdowns in the last decade have cited national security and threats to public order. However, rights groups have argued that these shutdowns also violate court directives.

### What are the Key Trends of Internet Shutdown in India?

#### ➤ Instances of Internet Shutdown:

- The Indian government imposed a **total of 780 shutdowns between 1<sup>st</sup> January, 2014, and 31<sup>st</sup> December, 2023**, according to data collected by the Software Freedom Law Centre (SFLC).
- Shutdowns flared up during the protests against the [Citizenship Amendment Act in 2019](#), the abrogation of [Article 370 in 2019](#), and the introduction of [Farm Bills in 2020](#).
- Internet disruptions in India accounted for **more than 70% of the total loss to the global economy in 2020**.
- India shut down the internet for over 7,000 hours in 2023.
  - Regionally, Jammu and Kashmir saw the highest number of shutdowns — at 433 — in the last 12 years.
    - The longest blackout in 2023 took place in Manipur from May to December, amid ethnic clashes.
- Between 2015 and 2022, more than 55,000 websites were blocked, according to SFLC data.
  - The biggest share of content censored was done under [section 69A of the IT Act](#), by the Ministry of Electronics and Information Technology and the Ministry of Information and Broadcasting.
  - URLs were blocked due to links to organizations banned under the [Unlawful Activities \(Prevention\) Act](#).
- **Global Internet Freedom:**
  - Global Internet freedom has declined for the 13th consecutive year, and the environment for human rights online has deteriorated in 29 countries, according to the latest Freedom House report.
    - India's ranking has hovered around the same benchmark in the last three years.
    - This is a dip from 2016 and 2017, when India scored 59 points, to 50 points in 2023.

Note:

### What are the Provisions Related to Internet Shutdown?

- **Section 5(2) of the Indian Telegraph Act, 1885, read with Temporary Suspension of Telecom Services (Public Emergency and Public Safety) Rules, 2017:**
  - These rules allow the union or state home secretary to order the suspension of any telegraph service (including internet) in case of public emergency or public safety.
  - Such an order must be reviewed by a committee within five days and cannot last for more than 15 days. In an urgent situation, an officer of joint secretary level or **above, authorized by the union or state home secretary, can issue the order.**
    - However, the law does not define what qualifies as an emergency or safety issue. The Supreme Court, in the landmark **Anuradha Bhasin v. Union of India case, 2020** reiterated that internet shutdowns violate **fundamental rights to freedom** of expression and shutdowns lasting indefinitely are unconstitutional.
- **Section 144 of the Code of Criminal Procedure:**
  - This section empowers a district magistrate, a sub-divisional magistrate or any other executive magistrate specially empowered by the state government to issue orders to prevent or stop any nuisance or disturbance of public tranquility.
  - Such orders can include the suspension of internet services in a particular area for a specified period.

### What are the Arguments Regarding Internet Shutdown?

- **Prevents Hate Speech and Misinformation:**
  - Internet shutdowns can help to prevent the spread of **hate speech** and fake news that could incite violence and riots.
  - For example, the government announced the **internet shutdown in Delhi NCR following the farmers' protest on Republic Day** to combat misinformation and maintain law and order.
- **Prevents any Anti-National Activities:**
  - Internet shutdowns can help curb the organization and mobilization of protests that could disrupt public order and security.
  - For example, the government imposed **internet shutdowns in Kashmir** and other parts of the

country after the abrogation of **Article 370** to prevent any anti-national activities and separatist movements.

- **Protects National Security:**
  - Internet shutdowns can help protect national security and sovereignty from external threats and **cyberattacks.**
  - For example, the government suspended internet services in some border areas during the **standoff with China** to prevent any espionage or sabotage.
- **Curb on Objectionable Content from Consumption:**
  - Internet shutdowns can help control the distribution and consumption of content that could be harmful or offensive to certain groups or individuals.
  - For example, the **government blocks internet access in some regions** to prevent the circulation of objectionable images or videos.

### What are the Concerns Related to Internet Shutdown?

- **Violation of Rights:**
  - Internet shutdowns violate Fundamental Rights under **Article 19(1)(a) and Article 19(1)(g).**
    - The freedom of speech and expression and freedom to practice any profession over the medium of the internet enjoy constitutional protection under Article 19(1)(a) and Article 19(1)(g) - the Supreme Court in **Anuradha Bhasin vs Union of India case (2020).**
  - Internet Shutdown also violates **Right to Information** which has been declared as a **Fundamental Right under Article 19** by the Supreme Court in **Raj Narain vs State of UP (1975) case.**
  - Internet Shutdowns also violate the **Right to Internet** which was declared a Fundamental Right under **Article 21** by the Kerala High Court in **Faheema Shirin v. State of Kerala** case.
- **Lack of Accountability:**
  - Shutdowns are **often implemented without clear legal frameworks** or oversight mechanisms, leading to arbitrary and disproportionate restrictions on internet access.
  - The absence of accountability mechanisms exacerbates the risk of abuse of power by authorities, who may impose shutdowns without adequate justification or recourse for affected individuals.

Note:



- **Economic Disruption:**
  - Beyond the immediate social and political implications, **internet shutdowns have significant economic repercussions**. Disruptions to online commerce, communication, and financial transactions disrupt business operations, hinder economic growth, and deter investment, ultimately undermining long-term development objectives.
    - According to Top10VPN, India lost Rs 2,091 crore (\$255.2 million) in the first half of 2023 because of internet shutdowns.
- **Social Disruption:**
  - Shutdowns disrupt the fabric of society by impeding **communication networks, hindering access to vital services**, and isolating individuals from their communities. Social cohesion may suffer as a result, as people are unable to connect, organize, or mobilize effectively, leading to feelings of isolation and alienation.

## Debate on Post-Retirement Appointments for Judges

### Why in News?

The practice of **judges accepting official posts after retirement** has become a subject of debate, particularly in light of recent events where a former judge joined a political party shortly after resigning from the judiciary raised questions about judicial conduct.

### What are the Constitutional Provisions Related to Retired Judges in India?

- **Constitutional Provisions:**
  - **Article 124(7):** It prohibits a retired judge of the Supreme Court from practising before any court or authority in India.
    - This restriction is aimed at maintaining the independence and impartiality of the judiciary.
    - However, the Constitution does not explicitly prohibit retired judges from accepting post-retirement assignments or appointments.
  - **Article 128:**
    - The **Chief Justice of India**, with the President's consent, may request a **retired Judge of the**

**Supreme Court, Federal Court, or High Court** qualified for Supreme Court appointment to sit and act as a Supreme Court Judge.

- **Article 220:**
  - It bars High Court judges from pleading before “any authority in India except the Supreme Court and the other High Courts.”

### ➤ Related Cases and Recommendations:

- **Bombay Lawyers Association v. Union of India:** The Supreme Court dismissed a **public interest litigation (PIL)** petition seeking a **mandatory cooling-off period of two years** for retired judges before accepting post-retirement appointments.
  - The apex court stated that it was not within the court's jurisdiction to mandate a cooling-off period.
  - While dismissing the PIL, the court underscored the importance of enacting **legislation to regulate post-retirement appointments for judges**, thereby leaving the matter to the discretion of the concerned judge or legislative intervention.
- **14<sup>th</sup> Law Commission:** The 14th Law Commission, headed by **MC Setalvad**, had recommended that judges should not take up post-retirement jobs from the government; it also recommended setting the **Cooling-off Period after retirement**.
  - However, there is no specific rule that prevents judges from accepting such positions.

### What are the Arguments Related to Post-Retirement Appointments for Judges?

- **Arguments in Favour:**
  - **Utilisation of Expertise:** Proponents argue that judges possess valuable expertise and experience that can be **beneficial to the government and public service sectors**.
    - By accepting official posts post-retirement, judges can contribute to **policy making and governance** based on their deep understanding of legal principles and judicial processes.
  - **Ensuring Integrity in Official Positions:** Supporters of post-retirement appointments argue that judges are held to **high standards of integrity throughout their careers**, and this integrity is likely to carry over into their roles in official positions.

Note:

- By appointing retired judges to key positions, there's an assurance of upholding ethical standards and impartiality in decision-making.
- **Fulfilling Vacancies Requiring Specialised Knowledge:** Certain official positions require specific expertise or understanding of legal intricacies, which retired judges are well-equipped to provide.
  - These appointments ensure that crucial positions are filled by individuals with deep insights into legal matters, contributing to effective governance and administration.
- **Maintaining a Pool of Talent:** Offering post-retirement appointments ensures that the **country retains the knowledge and skills of seasoned jurists.**
  - It allows for the continued contribution of judicial veterans to public service beyond their tenure on the bench.
- **Arguments Against Post-Retirement Appointments:**
  - **Risk of Compromising Judicial Independence:** Critics argue that accepting official posts after retirement may compromise judicial independence, as it could create perceptions of **favouritism towards the appointing authority.**
    - This **quid pro quo** undermines public trust in the judiciary and raises questions about the impartiality of judicial decisions made during their tenure.
    - The **Restatement of Values of Judicial Life** emphasises the importance of impartiality in judicial conduct. Judges must not only deliver justice but also ensure that their actions uphold public confidence in the judiciary's impartiality.
  - The **Supreme Court of India** adopted the **Restatement of Values of Judicial Life in 1997**, which outlines ethical standards for judges.
  - It emphasises the importance of impartiality, avoiding conflicts of interest, refraining from seeking financial benefits, and being conscious of public scrutiny.
  - **Potential for Conflict of Interest:** There's a concern that post-retirement appointments may create **conflicts of interest**, especially if the former judge's decisions or rulings during their **tenure benefit the appointing authority.**
    - This could erode public confidence in the judiciary and raise doubts about the motivations behind judicial decisions.

- **Destabilising the Judiciary:** These appointments are seen as part of a larger strategy to undermine the **judiciary's independence by gradually eroding its authority and integrity.**
  - By enticing judges with political appointments, the government risks compromising the judiciary's ability to act as a check on executive power.

Position	Appointment Procedure
<u>Chief Justice of India (CJI)</u>	Article 124 (2), vests power on the <b>President to appoint judges of the Supreme Court</b> including the CJI, by warrant under his hand and seal.  The outgoing CJI recommends his successor, typically based on seniority.
Supreme Court Judges	They are also appointed by President.  The proposal is initiated by the CJI. The CJI consults other <b>Collegium</b> members and the senior-most judge of the court from the relevant High Court, Opinions are recorded in writing.  The recommendation is forwarded to the Law Minister, who advises the Prime Minister to advise the President.
Chief Justice of High Courts	The <b>Chief Justice and Judges of the High Courts</b> are to be appointed by the President under clause (1) of Article 217 of the Constitution after consultation with: The CJI and the Governor of the state concerned.

## SC Halts Implementation of Amended IT Rules

### Why in News?

The **Supreme Court** of India has placed a temporary hold on the central government's notification establishing a **Fact Check Unit (FCU).**

- This comes after an appeal was filed in Bombay High Court challenging the **amended Information Technology (IT) Rules, 2023**, which empowered the government to identify **fake news** on social media platforms.

Note:

### Does the Judiciary have Power to Hold a Law before Declaring it Unconstitutional?

- Laws made by Parliament are presumed **constitutional**. While it is subject to **judicial review**, the burden lies with the petitioners in the court to prove it unconstitutional.
  - Courts tend to avoid suspending laws until they determine their constitutionality, balancing judicial review and Parliament's legislative authority.
  - However, the IT Rules in question are not legislative acts but are formulated by the MeitY under powers delegated by Parliament, affecting the presumption of constitutionality.
    - The Supreme Court leans towards the opinion that it fulfils the requirements for an **"explicit finding of unconstitutionality"** resulting in a temporary stay.
- Previous cases, such as the **Maratha reservation law in Maharashtra 2020** and the **farm laws of 2021** (which were later repealed), were temporarily suspended by the Supreme Court.

### What is the Fact Checking Unit and Amended IT Rules 2023?

- **Fact Checking Unit:** The **Ministry of Electronics and Information Technology**, designated the FCU as a statutory body under the **Press Information Bureau (PIB)** as per the amendment made to **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021** in 2023.
  - FCU has been tasked with **flagging content deemed to be false information** related to the central government and its agencies on social media platforms.
- **Key Provisions of IT Rules, 2023 Regarding Fake News:**
  - Online intermediaries, such as social media platforms like **Facebook, YouTube, and Twitter**, along with internet service providers like Airtel, Jio, and Vodafone Idea, are required to ensure they **do not disseminate inaccurate information about the Government of India**.
    - Additionally, these platforms must make reasonable attempts to avoid hosting content related to the Central Government that **has been flagged as false or misleading by a fact-checking unit**.

- If the fact-checking unit identifies any information as false, **online intermediaries will be obligated to remove it**.
  - Failing to do so could result in the loss of their safe harbour protection, which shields them from legal action regarding **third-party content**.

### What are the Exemptions to Intermediaries Regarding Third-party Information Liability?

- **About: Section 2(1)(w) of the Information Technology Act 2000** defines an intermediary as a person who receives, stores or transmits any electronic record and provides any service relating to such record on the behalf of another person.
  - Intermediary includes network service providers, telecom service providers, internet service providers, search engines, web-hosting service providers, online-auction sites, online payment sites, online-marketplaces and cyber cafes.
- **Criteria for Exemptions: Section 79(1) of the IT Act, 2000** grants intermediaries exemption from liability for third-party information, subject to certain conditions:
  - The intermediary's role is limited to providing access to a communication system through which third-party information is **transmitted, hosted, or stored**.
  - The intermediary does not initiate or control the transmission, recipient selection, or content modification.
- **Conditions for Intermediary Liability:** Under Section 79(3) of the IT Act, intermediaries can be held liable for third-party content in specific situations:
  - If they are involved in unlawful acts like **conspiracy, abetting, aiding, or inducing**.
  - If they fail to promptly remove or disable access to unlawful material upon receiving actual knowledge or notification from the government without tampering with evidence.

### What are the Major Concerns Related to the Amended IT Rules, 2023?

- **Potential Arbitrary Enforcement:** There are concerns about the arbitrary nature of how the FCU determines what constitutes false information related to the central government.
  - This could lead to **subjective judgments and selective targeting** of certain viewpoints or individuals.

Note:

- Critics argue that these rules specifically the amendment to Rule 3(1)(b)(v) of the IT Rules 2021 as being violative of **Article 14, Article 19(1)(a) and (g), Article 21 of the Constitution.**
  - The Supreme Court in ***Shreya Singhal vs Union of India (2015)***, held that a law that limits speech can neither be vague nor over-broad.
  - The amendment to Rule 3(1)(b)(v) of the IT Rules 2021 expanded the definition of “fake news” to include fake news involving government business which can lead to potential arbitrary enforcement.
- **Impact on Intermediaries:** The rules place significant responsibilities on online intermediaries to monitor and remove content flagged by the FCU.
  - This could create a burden for these intermediaries and potentially lead to **over-censorship to avoid legal repercussions.**
- **Potential for Misuse:** There are concerns that these rules could be misused by the government to **suppress dissenting opinions or criticism**, particularly against government policies or officials.
  - The lack of robust safeguards against such misuse raises apprehensions about the rules’ overall impact on democratic discourse and transparency.



Note:



# Economic Scenario

## Highlights

- Asia Development Outlook Report 2024
- Government Reviews RERA Functioning
- MPC Keeps Repo Rate Unchanged
- Reform by RBI for Financial Inclusion and Digital Innovation
- RBI to Review Framework on Liquidity Coverage Ratio
- Onion Export Ban & Associated Challenges
- Accelerating Crop Diversification in India
- Food Waste Index Report 2024
- T+0 Settlement Cycle
- India's First Small-Scale LNG Unit in Madhya Pradesh
- Core Sector Industries
- India Rejects China's Claim Over Arunachal Pradesh

## Asia Development Outlook Report 2024

### Why in News?

The [Asian Development Bank \(ADB\)](#) recently released the Asia Development Outlook Report in April 2024 and revised [India's Gross Domestic Product \(GDP\) growth](#) forecast for the fiscal year (FY) 2024 and FY 2025, citing various factors contributing to this optimistic outlook.

### What are the Key Highlights of Asia Development Outlook Report 2024?

#### ➤ Asia's Growth Outlook:

- **About:** Despite uncertain external prospects, Asia is projected to maintain resilient growth in the coming years.
  - Factors such as the conclusion of **interest rate hiking cycles** in most economies and a sustained recovery in goods exports, **particularly driven by improving semiconductor demand**, contribute to the region's broadly positive outlook.
- **GDP Growth Forecast:** Asia's GDP growth forecast for 2024 stands at 4.9%, with a similar projection maintained for 2025.
  - This steady growth trajectory reflects the region's ability to navigate external challenges and sustain economic momentum.
- **Inflation Trends:** Inflation in Asia is expected to moderate, with a forecast of **3.2% for 2024** and a further decrease to 3.0% in 2025.
  - This trend indicates a relatively stable pricing environment, which can support consumer confidence and spending.

#### ➤ India's Growth Forecast:

- **Growth Forecast:** India's investment-driven growth is highlighted as a significant factor in positioning the country as a major economic engine within Asia.
  - ADB now projects India's GDP growth to reach **7% in FY 2024** and **7.2% in FY 2025**, up from the previous forecast of 6.7% for FY 2024.
- **Factors Fueling Growth in FY 2024:**
  - **Higher capital expenditure** on infrastructure development by central and state governments is a major driver of growth.
  - Private corporate investment is expected to rise, supported by stable interest rates and improved consumer confidence.
  - The **service sector's performance**, including financial, real estate, and professional services, is contributing significantly to economic expansion.
- **Growth Momentum in FY 2025:** FY 2025 is expected to witness increased momentum, **driven by improved goods exports**, enhanced manufacturing productivity, and higher agricultural output.
  - The forecast reflects a positive outlook for India's economy, buoyed by its strong domestic demand and supportive policies.
- **Risks and Challenges:** Despite the positive forecast, unanticipated global shocks like **supply disruptions in crude oil markets** and weather-related impacts on agriculture remain key risks.
- The **current account deficit** is projected to widen moderately due to rising imports to meet domestic demand.

Note:



- However, according to recent RBI data, the current account deficit (CAD) decreased sequentially from 1.3% of GDP in Quarter 2 FY24 to **1.2%** in Quarter 3 FY24.

#### What is the Asian Development Bank?

- **About:** Established in 1966, ADB is a regional development bank that envisions a prosperous, inclusive, resilient, and sustainable Asia and the Pacific while sustaining its efforts to eradicate extreme poverty in the region.
  - ADB supports its members and partners through the provision of **loans, technical assistance, grants, and equity investments** aimed at advancing social and economic development.
- **Headquarters:** Manila, Philippines
- **Members:** It currently has 68 members of which 49 are from within Asia and the Pacific and 19 outside.
- **ADB and India:** India is a founding member of ADB and the bank's **fourth-largest shareholder**.
  - ADB supports India's priorities for robust, climate resilient, and inclusive growth, aligned with **ADB's Strategy 2030** and the **country partnership strategy, 2023–2027**.

#### What are the Sectors Driving Asia's Growth?

- **Economic Powerhouse:** Asia is home to several of the world's fastest-growing economies. With **China, Japan and India** being in the top 5 economies of the world.
  - Fueled by economic growth, a burgeoning middle class across Asia is creating a vast pool of consumers, driving demand for goods and services.
    - **Example:** Vietnam is expected to add 36 million people to its middle class by 2030.
- **Home to Manufacturing Hubs:** For decades, Asia has been a dominant manufacturing centre. From **China's dominance in electronics to Vietnam's rise in footwear production**, Asian countries benefit from skilled labour forces and efficient infrastructure, making them cost-competitive and crucial to global supply chains.
- **Rising Trade & Investment:** Asian nations are actively involved in international trade. Regional trade agreements like the **Regional Comprehensive Economic Partnership (RCEP)** create significant trade blocs, boosting intra-Asian trade and foreign investment.

- **Rising Financial Centers:** Asian cities such as **Tokyo, Hong Kong and Singapore** have emerged as major financial centres, attracting investments, fostering entrepreneurship, and facilitating cross-border capital flows.

- The growing influence of Asian financial institutions like the **Asian Infrastructure Investment Bank (AIIB)** reflects the region's increasing role in shaping global economic policies.

#### What is India's Contribution to Asia's Growth?

- **Regional Connectivity:** India has been a key player in promoting regional connectivity in Asia through initiatives like the **International North-South Transport Corridor (INSTC)** and the **India-Middle East-Europe Corridor**.
  - These projects aim to improve transportation networks, trade routes, and economic cooperation between Asia, Africa, and Europe.
- **Renewable Energy:** India is actively promoting renewable energy initiatives that contribute to sustainable development in Asia.
  - The **International Solar Alliance (ISA)**, launched by **India and France**, aims to promote solar energy adoption globally, especially in sun-rich countries in Asia and Africa, thereby addressing energy security and climate change challenges.
- **Capacity Building:** India engages in capacity-building efforts across Asia through initiatives like the **Indian Technical and Economic Cooperation (ITEC) program**.
  - It offers training, education, and skill development opportunities to professionals and students from Asian countries, fostering human resource development and cultural exchanges.
- **Unifying Asia with UPI:** India's **UPI (Unified Payments Interface)** services are becoming increasingly popular in Asia due to their convenience and efficiency in digital transactions.
  - UPI services have already been launched in **Sri Lanka and Mauritius**.

## Government Reviews RERA Functioning

### Why in News?

The Ministry of Housing and Urban Affairs is in the process of reviewing the functioning of the **Real Estate (Regulation and Development) Act, 2016**.

Note:

### What is RERA?

#### ➤ About:

- The **Real Estate (Regulation and Development) Act (RERA)**, is a significant legislation enacted by the Government of India in 2016.
- Its primary objective is to **regulate the real estate sector** and promote transparency, accountability, and **efficiency in real estate transactions**.
- RERA aims to protect the **interests of homebuyers and promote fair practices** in the real estate industry.

#### ➤ Need:

- **Securing the Largest Investment Sector:** Regulation of the real estate sector has been under **discussion since 2013**, and the RERA Act eventually came into being in 2016.
  - Data show that more than **77% of the total assets of an average Indian household are held in real estate**, and it's the single largest investment of an individual in his lifetime.
- **Creating Accountability:** Before the law, the real estate and housing sector **was largely unregulated**, with the consequence that **consumers were unable to hold builders and developers accountable**.
  - The Consumer Protection Act of 1986 was **inadequate to address the needs** of homebuyers.
  - RERA was introduced to ensure greater accountability towards consumers, **to reduce frauds and delays**, and to set up a fast track dispute resolution mechanism.

#### ➤ Major Provisions:

- **Establishment of State-Level Regulatory Authorities, i.e. Real Estate Regulatory Authority (RERA):** The Act provides for State governments to establish **more than one regulatory authority** with the following mandate:
  - Register and maintain a database of real estate projects; publish it on its **website for public viewing**,
  - Protection of interest of promoters, buyers and real estate agents
  - Development of **sustainable and affordable housing**,

- Render advice to the government and **ensure compliance with its Regulations and the Act**.

- **Establishment of Real Estate Appellate Tribunal:** Decisions of RERAs can be appealed in these tribunals.
- **Mandatory Registration:** All projects with a plot size of a **minimum of 500 sq. mt** or eight apartments **need to be registered with Regulatory Authorities**.
- **Deposits:** Depositing 70% of the funds collected from buyers in a separate **escrow bank** account for **construction of that project only**.
- **Liability:** Developer's liability to **repair structural defects** for five years.
- **Penal interest in case of default:** Both promoter and buyer are liable to pay an equal rate of interest in case of any default from either side.
- **Cap on Advance Payments:** A promoter cannot accept more than 10% of the cost of the plot, apartment or building as an advance payment or an application fee from a person without first entering into an agreement for sale.
- **Carpet Area:** Defines Carpet Area as **net usable floor area of flat**. Buyers will be charged for the carpet area and **not the super built-up area**.
  - The **built-up area refers to the total floor area of a building, including all interior and exterior spaces** such as walls, balconies, common areas, and amenities.
- **Punishment:** Imprisonment of up to three years for developers and up to one year in case of agents and buyers for **violation of orders of Appellate Tribunals and Regulatory Authorities**.

#### ➤ Implementation:

- All States/ UTs have notified Rules under RERA **except the State of Nagaland**.
- **32 States/UTs have set up a Real Estate Regulatory Authority** and 28 States/UTs have set up a Real Estate Appellate Tribunal.
- 1,01,304 Real Estate Projects & 72,012 Real Estate Agents have been registered under the provisions of RERA and 1,06,657 complaints have been successfully disposed of by the Real Estate Regulatory Authorities across the country.

Note:

### What is the Status of Home Buyers and Builders under the IBC?

- Under the **Insolvency and Bankruptcy Code (IBC)**, homebuyers have been **granted certain rights and provisions**, primarily through amendments made to the code over the years. **Legal provisions for homebuyers under the IBC are:**
  - **Classification as Financial Creditors:** Through amendments, particularly the 2018 Amendment Act, homebuyers have been categorised as **Financial Creditors**. This means that the **money advanced by a homebuyer to a real estate project is considered a financial debt**, granting them the **status of a creditor under the IBC**.
  - **Right to Initiate Insolvency Proceedings:** Homebuyers have the right to initiate insolvency proceedings against a **defaulting builder company under the IBC**.
    - However, the process involves certain conditions. As per the 2020 Amendment, homebuyers must **jointly file an application for initiation of corporate insolvency** with either at least 100 homebuyers or at least 10% of the homebuyers **in the same real estate project**.
  - **Position in Liquidation Stage:** In case the insolvency process fails and the company is pushed into liquidation, homebuyers are **treated as unsecured financial creditors**.
    - This places them in the **fourth position under the waterfall mechanism of Section 53 of the IBC**.
    - Homebuyers' claims are considered after the dues of insolvency process costs, secured creditors, workmen, and employees are satisfied.

### Why is the Government Reviewing RERA?

- **Assessment of Effectiveness:**
  - The government wants to assess the effectiveness of RERA in achieving its objectives.
  - This includes evaluating its **impact on transparency, accountability, information dissemination**, and grievance redressal in the real estate sector.

- By holding regular meetings with homebuyers and other stakeholders, the government aims to gather feedback on their experiences with RERA.
  - This feedback can help **identify any shortcomings or areas** for improvement in the implementation of the Act.

### ➤ Data Collection:

- The Ministry is setting up a data collection unit to gather data on the functioning of the RERAs over the years.
- This data would provide insights into the number of projects approved, their progress, delays, and other relevant information, **helping in assessing RERA's overall impact**.

### ➤ Uniformity and Compliance:

- The government is focusing on ensuring uniformity in the information available on RERA websites across different states.
- This indicates a push for greater compliance with the provisions of the Act, such as mandatory **publication of annual reports and quarterly progress reports of builders**.
  - During the meeting, the issue of lack of information on the RERA websites was raised which as per the Act should have annual reports and quarterly progress reports of builders.
  - It was also found that there were instances where RERAs had registered projects **without verification of documents**.

### ➤ Possible Amendments:

- The government's review process lays the groundwork for any future changes.
- This suggests a **proactive approach towards addressing any shortcomings** identified during the review process and improving the effectiveness of RERA.

## MPC Keeps Repo Rate Unchanged

### Why in News?

Recently, the **Monetary Policy Committee (MPC)** of the **Reserve Bank of India (RBI)** voted in its meeting to

Note:



keep interest rates unchanged. The repo rate stands at 6.5%.

- The committee also decided to remain focused on the **withdrawal of accommodation**.

#### Note:

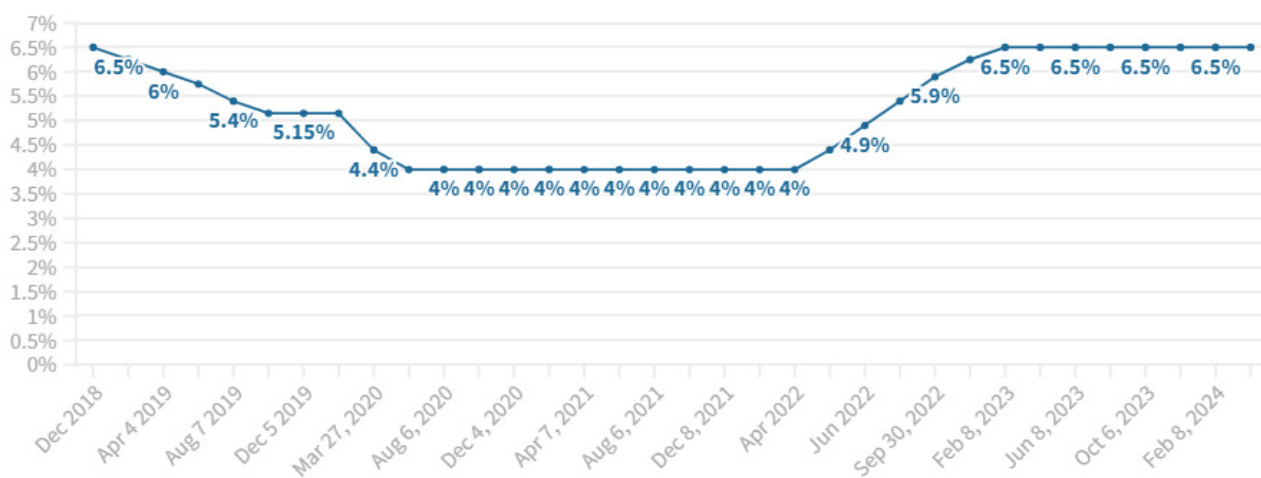
- **Accommodative Monetary Policy: An accommodative stance** means the **central bank is prepared to expand the money supply to boost economic growth**.
- The withdrawal of accommodative policy means a reduction of the money supply in the system which will rein in inflation.

#### What are the Outcomes of the MPC Meeting?

- The **RBI has retained the GDP growth forecast at 7%** for FY25 as against the 7.6% growth projected by the **National Statistical Office (NSO)**.
  - It has projected a growth of **7.1% in the first quarter of FY25**, 6.9 per cent in Q2, and 7% each in Q3 and Q4.
- The **MPC decided to keep the policy repo rate under the liquidity adjustment facility (LAF) unchanged at 6.50%** and the **standing deposit facility (SDF) at 6.25%**.
- The **MPC remains committed to aligning inflation with the 4% target within a band of +/- 2%** while supporting the objective of growth.

#### RBI repo rate

The repo rate is the interest rate at which the RBI lends to commercial banks.



#### What are the Reasons for Holding Interest Rates Unchanged?

- **Food Inflation**
  - Higher food inflation keeps **headline inflation elevated** even though the Indian economy has witnessed broad-based moderation in **inflation**.
  - The **uncertainties in food prices** continue to pose challenges, due to global uncertainties and the effect of **El Nino**.
  - The arrival of **rabi harvests in the market along with expectations of a normal monsoon**, next year will also **alleviate pressure on food prices**.
  - However, the **food and beverages inflation remains elevated** led by price pressures in vegetables, pulses and spices.
- **Festival Season:**
  - The festive season will **promote liquidity in the market due to inflated demand** and increased consumption during festival days.
- **Crude Oil Prices and Input Costs:**
  - **Crude oil prices** have eased, but the outlook remains uncertain, due to global uncertainty because of **regional conflict and supply chain disruptions**.
- **Resilient Economic Activity:**
  - The Indian economy has displayed **resilience despite the uncertainties** and challenges posed by various factors.
  - This has led to the decision **to maintain benchmark rates**, reflecting confidence in the economy's ability to **withstand potential shocks**.

Note:



- **Previous Policy Repo Rate Hikes:**
  - The **Monetary Policy Committee** acknowledged that the previous policy repo rate hikes are still in the process of influencing the economy.
- **Inflation Risk Management:**
  - Keeping rates unchanged might be a **precautionary measure** to closely monitor the situation and be ready to act promptly in case inflationary pressures escalate.

### What is Inflation Targeting?

- **About:**
  - Inflation targeting in India is a **monetary policy framework** that was adopted by the **Reserve Bank of India** in 2016.
  - Under this framework, the **RBI targets the inflation rate and uses monetary policy instruments to achieve it.**
  - Currently, RBI's primary objective is to achieve the **4% inflation target**. The **RBI** has a **comfort zone of +/- 2% within which inflation must remain**. This means that the RBI aims to keep the **inflation rate between 2% to 6%**.
- **Limitations:**
  - **Structural Constraints:** Inflation targeting may **not be effective in addressing supply-side shocks** or structural constraints that affect the economy, **such as inadequate infrastructure**, which can lead to higher inflation.
  - **Exchange Rate Volatility:** Inflation targeting can lead to exchange rate volatility, particularly in countries with open economies, **as changes in interest rates can affect capital flows and exchange rates.**
  - **Socio-Economic Impacts:** Inflation targeting can have social and economic impacts, particularly on vulnerable populations, as changes in interest rates can affect employment, income, and other macroeconomic variables.
  - **Data Availability:** Inflation targeting requires accurate and timely data on inflation and other macroeconomic variables, **which may not be available in all countries, including India.**

## Monetary Policy Committee



### Monetary Policy

- It is formed and managed by **Reserve Bank of India** to control a nation's overall money supply and achieve economic growth
- It is **different from Fiscal Policy** which is managed by the **Ministry of Finance** that measures the spending and taxation in Indian Economy

### Monetary Policy Committee (MPC):

- **Ex-officio Chairperson:** RBI Governor
- **Objective:** To determine the policy rate required to achieve the inflation target (4 +/- 2%, Urjit Patel Committee)
- **Legal Framework:** Under Section 452B of the amended RBI Act, 1934, the Central Government is empowered to constitute a six-member Monetary Policy Committee (MPC)
  - The MPC is required to meet at least four times in a year. Each member of the MPC has one vote, and in the event of an equality of votes, the Governor has a second or casting vote.
- **Monetary Policy Report:** RBI once in every six months, releases Monetary Policy Report to explain the sources of inflation and the forecast of inflation for 6-18 months ahead



## Reform by RBI for Financial Inclusion and Digital Innovation

### Why in News?

Recently, the **Reserve Bank of India (RBI)** governor, in a press conference on monetary policy decisions, announced several changes aimed at **promoting greater economic inclusivity** and enhancing the utilisation of **information technology** for economic activities.

### What are Recent Developments Proposed by RBI?

- **Cash Deposit Facility by Unified Payment Interface (UPI):**

Note:

- Customers will have the option to deposit cash at **cash deposit machines (CDMs)** in banks and **ATMs** using the UPI app.
  - Presently, cash deposits at **CDM** typically necessitate the use of a debit card, whether at banks or **ATMs**.
- UPI is a system that **powers multiple bank accounts into a single mobile application (of any participating bank)**, merging several banking features, seamless fund routing & merchant payments into one hood.
- UPI is currently the biggest among the **National Payments Corporation of India (NPCI) operated systems** including **National Automated Clearing House (NACH)**, **Immediate Payment Service (IMPS)**, **Aadhaar enabled Payment System (AePS)**, **Bharat Bill Payment System (BBPS)**, **RuPay** etc.
- **Allowing Third Party App to access UPI for Prepaid Payment Instruments (PPIs):**
  - Currently, UPI payments from PPIs require using the web or mobile app provided by the PPI issuer.
  - RBI suggested allowing users to use third-party UPI apps to make UPI payments from **PPI wallets**.
- **PPIs** are instruments that facilitate the **purchase of goods and services, conduct of financial services and enable Remittance** facilities, among others, against the money stored in them.
- PPIs can be **loaded/reloaded by cash, debit to a bank account, or credit and debit cards**.
- **Permit FPIs to invest in Sovereign Green Bond:**
  - To encourage broader participation of non-residents in **Sovereign Green Bond**, the RBI has decided to authorise eligible foreign investors in the **International Financial Services Centre** to invest in these bonds.
  - Currently, **foreign portfolio investors (FPIs)** registered with **SEBI** can invest in **Sovereign Green Bond** through various investment routes available for **FPIs** in government securities.
    - **Sovereign Green bonds** are issued by companies, countries and multilateral organisations to **exclusively fund projects** that have **positive environmental or climate benefits** and provide investors with fixed-income payments.
    - The projects can include **renewable energy, clean transportation and green buildings, among others**.

#### ➤ **Mobile App for Retail Direct Scheme:**

- The **RBI** also decided to introduce a **mobile app for its Retail Direct scheme**, launched in **November 2021**.
- This scheme allows individual investors to hold gilt accounts with the **RBI** and invest in **government securities**.
  - **A Gilt Account** is an account opened and maintained for holding Government securities.

#### ➤ **Review of Liquidity Coverage Ratio (LCR):**

- The **RBI** is likely to review the framework on **LCR** for better management of liquidity risk by banks.
- The **LCR** is a ratio that measures the proportion of **high-quality liquid assets (HQLA)** that financial institutions hold.
  - Banks covered under the **LCR** framework **must maintain a stock of HQLA to cover 30 days' net outflow under stressed conditions**, with a minimum **LCR** of 100% since 1<sup>st</sup> January 2019.
- **HQLAs** include cash, short-term bonds, and other cash equivalents, as well as excess **Statutory Liquidity Ratio (SLR)**, **Marginal Standing Facility (MSF)** assets and the Facility to Avail Liquidity for Liquidity Coverage Ratio (**FALLCR**) (set at 15% of the bank's deposits since 1<sup>st</sup> April 2020).

## **RBI to Review Framework on Liquidity Coverage Ratio**

### **Why in News?**

The **Reserve Bank of India (RBI)** is likely to review the framework on **Liquidity Coverage Ratio** for better management of liquidity risk by banks.

- Recent incidents in certain jurisdictions, like **Silicon Valley** and **Signature Bank** in the **US**, have shown the **potential for quick fund withdrawals through digital banking channels during stressful times**.
- The **RBI Governor** highlighted the need to reevaluate the **LCR** framework in response to these emerging risks.

### **What is the Liquidity Coverage Ratio (LCR)?**

- The **LCR** was introduced as part of the **Basel III reforms following the 2008 global financial crisis**.
- The **LCR** is a ratio that measures the proportion of **high-quality liquid assets (HQLA)** that financial institutions hold.

Note:

- Banks covered under the LCR framework **must maintain a stock of HQLA to cover 30 days' net outflow under stressed conditions**, with a minimum LCR of 100% since 1<sup>st</sup> January 2019.
  - HQLA are liquid assets that can be **sold immediately or converted to cash at little or no loss of value**. HQLA can also be used as collateral for borrowing purposes.
  - HQLAs include cash, short-term bonds, and other cash equivalents, as well as excess **Statutory Liquidity Ratio (SLR)**, **Marginal Standing Facility**

**(MSF)** assets and the **Facility to Avail Liquidity for Liquidity Coverage Ratio (FALLCR)** (set at 15% of the bank's deposits since 1<sup>st</sup> April 2020).

- The LCR is a **preventive measure** that can be beneficial for a bank during a financial crisis.
- **Limitation:** The LCR may lead to banks holding more cash and issuing fewer loans, potentially slowing economic growth.
- **Status of LCR:** **Scheduled Commercial Banks** currently maintain an LCR of 131.4%, significantly above the minimum requirement of 100%.

**LCR = High-Quality Liquid Asset Amount (HQLA) / Total Net Cash Flow Amount**

## QUANTITATIVE INSTRUMENTS OF MONETARY POLICY



### LIQUIDITY ADJUSTMENT FACILITY (LAF)

- **Repo Rate (RR):** The rate at which the RBI lends money to commercial banks. Here, RBI **purchases securities**.
- **Reverse Repo Rate:** The rate at which the RBI borrows money from commercial banks within the country. **Opposite of Repo.**
- If RBI wants to signal **tight monetary policy**, it will **increase the repo rate**; banks will **increase their lending rates**.

### BANK RATE

- It is a **long-term rate (RR is short-term)** at which the central bank lends money to other banks.
- **Increase in Bank rate** will increase the **interest rates on the Loans / Deposits** and vice versa.

### STATUTORY LIQUIDITY RATIO (SLR)

- SLR is the minimum percentage of deposits that a commercial bank has to **maintain in the form of liquid cash, gold or other securities**.
- If RBI wants to **tighten the monetary policy**, it will **raise the SLR**.

### CASH RESERVE RATIO (CRR)

- Banks are required to hold a certain proportion of their deposits in the form of **cash with RBI**.
- With the **increase in CRR**, banks **increase the lending rates**.

### OPEN MARKET OPERATIONS (OMOS)

- These include **purchase/sale of government securities** by the Central Bank for **injection/absorption of durable liquidity** in the banking system.



Drishhti IAS

Note:



## Onion Export Ban & Associated Challenges

### Why in News?

Recently, the Indian government allowed **some onion exports to the UAE** despite an ongoing **export ban**, aiming to reduce domestic surplus.

- However, critics allege the selling price in the UAE market is significantly lower than global prices, reducing their profits and raising concerns about unfair practices.

### What is the Current Issue Related to the Export of Onion?

- **Background:** In December, 2023 the Indian government **banned onion exports** to prevent a domestic shortage, but allowed exports to specific countries, such as the UAE, upon **diplomatic requests**.
  - However, the shipments of onions to the UAE have resulted in a considerable **price gap**, with Indian farmers receiving low prices compared to the much higher prices in UAE markets.
    - Example, recently onion prices in **major markets** like the UAE have surged to as high as **\$1500 per tonne**, while India's recent shipments to the UAE were sent at around **\$500 to \$550 per tonne**.
- **Concerns Raised by Exporters:**
  - **Lack of Transparency:** The process of **determining** export prices and **selecting** exporters and importers **lacks transparency**, leading to concerns among farmers and exporters.
    - Exporters allege that **some importers** in the UAE have made **windfall profits** at the **expense of Indian farmers**.
    - The exports are being managed by the **National Cooperative Exports Limited (NCEL)**, a government-owned body in India.
- **Importers** in the UAE receiving these shipments are **private traders** and **supermarket chains**, not government agencies focused on food security.
  - **Violation of Trade Norms:** As per **trade norms**, local onion suppliers bid for the lowest possible price, while buyers are selected based on the highest price offered.
    - However, exporters argue that this **practice** is **not being followed** in the case of the UAE.

### ➤ Concerns Raised by the Onion Farmers:

- **Absence of MSP:** Onion farmers receive **no benefits** from government **Minimum Support Price(MSP)-based procurement** and are solely reliant on market forces.
- **Price Disparity:** Farmers are paid **very low prices** for their onions compared to the prices at which these onions are sold in international markets, leading to **significant losses** for the farmers.
  - **Unseasonal heavy rains** in March and April 2023 damaged a significant portion of harvested onions, making them less suitable for storage, leading farmers to engage in distressed sales of onions prone to rapid quality deterioration.
- **Export Bans:** Frequent bans on onion exports by the government due to domestic shortages can **disrupt the market** and affect **farmers' income**.
  - Most **rabi onion farmers** store their crops after harvesting to prevent moisture and sprouting, selling them gradually from September to October before the next **kharif crop**.
  - Higher realisations in the off-season help them **recoup their losses** from the earlier low-price sales. But steps like the **export ban** dampen their hope of making their due profits.
  - Furthermore, export bans on **staples like rice, wheat, or onions** could damage India's reputation as a dependable global food source, making its restoration challenging.

### What are the Steps Needed to Address the Issues of Onion Farmers in India?

- **Fair Price Mechanism:** Implement a **fair and transparent pricing mechanism** that ensures farmers receive reasonable prices for their onions.
- **Export Policy Review:** There is a time for India to review and revise export policies in line with the General Agreement on Tariffs and Trade to ensure they do not negatively impact farmers, and **promote fair trade practices**.
- **Market Reforms:** Introduce **reforms in the agricultural marketing system** to reduce dependency on middlemen and ensure farmers get fair prices for their produce.
- **Export Price Monitoring:** Monitor export prices closely to ensure they are **in line** with **international market prices** and do not disadvantage domestic farmers.
- **Solar-powered Dehydration Units:** Deploying mobile, **solar-powered dehydration units** at village levels

Note:

can **empower farmers** to dehydrate excess onions during surplus.

- This extends shelf life, minimises spoilage, and creates a readily exportable product.

### **What are the International Treaties/Policies Related to Import and Export of Agricultural Products?**

- **WTO Agreement on Agriculture:** This agreement, resulting from the **Uruguay Round negotiations**, aims to **reform trade** in the sector and to make policies more **market-oriented**.
  - This includes commitments to **reduce subsidies**, lower trade barriers, and make trade more predictable and transparent. **India** is a **party** to the WTO Agreement on Agriculture (AoA).
- **Agreement on the Application of Sanitary and Phytosanitary Measures:** These are measures to **protect human, animal, or plant life** or health from risks arising from the introduction of pests and diseases, or from additives, contaminants, toxins, or disease-causing organisms in food, beverages, or feedstuffs.
  - **India** is a **party** to it.
- **International Plant Protection Convention (IPPC):** This **treaty** protects the **world's plant resources** from the spread and introduction of pests and promotes safe trade.
  - India is a party to the International Plant Protection Convention

#### **What are the Key Facts About Onion?**

- **About:** The onion is an herb that belongs to the lily family. It is an important horticultural commodity **grown worldwide** for their culinary purposes and **medicinal values**.
- **Major Producer:** India is the world's **second-largest** onion producer.
  - **Maharashtra**, Karnataka, Orissa, Uttar Pradesh, Gujarat, Andhra Pradesh, and Tamil Nadu are the major onion-producing states.
  - **Maharashtra** ranks **first** in Onion production with a share of 42.53% followed by Madhya Pradesh with a share of 15.16% in 2021-22 (3rd Advance Estimate).
- **Export Destination:** Major export destinations of Indian onion include **Bangladesh, Malaysia, United Arab Emirates, Sri Lanka** and Nepal.

## **Accelerating Crop Diversification in India**

### **Why in News?**

In recent years, West Bengal has been witnessing a significant transformation in its agricultural landscape through **crop diversification**, particularly in districts bordering Bangladesh.

- This shift is characterised by **farmers moving away from traditional wheat cultivation towards alternatives** like bananas, lentils, maize, and other crops.

### **What are the Reasons Behind the Shift from Wheat Production?**

- **Wheat Blast Disease:** The emergence of **wheat blast disease in Bangladesh in 2016** led to a two-year ban on wheat cultivation in border areas of West Bengal, including Murshidabad and Nadia districts, prompting farmers to explore alternative crops.
  - **Wheat blast disease is a fungal infection** caused by the fungus *Magnaporthe oryzae Triticum (MoT)* that primarily affects wheat crops.
    - It manifests as dark lesions on wheat spikes, leaves, and stems, leading to severe yield losses.
- **Economic Viability:** Farmers have highlighted the economic advantages of cultivating alternative crops such as **bananas**.
  - The profitability of crops like bananas during peak seasons, coupled with stagnant wheat prices and concerns over water consumption, has contributed to the shift.
- **Shift to Higher Output Crops:** **Maize** cultivation has seen a significant uptick in the area as well, with production increasing eightfold from 2011 to 2023.
  - While **maize prices may be lower** per quintal compared to wheat, **higher per-hectare output and demand from poultry** and food processing industries make it a lucrative alternative.
  - **Pulses** and **oilseeds** production in this area has also surged.

Note:

Type of diversification	Nature of diversification	Potential benefit
Improved structural diversity	Makes crops within the field more structurally diverse	Pest suppression
Genetic diversification in monoculture	Cultivation of mixture of varieties of same species in a monoculture	Disease suppression, Increased production stability
Diversify field with fodder grasses	Growing fodder grasses alongside of food/pulse/oilseed/vegetable etc.	Pest suppression, opportunity to livestock farming
Crop rotations	Temporal diversity through crop rotations (Sequential cropping)	Disease suppression, Increased production stability
Polyculture	Spatial and temporal diversity of crops (Growing two or more crop species within the field)	Insect, pest disease suppression, climate change buffering and increased production
Agroforestry	Growing crops and trees together (Spatial and temporal diversity)	Pest suppression and climate change buffering
Mixed landscapes	Development of larger-scale diversified landscapes through mixture of crops and cropping system with multiple ecosystems	Pest suppression and climate change buffering
Micro-watershed based diversification	Integration of crop with other farming components for year round income and employment generation, besides sustaining soil and environmental health	Insect, pest and disease suppression, climate change buffering and increased production, employment and income

### Why India Needs to Focus on Crop Diversification?

➤ **About:** Crop diversification refers to the **practice of growing a variety of crops** on a farm instead of focusing on a single crop.

- The **Green Revolution in India**, through the introduction of **high-yielding rice and wheat varieties**, resulted in a substantial increase in food output, effectively reducing hunger and malnutrition.
  - However, the monoculture of these crops led to a decrease in crop variety, causing the **decline of traditional, region-specific strains** and a loss of genetic diversity.
  - For instance, India has **lost over 100,000 traditional rice varieties** since the 1970s due to the Green Revolution's impact.
- Therefore, there is a need to shift towards crop diversification to promote sustainable agriculture.

➤ **Benefits of Crop Diversification:**

- **Risk Reduction:** In regions prone to drought, farmers can diversify their crops by growing both **drought-tolerant varieties** (like millets or sorghum) and **water-intensive crops** (like rice or vegetables).

- If there's a water shortage, the drought-tolerant crops can still thrive, ensuring some level of harvest despite adverse conditions.
- **Soil Health Improvement:** Planting **leguminous crops** like **soybeans** or **peanuts** can fix nitrogen in the soil, benefiting subsequent crops such as **maize or wheat** that require nitrogen-rich soil for optimal growth.
- **Market Opportunities:** Diversifying crops can help farmers tap into niche markets or emerging trends.
  - For example, the **rising demand for organic produce** presents an opportunity for farmers to diversify into organic farming, which often commands higher prices in the market compared to conventionally grown crops.
- **Pest and Disease Management:** Intercropping or mixed cropping, a form of crop diversification, can help manage pests and diseases.
  - For instance, **planting marigold flowers** alongside vegetable crops can deter pests, **reducing the need for chemical pesticides** and promoting natural pest control mechanisms.
- **Source of Biofuels:** Crops like **Jatropha** and **Pongamia** are potential sources for **biofuel**.

Note:

**production.** This can offer farmers additional income opportunities and contribute to India's energy security.

➤ **Concerns:**

- **Market Risks and Limited Opportunities:** Farmers are often hesitant to switch from established crops like rice and wheat (**which have assured government support through MSP**) to lesser-known crops.
  - These alternatives may have fluctuating market prices or limited demand, leading to potential income loss.
- **Financial Constraints:** Diversifying crops can require **additional investment in seeds, equipment,** and even acquiring new knowledge about cultivation practices.
  - **Smallholder farmers,** who make up a significant portion of India's agricultural sector, may not have the financial resources to readily adopt these changes.
  - Also, Millets like Jowar, Ragi, and Bajra are gaining traction due to their high nutritional value and ability to thrive in marginal lands.

➤ However, creating a robust market for these requires investment in **processing facilities** to convert them into **consumer-friendly products** like ready-to-eat mixes or breakfast cereals.

- **Lack of Infrastructure and Storage:** Perishable, diversified crops often require **specialised storage and transportation facilities** that may not be readily available in rural areas.
  - Without proper infrastructure, these crops can spoil quickly, leading to wasted produce and lost income.
- **Clash With Dietary Habits:** Crop diversification in India, particularly in regions where **rice and wheat are staples** for a significant portion of the population, could potentially disrupt the established market dynamics and consumption patterns prevalent in these areas.

#### What are the Steps Taken by the Government Regarding Crop Diversification?

- **Crop Diversification Programme:** The Department of Agriculture & Farmers Welfare (DA&FW) has been implementing the **Crop Diversification Programme (CDP)** since 2013-14, as part of the **Rashtriya Krishi Vikas Yojana (RKVY)**, specifically targeting the Original Green Revolution States- **Haryana, Punjab, and Western Uttar Pradesh.**

- This initiative aims to **shift focus from water-intensive paddy cultivation to alternative crops** such as pulses, oilseeds, coarse cereals, nutri cereals, and cotton.

➤ **Mission for Integrated Development of Horticulture (MIDH):** It is a **Centrally Sponsored Scheme** for the holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo.

➤ **Increase in MSP for Kharif Crops:** The **Cabinet Committee on Economic Affairs (CCEA)** has approved an increase in the **Minimum Support Prices (MSP)** for all mandated Kharif crops for the Marketing Season 2023-24.

➤ **Mera Pani-Meri Virasat Scheme (Haryana):** It offers financial aid to farmers transitioning from paddy cultivation to water-saving alternatives like pulses, oilseeds, millets, and vegetables.

## Food Waste Index Report 2024

### Why in News?

Recently, the **Food Waste Index Report 2024**, was released jointly by the **United Nations Environment Programme (UNEP)** and **WRAP (Waste and Resources Action Programme)**, a UK based non-profit organisation, stressed the importance of expanding and strengthening data infrastructure to enable the tracking and monitoring of food waste.

- WRAP is a climate action NGO working around the globe to tackle the causes of the climate crisis and give the planet a sustainable future.
- The report defines **“food waste”** as **“food and the associated inedible parts removed from the human food supply chain”**.
- **Food Loss** is defined as **“all the crop and livestock human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/slaughter production/supply chain up to, and excluding, the retail level”**.

Note:



**Note:**

The Food Waste Index Report is tracking **country-level progress to halve food waste by 2030 (SDG 12.3)**. SDG 12 aims to ensure **sustainable consumption and production patterns**.

- First published in 2021, the current report builds on **recent and greater datasets and provides an update** on the scale of food wasted worldwide, as well as a focus on multi-stakeholder collaboration through **Public Private Partnerships (PPP)** as a solution.

**What are the Key Highlights of the Report?**

- **Magnitude of Food Waste:**
  - In 2022, the world wasted 1.05 billion tonnes of food, **amounting to one fifth (19%) of food available to consumers being wasted**, at the retail, food service, and household level.
  - That is in addition to the 13% of the world's food lost in the supply chain, as estimated by **FAO (Food and Agricultural Organization)**, from post-harvest up to and excluding retail.
- **Food Waste and GreenHouse Gas Emission:**
  - Food loss and waste generates 8-10% of **Global Greenhouse Gas (GHG)** emissions – almost **five times the total emissions from the aviation sector**.
    - It occurs while a **third of humanity faces food insecurity**.
- **Lower Disparity in Food Waste:**
  - Since the release of the **2021 Food Waste Index Report**, there has been a significant expansion in data coverage, resulting in a notable reduction in disparities in average per capita household food waste.
  - Across high-income, upper-middle income, and lower-middle income countries, the observed average levels of household **food waste differ by just 7 kg per capita per year**.
- **Temperature and Food Waste Correlation:**
  - Hotter countries appear to have **more food waste per capita** in households, potentially due to **increased consumption of fresh foods** with substantial inedible parts and lack of robust cold chain.
  - Higher seasonal temperatures, extreme heat events, and droughts make it more challenging to **store, process, transport**, and sell food safely,

often leading to a significant volume of food being wasted or lost.

- **Urban-Rural Disparities:**
  - Middle-income countries display variations between urban and rural populations, with **rural areas generally wasting less**.
  - Possible explanations include greater **diversion of food scraps to pets, animal feed, and home composting in rural areas**.
- **Lack Adequate System to Track Progress:**
  - Many low- and middle-income countries continue to **lack adequate systems for tracking progress** to meet Sustainable Development Goal 12.3 of halving food waste by 2030, particularly in retail and food services.
  - At present, **only four G-20 countries** (Australia, Japan, UK, US) and the **European Union** have food waste estimates suitable for tracking progress to 2030.
- **Data Variance and Subnational Estimates:**
  - Countries like India, Indonesia, and South Korea **have only subnational estimates regarding food waste**, highlighting a gap in comprehensive national data.
  - The report suggests that this variance necessitates more inclusive studies to capture a clearer picture of the food waste landscape.

**What are the Key Recommendations of the Food Waste Index Report 2024?**

- **Engagement of G20 Countries:**
  - Encourage G20 countries to take a leading role in international cooperation and policy development to achieve **Sustainable Development Goal (SDG) 12.3**, leveraging their influence on global consumer trends to promote awareness and education about food waste domestically and internationally.
- **Promotion of Public Private Partnerships:**
  - Encourage the embrace of Public Private Partnerships (PPPs) to reduce food waste and its impacts on climate and water stress, bringing together governments, regional and industry groups to collaborate and deliver a shared goal through a **Target-Measure-Act approach**.
- **Utilisation of the Food Waste Index:**
  - Advocate for countries to **use the Food Waste Index to consistently measure** food waste, develop robust national baselines, and track progress towards SDG 12.3. This includes **addressing the**

Note:



lack of comprehensive food waste data collection, especially in the retail and food service sectors.

- **Conducting Representative National Food Waste Studies:**
  - Highlight the necessity for representative national food waste studies in key countries such as **India, China, South Africa, Indonesia, and Mexico** to address the variance in data and effectively tackle food waste at both individual and systemic levels.
- **Collaborative Efforts Across Sectors:**
  - There is a need to urge governments, cities, food businesses, researchers to collaborate in efforts to reduce food waste, emphasising the importance of accurate measurement, innovative solutions, and collective action to achieve SDG 12.3 by halving global food waste by 2030.

#### What are the Key Efforts Related to Food Loss and Waste?

- **Constitutional Provision:**
  - Though the Indian Constitution does not have any explicit provision regarding the right to food, the fundamental right to **life enshrined in Article 21 of the Constitution** can be interpreted to include the right to live with human dignity, which may include the right to food and other basic necessities.
- **Buffer Stock:**
  - **Food Corporation of India (FCI)** has the prime responsibility of procuring the food grains at **minimum support price (MSP)** and stored in its warehouses at different locations and from there it is supplied to the state governments in terms of requirement.
- **National Food Security Act, 2013 (NFSA):**
  - It marks a paradigm shift in the approach to food security from welfare to rights-based approach.
  - **NFSA covers 75%** of the rural population and 50% of the urban population under:
    - **Antyodaya Anna Yojana:** It constitutes the poorest-of-the-poor, who are entitled to receive 35 kg of foodgrains per household per month.
    - **Priority Households (PHH):** Households covered under PHH category are entitled to receive 5 kg of foodgrains per person per month.

## T+0 Settlement Cycle

### Why in News?

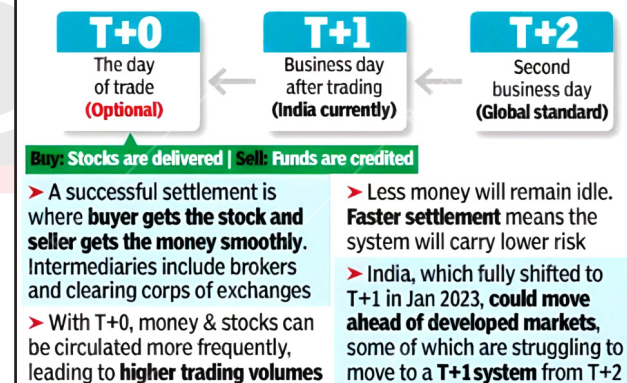
Recently, the **Bombay Stock Exchange (BSE)** and **National Stock Exchange (NSE)** introduced trading in the **T+0 beta version of the settlement cycle** in the equity segment on an optional basis.

- This came after the **Securities and Exchange Board of India (SEBI)** issued operational guidelines for the launch of the shorter tenure settlement cycle.

**Note:** The term “Beta Version” refers to a **pre-release version of software** or a product that is still in the testing phase.

- Beta versions may contain some features that are still in development or may not yet be fully functional, and they are often subject to further refinement based on user feedback before the final release.

### SPEEDING UP BOTH BUYING & SELLING



### What is the T+0 Trading Settlement Cycle?

- **About:**
  - In December 2023, the SEBI proposed to introduce a facility for clearing and settlement of funds and securities on T+0 (same day) on an optional basis, in addition to the existing **T+1 settlement** cycle.
  - Under the T+0 trade cycle, the settlement of trades would occur on the same day after the closure of **the T+0 market**.
    - This means that if investors sell a share, they would receive the money credited to their **account on the very same day**, and the buyer would also get the shares in their demat account on the day of the transaction itself.

Note:

- This is the world's fastest stock settlement system.
  - In comparison, the current T+1 system involves a **delay of one business day between the trade execution date** and the settlement date.
    - In this system, sellers only receive 80% of their cash on the day of sale, with the remaining 20% available the following day.
    - However, with the introduction of the new T+0 settlement system, sellers would have instant access to 100% of their cash on the day of the transaction, eliminating the need to wait for the following day for the remaining amount.

➤ **Benefits:**

- A shortened settlement cycle **will bring cost and time efficiency**, transparency in charges to investors, and strengthen risk management at clearing corporations and the overall securities market ecosystem.
- The T+0 trade cycle is **expected to provide flexibility in terms of faster pay-out of the funds** against the securities to the sellers and faster pay-out of securities against the funds to the buyers.
- It will allow better control over funds and securities by the investors.
- For the securities market ecosystem, a **shorter settlement cycle will further free up capital** in the securities market, thereby enhancing the overall market efficiency.
- It will enhance the overall risk management of Clearing Corporations (CCs) as the trades are backed by upfront funds and securities.

➤ **Stages of Settlement:**

- There will be two stages to the T+0 settlement cycle.
- **Phase 1 deals** made up to 1:30 pm will be taken into account for the settlement, which must be finished by 4:30 pm.
- Trading will begin at 1:30 pm and last until 3:30 pm in the **second phase and the first phase will be discontinued.**
  - SEBI has proposed the initial rollout of the T+0 settlement for the top 500 listed equity shares in three tranches (200, 200,100) based on market capitalization.
    - This initiative corresponds to the changing Indian securities market, marked by surging volumes, values, and participants.

## T+ 0 settlement: Sebi for 2 phase implementation

BS

### Phase 1

▶ Custodian clients, such as FPIs and certain institutional investors, will be kept out

▶ For trades until 1:30 pm, settlement to be done by 4:30 pm on the same day

▶ Exchanges will create a separate group or series for stocks under T+0

▶ To be available in tranches for top 500 firms by mcap

### Phase 2

▶ All investors are likely to be permitted

▶ Shorter settlement to be available for trades until 3:30 pm

▶ Once phase 2 is implemented, phase 1 will be discontinued



## India's First Small-Scale LNG Unit in Madhya Pradesh

### Why in News?

The **Union Minister for Petroleum and Natural Gas** recently inaugurated India's first **small-scale liquefied natural gas (SSLNG)** unit at GAIL (India) Ltd's Vijaipur complex in Madhya Pradesh.

- This development is part of the government's broader initiative to promote the **use of natural gas** in various sectors and increase its share in the country's primary energy mix to **15% by 2030**.

### What is LNG and SSLNG?

- **About:** Liquefied natural gas (LNG) is natural gas that has been cooled to a liquid state, about **-260°F (-162°C)**, to make it easier and safer to store and transport.
  - Natural gas is a cleaner and more economical alternative to conventional hydrocarbons like **coal and oil**, making it crucial in India's transition towards greener energy sources.
    - The primary component of natural gas is **methane**, comprising 70-90% of its composition.

Note:



- According to the IEA, Natural gas accounts for about a quarter of global electricity generation.
  - Presently in India the share of natural gas in the energy basket is **6.7%**.
- The top natural gas producing countries are the **United States, Russia and Iran.**
- **Small-Scale LNG:** SSLNG involves **liquefying and transporting natural gas on a smaller scale**, catering to areas without pipeline connections using specialised trucks and vessels.
  - Starting from large-scale LNG import terminals, **SSLNG can supply LNG directly to consumers via cryogenic road tankers** or small vessels, either as a liquid or regasified for traditional uses.
  - It will lead to reduced dependency on **costly gas imports**, especially if it replaces a significant portion of **diesel consumption**, leading to substantial foreign exchange savings.
    - It also promotes cleaner energy and supports India's transition towards sustainable fuel sources.
- **Major Applications:**
  - **Transportation:**
    - **Marine Fuel:** LNG is increasingly used as a fuel for ships and vessels, especially in **emission-controlled areas**, due to its lower emissions of sulphur oxides (SOx) and particulate matter compared to traditional marine fuels.
    - **Road Transport:** LNG is used as a fuel for **trucks, buses, and other heavy-duty vehicles**, offering reduced emissions of nitrogen oxides (NOx), particulate matter, and greenhouse gases compared to diesel.
  - **Industrial Applications:**
    - **Power Generation:** LNG is used in **gas-fired power plants** to generate electricity, providing a cleaner alternative to coal or oil-fired power plants with lower emissions of pollutants.
    - **Heating and Cooling:** LNG can be used in industrial processes for **heating and cooling applications**, such as in manufacturing, food processing, and refrigeration.
- **Energy Storage and Backup:**
  - **Renewable Energy Integration:** LNG can complement **renewable energy sources** like wind and solar by providing backup power when renewable generation is intermittent or unavailable.
- **Related Challenges:**
  - **High Costs:** Building LNG liquefaction and regasification facilities is expensive. Additionally, the transportation process itself requires specialised cryogenic (super cold) carriers, further adding to the cost.
    - Countries like China have successfully integrated LNG in commercial vehicles, but India faces challenges such as **limited availability of LNG vehicles**, higher initial costs, and a **lack of financing and retail networks for LNG.**
  - **Environmental Impacts:** While cleaner than coal, LNG production and transportation still have some environmental impact, such as **methane emissions.**
    - Methane is the **second-most abundant GHG after CO<sub>2</sub>**. Although methane dissipates faster than CO<sub>2</sub> in the atmosphere, it has a much stronger planetary warming effect.
  - **Safety Concerns:** LPG is highly flammable and can pose significant safety risks if not handled properly. Improper storage, handling, or use can lead to leaks, fires, or explosions.

#### What is Compressed Natural Gas?

- **About:** CNG is natural gas that has been compressed under **high pressure**, allowing it to occupy a smaller volume in fuel tanks.
  - It is usually compressed at pressures ranging from **200 to 250 kg/cm<sup>2</sup>**, reducing its volume to less than **1% of its size at atmospheric pressure.**
    - Unlike LPG, which is a mixture of compressed propane and butane, **CNG primarily consists of 80 to 90% methane in a gaseous state.**
  - The **distinction between CNG and LNG lies in their physical states:** CNG exists as a gas, whereas LNG exists as a liquid which is then regasified for usage.

Note:

### ➤ Advantages of CNG:

- **Lighter than air**, disperses quickly in case of leaks.
- Clean burning with minimal residue, reducing engine maintenance.
- Lower greenhouse gas emissions compared to petrol or diesel.
- High safety due to its **high auto-ignition temperature**.
- Cost-effective compared to petrol and diesel, with a higher calorific value.

### ➤ Disadvantages of CNG:

- Requires large fuel tanks.
- Limited range per fill-up.
- Fewer filling stations available.
- Retrofitting older vehicles for CNG is challenging.

- **BioCNG: BioCNG**, also known as **biomethane**, is a renewable, clean-burning transportation fuel made from organic waste. It's produced by upgrading biogas to natural gas quality.

## Core Sector Industries

### Why in News?

India's **core sector output** witnessed a notable surge in February 2024, with growth reaching a **three-month high of 6.7%**. This growth was primarily driven by significant increases in **coal, natural gas, and cement production**.

### What is the Core sector?

#### ➤ About:

- The core sector in India comprises eight key industries: **coal, crude oil, natural gas, refinery products, fertilizers, steel, cement, and electricity**.
  - The growth rate of the core sector is a crucial indicator of the overall health of the Indian economy. A strong growth rate in the core sector often signals a positive economic outlook.

#### ➤ Significance:

- The core sector's performance is considered a key indicator of a **country's overall industrial and**

**economic performance**, serving as a barometer for gauging the health of the economy and predicting future economic trends. For example, steel is a critical material for construction, automobiles, and machinery. Electricity is essential for powering factories, homes, and businesses.

- The core sector industries have significant interconnections with other sectors. This interdependence creates a **multiplier effect**, where changes in the core sector's growth or contraction impact the entire economy.
- Core industries are essential for developing a country's infrastructure. Production of steel, cement, and electricity is necessary for building roads, bridges, and power plants.

### What is Core Sector Growth?

- Core sector growth refers to the **growth rate or the increase in output/production from the core industries** of an economy over a given period of time, typically measured on an annual or monthly basis.

- The core sector growth is calculated by **combining the growth rates of these individual industries, using their respective weights** in the overall Index of Core Industries (ICI)

#### ➤ Index of Eight Core Industries (ICI):

- The **Index of Eight Core Industries (ICI)** is prepared every month and released by the **Office of the Economic Adviser (OEA), Department for Promotion of Industry and Internal Trade (DPIIT), and Ministry of Commerce & Industry**.
- The ICI comprises various components that collectively reflect the performance and vitality of India's industrial sector. These components include:
  - **Coal:** Coal production, excluding Coking coal.
  - **Electricity:** Electricity generation from thermal, nuclear, hydro sources, and imports from Bhutan.
  - **Crude Oil:** Total crude oil production.
  - **Cement:** Production in both large plants and mini plants.
  - **Natural Gas:** Total production of natural gas.
  - **Steel:** Production of alloy and non-alloy steel only.

Note:





- **Refinery Products:** Total refinery production.
- **Fertiliser:** Production of urea, ammonium sulphate, calcium ammonium nitrate, complex grade fertiliser, single superphosphate, among others.

**Note:**

- The **Index of Industrial Production (IIP)** is a key indicator for measuring the growth rates in different industry groups of the economy in a fixed period.
  - It is a composite index that shows **short-term changes in the production volume** of a basket of industrial products compared to a chosen base period.
  - The Eight Core Industries comprise above 40 percent of the weight of items included in the Index of Industrial Production (IIP).
- The index is compiled and published monthly by the **Central Statistical Organisation (CSO)** six weeks after the reference month ends. It is crucial for the government for policy planning and analysis.
  - The level of IIP is an abstract number representing the status of industrial production compared to a reference period, with the **current base year 2011-12**.
- The current weightage, of eight core industries is Petroleum Refinery Products (28.04%) > Electricity (19.85%) > Steel (17.92%) > Coal (10.33%) > Crude Oil (8.98%) > Natural Gas (6.88%) > Cement (5.37%) > Fertiliser (2.63%).

- ICI for a reference month is released with a time lag of one month on the last day of the next month, which is about **twelve days prior to the release of Index of Industrial Production (IIP)** for the reference month.
- The choice of the base year of ICI is according to the choice of base year for the IIP.
  - The **base year** in the current series of ICI is **2011-12**.
- The ICI is widely used by policymakers, including the Ministry of Finance, other Ministries and Departments, Banks financing Infrastructure projects, the **Reserve Bank of India (RBI)**, and the Railway Board.

**What are the Recent Trends in the Core Sector?**

- India's eight core sectors witnessed a notable uptick in output growth of **6.7% in February 2024**.
  - This growth was primarily led by double-digit increases in coal, natural gas, and cement production.
- Despite overall growth, fertilisers' production contracted by 9.5% in February 2024, marking the sharpest decline since May 2021.
- Cumulative growth in the core sector for the fiscal year 2023-24 has been robust at 7.7%, surpassing the growth rate of 6.8% recorded in the 2022-2023. This indicates overall resilience and positive momentum in industrial activity.



Note:



# International Relations

## Highlights

- Africa at Centre of India's Vision for Global South
- Unite Aware Platform
- India Stands with the Philippines in the South China Sea
- Katchatheevu Island
- Addressing Antimicrobial Resistance

## India Rejects China's Claim Over Arunachal Pradesh

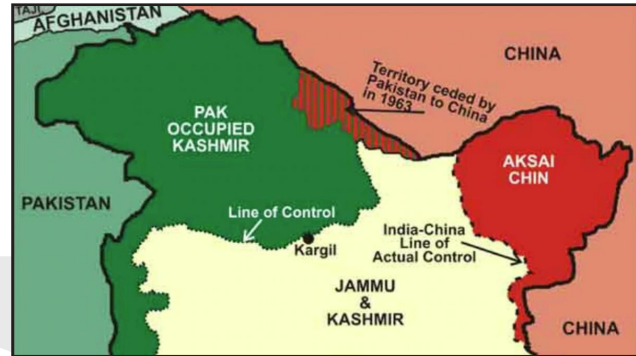
### Why in News?

Recently, China has renamed some places in Arunachal Pradesh, which India rejected stating that assigning "invented" names does not **alter the reality that the state "is, has been, and will always be" an integral part of India.**

- The Chinese Ministry of Civil Affairs released the fourth list of standardised geographical names in Zangnan, the Chinese name for Arunachal Pradesh, which Beijing claims as part of south **Tibet**.
- In April 2023 too, India had reacted sharply when China released the **third list of standardised names of 11 places in Arunachal Pradesh.**

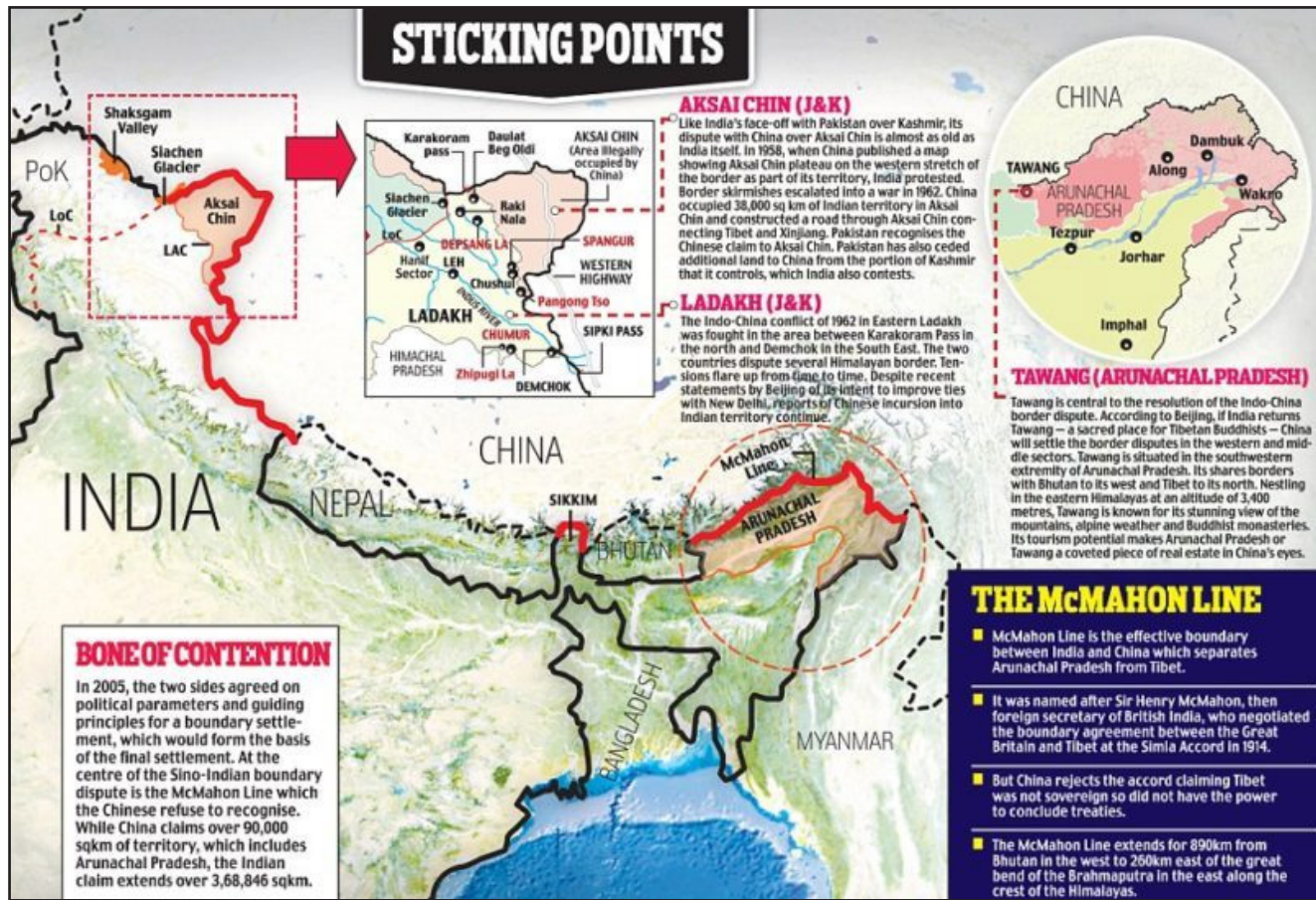
### What is the Border Dispute between India and China?

- **Background:**
  - The India-China border dispute **refers to the long-standing and complex territorial disputes** along their shared border of 3,488 kilometres.
  - The main areas of dispute are Aksai Chin, located in the western sector, and Arunachal Pradesh, **in the eastern sector.**
    - **Aksai Chin:** China administers Aksai Chin as part of its Xinjiang region, while India considers it part of its UT of Ladakh. The region holds strategic significance due to its proximity to the **China-Pakistan Economic Corridor (CPEC)** and its potential as a military route.
    - **Arunachal Pradesh:** China claims the entire state of Arunachal Pradesh, referring to it as "South Tibet". India administers this region as a northeastern state and considers it an integral part of its territory.



- **No Clear Demarcation:** The border between India and China is not clearly demarcated throughout and there is no mutually agreed **Line of Actual Control (LAC)** along certain stretches. LAC came into existence after the **1962 Indo-China war.**
  - The India-China border is divided into three sectors.
    - Western Sector: Ladakh
    - Middle Sector: Himachal Pradesh and Uttarakhand
    - Eastern Sector: Arunachal Pradesh and Sikkim
- **Military Standoffs:**
  - **1962 Sino-Indian War:** The border dispute has led to a number of military standoffs and clashes, including the **1962 Sino-Indian War.** Both the countries have made efforts to manage the tensions, with various agreements and protocols aimed at maintaining peace along the border.
  - **Recent Faceoffs:** Since 2013, there have been heightened frequency of serious military confrontations between India and China along the **Line of Actual Control (LAC).**
    - The most serious recent episodes of conflict were the 2017 standoff in **Doklam** region, in **Galwan Valley in Ladakh in 2020** and in **Tawang** in Arunachal Pradesh in 2022.

Note:



### How is India Responding to China's Aggressive Measures?

- **Global Strategic Alliances:** India actively engages with like-minded nations to collectively address China's influence in the Indian Ocean Region.
  - **QUAD:** All four member nations find a common ground of being democratic nations and also support the common interest of unhindered maritime trade and security.
  - **I2U2:** It is a new grouping of India, Israel, the USA, and the UAE. Forming alliances with these countries strengthens India's geopolitical standing in the region.
  - **India-Middle East-Europe Economic Corridor (IMEC):** Launched as an alternative trade and connectivity corridor to **China's BRI**, IMEC aims

to strengthen India's presence in the Arabian Sea and the Middle East.

- **International North-South Transport Corridor (INSTC):** INSTC, formed by India, Iran, and Russia, spans 7,200 km, linking the Indian Ocean, Persian Gulf, and Caspian Sea. With **Chabahar Port** as a **key node**, it strategically counters China, providing an alternative to **CPEC's Gwadar port**.
- **India's Necklace of Diamonds Strategy:**
  - In response to China's String of Pearls strategy, India adopted the **Necklace of Diamonds strategy**, emphasising the encirclement of China by enhancing its naval presence, expanding military bases, and strengthening diplomatic ties with regional nations.
    - This strategy aims to counter China's military network and influence in the Indo-Pacific and Indian Ocean regions.

Note:



#### ➤ Infrastructure Projects Along Borders:

- India has been actively enhancing its border infrastructure to strengthen its position along the India-China border.
- The **Border Roads Organisation (BRO)** has completed 90 infrastructure projects along the **India-China border, worth Rs 2,941 crore.**
  - As of September 2023, 36 of these projects are in Arunachal Pradesh, 26 in Ladakh, and 11 in Jammu and Kashmir.

#### ➤ Cooperation With Neighbors:

- India is actively engaging in regional partnerships with neighbouring countries to mitigate Chinese influence.
  - Recently, India has supported the development of the **Gelephu mindfulness city** in Bhutan.
- Furthermore, India has strengthened ties with Nepal through a recent power pact signed during the visit of India's External Affairs Minister to Kathmandu.
  - In 2024, the two countries signed a **bilateral agreement for the export of 10,000 MW of power** over the next 10 years.
  - They also inaugurated three cross-border transmission lines, including the 132 kV Raxaul-Parwanipur, 132 kV Kushaha-Kataiya, and New Nautanwa-Mainahiya lines
- These efforts underscore India's strategy of fostering cooperation with neighbouring nations to **bolster regional stability and reduce Chinese influence** in the area.

### What have been the Previous Efforts to Settle Indo-China Border Disputes?

#### ➤ Shimla Agreement of 1914:

- To demarcate the boundary between Tibet and North East India, a convention was **held at Shimla in 1914**, representatives of all three i.e. Tibet, China, and British India.
- After the discussion, the agreement was **signed by British India and Tibet but not by the Chinese officials.** Presently India recognizes but China rejected both the Shimla agreement and the McMahon line.

#### ➤ Panchsheel Agreement of 1954:

- The Panchsheel doctrine clearly indicated the willingness to 'Respect each other's sovereignty and territorial integrity'.
- **China initially accepted** the Panchsheel principles, and the agreement served as a basis for **bilateral relations between the two countries.** However, over time, the Panchsheel Agreement faced challenges, **especially during the Sino-Indian War of 1962.**

#### ➤ The Agreement on the Maintenance of Peace and Tranquility:

- It was signed in 1993, which called for a renunciation of the use of force, recognition of the LAC, and the resolution of the border issue through negotiations.
- The agreement laid the groundwork for stability and security in border areas, but tensions persisted.
- **China accepted this agreement, but their effectiveness varied over time** due to changing geopolitical dynamics and occasional border tensions

#### ➤ The Agreement on Confidence Building Measures in the Military Field along the LAC:

- It was signed in 1996, which laid down pledges on non-aggression, prior notification of large troop movements, and exchange of maps to resolve disagreements over the LAC.
- **Both countries agreed this agreement**, aiming to prevent accidental escalations and improve communication between the two countries

Note:



- **The Border Defence Cooperation Agreement (BDCA):**
  - It was signed in 2013 following the Depsang Valley incident. It aimed to prevent incidents like the Depsang Valley face-off and enhance mutual understanding.
  - Despite the BDCA, tensions along the India-China border have persisted, and incidents continue to occur. However, the **agreement remains an important framework** for managing border-related issues and maintaining peace in the region.

## Africa at Centre of India's Vision for Global South

### Why in News?

India's increased emphasis on **Africa** has been highlighted during various state visits. This shift is significant as it reflects India's growing stature as a major global power, providing an opportunity to champion the interests of the **Global South**.

### What is India's Vision for the Global South?

- **Giving Voice to the Global South:** India sees itself as a representative for developing countries, ensuring their issues are heard at forums like **G20**.
  - This includes initiatives like the "**Voice of Global South Summit**" aimed at creating a platform for

developing countries to discuss common challenges.

- **Advocacy and Reform:** India advocates for reforms in global institutions to better reflect the interests of developing countries.
  - This could involve changes in areas like international taxation, climate finance or giving greater decision-making power to developing nations within organisations like the **United Nations Security Council**.
- **South-South Cooperation:** India promotes cooperation among developing countries by sharing best practices, technologies, and resources.
  - The **India-UN Development Partnership Fund**, launched in 2017 aids Southern-led **sustainable development** projects, prioritising **least developed countries and small island developing States**.
- **Climate Change Mitigation:** India's vision for the Global South includes collaborative efforts to address **climate change**.
  - Through initiatives like the **International Solar Alliance (ISA)**, India aims to promote renewable energy adoption in countries across **Asia, Africa, and Latin America**, contributing to sustainable development and climate resilience.

### What is Global South?

- **About:** Global South refers to a group of countries generally characterised as **developing, less developed, or underdeveloped**.
  - The term Global South is not **geographical**. Rather, its usage denotes a mix of political, geopolitical and economic commonalities between nations.
  - It encompasses countries **with lower GDPs, higher poverty rates, and less developed infrastructure** than the "Global North."
  - These nations are typically located in Africa, Latin America, the Caribbean, and Asia (**excluding high-income countries like Japan, South Korea and Australia**).

Note:



#### ➤ History

- The **Brandt Line**, introduced by former **German Chancellor Willy Brandt** in the 1980s, visually represents the global north-south economic divide using per-capita GDP as a measure.
- The **Group of 77 (G-77)** was established in 1964 during the first UN Conference on Trade and Development (UNCTAD) session in Geneva, making it the largest intergovernmental organisation of **developing nations at that time**.

### **How can India Benefit from Prioritising Africa in its Global South Vision?**

- **Economic Potential:** Africa represents a vast economic opportunity for India. With Indian investments in Africa reaching **USD 98 billion in 2023** and trade totaling **USD 100 billion**, the continent serves as a crucial market for Indian businesses.
- **Enhanced Strategic Ties:** Africa's influence in global forums is rising, making it a strategic partner for India's global aspirations.
  - India's advocacy for **African representation in forums like the G20 and UNSC** reflects the shared vision for inclusive global governance.
  - In this regard, India has achieved several diplomatic victories, such as the **African Union's (AU) inclusion** in the G20 in September 2023.
- **Tapping Youthful Demographics:** Africa's young population, with **60% under the age of 25 years**, presents immense potential for collaboration in **education, technology, and innovation**.
  - India's experience in skill development and education initiatives can be leveraged to empower African youth and foster sustainable development.
- **Potential Resource Collaboration:** Africa's rich reserves of **critical minerals** essential for industries like **renewable energy and technology** offer a significant opportunity for collaboration.
  - India's expertise in sectors like renewable energy can be combined with Africa's resources to drive innovation and sustainable development.
- **Stronger Geopolitical Influence:** A strong partnership with Africa enhances India's strategic standing on the world stage.

Note:



- It allows India to play a more influential role in shaping global governance and addressing issues critical to the Global South.
- India's growing ties with Africa can help counterbalance China's rising influence on the continent (especially in the [Horn of Africa](#)).

### What are the Challenges for India as a Leader in the Global South?

- **Internal Development Issues:** Critics argue India should prioritise its domestic development issues like **unequal wealth distribution, unemployment, and inadequate infrastructure**, before leading others.
  - India's vast rural population lacks access to quality healthcare and education, raising questions about its capacity to address similar issues in other developing nations.
- **Diverse Needs and Priorities:** The Global South is not a **homogenous group**. Different countries have varying needs and priorities. Balancing these diverse demands can be difficult.
  - African nations might prioritise debt relief, while Southeast Asian nations might focus on technology transfer.
  - India needs to find ways to address these distinct needs while promoting a unified front.

- **Balancing Global Partnerships:** India enjoys strong **economic ties with developed nations like the US and Japan**. This can create a conflict between advocating for the Global South and maintaining these vital relationships.
  - India might shy away from pushing for stricter trade regulations that could potentially harm its exports to developed countries.
- **Credibility on Climate Change:** India is the world's **third-largest emitter of CO2**, despite low per capita CO2 emissions. This weakens its position when advocating for stricter climate action within the Global South.

## Unite Aware Platform

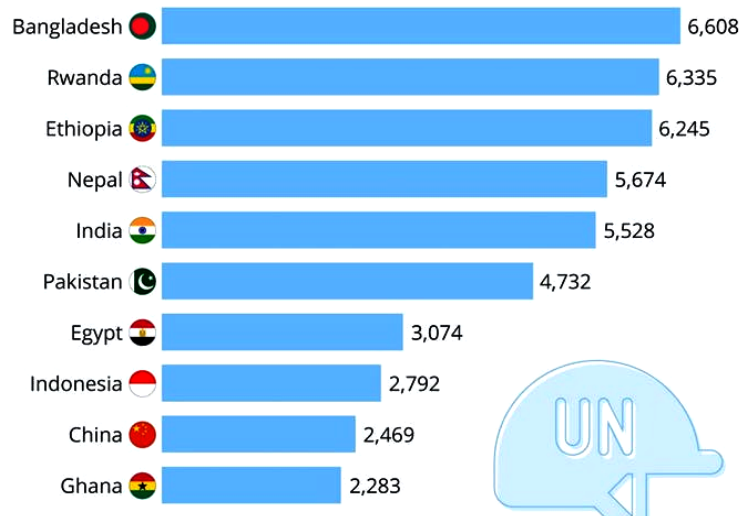
### Why in News?

Recently, India launched a **new database (Unite Aware platform)** to record crimes against UN peacekeepers and monitor progress in holding perpetrators accountable.

- It was launched by the India-led **Group of Friends (GOF) initiative** in its second meeting to promote accountability for crimes against peacekeepers.

## The Biggest Contributors To UN Peacekeeping Operations

Main contributors of uniformed personnel to UN peacekeeping operations as of March 31, 2021\*



Note:

### What is the Use of the Database?

- The database will **serve as an online repository** to monitor and address cases of malicious acts against Peacekeepers.
  - It will facilitate comprehensive analysis and drive effective strategies for promoting accountability.
  - It is hosted on the **Unite Aware platform**.
- It implements the provisions of **UN Security Council resolution 2589** (adopted in August 2021) which called upon troops hosting **member states to bring to justice perpetrators of all acts of violence against United Nations personnel**.

### What is the Group of Friends?


- **About:** On 16<sup>th</sup> December 2022, **India launched a 'Group of Friends'** to promote accountability for crimes


against peacekeepers. It comprises 40 member states.

- It calls on member states to **investigate, arrest, and prosecute perpetrators** of crimes against **peacekeepers (Blue Helmets)** in line with international obligations, and to promote **accountability both within and outside the UNSC in practical terms**.
  - India has lost 177 of its peacekeepers in the line of duty, the largest by far from any troop-contributing country.
- **Co-chairs:** India, Bangladesh, Egypt, France, Morocco and Nepal.
- The GoF will convene **two meetings of its members per year**, organise and **host one event per year** to inform and galvanise support for promoting accountability for crimes against peacekeepers.

## UN Security Council (UNSC)

The UN Charter vests the primary responsibility for maintaining international peace and security to the UNSC

<b>About</b> One of the 6 principal organs of UN; established in 1945 by UN Charter	<b>Headquarters</b> New York City	<b>First Session</b> 17 January 1946 at Church House, Westminster, London	<b>Membership</b> • 15 members - 5 Permanent Members (P5), 10 Non-Permanent Members elected for two-year terms (5 elected each year) • P5 - the US, the UK, Russia, France and China	<b>Presidency</b> • Rotates every month among the 15 members • India's Presidency for year 2022 - December
<b>Voting Powers</b> • 1 member = 1 vote • P5 have <b>veto power</b> • Members of UN sans membership of UNSC participate without vote	<b>UNSC Committees/Resolutions</b> <b>Terrorism</b> • Resolution 1373 (Counter Terrorism Committee) • Resolution 1267 (Da'esh and Al Qaeda Committee)		<b>Non-Proliferation Committee</b> • Resolution 1540 (against nuclear, chemical and biological weapons)	
<b>India and UNSC</b> • Served 7 times as non-permanent member; elected for the 8 <sup>th</sup> time for 2021-22; advocates for a permanent seat • Arguments for a permanent seat: • 43 peacekeeping missions • Active participation in formulating Human Rights Declaration (UDHR) • India's population, territorial size, GDP, economic potential, cultural diversity, political system etc.			<b>G4</b> Group of 4 countries (Brazil, Germany, India and Japan) which advocate each other's bids for permanent seats in the UNSC	
<b>Uniting for Consensus (UfC) Movement</b> • Informally known as the <b>Coffee Club</b> • Countries <b>oppose the expansion Permanent Seats</b> of UNSC • <b>Prime movers of the club</b> - Italy, Spain, Australia, Canada, South Korea, Argentina and Pakistan • Italy and Spain are opposed to Germany's bid; Pakistan - India's bid; Argentina - Brazil's bid and Australia - Japan's bid		<b>Major Challenges in UNSC</b> • Usual UN rules don't apply to UNSC deliberations; <b>no records of meetings kept</b> • Powerplay in UNSC; <b>anachronistic veto powers</b> of P5 • <b>Deep polarisation</b> among P5; frequent divisions end up blocking key decisions • <b>Inadequate representation</b> of many regions among of the world		



Note:

## India Stands with the Philippines in the South China Sea

### Why in News?

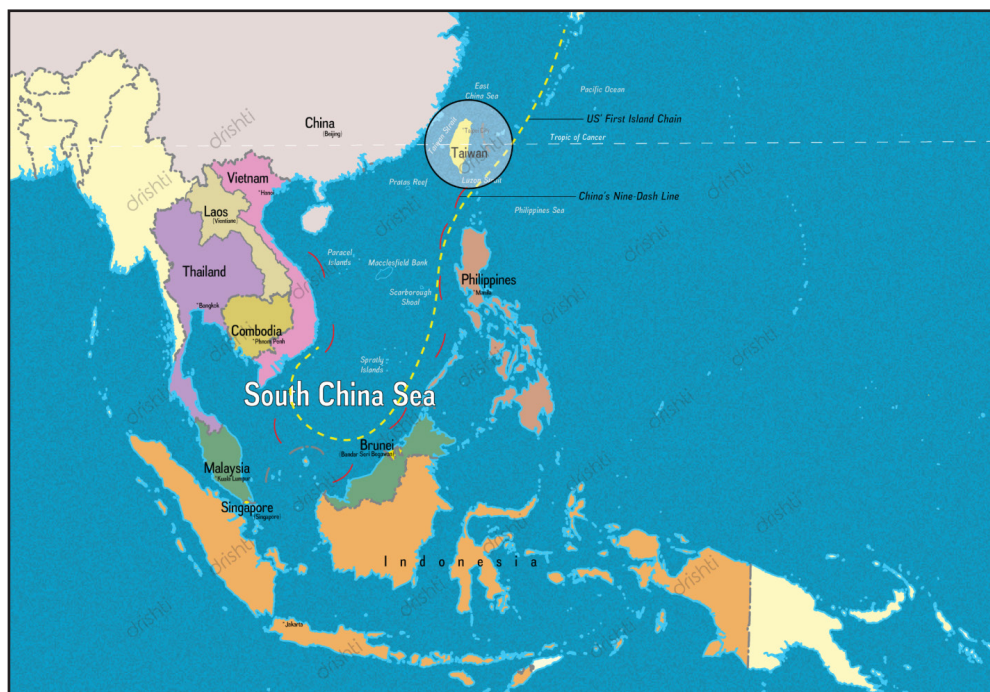
India's Ministry of External Affairs recently expressed firm support for the **Philippines** in defending its national sovereignty amidst tensions with China over the **South China Sea**.

- The diplomatic relations between the Philippines and India are approaching their **75<sup>th</sup> year in 2024**. This milestone marks a transformative partnership between the two nations.

### What is the Dispute in the South China Sea Region?

- **Significance of South China Sea:**
  - **Strategic Location:** The South China Sea is strategically located, bordered by **China and Taiwan** to the north, the **Indo-Chinese peninsula** (including Vietnam, Thailand, Malaysia, and Singapore) to the west, **Indonesia and Brunei** to the south, and the **Philippines** to the east (referred to as the West Philippine Sea).
  - the **Luzon Strait** with the Philippine It is connected by the **Taiwan Strait** with the East China Sea and by Sea (both marginal seas of the Pacific Ocean)

- **Trade Importance:** One-third of all global shipping passes through the South China Sea. Over 64% of China's maritime trade passes through the South China Sea.
  - Over 55% of India's trade passes through the South China Sea and **Malacca Strait**.
- **Fishing Ground:** The South China Sea is also a rich fishing ground, providing a vital source of livelihood and food security for millions of people in the region.
  - It supports a diverse **marine ecosystem and sustains fisheries**, contributing significantly to regional economies and food supplies.
- **Dispute:**
  - The core of the South China Sea dispute involves competing claims over land features like islands and reefs and their surrounding waters.
    - The involved parties in these disputes include China, Brunei, Taiwan, the Philippines, Vietnam, and Malaysia.
    - China's "**nine-dash line**" claim encompasses up to **90% of the sea**, leading to tensions as it has expanded islands and built military installations to reinforce control, especially in the **Paracel and Spratly Islands**.
  - Key areas include the **Spratly Islands, Paracel Islands, Pratas, Natuna Islands, and Scarborough Shoal**.



Note:



**What are Other Major Water Bodies Facing Territorial Disputes?**

Maritime Area	Primary Countries Involved	Territorial Disputes	Map
<b>East China Sea</b>	China, Japan, Taiwan	Dispute over Senkaku/Diaoyu Islands	
<b>Aegean Sea</b>	Greece, Turkey	Overlapping claims, resource exploration, maritime boundaries	
<b>Arctic Ocean</b>	US, Canada, Russia, Denmark, Norway	Claims for Extended Exclusive Economic Zones	

**What is Salami Slicing Technique in Maritime Disputes?**

- **About:** It involves countries **incrementally asserting control over maritime areas** through small, gradual actions over time.
  - It avoids direct confrontation, **exploits legal ambiguities**, and aims to assert influence and create irreversible situations in disputed waters.
- **Example:** China has been accused of employing the **salami slicing technique** in the South China Sea through actions like **building artificial islands, conducting resource exploration, and imposing fishing bans** to assert control and limit access for other countries.
  - For instance, recently Chinese coast guard ships blocked Philippine vessels at **Second Thomas Shoal**, resulting in escalated tensions in the region.

Note:



### What are the Areas of Cooperation Between India and the Philippines?

- **About:** India and the Philippines formally established diplomatic relations on **26<sup>th</sup> November 1949**.
  - With the **Act East Policy** initiated in 2014, the relationship with the Philippines has diversified further into political security; trade, industry, and people-to-people realms.
- **Bilateral Trade:** As per the official trade figures of the Department of Commerce, Government of India, bilateral trade between India and the Philippines crossed the **USD 3 billion** mark for the first time in 2022-23.
  - India exports engineering goods, automobile parts, petroleum products, pharmaceuticals, bovine meat, oilseeds, tobacco, and groundnuts to the Philippines.
  - Imports from the Philippines to India include **electrical machinery, semiconductors, ores, copper, plastics**, pearls, waste from the food industry, and animal fodder.
- **Health and Medicine:** The Philippines was the first ASEAN member to grant **Emergency Use Authorization (EUA)** for Bharat Biotech's Covaxin.
  - Currently, the Philippines accounts for about **20%** of India's pharmaceutical exports to **ASEAN**, with India being its largest supplier.
- **Science and Technology:** A Bilateral Programme of Cooperation (POC) in Science and Technology was signed in October 2019, covering areas like agricultural biotechnology, material science, and ocean science.
  - India signed a deal with the Philippines in **January 2022** to supply a shore-based anti-ship variant of the **BrahMos supersonic cruise missile**.
    - This underscores the global demand for India's advanced defence capabilities.

## Katchatheevu Island

### Why in News?

The **Katchatheevu Island** has garnered attention for its role in the **India-Sri Lanka relationship** and the contentious **fishing rights issue**, showcasing the complexities of maritime boundary disputes and fishing rights in the area.

### What is Dispute Related to Katchatheevu Island?

- **About:**
  - **Katchatheevu** is a 285-acre uninhabited island in the **Palk Strait** between India and Sri Lanka.
  - Located northeast of **Rameswaram**, approximately 33 km from the Indian coast, it sits about 62 km southwest of **Jaffna**, at the northern tip of Sri Lanka.
  - Katchatheevu is **not suited for permanent human settlement** as there is no source of drinking water on the island.
    - The island's **sole structure is St. Anthony's church**, an early 20<sup>th</sup>-century Catholic shrine, where Christian priests from India and Sri Lanka conduct an **annual festival service** attended by devotees from both countries.
- **History of island:**
  - **Origin:** The Island was formed as a result of **volcanic eruption** in the 14<sup>th</sup>-century.
  - **Early Rulers:** The region was initially ruled by the **Jaffna kingdom** of Sri Lanka in the early medieval period, but control later shifted to the **Ramnad zamindari** under **Nayak dynasty of Madurai** in the 17<sup>th</sup> century.
  - **Dispute:**
    - **India:** The ownership dispute over Katchatheevu between India and Sri Lanka, which had been part of the **Madras Presidency** during the British Raj, persisted until 1974, with both countries claiming the island as their own.
    - **Sri Lanka:** Sri Lanka claimed sovereignty over Katchatheevu on the ground that the **Portuguese** who had occupied the island during **1505-1658 CE** had exercised **jurisdiction** over the islet.
  - **1974:** Under Indo-Sri Lankan Maritime Agreement the island's transfer to Sri Lanka occurred.
  - **1976:** An additional agreement was made that prevented both countries from fishing in each other's **Exclusive Economic Zones**, with **Katchatheevu** positioned at the boundary of these zones, **causing ambiguity over fishing rights**.
  - **2009:** After Sri Lanka's civil war ended in 2009, tensions escalated over Indian fishermen entering Sri Lankan waters, leading to **arrests**, allegations of **custodial torture**, and renewed retrieval demands regarding Katchatheevu.
  - **Contentious Issues:**
    - The 1974 agreement permitted Indian fishermen to continue accessing Katchatheevu.

Note:

- Due to **differing interpretation** of the agreement by both sides, it **failed to resolve** the fishing rights issue, with Sri Lanka **limiting Indian fishermen's access** to activities such as resting, drying nets, and visiting the Catholic shrine without visa.



### **What has been the Stand of the Various Stakeholder on the Issue?**

#### ➤ **Tamil Nadu's Stand:**

- **In 1973**, then Chief Minister of Tamil Nadu had urged centre to retain Kachchatheevu, stating it belonged to India and not just Tamil Nadu.

- **In 1991**, the issue **resurfaced** when the then Chief Minister called for its **retrieval** later modifying her demand to a **perpetual lease** of the Island with both Chief Minister and Leader of Opposition approaching the Supreme Court.

#### ➤ **Union Government's Stand:**

- **2013:** The Union government informed the **Supreme Court** that the issue of reclaiming Kachchatheevu from Sri Lanka was irrelevant **as no Indian territory was relinquished**, citing historical disputes settled by agreements in 1974 and 1976.
- **2022:** However, the Union government, while referring to the two agreements, pointed out in its reply in the Rajya Sabha that Kachchatheevu **"lies on the Sri Lankan side of the India-Sri Lanka International Maritime Boundary Line."**
- The matter is **still sub judice** in the **Supreme Court**.

#### **Other Maritime Disputes of India with Neighbouring Nations**

- **With Pakistan:** Over demarcation of boundary along **Sir Creek**.
- **With Bangladesh:** New Moore Island in Bay of Bengal (Permanent Court of Arbitration ruled in favour of Bangladesh).



Note:



# Social Issues

## Highlights

- World Anti-Doping Report 2022
- Global Hepatitis Report
- India TB Report 2024
- Recognition of LGBTQIA+ Rights in India
- Water Crisis in South India
- 3-D Map of the Universe

## Addressing Antimicrobial Resistance

### Why in News?

Global Leaders Group (GLG) on **Antimicrobial Resistance (AMR)** released a report titled “Towards specific commitments and action in the response to antimicrobial resistance” ahead of a high-level meeting on AMR to be held at the **United Nations General Assembly**.

### What are the Key Highlights of the Report?

- The GLG report emphasises the need for **adequate, predictable, and sustainable financing from domestic and external sources** to address AMR, including tackling the dwindling research and development pipeline for new antibiotics.
- The GLG proposes **expanding the scope of existing financing instruments** to include AMR and increasing investments to support the implementation of multisectoral **National Action Plans**, especially in **low- and middle-income countries**.
- The GLG stresses the need for **improved quality of data** on AMR through surveillance and monitoring and recommends strengthening human resources and infrastructure capacity.
- The GLG proposes the following **global targets** to catalyse action at the national level:
  - **Deaths Caused by Bacterial AMR:** By 2030, reduce global deaths caused by bacterial AMR by 10%.
  - **Antibiotic Stewardship and Responsible use in Humans:** By 2030, **ACCESS group antibiotics** comprise at least 80% of overall human antibiotic consumption.
    - The ACCESS group antibiotics are a category of antibiotics designated by the **World Health**

**Organization (WHO)** through their **AWaRe classification system**.

- Access antibiotics are antibiotics with a narrow spectrum of activity, generally with fewer side-effects, a lower potential for the selection of antimicrobial resistance and lower cost.
- **Antimicrobial use in Agri-food Systems:**
  - By 2030, reduce the number of antimicrobials used in the **agri-food system globally by at least 30-50%** from the current level.
  - By **2030, eliminate the use of medically important antimicrobials** for human medicine in animals for non-veterinary medical purposes, or in crop production and agri-food systems for non phytosanitary purposes.
- Based on these global targets, the GLG recommends that all countries should develop national, outcome-oriented, sector-specific targets with clear goals and timelines, and follow up on their implementation.

### Global Leaders Group (GLG) on Antimicrobial Resistance (AMR)

- The GLG on AMR was established in 2020 following the recommendation of the **Interagency Coordination Group on AMR (IACG)** with the mission to advise on and **advocate for political action for the mitigation of drug-resistant infections** through responsible and sustainable access to and use of antimicrobials.
- Secretariat support for the GLG is provided by the **Quadripartite Joint Secretariat (QJS)** on Antimicrobial Resistance, a joint effort by the **Quadripartite organisations** (the **Food and Agriculture Organization of the United Nations (FAO)**, the **United Nations Environment Programme (UNEP)**, the **World Health Organization (WHO)**, and the **World Organisation for Animal Health (WOAH)**).


Note:



### Why is Antimicrobial Resistance a Growing Concern?


- AMR is already a leading cause of death globally, contributing to **nearly 5 million deaths annually**, with a significant portion occurring in children under the age of five.
  - In 2019, bacterial AMR directly caused 1.27 million deaths globally and contributed to 4.95 million deaths.
- Uncontrolled AMR is projected to **lower life expectancy** and result in unprecedented healthcare costs and economic losses.
  - The studies forecast a potential **loss of 1.8 years of life expectancy globally by 2035** if stronger responses to AMR are not implemented.
- Without decisive action, AMR is projected to incur substantial economic losses, with estimates suggesting an annual cost of USD 412 billion in additional healthcare expenses and USD 443 billion in lost workforce productivity.
- AMR incurs significant economic costs, with estimates suggesting up to USD 3.4 trillion GDP losses per year by 2030.

# ANTIMICROBIAL RESISTANCE



**Drishti IAS**

*The ability of microorganisms to resist the effects of antimicrobial drugs*



## CAUSES OF ↑ AMR

- Poor infection control/sanitation
- Antibiotic overuse
- Genetic mutations of microbe
- Lack of investment in R&D of new antimicrobial drugs

*Microbes that develop AMR are called 'Superbugs'*

## IMPACTS OF AMR

- ↑ Risk of spreading infections
- Makes infections harder to treat; prolonged illness
- ↑ Healthcare costs

## EXAMPLE

- Carbapenem antibiotics stop responding due to AMR in *K. pneumoniae*
- AMR Mycobacterium tuberculosis causing Rifampicin-Resistant TB (RR-TB)
- Drug-resistant HIV (HIVDR) making antiretroviral (ARV) drugs ineffective

## RECOGNITION BY WHO

- Identified AMR as **one of the top 10 threats** to global health
- Launched **GLASS** (Global Antimicrobial Resistance and Use Surveillance System) in 2015

## INDIA'S INITIATIVES AGAINST AMR

- Surveillance of AMR in microbes causing **TB, Vector Borne diseases, AIDS etc.**
- **National Action Plan on AMR (2017)** with One Health approach
- **Antibiotic Stewardship Program** by ICMR

*New Delhi metallo-β-lactamase-1 (NDM-1) is a bacterial enzyme, emerged from India, that renders all current β-lactam antibiotics inactive*

Note:



### What is Antimicrobial Resistance?

- **About:**
  - AMR is a global public health threat that occurs when **bacteria, viruses, fungi, and parasites no longer respond to antimicrobial medicines.**
  - **Misuse and overuse of antimicrobials** in humans, animals, and plants are primary drivers of drug-resistant pathogens.
  - Low- and middle-income countries are disproportionately affected by AMR due to poverty and inequality.
  - **AMR jeopardises the efficacy of modern medicine**, making infections harder to treat and medical procedures riskier.
- **Global Initiatives:**
  - **One Health Approach:**
    - Integrated approach involving human health, animal health, and environmental sectors.
    - Aim to achieve optimal health outcomes for people, animals, and ecosystems.
  - **Global Action Plan (GAP) on Antimicrobial Resistance:**
    - Adopted during the **2015 World Health Assembly** to tackle AMR with a One Health approach.
  - **Quadripartite Joint Secretariat on Antimicrobial Resistance:**
    - Collaboration between WHO, FAO, UNEP, and WOA to coordinate global response.
  - **High-level Meetings on AMR:**
    - UNGA resolution established high-level meetings to address AMR.
  - **World AMR Awareness Week (WAAW):**
    - Global campaign to raise awareness and promote best practices.

## World Anti-Doping Report 2022

### Why in News?

The **World Anti-Doping Agency (WADA)** anti-doping report, 2022, released by the WADA reveals alarming statistics on **global doping violations**, emphasising the need for stringent measures to safeguard the integrity of sports.

### What are the Key Findings of the Report?

- **India Leads Globally in Doping Offences:**
    - India emerged with the highest percentage of doping offenders, accounting for 3.26% of tested athletes.
      - Out of 3,865 samples tested by India's **National Anti-Doping Agency (NADA)**, 125 returned **Adverse Analytical Findings (AAFs)**, making India the only country with over 100 positive results and the highest among nations testing more than 2,000 samples.
        - An AAF is a report from a **WADA-accredited laboratory** that identifies the **presence of a prohibited substance and/or its metabolites or markers in a sample.**
    - Despite being **11<sup>th</sup> in the number of samples tested**, India's doping violations surpassed major sporting nations like Russia, the USA, Italy, and France.
  - **Comparison with Other Nations:**
    - South Africa followed India with 2.09% of samples testing positive among nations collecting over 2,000 samples.
    - **China tested the most samples (17,357), producing only 0.25% AAFs**, while the USA (84) and Russia (85) closely followed India in the number of positive results.
  - **Overall Increase in Testing and AAFs:**
    - WADA reported a 6.4% increase in the total number of samples analysed and reported into its **Anti-Doping Administration and Management System (ADAMS)** in 2022 compared to 2021, signalling a positive trend towards maintaining the integrity of sports.
      - The percentage of AAFs rose from 0.65% in 2021 to 0.77% in 2022.
    - The director general of WADA, emphasised the importance of intelligence-led strategic testing plans along with values-based education, intelligence, investigations, and other strategies to combat doping effectively.
- ### What are the Implications of These Findings for India?
- **Concerns Regarding Athletes:**
    - The prevalence of **doping among young athletes** raises serious concerns about their **physical and mental development.**

Note:

- Doping poses significant health risks to athletes and undermines their long-term well-being.
- It is imperative for **India to prioritise the health and safety of its athletes** by implementing measures to prevent doping and promote clean sports culture.
- **Reputation Damage:**
  - India's standing as the country with the highest percentage of doping offenders tarnishes its **reputation in the international sports community**.
  - The prevalence of doping could **erode trust in Indian athletes and cast doubts on their achievements**, impacting India's credibility in global sports.
- **Olympic 2024:**
  - A total of **142 Indian athletes were caught for doping-related activities** in the period between April 2022 and March 2023, data compiled by the NADA has revealed.
  - Doping violations may pose a significant risk of disqualification for Indian athletes in the coming **Olympics 2024**, depriving them of the opportunity to compete and represent their country at the highest level of sporting competition.
  - The threat of disqualification highlights the need for India to address doping effectively and ensure clean participation in the Olympics.
- **Discrepancies in Testing Efforts:**
  - While the total number of samples tested increased from 1,794 in 2021 to 3,865 in 2022, it pales in **comparison to countries like China, which tested 17,357 samples (almost five times that of India) but produced just 33 positive results**.
    - Despite increased testing, the number of positive cases remains a concern, indicating the need for more comprehensive measures.
- **Regulatory Oversight:**
  - India's position at the top of the doping offenders list raises concerns and highlights systemic **issues within the country's anti-doping framework**.
    - There is a pressing need to strengthen regulatory frameworks and enhance monitoring mechanisms to curb doping effectively.
- **Economic Impact:**
  - The doping crisis could have economic repercussions, affecting **sponsorships, investments, and revenue streams** associated with Indian sports.

- Upholding integrity in sports is essential to sustain and grow India's sports industry and economy.

### What is Anti-Doping?

#### ➤ About:

- Doping is the **act of consuming artificial and often illegal substances to gain an advantage over others** in sporting competitions (For example: anabolic steroids, human growth hormones, stimulants and diuretics).
  - Doping products are often illegally produced, trafficked and distributed. As they are rarely approved for public use, their consumption is dangerous and poses a serious health risk to both professional and amateur sports people.
- **Anti Doping** is opposing or **prohibiting illegal doping to improve athletic performance**.
- **India's Initiatives Related to Anti-Doping:**
  - **National Anti-Doping Agency (NADA):**
    - NADA was set up as a registered society under the **Societies Registration Act of 1860 in 2005**, with a mandate of creating dope-free sports in India.
    - NADA is responsible for planning, implementing, and coordinating India's anti-doping activities. It **adheres to the World Anti-Doping Agency (WADA) code and regulations**.
  - **The National Anti-Doping Act 2022:**
    - The **National Anti-Doping Act 2022** provides legal backing to NADA's. for regulating anti-doping activities in sports and to give effect to the **United Nations Educational, Scientific and Cultural Organisation (UNESCO) International Convention against doping in sport**.
      - The act aims to ensure the highest standards of integrity while participating and preparing for sports competitions, both domestically and internationally.
  - **National Dope Testing Laboratories (NDTL):**
    - NDTL under the **Ministry of Youth Affairs and Sports**, is responsible for sample analysis and research work in the field of dope analysis.
    - The **NDTL is WADA-accredited**, this accreditation is a testament to the NDTL's commitment to quality and accuracy in its testing procedures.

Note:

### World Anti-Doping Agency (WADA)

- Established in 1999 by the **International Olympic Committee (IOC)** to combat doping in sports globally. WADA's governance and funding are based on equal partnership between the Sport Movement and Governments of the world.
  - The **IOC is a not-for-profit independent international organisation** committed to building a better world through sport. Established in 1894, it is the supreme authority of the **Olympic Movement**, fostering collaboration among all parties involved in the Olympic family.
- Its mission is to promote and coordinate the fight against doping in sports internationally.
- **Headquarters: Montreal (Canada).**
- The **World Anti-Doping Code (Code)** is the core document produced by WADA that harmonises anti-doping policies, rules and regulations within sports organisations and among public authorities.
  - It is designed to harmonise anti-doping policies and ensure the standards are the same for all athletes.
- The **WADA Prohibited List** is the international standard for identifying banned substances and methods in sports.
  - It is updated annually and applies to both in-competition and out-of-competition scenarios, as well as specific sports.

## Global Hepatitis Report 2024

### Why in News?

The recently released **Global Hepatitis Report 2024** by the **World Health Organisation (WHO)** has highlighted **India as one of the nations facing a significant burden of viral hepatitis**, particularly Hepatitis B and C infections.

### What are the Key Findings of the Report?

- **India's Hepatitis Burden:**
  - **Prevalence in India:**
    - India is one of the countries with the highest burden of viral hepatitis.

- India has an estimated **2.9 crore people living with Hepatitis B infection** and **0.55 crore living with Hepatitis C infection**.
- There were over 50,000 new Hepatitis B cases and 1.4 lakh new Hepatitis C cases reported in India in 2022.
- These viral hepatitis infections killed **1.23 lakh people in India in 2022**.
- **Drivers of Hepatitis Infections in India:**
  - Both Hepatitis B and C infections are transmitted through various means, including mother-to-child transmission, **unsafe blood transfusions**, contact with infected blood, and **needle-sharing** among drug users.
    - Despite advancements in blood safety protocols, mother-to-child transmission remains a primary mode of infection for Hepatitis B in India.
- **Diagnosis and Treatment Coverage:**
  - In India, only **2.4% of Hepatitis B cases and 28% of Hepatitis C cases are diagnosed**.
  - Treatment coverage is even lower, at **0% for Hepatitis B and 21% for Hepatitis C**, despite the availability of affordable generic medicines.
- **Barriers to Improving Hepatitis Outcomes:**
  - Limited reach and utilisation of the **National Viral Hepatitis Control Program**.
  - Need to **expand access to affordable diagnostics** and treatment services under the program.
  - Requirement to **treat all diagnosed individuals, regardless of disease stage**, to reduce health consequences and transmission.
- **Global:**
  - **Mortality Trends:**
    - Viral hepatitis caused an estimated **1.3 million deaths globally in 2022, on par with tuberculosis**.
      - Hepatitis B accounted for 83% of these deaths, while hepatitis C accounted for 17%.
    - The rise in mortality suggests an increase in **hepatitis-related liver cancer cases and deaths**.
    - The number of new viral hepatitis infections declined from 2.5 million in 2019 to 2.2 million in 2022.

Note:

- **Prevalence:**
  - Globally, an estimated 304 million people were living with hepatitis B and C in 2022.
    - WHO estimates indicate that **254 million people lived with hepatitis B and 50 million with hepatitis C in 2022.**
    - **12% of the burden is among children,** particularly for hepatitis B.
- **Barriers to Scaling Up Testing and Treatment:**

- Lack of funding and limited decentralisation have restricted the scaling up of testing services.
- Many countries are still not procuring hepatitis medicines at the available generic prices, leading to high costs.
- Patent-related barriers remain an obstacle to accessing affordable hepatitis C medicines in some countries.

**What are the Key Facts About Hepatitis?**

➤ **About:**

- Hepatitis is caused by infectious viruses (*viral hepatitis*), and noninfectious agents, leading to a range of health problems, some of which can be fatal.
- There are **five main strains of the hepatitis virus: A, B, C, D, and E**, each with different modes of transmission, severity, geographical distribution, and prevention methods.
- Types **B and C are the most common cause of liver cirrhosis** (a condition in which the liver is scarred and permanently damaged), liver cancer, and viral hepatitis-related deaths.
- Some types of **hepatitis are preventable through vaccination**, and an estimated **4.5 million premature deaths could be prevented by 2030** through vaccination, diagnostic tests, medicines, and education campaigns.
- WHO’s global hepatitis strategy aims to reduce new hepatitis infections by **90% and deaths by 65% between 2016 and 2030.**

**Types of Hepatitis**

	TRANSMISSION	PREVENTION	TREATMENT
Hepatitis A	Eating contaminated food or drinking contaminated water	<ul style="list-style-type: none"> <li>• Practicing good hygiene</li> <li>• Vaccine</li> </ul>	No treatment
Hepatitis B	Through contact with the blood or bodily fluids of an infected person	<ul style="list-style-type: none"> <li>• Practicing good hygiene</li> <li>• Vaccine</li> <li>• Blood screening</li> </ul>	<ul style="list-style-type: none"> <li>• Alpha interferon</li> <li>• Peginterferon</li> </ul>
Hepatitis C	Blood-to-blood contact	<ul style="list-style-type: none"> <li>• Practicing good hygiene</li> <li>• Avoid sharing needles, toothbrushes, razors or nail scissors</li> </ul>	Direct-acting antiviral drugs
Hepatitis D	Contact with infected blood (only occurs in people already infected with hepatitis B)	<ul style="list-style-type: none"> <li>• Hepatitis B vaccine</li> <li>• Avoid sharing needles, toothbrushes, razors or nail scissors</li> </ul>	Interferon
Hepatitis E	Eating contaminated food or drinking contaminated water	<ul style="list-style-type: none"> <li>• Practicing good hygiene</li> <li>• Avoid drinking water that has come from a potentially unsafe source</li> </ul>	No treatment

Note:



### ➤ Symptoms and Severity:

- Hepatitis A, B, C, D, and E can exhibit mild or no symptoms.
- Symptoms of hepatitis A, B, and C include fever, malaise, loss of appetite, diarrhoea, nausea, abdominal discomfort, dark-coloured urine, and jaundice.
  - Chronic liver infection, cirrhosis, and liver cancer can result from hepatitis A, B, and C.
- **Hepatitis D is found in people already infected with hepatitis B** and can cause a more serious infection and accelerated progression to cirrhosis. Chronic hepatitis D is rare.
- Hepatitis E symptoms include mild fever, reduced appetite, nausea, vomiting, abdominal pain, itching, skin rash, joint pain, jaundice, dark urine, pale stools, and hepatomegaly or acute liver failure.

### ➤ India's Initiatives:

- [National Viral Hepatitis Control Program](#).
- [National Health Mission](#).
- [India's Universal Immunization Programme \(UIP\)](#).

### ➤ Global:

- [World Hepatitis Day](#).
- [WHO Elimination of hepatitis by 2030](#)

## India TB Report 2024

### Why in News?

Recently, the Ministry of Health and Family Welfare released the **India TB Report 2024**, which highlights that the mortality rate due to **Tuberculosis (TB)** had declined from 28 per lakh population in 2015 to 23 per lakh population in 2022.

### What are the Key Highlights of the Report?

#### ➤ Trends in TB Cases and Deaths:

- The majority of the TB cases are still reported by the government health centres, even as there has been an uptick in notifications by the private sector.

- Nearly 33% or 8.4 lakh of the 25.5 lakh cases reported in 2023 came from the private sector.
- To compare, only **1.9 lakh cases were reported by the private sector** in 2015, the year considered to be the baseline by the programme that is geared towards the elimination of the disease.
- The estimated incidence of **TB in 2023 increased slightly to 27.8 lakh from the previous year's estimate of 27.4 lakh**.
- The mortality due to the infection remained the same at **3.2 lakh**.
- India's **TB mortality dropped** from 4.94 lakhs in 2021 to 3.31 lakhs in 2022.
- India reached its **2023 target of initiating treatment in 95%** of patients diagnosed with the infection.

## TB CASES IN INDIA OVER THE YEARS

	India TB Report 2020	2023	2024
Estimated TB cases	26.9 lakh	27.4 lakh	27.8 lakh
Number of cases reported	24.04 lakh	24.2 lakh	25.5 lakh
Reporting from private sector	6.8 lakh	7.3 lakh	8.4 lakh
% cases from private sector	28.20%	30%	32.90%
Estimated mortality	4.36 lakh	3.2 lakh	3.2 lakh

Note:

### ➤ Challenges in Meeting Targets:

- Despite setting **ambitious goals to eliminate tuberculosis by 2025**, India has faced challenges in meeting these targets.
- The **number of cases and deaths recorded in 2023 fell short** of the targets set by the country.
- There **are various risk factors** that contribute to the incidence and treatment outcomes of tuberculosis.
  - These include **Undernourishment, HIV, Diabetes, Alcohol Use, and smoking**.
- **Undernourishment:**
  - Nearly **7.44 lakh TB patients were undernourished in 2022**. To improve nutrition, the government provides **monthly support of Rs 500 to nearly one crore beneficiaries**.
    - Other than that, the **Ni-kshay Mitra programme** calls for the donation of food baskets.
- **HIV:**
  - **People living with HIV have a 20-times higher risk of developing symptoms of TB** as compared to the normal population. Altogether 94,000 TB patients in 2022 had HIV.
- **Diabetes:**
  - Of the 3.70 lakh TB patients with diabetes globally in 2022, **1.02 lakh were in India as per estimates**.
  - Diabetes escalates the likelihood of contracting **TB two-to-threefold**, which in turn is linked to increased risk of **Multi-Drug Resistant TB**.
  - The TB treatment also does not work as well in diabetics. **Nearly 92% of TB patients were screened for diabetes in 2023**, with 7.7% being diagnosed with it. And, nearly 63% of those diagnosed initiated diabetes treatment as per the report.
- **Alcohol and Tobacco Use:**
  - A **daily intake of more than 50 ml of alcohol increases the risk of TB** infection, active infection and recurrence of infection.

- Around 18.8 lakh or **74% of TB patients underwent alcohol use screening**, out of which 7.1% were identified as alcohol users.
- In 2023, around 19.1 lakh or **75% of TB patients were screened for tobacco use**, of whom 11% were identified as tobacco users.
  - And 32% of these people were linked to tobacco cessation services.

### What is Tuberculosis?

#### ➤ About:

- Tuberculosis is a **bacterial infection caused by Mycobacterium tuberculosis**. It can practically affect any organ of the body. The most common ones are the lungs, pleura (lining around the lungs), lymph nodes, intestines, spine, and brain.

#### ➤ Transmission:

- It is an **airborne infection** that spreads through close contact with the infected, especially in densely populated spaces with poor ventilation.

#### ➤ Symptoms:

- Common symptoms of active lung TB are cough with sputum and blood at times, chest pains, weakness, weight loss, fever and night sweats.

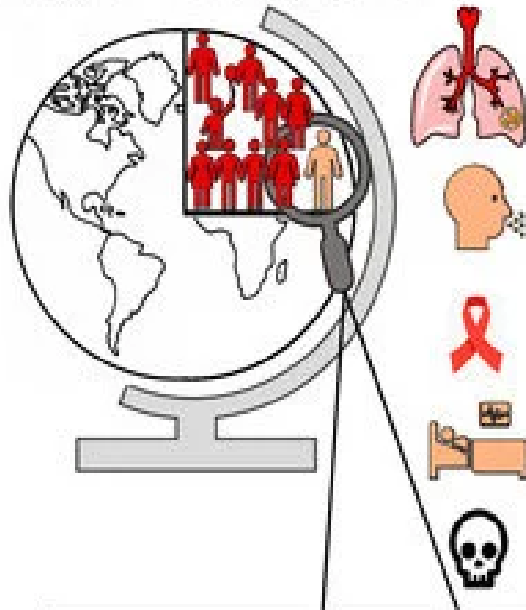
#### ➤ Infection Prevalence:

- Every year, 10 million people fall ill with TB. Despite being a preventable and curable disease, **1.5 million people die from TB each year** – making it the world's top infectious killer.
- TB is the **leading cause of death of people with HIV** and also a major contributor to antimicrobial resistance.
- Most of the people who fall ill with TB live in low- and middle-income countries, but TB is present all over the world. **About half of all people with TB can be found in 8 countries:** Bangladesh, China, India, Indonesia, Nigeria, Pakistan, Philippines and South Africa.

Note:



## Global TB statistics



2 billion people harbour a dormant form of *M. tb* infection worldwide

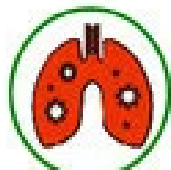
5 – 10% of latently infected individuals are predisposed to developing active TB in their lifespan

HIV co-infection increases the risk of TB reactivation by 18 times

around 10 million people fall ill with TB every year at least since 2000

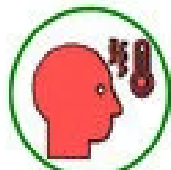
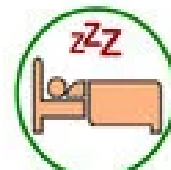
> 1 million people succumb to death from TB every year at least since 2000

## Active TB symptoms



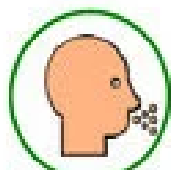
Chest pain

Fatigue



Fever

Loss of appetite



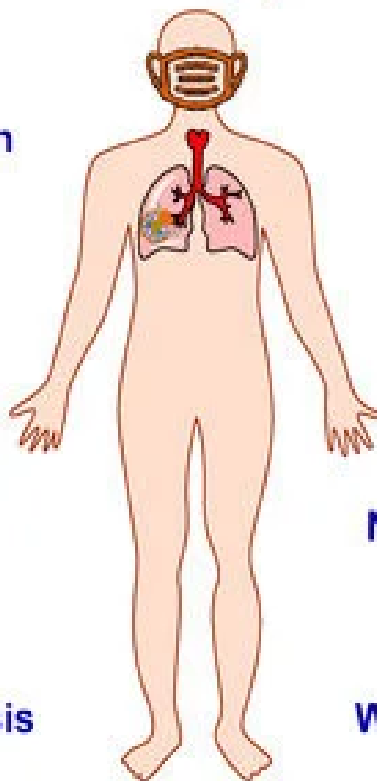
Persistent cough

Night sweat



Hemoptysis

Weight loss



Note:

### ➤ Treatment:

- TB is treated with a standard 6-month course of 4 antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer.
- **Anti-TB medicines have been used for decades** and strains that are resistant to 1 or more of the medicines have been documented in every country surveyed.
  - **Multidrug-resistant Tuberculosis (MDR-TB)** is a form of TB caused by **bacteria that do not respond to isoniazid and rifampicin**, the 2 most powerful, first-line anti-TB drugs.
    - MDR-TB is treatable and **curable by using second-line drugs** such as bedaquiline.
  - **Extensively drug-resistant TB (XDR-TB)** is a more serious form of MDR-TB caused by bacteria that **do not respond to the most effective second-line anti-TB drugs**, often leaving patients without any further treatment options.

### ➤ Drugs for TB:

- **Isoniazid (INH):** This drug is a cornerstone of TB treatment and is highly effective against **Mycobacterium tuberculosis**.
  - It works by inhibiting the synthesis of mycolic acids in the bacterial cell wall.
- **Rifampicin (RIF):** Another essential drug in TB treatment, rifampicin works by inhibiting the synthesis of RNA in the bacteria.
  - It is often used in **combination with other drugs to treat TB** and is crucial for preventing the development of drug resistance.
- **Delamanid:** Delamanid is a newer drug that is used in the treatment of **multidrug-resistant TB (MDR-TB)** and is often **used in combination with other drugs**.

#### What are Different Initiatives to Combat TB?

##### ➤ Global Efforts:

- The **WHO (World Health Organisation)** has launched a joint initiative **"Find. Treat. All. #EndTB"** with the **Global Fund** and **Stop TB Partnership**.
  - WHO also releases the **Global Tuberculosis Report**.

- **The Global Plan to End TB, 2023-2030:** It is a plan for ending TB as a public health challenge by 2030. It provides a blueprint of priority actions required and a detailed estimate of the financial resources needed to end TB.

- It is a goal that has been adopted by all Member States of the **United Nations (UN)** and the WHO.
- The **End TB Strategy** builds on and significantly expands the scope of efforts in the context of the United Nations **Sustainable Development Goal 3.3**.

##### ➤ India's Efforts:

- **Pradhan Mantri TB Mukht Bharat Abhiyan**
- **National Strategic Plan (NSP) for Tuberculosis Elimination (2017-2025)**
- **TB Harega Desh Jeetega Campaign**
- **Nikshay Poshan Yojna**
- **RePORT India: RePORT India (Regional Prospective Observational Research for Tuberculosis (TB))** is a bilateral, multi-organizational, collaborative effort established in 2013 under the **Indo-US Vaccine Action Program (VAP)**.
  - It aims to address the **threat of TB to the people of India and across the globe**.

## Recognition of LGBTQIA+ Rights in India

### Why in News?

The **Supreme Court(SC)** recently warned judges against using **court-ordered counseling** to make **LGBTQ+ individuals** a way to turn them against their own identity and **sexual orientation**, especially when they are distressed or separated from partners by family members.

- SC noted that while understanding a person's desires is acceptable, trying to change their identity and sexual orientation through counseling is highly inappropriate.

### What is the Status of LGBTQIA+ Rights and Recognition in India?

- **About:** LGBTQIA+ is an acronym that represents **lesbian, gay, bisexual, transgender, queer, intersex, and asexual**.

Note:



- The “+” represents the many other identities that are still being explored and understood. The acronym is constantly evolving and may include other terms like **non-binary and pansexual**.
  - **History of Recognition of LGBTQIA+ in India:**
    - **Colonial Era and Stigma (Pre-1990s):**
      - **1861:** **Section 377** of the Indian Penal Code, criminalizing “**carnal intercourse against the order of nature**,” is introduced under British rule. This law becomes a major hurdle for LGBTQIA+ rights in India.
    - **Early Recognition and Activism (1990s):**
      - **1981:** The first **All-India Hijra Conference** took place in 1981.
      - **1991:** The **AIDS Bhedbhav Virodhi Andolan (ABVA)** publishes “**Less Than Gay**,” the first public report on the status of LGBTQIA+ people in India, demanding legal changes.
    - **Landmark Cases and Setbacks (2000s):**
      - **2001:** The Naz Foundation files a Public Interest Litigation (PIL) challenging Section 377.
      - **2009:** A landmark Delhi High Court ruling in **Naz Foundation vs Govt of NCT of Delhi** **decriminalizes consensual homosexual acts**, seen as a major victory for LGBTQIA+ rights.
      - **2013:** The Supreme Court, in a setback, overturns the Delhi High Court decision, **upholding Section 377**.
    - **Recent Advancements and Ongoing Struggle (2010s-Present):**
      - **2014:** The Supreme Court recognizes transgender people as a “**third gender**.” (**National Legal Services Authority V/s Union of India popularly known as NALSA judgement**)
      - **2018:** In a historic decision, the Supreme Court strikes down **Section 377**, decriminalizing same-sex relationships. (**Navtej Singh Johar v. Union of India**)
      - **2019:** The **Transgender Persons (Protection of Rights) Act, 2019** was passed, granting legal recognition and prohibiting discrimination against transgender individuals.
      - **2020:** The Uttarakhand High Court acknowledges legal protection for live-in relationships of same-sex couples.
      - **2021:** In the case of **Anjali Guru Sanjana Jaan v. State of Maharashtra & Ors. (2021)**, the Bombay High Court observed that for the Village Panchayat elections, the petitioner identified herself as a female while she was a transgender and her application was rejected.
  - The court held that the petitioner had the **right to self-identify** her gender and accepted her application.
    - **2022:** In August 2022, the Supreme Court of India expanded the definition of family to include **same-sex couples and queer relationships**.
    - **2023:** In October 2023, A five-judge Constitution Bench of the Supreme court rejecting petitions to legalise **same-sex marriage in India**.
  - SC ruled that it does not have the authority to modify the **Special Marriage Act (SMA), 1954** by either removing or adding provisions to include same-sex individuals.
  - It stated that the responsibility lies with Parliament and state legislatures to enact laws regarding this matter.
- What are the Major Challenges Faced by LGBTQIA+ in India?**
- **Social Stigma:** Deep-rooted societal attitudes and stigma against LGBTQIA+ individuals persist in many parts of India.
    - This leads to **prejudice, harassment, bullying, and violence** in different social arenas like education and employment affecting the mental and emotional well-being of LGBTQIA+ individuals.
  - **Family Rejection:** Many LGBTQIA+ individuals experience rejection and discrimination within their families, leading to strained relationships, **homelessness**, and a lack of support systems.
  - **Healthcare Access:** They often encounter barriers to accessing healthcare services, including **discrimination from healthcare providers, lack of LGBTQIA+-friendly healthcare facilities**, and challenges in obtaining appropriate medical care related to sexual health.
  - **Inadequate Legal Recognition:** While progress has been made in recognizing transgender rights, there is still a **lack of legal recognition and protections for non-binary and gender non-conforming individuals**.
    - Legal challenges related to marriage, adoption, inheritance, and other civil rights persist for them.
  - **Intersectional Challenges:** LGBTQIA+ individuals who belong to marginalised communities, such as Dalits, tribal communities, religious minorities, or those with disabilities, **face compounded discrimination and marginalisation based on their intersecting identities**.

Note:

- **Manipulative Counselling:** Manipulative counselling practices, such as **conversion therapy** and pathologizing LGBTQIA+ identities, exacerbate the challenges faced by this community.
  - These practices reinforce harmful stereotypes, deny authenticity, and contribute to internalised stigma and distress.

## Water Crisis in South India

### Why in News?

The southern states of India, particularly Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana, are facing a severe water crisis due to significantly low water levels in major reservoirs.

### What is the Current Situation of Water Crisis in the Southern States?

- **Current Water Situation:**
  - According to the **Central Water Commission**, most major reservoirs in Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana are **filled to only 25% of their capacity or even less.**
  - Notable dams such as **Tungabhadra** in Karnataka and **Nagarjuna Sagar** on the Andhra Pradesh-Telangana border are filled to 5% or less of their full capacity.
    - Mettur dam in Tamil Nadu and Srisailem on the Andhra Pradesh-Telangana border are also experiencing low levels, with less than 30% of their capacity filled.

### Comparison of Water Levels Across Regions:


- The southern region is the most affected, with reservoirs collectively filled to only 23% of their capacity,

significantly lower than last year and the 10-year average.

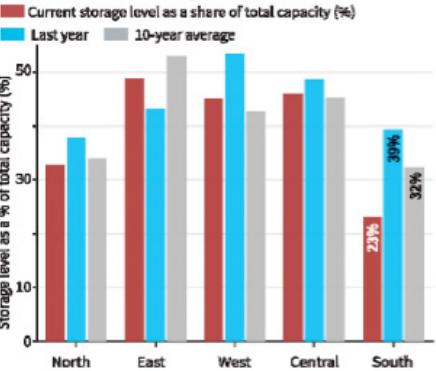
- In contrast, other regions like northern, central, western, and eastern India have reservoir levels closer to their 10-year averages.
- **Exception in Kerala:**
  - Kerala stands out among southern states with most major dams filled to at least 50% of their capacities.
    - Reservoirs like **Idukki**, Idamalayar, Kallada, and Kakki are reported to have relatively better water levels.

### In troubled waters

The data for the charts were sourced from the latest weekly bulletin published by the Central Water Commission



**Chart 1:** The chart shows a region-wise comparison of the current storage levels as a share of the total capacities of reservoirs. It also compares the current water levels with last year's levels and the 10-year average



Region	Current storage level as a share of total capacity (%)	Last year (%)	10-year average (%)
North	32	38	35
East	48	42	45
West	45	52	40
Central	45	48	42
South	23	38	32

**Chart 2,3,4,5:** The charts show the current storage levels as a share of the total capacity of major dams in southern States

■ Current storage level as a share of total capacity (%)  
■ Total capacity (in lakh crore litres)

**Chart 2: Andhra and Telangana**

Dam	Current storage level as a share of total capacity (%)	Total capacity (in lakh crore litres)
Srisailem	15%	6
Nagarjuna Sagar	4%	5.1
Sriramsagar	23%	2.3
Somasila	8%	2
Kandaleru	7%	1.8

**Chart 3: Karnataka**

Dam	Current storage level as a share of total capacity (%)	Total capacity (in lakh crore litres)
Linganamakki	22%	4.3
Supa	36%	4.1
Tungabhadra	5%	3.3
Almatti	22%	3.1
Bhadra	25%	1.8

**Chart 4: Tamil Nadu**

Dam	Current storage level as a share of total capacity (%)	Total capacity (in lakh crore litres)
Mettur (Stanley)	28%	2.6
Lower Bhawani	24%	0.8
Parambikulam	28%	-
Sathanur	28%	-
Vaigai	74%	-

**Chart 5: Kerala**

Dam	Current storage level as a share of total capacity (%)	Total capacity (in lakh crore litres)
Idukki	47%	1.5
Idamalayar	48%	1.0
Kallada (Parappari)	58%	0.5
Kakki	54%	0.4
Malampuzha	17%	0.2

**Table 6:** The table shows the % of districts, across various levels of rainfall deficits, during the 2023 south-west monsoon. For Instance, In about 27% districts of Kerala, rainfall deficit during last monsoon was 40% or more

State	Deficit				No deficit
	40% or more	25%-40%	15%-25%	<15%	
Andhra	5%	5%	32%	21%	37%
Karnataka	6%	13%	48%	26%	6%
Kerala	27%	20%	40%	13%	-
Tamil Nadu	3%	11%	13%	16%	58%
Telangana	-	7%	2%	27%	63%

Note:

### What are the Reasons for the Water Crisis in South India?

- **Rainfall Deficiency and El Niño Effect:**
  - Lower rainfall caused by **El Niño** events has led to **drought-like conditions** and prolonged dry periods in the region.
    - El Niño is a climate pattern characterized by the warming of sea surface temperatures in the Pacific Ocean, which can disrupt normal weather patterns globally, leading to reduced rainfall in certain regions.
- **Delayed Monsoon and Post-Monsoon Deficiency:**
  - The deficiency in rainfall during the **Monsoon** and post-monsoon seasons has contributed **significantly to the depletion of water levels** in reservoirs.
  - The delayed onset of monsoon and inadequate rainfall during critical periods have exacerbated the situation.
  - During the **post-monsoon period (October-December 2023)**, more than 50% of regions in the country **were rain-deficient**.
- **Increased Temperature and Evaporation:**
  - Rising temperatures due to global warming accelerate evaporation rates, leading to faster depletion of water from reservoirs and water bodies.
  - Higher temperatures also exacerbate drought conditions, increasing water demand for agriculture, urban consumption, and industrial purposes.
- **Groundwater Depletion:**
  - Excessive groundwater extraction for irrigation, particularly in regions with inadequate surface water sources, has led to groundwater depletion.
  - South India predominantly cultivates crops such as rice, sugarcane, and cotton, which require substantial amounts of water.
- **Pollution of Water Bodies:**
  - Pollution from industrial discharge, untreated sewage, and solid waste dumping has contaminated water sources, rendering them unfit for consumption and further reducing the available water supply.
  - A study conducted by the **Environmental Management & Policy Research Institute (EMPRI)** states that about 85% of Bengaluru's water bodies are polluted by industrial effluents, sewage, and solid waste dumping.
- **Mismanagement and Inequitable Distribution:**
  - Inefficient water management practices, including wastage, leakage, and unequal distribution of water

resources, contribute to the severity of the water scarcity crisis in the region.

### What are the Implications of the Water Crisis in India?

- **Health Issues:**
  - Lack of access to safe drinking water can cause **various health problems such as dehydration, infections, diseases, and even death**.
  - A report by the **NITI Aayog** stated that **around 2 lakh** people die in India every year due to inadequate water supply.
    - According to the **World Bank**, **India has 18% of the world's population**, but only has enough water resources for **4% of its people**.
    - In 2023, around 91 million Indians will not have access to safe water.
- **Ecosystem Damage:**
  - Water scarcity also poses a **threat to the wildlife and the natural habitats** in India. It also disrupts the biodiversity and the ecological balance of the ecosystems.
  - Many wild animals have to venture into human settlements in search of water, which can lead to conflicts and endangerment.
- **Reduced Agriculture Productivity:**
  - Water scarcity can have a negative impact on the agricultural sector, **which consumes approximately 80% of the country's** water resources.
  - Water scarcity can reduce crop yields, affect food security, and increase poverty among farmers.
- **Economic Losses:**
  - Water scarcity can affect industrial production, reduce energy generation, and increase the cost of water supply and treatment. Water scarcity can also affect tourism, trade, and social welfare.
  - In the report, '**Climate Change, Water and Economy**', the **World Bank (2016)** underlines that countries with water shortages may face a major setback in economic growth by 2050.

#### What are the Government Initiatives To Tackle the Water Crisis in India?

- **MGNREGA for water conservation**
- **Jal Kranti Abhiyan**
- **National Water Mission**
- **Atal Bhujal Yojana (ABHY)**
- **Jal Jeevan Mission (JJM)**
- **National Mission for Clean Ganga (NMCG)**

Note:

# Science & Technology

## Highlights

- Exploring the Durability of Modern Vaccines
- Semiconductor Chip Manufacturing Technology
- Atomic Clocks for One-Nation, One-Time
- Kodaikanal Solar Observatory
- Green Steel Policy
- Ozone Found on Jupiter's Moon Callisto
- Energy Efficiency in Construction Sector
- Cicadas

## 3-D Map of the Universe

### Why in News?

Recently, the most comprehensive three-dimensional map of the universe has been released by an international team of researchers.

- Scientists believe that this development could reveal some clues about **Dark Energy**.
- This map, derived from the first year of observations by the **Dark Energy Spectroscopic Instrument (DESI)**, offers insights into the **spatial distribution of galaxies** and holds promise in unravelling the mysteries of **Dark Energy**.

### What are the Universe's Fundamental Components?

- **The universe is made up of three components:**
  - Normal or visible matter (5%)
  - Dark matter (27%),
  - Dark energy (68%)
- **Normal Matter:**
  - Normal matter makes up everything we can directly observe.
  - It is composed of atomic particles like **protons, neutrons, and electrons**.
  - It can exist as gas, solid, liquid, or plasma of charged particles.
- **Dark Matter:**
  - Like ordinary matter, dark matter **takes up space and holds mass**.

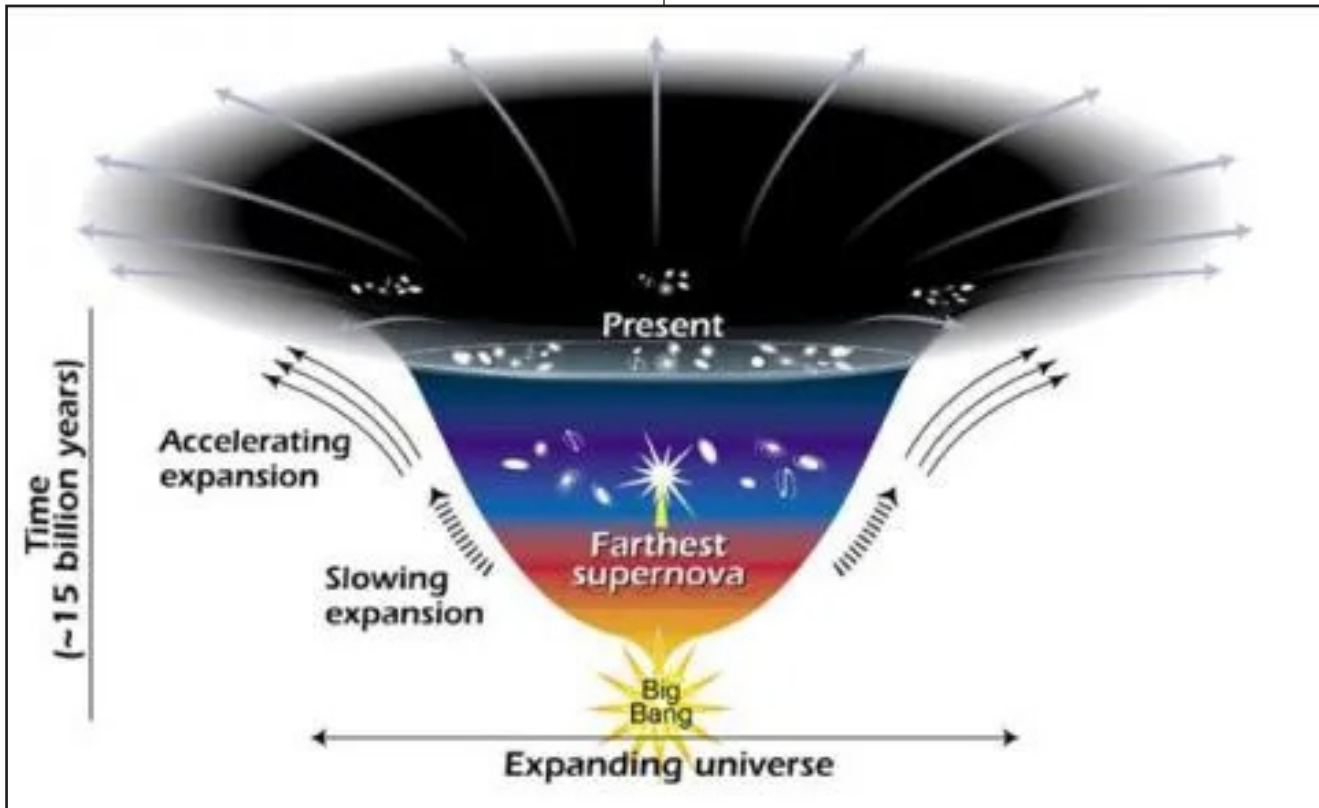
- Dark matter is **invisible and does not interact with light**, making it impossible to directly observe.
- It **exerts gravitational influence**, as evidenced by its impact on the motion of stars, gas, and galaxies.
- Dark matter is believed to **form halos around galaxies**, and it is more **prevalent in dwarf galaxies compared to larger ones**.
- **Dark Energy:**
  - Dark energy is a mysterious force **that counteracts gravity, causing the expansion of the universe to accelerate**.
  - Despite being invisible like dark matter, dark energy has a different effect, **pushing galaxies apart instead of pulling** them together.
  - The discovery of dark energy in 1998 was based on measurements of cosmic expansion, which revealed an increasing rate of expansion.
- **Nature of Dark Energy:**
  - The recent findings have raised the tantalising possibility that dark energy – a mysterious, repulsive force that drives the process – **is not constant throughout time as has previously been suggested**.
  - **Dark Energy is detected by its effect** on the rate at which the universe expands and its effect on the rate at which large-scale structures such as galaxies and clusters of galaxies form through gravitational instabilities.

Note:



**Dark Energy Spectroscopic Instrument (DESI):**

- DESI is a unique piece of equipment that, once fitted over a telescope, can capture light from 5,000 galaxies at the same time.
  - It is a collaboration of more than 900 researchers in institutions across the world. From India, TIFR (Tata Institute of Fundamental Research) is the only participating institution.
- Using DESI, which is mounted over the Mayall 4-Meter Telescope in Arizona, US, researchers have been able to measure light from six million galaxies — some of which existed as far back as 11 billion years ago.
- This was used to prepare the most detailed map of the universe as yet.



- Read more: [Dark Energy](#), [Dark Matter](#)

## Exploring the Durability of Modern Vaccines

### Why in News?

Recently, in a review of several [vaccines](#), it has been found that only **five vaccines** provide long-lasting protection spanning more than **20 years** and only **three provide lifelong protection**.

- The variability in **vaccine efficacy** poses challenges concerning its **effectiveness** and **longevity**.

### What are Vaccines and Immunological Mechanism?

- **About:**
  - Vaccines are biological preparations designed to stimulate the **body's immune system** to recognise and fight against specific pathogens, such as [viruses](#) or [bacteria](#), without causing the disease itself.
  - They typically contain **weakened or inactivated** forms of the **pathogen**, **parts of the pathogen**, or **toxins** produced by the pathogen.
- **Immunological Mechanism :**
  - **Memory B Cells:** Formed in lymph nodes after vaccination, they "memorise" antigens and trigger

Note:

rapid antibody production upon subsequent exposure to the same antigen.

- **T Cell Support:** Memory B cells require T cell support vaccines that stimulate **T cells** can induce the production of **memory B cells**.
- **Variability in Vaccine-Induced B Cell Response:** Not all vaccines prompt the body to produce **memory B cells**. Some vaccines require frequent **boosters to enhance immunity duration**.
  - **Example: Measles and rubella vaccines** maintain constant levels of **memory B cells** in blood plasma, correlating with antibody levels for decades. However, this is not observed with **chickenpox, tetanus, and diphtheria vaccines**.

- **Long-Lasting Plasma Cells (LLPCs):** Migrate to the bone marrow and may endure for decades, playing a crucial role in vaccine-induced immunity.
  - LLPCs are essential for lifelong protection, termed the immunology “**holy grail**.” Vaccines aim to generate LLPCs for sustained immunity.
  - Some vaccines, like **mRNA Covid-19** shots, fail to activate LLPCs in the bone marrow, potentially impacting long-term protection.
- **Variability in Vaccine Efficacy:** Different vaccines differ in their ability to produce memory B cells and LLPCs, leading to discrepancies in durability and effectiveness.

#### ➤ Vaccine and its Efficacy:

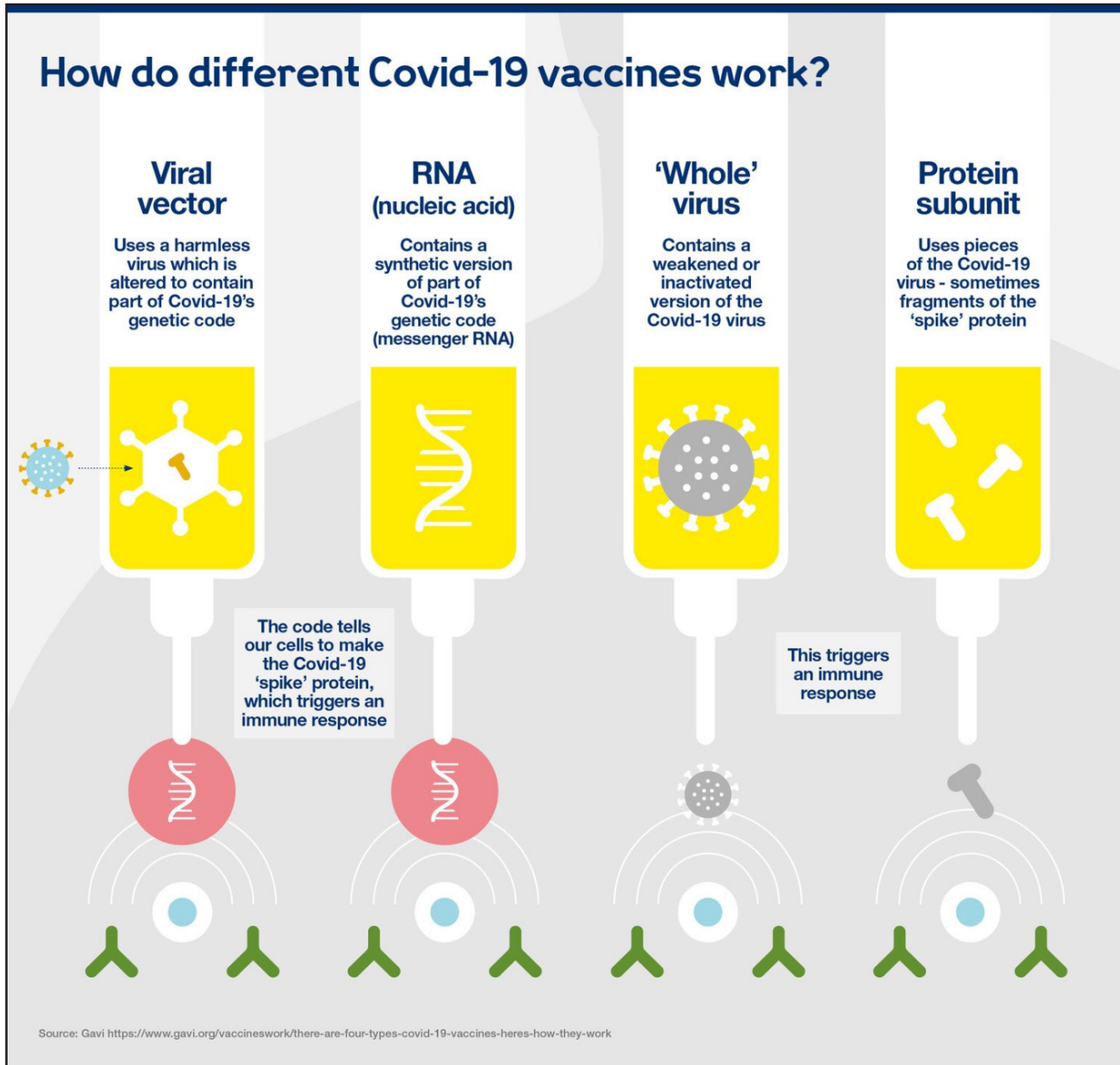
Vaccine	Vaccine type	Efficacy	Est. duration of protection
Measles	Live attenuated parenteral	83%	Lifelong
Rubella	Live attenuated parenteral	80.70%	Lifelong
Yellow fever	Live attenuated	~99%	Lifelong
Hepatitis B	Inactivated, subunit	89-96%	Up to 30 years
Hepatitis A inactivated	Inactivated	98%	At least 25 years

#### Vaccine Induced Immunity:

- Vaccine immunity, also known as acquired immunity or immunisation, refers to the protection against **infectious diseases** that is conferred by vaccination.
- When a person receives a vaccine, their immune system is stimulated to recognize and respond to **specific pathogens**, such as **viruses** or **bacteria**, without causing the disease itself.

Note:

## How do different Covid-19 vaccines work?



### What Factors Influence the Efficacy of Vaccines?

- **Vaccine efficacy** is influenced by **three primary categories of factors**, i.e., **vaccine related, pathogen related** and **host related**.
  - **Vaccine Related:**
    - **Live Viral Vaccinations:** It Includes the vaccines for **measles, rubella, yellow fever, chickenpox**, and **polio (oral)** provide long lasting protection than **killed pathogen or subunit vaccines**.

- **Interval Between Vaccine Doses:** A long interval of at least six months between priming and booster doses is crucial for a robust immune response.
- **Target Pathogen Related:**
  - **Pathogens with Mucosal Infections:** Viruses causing mucosal infections like **SARS-CoV-2** and **influenza** lead to frequent reinfections due to their quick transmission before the immune system can mount a response.

Note:

- **Genetic Stability of Virus:** RNA viruses like **measles** and **SARS-CoV-2**, with **high mutation rates**, may require vaccine updates.
  - Measles vaccine has remained stable, while **SARS-CoV-2 vaccines** have been updated due to mutations.
- **Host-Related Factors:**
  - **Age, Gender, and Obesity:** These factors influence vaccine efficacy and duration of immunity. **Extreme ages and obesity may lead to shorter-lasting immune responses.**

#### Initiatives for Taken by Government for Vaccination:

- **Universal Immunization Programme (UIP)**
- **Mission Indradhanush**
- **Electronic Vaccine Intelligence Network (eVIN) system**
- **National Health Mission**

## Semiconductor Chip Manufacturing Technology

### Why in News?

Recently, the **TATA Group** collaborated with **Taiwan's PSMC** to establish a 300 mm (millimetre) **wafer fabrication plant** in Gujarat, with plans to launch its initial 28 nm (nanometer) chip in 2026.

- The **Indian Government** has also recently sanctioned two assembly and test plants in Gujarat and Assam.

### What is a Semiconductor Chip?

#### ➤ About:

- **Semiconductor:** **Semiconductors** possess **electrical conductivity** properties **intermediate** between conductors and insulators, which can be modified by introducing **dopants**.
- **Semiconductor chips, transistors, fabrication technology, and wafers** are **interdependent components** essential for electronic device **functionality**.
  - Transistors serving as the **building blocks** of semiconductor chips fabricated on wafers using specific technologies, enabling the creation of **complex devices** powering modern technology.

#### ○ Semiconductor Chips:

- It is a tiny electronic device made of semiconductor material (usually silicon or germanium) which serves as the **basic building block** of most electronic circuits.
- These chips can contain billions of **microscopic switches** on a chip smaller than a fingernail.
- The basic component of a semiconductor chip is a **silicon wafer** etched with tiny transistors that control the flow of electricity according to various computational instructions.
- It performs various functions, such as **processing data**, storing information, or controlling electronic devices.
- They are a **critical part** of almost every modern electronic device, including smartphones, computers, and integrated circuits.

#### ○ Transistor:

- **Transistors** are fundamental components of semiconductor devices that amplify or switch electronic signals and electrical power.
- They are the building blocks of modern electronic devices and are used in various applications, including amplifiers, switches, and digital circuits.

#### ○ Fabrication Technology:

- **Fabrication technology** refers to the process of creating semiconductor devices like chips and transistors. It involves several key steps, including **wafer preparation**, photolithography, etching, doping, and packaging.

#### ○ Wafer:

- A wafer (also called a slice or substrate) is a **thin slice of semiconductor** material, such as **crystalline silicon**, used for the fabrication of integrated circuits.
- A **semiconductor chip** is produced by printing an array of chips on a **circular semiconductor wafer**, similar to how postage stamps are printed on a sheet and then cut out individually.
- **Larger wafer sizes** in the industry enable more chips to be printed on a single wafer, **accelerating** and **reducing** the cost of chip production, despite the technical challenges and initial capital expenses involved.

Note:



# SEMICONDUCTORS

Semiconductors are materials having conductivity between conductors and insulators

## EXAMPLES

- ▶ **Pure Elements:** Silicon and Germanium
- ▶ **Compounds:** Gallium Arsenide and Cadmium selenide

## SIGNIFICANCE

- ▶ Essential to almost all sectors of the economy - **aerospace, automobiles, communications, clean energy, information technology** and **medical devices** etc.

## SEMICONDUCTORS AND INDIA

- ▶ **India Imports from:** China, Taiwan, USA and Japan
- ▶ **Indian Semiconductor Market:** Expected to reach **USD 55 bn** by 2026

### SCHEMES

- ▶ **Production-Linked Incentive (PLI) scheme**
- ▶ **Design Linked Incentive (DLI) Scheme**
- ▶ Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECES)

### OBJECTIVES

- ▶ Encourage semiconductor and display manufacturing in the country.
- ▶ Nurture >20 domestic companies in semiconductor design  
Achieve a turnover of > Rs.1500 crore in next 5 years
- ▶ Manufacture electronics components and semiconductors

## INDIA'S SEMICONDUCTOR MISSION (ISM)

### VISION

- ▶ Build a **vibrant semiconductor** and **display design** and **innovation ecosystem**

### LAUNCHED

- ▶ 2021

### NODAL MINISTRY

- ▶ Ministry of Electronics and Information Technology (MeitY)

### TOTAL FINANCIAL OUTLAY

- ▶ Rs 76,000 crore

### COMPONENTS

- ▶ Scheme for setting up of Semiconductor Fabs
- ▶ Scheme for setting up of Display Fabs
- ▶ Scheme for setting up of Compound Semiconductors/Silicon Photonics/Sensors (including MEMS) Fabs/ Discrete Semiconductors Fab and Semiconductor ATMP/OSAT
- ▶ DLI Scheme



Note:

### What is the Status of India's Semiconductor Ecosystem?

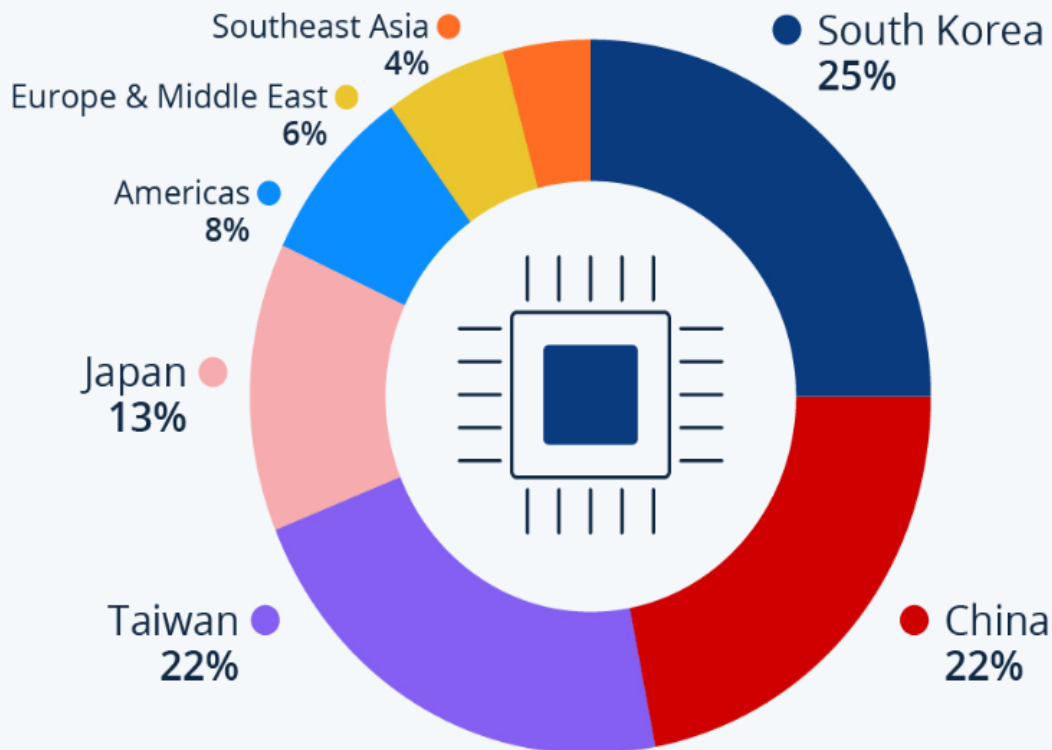
- India is actively pursuing the development of a **robust semiconductor ecosystem**. With its large market potential, talent pool, and government support. India aims to **reduce dependence on imports** and establish **domestic manufacturing capabilities**.
- India's established chip design industry **since the 1990s** will aid its semiconductor manufacturing efforts, offering opportunities for various professionals beyond electronics and computer engineers.

### Key Advantages:

- **Market Potential:** India's rapidly growing population and burgeoning middle class create a **strong demand** for semiconductor products.
  - India's semiconductor market is projected to reach **\$55 billion by 2026**, reflecting its focus on domestic manufacturing.
- **Talent Pool:** India emphasises **skill development** and innovation, encouraging domestic chip design skills.

## Where Can the Most Chips Be Manufactured?

Distribution of global semiconductor fabricating capacity in 2022, by location\*



\* 300mm fabs

Source: SEMI 300mm Fab Outlook to 2026

Note:



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### Initiatives Taken by the Government for the Semiconductor Sector:

- **Production Linked Incentive scheme (PLI)**
- **Digital RISC-V (DIR-V) program** for the production of microprocessors.
- **Modified Special Incentive Package Scheme (M-SIPS) for Semiconductors.**
- **Chips to Startup (C2S) Programme** to train high-quality engineers.

## Atomic Clocks for One-Nation, One-Time

### Why in News?

India aims to **deploy its own atomic clocks** across the nation, to enhance its **timekeeping infrastructure and national defence capabilities** for the future.

- The deployment of atomic clocks across India aims to **synchronise all digital devices with Indian Standard Time (IST)**, ensuring uniformity.
  - These atomic clocks are being installed by the **National Physical Laboratory (NPL)** under the **Ministry of Science and Technology** and the **Ministry of Consumer Affairs**.

### What are Atomic Clocks?

- **About:**
  - An atomic clock, is a clock, known for its **exceptional accuracy**, and functions by **utilising specific resonance frequencies of atoms, typically cesium or rubidium.**
  - It was invented in **1955** by **Louise Essen**.
  - The **extreme precision levels** of the atomic clocks can be interpreted by the fact that they will lose one second approximately every 100 million years.
  - **Currently, atomic clocks in India** are operational in Ahmedabad and Faridabad.
- **Types of atomic clock:**
  - Most commonly used are the **cesium atomic beam**, the **hydrogen maser**, and the **rubidium gas cell**.

- The **cesium clock** has **high accuracy and good long-term stability**. The **hydrogen maser** has the **best stability** for periods of up to a few hours.

### Working of Atomic Clocks:

- The electronic components of atomic clocks are governed by **microwave electromagnetic radiation (EM)**. Maintaining this radiation's precise frequency is essential to **induce quantum transitions in cesium or rubidium atoms**.
- The **quantum transition (energy change)** of cesium or rubidium atoms is induced solely when the radiation is maintained at an exceptionally specific frequency.
- In an atomic clock, **these quantum transitions are then observed and maintained in a feedback loop**. The waves generated in these quantum transitions are **then counted to arrive at the value of a second**.

### Why is India Developing its Atomic Clocks?

#### ➤ Background:

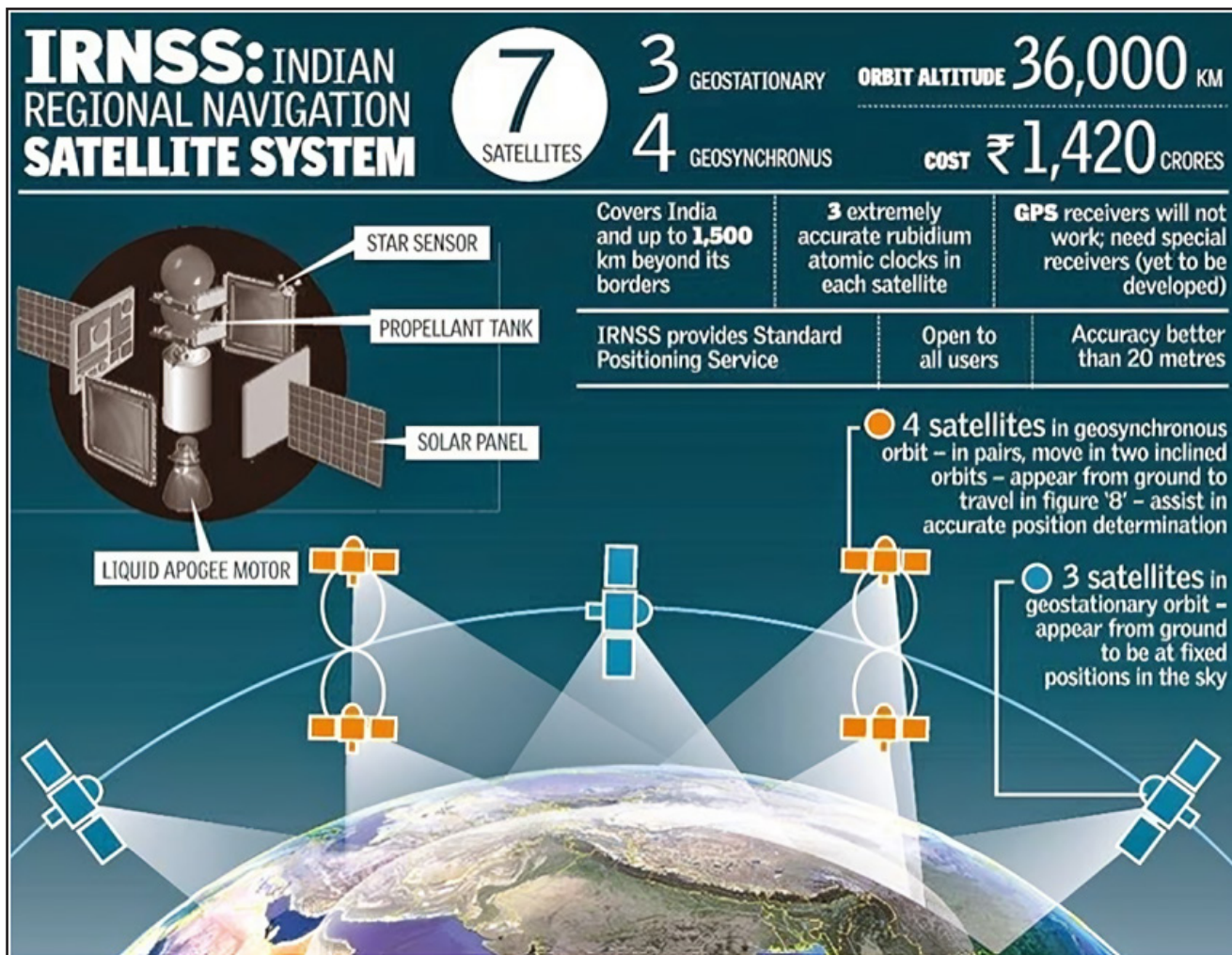
- This initiative was started due to the **denial of Global Positioning System (GPS) information during the Kargil War**. The existence of **independent timekeeping capabilities** is crucial for **defence, cybersecurity, and online transactions**.

#### ➤ Need for Enhanced Security Measures:

- Efforts are underway to **connect atomic clocks via optical cables** to bolster security against **potential disruptions during emergencies** or wartime, complementing satellite-based time dissemination.
- India is developing its atomic clocks to **reduce reliance on foreign atomic clocks**, especially for **critical infrastructure** like the **Indian Regional Navigation Satellite System (IRNSS)**, also known as **NavIC**.
  - Developing indigenous atomic clocks allows India to have **complete control over its navigation systems**, which is vital for both **national security and technological independence**.

Note:





Read More- [ISRO's new NavIC Satellite](#)

## Kodaikanal Solar Observatory

### Why in News?

Recently, **Kodaikanal Solar Observatory** celebrated its 125<sup>th</sup> birth anniversary. Over the years, it has played a crucial role in advancing our understanding of **solar activity** and its impact on **Earth's climate and space weather**.

### What is a Solar Observatory?

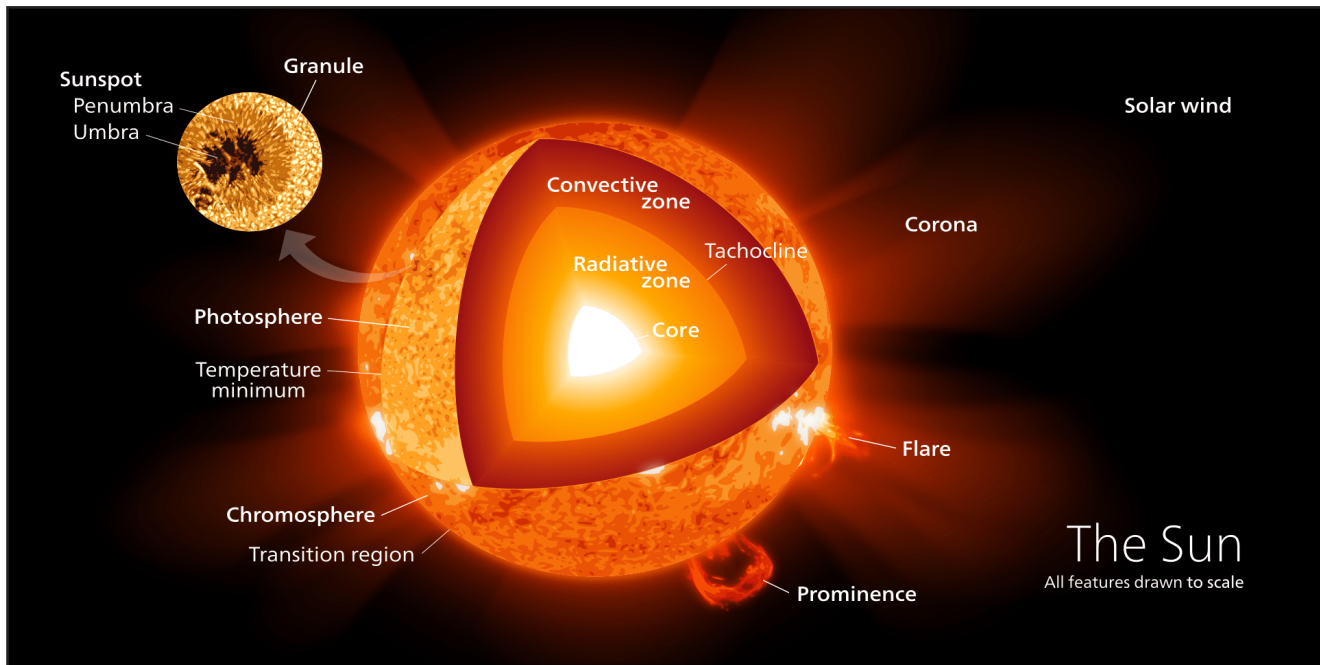
- **About:** A solar observatory is a facility or institution dedicated to observing and studying the Sun.
  - These observatories use **specialised telescopes**

**and instruments** to observe various phenomena on the Sun's surface, in its atmosphere, and in the surrounding space.

- **Need:** The Sun serves as the **main source of energy** for life on Earth, and alterations in its surface or surrounding areas have the potential to greatly impact our Earth's atmosphere.
  - Intense solar storms and **Solar flares** pose significant risks to satellite operations, power grids, and **navigation systems** reliant on **space-based technology**.
  - Through solar observatories, scientists can monitor these events and predict major events that can have an impact on earth's atmosphere.

Note:





### What is the Kodaikanal Solar Observatory?

- **About:** The Kodaikanal Solar Observatory is a solar observatory owned and operated by the **Indian Institute of Astrophysics**. It was established in 1899.
  - It is on the southern tip of the **Palani Hills**.
  - The **Evershed effect** (apparent radial flow of gas observed in the penumbra (outer region) of sunspots on the Sun) was first detected at this observatory in **January 1909**.
- **Cause of Establishment:** The establishment of the **Kodaikanal Solar Observatory (KoSO)** in India, was motivated by the need to understand the link between solar activity and monsoons.
  - The devastating Great Drought of 1875-1877 in India highlighted the potential link between **solar activity and seasonal rainfall patterns**.
    - India, along with **China, Egypt, Morocco, Ethiopia, southern Africa, Brazil, Columbia and Venezuela**, suffered concurrent multi-year droughts during 1876-1878, later named the Great Drought, and an associated global famine that killed nearly 50 million.
  - The Famine Commission recommended establishing a **solar observatory for systematic solar observations** to understand this connection.
  - Charles Michie Smith, a physicist, was entrusted with **finding a suitable location**.

- **Kodaikanal in Tamil Nadu** was chosen for its clear skies, low humidity, and minimal fog.

- **Madras Observatory (Chennai, 1792):** In 1792, the British East India Company established the **Madras Observatory, a first of its kind in this part of the world**.
  - Here, astronomical observations of the Sun, the Moon, bright stars and planets recorded **during 1812-1825 were preserved in two large data volumes**.
  - It was merged with the KoSO following the reorganisation of all Indian observatories in **April 1899**.

### What are the Other Major Space Observatories Established in India?

- **Indian Astronomical Observatory (IAO), Hanle:** It is situated in Hanle Ladakh and one of the country's premier astronomical facilities.
  - It is operated by the Indian Institute of Astrophysics and plays a vital role in advancing India's contributions to the field of astronomy and astrophysics.
- **Mt. Abu Infrared Observatory (MIO):** It is situated at the top of Mount Abu (at **Gurushikhar**) in the Aravalli Range of Rajasthan, India.
  - It is operated by the **Physical Research Laboratory (PRL)**.

Note:

- Infrared astronomy involves observing celestial objects and phenomena in the infrared portion of the electromagnetic spectrum.
- **Giant Metrewave Radio Telescope:** It is a prominent radio astronomy facility located near Pune, India.
  - Operated by the **National Centre for Radio Astrophysics (NCRA)**, the GMRT comprises 30 fully steerable parabolic radio telescopes spread over a large area.
  - Its design is based on the SMART Concept: **Stretch Mesh Attached to Rope Trusses.**

#### What are the Other Global Efforts and Missions to Study the Sun?

- **India's Aditya-L1 Mission:** Aditya-L1 is the first space-based observatory class Indian solar mission to study the Sun from a substantial distance of 1.5 million kilometres.
- **NASA's Parker Solar Probe:** It aims to trace how energy and heat move through the Sun's corona and to study the source of the solar wind's acceleration.
  - It recently made a 1<sup>st</sup>-of-its-kind observation within a coronal mass ejection.
- **Helios 2 Solar Probe:** The earlier Helios 2 solar probe, a joint venture between NASA and the space agency of erstwhile West Germany, went within 43 million km of the Sun's surface in 1976.
- **Solar Orbiter:** A joint mission between the European Space Agency and NASA to collect data that will help answer a central question of heliophysics like how the Sun creates and controls the constantly changing space environment throughout the solar system.

## Green Steel Policy

### Why in News?

The **Steel Ministry** is developing a comprehensive **green steel policy**, encompassing the manufacturing process, required skill set, and funding support, as part of a complete **decarbonization strategy**.

### What is Green Steel?

- **About:**
  - Green steel is the eco-friendly production of steel with lower **greenhouse gas emissions**, possibly **reducing costs** and enhancing quality compared to traditional methods.
- **Need:**
  - **High Coal Consumption in Blast Furnace:** The steel manufacturing process, involving **blast furnaces**, basic oxygen furnaces, and **electric arc furnaces**, is a major global source of carbon emissions, primarily due to the **high coal** and coke consumption in blast furnace operations.
    - A study suggests that with **steel demand projected to rise** through the **21st century**, there is a strong incentive to seek low **greenhouse gas (GHG) emission** alternatives for steel production.
    - **India's domestic steel sector** contributes **12%** of the country's greenhouse gas emissions, with an emission intensity of **2.55 tonnes of CO<sub>2</sub> per tonne** of crude steel, higher than the global average of 1.9 tonnes of CO<sub>2</sub>.

### Carbon emissions from coal-based steel production



Steel production today accounts for 8% of total global CO<sub>2</sub> emissions. Infographics: Azote

Note:



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➤ **As a Low-Grade Carbon Production Method:**

- It Includes **carbon capture and storage (CCS)**, using **Green/Blue hydrogen**, high **biomass** utilization, and **artificial iron units (AIUs)** for reducing carbon emissions and producing high-grade steel.

**CO<sub>2</sub> reduction**

	Strategy	Examples	Current outlook
<b>Blast furnace efficiency (BOF)</b>	Make efficiency improvements to optimize BF/BOF operations	Optimized BOF inputs (DRI, scrap), increased fuel injection in BF (e.g., hydrogen, PCI)	Technology readily available at competitive cost
<b>Biomass reductants</b>	Use biomass as an alternative reductant or fuel	Tecnored process	Process possible in South America and Russia, due to biomass availability
<b>Carbon capture and usage</b>	Capture fossil fuels and emissions and create new products	Bioethanol production from CO <sub>2</sub> emissions	Not available on an industrial scale

**Full decarbonization possible**

	Strategy	Examples	Current outlook
<b>Electric arc furnace (EAF)</b>	Maximize secondary flows and recycling by melting more scrap in EAF	EAF – usage to melt scrap	Technology readily available at competitive cost
<b>DRI plus EAF using natural gas</b>	Increase usage of DRI in the EAF	Current DRI plus EAF plants using natural gas (NG)	Technology readily available
<b>DRI plus EAF using H<sub>2</sub></b>	Replace fossil fuels in DRI process with renewable energy or H <sub>2</sub>	MIDREX DRI process running on H <sub>2</sub> HYL DRI process running on H <sub>2</sub>	Technology available at high cost

➤ **Global Initiatives:**

○ **First Movers Coalition:**

- It is an initiative of the **World Economic Forum** to decarbonize industrial sectors like steel.
- The **Coalition** announced it had **expanded**, with 55 companies and nine countries now committed to purchasing a proportion of the industrial materials and transport they need from suppliers using **near-zero or zero-carbon solutions**.

○ **The Industrial Deep Decarbonization Initiative (IDDI):**

- It encourages governments to **report environmental data** and use low-emission and near-zero emissions cement/concrete and steel in construction projects, with nine countries, including the U.S., having joined and set to declare their pledges.

○ **SteelZero and ConcreteZero:**

- The **Climate Group's** SteelZero and ConcreteZero initiatives are **corporate partnerships** with 25

Note:

and 22 companies respectively committed to using net-zero steel and low- and net-zero emission concrete — and effectively cement, as its key ingredient.

○ **European Union:**

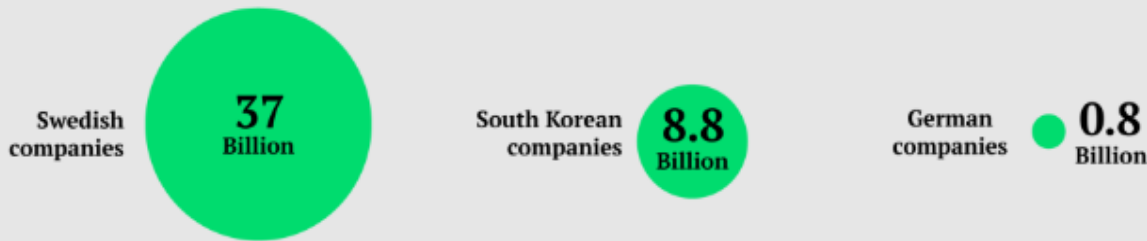
- By 2030, the **European Union** is projected to host nearly 50 green and low-carbon steel projects, driven in part by policies like the

European Union's **Carbon Border Adjustment Mechanism**.

○ **Sweden:**

- **Hybrit** supplied Volvo with the **first coal-free "green steel,"** while H2 Green Steel is constructing a **fossil fuel-free steel plant in Sweden** with a sustainable hydrogen facility, both striving for **environmentally friendly** steel production.

### Countries with the largest low-carbon steel investments announced (USD)



➤ **India's Initiative:**

- The Steel Ministry is developing a **green steel policy**, including process definition, required skills, and funding, with a focus on complete decarbonization.
- Already 13-odd **task forces** had been **formed** to determine the various modalities around green steel-making, including a definition of the offering.
- Recently, the 14th task force was set up to explore the option of using **biochar or biomass** (as an alternative in blast furnaces) in steel-making, thereby bringing down carbon emissions during the manufacturing process.
- India is exploring its own pure-hydrogen-based **DRI (direct reduction of iron) technology**, with the project report currently under scrutiny, and also considering a consortium-based pilot for a hydrogen-based DRI facility.
  - The **Ministry of New and Renewable Energy** has allocated ₹455 crore for piloting the use of hydrogen in steel making

## Ozone Found on Jupiter's Moon Callisto

### Why in News?

Recently, a team of scientists from various countries, including **India**, has uncovered compelling evidence suggesting the existence of **ozone on Callisto, one of Jupiter's moons**.

- Previously thought of as a barren celestial body, scientists now consider that this icy moon could harbour conditions conducive to supporting life.

**Note:** Researchers recreated Callisto's surface conditions in the laboratory and exposed this setup to vacuum-ultraviolet photons and observed an absorption spectrum showing **ozone formation**, similar to what **Hubble** observed on Callisto in 1997.

- **Ozone presence suggests the presence of oxygen, essential for life.**

### What are the Key Features of Callisto?

- **About:** Callisto ranks as one of Jupiter's largest moons and is the **third-largest moon in the Solar System, following Ganymede (Jupiter) and Titan (Saturn).**

Note:



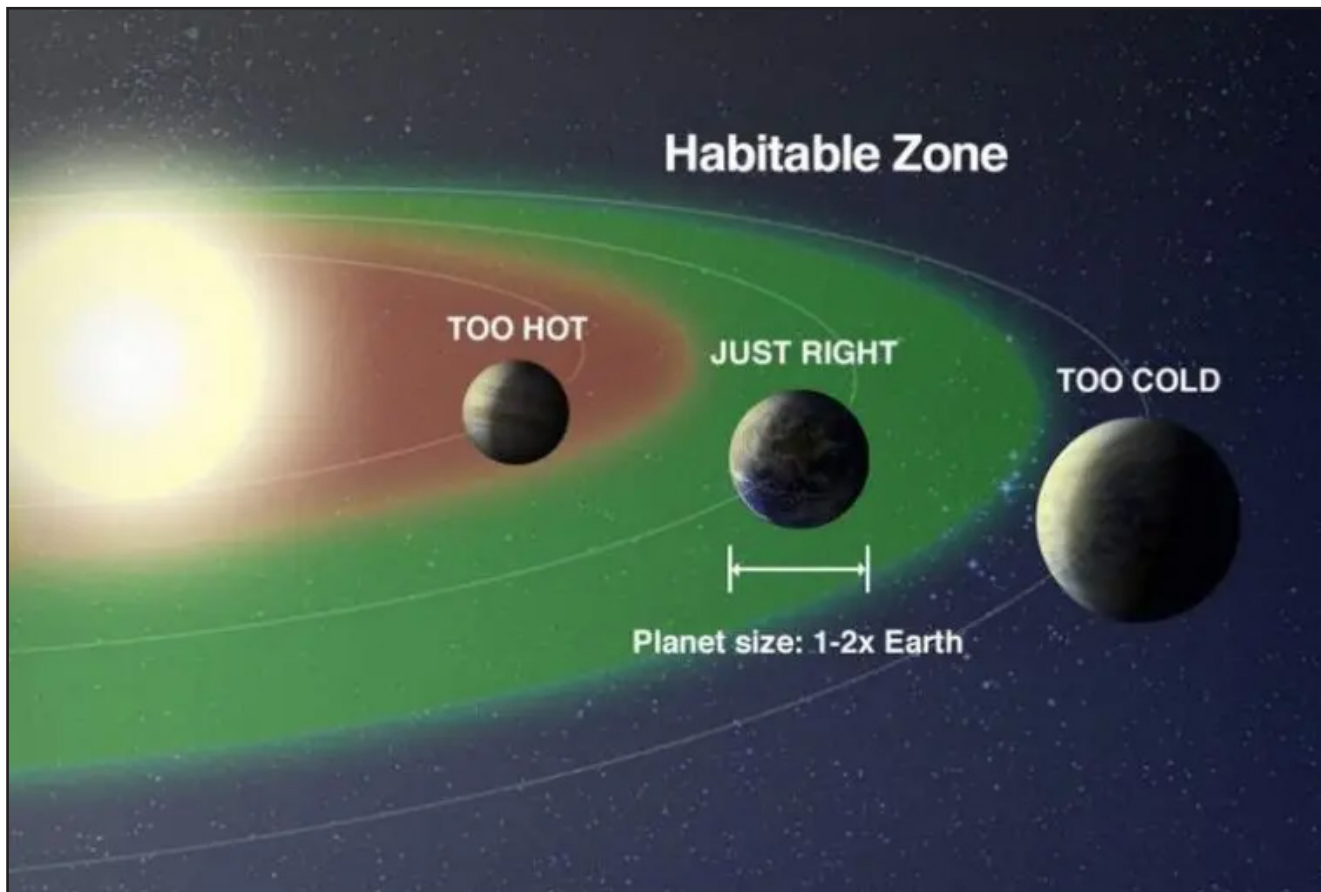


- It was discovered in 1610, by Italian scientist **Galileo Galilei** along with **Jupiter's three other largest moons: Ganymede, Europa and Io.**
- As per **NASA**, after **Saturn** (146), Jupiter (95) boasts the highest number of moons in the Solar System.
- **Features:** It is primarily composed of **water ice, rocky materials, sulfur dioxide, and organic compounds.**
- Its surface is heavily **cratered**, indicating a long history of being struck by asteroids and comets.
- It also lacks the **extensive seismic activity** seen

on some of Jupiter's other moons, such as **Io and Europa.**

### **What are Some Other Potentially Habitable Celestial Bodies?**

- **Habitable Zone:** Habitable zone is the distance from a star **at which liquid water could exist on orbiting planets' surfaces.**
- Habitable zones are also known as **'Goldilocks' zones**, where conditions might be just right (neither too hot nor too cold) for life.



### ➤ **Potential Habitable Celestial Bodies**

- **Kepler 22b:** It is the first planet confirmed by NASA's Kepler mission to orbit within the habitable zone of a sun-like star.
  - The planet, 2.4 times the size of Earth, resides in a region where liquid water could potentially exist, **vital for sustaining life.**
- **Proxima Centauri b:** Proxima Centauri b is an exoplanet, which is a planet that orbits a star other than our sun.

- It is located in the **habitable zone of its star**, which means that it is the right distance from the star to potentially have liquid water on its surface.
- Proxima Centauri b is also very close to Earth, at only 4.2 light-years away.
- **TRAPPIST-1 System (Star System):** The **TRAPPIST-1 system** is a group of seven Earth-sized planets orbiting an ultra-cool dwarf star about 39 light-years away.

Note:

- Several of the planets within the TRAPPIST-1 system are located within the habitable zone, and some may have liquid water on their surfaces.

#### Significance of Ozone

- Ozone, composed of **three oxygen atoms (O<sub>3</sub>) bonded together**, plays a vital role in shielding planets from harmful ultraviolet radiation.
  - The ozone layer is found in the lower part of the **earth's stratosphere**, around **15-35 km above ground**.
- It acts as a protective layer in Earth's atmosphere, absorbing most of the sun's harmful **ultraviolet (UV) radiation** and preventing it from reaching the surface.
  - Ultraviolet radiation in particular is harmful to many species (but also useful to some others).
  - Two of its components, called **ultraviolet-B and ultraviolet-C** can damage DNA, trigger mutations, and increase the risk of **skin cancer** and cataracts in humans.

## Energy Efficiency in Construction Sector

### Why in News?

India's unprecedented **construction sector** boom has brought forth **economic opportunities and improved living standards**, but it also poses significant **environmental challenges**. Addressing energy inefficiency in residential buildings becomes crucial amidst this scenario.

### Why is Addressing Energy Inefficiency in India's Construction Sector Important?

- Addressing energy inefficiency in residential buildings is crucial, given India's rising energy and cooling demand due to economic growth, **urbanisation**, **heat islands**, and **climate change**.
- The construction sector in India is witnessing an unprecedented boom, with over **300,000 housing units erected annually**. This growth brings economic opportunities and improved living standards but **poses significant environmental challenges**.
  - The building sector accounts for **over 33% of India's electricity usage**, contributing to **environmental degradation and climate change**.

- The **India Cooling Action Plan** forecasts an **eightfold increase in cooling demand between 2017 and 2037**, emphasising the need for thermal comfort while reducing active cooling demand.
- Improving energy efficiency offers a significant opportunity to reduce energy consumption and associated **greenhouse gas (GHG) emissions**.
  - Well-designed, energy-efficient buildings offer better indoor air quality, thermal comfort, and natural lighting, enhancing occupant well-being.

#### Note:

- Globally, the Buildings sector contributes to **approximately 37% of energy-related CO<sub>2</sub> emissions**.
  - More than 34% of global energy demand is attributed to constructing, heating, cooling, and lighting homes and businesses.
- The **Intergovernmental Panel on Climate Change (IPCC)** suggests that efficiency policies in buildings can cut **GHG emissions** by up to 90% in developed countries and up to 80% in developing countries.
  - Implementation of such policies can help lift up to 2.8 billion people in developing nations out of energy poverty.

### What are India's Initiatives Regarding the Energy Efficiency in the Construction Sector?

#### ➤ Eco-Niwas Samhita (ENS):

- **ECO Niwas Samhita** is an **Energy Conservation Building Code for Residential Buildings (ECBC-R)** launched by the Ministry of Power in December 2018.
  - The code aims to promote energy efficiency in the design and construction of homes, apartments, and townships for the benefit of occupants and the environment.
- The **Bureau of Energy Efficiency (BEE)** is the statutory body responsible for implementing policies and programs in energy efficiency and conservation.
- The ENS introduced the **Residential Envelope Transmittance Value (RETV)**, a metric measuring heat transfer through a building's envelope (walls, roof, and windows).
  - **Lower RETV values lead to cooler indoor environments** and decreased energy usage for cooling.

Note:

- The ENS recommends maintaining an RETV of 15W/m<sup>2</sup> or less for optimal efficiency, improved occupant comfort, and lower utility expenses.
- **Energy Conservation Building Code (ECBC):**
  - The Energy Conservation Building Code (ECBC), initiated by the **Bureau of Energy Efficiency (BEE)** in 2007 and updated in 2017, sets minimum energy standards for commercial buildings.
    - It aims to achieve energy savings of 25 to 50% in compliant buildings and applies to commercial buildings with a significant connected load.
  - ECBC primarily focuses on six components of building design, including **envelope, lighting systems, Heating, Ventilation, and Air Conditioning. (HVAC) systems, and electrical power systems.**
  - The updated 2017 code prioritises renewable energy integration, ease of compliance, inclusion of passive building design strategies, and flexibility for designers.
    - It offers tags of efficiency ranging from ECBC to Super ECBC based on compliance levels.
- **Energy Conservation (Amendment) Act, 2022:**
  - **Energy Conservation (Amendment) Act, 2022** provides for the transitioning of ECBC into the Energy Conservation and Sustainability Building Code by incorporating measures relating to **embedded carbon, net zero emissions, materials and resource efficiency**, deployment of clean energy, and circularity.
  - Energy Conservation (Amendment) Act, 2022 also makes **ECO Niwas Samhita**, the **residential building energy code, mandatory.**
- **NEERMAN Awards:**
  - **National Energy Efficiency Roadmap for Movement towards Affordable & Natural Habitat (NEERMAN) Awards**, recognized and encouraged buildings that comply with the Energy Conservation Building Code 2017 (ECBC 2017).
    - The awards were a part of the 'Azadi Ka Amrit Mahotsav' initiative.
- **BEE Star Rating for Buildings:**
  - BEE Star Rating for Buildings is a unique tool, which is developed to **assess the status of Energy Efficiency in Commercial Buildings.**

- This rating system is applicable to buildings with the connected load of 100 kW or greater.
- Under this system of evaluation, 1-5 stars are awarded based on the building's energy usage.
- The rating is based upon different criteria such as built-up area, conditioned and unconditioned areas, type of building, hours of operation of building in a day, climatic zone and other miscellaneous information related to facility.
- **Green Rating for Integrated Habitat Assessment (GRIHA):**
  - GRIHA is a national rating system for green buildings that is adopted while designing and evaluating new buildings. This tool has been adopted by the **Ministry of New and Renewable Energy.**
- **Indian Green Building Council (IGBC):**
  - The IGBC, part of the **Confederation of Indian Industry (CII)** was formed in the year 2001. The vision of the council is, "To enable a **sustainable built environment for all** and facilitate India to be one of the global leaders in the sustainable built environment by 2025".

### ***How can the Construction Sector Become Energy Efficient?***

- **Utilisation of Autoclaved Aerated Concrete (AAC) Blocks:**
  - An analysis across four warmer climate cities in India compared the popularity of materials like **Autoclaved Aerated Concrete (AAC) blocks**, red bricks, **fly ash**, and monolithic concrete (Mivan).
    - ACC is concrete that has been manufactured to contain closed air pockets. **AAC is one-fifth the weight of concrete.**
  - AAC blocks exhibit **superior thermal efficiency** across various climatic conditions.
    - They have the lowest RETV compared to other materials, indicating their potential for energy efficiency.
  - AAC blocks offer a better balance between embodied energy and construction time compared to red bricks and monolithic concrete.

Note:

➤ **Exploring Innovative Building Materials:**

- India possesses untapped potential for innovative building materials.
- **Interdisciplinary collaborations** with sustainability experts can optimise strategies for energy-efficient building design.

➤ **Addressing Sustainability Concerns:**

- The construction industry's preference for **materials like monolithic concrete** raises concerns due to high embodied carbon and thermal discomfort.
  - Monolithic construction is a method by which walls and slabs are constructed together.
- Sustainable construction requires innovation from manufacturers to develop cost-effective and resilient solutions.

➤ **Promoting Sustainable Practices:**

- Re-imagining construction practices and fostering a culture of sustainability can significantly enhance energy efficiency and environmental sustainability.
- Cost-effective, durable, and climate-resilient building materials can contribute to improved quality of life and align with environmental goals.

➤ **Adoption of Smart Building Systems:**

- Smart building systems, **Artificial Intelligence, 3D Printing** and the **Internet of Things (IoT)** should be integrated into construction projects to optimise energy consumption.
  - Deploy intelligent **HVAC systems that adjust based on occupancy** to minimise energy consumption while ensuring occupant comfort.
- Embrace 3D printing for creating energy-efficient building components with minimal material waste.



Note:



# Environment and Ecology

## Highlights

- Landscape Ecology in Elephant Corridors
- Tissue Culture Laboratory at the Asola Bhatti Wildlife Sanctuary
- South Africa to End Captive Breeding of Lions
- SC Overturns Unregulated Soil Extraction for Linear Projects
- Human Rights and Environment
- Solar Waste Management
- Kunming-Montreal GBF Implications for India's Indigenous Tribes
- Armed Forces (Special Powers) Act, 1958 (AFSPA)

## Cicadas

### Why in News?

In a rare occurrence, a trillion **cicadas** from two different broods are expected to begin appearing in the **Midwest and Southeast regions** of the **US** at the end of April, 2024.

### What are Cicadas?

#### ➤ About:

- **Cicadas** are **insects** that belong to the order Hemiptera and the superfamily Cicadoidea.
  - Hemipteran insects, also called true bugs, have mouthparts used for piercing and sucking and have two pairs of wings.
- They spend most of their lives **underground** and emerge from the **soil mainly to mate**. Once out of the ground, their **life span** is **fairly short**, somewhere between two to four weeks.

#### ➤ Habitat:

- Most cicadas are canopy dwellers and are found in natural forests with large trees; found in every continent except Antarctica.
  - The **genetic diversity** of cicadas in **India and Bangladesh** ranks the highest globally, followed by China.

#### ➤ Emergence:

- Cicadas have complex life cycles that involve long periods of underground development and short periods of adult emergence.
  - There are **three species** of cicadas that emerge every **17 years** and three species that emerge every **13 years**.

- Originally, **30 broods** of periodical cicadas were categorised based on geography and emergence times, but currently, only about **15 broods** remain active due to some becoming extinct.

#### ➤ Features:

- Researchers suspect that the **lengthy development period** of cicadas, during which they feed on plant sap underground, may be related to their **evasion of above-ground predators**, before emerging to construct a **"cicada hut"** and climb onto nearby trees or vegetation.
- The adult cicadas are **vulnerable to predators** such as **turtles** and other forest inhabitants because they are **clumsy and lack defences**, making them virtually **easy prey**.



### What Happens When Cicadas Emerge?

#### ➤ Mechanism:

- After emerging from the ground in **massive numbers**, cicadas **shed** their **exoskeletons** to transform into their **winged form**, often leaving the discarded exoskeletons attached to **tree trunks** and twigs.

Note:



drishti

- **Adult cicadas** live for a **short span** of two to four weeks, during which they eat little, mate, and produce a loud collective chorus of up to 100 decibels to **attract females**.
- **Significance:**
  - In urban areas, cicada bodies can be utilised as **free fertiliser** for gardens and natural areas.
    - They act as **natural tree gardeners** and benefit the environment by **aerating** the **soil** with the holes they leave behind when emerging, facilitating **rainwater absorption** to nourish tree roots during hot summer months.
  - The slits made by **cicadas** in trees can cause branches to break, leading to “**flagging**,” a **natural pruning process**, and when the branches regrow, they tend to produce larger fruits, while the cicadas’ decomposing bodies provide nutrients for the trees.

## Landscape Ecology in Elephant Corridors

### Why in News?

Recently, **landscape ecology** has become crucial for **identifying and restoring elephant corridors** effectively, rather than relying solely on expert field knowledge.

- **Landscape ecology** is the **study of the interactions** between the **temporal** (time-related) and **spatial** (space-related) **aspects of a landscape and the organisms within it**.
- **Landscape ecology** became more accurate with the advancements in detecting core areas and corridors are now **based on three factors**: intensive use of field data; **improvement in GIS (Geographic Information Systems)** and availability of **geospatial data and adapted algorithm**.

### What are Elephant Corridors?

- **About:**
  - **Elephant corridors** are strips of land that enable elephant movement between two or more friendly habitats.
- **Status of Elephant Corridors in India:**
  - The key findings of the **Elephant Corridors of India, 2023 Report** are as follows:

- The report highlighted a surge of 62 new corridors, marking a 40% increase since 2010, now totalling **150 corridors across the nation**.
- **West Bengal** has the **highest number of elephant corridors**, totalling 26, constituting 17% of the total corridors.
- The **East central region** contributes 35% (**52 corridors**), and the **North East** region follows as the second-largest with 32% (**48 corridors**).
- **Southern India** registered **32 elephant corridors**, representing 21% of the total, while **northern India** has the **lowest count of 18 corridors**, amounting to 12%.
- Elephants have **expanded their ranges** in the **Vidarbha region** of Maharashtra and southern Maharashtra bordering Karnataka.

### Elephants

- **Elephants in India:**
  - **Elephants** are **keystone species** as well as the **Natural Heritage** Animal of India.
  - India has the **largest number of wild Asian Elephants**. The elephant population in the country is estimated to be over 30,000.
  - **Karnataka** has the **highest elephant population** in India.
- **Conservation Status:**
  - **Convention of the Migratory Species (CMS):** Appendix I
  - **Wildlife (Protection) Act, 1972:** Schedule I
  - **International Union for Conservation of Nature (IUCN) Red List** of threatened species:
    - **Asian Elephant: Endangered**
    - **African Forest Elephant: Critically Endangered**
    - **African Savanna Elephant: Endangered**
- **Conservative Efforts:**
  - India:
    - **Gaj Yatra**
    - **Project Elephant**
  - Global:
    - **Monitoring of Illegal Killing of Elephants (MIKE) Programme.**
    - **World Elephant Day**

Note:

# Elephant Reserves

33 Elephant Reserves  
(as of November 2022)



## FACTS

- Tamil Nadu and Assam have the highest number (5) of elephant reserves in India.
- The Indian elephant *Elephas maximus* is included in Schedule I of the Indian Wildlife (Protection) Act, 1972 and in Appendix I of CITES.
- Indian Elephant has also been listed in the Appendix I of the Convention of the Migratory Species and as 'Endangered' in the IUCN Red List.
- The elephant was declared the National Heritage Animal of India in 2010.
- MoEFCC provides financial and technical support to major elephant range states in the country through Project Elephant. Project Elephant was launched by the Government of India in the year 1992 as a Centrally Sponsored Scheme.



Note:



# ELEPHANT



## 4 Main Species of Elephant

Species	Found in	IUCN Red List Status	Habitat
Indian	Asia	EN (CITES - Appendix I, WPA - Schedule I)	Subtropical broadleaf forest, tropical broadleaf moist forest, dry forest, grassland
Sumatran	Asia	CR	Broadleaf moist tropical forests
Savanna (Bush)	Africa	EN	All sub-Saharan Africa except for Central Africa's dense tropical forest
Forest	Africa	CR	Dense Tropical Forests

## Indian Elephant (*Elephas maximus*)

Largest Land Mammal on Asian Continent  
National Heritage Animal of India

- Top 5 Indian States by Maximum Elephant Population: (As per elephant census 2017)
  - Karnataka > Assam > Kerala > Tamil Nadu > Odisha
- Social Structure:
  - Female elephants are more social than males; form herd (generally 5-7)
  - Led by the oldest female, the 'matriarch'
  - Males usually live alone

### Threats:

- Habitat Fragmentation
- Poaching for Ivory
- Human-Elephant Conflict
- Mistreatment in Captivity

### Conservation Efforts:

- Gaj Soochna App (2022)
- Gaj Yatra (2017)
- Hathi Mere Sathi campaign (2011)
- National Elephant Corridor project (2005)
- Monitoring the Illegal Killing of Elephants (MIKE) Programme (2003)
- Project Elephant (1992)

## Tissue Culture Laboratory at the Asola Bhatti Wildlife Sanctuary

### Why in News?

Recently, the Delhi forest department has initiated the establishment of a tissue culture laboratory at the Asola Bhatti Wildlife Sanctuary to conserve rare native trees.

- The primary goal of the laboratory is to grow **endangered native** Delhi trees in a controlled environment and regenerate saplings of species facing **regeneration challenges** due to **invasive species**.

### What are key Facts about the Tissue Culture Laboratory?

- Tissue Culture Laboratory:
  - The lab will be able to extract plant tissue from an in-vitro fully grown plant, generating **multiple trees** from the same tree.
  - The forest department will take assistance from botanists and scientists from the **Indian Council**

of Forestry Research and Education (ICFRE) and the **Forest Research Institute (FRI)**.

### Other Similar Laboratories:

- The **National Facility for Plant Tissue Culture Repository (NFPTCR)** was established in Delhi at the **National Bureau of Plant Genetic Resources (NBPGR)** in 1986.
  - They carry out tissue culture experiments and research on **five plant types** -- tubers, bulbs, spices, plantation crops, horticultural crops, and medicinal and aromatic plants.

### Application:

- The Aravalli Plan:**
  - The regeneration of ridge species like Kulu (ghost tree), palash, doodhi, and dhau is hindered by invasive species, resulting in **poor survival rates**, with large-scale multiplication achievable only through tissue culture, **particularly shoot culture**.
  - The lab will also be useful in culturing endangered **medicinal plants**.
- Success Stories:**
  - Tissue culture has proven **highly effective** in agriculture, particularly with crops such as

Note:



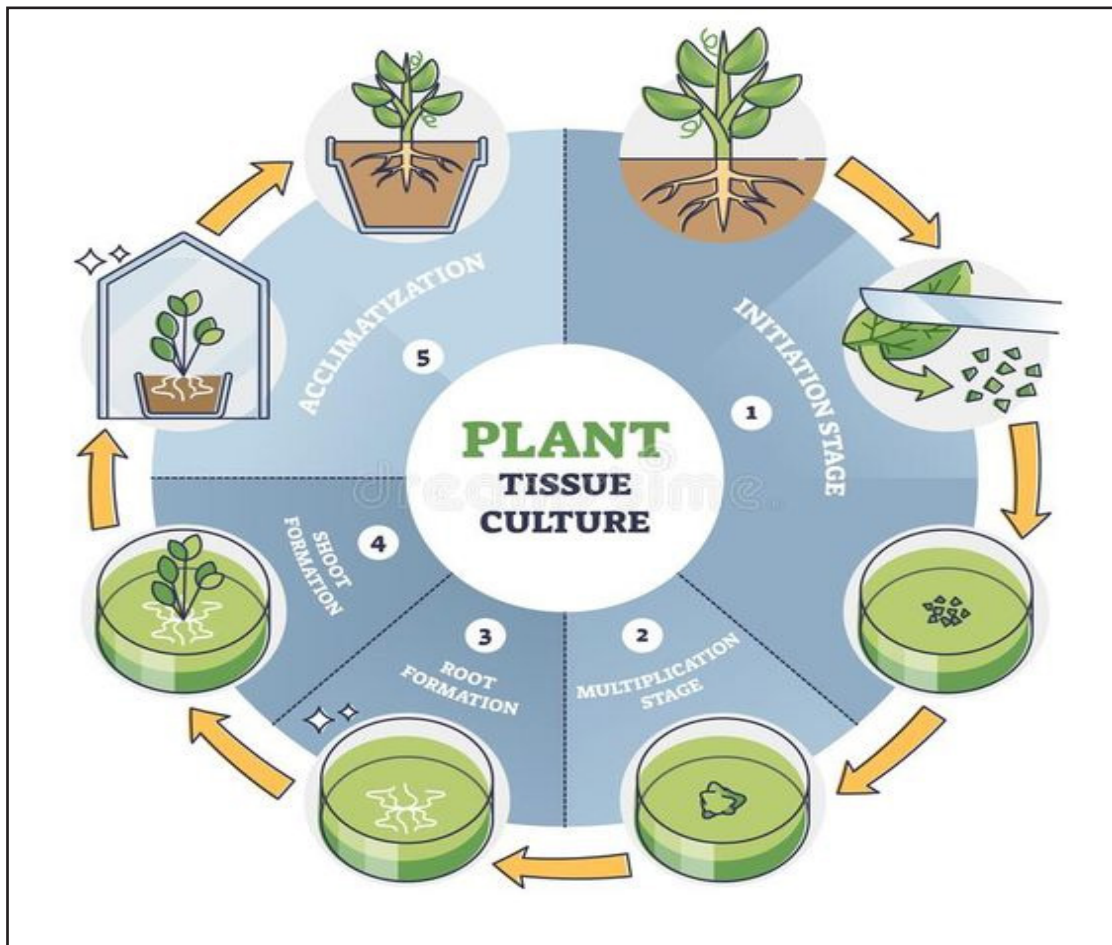
bananas, apples, pomegranates, and jatropha, offering **higher yields** compared to traditional farming methods.

➤ **Issues:**

- Biodiversity experts have contended that cloning should be limited to “**extremely rare trees**” to avoid **genetic homogeneity** and vulnerability to specific **diseases**.
- Cloning can result in **restricted genetic diversity**, with the trees being clones of a single tree or plant.

- To avoid this, one should not restrict oneself to a single seed variety; instead, **use different parent seeds** or seed varieties to prevent having multiple cloned trees.

- Experts believe that commonly found species like khair, dhak and desi babool in the Aravallis could waste public funds, despite **potential benefits for endangered or nearly extinct species**.



**What is Tissue Culture?**

- Tissue culture, also known as **micro-propagation**, allows multiple plants to be produced from a parent plant using **in-vitro tissue**, which is incubated under a controlled environment.
- **Types of Plant Tissue culture:**
  - **Callus Culture:** Involves **cultivating undifferentiated masses** of cells (callus) from explants.

- **Cell Suspension Culture:** Cultures **individual cells** or small aggregates of cells in a liquid medium.
- **Anther/Microspore Culture:** Used for **producing haploid plants** from pollen grains or anthers.
- **Protoplast Culture:** Cultures **isolated plant cells** without cell walls.
- **Applications of Plant Tissue Culture:**
  - **Micropropagation:** Rapid **clonal propagation** of plants by culturing small pieces of plant tissue.

Note:

- **Soma-clonal Variation:** Studying genetic variation among plant cells in culture.
- **Transgenic Plants:** Introducing and expressing foreign genes (transgenes) in plant cells.
- **Induction and Selection of Mutations:** Using mutagens to induce mutations for specific traits.

#### Animal Tissue Culture:

- Animal tissue culture is the **in vitro maintenance** and propagation of isolated cells, tissues, or organs **from animals in an appropriate artificial environment**.
- Cells used in animal tissue culture are usually obtained from **multicellular eukaryotes** and their established cell lines.
- This technique allows the study of **cell functions, mechanisms,** and applications.
- Animal cell culture has revolutionised research and **biotechnology**, providing insights into cell behaviour and applications across various fields.

#### Asola Wildlife Sanctuary

- **Asola-Bhatti Wildlife Sanctuary** is located at the end of an important wildlife corridor that starts from **Sariska National Park** in Alwar and passes through Mewat, Faridabad and Gurugram districts of Haryana.
- The region has a **semiarid climate** with notable diurnal temperature variations.
- The vegetation in the Wildlife Sanctuary is predominantly an **open canopied thorny scrub**. The native plants exhibit **xerophytic adaptations** such as thorny appendages, and wax-coated, succulent, and tomentose leaves.
- Major wildlife species include Peafowl, Common Woodshrike, Sirkeer Malkoha, Nilgai, Golden Jackals, Spotted deer, etc.

Read more: [Tissue Culture Plants](#)

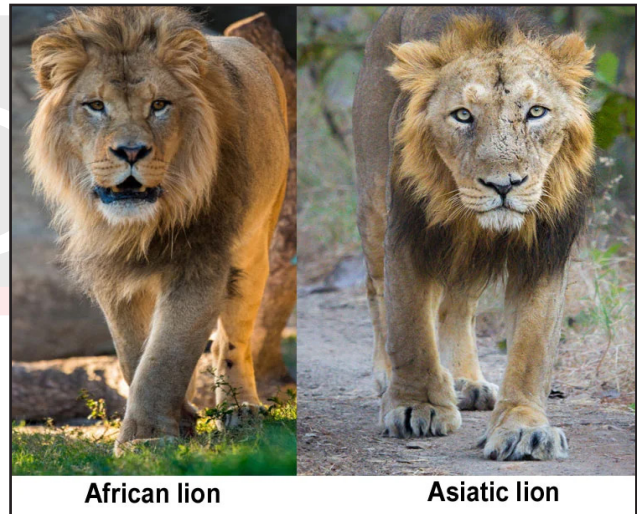
## South Africa to End Captive Breeding of Lions

### Why in News?

Recently, South Africa has decided to end **captive breeding of lions** (*Panthera leo*) due to concerns over **trophy hunting** and the use of lion **bones in traditional Chinese medicine** marks a significant shift in wildlife conservation.

### What are the Key Traits of Lions?

- **Subspecies:** There are two subspecies of lions found in the wild. The **African lion** (*Panthera leo leo*) and the **Asiatic lion** (*Panthera leo persica*).
  - African lions used to be spread across most of the African continent, but now are only found in sub-Saharan Africa, with **80% in eastern or southern Africa**.
    - Asiatic Lions are found at **Gir National Park and Wildlife Sanctuary** in Gujarat, India.
  - Although both subspecies of lions look very similar, there are some differences.
    - Male Asiatic lions tend to have darker, shorter manes compared to African Lions.
    - Additionally, both male and female Asiatic lions are smaller than African lions.



African lion

Asiatic lion

- **Habitat:** They are most active at night and live in a variety of habitats but prefer **grassland, savanna, dense scrub, and open woodland**.
- **Social Structure:** Lions are the most social big cat, living in groups called **prides**.
  - A pride typically consists of several related females, their cubs, and a few adult males (coalition).
  - **Lionesses are the primary hunters**, while dominant **males are responsible for protecting the pride's territory**.
- **Hunting and Diet:** Lions are apex predators and primarily hunt large ungulates like **wildebeest, zebra, and antelope**.
  - They typically hunt cooperatively, using their agility and teamwork to take down prey.

Note:

- Also, lions are **opportunistic feeders** and will not hesitate to scavenge when the opportunity arises, often stealing kills from other predators.

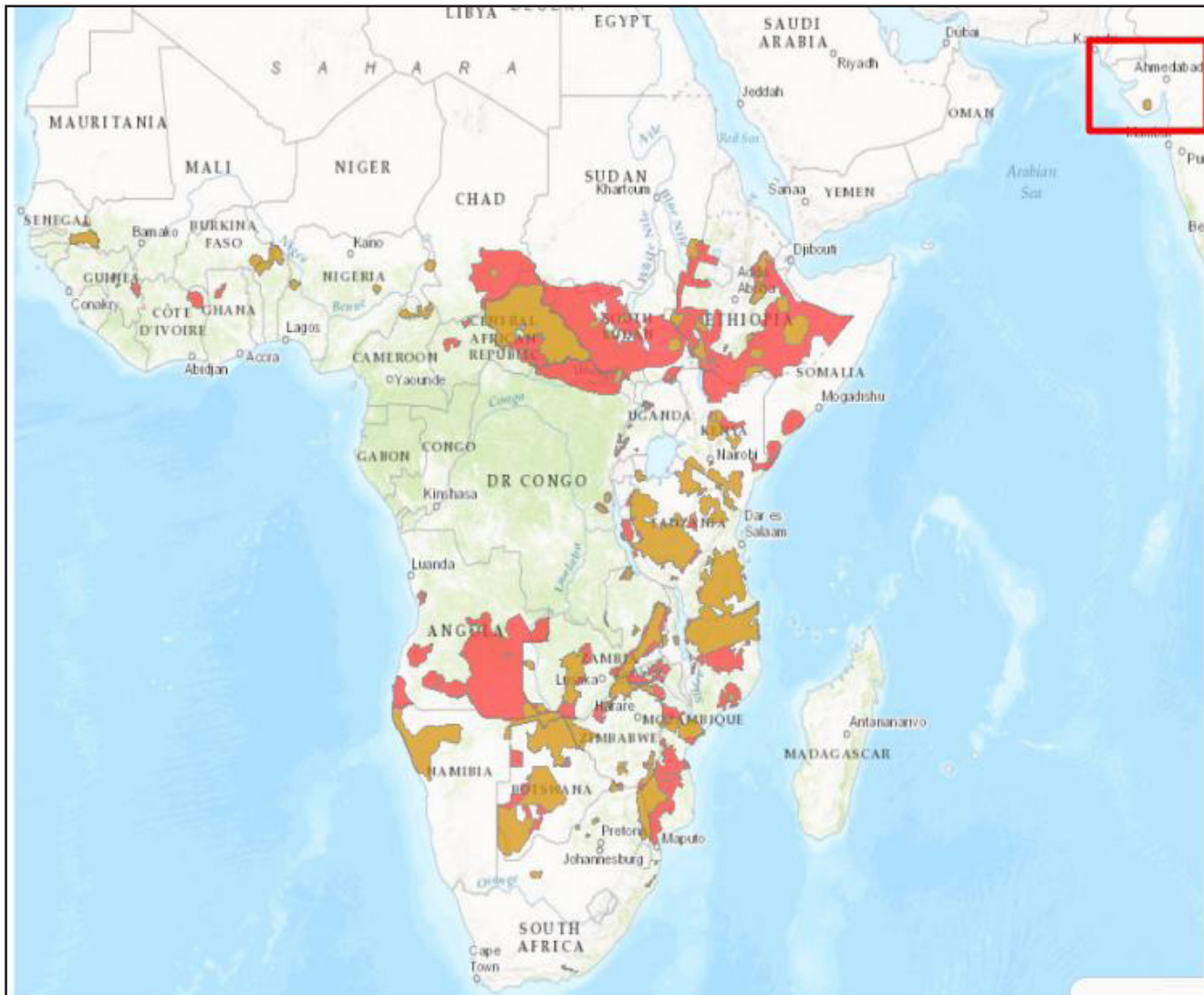
➤ **Threats:**

- They face a multitude of threats from habitat loss and fragmentation to climate change and the reduction of available prey.
- They are also **targeted by trophy hunters**.
  - Trophy hunting is a form of hunting where the

**primary goal is to kill animals for their body parts, such as horns, tusks, or skins, which are then kept as trophies or souvenirs (and not primarily as food).**

➤ **Conservation Status:**

- **IUCN Red List: Vulnerable**
- **CITES: Appendix I**
- **Wildlife Protection Act 1972: Schedule I**



**Distribution Map Panthera Leo**

Note:



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**Note:**

- In India, **Project Lion** envisages **landscape ecology based conservation** of the Asiatic Lion in Gujarat by integrating conservation and eco-development. The Gujarat government has planned to translocate 40 adult and sub-adult lions to the **Barda Wildlife Sanctuary** in the state, according to a 2023 report by Wildlife Institute of India (WII).

## SC Overturns Unregulated Soil Extraction for Linear Projects

**Why in News?**

Recently, the **Supreme Court** overturned a notification from the Ministry of Environment issued **three years ago**. This notification **exempted the extraction of ordinary earth** for linear projects like **road and railway construction** from needing **Environmental Clearance (EC)**.

- The exemption, introduced in March 2020, faced a challenge in the **National Green Tribunal (NGT)**, which instructed the Ministry in October 2020 to reassess it within three months.

**Linear Projects:**

- Linear projects refer to infrastructure developments that follow a linear or continuous path, such as **roads, railways, pipelines, canals, transmission lines**, and highways.
- These projects typically traverse long distances in a straight or curving line, connecting various points or locations.

**What was the 2020 Exemption for Linear Projects?****➤ Background:**

- In September 2006, the Environment Ministry issued a notification under the **Environment (Protection) Act, 1986**, outlining activities requiring prior **Environmental Clearance (EC)**.
- In January 2016, a **subsequent notification exempted certain project categories** from this requirement.

**➤ Exemptions Provided in 2020 Notification:**

- In March 2020, a notification was issued that **broadened the list of activities exempt from**

**requiring environmental clearance**. This included the extraction of ordinary earth, also referred to as sourcing or borrowing, for use in linear projects.

**Why was the 2020 Exemption Challenged?****➤ Grounds of Challenge by the Petitioner:**

- The exemption was challenged before the NGT on the grounds that allowing the extraction of earth **indiscriminately was arbitrary and violative of Article 14** of the Constitution of India.
  - The petitioner argued that the exemption violated the requirement of prior EC in the leases as laid down by the Supreme Court in **Deepak Kumar versus the State of Haryana Case, 2012**.
- The petitioner contended that the **Ministry had bypassed the proper legal procedure** of soliciting public objections **before issuing the 2020 notification**.
- Critics contend that the **exemption granted in the environmental clearance (EC)** process under the **guise of 'public interest'** during the **Covid-19** lockdown was merely a pretext **to favour private mining companies and contractors**.

**➤ Government's Argument:**

- Before the NGT, the Centre argued that the **exemption was essential "for the aid of the general public,"** benefiting various groups including the kumhars (potters), farmers, gram panchayats, banjara and oad communities in Gujarat, among others.
  - It contended that granting **exemption was a policy matter not subject to judicial intervention**.
- The overarching aim of the 2020 notification was to align with amendments to the **Mines and Minerals (Development and Regulation) Act, 1957**, enacted in March 2020.
  - These amendments allowed new lessees to continue mining for two years with the statutory **clearances and licenses obtained by their predecessors**.

**➤ Verdict of NGT:**

- In October 2020, the NGT stated that the **Ministry should aim for a balanced approach**. Instead of a complete exemption, it should **incorporate suitable safeguards** such as regulating the excavation process and determining the quantity.

Note:





- The Tribunal directed the Centre to review the notification within three months.
- **Centre's Response:**
  - The Centre **delayed action on the NGT order** until the appellant appealed to the Supreme Court.
- **Concerns Raised by the SC:**
  - The court ruled that the **2020 notification offering a blanket exemption** lacked clarity and violated **Article 14** of the Constitution.
    - The Notification didn't define '**linear projects**' or **specify the amount** and area of earth extraction.
    - Additionally, it didn't ensure that only the necessary amount of earth for these projects was exempted, undermining the purpose of the **Environmental Protection Act**.
  - The court found **no justification for waiving the requirement of public notice** in the notification or in the Ministry's submissions to the NGT and SC.
  - It deemed the decision arbitrary and lacking thoughtful consideration. The court also questioned the rush in issuing the notification during a nationwide lockdown when linear projects were halted.

**Note:**

- In *Deepak Kumar versus the State of Haryana Case, 2012*, the Court held that the **Model Rules of 2010** issued by the Ministry of Mines are vital from the environmental, ecological and bio-diversity point of view and therefore the State Governments have to frame proper rules in accordance with the recommendations, under **Section 15 of the Mines and Minerals (Development and Regulation) Act, 1957**.

**What are the Previous Similar Instances?**

- In January 2018, the **NGT quashed an exemption offered by the Ministry's 2016 notification** from the requirement of **prior EC for building and construction activities having built-up areas of more than 20,000 sq m**.
  - There was nothing to suggest an improvement in the quality of the environment to justify the exemption.
- Emphasising the requirement of prior approval under the **Environment Protection Act**, the NGT invalidated two Office Memorandums issued by the Ministry in

December 2012 and June 2013. These memorandums aimed **to grant retrospective Environmental Clearance to projects under the 2006 notification**.

- On 6<sup>th</sup> March 2024, the Kerala **High Court** quashed a 2014 notification that exempted educational institutions and industrial sheds with built-up areas of more than 20,000 sq m from obtaining EC.

## Human Rights and Environment

**Why in News?**

Recently a group of universities have written a joint note urging the **International Criminal Court (ICC)** to step in to deal with Environmental degradation linked with **Human Rights**.

- According to the University of Oxford, human activities leading to severe environmental harm usually also violate human rights and **thus qualify as a crime against humanity such as genocide**.
- This perspective emphasizes the need for a rights-based approach, recognizing the **right to a clean, healthy, and sustainable environment (R2hE)** as pivotal.

**How are Human Rights and the Environment Linked?**

- **Human Rights:**
  - As per the **United Nations (UN)**, human rights are rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion, or any other status.
  - Human rights are inherent entitlements that we possess because we exist as human beings - they are not granted by any state.
  - The UN General Assembly adopted the **Universal Declaration of Human Rights (UDHR)** in Paris on December 10, 1948, as a common standard of achievement for all nations and peoples.
  - It includes the right to life and **liberty**, freedom from slavery and torture, **freedom of opinion and expression**, the right to work and education etc.
    - Everyone is entitled to these rights, without **discrimination**.

Note:

➤ **Need for Environment as Human Rights:**

- The concept of human rights in general emerged after the **Second World War**, but the right to a healthy environment, as one of those human rights, was never a priority.
- A healthy environment is an essential aspect of the **right to life**, not only for human beings but also for other **animals on the planet**.
- Violation of the right to a healthy environment is **potentially a violation of the basic right to life**.
  - When environmental rights are violated, people and the planet suffer from reduced health and well-being.
  - Environmental deterioration could eventually endanger the life of present and future generations.

➤ **Recognizing the right to a clean, healthy, and sustainable environment (R2hE) :**

- The **R2hE** is a fundamental human right that encompasses the entitlement of all individuals to live in an environment that is conducive to their well-being and conducive to the fulfillment of their basic needs.
- This right recognizes the interconnectedness between human well-being and the health of the environment.

➤ **Challenges and Concerns Related to Healthy Environment:**

- **Legal Hurdles:** Holding perpetrators accountable, whether politicians, corporate entities, or criminal syndicates, presents **formidable legal hurdles**.
  - A report by the **UN Office on Drugs and Crime (UNODC)** highlighted these challenges, noting the need for better international cooperation and stronger national legislation.
  - A 2020 report by **Human Rights Watch** documented how environmental destruction disproportionately impacts the marginalized communities who have limited ability to fight back, affecting their health, livelihoods, and access to clean water.
- **The Transnational Nature of Environmental Crimes:** Environmental crimes often have a transnational dimension due to the interconnected nature of environmental systems, the global trade in natural

resources, and the movement of pollutants across borders.

- **Money Laundering from Environmental Crime:** The **Financial Action Task Force (FATF)**, 2021 report on money laundering from environmental crime found that criminals are making enormous profits by **using front companies to mix legal and illegal goods** and payments early in the resource supply chains.
- **Illicit Financial Flows:** The United States has become a destination for money earned through environmental crimes (according to the report published by the **Financial Accountability and Corporate Transparency Coalition** in 2023) which undermines global moves to stem illicit financial flows and combat the climate crisis.

➤ **Right to Healthy Environment In India:**

- The right to life has been used in a diversified manner in India. It includes, inter alia, the **right to survive as a species**, quality of life, the right to live with dignity and the right to livelihood. In India, this has been expressly recognised as a constitutional right.
- **Article 21 of the Indian Constitution states:** 'No person shall be deprived of his life or personal liberty except according to procedures established by law.'
- The **Supreme Court** expanded this negative right in two ways.
  - Firstly, any law affecting personal liberty should be reasonable, fair and just.
  - Secondly, the Court recognized several unarticulated liberties that were implied by **Article 21**.
  - It is by this second method that the Supreme Court interpreted the right to life and **personal liberty to include the right to a clean environment**.

**What are the Environment Protection Laws in India?**

- **Wildlife (Protection) Act, 1972**
- **Water (Prevention and Control of Pollution) Act, 1974**
- **Air (Prevention and Control of Pollution) Act, 1981**
- **The Environment (Protection) Act, 1986**
- **The National Green Tribunal Act, 2010**

Note:

### What are the International Efforts Related to the Right to Healthy Environment?

- On 28<sup>th</sup> July 2022, the **United Nations General Assembly (UNGA)** adopted a **resolution** declaring that everyone on the planet has a right to a healthy environment.
  - This resolution calls upon States, international organizations, and business enterprises to **scale up efforts to ensure a healthy environment** for all.
- The **1972 Human Conference on Human Environment**, often known as the **Magna Carta of the human environment**, emphasized the imperative to safeguard earth's natural resources, encompassing air, water, land, flora, and fauna, along with representative ecosystems.
  - It underscored the necessity of careful planning or management to ensure the well-being of present and future generations.
- The **World Commission on Environment and Development's report in 1987** put forth **22 legal principles** aimed at environmental protection and sustainable development.
  - This report introduced the **concept of sustainable development** and emphasized the interconnectedness of environmental, social, and economic issues.
- 'Caring for the Earth 1991' and the '**Earth Summit**' of 1992 reiterated that human beings have the right to lead healthy and productive lives in harmony with nature.

### What are the Cases Related to a Healthy Environment?

- **M.C Mehta v. UOI, 1986:**
  - Directions to remove environmental illiteracy were given-
    - Cinema halls/video parlors to exhibit not less than two slides on the environment prepared by the **Ministry of Environment, Forest and Climate Change** of India.
    - Doordarshan and AIR allot 5-7 minutes daily for interesting programmes on the environment.
    - Environment be made a compulsory subject in a graded way in schools and colleges and universities shall prescribe a course for the same.

- **M. C Mehta v. Kamal Nath, 1996:**
  - The Supreme Court made it clear that any disturbance of basic environmental elements namely air, water and soil which are necessary for life would be hazardous to life and can't be polluted.
- **Rural Litigation and Entitlement Kendra v. State of U.P, 1985:**
  - Limestone mining which denuded mussoorie hills of trees and forests cover and accentuated soil erosion resulting in blockage of underground water channels were banned.
- **Tarun Bharat Sangh (NGO) v. UOI, 1993:**
  - Closure of all 400 marble mines around **Sariska tiger reserve** which threatened the wildlife of that area.
- **Preventing Pollution of Ganga and Yamuna, 1995:**
  - Under the **Environmental Protection Act, 1986** the Supreme Court asked for the removal of all polluting industries settled on the bank of Ganga in Kanpur, Hoogly in Calcutta, and of Yamuna in Delhi.

## Solar Waste Management

### Why in News?

Recently, a report titled 'Enabling a Circular Economy in India's Solar Industry – Assessing the Solar Waste Quantum' shed light on India's escalating **solar waste** crisis.

- The study was conducted by the **Ministry of New and Renewable Energy (MNRE)** in collaboration with experts from the **Council on Energy, Environment and Water** (a leading not-for-profit policy research institution in Asia)

### What are the Key Highlights of the Report?

- **Solar Waste Projection:** The current solar capacity of India, as of FY23, has generated about **100 kilotonnes (kt)** of cumulative waste, which will increase to 340 kt by 2030.
  - This volume will increase 32 times by 2050 resulting in about 19000 kt of cumulative waste.
  - **77% of the cumulative waste generated by 2050** will be due to new capacities.
- **State-wise Contribution:** Around 67% of the projected waste by 2030 is expected to be produced by five states: **Rajasthan, Gujarat, Karnataka, Tamil Nadu, and Andhra Pradesh.**

Note:

- Rajasthan will account for 24% of the waste generated by 2030, followed by Gujarat accounting for 16%, and Karnataka accounting for 12%.
- **Critical Minerals Content:** Discarded solar modules contain **critical minerals** essential for India's economic development and national security, including silicon, copper, tellurium, and cadmium.
  - The projected 340 kt of waste by 2030 is estimated to comprise **10 kt of silicon, 12-18 tonnes of silver, and 16 tonnes of cadmium and tellurium.**
- **Recommendations:**
  - The MNRE should maintain and periodically update a database of the installed solar capacity (containing details such as module technology, manufacturer, commissioning date, etc.) for accurate mapping of plausible waste generation centres.
  - The Ministry of Environment, Forest and Climate Change should issue guidelines for **collecting and storing solar waste.**
    - Furthermore, it should **promote the safe and efficient processing of stored waste.**
  - Solar cell and module producers should start developing **waste collection and storage centres** to adhere to the responsibilities assigned in the **Electronic Waste Management Rules 2022.**

### What is Solar Waste?

- **About:** Solar waste is any waste generated during the **manufacturing of solar modules, or discarded modules and scrap** from manufacturing processes.
  - Modules are discarded at the end of their functional life or due to damages from transportation, handling, and installation.
  - Improper handling and landfilling of solar waste should be avoided. Proper treatment is necessary to **reclaim valuable minerals and prevent** the leaching of toxic materials like lead and cadmium.
- **Potential Recyclability of Solar Waste:** Approximately **80% of solar panel components, including glass and metal frames, are recyclable**, according to the **International Renewable Energy Agency (IRENA).**
  - Solar waste can be recycled to recover materials like glass, aluminium, copper, silicon and silver.
  - Recycling can be broadly categorised into **mechanical, thermal and chemical processes.**
    - Each process helps in the recovery of specific minerals of varying purity grades.

### Challenges of Solar Waste Recycling in India:

- **Lack of Policy Framework:** The absence of specific comprehensive laws governing solar waste management hinders the establishment of standardised recycling practices and may contribute to inconsistent recycling efforts.
- **Complex Composition & Difficulty in Separation:** Solar panels contain various materials like silicon, glass, aluminium, and toxic elements like lead and cadmium.
  - Separating these components for effective recycling requires specialised technology, which is often expensive and not widely available in India.
- **Informal Sector Involvement:** A large portion of solar waste ends up with **informal recyclers** who lack proper safety measures and often resort to environmentally harmful practices.
- **Limited Market for Recycled Materials:** In India, lack of adequate demand for materials such as silicon wafers or glass cullet from recycled panels undermines the economic feasibility of recycling efforts.

### What are India's Initiatives Related to Solar Energy?

- **National Solar Mission**
- **Solar Park Scheme**
- **Rooftop Solar Scheme**
- **PM-KUSUM scheme**
- **PM-Surya Ghar Muft Bijli Yojna**
- **International Solar Alliance**

### How can India Manage Solar Waste Effectively?

- **Stringent Regulatory Framework:** India can create a comprehensive regulatory framework to guide collection, recycling, and material-specific recovery targets for solar waste.
  - The framework can also encourage incentives like **green certificates** to encourage recycling and mineral recovery.
  - It should also include developing and implementing comprehensive policies to **promote circular economy principles** within the solar industry, encouraging resource efficiency, recycling, and reuse.
- **Formalisation of Informal Recyclers:** Integrating **informal recyclers into the formal system** through

Note:



**training programs** and providing them with proper equipment. This ensures safe, environmentally sound practices and also provides them a secured employment.

- **Solar Panel Refurbishment and Second Life:** . By establishing dedicated refurbishment facilities, India can **clean, repair, and retest slightly damaged panels**, diverting them from the waste stream and providing affordable options for consumers.
- **Solar-waste Entrepreneurship:** Encouraging and incentivising green innovators to design and prototype new sustainable products using recycled solar materials, thereby fostering creativity and effective utilisation.

### What are Electronic Waste Management Rules 2022?

- **About:** The management of E-Waste in India is presently regulated under E-Waste (Management) Rules, 2022 under the Environment Protection Act, 1986
  - It includes waste management of solar PV modules, panels, and cells.
- **Applicability:** These rules apply to everyone involved in the life cycle of e-waste, including manufacturers, producers, refurbishers, dismantlers, and recyclers.
- **Key Features:**
  - **Extended Producer Responsibility (EPR):** Producers are obligated to fulfil specific recycling targets for the e-waste they introduce into the market. This is achieved through a system of **EPR certificates**.
  - **Solar E-Waste Management:** Producers are mandated to store the waste generated from **solar PV modules and cells** up to 2034 – 2035 as per guidelines laid down by the **Central Pollution Control Board (CPCB)**.
    - The rules also mandate the filing of annual returns on the e-waste management portal up to 2034 – 2035.
  - **Hazardous Substances:** It mandates that every producer of Electrical and Electronic Equipment (EEE) and their components shall ensure that their products do not contain **lead, mercury and other hazardous substances** beyond the maximum prescribed concentration.

- **Exceptions:** The rules do not apply to the following:
  - Waste batteries regulated by the Battery Waste Management Rules, 2022
  - Packaging plastics governed by the Plastic Waste Management Rules, 2016
  - Micro enterprises defined in the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006)
  - Radioactive wastes covered by the provisions of the Atomic Energy Act, 1962 (33 of 1962) and its rules.

## Kunming-Montreal GBF Implications for India's Indigenous Tribes

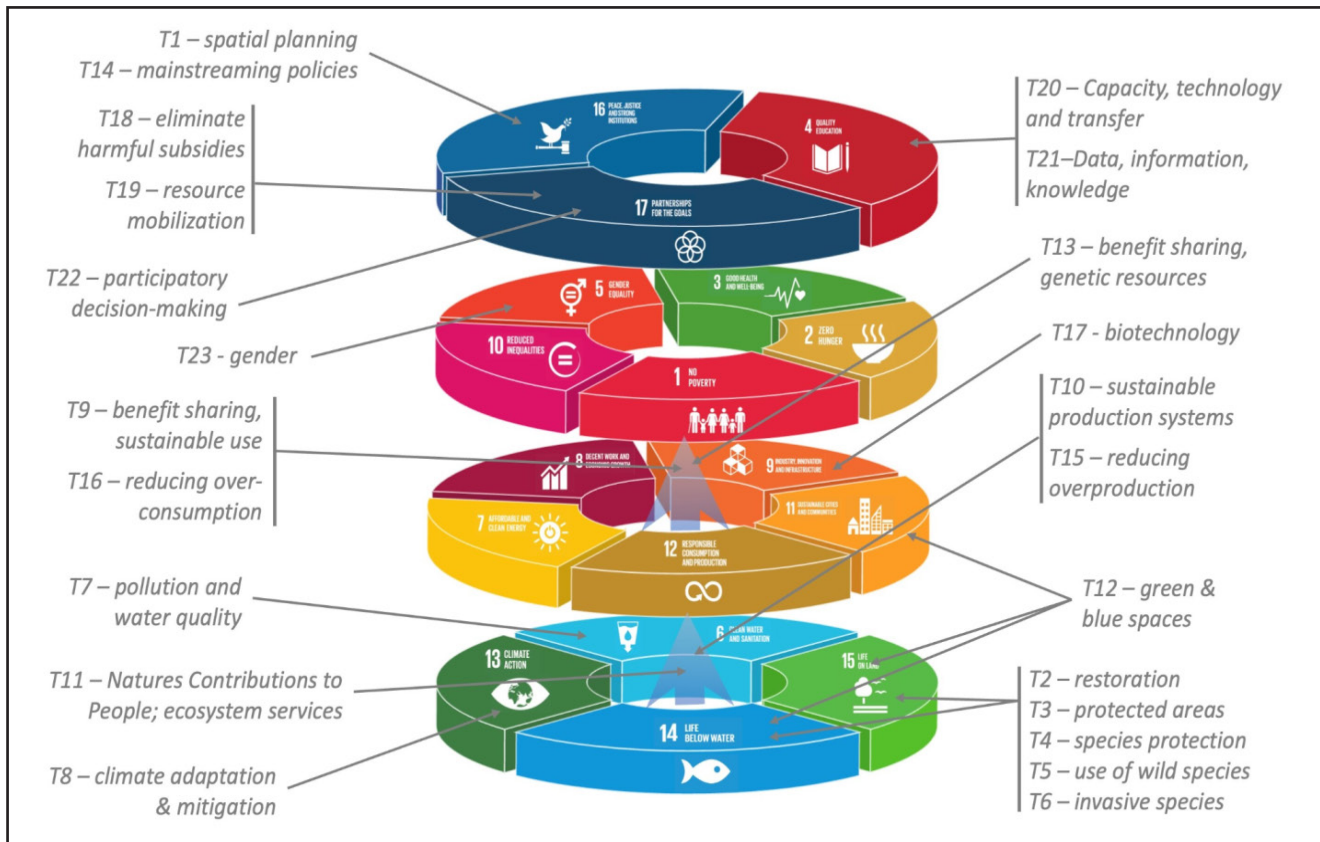
### Why in News?

A recent symposium organised by the University of Arizona highlighted concerns about the **Kunming-Montreal Global Biodiversity Framework (GBF)** and its potential impact, particularly on **India's indigenous tribes**.

### What is the Kunming-Montreal Global Biodiversity Framework?

- **About:** The Kunming-Montreal GBF was adopted during the **15<sup>th</sup> meeting of the Conference of the Parties to the UN Convention on Biological Diversity** in December 2022.
  - It aims to support the achievement of **sustainable development goals** and build on previous strategic plans.
  - The framework sets **four goals for 2050 and 23 targets for 2030**, covering planning, monitoring, reporting, finance, and capacity development.
    - Target 3 of the GBF aims to **increase protected areas to at least 30% of the world's terrestrial area by 2030, compared to the current 16%**.
  - All parties (including India) are committed to setting national targets to implement the GBF.

Note:



### ➤ India's Progress:

- **Target 3 - 30x30:** India reports bringing 22% of its terrestrial area and 5% of marine and coastal areas under the **Protected Area Network**.
  - While India shows progress in expanding protected areas, concerns arise over legal definitions and diversions of these areas for non-conservation purposes.
  - **India's Forest (Conservation) Amendment Act of 2023** expanded the definition of forest activities to include commercial ventures such as zoos and ecotourism, reflecting a commitment to sustainable development.
- However, the **Supreme Court** has issued directives that require any proposal for establishing zoos and safaris within forest areas (excluding protected areas) to **receive prior approval from the court**.
  - **Other Effective Area-Based Conservation Measures (OECMs):** India identifies 14 categories of OECMs, including citizen-led initiatives, but the voluntary

nature of their declaration raises questions about legal protection.

### **What Could be the Implication of Forest Expansion on India's Indigenous Tribes?**

- **Implication:** Forest Expansion under GBF targets may restrict traditional land use **practices and livelihoods of indigenous communities** relying on natural resources, leading to increased poverty and food insecurity among indigenous populations.
- About **84%** of India's **national parks** were established in areas inhabited by the indigenous peoples and meeting the GBF targets will threaten their existence.
- **Related Recent Instances:** Upgrading initiatives such as the **Kumbhalgarh Wildlife Sanctuary, Rajasthan to a tiger reserve** could displace 162 tribal villages.
- Expansion plans for the **Nauradehi Sanctuary in Madhya Pradesh** may affect 62 predominantly tribal villages.
- The notification for the **Barak Bhuban Wildlife Sanctuary** in Assam poses risks to Khasis, Dimasas, and other indigenous groups.

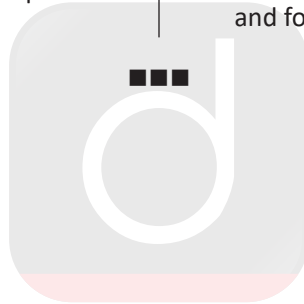
Note:

**Note:** This negative trend is also evident in other Southeast Asian countries where indigenous peoples face denial of basic rights in protected areas. Instances include **denial of housing, health, education, electricity, and security** to indigenous peoples in places like **Indonesia's Ujungkulon National Park**.

### ***How India can Utilise Indigenous Tribes in Biodiversity Conservation?***

- **Preserving Cultural Heritage through Ecotourism:** Supporting **ecotourism initiatives led by indigenous communities**, fostering cultural preservation and generating income.
  - A standout example is the **Wayanad tribal heritage villages in Kerala**, where community-led ecotourism projects have not only boosted income but also safeguarded wildlife and empowered local communities.

- **Integrating Traditional and Professional Knowledge:** Government can leverage traditional knowledge of indigenous tribes like the **Khasi and Jaintia tribes of Meghalaya** have a rich tradition of protecting "**sacred groves**(areas of natural vegetation that are preserved through local taboos and sanctions)."  
 ○ Integrating this knowledge with scientific surveys by institutions like the **Wildlife Institute of India (WII)** can create comprehensive conservation plans.
- **Promoting Co-Management Models:** Expanding **co-management models like the West Bengal Joint Forest Management (JFM) program** where indigenous communities work alongside forest departments to manage protected areas. This leverages their knowledge and fosters a sense of ownership.



Note:

# Security

## Highlights

- Islamic State-Khorasan

- New Year Festivals Across India

## Armed Forces (Special Powers) Act, 1958 (AFSPA)

### Why in News?

Recently, the Union Ministry of Home Affairs (MHA) extended the **Armed Forces (Special Powers) Act, 1958** in parts of Nagaland and Arunachal Pradesh for another six months.

- The AFSPA has been extended in **eight districts** and **21 police stations** in Nagaland for another six months.
- It will also be effective in specific areas of Arunachal Pradesh.

### What is AFSPA?

- **Background:**
  - The British colonial government had on **15th August, 1942**, promulgated the **Armed Forces Special Powers Ordinance** to suppress the **Quit India movement**.
  - It was the foundation for four ordinances, including one for the **"Assam disturbed areas"** invoked in **1947** to deal with Partition-induced internal security challenges.
  - The **Armed Forces (Assam and Manipur) Special Powers Act, 1958**, followed the **Assam Disturbed Areas Act of 1955** to deal with the uprising in the **Naga Hills** and **adjoining areas**.
  - The Act was replaced by the **AFSPA** for wider application. A similar Act specific to **Jammu and Kashmir** was enacted in **1990**.
- **About:**
  - The **Armed Forces (Special Powers) Bill** was passed by both the Houses of **Parliament** and it was approved by the President on September 11, 1958. It became known as the **Armed Forces Special Powers Act (AFSPA), 1958**.

- The Act came into force in the context of increasing violence in the **North-eastern States** decades ago, which the State governments found difficult to control.
- The **AFSPA** gives unbridled power to the **armed forces** and the **Central Armed Police Forces** deployed in **"disturbed areas"** as specified under the Act to kill anyone acting in contravention of law, arrest and search any premises without a warrant and ensures protection from prosecution and legal suits without the Central government's sanction.
- The State and Union government can issue notification regarding the AFSPA. For the **States of Arunachal Pradesh and Nagaland**, the **MHA** issues periodic **"disturbed area"** notifications.

### What are the Disturbed Areas described under AFSPA?

- A disturbed area is one that is declared by notification under **Section 3** of the **AFSPA**. It can be invoked in places where the use of armed forces in aid of civil power is necessary.
  - The Act was amended in **1972** and the powers to declare an area as **"disturbed"** were conferred concurrently upon the **Central government** along with the States.
- An area can be disturbed due to differences or disputes between members of different **religious, racial, language or regional groups or castes or communities**.
- The Central Government, or the Governor of the State or administrator of the Union Territory can declare the whole or part of the **State or Union Territory** as a disturbed area.
- Once declared **'disturbed'**, the region is maintained as disturbed for a period of three months straight, according to The **Disturbed Areas (Special Courts) Act, 1976**. The government of the state can suggest whether the Act is required in the state or not.

Note:



- Currently, the Union Home Ministry issues periodic “**disturbed area**” notification to extend AFSPA only for Nagaland and Arunachal Pradesh.

### **What are the Arguments in Favour and Against of AFSPA?**

#### ➤ **Argument in Favour:**

- **Addressing Ongoing Security Challenges:** The AFSPA is deemed necessary to tackle the persistent security threats in the regions where it’s enforced.
  - The presence of armed groups and insurgent activities poses a continuous danger to public safety and stability.
  - Without the legal framework provided by AFSPA, it might be difficult for security forces to effectively counter these threats.
- **Empowering Security Forces:** AFSPA provides security forces with the legal authority required to combat insurgency and terrorism effectively.
  - It grants them the necessary powers to conduct operations, make arrests, and maintain public order in areas designated as disturbed.
  - This empowerment is crucial for enabling security forces to tackle complex security challenges efficiently.
- **Legal Protections for Personnel:** AFSPA offers legal protections to security personnel operating in disturbed areas.
  - These protections shield them from legal liability while they carry out their duties under challenging and often hazardous circumstances.
  - Such legal safeguards are essential for ensuring that security personnel can perform their tasks without fear of undue legal consequences.
- **Boosting Morale:** The legal protections provided by AFSPA are instrumental in boosting the morale of armed forces personnel.
  - Knowing that they are legally protected while carrying out their responsibilities can enhance their confidence and motivation to perform effectively in challenging environments.
  - This morale boost is crucial for maintaining the effectiveness and efficiency of security operations in troubled regions.

#### ➤ **Argument Against:**

- **Violation of State’s Autonomy:** **Section 3 of AFSPA** grants the central government the authority to designate any area as a Disturbed Area without requiring the consent of the respective state.
  - This undermines the autonomy of the states and can lead to misuse of power by the central government.
- **Excessive Use of Force:** Section 4 of AFSPA grants specific powers to authorized officers, including the use of firearms against individuals, which can potentially result in fatalities.
  - This provision raises concerns about the excessive and disproportionate use of force by security forces.
- **Violation of Civil Liberties:** Section 4 also grants officers the power to arrest without a warrant and to seize and search premises without any warrant.
  - This can lead to violations of individuals’ civil liberties, as it bypasses standard legal procedures and safeguards against arbitrary detention and searches.
- **Lack of Accountability:** Section 7 of AFSPA requires obtaining prior executive approval from central or state authorities for the prosecution of a member of the security forces.
  - This provision creates a lack of accountability and transparency in cases of alleged human rights violations by security forces, as it allows them to operate with impunity.
- **Evidence of Abuse:** The Supreme Court-appointed Hegde Commission in 2013 found that all seven deaths in the six cases it investigated were extrajudicial executions.
  - Additionally, it highlighted widespread abuse of AFSPA by security forces in Manipur.

### **What are the Supreme Court’s Guidelines?**

- Questions regarding the **constitutionality of AFSPA** arose due to its intersection with the **jurisdiction of states over law and order matters**. The **Supreme Court**, in its **1998 ruling in Naga People’s Movement of Human Rights v. Union of India**, affirmed the constitutionality of AFSPA.

Note:

- In this landmark judgment, the Court reached specific conclusions, including:
  - The Central government has the authority to make a **suo-motto declaration**, yet it is preferable for the **central government** to consult with the **state government** before issuing such a declaration.
  - AFSPA does not grant **unrestricted authority** to designate an area as a **'disturbed area'**.
  - The declaration must have a defined time frame, and there should be regular assessments of its status. After **six months** have passed, a review of the declaration is necessary.
  - When implementing the powers granted by **AFSPA**, the authorized officer should employ the **least amount of force** required for **successful operations**, and adhere strictly to the guidelines outlined in the army's "Dos and Don'ts."
  - The Supreme Court determined that the Act does not infringe upon the Constitution, and the powers granted under **sections 4 and 5** are **neither arbitrary nor unreasonable**.

## Islamic State-Khorasan

### Why in News?

Recently, a terror attack at **Moscow's Crocus City Hall** claimed over 137 lives, reigniting concerns about the resurgence of the **Islamic State (IS)** and its growing terror capabilities.

- Experts believe the attack was likely carried out by **IS Khorasan (IS-K)**, the group's **Afghanistan-Pakistan branch**.

### What is the Islamic State-Khorasan (IS-K)?

- **IS-K:**
  - **IS-K, the Afghanistan-based arm of the IS**, has been responsible for recent attacks, including the twin bombings in Kerman, Iran.
  - Established in Afghanistan's Nangarhar province in 2015, IS-K comprises **Central Asian militants** and has gained prominence since the Taliban's return to power in August 2021.
  - IS-K targets **Afghanistan's Shia minority** and seeks to recruit radicalised youths from Central Asia and Afghanistan's Tajik and Uzbek minorities.

- IS-K utilises **anti-Russian and anti-Iranian propaganda** to recruit among Central Asians, Afghans, and Pakistanis.
  - Geopolitical instability in Afghanistan and parts of West Asia provides fertile ground for IS-K to regroup and launch attacks.
- **Security Challenges for Russia:**
  - Russia, hosting thousands of Central Asian migrant labourers, faces a serious security challenge due to IS-K's activities.
  - Russia faces pressure to enhance security measures and address the root causes fueling IS-K's resurgence.



### Islamic State:

- The Islamic State (IS) also known as the **Islamic State of Iraq and Syria (ISIS)** and the **Islamic State in Iraq and the Levant (ISIL)**, is a **Salafi-Jihadist militant organisation**.
- It is a **transnational Sunni insurgent group** operating primarily in western Iraq and eastern Syria that seeks to establish an **Islamic caliphate in Iraq and Syria** and to create a global Salafi-Jihadist movement.
- IS claimed the establishment of a **"province" in India called "Wilayah of Hind"**.
- ISIS is recognised as an **unlawful organisation in India under the Unlawful Activities (Prevention) Act, 1967**. The Central Government has included ISIS in the First Schedule of the Act.

Note:

## Prominent India-Centric Terror Organizations in Pakistan

Name	Formation	FTO Design-ation	About	Status in India as per the Unlawful Activities (Prevention) Act, 1967
Lashkar-e-Taiba (LET)	Late 1980s	2001	Responsible for major <b>2008 attacks in Mumbai</b> and numerous other high-profile attacks.	Banned
Jaish-e-Mohammed (JEM)	2000	2001	Along with LET, it was responsible for the <b>2001 attack on the Indian parliament</b> .	Banned
Harakat-ul Jihad Islami (HUJI)	1980	2010	Initially formed to fight the Soviet army, later redirected efforts toward India. Operates in Afghanistan, Pakistan, Bangladesh, and India, <b>seeking annexation of Kashmir into Pakistan</b> .	Banned
Harkat-ul-Mujahideen (HUM)	1985	1997	Operates mainly from <b>Pak-Occupied Kashmir and some Pakistani cities</b> .	Banned
Hizb-ul Mujahideen	1989	2017	The militant wing of <b>Pakistan's largest Islamist political party</b> , and is one of the largest and oldest militant groups operating in Jammu and Kashmir.	Banned
Al Qaeda	1988	1999	Operates primarily from former Federally Administered Tribal Areas in Karachi, and Afghanistan.	Banned



Note:

# Art and Culture

## Highlights

- ASI to Delist Lost Monuments
- 6 New MP Sites Listed on Tentative World Heritage Sites List
- 900-Year-Old Chalukyan Inscription

## New Year Festivals

### Across India

#### Why in News?

Recently, traditional **Hindu New Year festivals** like **Chaitra Sukladi, Ugadi, Gudi Padwa, Cheti Chand, Navreh, and Sajibu Cheiraoba** were celebrated across India, fostering cultural unity and appreciation.

#### What are the Major Traditional Indian New Year Festivals?

##### ➤ Chaitra Sukladi:

- Celebrated in **North India**, marks the beginning of the Hindu New Year.
  - The Hindu New Year Vikram Samvat begins with the new moon of the month of Chaitra.
- According to popular tradition, **King Vikramaditya of Ujjain** established the Vikrama Samvat era after defeating the Sakas.
  - The earliest known inscription which calls the era "Vikrama" is from 842 CE.

##### ➤ Ugadi:

- Ugadi marks the commencement of the Hindu New Year and is observed in **Andhra Pradesh, Telangana and Karnataka**.
  - The terms Yugadi or Ugadi stem from the Sanskrit words yuga (age) and adi (beginning), denoting the start of a new age.

- Panchanga Sravanam, the reading of the almanac for the new year, is an important ritual.

##### ➤ Gudi Padwa:

- Gudi Padwa, also known as Samvatsar Padvo, is observed in Maharashtra and Goa.
- It marks the beginning of Marathi New Year and is also observed as the first day of Chaitra Month.
- Marks the beginning of the Hindu New Year and the Marathi New Year.

##### ➤ Cheti Chand:

- Celebrated by the **Sindhi community**.
- Marks the beginning of the Sindhi New Year.
- The festival of Cheti Chand is observed by Sindhis to commemorate the birth of Jhulelal, also called Uderolal, who is considered their patron saint.

##### ➤ Navreh:

- Celebrated by the **Kashmiri Pandit** community.
- Navreh is derived from Sanskrit **Nava Varsha**, meaning the new year.
- Kashmiri Pandits dedicate the Navreh festival to their **Goddess Sharika** and pay homage to her during the festival.

##### ➤ Sajibu Cheiraoba:

- Sajibu Cheiraoba, also known as **Meitei Cheiraoba**, is a traditional festival celebrated in the northeastern Indian state of Manipur.
- It marks the beginning of the Manipuri lunar calendar year and is observed by the Meitei community, who are the majority ethnic group in Manipur.

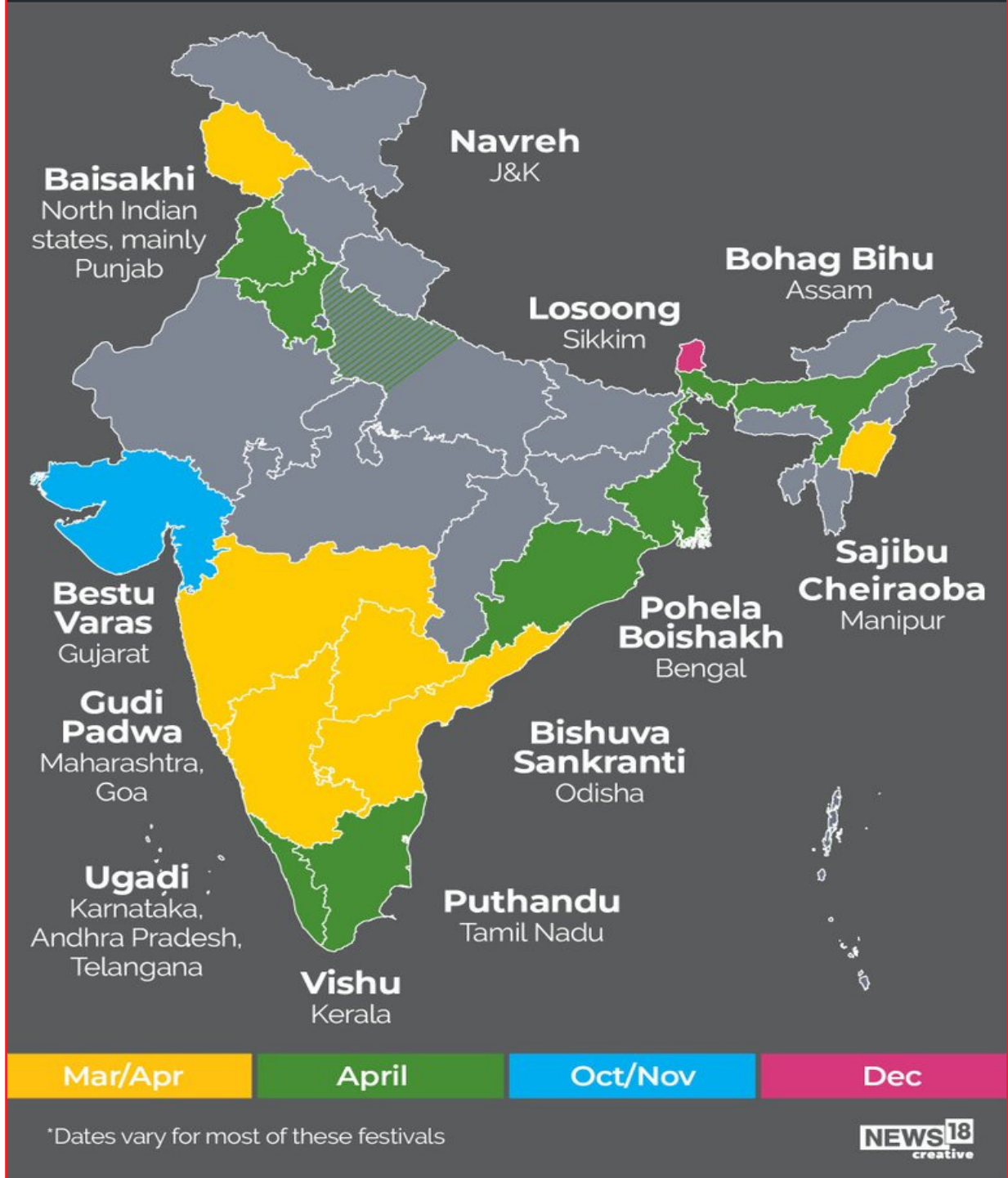
Note:





# THE NEW YEAR MAP OF INDIA

New Year festivals in different regions of India



Note:

## ASI to Delist Lost Monuments

### Why in News?

The [Archaeological Survey of India \(ASI\)](#) has decided to delist **18 “centrally protected monuments”** because it has assessed that they do not have national importance.

- These 18 monuments are part of an earlier list of monuments that the ASI had said were “untraceable”.

### Which Monuments are Being Delisted?

- Among the monuments that face delisting now are a mediaeval highway milestone recorded as **Kos Minar No.13 at Mujessar village in Haryana, Barakhamba Cemetery in Delhi, Gunner Burkill’s tomb in Jhansi district**, a cemetery at Gaughat in Lucknow, and the **Telia Nala Buddhist** ruins in Varanasi.
  - The precise location of these monuments, or their current physical state, is not known.
- This is the first such large-scale delisting exercise in several decades. The ASI **currently has 3,693 monuments under its purview**, which will fall to 3,675 once the current delisting is completed.

### What does Delisting a Monument Mean?

- **Removal from ASI’s Purview:**
  - The delisted monument will no longer be conserved, protected, and maintained by the ASI.
    - It will effectively be removed from the ASI’s list of centrally protected monuments.
- **Allowing Construction and Urbanisation:**
  - Under [The Ancient Monuments and Archaeological Sites and Remains Act, 1958 \(AMASR Act\)](#), any kind of construction-related activity is not allowed around a protected site.
    - Once the monument is delisted, activities related to construction and urbanisation in the area can be carried out in a regular manner.
- **Loss of Legal Protection:**
  - The AMASR Act, 1958 provides legal protection to monuments declared to be of national importance.
    - Delisting a monument means it will **no longer have this legal protection and could be subject to neglect or damage**.
- **Procedure for Delisting:**
  - **Section 35 of the AMASR Act** allows the Central Government to declare that any ancient monument

or archaeological site of national importance has **ceased to be of national importance** through a notification in the Official Gazette.

- A gazette notification was issued on 8<sup>th</sup> March 2024 for delisting the 18 monuments, followed by a two-month window for public objections or suggestions.

### What does It Mean When the ASI Declares a Monument “Untraceable”?

- When the ASI declares a monument as “untraceable,” it means that the monument is **no longer physically locatable or identifiable**.
  - Factors contributing to the loss of monuments include **urbanisation, encroachments, construction activities** like dams and reservoirs, and neglect over time.
  - Some monuments, especially **smaller or lesser-known ones, have deteriorated** to the extent that there is no surviving public memory of their existence.
- Despite the AMASR Act’s mandate for the ASI to regularly inspect and conserve protected monuments, the effectiveness of these efforts has been inconsistent.
- Declaring monuments untraceable underscores the **loss of valuable cultural heritage** and highlights the need for better conservation efforts and resource allocation in the future.

### What are the Challenges in Protecting India’s Historical Monuments?

- **Lost Monuments:**
  - The Ministry of Culture reported to the [Parliamentary Standing Committee](#) on Transport, Tourism and Culture that **50 out of India’s 3,693 centrally protected monuments were missing**.
    - Few among the lost monuments were victims of rapid urbanisation, submerged due to reservoirs/dams, and remained untraceable.
- **Inadequate Security:**
  - Only **248 out of over 3,600 protected monuments had security guards** posted.
    - The government could provide only 2,578 security personnel at 248 locations, falling short of the total requirement of 7,000 due to **budgetary constraints**.

Note:



- The Parliamentary Committee expressed dismay over the insufficient personnel for monument protection, highlighting **budgetary limitations as a significant challenge**.
- A report by the **Comptroller and Auditor General (CAG)** of India revealed that at least **92 centrally protected monuments had gone missing**,

highlighting the inadequacies in the monitoring and protection mechanisms.

- **Lack of Comprehensive Survey:**
  - The **absence of a comprehensive physical survey of all monuments** after Independence has led to a lack of reliable information regarding the exact number of monuments under the protection of the ASI.

## SCULPTURES IN ANCIENT INDIA

*Indian sculpture, stemming from folk culture, initially crafted with clay on the potter's wheel, evolved into terracotta and various styles, depicting gods and decorating Buddhist, Jaina, and Hindu architecture*

### About

- Small 3-D works of art
- Usually made of single type of material

### Harappan

- Extremely adept at handling 3-D volumes
- Common animal motifs - unicorn, humped bull, rhinoceros, tiger, elephant, buffalo, bison, goat, crocodile (No evidence of cow)
- **Bronze Figures:**
  - ❑ Made using "lost wax technique" or "Cire Perdue"
  - ❑ **Examples:** Bronze Dancing Girl of Mohenjo-daro, Bronze Bull of Kalibangan, etc.

### Mauryan

- Sculptures used primarily for decoration of stupas, in Torana and Medhi and as form of religious expression
- ❑ **Example:** Yaksha and Yakshi
  - Objects of worship related to Jainism, Hinduism, and Buddhism
- ❑ **Pottery:** Northern Black Polished Ware (NBPW)
  - Characterised by black paint and highly lustrous finish, used as luxury items

### Gupta

- New school of sculpture developed around Sarnath
- Use of cream-coloured sandstone and metal, sculptures immaculately dressed and lacking any form of nakedness
- ❑ **Example:** Copper sculpture of Sultanganj Buddha in Bihar

### Chola

- Chola temples emphasised decoration with sculptures, notably the Nataraja in Tandava posture

### Post Mauryan

- **Three prominent schools:**
  - ❑ **Gandhara:** Greek Influence, mainly Buddhist imagery, patronised by Kushana rulers, North West Frontier (Kandahar), used bluish-grey sandstone (later mud and stucco)
  - ❑ **Mathura:** Developed indigenously, used spotted red sandstone, Influence of Hinduism, Jainism, and Buddhism; patronised by Kushana rulers, developed in and around Mathura, Sonkh, and Kankalitala
  - ❑ **Amaravati:** Developed indigenously, used white marble, mainly Buddhist influence, patronised by Satvahana rulers, developed in Krishna-Godavari lower valley, in and around Amaravati and Nagarjunakonda
- Art of sculpture reached its climax in Post-Mauryan period



### Archaeological Survey of India (ASI)

- The ASI, which works under the **Union Ministry of Culture**, is responsible for protecting and maintaining certain specific monuments and archaeological sites that have been declared to be of national importance under the relevant **provisions of The Ancient Monuments Preservation Act, 1904** and **The Ancient Monuments and Archaeological Sites and Remains Act, 1958 (AMASR Act)**.
- Its activities include carrying out surveys of antiquarian remains, exploration and excavation of archaeological sites, conservation and maintenance of protected monuments etc.
- It was founded in **1861 by Alexander Cunningham**—the first Director-General of ASI. Alexander Cunningham is also known as the **“Father of Indian Archaeology”**.

### Archaeological Sites and Remains Act, 1958 (AMASR Act)

- The aim of the act is to protect and preserve ancient monuments for future generations.
  - Applies to **monuments over 100 years old in public or private ownership**.
- **Prohibits construction or alteration around ancient monuments** without National Monuments Authority (NMA) approval.
  - **NMA established in accordance with the AMASR Act** is responsible for the conservation and preservation of monuments and sites (and banned/restricted areas surrounding centrally designated monuments).
  - NMA is responsible for implementing the AMASR Act and granting permission for construction or developmental activity within protected and regulated areas.
- **Protected area is a 100-metre radius around the monument**, with a regulated area extending up to 200 metres beyond that.
  - Current restrictions prohibit construction within 100-metre radius of protected monuments and have strict regulations for permits in an additional 200-metre radius.

## 6 New MP Sites Listed on Tentative World Heritage Sites List

### Why in News?

Recently, 6 new sites from **Madhya Pradesh** have found place in the **Tentative UNESCO list of [World Heritage Sites \(WHS\)](#)**.

- The sites included in the new list included Gwalior Fort, Historical Group of Dhamnar Bhojeshwar Mahadev Temple, Rock Art Sites of Chambal Valley, Khooni Bhandara, Burhanpur, and Gond monuments of Ramnagar, Mandla.

### What are the Key Features of Sites Recently Added to Tentative UNESCO List of WHS?

- **Gwalior Fort:** It is renowned for its formidable walls, stands atop a hill providing panoramic views of the surrounding city.
  - Historically, it is believed that the fort's first foundations were laid in the **6th century AD by Rajput warrior Suraj Sen**.
    - Suraj Sen was the local chieftain who suffered from a severe leprosy but was healed by a hermit-saint named Gwalipa. In gratitude for this event, he established the Gwalior City named after him.
  - The Gwalior fort witnessed a tumultuous history of invasions and reconstructions, notably under the **Tomar ruler Maan Singh in 1398**, who added several monuments to its premises.
    - After Mansingh Tomar's reign, Gwalior came under Ibrahim Lodi, then the Mughal Sultanate. Akbar regained control in 1550 CE. The Marathas, led by the Scindias, took over later.
    - The fort briefly fell to **General White** during the second Maratha War but returned to Scindia control in 1805 CE until 1857.
      - British rule lasted until 1886 CE when it was exchanged for **Jhansi** and returned to the Scindias.
  - The fort boasts several ancient temples, including the Teli ka Mandir dedicated to Shiva, Vishnu, and Matrikas.

Note:



- The **Chaturbhuj temple** is notable for its mathematical significance, featuring one of the oldest references to zero in mathematics.
- The **Sas Bahu temples**, with the larger one dedicated to Vishnu, date back to 1150 CE and are known for their intricate inscriptions.
- Additionally, the **Gurdwara Data Bandi Chhor** commemorates Guru Hargobind Sahib, the sixth Sikh guru.
- As per its strategic location on the basalt rock hills, it is mentioned as **Gopachala, Gopagiri** in the old Sanskrit inscriptions.



- **Historical Group of Dhamnar:** It comprises **51 rock-cut caves, stupas, chaityas, and dwellings** dating back to the 7<sup>th</sup> century AD.
  - Among these, the colossal statue of **Gautam Buddha in the nirvana pose** is a significant highlight.
  - Noteworthy caves include the **Bari Kacheri and Bhima Bazar** on the northern bank, known for their historical importance and architectural features.
  - The earliest accounts of these monuments come from **James Tod**, who visited in 1821, followed by **James Fergusson** in 1845 and **Alexander Cunningham** between 1864-1865.
  - The name Dhamnar has no historical or literary basis, but evidence suggests it was known as **Chandanaganari-mahavihara** in Buddhist times.
    - Scholar K.C. Jain suggested that '**Dhamnar**' may come from the Shaivite term '**Dharmanatha**,' associated with the Linga in the mediaeval Vaishnava temple.



- **Bhojeshwar Mahadev Temple:** It is dedicated to Lord Shiva and boasts a massive **Linga carved from a single stone**.
  - Commissioned by **Raja Bhoj in the 11th century**, this temple is revered for its grandeur and unique architecture.
    - Raja Bhoj was a celebrated ruler of the **Paramara dynasty** known for his architectural treatise of the Samaranganasutradhara.
  - The temple's architecture follows the **Bhumija style** characterised by its towering shikhara and ornate carvings and sculptures.
    - Also, the main body of the temple and its shikhara have components influenced by the **Dravidian style of temple architecture**.



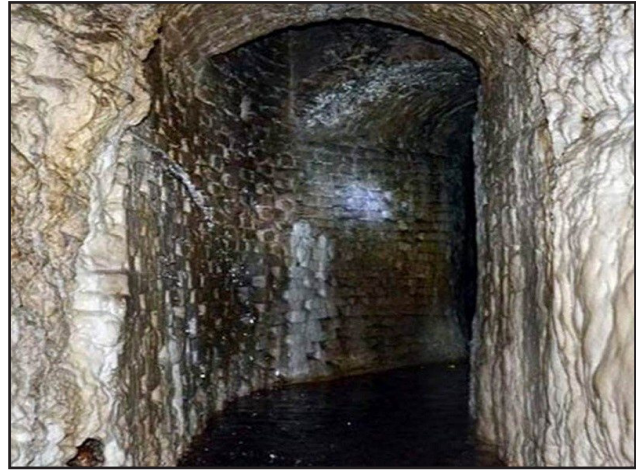
- **Rock Art Sites of the Chambal Valley:** It hosts the world's **largest concentration of rock art sites**, showcasing scenes from various historical periods and civilizations.

Note:

- These sites, spanning across **Madhya Pradesh, Rajasthan, and Uttar Pradesh**, provide insights into ancient human life and cultural evolution.
  - The rock art in the basin includes depictions of hunting and gathering scenes created by Mesolithic hunter-gatherers and those from the Protohistoric and later periods.
- They flourish in the hilly regions of Vindhyan, Satpura, and Kaimur ranges, marked by parallel ridges and dense vegetation.
- Major rock art sites in the Chambal Basin include Bhimlat Mahadev, **Chatturbhuj Nath Nala**, Garadia Mahadev, Bukki Mata, Chattaneshwar, and Kanyadeh.



- **Burhanpur's Khooni Bhandara:** It is an underground water management system comprising eight waterworks built by **Abdurrahim Khankhana** in the historical city of Burhanpur.
  - It was built using the **Persian qanat approach** and designed by Persian geologist, **Tabkutul Arz**
    - During the Mughal era, technologies like Persian Qanats from Iran and Iraq were imported to India as useful public utilities.
  - In the early 1900s, 8 sets of these underground conduits were excavated and traced, with 6 of them remaining intact to this day.
    - The hint of red colour in this mineral rich water, gave it the name **khooni (bloody)**.



- **Gond Memorial of Ramnagar, Mandla:** The region formerly known as the Central Provinces of India and covering parts of the present-day states of Madhya Pradesh, Chhattisgarh and Maharashtra; was historically called **Gondwana**, the home of the largest heterogenous tribe of India, the **Gond tribe**.
  - The cluster of monuments include the following:
    - Moti Mahal
    - Raibhagat ki Kothi
    - Suraj Mandir (Vishnu Mandir)
    - Begum Mahal
    - Dalbadal Mahal



**Note:** 3 sites from Madhya Pradesh are already included in **UNESCO's World Heritage Sites**. These include **The Khajuraho Group of Monuments (1986)**, **Buddhist Monuments of Sanchi (1989)**, and **The Rock Shelters of Bhimbetka (2003)**.

### **What is the Tentative UNESCO list of World Heritage Sites?**

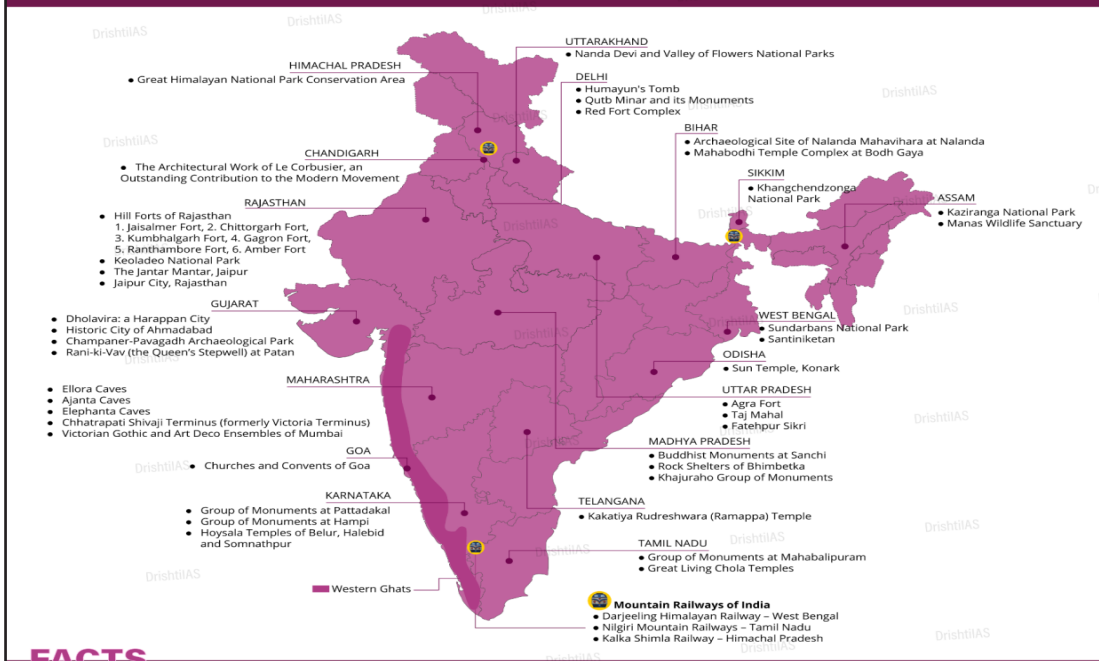
- **World Heritage Sites:** World Heritage Sites are special places around the world that are considered to be of outstanding value to humanity.

Note:



- They are designated by the **United Nations Educational, Scientific and Cultural Organization (UNESCO)** and are given special protection to ensure they are preserved for future generations.
- It is backed by the international agreement known as the **Convention concerning the Protection of the World Cultural and Natural Heritage**, established by UNESCO in 1972.
- **Tentative UNESCO list of World Heritage Sites:** It is a list of sites identified by individual countries (States Parties) that they consider to have “**outstanding universal value**” and may be suitable for inscription on the **World Heritage List**.
  - It is published by the World Heritage Centre.
- **Types of Heritage Sites:** There are three types of sites: Cultural, Natural, and Mixed.
  - **Cultural heritage** includes artifacts, monuments, a group of buildings and sites, and museums that have a diversity of values including **symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance**.
  - **Natural heritage** sites are limited to exceptional natural areas with outstanding ecological and evolutionary processes, unique natural phenomena, habitats hosting rare or endangered species, etc.
  - **Mixed heritage sites** incorporate aspects of both natural and cultural significance, blending elements such as historic buildings or archaeological sites with exceptional natural features or ecological processes.
- **India's WHS:** India currently has **42 UNESCO World Heritage Sites**. The most recent ones include:
  - **41<sup>st</sup>:** **Santiniketan**, established by Nobel laureate Rabindranath Tagore in West Bengal.
  - **42<sup>nd</sup>:** The **Sacred Ensembles of the Hoysalas in Karnataka**, which encompass a group of exquisite Hoysala era temples.

## UNESCO World Heritage Sites



### FACTS

- Total Number of World Heritage Sites in India: 42
- Total Cultural Heritage Sites: 34
- Total Natural Sites: 7 (Kaziranga National Park, Manas Wildlife Sanctuary, Western Ghats, Sundarbans National Park, Nanda Devi and Valley of Flowers National Parks, Great Himalayan National Park Conservation Area, Keoladeo National Park)
- Mixed Site: 1 (Khangchendzonga National Park)
- World Heritage Sites Listed First: Taj Mahal, Agra Fort, Ajanta Caves and Ellora Caves (all in 1983)
- Latest Addition (2023): Hoysala Temples (42<sup>nd</sup> site) and Santiniketan (41<sup>st</sup> site)
- Countries With the Most UNESCO World Heritage Sites: Italy (58), China (56), Germany (51), France (49), Spain (49)
- India is 6<sup>th</sup> in number of World Heritage Sites in the World

Note:

# History

## Highlights

- 100 Years of Vaikom Satyagraha
- India Developing Early Warning Systems in Partner Nations

## 900-Year-Old Chalukyan Inscription

### Why in News?

Recently, A **900-year-old Kannada inscription** belonging to the **Kalyani Chalukya dynasty** was discovered in a neglected state in Gangapuram, in **Telangana**.

- It was issued by Customs Officers under **Tailapa-III, son of Emperor 'Bhulokamalla' Someswara-III of the Kalyani Chalukya dynasty**.

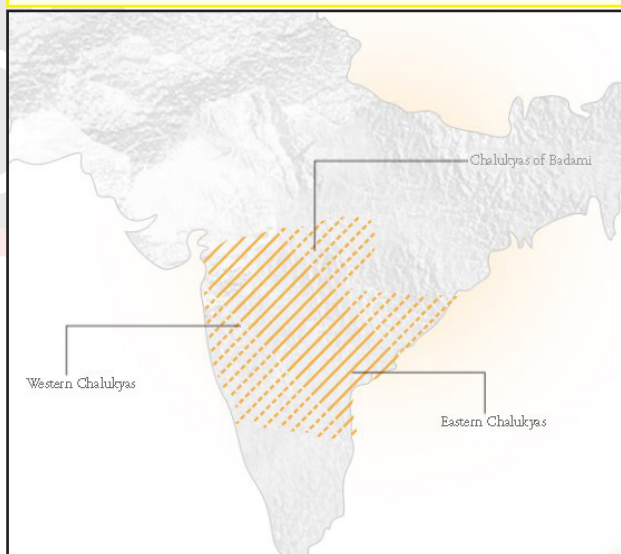
### Who were the Chalukyas?

- **Overview:**
  - The Chalukyas ruled **parts of Southern and Central India** between the 6<sup>th</sup> century and the 12<sup>th</sup> century.
  - The kingdom of Chalukyas was centred around the **Raichur Doab, between the Krishna and Tungabhadra rivers**.
- **Three distinct but related Chalukya dynasties:**
  - **Badami Chalukyas:** They were the **earliest Chalukyas** with their **capital at Badami (Vatapi) in Karnataka**.
    - Their rule started in the mid-6<sup>th</sup> century and declined after the death of their **greatest king, Pulakesin II** in 642 AD.
  - **Eastern Chalukyas:** Emerged after the death of **Pulakesin II** in Eastern Deccan with the **capital at Vengi**.
    - They **ruled till the 11<sup>th</sup> century**.
  - **Western Chalukyas:** They were the **descendants of the Badami Chalukyas**.
    - They **emerged in the late 10<sup>th</sup> century** and **ruled from Kalyani**.

### Note:

#### Pulakesin II: The Pinnacle of Chalukya Power -

- Conquered various kingdoms including Kadambas, Gangas of Mysore, Mauravas of North Konkan, Latas of Gujarat, Malavas, and Gurjars.
- Secured submissions from Chola, Chera, and Pandya kings.
- Defeated King Harsha of Kannauj and Pallava king Mahendravarman.



- **Administration and Cultural Contributions:**
  - **Robust Military:** Comprehensive army with infantry, cavalry, elephant unit, and a **strong navy**.
  - **Religious Tolerance:** Despite being Hindu rulers, they **showed tolerance towards Buddhism and Jainism**.
  - **Literary and Numismatic Contributions:** Advanced developments in Kannada and Telugu literature.
  - Coins featured Nagari and Kannada inscriptions, temple cryptograms, and symbols like lions, boars, and lotuses.

Note:



### ➤ Architectural Marvels:

- **Cave Temples:** Built temples with both **religious and secular themes** adorned with beautiful **mural paintings**.
- **Notable Temples:**
  - **Aihole temples:** Lady Khan (Surya), Durga, Huchimalligudi.
  - **Badami temples.**
  - **Pattadakal Temples:** The UNESCO World Heritage site features 10 temples in both Nagar and Dravida styles, including the Virupaksha and Sangameshwara Temples.

### ➤ Aihole Inscription of Pulakesin II:

- **Situated in the Megudi temple at Aihole, Karnataka,** the Aihole inscription provides invaluable insights into Chalukya history and achievements.

- Aihole is considered the “**Cradle of Indian temple architecture**”.
- **Crafted by the renowned poet Ravikriti,** the inscription is a lyrical tribute to the Chalukya dynasty, particularly **King Pulakesin II, lauded as the embodiment of truth (Sathyasraya)**.
- The inscription chronicles the Chalukya dynasty's triumphs over adversaries, including the renowned defeat of Harshavardhana.

### ➤ Decline:

- After the decline of the Chalukya Kingdom of Kalyani at the end of 12<sup>th</sup> century, the new kingdoms which arose in South India were Yadavas of Devagiri and Kakatiyas of Warangal and Hoysalas of Dwarasamudra and Pandyas of Madurai.

# INSCRIPTIONS AND ROCK EDICTS



**Sohgaura Copper Plate**

- ⊕ Location - Sohgaura, Gorakhpur (UP)
- ⊕ Mentions - Famine relief efforts
- ⊕ Language - Prakrit\*
- ⊕ Features - **Mauryan dynasty**
  - ⊕ Earliest-known copper plate
  - ⊕ (Rare) **Pre-Ashokan Brahmi inscription**

**Ashokan Edicts**

- ⊕ Location - Eastern India
- ⊕ Mentions - Ashoka's view of Dharma (Buddhist philosophy)
- ⊕ Language - Magadhi Prakrit\*
- ⊕ Features - 33 inscriptions (pillar edicts, Major rock edicts, Minor rock inscriptions)
  - ⊕ 1<sup>st</sup> **tangible evidence of Buddhism**
  - ⊕ Ashoka as **Devanampiyadasi** "Beloved servant of the God"

**Rummindei Pillar Edicts**

- ⊕ Location - Lumbini, Nepal
- ⊕ Mentions - Ashoka's visit to Lumbini and tax exemptions he made there
- ⊕ Script - Brahmi
- ⊕ Features - Minor pillar inscriptions

**Prayag-Prashasti (Allahabad Pillar)**

- ⊕ Location - Allahabad Fort (earlier Kaushambi)
- ⊕ Mentions - Ashoka Stambh but with 4 different inscriptions
- ⊕ Script - Brahmi
- ⊕ 4 Inscriptions include -
  - ⊕ Usual Ashokan Inscriptions
  - ⊕ Queen's Kaurwaki edict
  - ⊕ Samudragupta's conquests by Harisena
  - ⊕ Jahangir's inscriptions in Persian

**Mehrauli Inscription (Mehrauli Iron Pillar)**

- ⊕ Location - Qutub Minar complex, Delhi
- ⊕ Mentions - Credits **Chandragupta II** for the conquest of Vakatakas and Vanga countries
- ⊕ Script - Brahmi
- ⊕ Features - **Gupta dynasty**
  - ⊕ Pillar estd by Chandragupta II as **Vishnupada** (in honor of Lord Vishnu)
  - ⊕ Notable for rust-resistant metal composition

**Kalsi Inscription**

- ⊕ Location - Kalsi town (Uttarakhand)
- ⊕ Mentions - Ashoka's humane approach in administration, non-violence, spirituality
- ⊕ Language - Prakrit\*
- ⊕ Features - Only place in north India to have 14 Ashokan rock edicts

**Maski Inscription**

- ⊕ Location - Maski (an archaeological site in Karnataka)
- ⊕ Mentions - Dharma shasana (promotes Buddhist tenets)
- ⊕ Language - Prakrit\*
- ⊕ Features - 1<sup>st</sup> edict to contain Ashoka's name instead of Piyadasi.

**Kalinga Edicts**

- ⊕ Location - Kalinga, Odisha
- ⊕ Mentions - Kalinga war turning point for Ashoka
- ⊕ Language - Magadhi Prakrita, Script - Brahmi
- ⊕ Features - Set of 11 out of 14 rock edicts
  - ⊕ 2 special rock edicts signifying pacification
  - ⊕ Ashoka gave up **Digvijaya**, adopted non-violence & Buddhism

**Aihole Inscription**

- ⊕ Location - Meguti temple, Karnataka
- ⊕ Mentions - **Pulakeshin II** defeated Harshavardhana
- ⊕ Language - Sanskrit; Script - Kannada
- ⊕ Features - Chalukya victory → Pallavas
  - ⊕ Capital: **Aihole → Badami**
  - ⊕ Written by Ravikirti (Pulakeshin II's court poet)
  - ⊕ Samudragupta's conquests by Harisena

**AIHOLE WAS THE FIRST CAPITAL OF CHALUKYAS**

**Hathigumpha Inscription (Elephant Cave Inscription)**

- ⊕ Location - Udaygiri-Khandgiri Caves, Odisha
- ⊕ Mentions - History of King Kharvela - a champion of Jainism
- ⊕ Language - Prakrit\*
- ⊕ Features - **Mahameghavahana dynasty**

**NOTE: \*implies that wherever language is Prakrit, the script is Brahmi**



**Drishti IAS**

Note:

# 100 Years of Vaikom Satyagraha

## Why in News?

Recently, India commemorated the **centenary of Vaikom satyagraha**, a pivotal movement in India's history that challenged **untouchability and caste oppression**.

## What is Vaikom Satyagraha?

### ➤ Background:

- Vaikom Satyagraha, a **nonviolent agitation**, unfolded in **Vaikom** within the princely state of **Travancore, Kerala** precisely a century ago spanning from 30th March 1924 to 23<sup>rd</sup> November 1925.
  - This movement stood as a formidable protest against the entrenched practices of untouchability and caste discrimination that had long plagued Indian society.
  - The movement was triggered by the **prohibition of people from oppressed classes, especially Ezhavas**, from walking on the roads surrounding the Vaikom Mahadeva temple.
- Efforts were made to negotiate with authorities, including **Maharani Regent of Travancore, to open temple roads**.
- It was the **first among the temple entry movements in India**, setting the stage for similar movements across the country.
  - It emerged amidst the growing nationalist movement and aimed to foreground social reform alongside political aspirations.

### ➤ Key Figures:

- It was led by visionary leaders like **Ezhava leader T K Madhavan, K.P. Kesava Menon, and K. Kelappan**.

- **Erode Venkatappa Ramasamy**, revered as **Periyar or Thanthai Periyar**, played a crucial role, mobilising volunteers, delivering speeches, and enduring imprisonment, earning the title '**Vaikom Veerar**'.

- The movement gained more power when **Mahatma Gandhi** reached Vaikom in March 1925 and held discussions with leaders of various caste groups.

### ➤ Strategies and Initiatives:

- The satyagraha initially focused on opening the roads surrounding the Vaikom temple to people from all castes.
- Leaders of the movement strategically chose nonviolent methods, inspired by Gandhian principles of protest.

### ➤ Outcome:

- The Vaikom Satyagraha led to significant reforms, including the **opening of three out of four roads** surrounding the temple to people of all castes.

### ➤ Aftermath and Legacy:

- In November 1936, the Maharaja of Travancore signed the historic Temple Entry Proclamation, which **removed the age-old ban on the entry of marginalised castes** into the temples of Travancore.
- The Vaikom **Satyagraha led to a division in perspectives**, with few viewing it as a Hindu reformist movement, while another saw it as a fight against caste-based atrocities.
- Memorials, including the Vaikom Satyagraha Memorial Museum and Periyar's Memorial, were established to commemorate the movement's significance



Note:

# Geography

## Highlights

- Demographic Transition of India
- Time Zone for Moon
- India's Soil Erosion Crisis
- Taiwan Earthquake and Pacific Ring of Fire
- Total Solar Eclipse
- Magnetic Fossils in Bay of Bengal
- Kallakkadal
- Tropical Cyclones Need New Category
- Africa's Afar Triangle: Birthplace of a Potential New Ocean

## India Developing Early Warning Systems in Partner Nations

### Why in News?

India is taking proactive steps to assist neighbouring countries and **small island nations** in developing early warning systems to mitigate the impact of extreme weather events.

- This initiative aims to reduce the loss of life and property, aligning with the **United Nations' 'Early Warnings for All' initiative**.

### How does India Plan to Help Partner Countries?

- **About:**
  - Since, many countries **lack the capacity** to establish early warning systems, particularly those that are poor, least developed, or small island nations like **Maldives and Seychelles**.
    - Therefore India aims to play a crucial role in helping countries like Nepal, Maldives, Sri Lanka, Bangladesh, and Mauritius.
- **Role of India in Developing Early Warning System (EWS):**
  - India is providing technical expertise and financial aid to five partner countries, utilising **public-private partnerships** for financial support, with technical assistance from India and other contributing nations.
  - India will assist in setting up **meteorological observatories** in partner countries.
  - Partner nations will have access to India's **numerical models** to enhance their forecasting capabilities.

- India will aid in creating **decision support systems** to facilitate timely responses to extreme weather events.
- Ministries of communication in respective nations will collaborate to **establish data exchange and warning dissemination systems**.

### What are the Trends Related to the Extreme Weather Events?

- **Global Trends:**
  - A report by the **World Meteorological Organization (WMO)** highlights that **natural disasters** have **surged over five times** between 1970 and 2019, with water-related disasters becoming the most prevalent globally.
- **Impact on Asia:**
  - **Asia** has been **significantly affected**, with over 146,000 deaths and more than 911 million people directly affected by disasters from 2013 to 2022.
  - **Economic damages** in 2022 alone surpassed USD 36 billion, primarily attributed to **flooding** and **storms**.
- **Human and Economic Toll:**
  - From 1970 to 2021, nearly 12,000 weather, climate, or water-related disasters occurred, resulting in over two million deaths and economic losses exceeding USD 4.3 trillion.
- **The Role of Climate Change:**
  - **Climate change** exacerbates the frequency and intensity of disasters, making them more likely and more challenging to manage effectively.
- **Future Projections:**
  - By 2030, it is estimated that the world could face 560 medium- to large-scale disasters annually.

Note:



➤ **India As a Key Player:**

- India's initiative to bolster **early warning systems** underscores the importance of international cooperation in addressing the growing threat of natural disasters and climate change.

# UN SPECIALISED AGENCIES

UNSA's are 15 autonomous international organizations working with the UN

**Part IV**  
WIPO, WMO  
and IMO

## WIPO

- Estd. - 1967 (joined UN in 1974)
- Headquarters - Geneva, Switzerland

*World Intellectual  
Property Day - 26<sup>th</sup> April*

- Functions -
  - » Encourage creative activity, promote the protection of intellectual property (IP) throughout the world
  - » Shape balanced intl. IP rules
- Members - 193 (India joined in 1975)

- WIPO Treaties that India has ratified/acceded-
  - » Paris Convention (industrial property)
  - » Berne Convention (for Literary and Artistic Works)
  - » WIPO Performance and Phonograms Treaty
  - » Budapest Treaty
  - » Madrid Protocol for the International Registration of Marks
  - » Marrakesh Treaty (for Published Works by Visually Impaired Persons)
  - » WIPO Copyright Treaty
  - » Washington Treaty (IP for Integrated Circuits)
  - » Nairobi Treaty (for Olympic Symbol)
- Publication - Global Innovation Index



## WMO

- Estd. - 1873 (originated from Intl. Meteorological Organization - Vienna International Meteorological Congress)
- » Became a UNSA by WMO Convention 1950

*WMO is a UNSA for meteorology, operational hydrology & geophysical sciences*

- Headquarters - Geneva, Switzerland

- Functions -
  - » Coordinate activities of National Meteorological/Hydrological Services in Member States
  - » Predictions concerning locust swarms, transport of pollutants (nuclear, toxic substances, volcanic ash)
- Member States - 193 (incl. India)

*World Meteorological Day - 23<sup>rd</sup> March*

## IMO

- Estd. - 1948 (Convention on International Maritime Organization held in Geneva)
- Headquarters - London, United Kingdom
- Functions -
  - » Improve safety and security of intl. shipping
  - » Prevent pollution from ships
  - » Also involved in legal matters (liability, compensation issue)

- Member States - 174 (India joined in 1959)
- Important Treaties India has Ratified:
  - » MARPOL (1973) and its Protocols
  - » International Convention for the Safety of Life at Sea (SOLAS, 1974)

*IMO lists India among the 10 states with the largest interest in intl. seaborne trade*



Note:



**India Meteorological Department (IMD):**

- IMD was established in 1875.
- It is an agency of the **Ministry of Earth Sciences**.
- It is the principal agency responsible for meteorological observations, weather forecasting, and seismology.

**Early Warnings for All Initiatives:**

- The Early Warnings for All initiative is co-led by the **World Meteorological Organization (WMO)** and the **United Nations Office for Disaster Risk Reduction (UNDRR)**, with other partners.
- The Early Warnings for All initiative is **built on four pillars** to deliver effective and inclusive multi-hazard early warning systems:
  - Disaster risk knowledge and management
  - Detection, observation, monitoring, analysis, and forecasting
  - Warning dissemination and communication
  - Preparedness and response capabilities

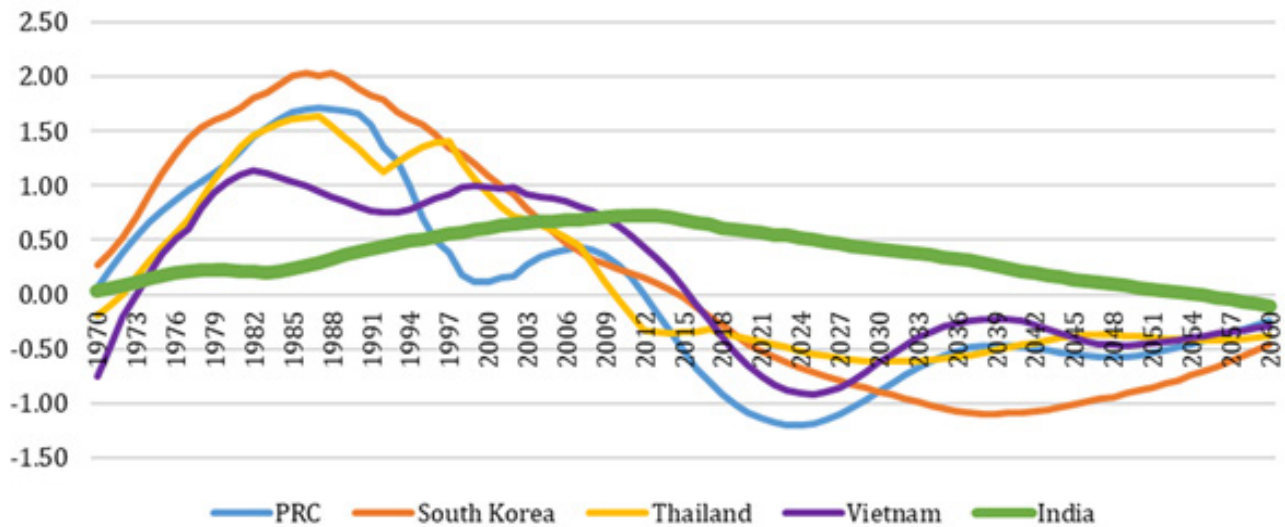
## Demographic Transition of India

**Why in News?**

India's population growth has been a major focus, with projections of reaching **1.7 billion by 2065**, according to the **UN Population Division**, underscoring the ongoing Transition of **Demographic Dividend** in India.

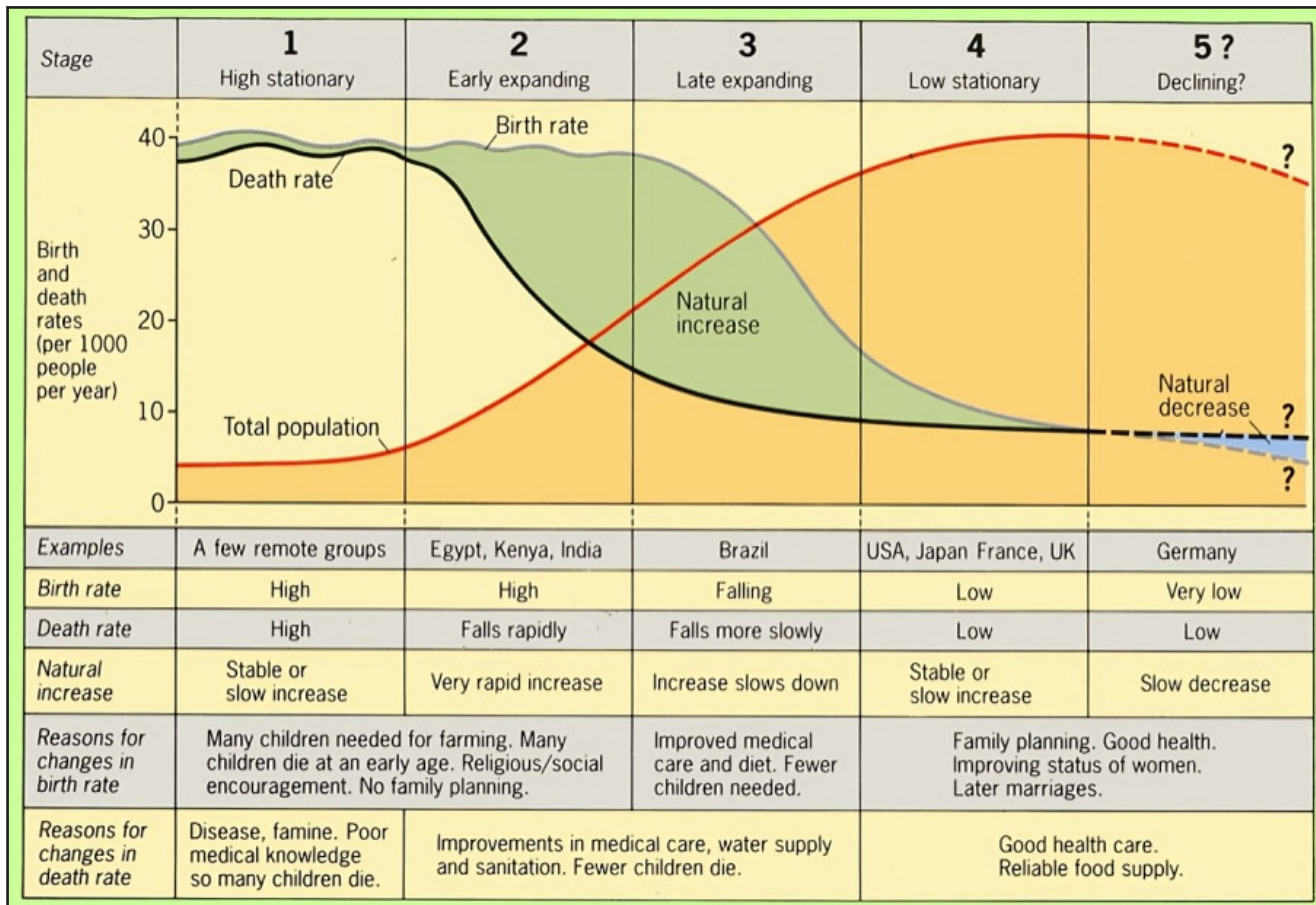
- It shifts the focus to a crucial but lesser-discussed aspect, **declining fertility rates**, which according to the Lancet Report is **projected to go down to 1.29 by 2051**.
- The government's projected **Total Fertility Rate (TFR)** for the period 2021-2025 (1.94) and 2031-2035 (1.73) is higher than estimates from **The Lancet study and NFHS 5 data**.
- This suggests that India's **population may stabilise below 1.7 billion earlier than 2065**.

Demographic Dividend: India vs. Others

**What is the Demographic Transition and Demographic Dividend?**

- A demographic **shift** refers to a **change in the composition of a population** over time.
  - This change can occur due to various factors such as changes in birth and death rates, migration patterns, and changes in social and economic conditions.
- A **demographic dividend** is a phenomenon that occurs when a country's population structure shifts from having a **high proportion of dependents (children and elderly) to having a higher proportion of working-age adults**.
  - This change in population structure can result in economic growth and development if the country invests in its human capital and creates conditions for productive employment.

Note:



### What Factors Triggered Demographic Transition in India?

- **Rapid Economic Development:**
  - The pace of economic development, particularly since the **early years of the 21<sup>st</sup> century**, has been a **significant driver of demographic transition**.
  - Economic growth leads to improved living standards, better healthcare facilities, and increased access to education, which **collectively contribute to lower fertility rates**.
- **Reduction in Infant and Child Mortality Rates:**
  - Lower mortality rates among infants and children have **reduced the need for families to have a large number** of children for old-age support.
  - As healthcare facilities improve and child mortality decreases, families feel more confident in having fewer children.
- **Rise in Women's Education and Work Participation Rates:**
  - Increased education and participation of women in the workforce have also **played a crucial role**.

- As women become more educated and financially independent, they tend to have fewer children and delay childbirth, leading to a decline in total fertility rates.
- **Improvement in Housing Conditions:**
  - Better housing conditions and access to basic amenities **contribute to improved quality of life**, which, in turn, affects family planning decisions.
  - Families may opt for smaller family sizes when they have better living conditions.

### What are the Challenges of Demographic Transition in India?

- **Dependency Ratio Shift:**
  - While initially, the decline in TFR leads to a **fall in the dependency ratio** and a larger working-age population, it eventually **results in a larger share of elderly dependents**.
  - This places a strain on resources for healthcare and social welfare, similar to the situations **observed in China, Japan, and European countries**.

Note:

- **Uneven Transition Across States:**
  - The decline in fertility rates is not uniform across all states in India. Some states, particularly larger ones like **Uttar Pradesh, Bihar, and Jharkhand**, may take longer to achieve replacement level fertility.
  - This can exacerbate **regional disparities in economic development** and healthcare access.
- **Labour Productivity and Economic Growth:**
  - While the demographic transition can potentially increase labour productivity and spur economic growth, it also poses challenges in terms of managing the aging workforce and ensuring **adequate skills development for the younger population**.

### **What are the Opportunities of Demographic Transition in India?**

- **Enhanced labour Productivity:**
  - The demographic transition **can lead to a deceleration in population growth**.
  - This can result in a **higher availability of capital resources** and infrastructure on a per capita basis, ultimately boosting labour productivity.
- **Reallocation of Resources:**
  - Decreasing fertility rates enable the reallocation of resources towards education and skill development, which can **lead to improved human capital** and workforce productivity.
    - A declining TFR will lead to a situation where the number of children enrolling in schools is lower, **as is already happening in states like Kerala**.
    - This could improve educational outcomes without additional resources being spent by the state.
- **Increased Women Participation in Workforce:**
  - A major factor responsible for the low participation of women in the workforce is their engagement in childcare at an age when they should be in the labour force.
  - With **less time needed for childcare**, one would expect **more women to join the labour force** in the coming decades.
    - The larger share of women in employment schemes like **Mahatma Gandhi National Rural Employment Guarantee (MGNREGA)** indicates a trend towards greater female labour force participation.

- **Spatial Redistribution of labour:**
  - Movement of labour from regions with surplus labour to regions with growing industries can **create spatial balance** in the labour market.
  - This would get an impetus with the modern sectors in the southern states, and Gujarat and Maharashtra, soliciting cheaper labour from the northern states.
  - This, over the years, must result in improved working conditions, elimination of wage discrimination for migrant workers and the mitigation of security concerns in the receiving states through institutional safeguards.

## **Time Zone for Moon**

### **Why in the News?**

Recently, the **European Space Agency** is planning a universal timekeeping system for the moon.

### **What is Timekeeping on the Moon?**

- **About:**
  - The Moon (the only natural Satellite of earth) has its own day and night cycle, which lasts about **29.5 Earth days**.
  - Currently, the time on the Moon is measured using **Universal Time Coordination (UTC)**, which is the same timekeeping system used on the Earth.
  - **'Coordinated Lunar Time' (LTC)** will be the unified time standard for the Moon.
    - To decide LTC, there will be a **need to place at least three atomic clocks on the lunar surface** that will tick at the Moon's natural pace, and whose output will be combined by an algorithm to generate a more accurate virtual timepiece.
- **Need of LTC:**
  - LTC will provide a **time-keeping benchmark** for lunar spacecraft and satellites that require extreme precision for their missions.
  - It will also **synchronise** the communication between satellites, astronauts, bases and the Earth.
  - Because the **Moon's day is much longer than Earth's day**, it would be difficult to use UTC for day-to-day activities on the Moon.
    - The **International Space Station**, being in low Earth orbit, will continue to use coordinated universal time (UTC).

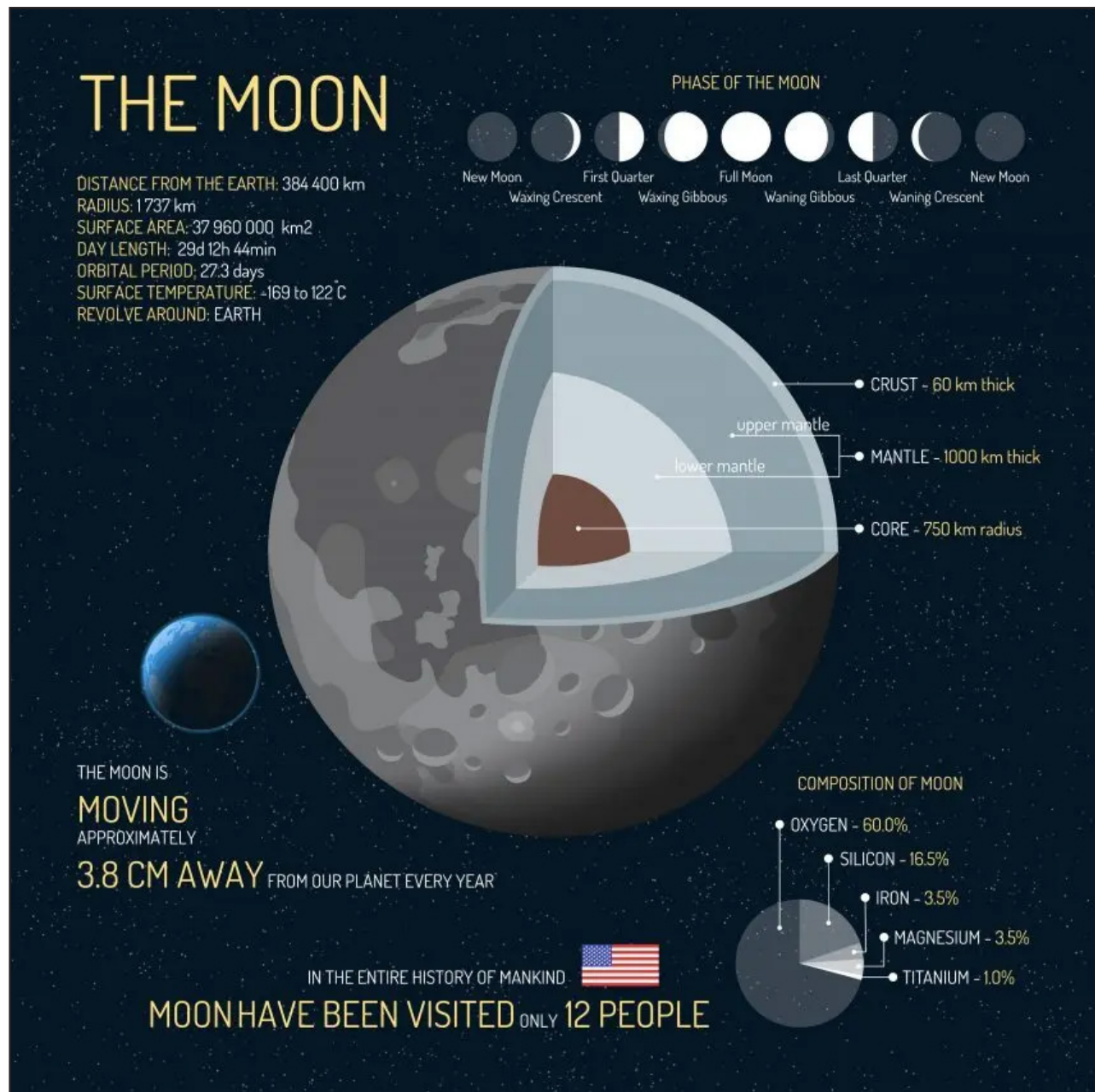
Note:



- Moon has a **lesser gravitational force than Earth**. Compared to Earth, **time on the Moon moves 58.7 microseconds quicker every day**.
  - An **atomic clock** on the moon will tick at a different rate than a clock on Earth.
- To address this issue, researchers have proposed creating a **lunar time zone** that would be based on the **Moon's day and night cycle**.
- This would make it easier for lunar settlers **to keep track of time and coordinate activities**.
- Having a lunar time zone would also make it **easier**

for researchers to conduct experiments and collect data on the Moon.

- It would also help **to prevent confusion and errors** that could arise from using different timekeeping systems on Earth and the Moon.
- **Challenges:**
  - Implementing a unified time standard for the Moon **requires extensive global cooperation and consensus on the scientific intricacies of timekeeping**.



Note:



### What is Universal Time Coordinated (UTC)?

- Universal Time Coordinated (UTC) is a **time standard** used to keep time consistent around the world.
- UTC is **based on International Atomic Time (TAI)**, which is maintained by **atomic clocks around the world**.
- It is the **primary time standard** used by many countries, international organisations, and scientific research institutions.
- UTC is **expressed as a 24-hour clock** and is used to indicate the time offset from Coordinated Universal Time (UTC+0).
- Time zones are defined as an **offset from UTC**, with some time zones being **ahead of UTC (UTC+1, UTC+2, etc.)** and others being **behind UTC (UTC-1, UTC-2, etc.)**.
- UTC is **adjusted periodically** to account for changes in the Earth's rotation, which can cause variations in the length of a day.
- These **adjustments are made by adding leap seconds** to UTC, which helps keep the time standard synchronised with the Earth's rotation.

### What are Atomic Clocks?

- An atomic clock, is a **clock, known for its exceptional accuracy**, and functions by utilising specific resonance frequencies of atoms, typically **cesium or rubidium**.
  - In atomic time, a **second is defined as the period in which a caesium atom vibrates 9,192,631,770 times**.
- It was **invented in 1955 by Louise Essen**.
- The extreme precision levels of the atomic clocks can be interpreted by the fact that they **will lose one second approximately every 100 million years**.
- Currently, atomic clocks in India are operational in Ahmedabad and Faridabad.

## India's Soil Erosion Crisis

### Why in News?

A recent study has shed light on the concerning state of **soil erosion** across India, revealing significant challenges and implications for **agricultural productivity** and environmental sustainability.

- The researchers employed the **Revised Universal Soil Loss Equation (RUSLE)** for pan-India soil erosion estimation. The equation considers factors like predicted crop loss, rainfall, soil erodibility, and land management practices.

### What are the Key Highlights of the Study?

- **30%** of India's landmass is experiencing "**minor**" soil erosion, **3%** facing "catastrophic" topsoil loss.
  - **Brahmaputra Valley** in Assam is identified as the country's biggest hotspot for soil erosion.
  - Odisha highlighted as another hotspot for "catastrophic" erosion due to anthropogenic interventions.
    - Catastrophic erosion is defined as **over 100 tonnes of soil lost per hectare annually**.

### What is the Status of Soil Erosion in India?

- **About:** **Soil erosion** refers to the process by which soil is moved or displaced from one location to another.
  - It can occur at varying rates depending on factors such as **climate, topography, vegetation cover, and human activities**.

### Factors Contributing Soil Erosion:

- **Natural Causes:**
  - **Wind:** Strong winds can pick up loose soil particles and carry them away, especially in dry areas with sparse vegetation.
  - **Water:** Heavy rainfall or fast-flowing water can detach and transport soil particles, particularly on **sloped land** or where there's little vegetation cover.
  - **Glaciers and Ice:** The movement of glaciers can scrape and transport massive amounts of soil, while **freezing and thawing cycles** can cause soil particles to break apart and become more susceptible to erosion.
- **Human-Induced Factors:**
  - **Deforestation:** Clearing forests removes trees and other vegetation that hold soil in place with their root networks.
    - This **exposes the soil to the full force of wind and rain**, making it more prone to erosion.
  - **Poor Agricultural Practices:** Conventional farming methods like **excessive tilling** can break down soil structure and leave it vulnerable to erosion.

Note:

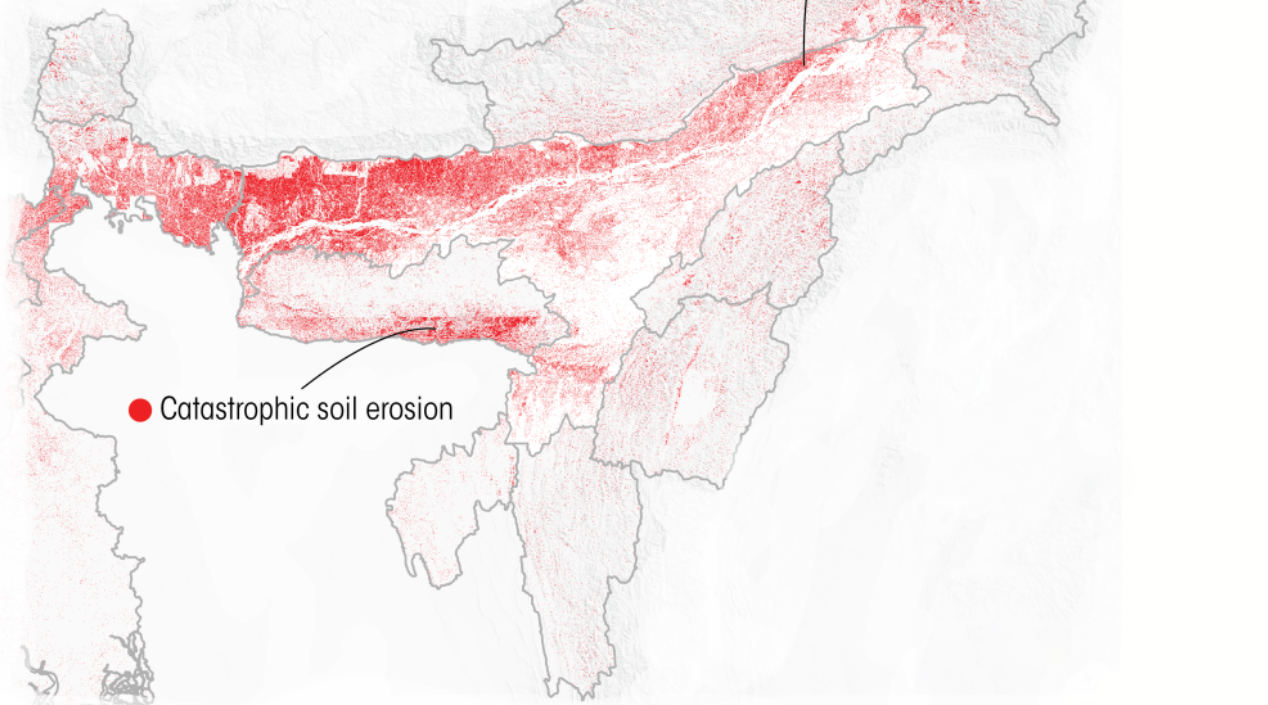
- Practices like **leaving fields bare during fallow periods** or using inadequate crop rotation also contribute to the problem.
- **Overgrazing:** When livestock graze an area too heavily, they can damage vegetation cover, leaving the soil exposed and susceptible to erosion.
- **Construction Activities:** Land clearing and excavation during construction projects disturb

the soil and make it more prone to erosion, especially if proper precautions are not taken.

- **Degraded Soil in India:** According to the **National Bureau of Soil Survey and Land Use Planning**, around 30% of the soil in India is degraded.
  - Of this, around **29% is lost to the sea, 61% is transferred** from one place to another, and **10% is deposited in reservoirs.**

## FACTSHEET: SOIL EROSION

In a first, a study conducted by a group of researchers, has come out with pan-India data on surface soil erosion. While soil erosion is a natural phenomenon, increase in land use and land cover — which can be attributed to anthropogenic intervention like deforestation and rigorous farming practice over the years — has led to large swathes of land exposed to water erosion. In a damning observation, a little over 3% of the total surface soil in India has reported 'catastrophic erosion' or where erosion has been over 100 tonnes per hectare per year. Assam — and in particular the Brahmaputra valley — being one of the major hotspots for erosion, has reported a whopping 31% of its total surface soil exposed to 'catastrophic erosion'.



Note:



drishti

### What are the Challenges Related to Soil Health in India?

- **Low Organic Carbon Content:** Indian soils typically have very **low organic carbon content**, which is crucial for fertility and water retention.
  - The soil organic carbon (SOC) content in Indian soils has declined from 1% to 0.3% in the past 70 years.
- **Nutrient Deficiencies:** A significant portion of Indian soils suffer from deficiencies in major nutrients like **nitrogen, phosphorus, and potassium**.
  - Over-reliance on chemical fertilisers exacerbate this problem.
- **Water Management Issues:** Both **water scarcity and improper irrigation practices** harm soil health. Insufficient water can lead to salinisation, while over-irrigation can cause waterlogging, both impacting soil fertility and structure.
  - Around 70% of irrigation water in India is wasted due to the poor management of the farmer.
- **Socioeconomic Factors:** **Land fragmentation** due to population pressures and economic constraints can make it difficult for farmers to adopt sustainable practices that improve soil health.
  - The average landholding size in India is **1-1.21 hectare**.

#### What are the Government's Initiatives Related to Soil Conservation?

- **Soil Health Management under National Mission for Sustainable Agriculture (NMSA):**
  - **Soil Health Card Scheme**
- **Paramparagat Krishi Vikas Yojana (PKVY):** By promoting organic farming, PKVY aims to reduce reliance on chemical fertilisers and pesticides thus allowing natural replenishment of soil nutrients and organic matter, leading to healthier soil.
- **Neem Coating of Urea:** Neem coating slows down the release of urea, making nitrogen available to plants for a longer period and reducing wastage.
  - This translates to less fertiliser needed and potentially improved soil health in the long run.
- **Nutrient Based Subsidy (NBS) Scheme:** This scheme focuses on subsidising essential nutrients (phosphorus and potassium) for plants, besides nitrogen from urea.
  - This encourages balanced fertiliser use, preventing excessive reliance on nitrogen, which can harm soil health over time.

### What Measures can be Adopted to Prevent Soil Erosion and Improve Soil Health?

- **Biochar and Biofertilizers:** Combining biochar application with biofertilizers can be a powerful strategy.
  - **Biochar holds nutrients and water**, while biofertilizers improve nutrient availability and soil health. This can reduce reliance on chemical fertilisers and enhance soil fertility.
    - Biochar is a charcoal-like substance produced by **pyrolysis (heating in absence of oxygen)** of organic materials like crop residues, manure, or weeds.
  - **Biofertilizers** are live microorganisms that can improve soil fertility and plant growth.
- **Drone Technology for Precision Agriculture:** **Namo Drone Didi Scheme** can be linked with soil conservation.
  - Drones equipped with multispectral sensors can map soil health parameters like **nutrient levels, organic matter content, and moisture levels across large fields**.
  - This data can be used for precision application of fertilisers and amendments, minimising waste and maximising effectiveness.
  - Drones can also be used for **targeted seeding and weed control**, further reducing soil disturbance.
- **Regenerative Agriculture Practices:** Integrating **no-till farming and using compost** can create a customised approach for different areas.
  - Additionally, exploring innovative cover cropping techniques like **multi-species cover cropping** can provide additional benefits like weed suppression and improved soil structure.

## Taiwan Earthquake and Pacific Ring of Fire

### Why in News?

A huge **earthquake** measuring **7.4 on the Richter Scale** struck Taiwan, making it one of the biggest Earthquakes in at least 25 years.

- Japan issued a tsunami alert for the **Ryukyu chain of islands which stretches from Taiwan** to its main 'home island' of Kyushu. The Ryukyu group includes the island of Okinawa, which has been home to large US military bases since **World War II** and the **Cold War**.

Note:





### What are the Causes of Such Earthquakes in Taiwan?

- Taiwan is prone to earthquakes as it lies along the **Pacific “Ring of Fire”** — where **90%** of the world’s earthquakes take place.
  - The Ring of Fire is the line of seismic faults encircling the Pacific Ocean where most of the world’s earthquakes occur.
- The area is particularly vulnerable to **temblors due to the tension accumulated from the interactions of two tectonic plates**, the Philippine Sea Plate and the Eurasian Plate, which may lead to sudden releases in the form of earthquakes.
- Taiwan’s mountainous landscape **can magnify the ground shaking, leading to landslides.**

# EARTHQUAKE

#### ABOUT

- Shaking of the earth, caused due to release of energy, generating seismic waves in all directions

#### EARTHQUAKE WAVES

- Body Waves:** Move in all directions travelling through the body of the earth
  - P Waves:** Move faster, First to arrive at surface, Similar to sound waves, Travel through gaseous, liquid and solid materials
  - S Waves:** Arrive at surface with some time lag, Travel only through solid materials
- Surface Waves:** Last to report on seismographs, More destructive, Cause displacement of rocks
  - Love Waves:** Same motion as S-waves (horizontal) without vertical displacement, Sideways motion perpendicular to the direction of propagation, Faster than Rayleigh waves
  - Rayleigh Waves:** Cause the ground to shake in an elliptical pattern, Spread out the most of all seismic waves, Move vertically and horizontally in a vertical plane

#### CAUSES OF EARTHQUAKES

- Release of energy along a **Fault/Fault Zones** (break in the crustal rocks)
- Movement of **tectonic plates (most common)**
- Volcanic eruption** (stress changes in rock-injection/withdrawal of magma)
- Human activities** (mining, explosion of chemical/nuclear devices etc.)

#### MEASURING EARTHQUAKE

- Seismometers** - Measures seismic waves
- Richter Scale** - Measures magnitude (energy released; range: 0-10)
- Mercalli** - Measures intensity (visible damage; range: 1-12)

#### DISTRIBUTION

- Circum-Pacific Belt** - 81% of earthquakes
- Alpine Earthquake Belt** - 17% of the largest earthquakes
- Mid-Atlantic Ridge** - Mostly submerged underwater

#### HYPOCENTER

- Location where the earthquake starts (below earth’s surface)

#### EPICENTER

- Location right above the Hypocenter (on the earth’s surface)

#### EARTHQUAKE IN INDIA

- India is **one of the highly earthquake affected countries** due to the presence of technically active mountains - the Himalayas.
- India has been divided into **4 seismic zones (II, III, IV, and V)**

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Note:



- Several such landslides occurred on Taiwan's eastern coast near the epicenter of when falling debris hit tunnels and highways, crushing vehicles and causing several deaths.

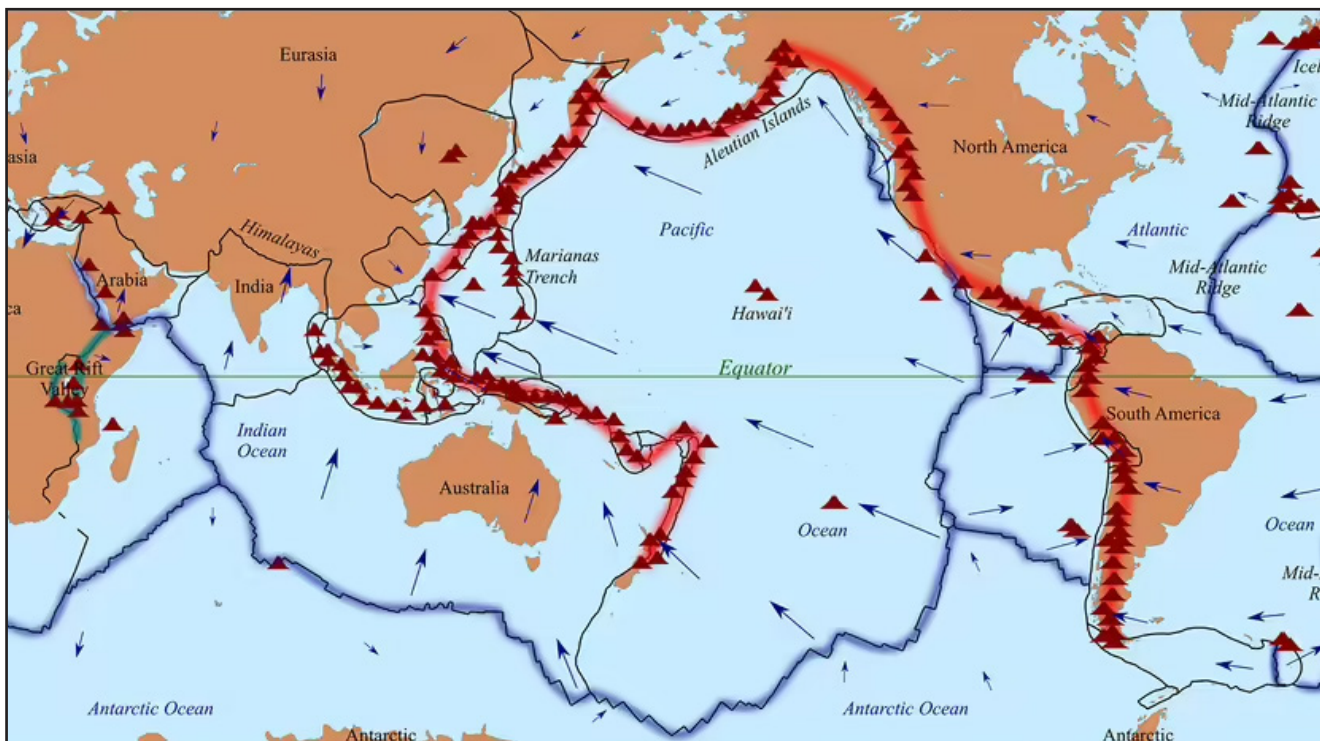
### What is the Pacific Ring of Fire?

#### ➤ About:

- Also called **the Pacific rim or the Circum-Pacific Belt**, is an area along the Pacific Ocean that is characterised by active volcanoes and frequent earthquakes.
- It is home to about **75% of the world's volcanoes** and about **90% of the world's earthquakes occur here**.

#### ➤ Geographical Stretch:

- The Ring of Fire is stretched to approximately 40,000 kilometres tracing boundaries between several tectonic plates including the **Pacific, Juan de Fuca, Cocos, Indian-Australian, Nazca, American, and Philippine Plates**.
- The chain runs up **along the western coast of South and North America**, crosses over the Aleutian Islands in Alaska, and runs down the eastern coast of Asia past New Zealand and into the northern coast of Antarctica.
- There are **several countries in the ring of fire like** Indonesia, New Zealand, Papa New Guinea, Philippines, Japan, United States, Chile, Canada, Guatemala, Russia, Peru, Solomon Islands, Mexico and Antarctica.



#### ➤ Causes of Volcanic Activity:

- Tectonic plates move towards each other **creating subduction zones**. One plate gets pushed down or is subducted by the other plate. This is a very slow process – a movement of just one or two inches per year.
- As this subduction happens, **rocks melt, become magma move to Earth's surface** and cause volcanic activity.

#### ➤ Recent Research:

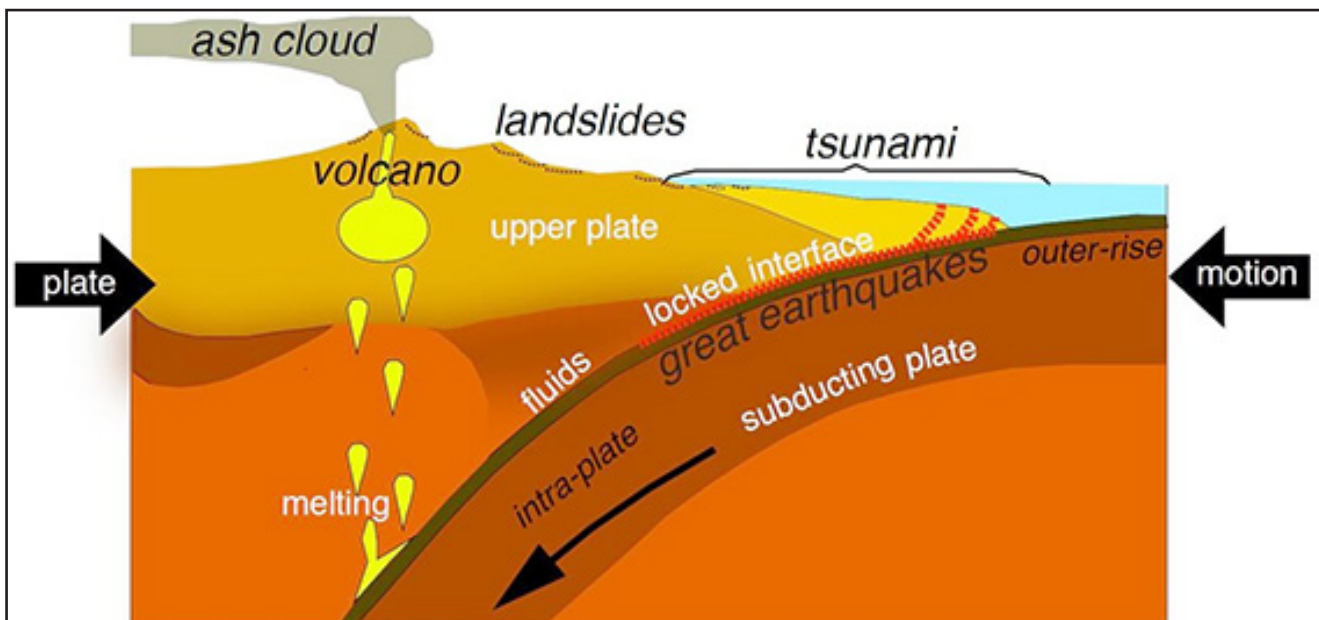
- The Pacific Plate, which drives much of the tectonic activity in the Ring of Fire, is cooling off.
  - The cooling process may alter the dynamics of plate boundaries, **affecting subduction zones and mountain-building processes**.
- Scientists have discovered that the **youngest parts of the Pacific Plate** (about 2 million years old) are **cooling off and contracting at a faster rate** than older parts of the plate (about 100 million years old).

Note:

- It could lead to **increased stress accumulation along plate boundaries** and may result in **more frequent and potentially stronger earthquakes**.
- The younger parts of the plate are found in its northern and western parts, the most active parts of the Ring of Fire.

#### What is Subduction?

- Subduction happens **when tectonic plates shift**, and one plate is pushed under another. This movement of the ocean floor produces a “mineral transmutation”, which leads to the melting and solidification of magma i.e., the formation of volcanoes.
  - In other words, when a “**downgoing**” oceanic plate is pushed into a **hotter mantle plate**, it heats up, volatile elements mix, and this produces the magma.
  - The magma then rises up through the overlying plate and spurts out at the surface.
- A subduction zone is the biggest crash scene on Earth. These boundaries mark the collision between two tectonic plates.
- When two tectonic plates meet at a subduction zone, one bends and slides underneath the other, curving down into the mantle, the hotter layer under the crust.



#### What is a Tsunami?

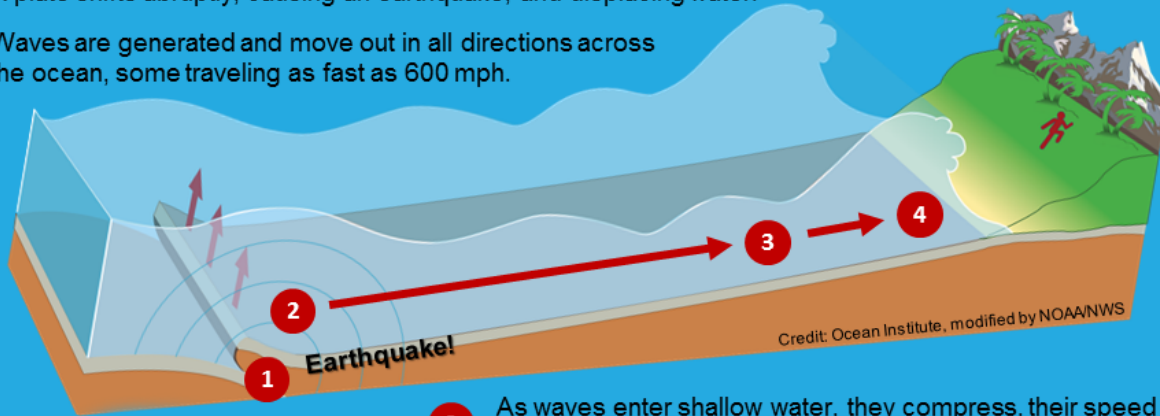
- Tsunami is a **Japanese term meaning a harbour wave**. It is also commonly known as killer waves.
- A Tsunami is not just a single wave **but a series of ocean waves** called a wave train caused by an underwater earthquake, by a volcanic eruption, landslide, rapid changes in atmospheric pressure, or a meteorite.
- However, tsunamis **caused by volcanic activity are less frequent**.
- Most tsunamis—about 80%—happen within the **Pacific Ocean’s “Ring of Fire,”** a geologically active area where tectonic shifts make volcanoes and earthquakes common.
- Tsunamis race across the sea at up to 800 kilometres an hour. At that pace, they can cross the entire expanse of the Pacific Ocean in less than a day.
- Since they are long wavelengths, they lose very little energy along the way.
  - **In December 2015**, the UN General Assembly designated **5<sup>th</sup> November as World Tsunami Awareness Day**.

Note:

# How a Tsunami Works

Most tsunamis are caused by large earthquakes below or near the ocean floor.

- 1 A plate shifts abruptly, causing an earthquake, and displacing water.
- 2 Waves are generated and move out in all directions across the ocean, some traveling as fast as 600 mph.



- 3 As waves enter shallow water, they compress, their speed slows, and they build in height.
- 4 The wave height increases, and associated currents intensify, becoming a threat to life and property.

## Total Solar Eclipse

### Why in News?

Recently, a total solar eclipse will cross **North America**, passing over **Mexico**, the **United States**, and **Canada**.

- **Royal Museums Greenwich** suggests that after a place on Earth experiences a total solar eclipse, it will take about **400 years** before that spot sees another one.

### What is a Solar Eclipse?

#### ➤ About

- A **solar eclipse** takes place when the **Moon** moves in the **middle of Earth** and the **Sun**.
- The Moon blocks the light of the Sun, either **fully or partially**, which casts a huge shadow on some parts of the world. The areas in the **centre of the Moon's shadow** at the time witnessed a **total solar eclipse**.
- The sky darkens and people who are in the path of a total solar eclipse can get a glimpse of the **Sun's corona**.

#### ➤ Types of Solar Eclipse:

- There are four different types of solar eclipses, including **total solar eclipse**, **annual solar eclipse**, **partial solar eclipse**, and **hybrid solar eclipse**.

#### ● Total Solar Eclipse:

- A **total solar eclipse** occurs when the **Moon** passes directly between the **Earth** and the **Sun**, blocking out the **Sun's entire disk** from view.
- This creates a **temporary darkness** known as totality in the areas where the eclipse is visible.
- During a total solar eclipse, the **Sun's corona**, or **outer atmosphere**, becomes visible, along with bright stars and planets in the sky.
  - ◆ It is a rare and often highly anticipated event.

#### ● Annual Solar Eclipse:

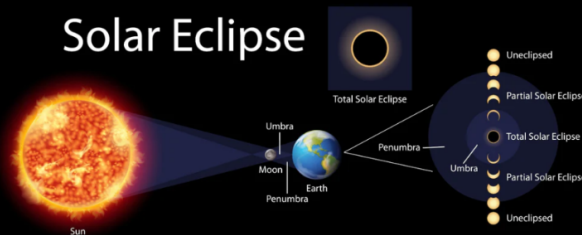
- An **annual solar eclipse**, also known as an **annular eclipse**, happens when the **Moon** passes directly between the **Earth** and the **Sun** but does not completely cover the **Sun's disk**.
- Instead, a **ring of sunlight** remains visible around **the edges of the Moon**, creating a "ring of fire" effect.
- Unlike a total solar eclipse, the Sun is not completely obscured during an annular eclipse.

Note:



# TYPES OF SOLAR ECLIPSE

A solar eclipse occurs when, at just the right moment, the Moon passes between the Sun and Earth.



## Total Solar Eclipse (TSE)

- ↳ The Moon completely covers the Sun but **corona can be witnessed**
- ↳ **Essential condition for TSE: Syzygy**
- ↳ No sunlight penetrates the umbra
- ↳ A TSE **occurs once every 1-2 years**; the longest timing recorded is 7.5 minutes



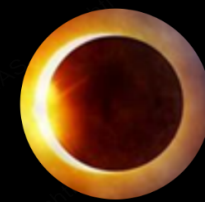
## Annular Solar Eclipse (ASE)

- ↳ **Moon near its farthest point** from Earth; Sun not fully covered by the moon
- ↳ Sunlight dims, but the sky does not go dark
- ↳ Sun's **corona not visible**
- ↳ **Essential condition for ASE: New Moon**
- ↳ Moon is at (or very near) a **lunar node**, so the Earth, the Moon, and the Sun are aligned in a straight (or nearly straight) line
- ↳ Sun looks like a ring (**annulus**) of light



## Partial Solar Eclipse (PSE)

- ↳ The Moon passes between the Sun and Earth, but **alignment is not perfect**
- ↳ Crescent shape as only a portion of the Sun is covered
- ↳ About 35% of all solar eclipses are PSEs



## Keywords Related to Solar Eclipse

- **Syzygy:** Linear alignment of three celestial objects
- **Bailey's Beads:** Appear around Moon's edge during totality, caused by sunlight passing through valleys and between mountains on the Moon's irregular surface
- **Shadow Bands:** Solar crescent in PSE acts as an anisotropic filter resulting in bands on the ground just before and immediately after totality
- **Diamond Ring Effect:** When the Sun is fully covered by the moon and a final bright spot of sunlight called the "diamond" remains visible in TSE
- **Apogee and Perigee:** Points in the moon's orbit farthest (Apogee) and nearest (Perigee) to the earth
- **Umbra and Penumbra:** 2 parts of Moon's shadow: central region (umbra) and outer region (penumbra)
- **Eclipse Magnitude:** Fraction of Sun's diameter covered by Moon
- **Saros Cycle:** A period of ~18 years, 11 days, and 8 hours during which the Sun, Earth, and Moon return to the same relative positions in the sky



- These events occur when the Moon is **near its farthest point from Earth** in its **elliptical orbit**, causing it to appear **smaller** and not fully cover the **Sun's disk**.
- **Partial Solar Eclipse:**
  - A **partial solar eclipse** occurs when the **Moon partially obscures** the Sun's disk as viewed from Earth.
  - During a partial solar eclipse, **only a portion of the Sun** is blocked by the Moon.
  - This creates a noticeable darkening or crescent shape on the Sun's disk, depending on the extent of the eclipse and the observer's location.
  - Partial solar eclipses are more common than **total or annular eclipses** and can be observed from a wider geographical area.
- **Hybrid Solar Eclipse:**
  - A **hybrid solar eclipse**, also known as an **annular-total eclipse**, is a rare type of eclipse that transitions between an **annular** and a **total solar eclipse** along its path.
  - In certain sections of the **eclipse path**, the **Moon's** apparent size is not large enough to completely cover the Sun's disk, resulting in an **annular eclipse**. However, along other portions of the path, the Moon is closer to Earth, and its apparent size is large enough to fully cover the Sun's disk, leading to a total eclipse.
  - As a result, observers situated along different parts of the eclipse path may experience either an **annular** or a **total solar eclipse**, while those positioned at specific locations along the path may witness a transition between the two types.

### ***How Frequently does a Solar Eclipse Occur?***

- A solar eclipse is witnessed only during the **new moon** when the **Moon and Sun** are aligned on the **same side of Earth**.
- A **new moon** occurs about **29.5 days** because that is how long it takes the **Moon to orbit Earth**.
- Solar eclipses typically happen only from **two to five times** per year. It is because the Moon does not orbit Earth in the same plane as the Earth orbits the Sun.

- The Moon is tilted by about **five degrees** with respect to **Earth**. As a result, most of the time when the Moon is in between the **Sun and Earth**, its shadow is either **too high or too low to fall on the Earth**.

### **Eclipse Magnitude:**

- Eclipse magnitude is the fraction of the **Sun's diameter** which is covered by the Moon.
- It is strictly a **ratio of diameters** and should not be confused with **eclipse obscuration**, which is a measure of the **Sun's surface area** covered by the Moon.
- Eclipse magnitude may be expressed as either a **percentage or a decimal fraction** (e.g., 50% or 0.50).
- By convention, its value is given at the instant of the greatest eclipse.

## **Magnetic Fossils in Bay of Bengal**

### ***Why in News?***

Recently, scientists have unearthed a **50,000-year-old sediment**, a massive **magneto fossil** found deep in the **Bay of Bengal**, marking one of the youngest discoveries of its kind.

- Scientists at **CSIR-National Institute of Oceanography**, used **magnetic analyses** and **electron microscopy** to study a sediment sample from the southwestern Bay of Bengal.

### ***What are the Key Findings of the Study?***

- **Monsoon Fluctuations:** Analysis of sediment samples indicated fluctuations in monsoon strength during the last **Glacial Maximum-Holocene period**, impacting weathering and sedimentation.
- **Optimal Conditions for Magnetic Fossil Growth:** The study suggests that **warming events are not necessary for giant magneto fossil formation**; instead, an optimal balance of **iron, organic carbon, and suboxic conditions** is crucial.
- **Information Encoded by Magnetofossils:** Magnetofossils encode information about **past environmental conditions, including nutrient availability, oxygen levels, and water stratification** in ancient aquatic environments.

Note:



- Rivers like **Godavari, Mahanadi, Ganga-Brahmaputra, Cauvery**, and **Penner**, discharging into the **Bay of Bengal**, contributed to magneto fossil formation by providing **nutrient-rich sediment** and reactive iron.

### What are Magento Fossils?

#### ➤ About:

- “**Magneto Fossils**” refer to fossilised remains of **magnetotactic bacteria** that contain magnetic minerals.
- **Magnetotactic bacteria** leave **fossilised magnetic particles** in geological records.

#### ➤ Magnetotactic Bacteria:

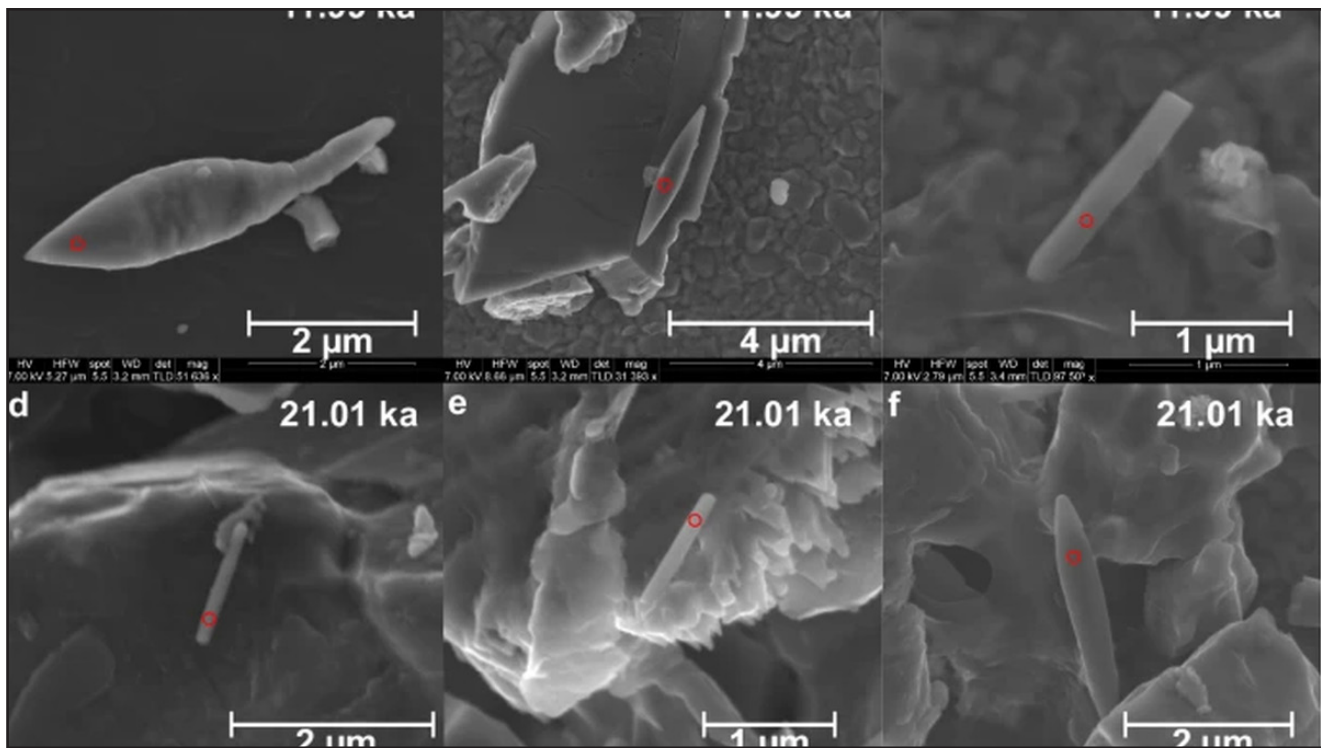
- Magnetotactic bacteria are mostly **prokaryotic organisms** that arrange themselves along the **earth’s magnetic field**. It was discovered by **Salvatore Bellini** in **1963**.
- These organisms follow the **magnetic field to reach places that had optimal oxygen concentration**. This process is facilitated by the presence of **iron-rich crystals** within their cells.
  - Magnetotactic bacteria create **tiny crystals of magnetite** or **greigite** within their cells to navigate **changing oxygen levels** and **sediment saturation** in water bodies.

- Crystals within magnetotactic bacteria are arranged in a **chain configuration** through **magnetotaxis**.

- Rare **giant magneto fossils** are **less common** than conventional magnetic fossils, these are likely produced by **eukaryotes** rather than bacteria.

#### ➤ Origin of Magnetofossils:

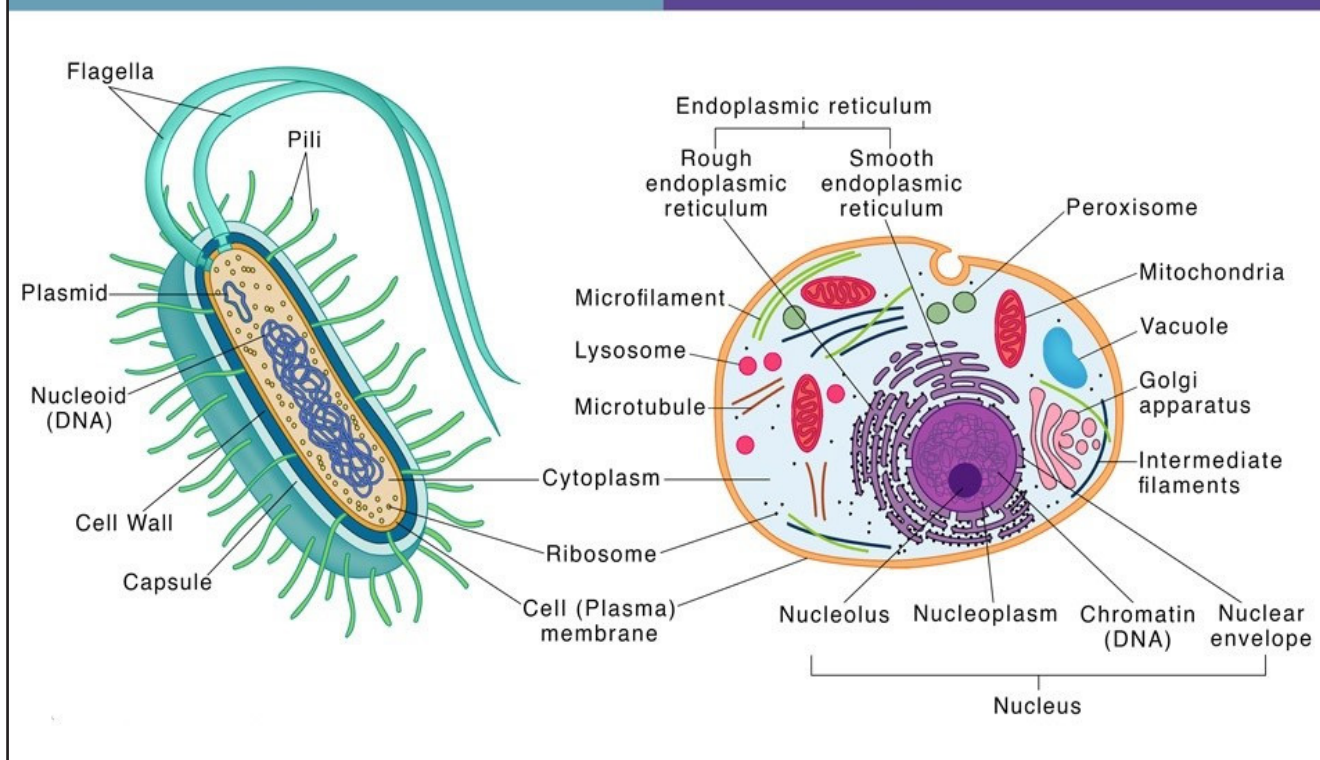
- Most giant magnetofossils have been found in sediments dating to two geological time periods — **Paleocen-Eocene Thermal Maximum (roughly 56,000 million years ago)** and **Middle Eocene Climatic Optimum (about 40 million years ago)** — both of which were **known for a rise in global temperature**.
  - It suggested that the magnetofossils formed only during periods of extreme warming.
- Discovery of giant magneto fossils from the Bay of Bengal were determined to be from the **late Quaternary period**, approximately **50,000 years ago**, making them the **youngest giant magneto fossils discovered to date**.
  - The present study challenges the assumption that the magnetofossils formed only during periods of extreme warming.



Note:

Prokaryotes	Eukaryotes
<ul style="list-style-type: none"> <li>➤ Prokaryotes are organisms that <b>lack a true nucleus</b> and <b>membrane-bound organelles</b>.</li> <li>○ Their <b>genetic material</b>, typically a <b>circular DNA molecule</b>, is present in the cytoplasm without being enclosed within a nuclear membrane.</li> <li>➤ Prokaryotes include <b>bacteria</b> and <b>archaea</b>.</li> <li>➤ Key features include <b>small, simple cells</b> without a <b>nucleus</b> or <b>organelles</b>.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Eukaryotes are organisms that have cells containing a <b>well-defined nucleus</b> enclosed within a membrane.</li> <li>○ Eukaryotic cells have a variety of membrane-bound organelles such as <b>mitochondria</b>, <b>endoplasmic reticulum</b>, <b>Golgi apparatus</b>, and a complex network of internal membranes.</li> <li>➤ Eukaryotes include all types of <b>animals</b>, <b>plants</b> and <b>fungi</b>.</li> <li>➤ Key features include large, complex cells with a nucleus and various organelles.</li> </ul>

## Prokaryotic Cells VS Eukaryotic Cells



### Kallakkadal

#### **Why in News?**

Recently, hundreds of houses have been flooded in several coastal areas of Kerala due to **high sea waves** named **Kallakkadal**.

- Lakshadweep and Tamil Nadu coast are other areas often affected by Kallakkadal.

#### **What is Kallakkadal?**

- **About:**
  - Kallakkadal refers to **coastal flooding** caused by **swell waves** during the **pre-monsoon** season (April-May) and sometimes during post monsoon along the southwest coast of India.
  - **The term Kallakkadal**, used by local fishermen, is a combination of two Malayalam words, including

Note:

**Kallan and Kadal.** “Kallan means **thief** and Kadal means **sea**, meaning “**ocean that arrives as a thief**.”

➤ **Causes:**

- It is caused by **waves formed by ocean swells**, which originate from distant storms such as **hurricanes** or prolonged periods of intense gale winds (**usually in the southern part of the Indian Ocean**).
- These storms **transfer significant energy from the air into the water**, resulting in the formation of extremely high waves.
  - These waves can travel vast distances from the storm center until they reach the shoreline.
- Kallakkadal **occurs without precursors or any kind of local wind activity** and as a result, it has been very difficult for the **coastal population** to get an advance warning.
- However, early warning systems like the **Swell Surge Forecast System** —launched by the **Indian National Centre for Ocean Information Services (INCOIS)** in 2020 gives forewarning seven days in advance.

#### Indian National Centre for Ocean Information Services (INCOIS)

- **INCOIS** is an **autonomous organisation** under the **Ministry of Earth Sciences (MoES)**.
  - It is located in **Hyderabad & was established in 1999**.
  - It is a unit of the **Earth System Science Organization (ESSO), New Delhi**.
- It is mandated to provide the best possible **ocean information and advisory services** to society, industry, government agencies and the scientific community through sustained ocean observations and constant improvement through systematic and focused research.

### **Why is Kallakkadal Different from Tsunami?**

- Kallakkadal came under the spotlight after the 2004 **tsunami** and is often mistaken for a tsunami. However, **a tsunami is a series of enormous waves** created by an underwater disturbance, usually associated with **earthquakes** occurring below or near the ocean.
  - Ocean waves (like Kallakkadal) have a wavelength of only 30 or 40 meters, **tsunamis have a very long wavelength** often hundreds of kilometers long.

## **Tropical Cyclones Need New Category**

### **Why in News?**

Recently, a study has been published in the journal *Proceedings of National Academy of Sciences*, where researchers have claimed that wind speed during a hurricane can cross 309 km/hour and therefore **wind scale must add a Category 6**.

### **What are the Key Highlights of the Study?**

- **Reconsideration of Saffir-Simpson (SS) Scale:**
  - There are concerns about the adequacy of the **Saffir-Simpson (SS) Hurricane Wind Scale**, which has been used for over 50 years to communicate hurricane risk based solely on wind speed.
    - There are **five categories on the SS hurricane wind scale** — **category 1 to category 5** — with category 5 wind speed **exceeding 252 km/hour**.
      - The combined effects of wind, storm surge, and rainfall in a category 5 impact would **completely raze any structure**.
  - The open-ended Category 5 may no longer be sufficient to communicate the **increasing risk of hurricane** damage in a warming climate.

Note:



Cyclones are classified into five different levels on the basis of wind speed. They are further divided into the following categories according to their capacity to cause damage:-

Cyclone Category	Wind Speed in Km/h	Damage Capacity
01	120-150	Minimal
02	150-180	Moderate
03	180-210	Extensive
04	210-250	Extreme
05	250 and above	Catastrophic

#### ➤ Introduction of Hypothetical Category 6:

- Due to **Global Warming**, there is now a need to **define a category 6 cyclone**.
  - The warming can be observed not only at the sea surface, but also in the depths of the ocean, which increases the heat content of the ocean and thus **favours the intensification of tropical cyclones**.
- To address the limitations of the existing scale the introduction of a hypothetical **Category 6** to the Saffir-Simpson Wind Scale is **proposed with the wind speed above 309 km/hour**.

#### ➤ Impact of Global Warming on Hurricane Intensification:

- Increased **greenhouse gas emissions** have caused the Earth to warm by about 1.10 degrees Celsius since pre-industrial times and caused **more intense tropical cyclones in the oceans**.
  - For every degree of warming, the **strongest cyclones are getting 12% stronger**, making them 40% more destructive.
- As the oceans warm, cyclones also strengthen faster and spend more lifetime over the oceans.
  - In 2023, **tropical cyclone Freddy spent 37 days over the oceans**, making it the longest-lived cyclones ever recorded.

#### ➤ Implications for Risk Messaging:

- The findings underscore the **importance of revising risk messaging** to better inform the public about the increased risk of major hurricanes due to global warming.
- SS Scale **does not address issues related to inland flooding** and storm surge, which are also critical components of hurricane risk.
- Therefore, changes in messaging beyond wind-based scales are necessary to adequately communicate the full spectrum of hurricane hazards.

#### Note:

- Once a tropical cyclone reaches maximum sustained winds of **119 km/hour** or higher, it is then classified as a **hurricane, typhoon, or tropical cyclone**, depending upon where the storm originates in the world.
  - In the North Atlantic, central North Pacific, and eastern North Pacific, the term hurricane is used.
- The **Western Pacific basin** is the **most active region for tropical cyclones** and accounts for **about a third of the world's tropical cyclones**.
- The North Indian basin accounts for **only about 4% of the global total**, although it is one of the **most vulnerable regions in the world** to the effects of such cyclones.

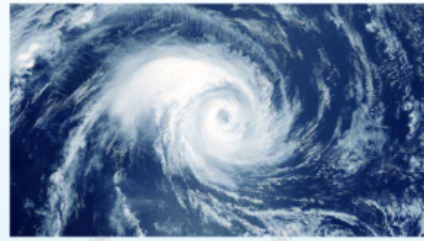
Note:

## What are Cyclones?

# CYCLONE



Cyclones are rapid **inward** air circulation around a **low-pressure** area.

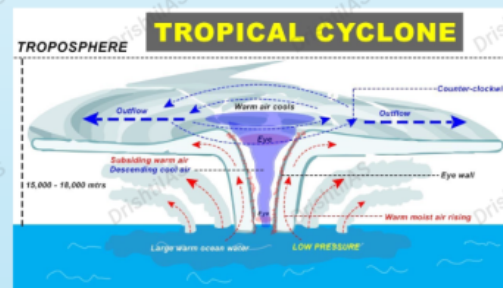


## Cyclone v/s Anticyclone

Pressure System	Pressure Condition at the Center	Pattern of Wind Direction	
		Northern Hemisphere	Southern Hemisphere
Cyclone	Low	Anticlockwise	Clockwise
Anticyclone	High	Clockwise	Anticlockwise

## Classification

- **Tropical Cyclones;** originate between the **Tropics of Capricorn and Cancer**
- **Extra Tropical/ Temperate Cyclones;** originate in the **Polar Regions**



### Conditions for Formation

- Large sea surface with temperature  $>27^{\circ}\text{C}$ .
- Presence of the **Coriolis force**
- Small **variations in the vertical wind speed**
- **A pre-existing weak low- pressure area**
- **Upper divergence** above the sea level system

### Different Names for Tropical Cyclones

- **Typhoons** - Southeast Asia and China
- **Hurricanes** - North Atlantic and eastern Pacific
- **Tornados** - West Africa and southern USA
- **Willy-willies** - Northwest Australia
- **Tropical Cyclones** - Southwest Pacific and Indian Ocean

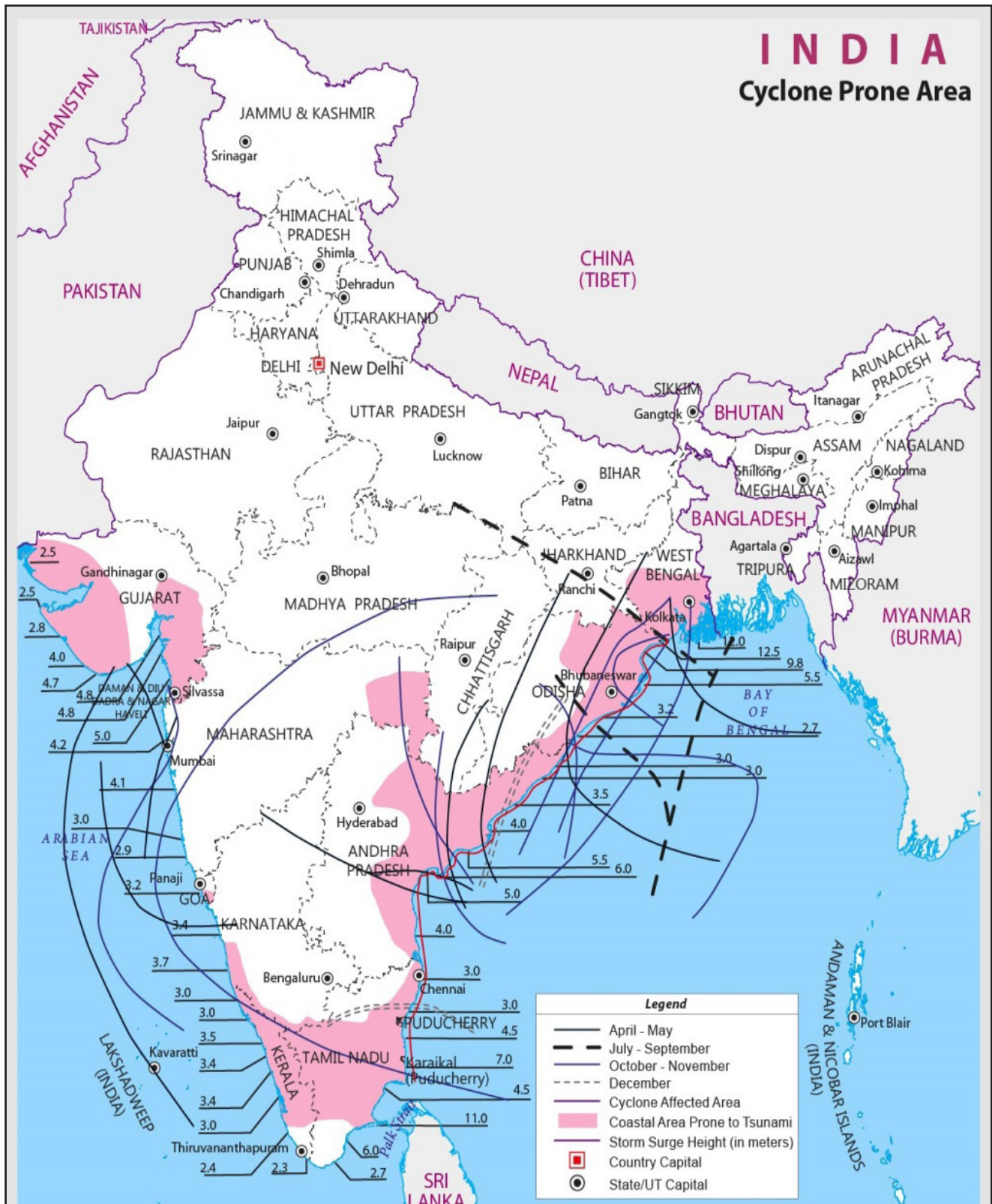
### Nomenclature

- Nodal Authority - **World Meteorological Organization (WMO)**
- Indian Ocean Region - **Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka and Thailand** contribute to naming cyclones that occur in this region.

### Cyclones in India

- **Bi-annual Cyclone Season** - March to May and October to December
- Recent Cyclones - **Tauktae, Vayu, Nisarga and Mekanu** (in Arabian Sea) and **Asani, Amphan, Fani, Nivar, Bulbul, Titli, Yaas and Sitrang** (in Bay of Bengal)

Note:



Note:



## Africa's Afar Triangle: Birthplace of a Potential New Ocean

### Why in News?

Recent geological findings suggest that **Africa's Afar Triangle** could be the birthplace of a new ocean in 5 to 10 million years.

- This phenomenon, unfolding amidst the rich and diverse landscapes of the African continent, offers a rare glimpse into the **dynamic processes that shape Earth's geography**.

### What is Africa's Afar Triangle?

- **About:** The **Afar Triangle**, nestled in the **Horn of Africa**, is a geological depression where three **tectonic plates**, the **Nubian, Somali, and Arabian plates** converge.
  - It is part of the **East African Rift system**, which extends from the Afar region down through eastern Africa.
  - Beyond its geological significance, the Afar Triangle holds a rich **paleontological history**, disclosing fossil specimens of some of the earliest **hominins**.
- **Tectonic Movement and Rift Expansion:** The Afar region has been experiencing gradual tectonic movements for millions of years.
  - The rift's expansion was notably highlighted in **2005** when a significant rift opened up in the **Ethiopian desert**, indicating the ongoing separation of the African continent at a tectonic level.
- **Factors Responsible for Rift's Expansion:**
  - One of the key factors driving the rifting process is believed to be a **massive plume of superheated rocks** rising from the mantle beneath East Africa.
    - This plume could be exerting pressure on the overlying crust, causing it to stretch and fracture.
  - Also, the magmatism in the region, particularly at the **Erta Ale volcano**, offers clues to the tectonic

transition, with characteristics that mimic those of a **mid-ocean ridge**.

- Magmatism is the formation and motion of magma below Earth's surface. It contributes to various phenomena on Earth, such as filling tectonic cracks, forming mountains, and aiding in the release of heat from the Earth's core.
- **Formation of Ocean:** This ongoing rift expansion in this region could potentially lead to the formation of a new ocean, tentatively named the **"Alvor-Teide Atlantic Rift"**.
  - This new body of water would be the result of the **Red Sea and the Gulf of Aden** flooding over the Afar region and into the East African Rift Valley.

### Key Terms

- **Tectonic Movement:** Tectonic movement refers to the large-scale motion of the Earth's lithosphere caused by the interactions of tectonic plates.
  - There are three main types boundaries formed due to tectonic movements: Divergent Boundaries, Convergent Boundaries and Transform Boundaries
- **Rifting:** Rifting refers to the geological process where the **Earth's Lithosphere (the outermost layer of the Earth)** is stretched and thinned, leading to the formation of rift valleys or basins.
  - This process As the plates move apart, tensional forces cause the lithosphere to crack and break, creating **rift zones**.
- **Mid-Oceanic Ridge:** A mid-oceanic ridge is a **long underwater mountain range** that forms along divergent boundaries between tectonic plates in the oceanic crust.
  - These ridges are characterised by volcanic activity and the upwelling of magma from the mantle, which solidifies to form a new oceanic crust.
  - Mid-oceanic ridges are key features of **seafloor spreading**, where new crust is continuously created as tectonic plates move apart.

Note:





# TECTONIC PLATES

## OR LITHOSPHERIC PLATES

### ABOUT

- ▶ Massive, irregularly-shaped slabs of solid rock (Crust + Top Mantle)
- ▶ In 1967, McKenzie, Parker and Morgan came out with the concept of Plate Tectonics

### TYPE

- ▶ Continental or Oceanic (whichever occupies the larger portion of plate)
- ▶ Pacific plate - Oceanic; Eurasian plate - Continental

### MAJOR AND MINOR PLATES



### THE INDIAN PLATE

- ▶ Includes - Peninsular India and the Australian continental portions
- ▶ East Extension - Rakim Yoma Mountains (Myanmar) to Java Trench
- ▶ West - Makrana coast of Balochistan (Pakistan)
- ▶ Rate of Movement - 54 mm/year in northeast direction
- ▶ Boundary b/w India and Antarctic plate - Marked by an oceanic ridge (divergent boundary)
- ▶ Formation of Himalayas - Collision of Indian and Eurasian plates

### PLATE MOVEMENT

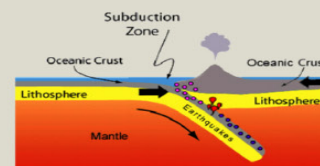
- ▶ Plates constantly move horizontally over the Asthenosphere
- ▶ Collision/driftng away of plates result in earthquakes/volcanic eruptions

Asthenosphere - a zone of Earth's mantle lying just beneath Lithosphere; believed to be much hotter and more fluid than Lithosphere

### SUBDUCTION

Occurs when tectonic plates shift and one is pushed under another

Downgoing ocean plate → Pushed into hotter Mantle plate → Heats up → Mixes volatile elements → Produces magma → Volcanic eruption



### BOUNDARIES OF PLATES

- ▶ **Convergent/Destructive**, where plates move into one another (subduction zones)
- ▶ **Divergent/Constructive**, where plates move apart (rift valleys)
- ▶ **Transform/Conservative**, where plates move sideways in relation to each other (creates faults)

# Miscellaneous

## Highlights

- 134<sup>th</sup> Dr. Ambedkar Jayanti
- Hurun Global Rich List, 2024

## 134<sup>th</sup> Dr. Ambedkar Jayanti



**Drishti IAS**

### Dr. Bhimrao Ramji Ambedkar



**Babasaheb Ambedkar-**  
The Father of Indian Constitution  
**14 April 1891- 06 December 1956**

- #### Brief Profile

  - A social reformer, jurist, economist, author and thinker of comparative religions
  - Labour member in the **Executive Council of Viceroy (1942)**
  - **Chairman** of the **Drafting Committee** for the new Constitution
  - **First Law Minister** of India
  - Posthumously awarded **Bharat Ratna (1990)**
- #### Contributions

  - Led the **Mahad Satyagraha in 1927** against Hindus
  - Participated in **all three Round Table Conferences**
  - Signed the **1932 Poona pact with Mahatma Gandhi** to abandon the idea of separate electorates for the depressed classes

*The reserved seats for depressed classes were increased from 71 to 147 in provincial legislatures and to 18% in the Central Legislature.*

  - **Opposed the special status of J&K (Article 370)**
  - Supported **Uniform Civil Code**
  - Referred **Article 32** as "**soul of the Constitution and very heart of it**"
- #### Resignation and Buddhism

  - Differences over **Hindu Code Bill** led to his resignation from Cabinet in **1951**
  - Converted to Buddhism; his death is observed as **Mahaparinirvan Diwas**
- #### Important Journals

• Mooknayak ( <b>1920</b> )	• Bahishkrit Bharat ( <b>1927</b> )
• Samatha ( <b>1929</b> )	• Janata ( <b>1930</b> )
- #### Books

  - Annihilation of Caste
  - Buddha or Karl Marx
  - **The Untouchable**: Who are They and Why They Have Become Untouchables
  - The Rise and Fall of Hindu Women
- #### Organisations

  - Estd. '**Bahishkrit Hitkarini Sabha**' (**1923**)
  - Founded **Independent Labour Party (1936)**
  - Founded **Scheduled Castes Federation (1942)**

Note:

### Why in News?

The 134<sup>th</sup> **Dr Ambedkar Jayanti** was celebrated on 14<sup>th</sup> April 2024, by the **Dr. Ambedkar Foundation (DAF)** on behalf of the Ministry of Social Justice & Empowerment.

- B.R. Ambedkar played a key role in drafting the **Constitution of independent India**. His lesser-known contribution to the **Hindu Code Bill**, aimed at reforming Hindu personal laws, is equally significant in understanding his vision for a more equitable society.

### What was the Hindu Code Bill?

- As the Law Minister in the newly formed government, Ambedkar embarked on drafting the **Hindu Code Bill in 1950**. It was Ambedkar's attempt to reform Hindu personal laws that would **codify and modernise Hindu law, giving greater rights to women**.
  - Before drafting the bill, Ambedkar appointed **Sanskrit scholars to translate important texts and shlokas**, ensuring the reforms were rooted in Hindu tradition.
- The bill faced strong resistance from within the Congress party and the opposition, leading Nehru to delay its passage.
- After Ambedkar resigned from the Cabinet, Nehru took over the initiative and championed four separate bills that encompassed the same content as the Hindu Code Bill.
  - These bills, namely the **Hindu Marriage Act (1955), Hindu Succession Act (1956), Hindu Minority and Guardianship Act (1956), and Hindu Adoptions and Maintenance Act (1956)** were enacted, realising Ambedkar's vision for Hindu reform.

#### Dr. Ambedkar Foundation (DAF)

- DAF was constituted to disseminate the message and ideologies of Babasaheb Dr. B.R. Ambedkar, aiming to further his visions and thoughts on a pan-Indian scale.
- Established in 1992, under the Ministry of Social Justice & Empowerment, DAF operates as an **autonomous body dedicated to preserving and propagating the legacy of Dr Ambedkar**.
- The **Dr Ambedkar National Memorial (DANM) museum** showcases the life, work, and contributions of Dr. B.R. Ambedkar through a collection of personal belongings, photographs, letters, and documents

## Hurun Global Rich List, 2024

### Why in News?

Recently, the Hurun Global Rich List, 2024 is released by the Hurun Research Institute. This is the 13<sup>th</sup> year of the ranking.

### What are the Key findings of Hurun Global Rich List, 2024?

- According to the **List**, Mumbai became the **fastest-growing billionaire capital** in the world with 92 billionaires, adding 26 since the previous year, taking it third in the world.
  - **Mumbai** has now **surpassed Beijing as Asia's billionaire capital**.
- India witnessed the addition of **94 new billionaires in 2023**, second only to the US, bringing the **total to 271 individuals** with a net worth of at least **USD 1 billion**.
  - The report indicates **India's growing economic prominence** in the recent past.
- Collectively, these **Indian billionaires possess wealth amounting to USD 1 trillion**, constituting 7% of the total global billionaire wealth, underscoring India's significant economic impact.
- The prominent industries among India's billionaires are **pharmaceuticals with 39 individuals, followed by automobile & auto components with 27, and chemicals with 24 individuals**.

#### World Inequality Lab Report 2022-23

- A recent working paper released by the **World Inequality Lab, a research organisation** based in Paris, provides estimates indicating that **economic inequality in India has surged significantly since the early 2000s**.
- Report titled "**Income and Wealth Inequality in India, 1922-2023: The Rise of the Billionaire Raj**" states that the **current inequality** in the country **surpasses that of the British Raj era**.
- The **shares of income and wealth of India's top 1%** at **22.6%** and **40.1%** respectively, at their highest historical levels in 2022-23.
- The richest 1% in India have **more income than those in South Africa, Brazil, and the US**. The **average wealth of India's richest 1% is Rs 5.4 crore, which is 40 times higher than the country's average income level**.

Note:

## THE TOP 10

Name	Wealth*	Country	No. of Billionaires
Elon Musk	<b>231</b> (47%)	China	<b>814</b> (-155)
Jeff Bezos	<b>185</b> (57%)	USA	<b>800</b> (109)
Bernard Arnault	<b>175</b> (-13%)	India	<b>271</b> (94)
Mark Zuckerberg	<b>158</b> (132%)	UK	<b>146</b> (12)
Larry Ellison	<b>144</b> (44%)	Germany	<b>140</b> (-4)
Warren Buffett	<b>144</b> (24%)	Switzerland	<b>106</b> (6)
Steve Ballmer	<b>143</b> (41%)	Russia	<b>76</b> (6)
Bill Gates	<b>138</b> (26%)	Italy	<b>69</b> (11)
Larry Page	<b>123</b> (64%)	France	<b>68</b> (-4)
Mukesh Ambani	<b>115</b> (40%)	Brazil	<b>64</b> (13)

\* In USD billion

Change in ( )

## WHERE THE RICH LIVE

City	Billionaires	City	Billionaires
1. New York	119 (14)	6. Shenzhen	84 (-10)
2. London	97 (10)	7. Hong Kong	65 (-12)
<b>3. Mumbai</b>	<b>92 (26)</b>	8. Moscow	59 (2)
4. Beijing	91 (-18)	<b>9. New Delhi</b>	<b>57 (18)</b>
5. Shanghai	87 (-16)	10. San Francisco	52 (-2)

Change Y-o-Y in ( )



Note:



# Rapid Fire Current Affairs

## Highlights

- Piezoelectric Bone Conduction Hearing Implants
- Venomous Jellyfish
- Cryogenics
- Artificial Reefs to be installed in Mumbai
- India Gains Sittwe Port Access
- Dispelling Myths Around Bats in Kerala
- Gravity Hole
- Plankton Crash
- God Particle or Higgs Boson
- India's Achievements in QS World University Rankings
- KABIL & CSIR-IMMT Sign Critical Minerals MoU
- Homoeopathy
- "Mother of Dragons" Comet
- ICGS Samudra Paheredar's ASEAN Deployment
- AUKUS Alliance to Expand Membership
- Political Contribution by Newly Incorporated Firms
- Change in Global Accounting Rule
- Important Terminology in AI
- India's Household Debt and Savings Crisis
- Parivartan Chintan: A Tri-Service Conference
- Punnett Square
- Mining Threatens African Great Apes
- Zaporizhzhia Nuclear Power Plant
- Invasive Chital Population in A&N Islands
- Yoga Mahotsav
- Suvidha Portal
- India's Agni Prime Missile
- Project Akashteer
- SKOCH ESG Award 2024
- First Tri-service Common Defense Station in Mumbai
- Restrictions on Pilgrims Visiting Ahobilam Shrine
- S.A.R.A.H
- Artificial Sun
- Shallow Fakes 143
- Anti-Dumping Probe
- Nepal Moves to Ratify BIMSTEC Charter
- Raising Day of Army Medical Corps
- Manufacturing Purchasing Managers' Index
- FSSAI Directives to E-commerce Food Business Operators
- Resourcefulness of Konda Reddi's Tribe's Knowledge
- Negative Leap Second
- Tornado
- India's First Commercial Crude Oil Storage
- Bima Sugam
- CCI Approves Acquisition of Shares Under the Large Value Fund (LVF) Scheme
- Space science and Technology Awareness Training (START) 2024
- Price-to-Earnings Ratio and Hockey-Stick Effect
- Havana Syndrome
- Successful Test Firing of Vikram-1 Stage-2
- Defence Exports Touch Record High
- Ketamine
- Tripura's Matabari Pera and Pachra Receive GI Tag
- cVIGIL: Empowering Electoral Oversight
- Closing Ceremony of International Year of Millets

## Piezoelectric Bone Conduction Hearing Implants

Command Hospital Pune has achieved a significant milestone by successfully performing two **piezoelectric bone conduction hearing implants**, marking the **first instance of such procedures in a government hospital in India**.

- The piezoelectric bone conduction hearing implant system is an expensive implantable medical device designed for patients with hearing impairments, including those with conductive loss (such as **aural atresia**), mixed hearing loss, and **single-sided deafness (SSD)**.
  - **Aural atresia** is a congenital condition that affects the development of the ear, specifically the ear canal.

Note:

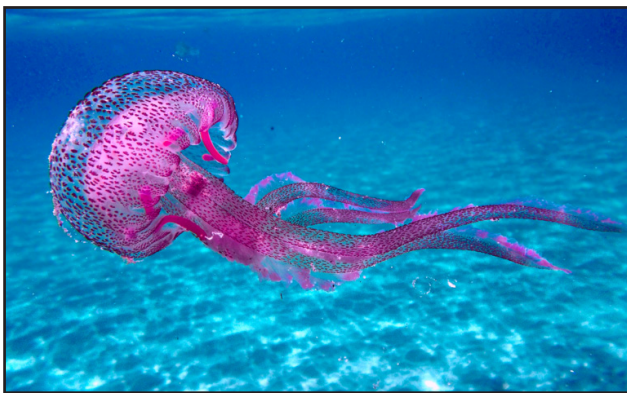
- In individuals with aural atresia, the ear canal fails to form properly or is completely absent, leading to significant hearing impairment or deafness in the affected ear.
- Single-sided deafness is a condition in which an individual experiences complete or near-complete hearing loss in one ear, while the other ear has normal or near-normal hearing.
- **Piezoelectricity** is a property of certain materials that induces an electric current when mechanically stressed.

Read more: [Piezoelectric Effect](#), [Empowering Persons with Disabilities](#)

## Venomous Jellyfish

Recently, a bloom of venomous jellyfish was reported across the Visakhapatnam coast.

- The species, *Pelagia noctiluca*, also known as the **mauve stinger or purple-striped jellyfish**, has a painful sting and causes different degrees of illnesses such as diarrhoea, extreme pain, vomiting and anaphylactic shock and can be **life-threatening**.
- It is a **purple-coloured translucent species** resembling a floating balloon.
- It is found worldwide in **tropical and warm-temperature seas**.
- Unlike other jellyfish species, it has stingers not just on the tentacles, but on the bell too.
- These are **bioluminescent**, having an ability to produce light in the dark.
- A **jellyfish bloom** is when the population of the species increases dramatically within a short period of time, usually due to a higher reproduction rate. It occurs frequently as a result of **rising ocean temperatures**.
- These have in the past been known to have caused massive damage to the fishing industry and impacted tourism.



Read more: [505-Million Year Old Jellyfish Fossils](#)

## Cryogenics

Cryogenics is defined as the science of materials at temperatures below negative 153 degrees Celsius. It deals with extremely **low temperatures where common gases like hydrogen, nitrogen, and air become liquid**.

- **Cryogenics**, typically uses **helium and nitrogen as the cryogenic fluid**, the thing that cools a substance.
  - **Nitrogen** has a boiling point of **negative 196 degrees C** and **helium** has a **negative 269 degrees C**. Below these temperatures **they are liquid**.
  - **These liquids** need to be stored in **vacuum flasks** or they could **leak and damage their surroundings**.

### Use of Cryogenics:

- For example, hydrogen is one of the best rocket fuels but it can only be used as a liquid, so it needs to be cryogenically cooled.
- Cryogenic hydrogen and cryogenic oxygen power the **third stage of ISRO's LVM-3 rocket**.
- **Magnetic resonance imaging (MRI)** devices used in medical diagnostics use **cryogenic fluids to cool their magnets**.



Read more: [3D Printed Cryogenic Engine and Space Sector Privatisation](#)

## Artificial Reefs to be installed in Mumbai

India's second-ever installation of **artificial reefs** (after Pondicherry) to boost marine life is being deployed near Worli Koliwada, Mumbai.

Note:

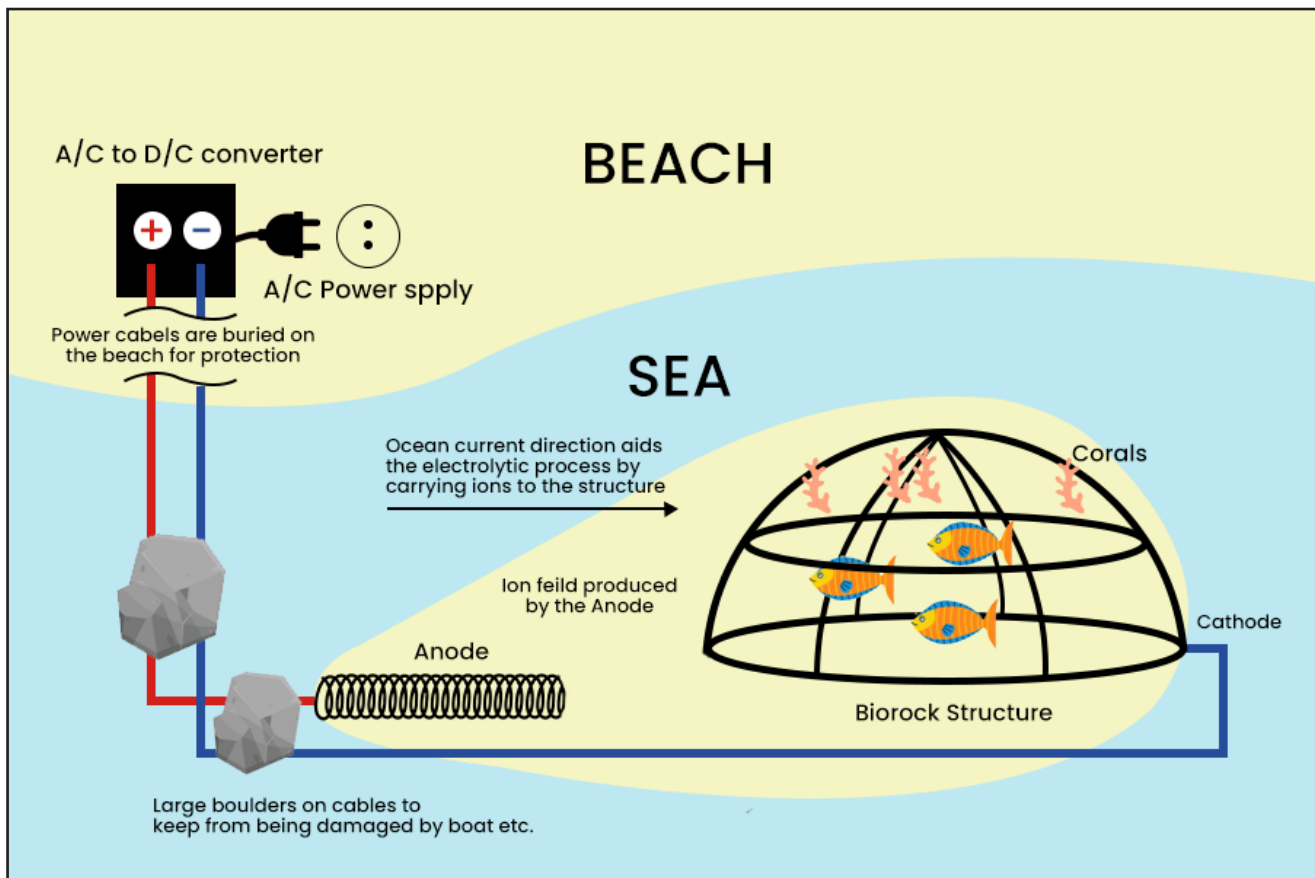
- **210 reef units** made from **recycled concrete and steel** are installed 500 meters offshore, and it will take 3 months to show initial signs of a thriving ecosystem.

### Artificial Reefs:

- These are structures built by humans through **biorock technology** and **placed on the seabed** in freshwater or saltwater environments.
  - **Biorock technology** was invented by **Wolf Hilbertz**. In this technology, a **low electrical current** is passed

through the water using electrodes placed near a steel structure.

- This current acts like a **magnet, attracting dissolved minerals**, particularly calcium and carbonate ions, forming a **calcium carbonate (CaCO<sub>3</sub>) layer** similar to natural coral reefs.
- These reefs offer **crucial hard surfaces** to which **algae, barnacles, corals, and oysters** can firmly attach themselves.
- These reefs will create **habitats for fish, absorb carbon dioxide**, and **benefit local fishing communities**.



Read More: [Coral reefs](#), [Biorock technology](#)

## India Gains Sittwe Port Access

Recently, the **Ministry of External Affairs (MEA)** has approved a proposal for **India Ports Global Ltd (IPGL)** to take over the operations of the entire **Sittwe port** located on the **Kaladan River, Myanmar**. It will be **India's 2<sup>nd</sup> overseas port** after **Chabahar Port**.

- **IPGL** is a company **100% owned** by the **Ministry of Ports, Shipping and Waterways**.

### Sittwe Port:

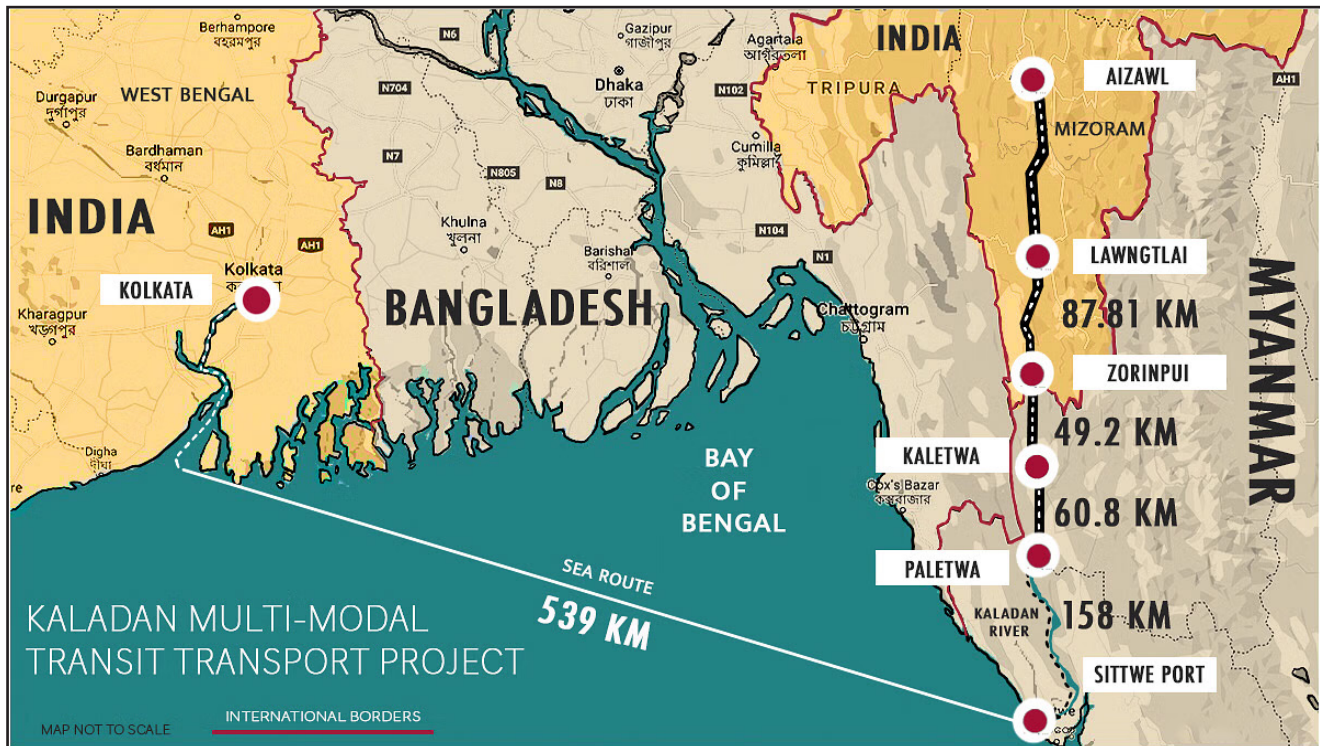
- The **Sittwe Port**, located in the **Rakhine State of Myanmar**, is a crucial component of the **Kaladan multi-modal transit transport project**.
- The **deep-water port** offers a significant connectivity advantage for cargo to reach from **Vizag and Kolkata to the Northeastern states**, bypassing Bangladesh.

Note:



- It will also reduce dependency on the Siliguri Corridor (or the chicken's neck) squeezed between Bhutan and Bangladesh.
- India's operational control over these 2 overseas

ports, Chabahar and Sittwe, will strengthen India's maritime influence to counter [China's String of Pearls policy](#) with ports like Hambantota in Sri Lanka, Djibouti in Africa, etc.



Read more: [India-Myanmar Ties: Fencing The Free Movement, India-Bangladesh Relations](#)

## Dispelling Myths Around Bats in Kerala

Recently, researchers from Kerala have training programs on bat taxonomy, acoustics, and biogeography.

- **Myth, superstition, and zoonotic diseases** such as [Covid-19](#) and the [Nipah virus](#) infection, have created a negative impression of bats.
- The project aims to address the challenges posed by emerging **zoonotic diseases** and the ongoing threats faced by **bat populations, including habitat loss and the cutting down of fruit bat roosts.**
- Researchers in Kerala are **also supporting the ongoing National Bat Monitoring Programme**, which has been running since 1996.
- It gives us the information needed to help **bat conservation.**

### Bats:

- India is home to 135 bat species. Bats are **nocturnal animals.**
- Bats normally **feed on fruits, helping in pollination by seed dispersal** but also cause agricultural losses and hence are regarded as **vermin.**
- The **population of bats** has declined worldwide due to **poaching, meat consumption, use in traditional medicines, climate change, environmental pollution, and biological invasions.**

Read more: [Invasive Alien Species](#)

## Gravity Hole

For a long time, geologists have been puzzled by the mystery of the "Gravity Hole" in the Indian Ocean.

- The **Earth's shape and gravity** are not uniform across its surface. Instead, it is slightly **flattened at the poles and wider at the equator** giving rise to the phenomenon of **gravity anomaly.**

Note:



- Moreover, the **gravitational force varies** depending on the **mass distribution** of the crust, mantle, and core below each location. The gravity hole in the Indian Ocean is one such example.
- The 'Gravity Hole,' officially known as the **Indian Ocean geoid low**, is a huge depression in the sea level that is

about **106 metres lower** than the global average and covers about **1.2 million square miles** area.

- It originates from the southern tip of India and was first noted by **Dutch geophysicist Felix Andries Vening Meinesz** in **1948**.

## TAKING A DEEP LOOK

**What is a Geoid** | The earth's surface is not a perfect ellipsoid but is more like an irregular shaped potato. Therefore, **scientists use an imaginary sea level shape called 'geoid' which has highs and lows from place to place.** The Indian Ocean exhibits the **largest drop** in the world, a depression of around **106 metres**

**What is a tectonic plate** | The **earth's outer shell is broken into massive pieces** of rock which are **around 100kms thick.** **Called tectonic plates,** they float over an underlying thick layer of hot, molten magma

Read More: [Gravitational Waves](#)

### Plankton Crash

Recently, the **National Green Tribunal (NGT)** panel has attributed the cause of the **sea turning red** in Puducherry to the phenomenon of the **plankton crash**.

- **Ruling out algal bloom and contamination** due to effluents, the NGT panel suggested that there was a **high iron concentration**, which favoured plankton bloom.
- A significant portion of a specific **unicellular phytoplankton species, *Noctiluca scintillans***, was responsible for the **discharge of red pigment** into the water.

- The **environmental parameters** such as sea surface temperature, water salinity, pH, and dissolved oxygen were conducive to the phytoplankton crash.

#### Algal Bloom:

- An **algal bloom** can be defined as a **rapid increase in the population of algae** in an aquatic ecosystem.
- It is usually recognised by the **discolouration** on the surface of the water due to the introduction of a nutrient (such as **nitrogen or phosphorus**) into an aquatic ecosystem.

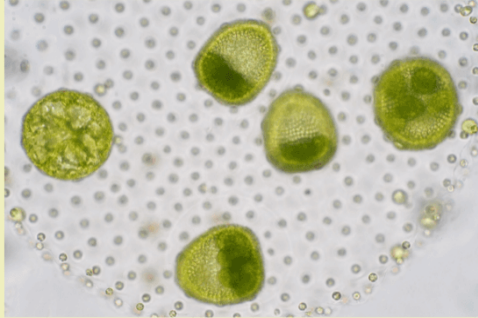
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## What Is Plankton?

Plankton consists of organisms that drift with tides and currents.

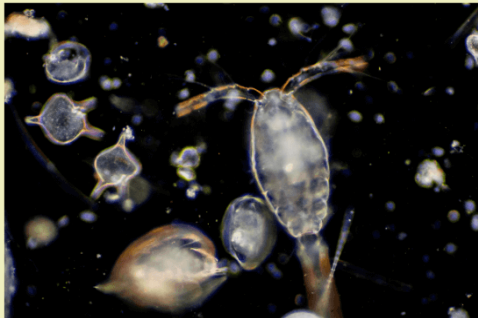
### Phytoplankton

Photosynthetic plants, algae, and cyanobacteria



### Zooplankton

Animals, such as krill, protozoa, larvae, and jellyfish



sciencenotes.org

Read More: [Harmful Algal Bloom](#), [National Green Tribunal \(NGT\)](#)

## God Particle or Higgs Boson

The recent passing of [Nobel laureate](#) physicist Peter Higgs has brought attention back to the elusive particle he theorised in the 1960s, known as the 'God particle' or Higgs boson.

- The Higgs boson, an elementary particle akin to **electrons or quarks, plays a crucial role in imparting mass** to other fundamental particles.
- Peter Higgs, first proposed the existence of the **Higgs field and the associated Higgs boson in the 1960s**.
  - The Higgs boson is the quantum excitation of the Higgs field, which is believed to permeate the entire universe and interact with other particles, **giving them mass**.
  - The discovery of the Higgs boson completed what is known as the **Standard Model of Particle**

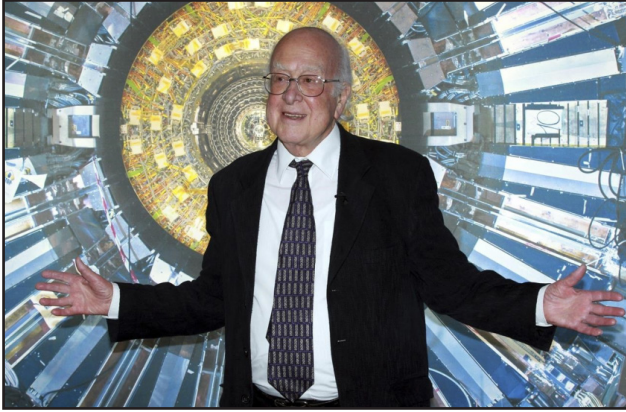
**Physics**, which describes all the fundamental particles (electrons and protons, and the forces, like electromagnetism, gravitation or nuclear forces, that build up the material part of the world).

- According to the Standard Model of Particle Physics, particles gain their mass by interacting with the Higgs field, which is present throughout the universe.
- The stronger a particle interacts with the Higgs field, the more it "feels" the field and the more massive it becomes.
- The Higgs boson was experimentally discovered in **2012 at the Large Hadron Collider (LHC) at CERN** (*Conseil Européen pour la Recherche Nucléaire*), the European Organization for Nuclear Research.

Note:



drishti



Read more: [Nobel Prize in Physics 2023](#)

## India's Achievements in QS World University Rankings

India's higher education and research landscape has shown significant progress in the **2024 QS World University Rankings by subject**, reflecting the country's growing presence in the global academic community.

- **IIM-Ahmedabad, IIM-Bangalore, and IIM-Calcutta ranked among the top 50** institutions globally for business and management studies.
- **Jawaharlal Nehru University achieved the 20<sup>th</sup> position globally** for development studies, making it the **highest-ranked university in India**.
- The Saveetha Institute of Medical and Technical Sciences in Chennai secured the 24<sup>th</sup> position globally for dentistry studies.
- **India emerged as one of the world's most rapidly expanding research centres**, showing a 54% surge in research output from 2017 to 2022.
  - **India ranks 4<sup>th</sup> in research volume globally**, trailing behind China, the US, and the UK, but ranks 9<sup>th</sup> for research impact.
- In the broader **Asian context, India ranks 2<sup>nd</sup> for the number of universities featured** and holds the 4<sup>th</sup> position in the total number of ranked entries.
- India faces challenges in securing citations in premier global journals, with only 15% of its research cited in top-tier journals between 2017 and 2021.

Read more: [QS World Ranking 2024](#)

## KABIL & CSIR-IMMT Sign Critical Minerals MoU

Khanij Bidesh India Limited (KABIL) and the **Council of Scientific and Industrial Research - Institute of Minerals and Materials Technology (CSIR-IMMT)** signed a Memorandum of Understanding (MoU) for Technical & Knowledge cooperation in **Critical Minerals**.

- The agreement facilitates joint research activities and scientific information exchange between KABIL and CSIR-IMMT.
- KABIL is a joint venture company formed in 2019 by National Aluminium Company Ltd. (NALCO), Hindustan Copper Ltd. (HCL), and Mineral Exploration Company Ltd. (MECL).
  - The company's goal is to **identify, acquire, develop, process, and use strategic minerals from overseas locations to supply India**.
- CSIR-IMMT was established in 1964 as Regional Research Laboratory, Bhubaneswar, under the aegis of the CSIR, New Delhi.
  - The institute conducts basic research and technology programs to address R&D problems in the mining, mineral, and metals industries.
  - Its main thrust is to empower Indian industries with advanced process know-how and consultancy services for sustainable development.

Read more: [Critical Minerals' Conundrum](#)

## Homoeopathy

Recently, the President of India inaugurated a two-day **Homoeopathy Symposium**, organised by the **Central Council for Research in Homoeopathy** on the occasion of the **World Homoeopathy Day**.

- Theme of the Symposium is: 'Empowering Research, Enhancing Proficiency' is very relevant.
- Homeopathy is a system of medicine which is based on the concept that the **body has an inherent ability to heal itself**, and the role of the homoeopathic remedy is to stimulate this self-healing process.
  - Practitioners of homoeopathy believe that diluting the substance to extremely small amounts enhances its healing properties while reducing any potential side effects.

Note:



- The **World Homoeopathy Day** is observed every year on 10<sup>th</sup> April to commemorate the Birth Anniversary of **Dr. Hahnemann**, the Founder of Homoeopathy.
  - **Theme 2024:** Homeoparivar: One Health, One Family.

## AYUSH Systems of Medicine

AYUSH encompasses Ayurveda, Yoga & Naturopathy, Unani, Siddha, Sowa Rigpa, and Homeopathy, with Ayurveda having a documented history of 5000+ years.

### Ayurveda

- ⊙ **Samhita Period (1000 BC):** Emerged as mature medical system
  - ⊕ **Charaka Samhita:** Oldest and most authoritative text
  - ⊕ **Sushruta Samhita:** Gives fundamental principles and therapeutic methods in eight specialties
- ⊙ **Main Schools:**
  - ⊕ **Punarvasu Atreya** - School of physicians
  - ⊕ **Divodasa Dhanvantari** - School of surgeons

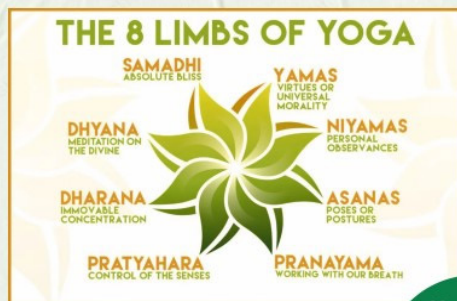
Lord Brahma is believed to be the 1<sup>st</sup> proponent of Ayurveda

### Branches of Ayurveda:

- |  |  |
|--|--|
| ■ Kayachikitsa (internal medicine)                       | ■ Agada Tantra (toxicology)                      |
| ■ Shalya Tantra (surgery)                                | ■ Bhootavidya (psychiatry)                       |
| ■ Shalakyata Tantra (disease of supra-clavicular origin) | ■ Rasayana Tantra (rejuvenation and geriatrics)  |
| ■ Kaumarabhritya (paediatrics)                           | ■ Vajikarana (eugenics & science of aphrodisiac) |



### Yoga & Naturopathy



- ⊙ **Naturopathy:** Healing with help of 5 natural elements - Earth, Water, Air, Fire and Ether
  - ⊕ Based on theories of self-healing capacity of body and principles of healthy living
  - ⊕ Encourages a **person-centred approach** rather than disease-centred

Yoga first propounded by Maharishi Patanjali in systematic form Yogsutra

### Unani

- ⊙ **Pioneered in Greece, developed by Arabs as 7 principles (Umoor-e-Tabbiya)**
  - ⊕ Based on the framework of teachings of **Buqrat** (Hippocrates) and **Jalinoos** (Galen)
    - ⊕ Hippocratic theory of **four humors** viz. blood, phlegm, yellow bile, and black bile
  - ⊕ **Recognised by WHO** and granted official status by India as an alternative health system

### Siddha

- ⊙ **Dates back to 10000 – 4000 BC; Siddhar Agasthiyar - Father of Siddha Medicine**
  - ⊕ Preventive, promotive, curative, rejuvenative, and rehabilitative health care
  - ⊕ **4 Components:** Latro-chemistry, Medical practice, Yogic practice & Wisdom
  - ⊕ Diagnosis based on 3 humors (**Mukkuttram**) and 8 vital tests (**Ennvagai Thervu**)
- ⊙ **Sowa Rigpa**
  - ⊕ **Origin: Lord Buddha in India before 2500 years**
  - ⊕ Traditional medicine in Himalayan regions of Ladakh, Himachal Pradesh, Arunachal Pradesh, etc.
  - ⊕ Recognised in India by Indian Medicine Central Council Act, 1970 (As amended in 2010)

### Homeopathy

- ⊙ **German physician Dr. Christian F. S. Hahnemann codified its fundamental principles**
  - ⊕ Medicines prepared mainly from natural substances (plant products, minerals, animal sources)
  - ⊕ Brought in India by European missionaries - 1810; official recognition - 1948
  - ⊕ **3 Key Principles:**
    - ⊕ **Similia Similibus Curentur** (let likes be cured by likes)
    - ⊕ Single Medicine
    - ⊕ Minimum Dose



Read more: [Synchronising AYUSH and Modern Medicine](#)

Note:



## “Mother of Dragons” Comet

The celestial phenomenon known as the “**Mother of Dragons**” comet, formally designated as **Comet 12P/Pons-Brooks**, is currently undergoing a rare sighting in the skies of the Northern Hemisphere.

- It was **first discovered** in the **early 19th century** and is known for its **distinctive green glow**. This hue is due to the **presence of diatomic carbon molecules** within the comet.
- It stands out for its **volcanic activity**. Unlike most comets, it erupts, **shooting ice and dust from its core**. These outbursts make the **comet brighter** and

easier to see from Earth, earning it the nickname “**Mother of Dragons**.”

- It is a **Halley-type comet**, meaning it has a **relatively short orbital period** compared to other comets, and it completes a single orbit around the sun in just **over seven decades**. The **last time** it passed by **Earth was in 1954**, and the next time will be during the mid-2090s.
- It falls into the category of **Jupiter-family comets**, indicating that its trajectory is affected by the gravitational force of Jupiter.
- It’s **periodic nature** provides insights into the **dynamics of comets and the evolution of our solar system**.

## What is a....?

### Comet

A comet is a mass of ice, rock, and dust, and often has a tail that is made up of dust and other materials.



### Asteroid

An asteroid is made up of metallic or non-metallic rocks, and orbits the sun. They can range in size from a few centimeters wide to almost a thousand kilometers across!



### Meteoroid

Meteoroids are usually fragments of asteroids or comets, often smaller than 1 meter wide, that fly through space.



### Meteor

A meteor is a meteoroid that enters Earth’s atmosphere. It burns up as it travels through the atmosphere, producing a streak of light behind it.



### Meteorite

If a meteor doesn’t completely burn up in the Earth’s atmosphere, the fragment found on Earth is called a meteorite.



Read More- [Hubble Space Telescope, Comets, National Aeronautics and Space Administration \(NASA\)](#)

Note:



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## ICGS Samudra Paheredar's ASEAN Deployment

The **Indian Coast Guard's** Pollution Control Vessel (PCV) Samudra Paheredar recently made a significant port call at **Muara, Brunei**, as part of its ongoing overseas deployment to **ASEAN** countries.

- This deployment is part of the **India ASEAN Initiative for Marine Pollution**, announced by the government in 2022.
- This deployment not only strengthens bilateral relationships but also aligns with India's maritime vision of **SAGAR, Act East Policy, and Indo-Pacific Vision**, emphasizing shared concerns for marine pollution and maritime security.



Read more: [India's Maritime Security Paradigm](#)

## AUKUS Alliance to Expand Membership

The **AUKUS alliance**, comprising **Australia, the United Kingdom, and the United States**, is set to enter discussions for expanding its membership.

- AUKUS is a trilateral partnership that aims to **strengthen security and defence interests through enhanced cooperation**.
- AUKUS will involve deeper **information and technology**

sharing, as well as integration of security and defence-related science, technology, industrial bases, and supply chains.

- The alliance was formed in 2021 to counter **China's influence in the Indo-Pacific region**.
- **India is not a member of the group**. However, India and the AUKUS bloc have engaged in informal talks on **emerging technologies**, although no formal dialogue has occurred yet.

Read more: [India and the AUKUS Grouping](#)

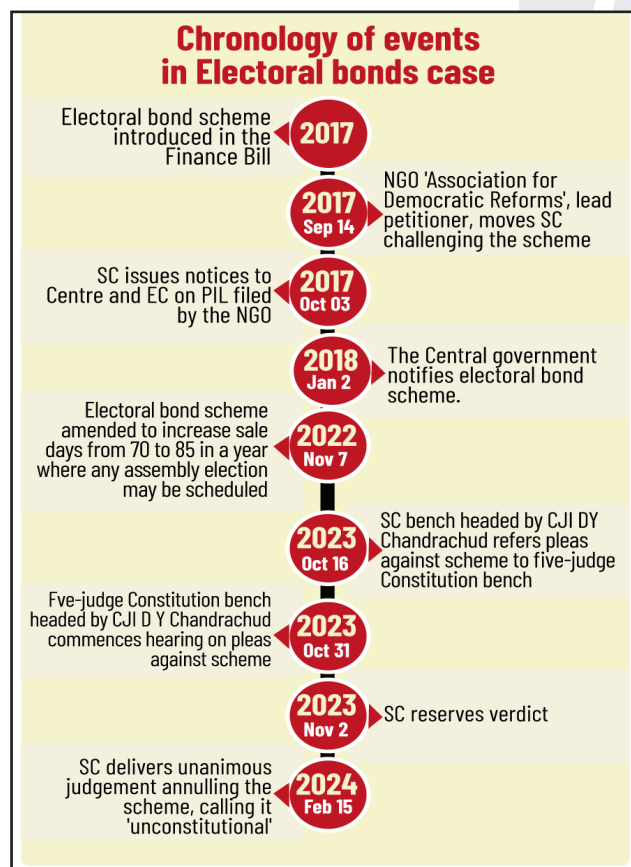
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## Political Contribution by Newly Incorporated Firms

Despite regulations prohibiting companies less than three years old from making political contributions, recent data reveals startling purchases of **electoral bonds** by newly established firms in India.

- The **Companies Act 2013** prohibits companies less than three years old from making political contributions, aiming to prevent **shell companies** from contributing funds into political parties.
  - The 2017 amendment removed the cap on contributions **but retained the three-year prohibition**.
- **Section 182 of the Companies Act 2013** outlines penalties for contravention, including fines and imprisonment for officers.



Read more: [SC Strikes Down Electoral Bonds Scheme](#)

## Change in Global Accounting Rule

Recently the **International Accounting Standards Board (IASB)** published new requirements under which Companies will have to publish standardised operating profit figures from 2027.

- Currently, before arriving at a net profit or loss, many companies report **earnings before interest, taxes, depreciation, and amortisation or EBITDA**.
  - This figure is not defined under IASB rules and therefore can be compiled in different ways to flatter performance.
- **International Accounting Standards Board (IASB):**
  - The IASB, established in 2001 under the oversight of the **International Financial Reporting Standard Foundation** that develops and approves **International Financial Reporting Standards** to create a global accounting language for financial reporting, mandated by over 140 jurisdictions.
- **Earnings Before Interest, Taxes, Depreciation, and Amortisation (EBITDA):**
  - EBITDA is a **financial metric** that evaluates a company's **operating performance** by excluding the effects of financing and accounting decisions, allowing a focus on **core operational profitability**.

Read more: [Indian Accounting Standards](#)

## Important Terminology in AI

Recently the few terms related to the field of **artificial intelligence (AI)** and computer science, are in the news in the context of emerging issues in the field of Information technology.

- **Data Dredging:**
  - It is a **statistical manipulation method** to find patterns in data, seemingly appearing to be significant but having no underlying effect in reality – resulting in **misleading conclusions**.
- **Air Gap:**
  - In **cyber security**, air gap refers to a **network security** measure of isolating computers or networks from **external connections**, including the internet.
  - Air gaps are typically **employed in high-risk scenarios**, like classified defence systems, to

Note:



safeguard data from damage, unauthorised access, and manipulation in cases of system failure or intrusion.

➤ **Mixture of Experts:**

- It is a **machine learning approach** to training by splitting tasks into sub-problems and assigning 'expert' models to handle each of them.
- Each expert model predicts the sub-tasks which are then combined to generate the final output.

➤ **OTA Update:**

- Over-the-air (OTA) updates are the **delivery of new software** or firmware features and updates via an internet connection.
- OTA updates provide enhancements to the operating system, system apps on **read-only partitions**, and time zone rules wirelessly, enabling **automatic or manual installation**.

Read more: [Cyber Security](#)

## India's Household Debt and Savings Crisis

India's economic landscape has witnessed a concerning trend with **household debt levels soaring to a historic high of 40% of GDP** by December 2023, while net financial savings moved to an alarming low of around **5% of GDP**.

- The report forecasts that the trend of low net financial savings is likely to persist, with household debt fueled by **personal loans, agricultural loans, and business loans** continuing its ascent.
- This financial strain, coupled with **declining Gross Domestic Savings**, paints a grim picture of India's economic stability and underscores the urgent need for comprehensive policy measures to address this mounting crisis.

Read more: [Household Consumption Expenditure Survey 2022-23](#)

## Parivartan Chintan: A Tri-Service Conference

**Parivartan Chintan**, an upcoming **Tri-Service Conference** aimed at generating new and fresh ideas, initiatives, and reforms to propel Jointness and Integration efforts, is being held in New Delhi on 8<sup>th</sup> April 2024.

- It was chaired by **Chief of Defence Staff**, General Anil Chauhan.
- It is the **first-ever conference** of the Heads of all Tri-Service Institutions.

### Chief of Defence Staff (CDS)

➤ **Background**

- The post of CDS was created in 2019 on the recommendations of a committee of defence experts headed by **Lt General DB Shekatkar**.
- **General Bipin Rawat** was the **first CDS** in the country.

➤ **Key Roles and Responsibilities**

- His core function is to **foster operational synergy** among Indian military branches.
- Acts as Head Department of Military Affairs in the Ministry of Defence.
- **Single-point military adviser** to the Defence Minister.
- **Advisory role** in Nuclear Command Authority.

Read More: [Chief of Defence Staff, India's Military Convergence](#)

## Punnett Square

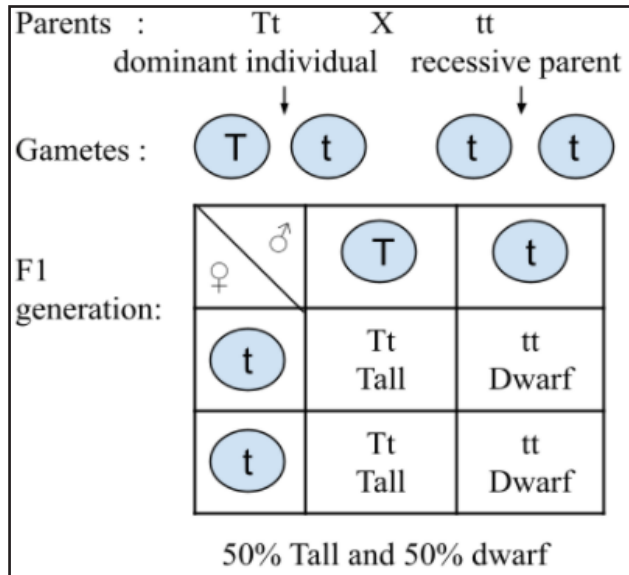
Punnett Squares are commonly used in biology to understand inheritance patterns.

- It is a square diagram that is used to **predict the genotypes** of a particular cross-breeding experiment.
- It is named after **Reginald C. Punnett**, who devised the approach in 1905.
- It is commonly used in biology to **understand inheritance patterns**, such as dominant and recessive genes.

Note:



- Researchers utilise **Punnett squares alongside Mendelian inheritance principles** to study genetic traits in offspring, including those of animals and humans.



Read more: [Genome Editing](#)

## Mining Threatens African Great Apes

A recent study published in the journal Science Advances has highlighted the grave threat posed by **mining** to the **great ape population in Africa**.

- The study indicates that more than a **third of the entire great ape population in Africa, nearly 180,000 individuals**, faces direct or indirect threats from mining activities.
- Approximately **20% of critical habitats intersect with mining areas**. Countries such as Liberia, Sierra Leone, Mali, and Guinea show significant overlaps between great ape habitats and mining sites.
- **Bonobo (*Pan paniscus*); Chimpanzee (*Pan troglodytes*); Eastern Gorilla (*Gorilla beringei*); Western Gorilla (*Gorilla gorilla*), and **orangutans (*Pongo*)** are referred to as great apes due to their large size and humanlike features. Great apes are a **taxonomic family of primates classified as Hominidae**.**
- According to the **IUCN Red List**, all great ape species are listed as **Endangered or Critically Endangered**.



Read more: [India's Only Ape Species: The Hoolock Gibbon](#)

## Zaporizhzhia Nuclear Power Plant

The Zaporizhzhia nuclear power plant (NPP) faced a drone strike amid the ongoing conflict between **Ukraine and Russia**.

- Russia, in control of the facility, accused Ukraine of launching the attacks.
- The Zaporizhzhya NPP is located near **Energodar in south-eastern Ukraine**, it ranks as **the largest NPP in Europe**. The facility is owned and operated by Energoatom, Ukraine's state-owned nuclear energy generating company.
- The **International Atomic Energy Agency (IAEA)**, the global nuclear watchdog, provides technical assistance to the plant and conducts inspections to ensure compliance with international safety standards.



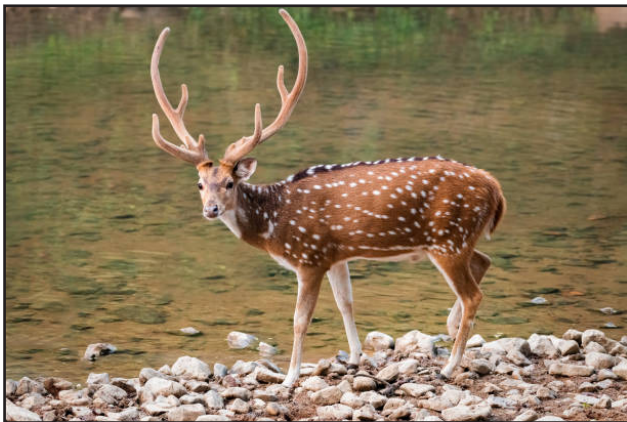
Read more: [A Strategic Roadmap for Nuclear Energy Expansion](#)

Note:

## Invasive Chital Population in A&N Islands

The chital (*Axis axis*) population on Bose Island, Andaman and Nicobar Islands has exceeded the ecosystem's carrying capacity, prompting the Andaman and Nicobar Forest Department to consider relocating around 500 deer to a Biological Park in Port Blair.

- It was brought to the Andaman and Nicobar Islands for hunting in the early 1900s by the British.
  - Recent studies indicate that the invasive chital species is negatively impacting local flora and fauna, necessitating strategic management measures.
- Under the [Wildlife Protection Act, 1972](#), an [Chief Wildlife Warden](#) can permit translocation for the purpose of scientific management.
  - The law mandates that such translocation should cause minimum trauma to animals.
- The chital, also known as the spotted deer or axis deer, is a graceful and elegant herbivore native to the grasslands and forests of India and Sri Lanka.
  - They prefer open grasslands, savannas, and lightly forested areas.
  - [IUCN Red list](#): Least Concern
  - [WLPA 1972](#): Schedule II.



Read more: [Wildlife Protection Act, 1972](#)

## Yoga Mahotsav

Recently, the 'Yoga Mahotsav' was held in celebration of the 75-day countdown to the International Day of Yoga in Pune.

- The participants performed **Common Yoga Protocol (CYP)** in complete rhythm and harmony with a

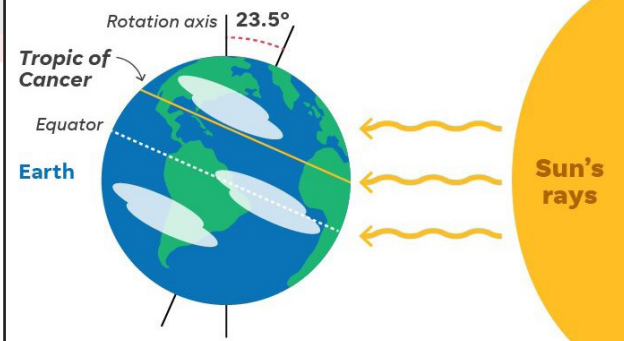
mesmerising outcome. It was organised by the **Ministry of Ayush, Govt. of India**.

### International Day of Yoga:

- The United Nations declared **21<sup>st</sup> June** as the [International Day of Yoga](#) in 2014.
- The date of **21<sup>st</sup> June** was suggested as it is the **longest day of the year** in the **Northern Hemisphere** having special significance in many parts of the world.
- The **first International Yoga Day** celebration was organised at Rajpath in New Delhi on 21<sup>st</sup> June **2015**.
- **Yoga** is an ancient physical, mental, and spiritual practice that **originated in India**.
- The word '**yoga**' is **derived from Sanskrit** and means to join or to unite, symbolising the union of body and consciousness.
- The [World Health Organization \(WHO\)](#) mentions yoga as a means to improve health in its **Global Action Plan on Physical Activity 2018–2030**.

### June 21 has the most daylight

Friday, June 21, at 11:54 a.m. EDT is the summer solstice, the moment the sun is directly over the Tropic of Cancer, an imaginary line that circles the globe. This marks the beginning of astronomical summer in the Northern Hemisphere.



Read More- [International Day of Yoga](#), [World Health Organization \(WHO\)](#)

## Suvidha Portal

The **Suvidha portal** is a technological solution developed by the [Election Commission of India \(ECI\)](#) to ensure a level playing field upholding the **democratic principles** of free, fair, and transparent elections.

- The Suvidha Portal aims to **streamline requests** for permissions and facilities from [political parties](#) and **candidates** during [elections](#), transparently **prioritising requests** based on the **First in First Out principle**.

Note:



- It caters to permissions for organising rallies, opening temporary party offices, door-to-door canvassing, video vans, helicopters, obtaining vehicle permits, and distributing pamphlets.
- Political parties and candidates can easily **request permission online** through the Suvidha portal, which also offers **offline options** for **inclusivity**, supported by a robust **IT platform managed by nodal officers** for efficient processing.
- Additionally, **Suvidha's companion app** allows applicants to track their requests' real-time status, enhancing **convenience and transparency**.

Read more: [SVEEP](#)

## India's Agni Prime Missile

The new generation ballistic missile **Agni-Prime** was successfully flight-tested from the Dr APJ Abdul Kalam Island off the coast of Odisha.

- It was conducted jointly by the **Strategic Forces Command (SFC) and Defence Research and Development Organisation (DRDO)**.
- The launch aligns with India's strategic goals, as part of its **'Mission Divyastra'** program, further solidifying its position among nations with formidable strategic capabilities.
- **Agni Prime is a nuclear-capable new-generation advanced variant** of the Agni class of missiles. It is a **two-stage canister missile** with a maximum range of 1,000 to 2,000 km.
  - It is lighter than all the earlier Agni series of missiles.
  - It is equipped with the **Multiple Independently Targetable Re-entry Vehicle (MIRV) technology**.

Read more: [Agni-Prime](#), [Multiple Independently Targetable Re-entry Vehicle \(MIRV\) Technology](#)

## Project Akashteer

The Indian Army has initiated the implementation of control and reporting systems as part of **'Project Akashteer'**, a strategic move aimed at bolstering its air defence capabilities.

- Developed by **Bharat Electronics Limited (BEL)**, the project is aimed at significantly enhancing the operational efficiency and integration of the Army's air defence mechanisms.
  - BEL is a **Navratna PSU** under the Ministry of Defence.
- The Akashteer Project stands as a pioneering effort to **automate air defence control** and reporting processes through digitisation, promising a streamlined approach to complex operations.

Read more: [Very Short-Range Air Defence System](#)

## SKOCH ESG Award 2024

REC Limited won the SKOCH ESG Award 2024 for 'Renewable Energy Financing'.

- REC (formerly Rural Electrification Corporation Limited) is a **'Maharatna'** Central Public Sector Enterprise under the **Ministry of Power**, and is registered with the **RBI** as a **Non-Banking Finance Company (NBFC)**, and **Infrastructure Financing Company (IFC)**.
  - REC funds both power and non-power **infrastructure**, encompassing a wide range from **generation to transportation and communication projects**, along with sectors including renewables, electric vehicles, and green technologies.
- The SKOCH ESG Awards **recognise** organisations demonstrating outstanding performance in **Environmental, Social, and Governance (ESG)** practices.
  - The **Award and Assessment** are a crucial **benchmark** for assessing organisations' dedication to **India 2047** by emphasising the link between **sustainable investments** and processes for a **sustainable business future**.
    - **SKOCH Group** is a prominent **Indian think tank** established in 1997, that specialises in **socio-economic issues** engaging with a wide range of entities from **Fortune 500 companies** to **community-based organizations**.

Read more: [SKOCH Awards](#), [REC Limited's Commitment to Armed Forces Welfare](#)

Note:



## First Tri-service Common Defense Station in Mumbai

The **Armed Forces** are embarking on a significant initiative to transform Mumbai into India's inaugural **tri-service common defence station**, marking a crucial step towards achieving jointness among the **Army, Navy, and Air Force**.

- This strategic move aims to consolidate all facilities and resources of the three services, encompassing logistics, infrastructure, repair and maintenance, and supplies, under a unified leadership framework.
  - Currently, **Mumbai houses separate wings of the three services**, operating independently.
  - The Navy, with its substantial presence in Mumbai, will assume the lead role in this new integrated setup.
- **Sulur**, located near Coimbatore, and **Guwahati** are expected to be selected as the sites for the second and third common defence stations.
- Currently, there are no common defence stations in India. The Andaman and Nicobar command is a full-fledged command raised as a tri-service command in 2001.

Read more: [Integration Among Defence Forces](#)

## Restrictions on Pilgrims Visiting Ahobilam Shrine

Recently, several restrictions have been imposed on visitors to the **Ahobilam Temple Complex**, which is located within the **Nagarjunasagar-Srisailem Tiger Reserve**.

- In response to the severe heatwave and to protect wildlife, restrictions are in place, including a ban on plastic items at Cheethal base camp, no overnight stays due to potential human-animal conflicts, and a prohibition on animal sacrifices at the shrine.
  - The nearby nallamala forest area is home to **red sanders, leopards and deer**. Tigers also inhabit the area.
- The **Ahobilam National Tiger Conservation Authority (NTCA)**, constituted as per the provisions of the **Wild Life Protection Act, 1972**, by the Ministry of Forests,

Environment and Climate Change, oversees the rare flora and fauna specific to the Region.

- The Ahobilam Temple Complex consists of **9 shrines to Lord Narisimha** situated within the **Nallamala forest**. In addition to the nine shrines, there is a temple for **Prahaladavarada Varadhan** in the foothills of the mountain.

Read more: [Nagarjunasagar-Srisailem Tiger Reserve](#)

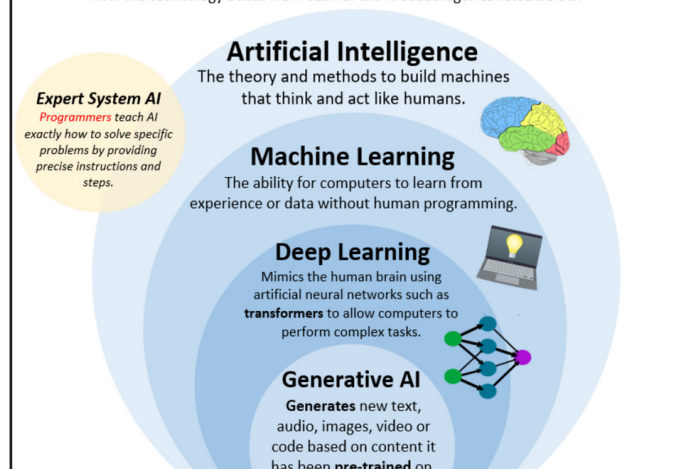
## S.A.R.A.H

Recently, the **World Health Organization (WHO)** announced the launch of S.A.R.A.H., a **digital health promoter prototype** with enhanced empathetic response powered by **generative artificial intelligence (AI)**.

- **S.A.R.A.H. (Smart AI Resource Assistant for Health)** engages users in **8 languages** on various health topics, **accessible 24/7** on any device.
- It **provides information on major health topics**, including healthy habits, mental health, and other risk factors related to overall physiological health.
- It aims to **empower individuals to optimise their health** and well-being journey, serving as an additional tool to realise their **rights to health**.
- It supports users in **understanding risk factors** for diseases like cancer, heart disease, lung disease, and diabetes.

## Defining Generative AI

To understand generative artificial intelligence (GenAI), we first need to understand how the technology builds from each of the AI subcategories listed below.



Read More: [Artificial Intelligence \(AI\)](#)

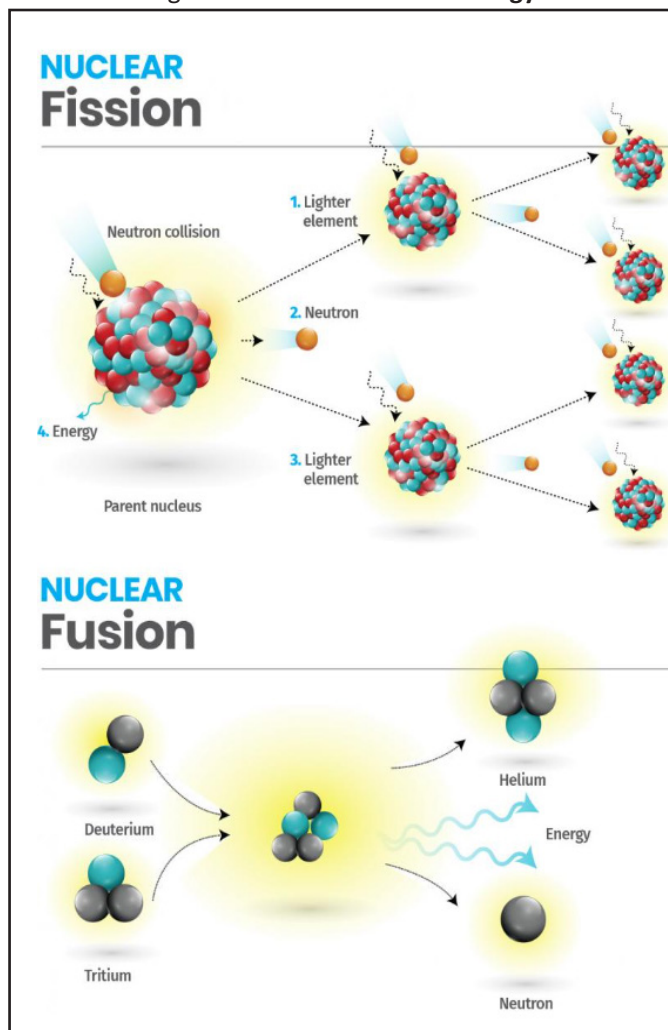
Note:



## Artificial Sun

Recently, a **new world record** was announced by scientists in **South Korea** in sustaining temperatures of **100 million degrees Celsius** for **48 seconds** in plasma state, in a **nuclear fusion** experiment. This is **seven times hotter** than the **core of the sun**.

- This accomplishment marks a significant milestone for **harnessing clean energy from nuclear fusion**, as it demonstrates the potential for producing massive heat energy comparable to the core of the Sun.
- **Tokamak (International Thermonuclear Experimental Reactor (ITER))** is a collaboration of **35 nations launched in 1985 with India being a member**. It is located in **France**.
  - It seeks to demonstrate **nuclear fusion's potential** as a large-scale and **carbon-free energy source**.

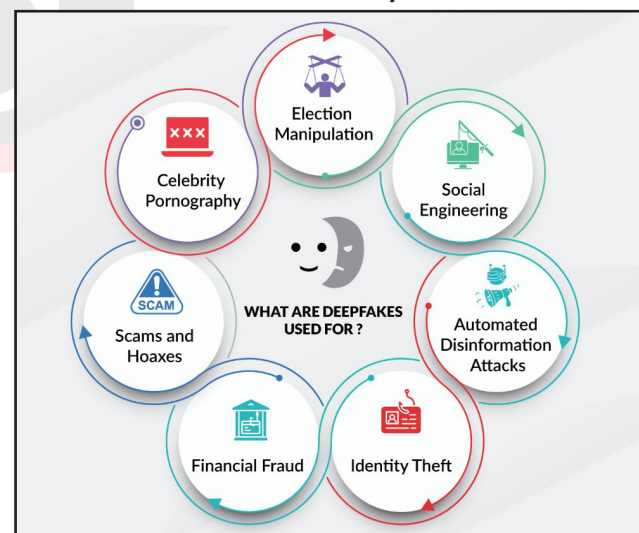


Read More- [International Thermonuclear Experimental Reactor \(ITER\), Nuclear Fusion Energy](#)

## Shallow Fakes

Recently, the viral video featuring US Vice President Kamala Harris making irrational remarks points toward the **threat society faces regarding shallow fakes**.

- **Shallow fakes** or cheap fakes are pictures, videos, and voice clips **created without the help of Artificial Intelligence (AI) technology** but by either editing or by using other simple software tools.
- **Deepfakes** are **synthetic media that use AI** to manipulate or generate visual and audio content, usually intending to deceive or mislead someone.
  - These are created using a technique called **generative adversarial networks (GANs)**, which involve two competing **neural networks**: a generator and a discriminator.
  - **Global Risk Report 2024**, by the **World Economic Forum (WEF)**, also highlighted **AI-powered misinformation and Disinformation** as the **most severe risks in the next 2 years**.



Read More: [Deepfakes, Global Risks Report 2024: WEF](#)

## Anti-Dumping Probe

Recently, India has initiated an **anti-dumping** probe into the import of '**Insoluble Sulphur**' used in the rubber industry from **China and Japan**.

- **Directorate General of Trade Remedies (DGTR)** is the **apex national authority under the Ministry of Commerce and Industry** for administering all

Note:

trade remedial measures including anti-dumping, **countervailing duties**, and safeguard measures.

- It offers **assistance to domestic industries**

**and exporters** in responding to trade remedy investigations initiated against them by foreign nations, thereby providing **trade defence support**.

## 1. WTO Framework on Trade Remedies



### Global Safeguards



### Anti-Dumping measures



### Countervailing Duties

#### Legal Basis

- GATT Article XIX

- GATT Article VI
- Agreement on Implementation of Article VI (AD Agreement)

- WTO Agreement on Subsidies and Countervailing Measures

#### Objectives and Features

- Create “breathing room” for domestic industry struggling with increasing imports
- MFN based import restrictions
- No allegations about unfair trade

- Protect domestic industry from imports sold “at less than the normal value of the products”
- Departure from MFN principle
- It’s about the “unfair” (pricing) practices of individual firms

- Protect domestic industry from effects of another country’s export subsidies actions
- Departure from MFN principle
- It’s about the “unfair” (subsidies) practices of governments

#### Measures

- Supplementary tariffs beyond bound MFN rates

- Supplementary tariff beyond bound MFN rates targeted at particular foreign firms based on difference between the import price and the “normal” value

- Supplementary tariff beyond bound MFN rates based on the value of the subsidy provided by the government of the exporting country

#### Criteria

- Imports must be rising (absolute)
- Imports are causing “serious” injury to the domestic industry

- Dumping, thus pricing below (1) production cost or (2) market price
- Imports are causing “material” injury to the domestic industry

- Specific subsidies (financial contribution) by foreign governments that are exported
- Imports are causing “material” injury to the domestic industry

Read More: [Anti-Dumping Duty](#), [Protectionism vs Globalization](#)

## Nepal Moves to Ratify BIMSTEC Charter

The presentation of the [Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation \(BIMSTEC\) Charter](#) in the Federal Parliament of Nepal marks a significant step towards regional cooperation and economic prosperity.

- The **BIMSTEC Charter** was adopted during the [Fifth BIMSTEC Summit, 2022](#). The Charter serves as the **foundational document**, setting out principles and structures for cooperation among member states. Besides Nepal, the **other six member countries of BIMSTEC have already endorsed the BIMSTEC Charter**.

- BIMSTEC, formed in **1997**, focuses on economic prosperity, social progress, scientific achievement, peace, and stability among countries in the Bay of Bengal region.
  - It is initially known as **BIST-EC (Bangladesh-India-Sri Lanka-Thailand Economic Cooperation)**, and the organisation now comprises **seven Member States** (Bangladesh, Bhutan, **India**, Myanmar, Nepal, Sri Lanka, and Thailand.)
- India views BIMSTEC as integral to its **‘Act East’ policy**, enhancing regional cooperation in [Southeast Asia](#) while advancing trade and security interests in the **Indian Ocean**. It also aligns with the [Indo-Pacific focus of Quad countries](#).

Note:

# BIMSTEC

## WHAT YOU SHOULD KNOW



Stands for **The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation**

Founded in 1997 through **Bangkok Declaration**

### 7 MEMBER COUNTRIES



First summit held in Thailand

Thailand is the current Chair

### Importance of BIMSTEC

- Accounts for **22%** of the world's population
- Combined GDP of **\$2.7 trillion**
- One-fourth of the world's traded goods cross the Bay every year
- Six focus areas—trade, technology, energy, transport, tourism and fisheries

Read more: [BIMSTEC](#)

Note:



drishti



## Raising Day of Army Medical Corps

The **Army Medical Corps (AMC)** commemorated its **260<sup>th</sup> Raising Day (3<sup>rd</sup> April 2024)** reflecting on centuries of dedication and sacrifice in serving the nation.

- The AMC, originally known as the **Indian Medical Service**, was founded in India in 1764 during the British colonial era. With the motto of **'Sarve Santu Niramaya' (let all be free from disease)** through selfless service.
- The Indian Army Medical Corps (IAMC) was established on 3<sup>rd</sup> April 1943, following the **Royal Army Medical Corps model (United Kingdom)**. It was created by merging the **Indian Medical Service (IMS)**, **Indian Medical Department (IMD)**, and **Indian Hospital Corps (IHC)** into a unified corps of officers and men.
- The IAMC was re-designated as the **Army Medical Corps (AMC) effective from 26<sup>th</sup> Jan 1950**.
- The AMC has excelled in **UN Peacekeeping Missions** and **Humanitarian Assistance and Disaster Relief (HADR)** activities, contributing to national progress and development.
- The AMC Raising Day recognises the contributions of Officers, and other ranks of the Army Medical Corps who have positively impacted the **lives of personnel, families, and veterans of the Armed Forces**.

Read more: [Indian Army's Proactive Measures for Mental Health](#)

## Manufacturing Purchasing Managers' Index

According to a survey released by Hong Kong and Shanghai Banking Corporation Limited (HSBC), India's Manufacturing **Purchasing Managers' Index (PMI)** reached a **16-year peak** of 59.1 in **March 2024**.

- **PMI** is an economic indicator, which is derived after monthly surveys of different companies. It shows trends in both the **manufacturing and services sector**.
  - A **PMI above 50** represents an expansion when compared with the previous month.
- It helps in determining whether the market conditions, as seen by purchasing managers, is **expanding, contracting or staying the same**.

- It is used to provide information regarding the current and future business conditions.
- The HSBC India Manufacturing PMI is compiled by **S&P Global**.

Read more: [Purchasing Managers' Index](#), [The Making of A Manufacturing Hub](#)

## FSSAI Directives to E-commerce Food Business Operators

The **Food Safety and Standards Authority of India (FSSAI)** has directed **e-commerce food business operators (FBOs)** to correctly categorise food products on their websites.

- The Authority observed cases where licensed **"proprietary foods,"** such as dairy-based, cereal-based, and malt-based beverage mixes, were **incorrectly labelled** and sold on e-commerce platforms as health or energy drinks.
  - The food products are considered **proprietary food if there are no existence of standards for them in FSSAI regulations**.
- FSSAI clarified that **"Health Drink"** is not defined or standardised anywhere under the **Food Safety and Standards Act, 2006** and advised FBOs to rectify this misclassification by placing such products in the appropriate category as per the law.
  - Also, FSSAI further said that the term **'energy drinks'** is permitted to be used **only for products which have been licensed** under that specific food category system.

Read more: [FSSAI to Streamline Food Safety Regulations](#)

## Resourcefulness of Konda Reddi's Tribe's Knowledge

Recently, forest officials learnt that the **bark of an Indian laurel tree or Indian Silver Oak (*Ficus microcarpa*)** stores water, particularly in the summer, as claimed by the **Konda Reddi tribe**.

- The Indian laurel tree is native to Southeast Asia and regions of India, it thrives in tropical and subtropical climates. A glossy, **dark green-leaved evergreen tree**, its latex sap is used in making rubber products.

Note:



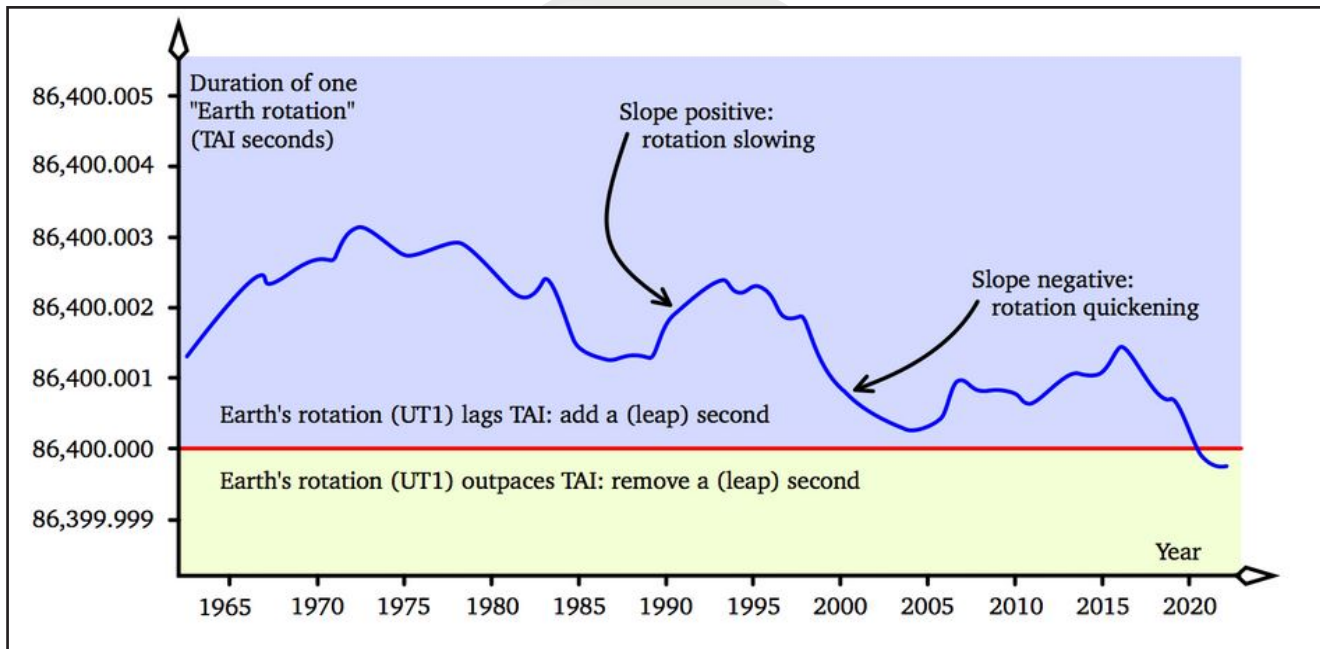
- Konda Reddi tribe is a **Particularly Vulnerable Tribal Group** inhabiting the **Papikonda hill range** (Andhra Pradesh) in the **Godavari region**. Their mother tongue is Telugu with a unique accent.
  - **Papikonda National Park (PNP)** was declared a reserved forest in 1882, a wildlife sanctuary in 1978, and a **national park** in 2008.
  - PNP has **moist deciduous forests** and includes animal species such as tigers, mouse deer, gaur etc.
- Read more:** [Bills to Include PVTGs to ST List in Odisha and AP, Empowering the Tribal Society.](#)

## Negative Leap Second

A recent study shows that **Climate change** is causing **glaciers and ice sheets** in Greenland and Antarctica to melt at an accelerating rate, redistributing weight across

the planet and slightly **slowing down the Earth's rotation** on its axis.

- The **Earth has been spinning slightly faster than normal** for a few decades.
- Timekeepers have **added an extra "leap second" to clocks worldwide** to adjust for this increase in speed of Earth's rotation – they have done this **27 times since the 1970s**.
  - The plan was to remove this leap second for the first time in 2026, a change they called the **"Negative leap second."**
- According to the recent study, the **accelerating melt of ice** from Antarctica and Greenland has acted like a **brake, slowing the rotation back down**, and potentially **delaying the need for a "negative leap second"** adjustment until 2029 or later.



**Read More:** [IPCC Reports and Equity in Climate Change Mitigation](#)

## Tornado

Recently, a deadly tornado struck Mainaguri in **Jalpaiguri district**, West Bengal, killing five and injuring over a hundred, highlighting the **increasing frequency** of tornadoes in India.

- **Tornado:**
  - A tornado is a **rotating column** of air that forms from a **thunderstorm** and touches the ground, while over the sea it is known as a **waterspout**.

- Any collision of warm, moist air with dry, cool air in the presence of a **low-pressure system** like a trough **causes** thunderstorms and tornadoes.
- **Tornadoes** can feature wind speeds ranging from **105 to 322 km/h**, with the system potentially being **stationary or moving** at approximately 97 km/h.
- Tornadoes generally occur in **middle latitudes**.
  - They are **most common** in the **United States, Argentina, and Bangladesh**.

Note:

- Extreme storms, **rare in India**, mostly occur in the **eastern states** of **West Bengal, Odisha, and Jharkhand** during the pre-monsoon period, with some evidence of them also forming in northwest India.
- In India, there is **no official monitoring** of tornadoes though the **India Meteorological Department (IMD)** recorded the recent West Bengal tornado.

## INSIDE A TORNADO

NATIONAL GEOGRAPHIC

A tornado occurs when a rotating column of air forms between thunderclouds and the ground. The most destructive tornadoes usually arise from supercells, which are strong, rotating thunderstorms.

Winds at higher altitudes move faster and in a different direction than winds at lower altitudes. This is called wind shear. As a result, the storm will begin to tilt and rotate.

Warm, wet air gets pulled upward and forms a funnel. At the same time, cooler air falls toward the ground. This helps concentrate the funnel's rotation and brings it closer to the ground.

If the funnel reaches the ground, it becomes a tornado. Scientists don't know why some funnels reach the ground and others don't.

### Tornado Categories

After a tornado has hit, experts assess the damage and rate the tornado's strength according to the Enhanced Fujita Scale.

Category	Wind gusts (miles/hr)	Damage
EF-0	65-85	Minor damage
EF-1	86-110	Moderate damage
EF-2	111-135	Considerable damage
EF-3	136-165	Severe damage
EF-4	166-200	Devastating damage
EF-5	over 200	Massive damage

Read more: [Cyclone](#)

## India's First Commercial Crude Oil Storage

India aims to construct its **first commercial crude oil strategic storage** to bolster reserves as a precaution against potential supply interruptions.

- **Indian Strategic Petroleum Reserves Limited (ISPRL)** has invited bids for building 2.5 million tonnes of underground storage at **Padur in Karnataka**.
- **Strategic Petroleum Reserves (SPR) Programme:**

Phase	Location	Status
Phase I	Visakhapatnam	Filled (Strategic in nature)
Phase I	Mangaluru	Filled (Strategic in nature)
Phase I	Padur	Filled (Strategic in nature)

Phase II	Chandikhol	Approved (PPP basis)
Phase II	Padur	Approved (PPP basis)

- Crude oil storages on India's East and West coasts are constructed in **underground rock caverns**, known as the **safest means** for storing hydrocarbons.
- **Indian Strategic Petroleum Reserves Limited (ISPRL):**
  - **ISPRL**, a subsidiary of the **Oil Industry Development Board (OIDB)** under the **Ministry of Petroleum & Natural Gas**, manages **Strategic Crude Oil Storage** facilities, with **Engineers India Limited (EIL)** as the Project Management Consultant, overseeing storage operations and coordinating stock release during **supply disruptions** through a **Government Empowered Committee**.

Note:

## Strategic Petroleum Reserves

### SPR-I

Govt has set up 5.33 MMT of strategic crude oil storages in SPR Phase-I at following 3 locations:

Vishakhapatnam, AP

Mangalore, Karnataka

Padur, Karnataka

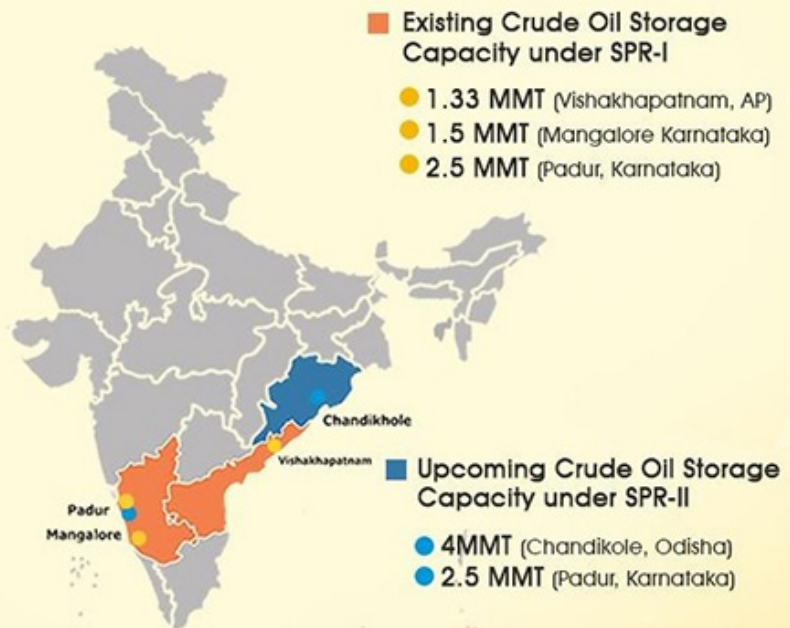
SPR-I has been commissioned and dedicated to the Nation in Feb' 2019

### SPR-II

Another 6.5 MMT of strategic crude reserves is being planned in SPR-II at:

Chandikhole, Odisha

Padur, Karnataka



Read more: [India's Strategic Petroleum Reserves](#)

## Bima Sugam

Recently, the [Insurance Regulatory and Development Authority of India \(IRDAI\)](#) has approved the setting up of [Bima Sugam](#) — an online insurance marketplace (like an e-commerce platform) for buying, selling, and servicing insurance policies as well as settling claims.

- It will onboard all the companies that offer life and non-life insurance products under one roof.
- Bima Sugam will serve as a unified platform, integrating with government databases, insurers, intermediaries, and insurance repositories.
- It will fetch customer details, provide product information, and facilitate the purchase and servicing of insurance policies.
- Acting as a single interface, it will cater to customers, intermediaries, and agents, enabling them to connect and transact across various insurers (life, health, non-life).
- **Benefits for Customers:**
  - Insurance policies are available in electronic format, reducing reliance on physical documents.

- Bima Sugam aims to make life insurance more affordable by streamlining processes and reducing administrative costs.

Read More: [Bima Sugam](#)

## CCI Approves Acquisition of Shares Under the Large Value Fund (LVF) Scheme

Recently, the [Competition Commission of India \(CCI\)](#) has approved the acquisition of shares of MG Motor India Private Limited by IndoEdge India Fund under the Large Value Fund (LVF) Scheme.

- **Large Value Fund (LVF) Scheme:** It is an [Alternative Investment Fund \(AIF\)](#) wherein every investor is an accredited investor and invests a minimum amount of Rs 70 crore.
- **Alternative Investment Fund (AIF):** An AIF is a privately pooled or collective investment fund incorporated in India for investment purposes.

Note:



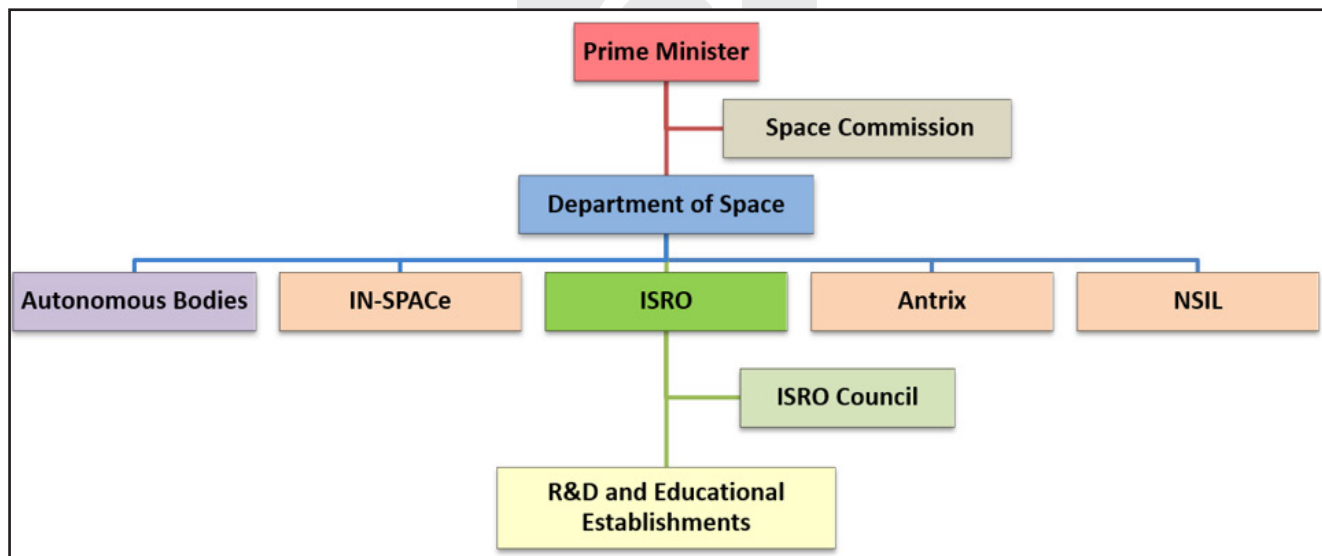
- SEBI categorizes AIFs into 3 types:
  - **Category-1 AIFs:**
    - Invest in **startups, Small and Medium-sized Enterprises (SMEs), and socially beneficial sectors** like infrastructure.
    - Includes **Infrastructure Funds, Venture Capital Funds, Angel Funds**, and Social Venture Funds.
  - **Category-2 AIFs:**
    - Invest in **equities and debt securities**, excluding Category 1 or 3.
    - Includes Fund of Funds, Debt Funds, and Private Equity Funds.
  - **Category-3 AIFs:**
    - Aim for **short-term investment returns**, utilizing **complex trading strategies**.
    - Includes Hedge Funds and Private Investment in Public Equity Funds.

Read More- [RBI Strengthens Norms for Lenders in AIFs, Competition Commission of India \(CCI\)](#)

## Space science and Technology Awareness Training (START) 2024

Recently, the **Indian Space Research Organisation (ISRO)** announced an active space science programme, the **Space Science and Technology Awareness Training (START), 2024**.

- START is an introductory-level **online training in space science and technology**.
- The **undergraduate (UG) and postgraduate (PG) students** of physical sciences (Physics and Chemistry) and technology (e.g. Electronics, Computer Science, Mechanical,) studying in various educational institutes within India will be eligible to be considered for the training.
- The **main objective** of the training programme is to **attract youngsters** to the fields of **space science and technology**.



Read more: [Indian Space Research Organisation \(ISRO\)](#)

## Price-to-Earnings Ratio and Hockey-Stick Effect

The Chairperson of **SEBI** noted that despite a high **P/E ratio**, overseas investors are attracted to the **Indian capital markets** due to the rapid **economic growth**, reflecting **global optimism** and trust in India, exemplified by the **hockey stick effect**.

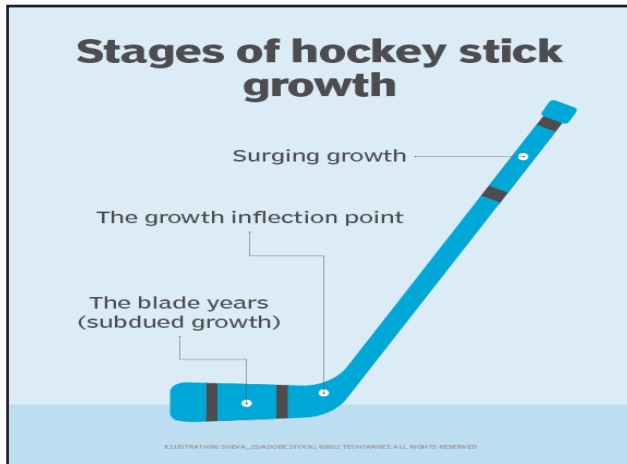
- **Price-to-Earnings (P/E) Ratio:**
  - The P/E ratio is the **company's share price** relative to its **earnings per share (EPS)**.
  - The P/E ratio helps assess a **company's stock value** compared to others and is also useful for comparing its valuation historically, against peers, or the market.
  - A high P/E ratio may indicate **overvaluation**, while a low ratio could suggest **undervaluation**.

Note:



### ➤ Hockey Stick Effect:

- The **hockey stick effect** is characterised by a **sharp rise or fall** of data points after a long flat period.
- Hockey stick charts visually depict **notable changes** or rapid growth, seen in areas like corporate earnings, **global temperatures**, and **poverty** statistics, with applications in business, economics, and policy.
  - It indicates the **need for urgent action** due to a drastic shift in data points.



Read more: [SEBI](#)

## Havana Syndrome

Recently, there has been a noticeable surge in interest in the **Havana Syndrome**, particularly concerning its occurrence among US diplomats.

- Havana Syndrome is a mysterious illness causing a range of neurological problems. It was first reported by the US Embassy staff in **Havana, Cuba** in 2016, when they began experiencing extreme **headaches and hearing piercing sounds at night**.
- Other symptoms including bloody noses, headaches and vision problems were later reported by embassy staff in **China and Europe**.
  - In 2021, Havana Syndrome gained attention in India after a US intelligence officer travelling with CIA director William Burns to New Delhi reported symptoms.
- A 'syndrome' does not mean a unique medical condition but denotes a cluster of **symptoms that commonly occur together**, making it hard to determine their precise origin.

Read more: [Havana Syndrome](#)

## Successful Test Firing of Vikram-1 Stage-2

Skyroot Aerospace, a leading Indian space-tech company, achieved a significant milestone with the **successful test firing of Stage-2 of the Vikram-1 space launch vehicle**, known as **Kalam-250**, at **Indian Space Research Organisation (ISRO)**'s propulsion testbed in **Sriharikota, Andhra Pradesh**.

- Stage 2 plays a crucial role in transitioning the launch vehicle from the atmospheric phase to the deep vacuum of outer space, propelling it toward its destination with **precision and efficiency**.
- Kalam-250 utilises a high-strength carbon composite rocket motor with solid fuel and a high-performance **Ethylene-Propylene-Diene terpolymers (EPDM) Thermal Protection System (TPS)**. It also features a carbon ablative flex **nozzle for precise thrust vector control**.
- **Vikram-1** marks **India's first private orbital rocket launch**, following the suborbital space launch of Vikram-S in November 2022. It demonstrates India's progressing capabilities in space technology and exploration.

Read more: [India's First Private Launch Vehicle](#)

## Defence Exports Touch Record High

**Defence exports** reached a **historic high** of Rs 21,083 crore (approximately USD 2.63 billion) in FY 2023-24, marking a **32.5% increase** from the previous fiscal year, with recent data showing a **31-fold growth over the past decade compared to FY 2013-14**.

### ➤ Key Statistics:

- Comparing **two decades**, from 2004-05 to 2013-14 and from 2014-15 to 2023-24, shows a **21-fold increase in defense exports**.
- The **private sector** contributed approximately **60%**, while Defence Public Sector Undertakings (**DPSUs**) contributed around **40%**.
- The number of **export authorisations** issued to defense exporters also increased in FY 2023-24 compared to FY 2022-23.

Note:

### ➤ Key Drivers:

- The significant growth in the Indian defence sector is attributed to **policy reforms**, **Ease of Doing Business** initiatives, and comprehensive **digital solutions**, reflecting global acceptance of Indian defence products and technologies.

Read more: [India's Defence Exports](#)

## Ketamine

In a recent interview, Elon Musk revealed he uses a prescription for **ketamine** to manage what he described as a “**negative chemical state**” similar to depression.

- **Ketamine** is a medication primarily used for inducing **anaesthesia and sedation** in medical settings.
  - It belongs to a class of drugs called **dissociative anaesthetics**, which means it can cause a person to feel detached from reality and experience a sense of disconnection from their surroundings.
- While ketamine shows promise in treating depression, especially **treatment-resistant cases**, it is not a cure. It is typically used in conjunction with other therapies.
- Misuse of ketamine can lead to harmful effects such as **hallucinations, confusion, dissociation**, and in high doses, it can cause serious health complications or be life-threatening.

Read More: [Ketamine Drug](#)

## Tripura's Matabari Pera and Pachra Receive GI Tag

The Tripura Chief Minister announced that two traditional items from the state, **Matabari Pera** and **Pachra**, have been honoured with the **Geographical Indication (GI) tag** marking a significant milestone for local artisans and weavers.

- **Matabari Pera**, a **dairy-based confectionery** that served as prasad at the **Tripurasundari temple**, and **Pachra**, a **handwoven cloth** used by Indigenous communities, have been recognised with the prestigious GI tag.
  - The GI tag ensures legal protection against **unauthorised imitation or misuse of the product**, safeguarding its authenticity and preserving the cultural heritage associated with it.

- This recognition also facilitates market access and promotion, both domestically and internationally, fostering economic opportunities for local communities involved in its production.

- **Tripura's iconic queen pineapple** was previously honoured with the GI tag, along with 13 other products from the Northeast, highlighting the region's diverse and unique offerings.



Read more: [GI Tags for Over 17 Products](#)

## cVIGIL: Empowering Electoral Oversight

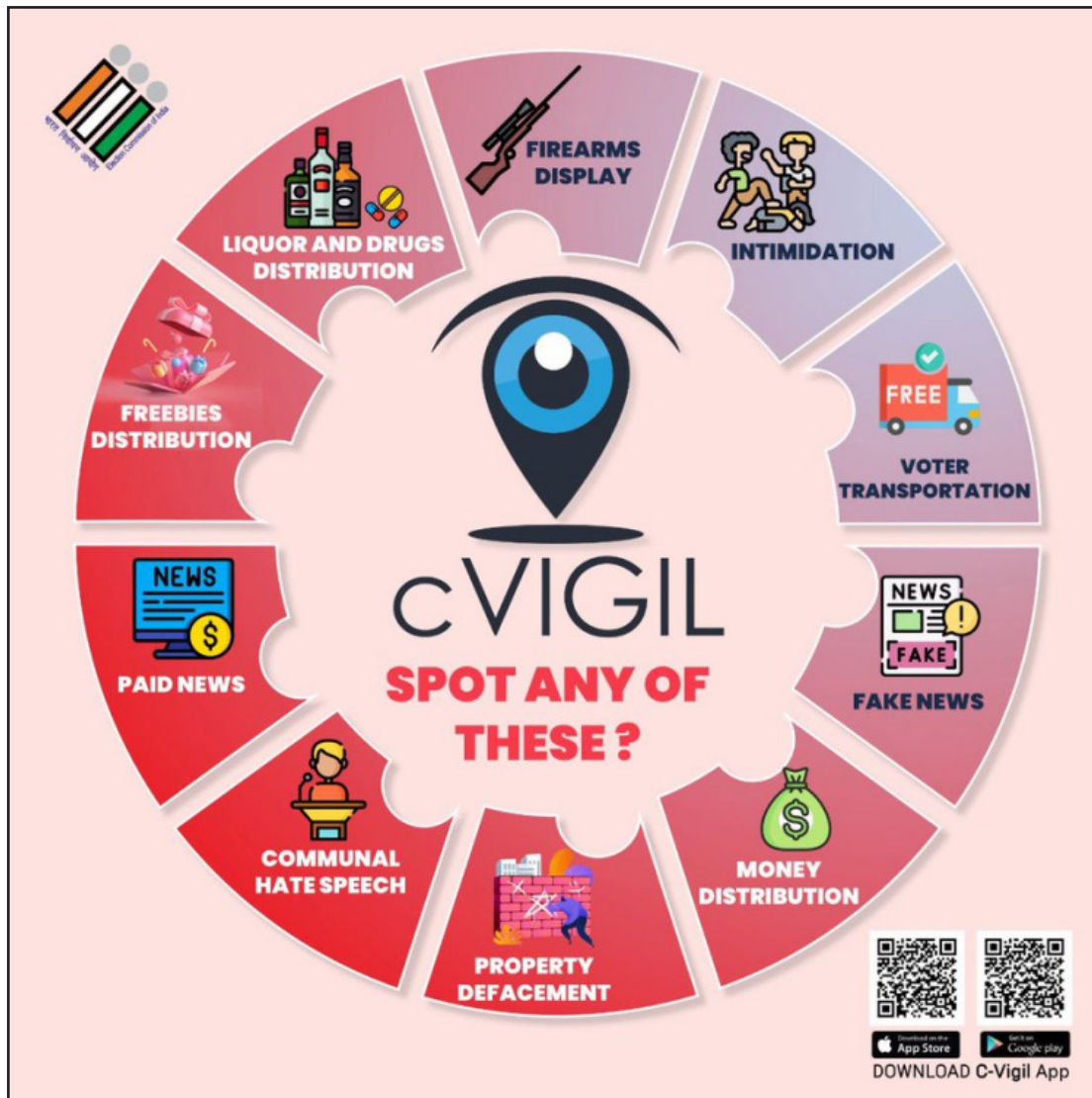
The **cVIGIL app** by the **Election Commission of India** has emerged as a powerful tool for citizens to report **election code violations**, particularly during the ongoing **General Elections 2024**.

### ➤ Key Features of cVIGIL:

- **Register Complaints:** cVIGIL allows anyone in the election-bound state to report violations of **Model Code of Conduct (MCC)** that comes into effect from the date of announcement of elections and goes on till a day after the polls.
- **Anonymous Reporting:** Users can submit complaints anonymously, ensuring their personal details remain undisclosed.
- **Geotagging:** The app automatically adds geotags to reports when users use the camera feature, providing precise location information to field units.
- Since the announcement of General Elections 2024, over 79,000 complaints have been received. Over 99% complaints have been resolved.
  - The majority of complaints, around 73%, are related to **illegal hoardings and banners**, while issues such as the distribution of money, gifts, and liquor also feature prominently.

Note:





Read more: [Election Commission of India, Model Code of Conduct](#)

## Closing Ceremony of International Year of Millets

Recently, the [Food and Agriculture Organization \(FAO\)](#) hosted the closing ceremony of the [International Year of Millets \(IYM\) 2023](#) at the FAO headquarters in Rome.

- The [United Nations](#) declared 2023 as the International Year of Millets following a proposal by India, supported by over 70 countries, to raise awareness about millets' benefits.
  - The year-long celebration highlighted millets'

nutritional benefits, adaptability to adverse climates, and role in creating sustainable market opportunities.

- Millets are **small-grained, annual, warm-weather cereals** belonging to the **grass family**.
  - Jowar (Sorghum), Bajra (Pearl Millet) and Ragi (Finger millet) are the important millets cultivated in India.
  - Millets are the main crops in **semiarid tropics due to low rainfall and poor soil fertility**. They have higher nutrient content than major cereal crops and are tolerant to drought and extreme weather conditions.

Note:



# Millets

## About

- Small-grained cereals also known as **coarse grains**
- Often referred to as **'Superfood'**
- Among the **first crops to be domesticated** - evidence of millet consumption dates back to the **Indus Valley Civilisation (3,000 BC)**

## Climatic Conditions

- **Mainly a Kharif crop in India**
- **Temperature:** 27°C - 32°C
- **Rainfall:** Around 50-100 cm
- **Soil Type:** Inferior alluvial or loamy soil

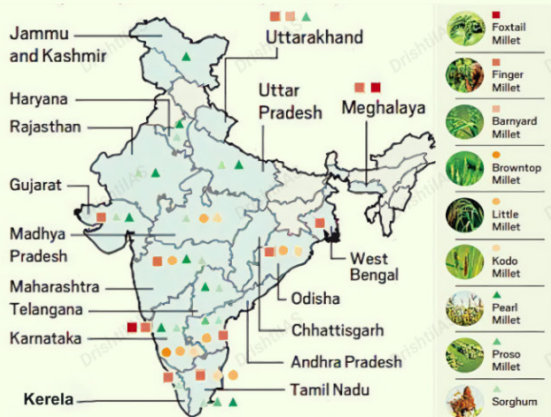


## India and Millets

- **Global Largest Millet Producer:**
  - 20% of global production, 80% of Asia's production
- **Common Millets:**
  - **Ragi** (Finger millet), **Jowar** (Sorghum), **Sama** (Little millet), **Bajra** (Pearl millet), and **Variga** (Proso millet)
  - **Indigenous varieties** (small millets) - **Kodo, Kutki, Chenna and Sanwa**
- **Top Millets Producing States:**
  - Rajasthan (largest), Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh
- **Govt. Initiatives:**
  - Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP)
  - **'India's Wealth, Millets for Health'**
  - Millet Startup Innovation Challenge
  - **Hiked MSP** for Millets
  - Agriculture Ministry declared millets as **"Nutri Cereals"** in 2018

## Significance

- Less expensive, **nutritionally superior**
- High protein, fibre, minerals, iron, calcium and a **low glycemic index**
- Help **tackle lifestyle problems and health** (obesity, diabetes etc.)
- Photo-insensitive, **resilient to climate change & water efficient**



## International Year of Millets - Year 2023

Proposed by India, declared by UNGA



Read more: [India's Millet Revolution](#)

Note: