



drishti

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Note:

Polity and Governance

Highlights

- Delimitation and Concerns of Southern States
- Internet Shutdowns
- SWAYATT Initiative
- Mediation as a Solution to Judicial Backlog
- SC's Direction on Remission
- NEP 2020 and Samagra Shiksha Abhiyan
- Draft UGC Regulations 2025
- 2nd All-India State Water Ministers' Conference
- 22nd Foundation Day of NCST
- Appointment of CEC and EC
- Mob Lynching
- President's Rule in Manipur
- Status of Devolution to Panchayats in States 2024 Report

Delimitation and Concerns of Southern States

Why in News?

The Union Home Minister assured that the upcoming **delimitation exercise** would **not harm southern states** and promised them a **fair share** of any seat increase.

What is Delimitation?

- **About:** Delimitation means the process of **fixing the number of seats and boundaries of territorial constituencies** in each State for the **Lok Sabha** and **Legislative assemblies**.
 - This 'delimitation process' is performed by the '**Delimitation Commission**' that is set up under an **act of Parliament**.
- **Delimitation Commission:** It is a **high powered 3 member body** whose orders have the **force of law** and **cannot be called in question before any court**.
 - It includes **two Supreme Court or High Court judges**, one appointed as **chairman** by the central government, and the **Chief Election Commissioner** as an ex-officio member.
 - Its orders are presented to the **Lok Sabha and State Assemblies** but **cannot be modified**.
 - It has powers of a **civil court**.
 - It has been set up **four times** till February 2024 i.e., **1952, 1963, 1973 and 2002**.

- **Rationale Behind Delimitation:** Each state is divided into territorial constituencies in such a manner that the **ratio** between **population** of each constituency and the **number of seats allotted** to it is the **same throughout the state**.

- It ensures uniform representation both **among different states** and **within constituencies** of the same state.

- **Constitutional Provisions:**

- **Article 82:** It provides for the **readjustment of seats** in the House of the people to the states and the **division of each State** into territorial constituencies after **every census**.
- **Article 170:** It provides for the **composition** of Legislative Assemblies.

- **Related Amendments:** Population-based seat allocation **favours high population growth states**, so amendments were made to **prevent imbalances** and **reward population control efforts**.

- **42nd Amendment Act, 1976:** It **froze** Lok Sabha seat allocation and constituency division at the **1971 level until 2000**.
- **84th Amendment Act, 2001:** The freeze on readjustment was **extended** for another 25 years **until 2026**.
- **87th Amendment Act, 2003:** It allowed delimitation based on the **2001 census** without changing the number of seats or constituencies.

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Note:

- **Judicial Review:** In the *Kishorchandra Chhanganlal Rathod Case, 2024*, the Supreme Court held that an order by the Delimitation Commission can be reviewed if it is clearly **arbitrary and violates constitutional values**.

Note:

- **Article 329** bars courts from questioning laws on delimitation or seat allotment.
- **31st Amendment Act, 1973:** States with populations **under six million** were **excluded** from the population-based delimitation exercise.

Why are Southern States Concerned with Upcoming Delimitation?

- **Fear of Losing Representation:** Low Southern states' population compared to Northern states may result in fewer **Lok Sabha seats** for southern states if delimitation is solely based on population.
 - E.g., **0% increase** in the number of seats for **Kerala**, only a **26% increase** for **Tamil Nadu**, but a whopping **79% for both MP and UP**.
- **Gerrymandering:** Southern states are concerned about **gerrymandering** that is a practice of **manipulating electoral boundaries** to unfairly **favor a party or group**, distorting fair representation.
 - E.g., Under Nepal's **new constitution (2015)**, **Nepal's Terai region**, with **50% of the population**, got **fewer seats** than the **hills** due to constituency demarcation **favoring geography over population**, benefiting the hill elite.
- **Threat to Federalism:** Delimitation may increase the **fiscal burden on Southern states** as more seats for the North could mean **higher central allocations** per representative.
 - **Lower political representation** of southern states compared to northern states may pressure them to **accept policies they see as unfair**.
- **Discouragement to Good Governance:** Southern states' population control efforts could lead to fewer seats in delimitation, unfairly favoring high-fertility states and **discouraging good governance**.
 - It leads to criticism of good policies and may prove **counter-productive**. E.g., some politicians considered **incentives for larger families**.

- **North-South Division:** A sense of political and economic imbalance could fuel demands for **greater autonomy or special status**, straining national unity and deepening **North-South divisions**.
- **Skewed Resource Allocation:** Northern states may gain more central funds and welfare schemes due to greater parliamentary influence, while **southern states risk fewer resources despite better governance**.
 - **The Finance Commission (FC)** uses **population** as one of the criteria for allocating funds to states, which can be **disadvantageous for southern states**.
- **Weakening Regional Parties:** Many fear delimitation may favor **parties with strong northern bases**, shifting political dynamics and **weakening southern regional parties**.

Internet Shutdowns

Why in News?

A 2024 report by digital rights group 'Access Now' revealed a record-high number of global **internet shutdowns**, with **Myanmar topping** the list with 85 shutdowns, **followed by India**.

What are the Key Findings of the Report on Internet Shutdowns?

- **India:** India accounted for 84 of internet shutdowns, making up 28% of all shutdowns.
 - Manipur recorded the highest number of internet shutdowns in India with **21 instances**, followed by **Haryana and Jammu & Kashmir**.
 - In total, **16 states and Union Territories** experienced internet restrictions in 2024.
 - **Main Reasons for Shutdowns:** Shutdowns in India were primarily linked to **protests (41 instances)**, **communal violence (23 instances)**, and **examination-related security measures (5 instances)**.
 - Additional shutdowns were enforced due to **local conflicts and administrative decisions**.
 - Authorities often justify shutdowns as necessary to **prevent communal violence, riots, and misinformation spread** via social media.

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Note:

- **Global:** A total of 296 internet shutdowns were recorded worldwide in 2024, the highest ever.
 - Myanmar(85), India, and Pakistan(21) together accounted for over 64% of all recorded shutdowns in 2024.

Legal Provisions for Internet Shutdowns in India

- **Telecommunications Rules:** Internet shutdowns in India are governed by the **Telecommunications (Temporary Suspension of Services) Rules, 2024**, issued under the **Telecommunications Act, 2023**.
 - These rules **replace the Telecom Suspension Rules, 2017** and regulate the process of suspending telecom services, including the internet.
- **Authority to Issue Shutdown Orders:** Union Home Secretary (for national-level shutdowns) and State Home Secretary (for state-level shutdowns).
 - In unavoidable circumstances, a Joint Secretary-level officer (duly authorized) can issue an order, but it must be confirmed within 24 hours, or it will cease to exist.
- **Judicial Precedent:** The **Supreme Court of India** in the case of *Anuradha Bhasin v. Union of India, 2020* ruled that **indefinite internet shutdowns are unconstitutional** and that such curbs should meet the tests of **necessity and proportionality**.
 - However, many shutdown orders lack proper documentation and justification.

What Concerns Regarding Internet Shutdowns?

- **Violation of Rights:** Restricts **freedom of speech and expression (Article 19)** and limits Right to internet access recognized under **Article 21 (right to life and personal liberty)**.
- **Lack of Oversight:** The Telecommunications Act 2023 retains provisions from the colonial-era **Telegraph Act, 1885**, allowing shutdowns.
 - There is a lack of strict independent oversight mechanisms, leading to **arbitrary implementation**.
- **Economic and Social Disruptions:** India experienced the third-largest economic loss due to internet shutdowns in 2023, with the total cost reaching USD 255.2 million.

- **Businesses, students, and digital service providers suffer significant losses** due to prolonged shutdowns.
- **Impact on Democratic Processes:** Restrictions on digital communication **curtail press freedom, and democratic engagement**.
 - Shutdowns in protest-prone regions prevent **citizens from exercising their right to dissent**.
- **Impact on Governance:** Critics claim that frequent internet shutdowns contradict India's ambitions of becoming a global leader in **Artificial Intelligence (AI)**, digital governance, and technological progress.

SWAYATT Initiative

Why in News?

Government E-Marketplace (GeM) celebrated the **6th anniversary** of the **SWAYATT (Startups, Women & Youth Advantage through e-Transactions)** initiative.

What is the SWAYATT Initiative?

- **About:** It was launched in **2019** to **enhance the market access** for women entrepreneurs, youth, startups, **Micro & Small Enterprises (MSEs)**, and **Self-Help Groups (SHGs)**.
 - It enhances **seller inclusion** through **training, registration, and** capacity-building to leverage GeM for market access and growth.
- **Achievements:**
 - **Women-led enterprises and startups** have grown significantly, increasing from 6,300 women-led MSEs and 3,400 startups at launch to 1,77,786 **Udyam**-verified women MSEs.
 - Women-led businesses now constitute **8%** of GeM's seller base.
 - GeM facilitated **Rs 35,950 Crore** worth of orders from startups, addressing challenges in **market access, finance, and value addition**.
 - It aims to **double women entrepreneurs**, increase their procurement share (**currently 3.78%**), and onboard **1 lakh DPIIT-registered startups**.
 - **MoU was signed between GeM & FICCI Ladies Organisation (FICCI-FLO)** to train and onboard **9,500+ women entrepreneurs**, ensuring direct market linkages and boosting inclusive growth.

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Note:

- “Startup Runway” and “Womaniya” storefronts were included to enhance **visibility for startups, women entrepreneurs, and youth** among government buyers.

What is Government e-Marketplace (GeM)?

- GeM is the **public procurement portal** for Central & State Governments, PSUs, and affiliated entities to procure goods and services.
 - It serves as **India’s National Procurement Portal**.
- It was established in **2016** under the **Directorate General of Supplies and Disposals (DGS&D), Ministry of Commerce and Industry** with technical support from the **National e-Governance Division (MeitY)**.
- It is a **paperless, cashless, and system-driven** platform that **minimizes human intervention** in public procurement.

Mediation as a Solution to Judicial Backlog

Why in News?

The **backlog of cases** in India’s judicial system has reached alarming levels, with over **82,000 pending cases in the Supreme Court (SC)**, 62 lakh in High Courts, and nearly 5 crore in lower courts.

- Amidst growing concerns over judicial delays, **mediation** is emerging as a **viable alternative** to reduce the burden on courts and facilitate quicker dispute resolution.

What are the Causes for Judicial Backlog in India?

- **Low Judge-to-Population Ratio:** India has **only 21 judges per million people**, one of the lowest ratios globally. This results in an overwhelming **workload for judges**, slowing down case disposal.
- **Rise in Litigation:** Growing legal awareness and mechanisms like **Public Interest Litigation (PIL)** have led to an increase in the number of cases filed.
 - Litigants often approach courts for **every small dispute**, including non-meritorious cases which further clog the judiciary.
 - Nearly **half of all pending cases** involve the **government as a litigant**, increasing the burden on courts.

- **Adversarial Legal System:** The Indian Judicial system encourages **multiple interim applications and successive appeals**, prolonging the litigation process.
 - Further, laws like the **Bihar Prohibition and Excise Act, 2016**, have further clogged high courts with bail applications.
- **Infrastructure and Procedural Deficiency:** **Lack of sufficient courtrooms, and digital infrastructure** delays proceedings. Budgetary constraints limit the expansion of judicial capacity.
 - Adjournments, difficulty in locating witnesses, and delays in obtaining evidence contribute to the backlog.
- **Underutilized ADR Mechanisms:** Although **Alternative Dispute Resolution (ADR)** Mechanisms like **mediation, arbitration, and conciliation** are available, they are not widely used.

How Can Mediation Help in Reducing Judicial Backlog?

- **Mediation:** It is an **ADR process** in which a **neutral third party (mediator)** facilitates discussions between disputing parties to help them reach a mutually agreeable solution.
 - Mediation is voluntary, confidential, and cost-effective, with mediators guiding parties to a mutual solution.
- **Legal Framework:**
 - **Mediation Act, 2023:** Mandates **pre-litigation mediation** for civil and commercial disputes, except in urgent cases.
 - The **Mediation Act, 2023** grants mediation agreements the same legal status as a court decree and mandates resolution within **120 days**, extendable by 60 days if needed.
 - However, cases related to **criminal offenses, third-party rights, and taxation** are exempt from mediation.
 - **Commercial Court Act 2015:** Parties are mandated to try mediation before entering courts.
 - **Code of Civil Procedure, 1908:** Includes ADR methods like **Arbitration, Mediation, and Conciliation** for resolving disputes outside traditional court proceedings.

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Note:

- **Role in Reducing Judicial Backlog:** Mediation resolves civil, commercial, family, consumer, and property disputes, allowing courts to focus on criminal and constitutional cases, reducing their workload.
- **NITI Aayog (National Institution for Transforming India)** suggests pre-litigation mediation in government cases to ease court congestion and minimize legal disputes.
- Mediation helps resolve business, family, and community disputes while preserving relationships, often leading to amicable settlements in matrimonial cases.

What are the Alternative Dispute Resolution Mechanisms?

Click here to Read: [Alternative Dispute Resolution Mechanisms](#)

What are the Challenges Regarding Mediation in India?

- **Lack of Awareness:** Many litigants and lawyers prefer traditional litigation over mediation due to lack of awareness about its benefits.
- **Enforcement Mechanism:** While the **Mediation Act, 2023** mandates the **Mediation Council of India (MCI)**, no such body has been formed yet for effective implementation.
 - Government agencies, involved in **50% of cases**, often prefer prolonged litigation over quick mediation settlements.
- **Non-Binding Nature:** Since mediation is **voluntary and non-binding until agreement**, parties may walk away without resolution.
- **Limited Institutional Support:** Court-annexed mediation centers are **not available in all courts**, limiting access to mediation services.

SC's Direction on Remission

Why in News?

The **Supreme Court (SC)** issued **guidelines on remission**, directing states to **consider the premature release of prisoners under remission policies**, even without a formal application.

- This judgment, delivered in a *suo-motu* case initiated in **2021**, aims to **address prison overcrowding** while ensuring a **fair and non-discriminatory approach to remission**.

What are Latest SC Guidelines on Remission Policy (2025)?

- **Directive:** States **must formulate a clear remission policy within 2 months**, ensuring alignment with constitutional and judicial principles.
- **Legal Precedent:** Remission criteria must be **reasonable**, as upheld in the *Mafabhai Motibhai Sagar Case (2024)*.
- **Due Process Requirement:** Remission **cannot be revoked arbitrarily**, if conditions are violated, the state must **issue a notice with reasons** and **allow the convict to respond** before a final decision.

Note:

- As per **National Crime Records Bureau (NCRB)** data for 2022, India's prisons have a **131.4% occupancy rate**, with **75.8% undertrials**.
- As per **Prison Statistics in India Report (2022)**, **premature releases** rose from **2,321 (2020) to 5,035 (2022)**.

What is Remission?

- **About:**
 - Remission refers to the **reduction of the duration of a prison sentence without altering the nature of the sentence**.
 - It allows a **convict to be released earlier than the original term** prescribed by the court, provided they **meet specific eligibility criteria**.
- **Constitutional Provisions:**
 - **Article 72** empowers the **President of India** to grant **pardons, reprieves, respites, or remissions of punishment**, or to **suspend, remit, or commute the sentence of any person** convicted of an offense under Union law or in cases involving military courts.
 - **Article 161** grants **similar powers to the Governor** for offenses under state laws.
 - **Article 32 & 226:** Enable the **SC and High Courts**, respectively, to **intervene in remission cases** through writ jurisdiction.

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Note:

➤ Statutory Provisions:

- **Section 473 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023** (earlier **Section 432 of the CrPC**): Grants state governments the power to remit sentences *at any time*, with or without conditions.
 - Non-compliance with conditions can lead to cancellation of remission and re-arrest without a warrant.
- **Section 475 of BNSS** (earlier **Section 433A of CrPC**): Life convicts sentenced for offenses punishable by death cannot be released before completing 14 years of imprisonment.

Key Terms

- **Pardon:** Completely absolves the convict, removing both conviction and sentence, along with all associated punishments and disqualifications.
- **Commutation:** Replaces a punishment with a lesser one, such as converting a death sentence to rigorous imprisonment.
- **Respite:** Grants a reduced sentence considering special circumstances, like physical disability or pregnancy of the convict.
- **Reprieve:** Temporarily delays the execution of a sentence, particularly the death penalty, allowing time for the convict to seek pardon or commutation.

What are the Supreme Court Rulings Related to Remission?

- In **Laxman Naskar v. Union of India (2000)**, the Supreme Court (SC) outlined 5 factors for remission: societal impact, crime severity, risk of recidivism, prison conduct, and potential for reintegration, ensuring a balanced approach to justice and public safety.
- In **Epuru Sudhakar v. State of Andhra Pradesh (2006)**, the SC ruled that judicial review of remission orders is permissible on grounds such as non-application of mind, mala fide intent, reliance on extraneous or irrelevant considerations, exclusion of relevant materials, or arbitrariness.
- In the **State of Haryana vs. Mahender Singh (2007)**, the SC held that while remission is not a fundamental right of a convict, the State must exercise its executive power judiciously, considering each case based on relevant factors.

- In **Sangeet & Anr. v. State of Haryana (2013)**, the SC held that remission under Section 432 CrPC requires a convict's application and cannot be granted *suo-motu* by the government.
- In **Mohinder Singh v. State of Punjab (2013)**, the SC reaffirmed that courts do not have the authority to grant remission on their own, emphasizing that remission must be initiated through a formal request.
- In **Union of India v. V. Sriharan (2015)**, the SC upheld life imprisonment without remission until the convict's "last breath," deeming it an alternative to the death penalty.
- The SC, in 2024 quashed the **Gujarat government's remission order** for the 11 convicts in the **Bilkis Bano case** and set aside its 2022 judgment that had allowed Gujarat to decide their premature release.
 - It ruled that, as per **Section 432(7) of the CrPC**, the "appropriate government" for remission is where the offender is sentenced, not where the crime occurred. This principle was reaffirmed from **V. Sriharan v. Union of India (2015)**.
- In **Mafabhai Motibhai Sagar v. State of Gujarat (2024)**, the SC ruled that remission conditions must be reasonable, ensuring they are neither arbitrarily stringent nor vague.

Read More:

- [What are the Different Types of Pardoning Power?](#)
- [What are the Issues in Granting Remission?](#)

NEP 2020 and Samagra Shiksha Abhiyan

Why in News?

The Union Government has withheld Tamil Nadu's central share of **Samagra Shiksha Abhiyan** funds for opposing the **National Education Policy (NEP 2020)**.

Why Tamil Nadu Opposes NEP 2020?

- **Language Policy Dispute:** NEP 2020 mandates a **three-language policy** (Tamil, English, and a regional language), which Tamil Nadu views as an imposition of the center's policy.
 - Tamil Nadu follows a **two-language formula** (Tamil and English) since 1968.

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Note:

- **Undermining State Autonomy:** Tamil Nadu sees the Centre's push for uniform NEP implementation as an **infringement on its autonomy**, weakening **cooperative federalism**.
 - Education is on the **Concurrent List**, requiring flexibility and **state-level adaptability**.
 - Tamil Nadu is drafting its own **State Education Policy** to suit its **socio-linguistic and economic context**.
- **Call for a Pragmatic Approach:** Tamil Nadu argues that central schemes like **Samagra Shiksha** and **PM SHRI** should be **delinked from NEP 2020**.
 - Funding should be based on **performance indicators** rather than policy compliance.

What is the National Education Policy (NEP) 2020?

- **About:** NEP 2020 replaced the **34-year-old NEP of 1986** and aimed to bridge gaps in **quality, equity, and access to education** at all levels.
 - Based on the recommendations of **Dr K Kasturirangan committee**, it prioritizes **foundational literacy, a holistic curriculum, multilingual learning**, and integration of vocational and academic pathways.
- **Key Provisions:**
 - **Structural Reforms:** NEP 2020 replaced the **10+2 system with a 5+3+3+4 structure**, aligning education with the developmental needs of children **aged 3 to 18 years**.

Stage	Duration	Ages (Grades Covered)	Key Features
Foundational Stage	5 years	Ages 3-8 (Preschool & Grades 1-2)	Play-based learning
Preparatory Stage	3 years	Grades 3-5	Introduction of formal learning methodologies
Middle Stage	3 years	Grades 6-8	Experiential and multidisciplinary learning
Secondary Stage	4 years	Grades 9-12	Flexibility in subject choices

- **Experiential Learning:** NEP 2020 emphasizes experiential learning through **internships, field visits, and real-world projects** to bridge theory and practice.
 - NEP promotes technology integration through **digital literacy, online platforms**, and tech-enabled classrooms to enhance learning.
- **Teacher Training:** NEP 2020 emphasizes continuous professional development to **equip teachers for evolving educational needs**.
- **Key Initiatives:**
 - **PM SHRI scheme:** It aims to develop **14,500 ideal schools** to serve as role models.
 - **NIPUN Bharat Mission:** It was launched to ensure **foundational literacy and numeracy by Grade 2**.
 - **PARAKH:** **PARAKH (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development)** have been introduced to **monitor learning outcomes**.
 - **NISHTHA:** **NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement)** teacher training program launched to **equip educators with skills** aligned with NEP's transformative goals.
- **Major Achievements:**
 - **Foundational Stage Curriculum:** The **National Curriculum Framework for the Foundational Stage (NCF-FS)** introduced the **Jadui Pitara kit** to promote play-based learning for children aged 3-8.
 - **Regional Language Inclusion:** AICTE-approved engineering and medical courses are now available in **regional languages**, with **JEE and NEET** conducted in **13 languages** for better accessibility.

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Note:

- **Four-Year Undergraduate Program (FYUP):** Over 105 universities have adopted the FYUP, offering **multiple exit options and greater flexibility** in higher education.
- **Global IITs:** IIT-Madras opened a campus in **Zanzibar** (Tanzania) and **IIT-Delhi** is planning a campus in Abu Dhabi (UAE).
- **Digital Learning:** **PM e-VIDYA** and **DIKSHA platforms** promote digital learning for universal access, while **Vidya Samiksha Kendra** provides real-time data on educational progress.
- **Challenges:**
 - **Integration of the 5+3+3+4 Structure:** Aligning state curricula and training teachers for new methods remains a **challenge**, with foundational textbooks for some grades only recently prepared.
 - **Pending Legislation:** NEP 2020 proposes merging **UGC, AICTE, and NCTE** into a single higher education regulator, but the legislative framework is still **pending**.
 - **Lack of Uniform Monitoring:** Although evaluation efforts are ongoing, there are **no standardized assessment metrics** across states to measure NEP's impact effectively.

What is Samagra Shiksha Abhiyan?

- **About:** Introduced in the Union Budget 2018-19, **Samagra Shiksha** is a comprehensive program covering education from **pre-nursery to Class 12** to ensure equitable learning outcomes.
- **Key Features:**
 - **Integration of Schemes:** It subsumes three earlier schemes:
 - **Sarva Shiksha Abhiyan (SSA):** Focused on universal primary education.
 - **Rashtriya Madhyamik Shiksha Abhiyan (RMSA):** Aimed at secondary education.
 - **Teacher Education (TE):** Focused on training teachers.
 - **Sector-Wide Development Approach:** It streamlines implementation across **all levels (state, district, and sub-district)** instead of fragmented project-based objectives.

- **Alignment with SDGs:** Ensures free, equitable, and quality education (**SDG 4.1**) while eliminating gender disparities and ensuring access for vulnerable groups (**SDG 4.5**).
- **Implementation:** It is a **centrally sponsored scheme** (CSS) implemented through a **single State Implementation Society (SIS)** at the **State/UT level**.
 - SIS is a **state-registered body** implementing **CSS** and **development programs**.

Click Here to Read:

- **How CSS Pose Challenge to Fiscal Federalism?**
- **What are the Challenges in Competitive and Cooperative Federalism in India?**

Draft UGC Regulations 2025

Why in News?

Six Indian states called for the **withdrawal of the draft University Grants Commission (Minimum Qualifications for Appointment and Promotion of Teachers and Academic Staff in Universities and Colleges and Measures for the Maintenance of Standards in Higher Education) Regulations, 2025**, citing concerns over **federal autonomy** and educational standards.

What are the Key Provisions of Draft UGC Regulations 2025?

- The draft centralizes the selection process for **Vice Chancellors (VCs)** by removing the role of **State governments** in the appointment.
 - Universities failing to comply could be **debarred from UGC schemes** and denied funding.
- The draft proposes increasing the tenure of VCs from three years to five years.
- The draft allows the appointment of **non-academics with at least 10 years of senior-level experience** in public administration and public policy.
- The draft proposes **making entrance exams mandatory for undergraduate courses**.
- The draft strengthens academia-industry collaboration, promotes Indian languages in academic publication, enhances transparency, and includes sportspersons in teaching roles.

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Note:

What are the Key Facts About UGC?

- **Genesis:** India's first effort to establish a national education system began with the **1944 Sargeant Report**, which recommended creating a **University Grants Committee**.
 - Formed in **1945**, the committee initially supervised **Aligarh, Banaras, and Delhi** universities. By **1947**, its scope expanded to include all existing universities.
 - In **1948**, the **University Education Commission**, led by **Dr. S. Radhakrishnan**, recommended its restructuring based on the **UK model**.
 - In **1952**, the Union Government designated the **University Grants Commission (UGC)** to oversee grants for Central Universities and higher education institutions.
 - Formally inaugurated by **Maulana Abul Kalam Azad** in **1953**, it became a **statutory body** in **1956**. The head office of the UGC is located in **New Delhi**.
- **Composition:** UGC is made up of a **Chairman, a Vice-Chairman, and 10 other members**. The Central Government appoints all members of the UGC.
- **Key Functions:** Assess universities' financial needs, and allocate and disburse grants for maintenance, development, and other purposes.
 - Recommends improvements in higher education and assists in implementation.

Regulation of Education in India

- **About:** Professional fact-checkers are **individuals or organizations** that **verify public claims to combat**
- The **42nd Constitutional Amendment Act, 1976** shifted **Education** from the **State List** to the **Concurrent List**, allowing the **central government** greater involvement in policymaking while preserving **state autonomy** in local education administration.
 - Policies like **National Education Policy (NEP) 2020** and the role of bodies like **UGC**, and **All India Council for Technical Education (AICTE)** derive their authority from the Concurrent List.
- **Education in 7th Schedule:**

Union List (List I)	State List (List II)	Concurrent List (List III)
<ul style="list-style-type: none"> ➤ The institutions known at the commencement of this Constitution include Banaras Hindu University, Aligarh Muslim University, Delhi University. ➤ Institutions of national importance (IITs, IIMs, AIIMS, etc.) ➤ Institutions for scientific or technical education funded by the Union Government. ➤ Coordination and determination of standards in higher education and research institutions (e.g., UGC, AICTE). ➤ Union agencies involved in vocational, technical, and scientific education. 	<ul style="list-style-type: none"> ➤ Incorporation and regulation of universities, educational institutions, and libraries within the state (excluding institutions of national importance). 	<ul style="list-style-type: none"> ➤ Education, including technical and medical education, universities, and vocational training (both Union and State governments can legislate).

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Note:

2nd All-India State Water Ministers' Conference

Why in News?

The 2nd All-India State Water Ministers' Conference, organized by the Ministry of Jal Shakti concluded in Udaipur, Rajasthan suggested a number of initiatives for water management issues.

- The conference, themed "India@2047 – A Water Secure Nation".

Note:

- The First All India State Ministers Conference on Water held in Bhopal (January 2023) focussed on five key areas i.e., water security, water use efficiency, governance, climate resilience, and water quality.

What are Key Initiatives Suggested by 2nd All-India State Water Ministers' Conference?

- **Agricultural Water Management:** Adoption of **micro-irrigation** techniques such as **drip and sprinkler irrigation**, expanding **Pressurized Irrigation Networks (PIN)**, **Evapotranspiration (ET)**-based irrigation performance assessment to improve **water efficiency** in agriculture.
 - ET combines **soil evaporation** and **plant transpiration** to assess whether crops receive **adequate water** for **optimal growth**.



- **River Rejuvenation:** Implementing **floodplain zoning**, rejuvenating water sources such as **springs** to augment river flows, and promoting **quantification of water consumption** can augment **river restoration projects**.

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Note:

- **Strengthening Drinking Water Supply:** Sustaining the **Jal Jeevan Mission (JJM)** through **Village Water & Sanitation Committees (VWSCs)**.
 - Enhancing **urban water security** through **AMRUT** by improving water supply infrastructure promoting **grey water management** under **Swachh Bharat Mission 2.0** for wastewater reuse.
- **Improving Water Storage:** Prioritizing **Extension, Renovation, and Modernization (ERM)** of water storage systems to **maximize efficiency and lifespan** while restoring smaller water bodies to enhance availability in **rural and urban areas**.
 - Implementing **automated reservoir operations** for better management of water storage and distribution.
- **Strengthening Water Governance:** Implementing **Integrated Water Resources Management (IWRM)** with state-specific solutions and strengthening **grassroots participation** in water governance.
 - **Scaling up the 'Jal Sanchay Jan Bhagidari'** initiative **nationwide** to promote **community-driven** water conservation efforts.

22nd Foundation Day of NCST

Why in News?

The **National Commission for Scheduled Tribes (NCST)** celebrated its **22nd Foundation Day** on **19th February 2025**, highlighting the Commission's role in protecting **Scheduled Tribes (ST)** rights.

What are the Key Facts About the National Commission for Scheduled Tribes?

- **Origin and Evolution:** In 1992, a statutory National Commission for Scheduled Castes (SCs) and STs was established. Later, to address the **distinct needs of STs**, the NCST was **established** on **19th February 2004**, through the **89th Constitutional Amendment Act**, amending **Article 338** and adding **Article 338A** to the Constitution.
- **Composition and Tenure:**
 - **Structure:** NCST comprises a **Chairperson** (Cabinet Minister rank), a **Vice-Chairperson** (Minister of State rank), and **three Members** (Secretary rank), all appointed by the **President**.
- At least one other Member shall be appointed from amongst **women**.
- **Tenure & Reappointments:** The **term of office** for all members is **three years**. A member can be reappointed for a **maximum of two terms**.
- **Key Functions:** Under **Article 338A(5)**, the NCST monitors **constitutional safeguards for STs**, addresses tribal rights issues, advises on socio-economic development.
 - Reports to the **President on tribal welfare**, suggests policy measures, and oversees ST welfare programs.
 - Additionally, under the **NCST (Specification of Other Functions) Rules, 2005**, the commission recommends land ownership rights for tribals (**Forest Rights Act, 2006**), and suggests alternative livelihood strategies.
 - Advocates for full implementation of the **Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA)**, and seeks solutions to reduce and eliminate shifting cultivation.

Who are the Provisions Related to Scheduled Tribes in India?

Click here to Read: [Provisions Related to STs in India](#)

What are the Challenges Regarding the NCST?

- **Administrative and Financial Constraints:** The NCST functions under the **Ministry of Tribal Affairs**, lacking **financial and operational autonomy**, affecting its independence in budgeting, and operations.
 - **Article 338A(9)** of the Constitution mandates that the **Union and State Governments consult the NCST on all major policy matters** affecting STs.
 - However, many states and departments **fail to seek its advice**, leading to **tribal welfare policies being designed without the Commission's input**.
- **Manpower Shortages:** The NCST reviews tribal welfare schemes, but its effectiveness is hindered by **limited staff and poor coordination**.
 - Historically, the NCST has faced **prolonged vacancies** in key positions like Chairperson and Members.
 - Manpower shortages and bureaucratic delays result in prolonged resolution times, leaving many cases pending for years and weakening public trust.

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Note:

- **Weak Enforcement Powers:** The **recommendations of NCST are not binding**, limiting its ability to enforce protective measures for STs.
 - Despite receiving numerous petitions on **atrocities against tribals, land alienation, and denial of reservation benefits**, the NCST lacks the power to enforce its directives.
 - This weakens its authority and **reduces accountability among government agencies**.
- **Lack of Awareness and Outreach:** Many tribals are **unaware** of their rights and the existence of NCST, the **Commission lacks a strong grassroots presence**.

Appointment of CEC and EC

Why in News?

Gyanesh Kumar has been appointed as the **Chief Election Commissioner (CEC)** under the **Chief Election Commissioner and other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**.

- **One of the members** of the selection committee objected that the selection process **bypassed Supreme Court (SC)** guidelines in the **Anoop Baranwal Case, 2023**.

What are the Key Facts Regarding the 2023 Act?

- **About:** The Act replaces the **Election Commission (Conditions of Service of Election Commissioners and Transaction of Business) Act, 1991** to regulate the **appointment, tenure, service conditions** of CEC/ECs, and **Election Commission** procedures.
- **Judicial Background:** This Act followed SC intervention after several petitions challenged the **Centre's exclusive power** in appointing CEC and ECs.
 - In the **Anoop Baranwal Case, 2023**, the SC ruled that a panel of the **Prime Minister, LoP, and CJI** would select CEC and ECs until **Parliament** passed a law.
 - Before the Judgement, the appointment of the CEC and other ECs was made by the **President** on the advice of the **Union Council of Ministers** headed by the **Prime Minister**.

Key Provisions:

- **Selection Committee:** The CEC and ECs will be appointed by the **President** based on the recommendation of a **Selection Committee** consisting of:
 - Prime Minister (Chairperson).
 - **Leader of the Opposition (LoP)** (or leader of the largest opposition party) in the **Lok Sabha**.
 - **Union Cabinet Minister** nominated by the Prime Minister.
- **Search Committee:** A Search Committee, **led by the Law Minister** and comprising **two other members not below the rank of Secretary** to the Government of India, shortlists five candidates.
 - **Section 8** of the Act gives the Selection Committee the power to **consider names beyond the shortlisted five**.
- **Eligibility Criteria:** The CEC and other ECs must have held a **Secretary-level post** in the Government of India and possess **integrity, election management experience**.
- **Salary, Term, and Reappointment:** CEC and ECs receive a **SC judge's salary** and serve for **six years or until age 65**, whichever is earlier.
 - CEC and ECs **cannot be re-appointed**. If an EC becomes CEC, their total tenure **cannot exceed six years**.
 - A CEC or EC receiving a government pension (**excluding disability pension**) will have their salary **reduced by the amount of the pension received**.
- **Removal and Resignation:** The CEC can be removed only in the **same manner** and on the **same grounds as a SC Judge**, while an EC can be **removed** on the CEC's recommendation.
 - Both can **resign to the President**.

What are the Key Concerns Regarding the 2023 Act?

- **Exclusion of CJI:** The 2023 Act replaces the **SC-mandated panel (PM, LoP, CJI)** with a committee of the **PM, LoP, and a Union Minister** allowing the **executive to dominate** the selection process.

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Note:

- **Violation of Separation of Power:** The Act is being challenged in SC by petitioners arguing whether **Parliament** has the **legal authority to override or modify a SC's Constitution Bench ruling** in the **Anoop Baranwal Case, 2023** through legislation or ordinance.
- **Vacancy in Selection Committee:** The Act allows the Selection Committee to **function despite vacancies**.
 - If the **LoP** post is vacant due to the **dissolution of the Lok Sabha**, only the **PM and a Union Minister** will remain for selecting candidates, effectively bypassing both the **judgment and the 2023 Act**.
- **Undermining Free and Fair Elections:** With the **executive holding two of three votes**, the Act raises concerns over ECs' independence and **potential alignment with the ruling party** that may undermine free and fair elections.
- **Impact on Credibility of EC:** The Act's Search Committee for CEC and EC candidates faces criticism for **increasing executive influence** even before appointment.
 - **Perceived bias** in EC selection could significantly impact **Indian democracy**, as elections determine political power.

Global Practices in the Appointment of Electoral Body Members

- **South Africa:** The selection process involves key figures such as the **President of the Constitutional Court**, representatives of the **Human Rights Court**, and advocates for **gender equality**.
- **United Kingdom:** Candidates for the electoral body are subject to approval by the **House of Commons**.
- **United States:** The President appoints members to the electoral body, and the appointments require **confirmation by the Senate**.

Mob Lynching

Why in News?

The Supreme Court has **declined to issue nationwide directives** for uniform **compensation and monitoring of mob lynching and cow vigilantism** cases, citing feasibility concerns.

- However, it reaffirmed that its 2018 **2018 Tehseen Poonawalla guidelines** remain binding on all states under **Article 141** of the Constitution.

What is Mob Lynching?

- **About:**
 - Mob Lynching is a **collective violence** where a **group unlawfully punishes** individuals based on **perceived wrongdoing**, bypassing legal procedures.
 - **Cow Vigilantism** is a **violence in the name of cow protection**, threatening secularism and social harmony, often **driven by suspicion**.
- **Causes of Mob Lynching:**
 - **Perceived Threat to Culture or Identity:** Lynching occurs when individuals or groups are seen as **threatening cultural, religious, or traditional values**.
 - Common triggers include **inter-caste/inter-religious relationships, food habits, or customs** perceived as challenging societal norms.
 - **Rumors: Fake news and rumors**, often spread via **social media and word of mouth**, can incite mob violence.
 - **Socio-Political Tensions:** Tensions from **land disputes, resource competition, and economic disparities** can escalate into violence, often **exploited for political gains**.
 - **Communal Divisions:** Historical religious, ethnic, or **communal tensions** often act as catalysts for lynching incidents.
 - **Moral Vigilantism:** Self-proclaimed groups enforce **their interpretation of social norms** through violence, targeting individuals they consider violators.

What are the Legal Provisions Related to Mob Lynching in India?

- **Bhartiya Nyaya Sanhita (BNS), 2023:**
 - Section 103(2): Mob Lynching as Murder
 - When a group of **5 or more persons** acting in **concert** commits **murder** on grounds like race, caste, community, sex, place of birth, language, or personal belief.
 - **Punishment:** Death penalty or life imprisonment along with a fine.
 - Section 117(4): Grievous Hurt by a Mob
 - When a group of **5 or more persons** acting in **concert** causes **grievous hurt** on similar discriminatory grounds.
 - **Punishment:** Imprisonment up to **7 years** and fine.

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Note:

- **SC Directions in *Tehseen Poonawalla Case, 2018*:**
 - SC **strongly condemned mob violence**, stating that **no individual or group can take the law into their own hands**.
 - The Court warned that unchecked lynching could become **"the new normal"** and emphasized that **mob justice has no place in a civilized society**.
 - It stated that the **state has a duty to protect citizens and prevent targeted violence**.
 - It cited **American legal precedents** to reinforce that **mob justice undermines the rule of law**.
 - **SC Directions for Mob Lynching:**
 - **Strict Action Against Incitement:** Automatic FIRs under IPC Section 153A (**section 196 in BNS**) (**promoting enmity between different groups**) for those spreading **hate speech or fake news**.
 - **Preventive Measures:** States to appoint a **senior police officer as a nodal officer** in each district.
- Identify vulnerable areas and **increase police patrolling**.
- Social media platforms must **curb hate speech and fake news**.
 - **Punitive and Remedial Measures:** Fast-track courts in every district to resolve cases within **6 months**.
- Strict punishment, including **life imprisonment**, for lynching crimes.
- **Disciplinary action** against negligent officials.
 - **Victim Compensation:** States to develop a **compensation scheme** based on **injury severity, livelihood loss, and medical expenses**.
 - **Accountability of Officials:** Action against officials failing to prevent lynching.
 - **Monitoring and Legislative Measures:** States must **submit periodic reports** on mob lynching incidents.
- Parliament urged to **enact a national anti-lynching law** (pending), though **Rajasthan and Manipur** have enacted state laws.

What are the Challenges in Tackling Mob Lynching?

- **Legal Gaps and Weak Enforcement:** India lacks a **specific anti-lynching law**, leading to **inconsistent action** against such crimes. Though the SC has set

guidelines to prevent mob violence, **enforcement remains weak**.

- **Communal Targeting and Bias:** Lynching incidents **disproportionately affect weaker communities**. This **deepens communal divisions** and raises concerns about systemic discrimination and biased law enforcement.
- **Data Deficiency and Policy Gaps:** The **NCRB** stopped recording separate data on mob lynching and hate crimes after 2017, making it **hard to gauge the extent of the issue** leading to challenges in formulating effective measures to prevent such violence.
- **Social Media & Misinformation:** Fake news and **inflammatory content** on digital platforms incite violence, making regulation and accountability difficult.

President's Rule in Manipur

Why in News?

The Centre has imposed the **President's rule** in Manipur under **Article 356** of the **Indian Constitution** and suspended the state assembly after the **resignation** of its **Chief Minister**.

How President's Rule Can Help in Resolving Conflict in Manipur?

- **Neutral Administration:** Central rule will remove **allegations of biased handling of ethnic violence**, protecting both **Kuki-Zo and Meitei** communities.
 - Governor-supervised central forces can **prevent ethnic clashes** and maintain law & order in the state.
- **Electoral Stability:** Prevents governance erosion by **ending internal disputes** within the ruling party.
- **Rehabilitation:** Ensures **fair relief and rehabilitation** for 60,000 displaced people in camps for over 20 months.

Click Here to Read: [What led to the Manipur Unrest?](#)

What is the President's Rule?

- **About: President's Rule** refers to the suspension of a **state government** and its **legislative assembly**, placing the state under the **direct control of the central government**.
 - It is imposed under **Article 356** of the **Indian Constitution**.

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- **Constitutional Basis:** **Article 355** mandates the Central government to ensure that every state functions as per the Constitution.
 - If a state government **fails to function as per constitution**, the Centre can **intervene** under **Article 356** by imposing **President's Rule**.
 - President's Rule is also known as **State Emergency** or **Constitutional Emergency**.
- **Grounds for Proclamation:**
 - **Article 356:** The President can impose President's Rule if a **situation arises** where the state government **cannot function as per the Constitution**. This can be done:
 - On the recommendation of the **Governor**.
 - On the **President's discretion**, even without the Governor's report.
 - **Article 365:** If a state **fails to comply with the Centre's directions**, the President can declare that its government **cannot function constitutionally**.
- **Parliamentary Approval:** A proclamation of President's Rule must be approved by **both Houses of Parliament** within **two months**.
 - If President's Rule is declared when the **Lok Sabha is dissolved**, or if it dissolves **within two months without approving** the proclamation, it remains **valid until 30 days after the Lok Sabha reconvenes**, provided the **Rajya Sabha approves** it during this period.
 - Approving or extending the President's Rule requires a **simple majority** in Parliament (majority of members present and voting).
- **Duration:** President's Rule lasts **six months** initially and can be extended **up to 3 years** with Parliament's approval every six months.
 - The **44th Amendment Act, 1978** allows extending President's Rule **beyond one year only if:**
 - **National Emergency** is in force across India or in any part of the state.
 - The **Election Commission** certifies that elections to the state assembly cannot be held due to difficulties.

- For extension of President's Rule **beyond 3 years**, constitutional amendment is required. E.g., **67th Amendment Act, 1990** and **68th Amendment Act, 1991** was enacted to extend President's Rule beyond 3 years in Punjab during **Punjab insurgency**.
- **Impacts:** The **President assumes extraordinary powers** when the President's Rule is imposed.
 - **Executive Powers:** The President takes over state functions, with the **Governor administering** on their behalf, assisted by the **Chief Secretary** and appointed advisors.
 - **Legislative Powers:** The State Legislature is **suspended or dissolved**, with **Parliament** exercising its powers or delegating law-making authority to the President or a specified body.
 - Laws made during the President's Rule remain in force **unless repealed by the state legislature**.
 - **Financial Control:** The President **can authorize expenditure** from the **State Consolidated Fund** until it is approved by Parliament.
- **Revocation:** The **President can revoke President's Rule anytime** without parliamentary approval.

What is the Supreme Court's Stand on Imposition of President's Rule?

- **SR Bommai Case, 1994:** The Supreme Court (SC) ruled that **Article 356 is subject to judicial review**, and state government's dismissal must be based on a **floor test**, not the **Governor's opinion**.
- **Sarbananda Sonowal Case, 2005:** Article 355's scope was **broadened**, enabling the Union to take **wider actions to uphold state governance** and constitutional principles.
- **Rameshwar Prasad Case, 2006:** The SC condemned the Bihar Assembly's dissolution **without a floor test** and criticized the **political misuse of Article 356**.
 - **Article 356 cannot** be used to combat social evils like **defection**.
 - Immunity under **Article 361** does **not prevent** the court from reviewing the **validity of actions**.

Click Here to Read: [Proper and Improper Use of Article 356](#)

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Note:

What are the Recommendations Regarding Imposition of President's Rule?

- **Sarkaria Commission (1987):** It recommended using **Article 356 sparingly**, only as a **last resort** when all **alternatives fail** to resolve a state's constitutional breakdown.
- **Punchhi Commission (2010):** It proposed “**localizing emergency provisions**” under Articles 355 and 356, allowing Governor's rule localised areas, like a **district or parts of it** for up to **3 months**.
- **National Commission to Review the Working of the Constitution (NCRWC, 2000):** **Article 356 should not be deleted**, but it must be **used sparingly** and only as a remedy of the **last resort**.
 - President's Rule may continue even **without an emergency if elections cannot be held**. Article 356 should be **amended accordingly**.
- **Inter-State Council (Article 263):** The Governor's report recommending imposition of President's rule should be **detailed and explanatory**.
 - The state at fault should **receive a warning before President's Rule** is imposed.
 - A **special majority** should be required for ratifying the proposal to impose **President's Rule**.

Status of Devolution to Panchayats in States 2024 Report

Why in News?

The **Ministry of Panchayati Raj** has released a report titled “**Status of Devolution to Panchayats in States – An Indicative Evidence Based Ranking**” highlighting the **progress in empowering Panchayati Raj Institutions (PRIs)** across India.

What are the Key Findings of the Devolution to Panchayats in States 2024 Report?

- **About Report:** It is also referred to as the **Panchayat Devolution Index 2024** which evaluates the autonomy and empowerment of **Panchayati Raj Institutions (PRIs)** by assessing the devolution of powers and resources across Indian states and Union Territories.

- It assesses **Panchayats' autonomy** in decision-making and implementation, reflecting **Article 243G** of the Constitution.
- **Dimensions:** It assesses **six critical dimensions** i.e., Framework, Functions, Finances, Functionaries, Capacity Building, and Accountability of the Panchayats.
- **Key Findings:**
 - **Overall Devolution:** The overall devolution to **rural local bodies** increased from **39.9% in 2013-14 to 43.9% in 2021-22**.
 - **State Rankings: Top 5 States** are **Karnataka (1st)**, **Kerala (2nd)**, **Tamil Nadu (3rd)**, **Maharashtra (4th)** and **Uttar Pradesh (5th)**.
 - Lowest-ranked states/UTs are **Dadra & Nagar Haveli and Daman & Diu (13.62)**, **Puducherry (16.16)**, and **Ladakh (16.18)**.
 - **Improvements in Infrastructure:** Government efforts have strengthened PRIs through **infrastructure, staffing, and digitalization**, raising the functionaries index from **39.6% to 50.9%**.
 - The **Rashtriya Gram Swaraj Abhiyan (RGSA, 2018)** boosted the capacity enhancement component of the Index from **44% to 54.6%**.
 - **Performance Across 6 Dimensions:**

Dimension	State	Key Strength
Framework	Kerala	Robust legal and institutional framework for Panchayats
Functions	Tamil Nadu	Devolved functional responsibilities to Panchayats
Finances	Karnataka	Best financial management practices
Functionaries	Gujarat	Personnel management and capacity-building efforts
Capacity Enhancement	Telangana	Institutional strengthening efforts
Accountability	Karnataka	Transparency and financial accountability

- **Challenges:**
 - **Institutional Flaws:** **Rotation** of reserved seats for **SCs, STs, and women** affects leadership continuity as new leaders may **not prioritize the same goals** or may have **different approaches**.
 - **District Planning Committee (DPCs)** exist but lack proper implementation.

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Note:

- **Inconsistent Transfer of Functions: 29 subjects (11th Schedule)** are **inconsistently** transferred as State governments **fear losing control or influence** at ground level, limiting Panchayats' decision-making power.
- **Weak Financial Autonomy:** Non-implementation of **State Finance Commissions (SFCs)** recommendations, **centralized GST**, and **lack of fiscal autonomy** restrict Panchayats' financial control.
- **Poor Resource Capacity:** Elected representatives **lack proper training in governance, budgeting, and planning.**
- **Low Accountability:** Low **social audits** and **Gram Sabha participation** reduce oversight; insufficient finance disclosure undermines transparency.
- **Recommendations:**
 - **Fund Utilization:** Stresses **strict monitoring of funds** to prevent misuse and corruption.
 - **Strengthening Panchayat Bhawans:** Should act as **hubs for public services** and improve access to government schemes e.g., **Ayushman Bharat.**
 - **Empower Panchayats:** Urges states to fully **devolve powers and responsibilities** to Panchayats.
 - **Strengthening SFCs:** To ensure **timely fund allocation.**

- **Autonomy in decision-making** for Panchayats, especially in flagship schemes like **MGNREGA, NHM, and PMAY.**
- **Digital Infrastructure:** Enhance **digital infrastructure** in Panchayats for better governance and transparency.

What is the Status of PRI Funding?

- **Revenue Composition:** PRIs generate **only 1%** of revenue through taxes, indicating limited self-financing capacity.
 - **80% of PRI revenue** comes from **Central government grants**, and **15% from State government grants.**
- **Revenue Per Panchayat:** Each Panchayat earns **Rs 21,000 from own taxes** and **Rs 73,000 from non-tax sources.**
 - Central grants average **Rs 17 lakh**, and State grants are around **Rs 3.25 lakh per Panchayat**, showing high reliance on external support.
- **Low Revenue Expenditure:** The ratio of revenue expenditure of panchayats to **nominal GSDP** is less than **0.6%** for all the states ranging from **0.001% in Bihar to 0.56% in Odisha.**
- **Inter-State Disparities:** Kerala and West Bengal have the **highest average revenue** (over Rs 60 lakh and Rs 57 lakh), while states like **Andhra Pradesh and Punjab** report **much lower revenues** (less than Rs 6 lakh).



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Note:

Economic Scenario

Highlights

- RBI Reduces Risk Weights on NBFCs and MFIs Loans
- AI Revolution in Indian Agriculture
- Quality of Public Expenditure Index
- Stagnation of India's Patent Growth
- 10th Anniversary of Soil Health Card Scheme
- Microfinance Sector in India
- 9th Anniversary of PMFBY
- Cooperative Bank

RBI Reduces Risk Weights on NBFCs and MFIs Loans

Why in News?

Reserve Bank of India (RBI) reduced the risk weights of bank loans to **NBFCs** and **Microfinance Institutions** to **boost credit flow** and enhance lending to the retail sector of the economy.

What is the Risk Weight on Loans and How Does It Impact NBFCs and Banks?

- **About:** Risk weight is a **percentage factor** assigned to a **bank's assets**, including loans, to determine the amount of **capital required to cover potential losses**.
 - **Higher risk weight increases capital requirements**, making loans costlier, while **lower risk weight reduces capital needs**, enabling more lending.
- **Criteria:** Risk weights depend on **credit rating, asset type, and regulations**. **Highly rated** borrowers get **lower risk weights**, while **low-rated** ones face **higher risk weights**.
- **Impact of Lower Risk Weights:**
 - **Encouraging Bank Lending to NBFCs:** Banks need to hold **less capital** for loans, increasing their **lending capacity to NBFCs**.

- **Positive Impact on Credit Growth:** Enhanced liquidity will boost **NBFC lending in housing, consumer finance, and MSMEs**. The retail sector gains from improved access to credit.
- **Enhancing Financial Stability:** Boosting credit growth increases **employment, income levels and financial resilience**.

Capital Adequacy Ratio (CAR)

- **About:** It measures a **bank's financial strength**, ensuring a bank has **enough capital to absorb potential losses** and protect depositors.
- **Components:**
 - **Tier-1 Capital:** Core capital (**equity, share capital, retained earnings**) used to absorb losses while the bank continues operating.
 - **Tier-2 Capital:** Secondary capital (**unaudited reserves, subordinated debt**) used when the bank is winding down.
- **Regulatory Requirement:** It is set by the **Basel Accords** and enforced by central banks (e.g., RBI in India).
 - As per **Basel III norms**, banks are required to maintain a **minimum CAR of 8% globally**, while **RBI mandates 9% for Indian banks**.
- **Importance:** A higher CAR indicates a bank is **financially stable** and capable of handling financial crises.

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Note:

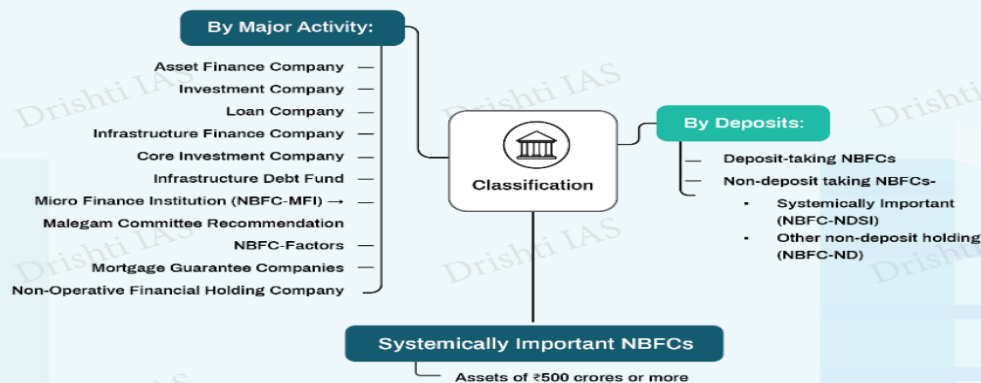
Non-Banking Financial Companies (NBFCs)

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

About:

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

Classification:



Regulation:

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

Benefits of NBFCs:

- Financial Inclusion
- Innovative Products
- Liquidity
- Support for MSMEs

Challenges of NBFCs:

- Funding Constraints
- Asset Quality & Credit Risk
- Regulatory Compliance
- Corporate Governance



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Note:

Microfinance Institutions (MFIs)

About MFIs

- Provides financial services & small-value loans
- **Targets** – Low-income households, small businesses, & entrepreneurs in rural & urban areas
- Maximum annual income criteria – **Rs 3 lakh** (for collateral-free microloans)

Evolution of Microfinance Sector

- **Initial Period (1974–1984):**
 - Shri Mahila Sewa Sahakari Bank established for women
 - NABARD promoted SHG linkage
- **Change Period (2002–2006):**
 - Unsecured lending norms for SHGs were aligned with secured loans
 - RBI included microfinance in the priority sector
- **Growth and Crisis (2007–2010):**
 - Private equity investments → Rapid MFI growth
 - Microfinance Institutions Network (MFIN) formed
- **Consolidation and Maturity (2012–2015):**
 - Malegam Committee (2012) recommended regulatory changes
 - New Category of NBFCs – Non Banking Financial Company-Micro Finance Institutions (NBFC-MFIs)
 - Universal banking license to Bandhan Bank (largest microlender) by RBI (2014)
 - MUDRA Bank launched (2015)



MFIs in India are regulated by the RBI through the NBFC-MFIs framework 2014.

Business Models

- **Self Help Groups (SHGs):**
 - Informal groups (10-20 members) saving together & accessing credit
 - Linked to banks through the SHG-Bank Linkage Programme
- **Microfinance Institutions (MFIs):**
 - Offer micro-credit & financial services
 - Loans through Joint Lending Groups (JLGs) of 4-10 members

Types of MFIs

- **NGO-MFIs** (under Society Registration Act 1860 or Indian Trust Act 1880)
- **Co-operative Societies**
- **Section 8 Companies** (under Companies Act, 2013)
- **NBFC-MFIs** (accounts for 80% of microfinance market)

Benefits

- Digitization and financial inclusion
- Self-sufficiency (entrepreneurship and improved livelihoods)
- Steady income (assets building)
- Women entrepreneurship



Challenges of MFIs	Way Forward
High Interest Rates	Improve regulatory oversight and encourage interest rate caps
Over-Indebtedness of Borrowers	Strengthen credit risk assessment and promote financial literacy
Dependency on External Funding	Diversify funding sources through partnerships and capital markets
Low Financial Literacy Among Borrowers	Promoting financial education programs/campaigns



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Note:

AI Revolution in Indian Agriculture

Why in News?

Microsoft Chairman **Satya Nadella** recently highlighted the transformative impact of **Artificial Intelligence (AI)** in agriculture through **Project Farm Vibes (PFV)** in Baramati, Maharashtra, which has **boosted crop yields by 40%** while reducing resource consumption.

What is the Project Farm Vibes?

- **About:** Project Farm Vibes, developed by Microsoft Research with the Agricultural Development Trust, Baramati (MH), is an **open-sourced AI suite of farm-focused technologies** transforming farming with data-driven insights, empowering researchers, farmers.
- **Technologies Used:**
 - **Azure Data Manager for Agriculture:** Aggregates satellite, weather, and sensor data for a holistic view of field conditions.
 - **FarmVibes.AI:** Uses AI to analyze soil moisture, temperature, humidity, and pH for precise farming recommendations.
 - **Agripilot.AI:** Offers real-time, actionable insights for sustainable farming and generates personalized recommendations in local languages.
- **Impact:** **40% increase in crop production**, with healthier and more resilient crops.
 - **25% reduction in fertiliser costs** through precise, AI-guided spot fertilization.
 - **50% less water consumption**, promoting sustainable irrigation.
 - **12% decrease in post-harvest wastage**, improving profitability.
 - Reduced **chemical runoff**, **soil erosion**, and **greenhouse gas emissions** and **deforestation**, leading to environmental benefits.

How is AI Revolutionizing Indian Agriculture?

- **Smart Irrigation:** Water scarcity is a significant challenge in Indian agriculture. AI is addressing this issue through **Soil moisture and climate analysis** to optimize **irrigation schedules**.

- **AI-integrated drip and sprinkler irrigation systems** under the **"Per Drop More Crop" scheme**, improving water efficiency.
- **IoT-based irrigation solutions**, developed by ICAR, which **automate water supply based on real-time field conditions**, reducing wastage.
- **Pest & Weed Control:** The **National Pest Surveillance System**, which leverages AI to monitor pest activity and provide real-time alerts.
 - **Automated weed detection**, where AI-powered computer vision **distinguishes weeds from crops** and applies herbicides only where needed, reducing chemical usage.
- **Economic Impact of AI in Agriculture:** The AI in agriculture market is expected to grow from **USD 1.7 billion in 2023 to USD 4.7 billion by 2028** at a CAGR of 23.1%, driven by advancements in precision farming, drone analytics, and labour management.
 - **Kisan e-Mitra**, an AI-powered **chatbot** assisting farmers with queries about the **PM Kisan Samman Nidhi** scheme.

What Challenges Does AI Adoption in Agriculture Face?

- **Lack of Awareness:** Many farmers, especially in rural India, **lack digital literacy** to use AI-based tools effectively hindering large-scale adoption.
- **High Implementation Costs:** AI solutions like **drones**, **Internet of things (IoT) sensors**, and automated irrigation systems require significant investment.
 - Small and marginal farmers, **who make up 85% of India's farming community**, **struggle with affordability**.
- **Infrastructure Gaps:** **Unreliable internet connectivity** in rural areas restricts access to AI-powered platforms.
 - Out of 5,97,618 inhabited villages in the country, 25,067 villages lack mobile connectivity and Internet.
- **Data Availability and Quality:** AI relies on **real-time and historical data** for accurate predictions. **Incomplete or inaccurate agricultural data** limits AI's effectiveness.
- **Limited Customization:** Most AI models are **not tailored** to India's **diverse agro-climatic conditions**.
 - More research is needed to develop **region-specific AI solutions**.

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Note:

Quality of Public Expenditure Index

Why in News?

The **Reserve Bank of India (RBI)** has developed the **Quality of Public Expenditure (QPE) Index** to assess how efficiently the **Centre and state governments** allocate public funds.

What is the Quality of Public Expenditure Index?

- **About:** QPE Index is a framework that assesses the **efficiency of government spending**.
 - Rather than focusing **solely on the total expenditure**, the index analyzes the composition of spending and its impact on **long-term economic growth and development**.
- **Key Components:** The index is based on five major indicators:

Indicator	What It Measures	Significance
Capital Outlay to GDP Ratio	Share of Gross Domestic Product (GDP) allocated to infrastructure (roads, railways, power, etc.).	A higher ratio indicates better expenditure quality.
Revenue Expenditure to Capital Outlay Ratio	Comparison of spending on salaries, pensions, and subsidies vs. infrastructure and asset creation.	A lower ratio indicates more funds allocated to productive investments.
Development Expenditure to GDP Ratio	Spending on education, healthcare, R&D, and public infrastructure.	A higher ratio indicates improved economic productivity.
Development Expenditure as Share of Total Government Expenditure	Proportion of the total budget dedicated to development sectors.	Higher share indicates higher spending quality.
Interest Payments to Total Expenditure Ratio	The financial burden of past borrowings.	A lower ratio indicates better fiscal health and more funds for development.

- **Key Findings:** The RBI's QPE Index has categorised India's public expenditure trajectory since **1991 into six distinct phases**.
 - **1991–1997:** Early **liberalization** saw slight improvement in Centre's expenditure quality, but states struggled amid fiscal pressures and declining public investment.
 - **1997–2003:** Expenditure quality declined due to salary hikes (**Fifth Pay Commission**), rising interest payments, and revenue-heavy spending.
 - **2003–2008:** **Fiscal Responsibility and Budget Management (FRBM) Act, 2003** enforced in **2004**, improved fiscal discipline.
 - States benefited from **higher tax devolution**, but the **2008 Global Financial Crisis (GFC)** halted progress.
 - **2008–2013:** The Centre's stimulus spending initially improved quality but later caused fiscal imbalances.
 - **2013–2019:** States improved with **higher development spending** and **14th Finance Commission funds**, while the Centre faced challenges as **Goods and Services Tax (GST) revenue sharing** initially benefited states more.
 - **2019–2025:** **Fiscal stimulus measures** during **Covid-19** led to a temporary decline in expenditure quality.
 - **Post-pandemic recovery**, driven by **higher capital expenditure**, helped improve spending efficiency.

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Note:

- In 2024-25, India's **QPE is at its highest level** since the 1991 economic liberalization, reflecting improved fiscal management and spending efficiency.

What is Public Expenditure?

- **About:** Public expenditure (PE) refers to the **spending by the government** to fulfill collective needs such as **education, healthcare, infrastructure, and welfare**.
- **Objective:** PE ensures **efficient resource allocation**, promotes **income redistribution**, and maintains **economic stability** by managing inflation and employment.
 - It also drives **development** through investments in infrastructure, technology, and welfare, fostering inclusive growth.
- **Classification:**
 - **Revenue Expenditure:** Routine expenses like salaries, pensions, and interest payments.
 - **Capital Expenditure:** Investments in long-term assets. A higher share of capital expenditure (Capex) improves the quality of public spending, leading to long-term economic growth.
- **Recent PE Trends:** According to the **Economic Survey 2024-25**, government **Capex** increased **8.2% YoY**, while state revenue expenditure grew **12% Year-over-year (YoY)**.
 - The **Union Budget 2025-26** has allocated **Rs 11.21 lakh crore** for **capital expenditure (3.1% of GDP)** in **FY 2025-26**.
- **Challenges:** Excessive spending on **salaries, pensions, and subsidies** (revenue expenditure) and welfare (like free electricity) can reduce financial sustainability.
 - Excessive PE leads to **fiscal deficits and debt burdens**, reducing funds for development.
 - Higher **budget deficits strain public finances**, limiting the government's ability to invest in development.
 - High Revenue Expenditure can weaken investor confidence, affecting overall economic stability.

Stagnation of India's Patent Growth

Why in News?

India's **Intellectual Property Rights (IPR)** ecosystem has grown significantly over the past decade. However, patent applications **stagnated in 2024**, with very few approvals, raising concerns that low private-sector Research and Development (R&D) investment is limiting innovation.

What are the Key Trends in India's IPR Ecosystem?

- **Increase in Patents:** India now ranks 6th globally in terms of patent applications, with 64,480 patent filings in 2023.
 - Patent applications grew from 42,951 (2013-14) to 92,168 (2023-24), with grants rising due to backlog clearance.
 - In 2013-14, **25.5% of patent applications** were from Indian residents, which increased to **56% in 2023-24**.
 - Earlier, patent filings were dominated by **foreign multinational corporations**, but Indian applicants are now filing more patents.
 - However, in 2024-25, 78,264 patent applications and **26,083 grants indicate a lower approval rate**.
- **Trademarks:** According to the **World Intellectual Property Organization (WIPO) 2024 report**, India ranked **4th globally in trademark filings** after the US, China, and Russia.
 - Trademark applications in India have indeed grown significantly from around 2 lakh in 2016-17 to approximately 4.8 lakh in 2023-24. **However, the rate of increase has slowed.**
- **Industrial Design:** 36.4% increase in industrial design applications, driven by textiles, tools & machines, and health sectors.
- **Manpower:** The patent office workforce increased from **272 in 2014-15 to 956** currently, but still lags behind **China (13,704) and the US (8,132)**.

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Note:

INTELLECTUAL PROPERTY RIGHTS (IPRs)

IP refers to intangible assets owned/legally protected by an individual/company from outside use or implementation without consent.



NEED FOR IPR

- Encourages Innovation
- Economic growth
- Safeguard rights of creators
- Enhances ease of doing business



RELATED CONVENTIONS/TREATIES (INDIA SIGNATORY TO ALL)

- WIPO Administered (first recognised IPR under):
 - Paris Convention for the Protection of Industrial Property 1883 (Patents, Industrial Designs)
 - Berne Convention for the Protection of Literary and Artistic Works 1886 (Copyrights)
- WTO - TRIPS Agreement:
 - Ensures adequate standard of protection
 - Argues for incentives for technology transfer to developing countries
- Budapest Treaty 1977:
 - International recognition of the deposit of micro-organisms for the purposes of patent procedure
- Marrakesh VIP Treaty 2016:
 - Facilitate access to published works by visually impaired persons and persons with print disabilities
- IPR also outlined in Article 27 (Universal Declaration of Human Rights)



INDIA AND IPRS - INITIATIVES

- National IPR Policy 2016:
 - Motto: "Creative India; Innovative India"
 - Compliant with TRIPS Agreement
 - Brings all IPRs to single platform
 - Nodal Dept - Department of Industrial Policy & Promotion (Ministry of Commerce)
- National (IP) Awareness Mission (NIPAM)
- Kalam Program for Intellectual Property Literacy and Awareness Campaign (KAPILA)

World Intellectual Property Day: 26th April

Intellectual Property	Protection	Law in India	Duration
Copyright	Expression of Ideas	Copyright Act 1957	Variable
Patent	Inventions- New Processes, Machines, etc.	Indian Patent Act 1970	20 years Generally
Trademarks	Sign to distinguish business goods or services	Trade Marks Act 1999	Can last Indefinitely
Trade Secrets	Confidential Business Information	Protected without Registration	Unlimited time
Geographical Indication (GI)	Sign used on specific geographical origin and possess qualities due to site of origin	Geographical Indications of Goods (R & P) Act, 1999	10 years (Renewable)
Industrial Design	Ornamental or aesthetic aspect of an article	Design Act, 2000	10 years



What are the Challenges in India's Patent Ecosystem?

- Low R&D Investment: India's R&D spending is just 0.65% of GDP (compared to the US (3.6%), China (2.4%), Singapore (2.2%)).
 - The private sector contributes only 36% to R&D, whereas it accounts for 79% in the US and 77% in China.

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Note:

- Many Indian companies operate at a global scale but invest little in R&D, limiting patent filings.
- **High Dependence on Foreign Patents:** Despite rising domestic filings, foreign entities dominate Patent approvals (74.46% in 2022), far exceeding China's 12.87%.
- India remains reliant on imported technology, leading to a trade deficit and reduced self-reliance in innovation.
- **Manpower Shortage:** Patent examination capacity is limited due to a lack of skilled examiners. Fewer examiners lead to long processing delays and lower patent approval rates.
 - On average, it takes about 58 months to grant a patent in India, compared to 21 months in the US.
- **Quality of Patent Applications:** Domestic patent filings lag in approvals due to poor-quality applications, weak research, plagiarized content, and lack of resources in startups.
- **Weak IP Enforcement:** Patent infringement cases are rising in India, but weak enforcement and judicial backlogs hinder effective protection.
 - Indian firms often lack the expertise to navigate the global IP system effectively. In the digital age, easy copying, anonymous infringers, and cross-border piracy further complicate IP enforcement.

10th Anniversary of Soil Health Card Scheme

Why in News?

The year 2025 marks the 10th anniversary of the **Soil Health Card (SHC) scheme** that was launched on 19th February 2015 at Suratgarh, Rajasthan.

- It helps in improving soil health and tackling soil degradation.

What is a Soil Health Card Scheme?

- **About:** It is a centrally sponsored scheme to assist state governments in issuing Soil Health Cards (SHCs) to all farmers across India.
- **Objective:** It provides farmers with information on the nutrient status of their soil along with recommendations for the appropriate dosage of nutrients to improve soil health and fertility.

- Soil samples are collected twice a year, post-harvest of **Rabi and Kharif crops** or when no standing crop is in the field.
- **Contents of SHC:** The SHC provides soil status for 12 parameters, including:
 - **Macronutrients:** Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S).
 - **Micronutrients:** Zinc (Zn), Iron (Fe), Copper (Cu), Manganese (Mn), Boron (Bo).
 - **Other soil properties:** pH (Acidity or Basicity), Electrical Conductivity (EC), and **Organic Carbon (OC)**.
- **Initiatives Under SHC:**
 - **Village Level Soil Testing Labs (VLSTLs):** VLSTLs are small, decentralized soil testing labs at local level. As of February 2025, 665 VLSTLs have been set up across 17 states.
 - **School Soil Health Programme:** It aims to educate students on soil health and sustainability through sample collection, testing, and SHC generation.
 - As of 2024, the program expanded to 1,020 schools, establishing 1,000 soil testing labs.
- **Integration with RKVY:** Since 2022-23, the Soil Health Card Scheme has been merged into **Rashtriya Krishi Vikas Yojana (RKVY)** as a component under 'Soil Health & Fertility'.
 - **RKVY (2007)** is an umbrella scheme for ensuring holistic development of agriculture and allied sectors.
- **Technological Advancements:**
 - **SHC Portal:** For uniform generation of SHCs in all major Indian languages and five dialects.
 - **SHC Mobile App:** For easy access to Soil Health Cards and streamline sample collection.
 - **GIS Integration:** Automatic geo-mapping of soil samples using latitude and longitude so that all the test results are captured and seen on a map.
- **Benefits of SHC:**
 - **Improved Yield:** The highest increase in yield was recorded for **Bengal gram (44%)** in Karnataka, followed by **wheat (43%)** in Karnataka, **maize (30%)** in Madhya Pradesh, and **red gram (22%)** in Maharashtra.
 - **Reduction in Fertilisers Use:** Significant reduction in fertilizer use e.g., **nitrogen (7%)**, **phosphorus (41%)**, **potassium (27%)** has been observed in case of wheat.

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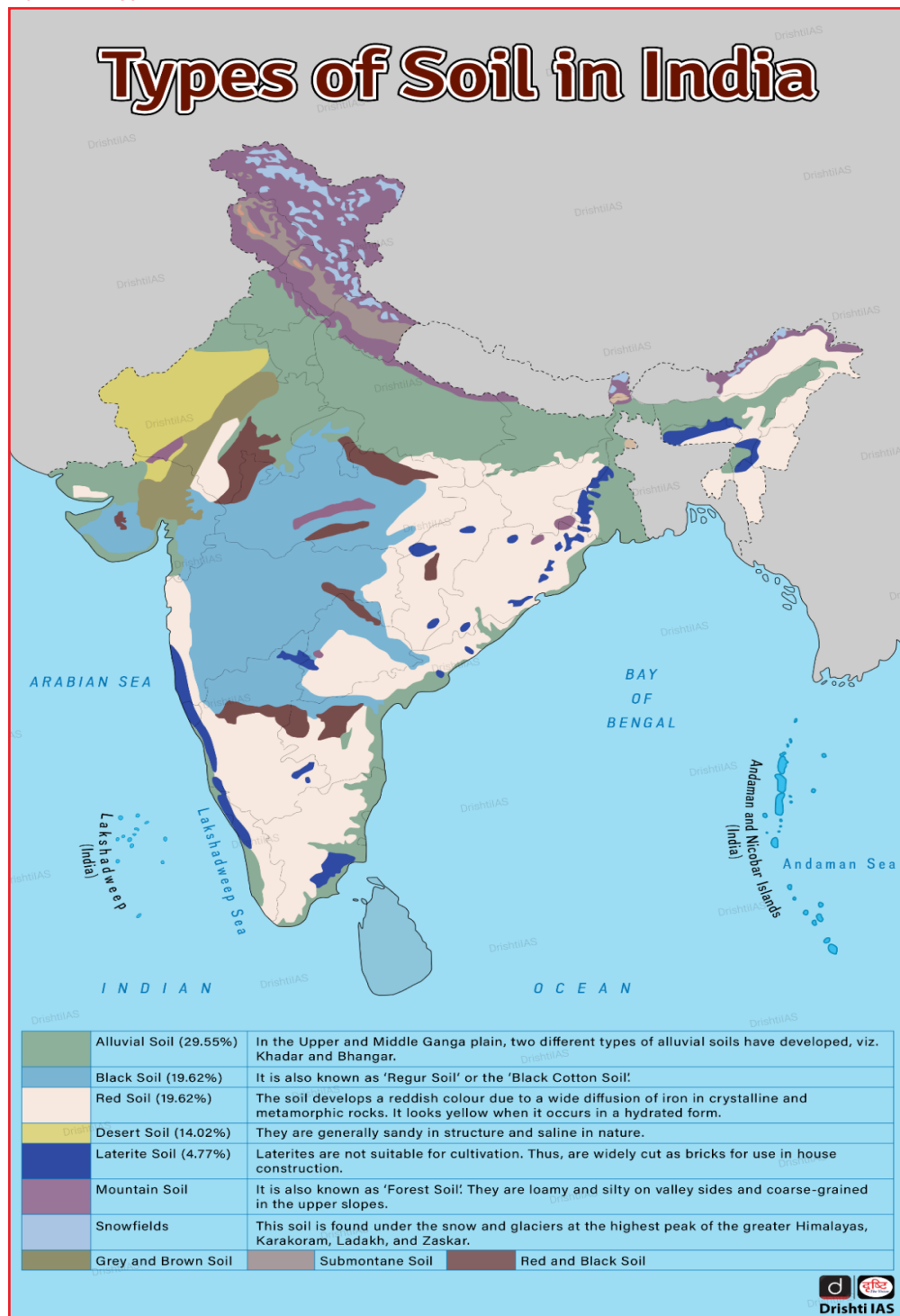
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Note:

- **Reduction in Pest:** Pest and disease incidence reduced by **46%**.
- **Other Benefits:** It included improved **soil texture (12%)**, enhanced **crop growth (38%)**, and better **grain filling (35%)**.

Read more: [Major Soil Types in India](#)



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Note:

What is the Current Status of Soil Health in India?

- **Unsustainable Agricultural Practices:** Intensive farming, with excessive chemicals and **monocropping**, has caused **nutrient depletion** and **soil acidification**.
 - E.g., lowered organic carbon levels in Punjab and Haryana due to the **Green Revolution**.
- **Water Mismanagement:** Over-extraction and poor irrigation, like **flood irrigation**, cause **soil salinization** and **waterlogging**.
 - By 2050, **50%** of arable land may be **salt-affected**.
- **Overgrazing:** Unregulated **livestock** grazing has led to **vegetation loss**, making soil vulnerable to **erosion**, particularly in **arid regions** like Rajasthan and Gujarat.
- **Shifting Cultivation:** The practice of **slash-and-burn agriculture** causes severe soil degradation by destroying **organic matter**.
- **Invasive Species:** The spread of invasive plant species like **Lantana camara** depletes soil nutrients and **disrupts** native **biodiversity**.

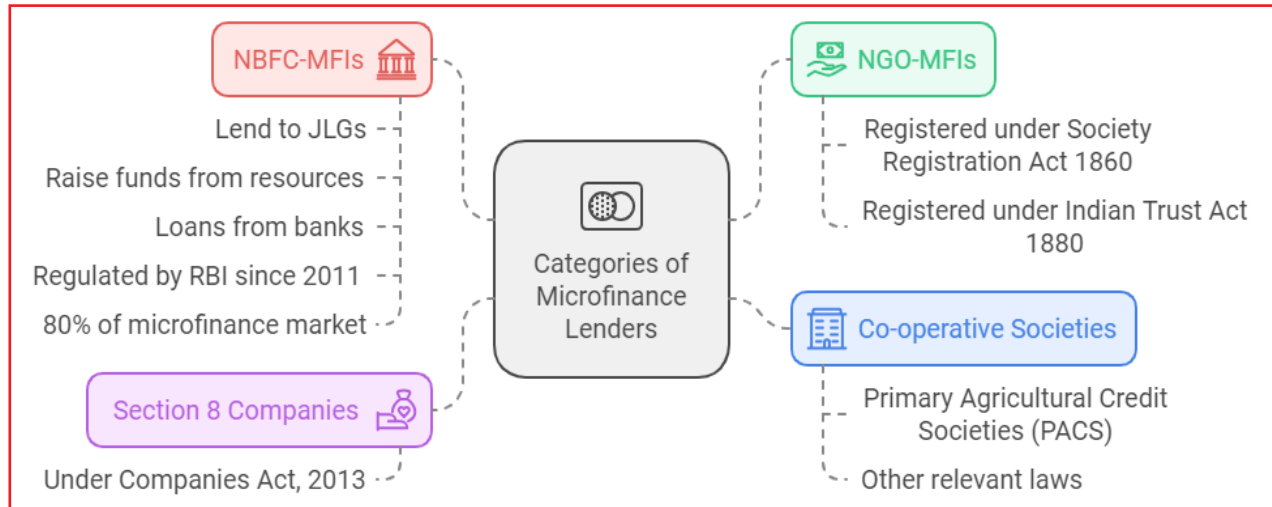
Microfinance Sector in India

Why in News?

The **microfinance sector** in India has played a pivotal role in **financial inclusion** by providing credit to underserved households. However, rising concerns over **credit expansion** underscore the need for **stronger regulations and responsible lending**.

What are Microfinance Institutions (MFI)?

- **About:**
 - MFIs are **financial companies** that provide **small loans and other financial services** to people who **don't have access to banking facilities**.



- **Objective:**
 - It aims to **empower low-income and unemployed individuals** by fostering **self-sufficiency**.
 - It plays a **crucial role in financial inclusion**, particularly benefiting **marginalized groups**, including women, by promoting **social equity and economic empowerment**.

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Note:

- **Regulatory Framework:** The RBI regulates MFIs under the **NBFC-MFI framework (2014)**, which covers **client protection, borrower safeguards, privacy, and credit pricing**.
- Business Models in Microfinance: **Self-Help Groups (SHGs) and Microfinance Institutions (MFIs)**
- **Categories of Microfinance Lenders:**
- MFIs in India:
 - As of 31st March 2024, India's microfinance sector comprises **168 MFIs across 29 states, 4 UTs, and 563 districts**, serving **over 3 crore clients** with a loan portfolio of **Rs 4.33 lakh crore**.

Read More: [History and Evolution of the Microfinance Sector in India](#)

What are the Challenges for Microfinance Institutions (MFIs)?

- **Profitability and Economic Sustainability:** MFIs rely on **subsidies**, face **high operating costs**, and limited capital access. Most MFIs cover costs but **only a third are truly profitable** after capital expenses.
 - To cover costs, they **charge high interest rates**, which can **burden borrowers**.
- **Regulatory Gaps:** The RBI framework mandates **household income and liability assessments**, but **lack of documentary proof** and delayed credit bureau data hinder **accurate evaluation**, especially by unregulated lenders.
- **Rising Competition:** More regulated and unregulated players in the sector have **increased credit supply**, sometimes **without stringent due diligence**.
- **Poor Model Selection:** MFIs in India mainly use the **SHG or JLG lending models** whose effectiveness is **often questioned** and also their selection is often **random rather than scientific reasoning**.
 - The choice of the lending **model impacts the repayment burden on weaker sections** and affects the **long-term sustainability of MFIs**.
- **Gender Bias:** Women face significant barriers in accessing financial services and are **15-20% less likely than men** to have a **bank account or access formal credit**.
 - However, studies indicate that women have a **17% higher loan repayment rate** compared to men.

Read More: [Challenges for Microfinance Institutions](#)

RBI Guidelines on Microfinance Lending (2022)

- Microfinance loans are **collateral-free for households** with **annual incomes up to Rs 3 lakh**.
- Lenders must ensure **flexible repayment policies** and **assess household income**.
- The **cap on the number of lenders per borrower is removed**, but loan repayments **cannot exceed 50% of monthly income**.
- The requirement for **NBFC-MFIs to maintain 75% of their loan portfolio in microfinance** (reduced from 85%).
- Entities must **report income discrepancies** and **household income details**.
- **No prepayment penalties**; late fees apply only to overdue amounts.

What are the Government Schemes Related to Microfinance?

- **Pradhan Mantri Mudra Yojana (PMMY)**
- **Self-Help Group (SHG) - Bank Linkage Program**
- **Credit Guarantee Fund for Micro and Small Enterprises (CGTMSE)**

9th Anniversary of PMFBY

Why in News?

The year **2025** marks the **9th anniversary of the Pradhan Mantri Fasal Bima Yojana (PMFBY)** that was launched in **2016** to protect farmers from **crop losses** due to **unpredictable natural disasters**.

- The Union Cabinet approved the **continuation of the PMFBY and Restructured Weather Based Crop Insurance Scheme (RWBCIS)** till 2025-26.

What is PMFBY?

- **About:** PMFBY is a **central sector scheme** that aims to provide **financial protection** to farmers in case of **crop failure** due to **natural disasters, pests, or diseases**.
- **Key Features:**
 - **Eligibility:** All farmers including **sharecroppers and tenant farmers** growing the notified crops in the notified areas are eligible for **coverage**.
 - Farmers' participation is **voluntary** and **non-loanee farmers** make up **55% of the total coverage** under PMFBY.

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Note:

- **Risk Coverage:** PMFBY provides extensive coverage for various risks.
 - **Natural Calamities:** Floods, droughts, cyclones, hailstorms, landslides, and unseasonal rains.
 - **Pests and Diseases:** Pest infestations and plant diseases.
 - **Post-Harvest Losses:** Covers losses within 14 days of harvest, mainly for crops stored in “cut and spread” conditions.
 - **Prevented Sowing:** Farmers are eligible for indemnity claims up to 25% of the sum insured if sowing is prevented due to adverse weather.
- **Affordable Premiums:** It offers affordable premiums at rates of 2% for Kharif crops, 1.5% for Rabi crops, and 5% for yearly commercial or horticultural crops.
 - The government covers the entire premium for farmers in the North-Eastern States, Jammu & Kashmir, and Himachal Pradesh.
- **Technological Advancements:**
 - **Satellite Imagery & Drones:** For crop area estimation, yield disputes, and crop loss assessment.
 - **Crop Cutting Experiments (CCEs):** The CCE-Agri App facilitates direct upload of crop yield data to the National Crop Insurance Portal (NCIP), ensuring transparency in loss assessments.
- **Timely Compensation:** PMFBY ensures claims are processed within two months of harvest, providing timely compensation to help farmers avoid debt traps.
- **Global Scale:** PMFBY is now the world's largest crop insurance scheme in terms of farmers and hectares of land covered in 2023-24.

PMFBY and RWBCIS

- PMFBY relies on actual crop loss assessment to provide compensation to farmers for losses due to natural calamities, pests, or diseases. In contrast, RWBCIS compensates farmers based on deviations from predefined weather parameters such as rainfall, temperature, humidity, and wind speed.
 - RWBCIS uses these weather parameters as a proxy for crop yields to estimate and compensate for deemed crop losses, without requiring direct field-level assessment.

What are the Challenges in Implementation of PMFBY?

- **Delayed Claim Settlement:** The claims settlement process is slow, lacks transparency, and leads to ongoing disputes over damage calculation and yield loss estimation.
- **Geographical Disparities:** States like Gujarat, Maharashtra, Andhra Pradesh, and Madhya Pradesh account for the majority of crop insurance claims, while states like Bihar, Assam, and the northeastern regions have seen low participation.
- **Challenges in Premiums Subsidies:** Delays in the release of subsidy payments have resulted in claims being pending for extended periods (12-18 months), affecting the credibility of the scheme.
- **Post-Harvest Loss Issues:** Post-harvest losses under PMFBY cover only physical damage (quantity), not quality losses like discoloration or rotting.
 - Post-harvest loss coverage lasts up to 14 days. This short period complicates loss calculation and compensation.
- **Data Constraints:** The absence of reliable data on farm gate prices and yield estimation, along with inaccurate land records of tenant farmers, complicates damage calculations and scheme implementation.
- **Segregation of Insurance and Disaster Relief:** A key issue is separating insurance from disaster relief as insurance manages commercial risks while disaster relief serves as a safety net.
 - This is especially challenging for high-value crops like horticultural products outside the MSP regime.

Cooperative Bank

Why in News?

The Reserve Bank of India (RBI) intervened in New India Cooperative Bank over fund misappropriation concerns, appointing an administrator and imposing restrictions to protect depositors.

- This move reflects a broader trend of consolidation and financial discipline in the cooperative banking sector.

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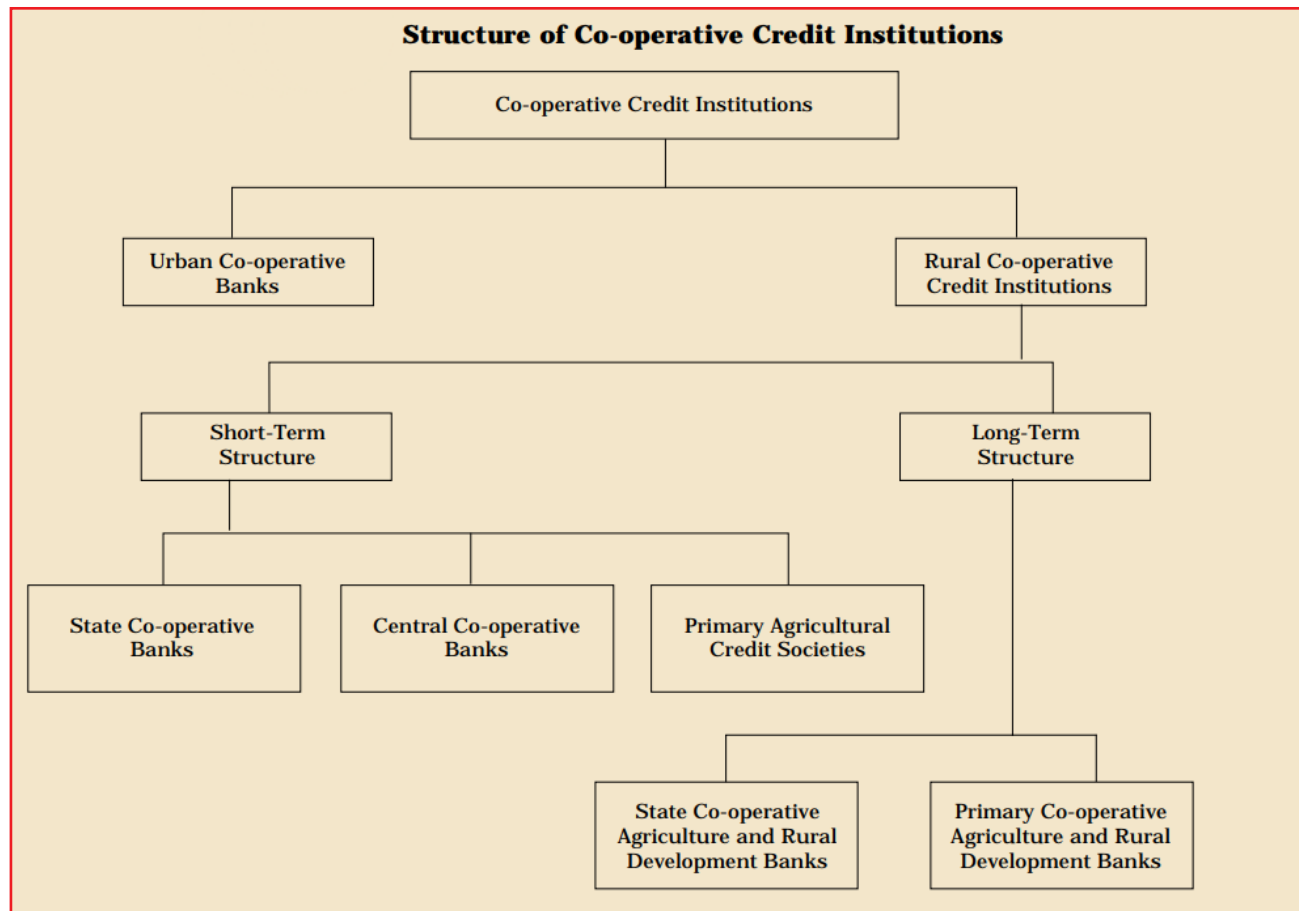
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Note:

What are the Cooperative Banks?

- **Definition:** A Co-operative Bank is a **Co-operative Society**, either registered under **State Cooperative Societies Acts** or the **Multi-State Cooperative Societies Act, 2002**, engaged in **banking business**.
 - Cooperative banks in India are classified into **Urban Cooperative Banks (UCBs)**, and **Rural Cooperative Banks (RCBs)**.



- **Ownership:** Cooperative banks are owned and operated by members, who are its customers.
 - Members usually have equal voting rights, according to the cooperative principle of “one person, one vote”.
- **Objective:** Provide **rural financing and micro-financing**. Primarily support agriculture, small-scale industries, and self-employed workers
- **Regulation and Supervision:** Cooperative banks in India function under a **dual regulatory framework**, dividing banking and managerial oversight between the RBI and the Registrar of Cooperative Societies (RCS).
 - **RBI's Role:** Regulates **banking functions** under the **Banking Regulation Act, 1949**, and **Banking Laws (Application to Cooperative Societies) Act, 1965**. This includes **capital adequacy, risk management, lending norms, and financial supervision**.
 - **RCS's Role:** Oversees **managerial aspects** under the **State/Central Government**, including **incorporation, registration, governance, audit, board supersession, and liquidation** of cooperative banks.
- **License Cancellation:** RBI can revoke the license of a Co-operative Bank if it ceases banking operations or fails to meet the conditions set by RBI.

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Note:

- **Importance:** UCBs cater to the financial needs of small businesses and individuals, fostering growth in urban and semi-urban areas.
- Cooperative banks play a vital role in providing credit to farmers, boosting rural economic development.
 - Cooperative banks are **more resilient to economic downturns**, as they avoid high-risk assets, demonstrated by UCBs during the 2008 global financial crisis.
 - They cater to the unbanked and underbanked sections, promoting inclusive growth by Financial Inclusion.

Aspect	Commercial Banks	Cooperative Banks
Governing Act	Commercial banks are constituted by a uniform act passed by the parliament	Cooperative banks are constituted by different states under different acts.
Regulation	RBI directly	Regulated by RBI, NABARD and Registrar of Co-operative Societies.
Services Offered	Larger scope in offering a variety of banking services	Lesser scope in offering a variety of banking services.
Area of Operation	Large-scale operation, usually countrywide. Commercial banks can also open branches in foreign countries.	Small-scale operation, usually limited to a region. Cooperative banks cannot open branches in foreign countries.
Borrowers	Borrowers are only account holders and have no voting power, so they cannot influence the lending policy	Borrowers are member shareholders, so they have some influence on the lending policy of the bank



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Note:

International Relations

Highlights

- India - US COMPACT Initiative
- India-Qatar Strategic Partnership
- China's Weaponization of Supply Chains
- India's Trade with Afghanistan and Nepal
- 8th Indian Ocean Conference
- India's Overseas Port Investment
- India as a Bridge Between the Global North and South

India - US COMPACT Initiative

Why in News?

The **US-India COMPACT (Catalyzing Opportunities for Military Partnership, Accelerated Commerce & Technology)** for the 21st Century was launched by President Donald Trump and Prime Minister Narendra Modi.

What are the Highlights of the India - US COMPACT Initiative?

- **Defence Collaboration:** A new **10-year Framework for the US - India Major Defence Partnership (2025-2035)** will be signed, expanding Defence sales and co-production of **Javelin Anti-Tank Guided Missiles**, and enhancing joint exercises like **Tiger Triumph**.
 - The initiative includes the **Reciprocal Defence Procurement (RDP) Agreement** for seamless Defence trade and **Autonomous Systems Industry Alliance (ASIA)** to boost AI-driven autonomous Defence cooperation.
- **Trade and Investment Expansion:** Under the COMPACT Initiative, the **'Mission 500'** initiative was launched to increase bilateral trade to USD 500 billion by 2030, supported by negotiations for a **Bilateral Trade Agreement (BTA)**.

- Efforts include reducing trade barriers, such as tariff cuts on beverages, vehicles, and Information and communication technology (ICT) products, while increasing market access for agricultural goods and industrial exports.

- **Energy Security:** Strengthens energy ties, boosting oil, gas, and nuclear cooperation, with the US supporting India's **International Energy Agency (IEA)** membership.
- **Technology Advancement:** The **Initiative on Critical and Emerging Technologies (iCET)** was rebranded as **TRUST (Transforming the Relationship Utilizing Strategic Technology)**, focusing on **semiconductors**, **quantum computing**, and **Artificial Intelligence (AI)**.
 - Efforts will expand **critical mineral supply** chains, including **lithium and rare earth recovery projects**.
 - Civil space cooperation will advance through **NASA-ISRO initiatives**, including an Indian astronaut's mission to the **International Space Station (ISS)** and the **NISAR** launch.
- **Multilateral and Regional Cooperation:** Strengthen **Quad partnerships**, enhance counterterrorism efforts, **Indo-Pacific** security and advance connectivity projects like the **India-Middle East-Europe Corridor**.
- **People-to-People Engagement:** The COMPACT initiative boosts academic and workforce mobility, eases legal migration, and strengthens law enforcement cooperation against trafficking and transnational crime.

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Note:

India - US Relations

- **Trade and Investment:** India-US ties have evolved into a “global strategic partnership”.
 - In 2024, India's total goods trade with the U.S. reached **USD 129.2 billion**. India's exports to the U.S. stood at **USD 87.4 billion**, while imports from the US were **USD 41.8 billion**. India has a **USD 45.7 billion** trade surplus with the US in 2024.
 - USA is the **3rd largest investor in India** with cumulative **Foreign Direct Investment (FDI)** inflows of USD 65.19 billion from 2000- 2024.
- **International Cooperations:** India and the US collaborate in multilateral forums like the **United Nations, G-20, Association of Southeast Asian Nations, World Trade Organization, I2U2 group** and **Indo-Pacific Economic Framework for Prosperity (IPEF)**.
- **Defence Cooperation:** India-US defense ties strengthened with the 2005 Defense Framework, renewed in 2015.
 - India is a **Major Defense Partner of the US** with **Strategic Trade Authorization-1 (STA-1)** status (allowing easier access to US defense technologies).
 - **Joint exercises:** **Ex VAJRA PRAHAR** (Army), **SALVEX** (Indian Navy), **Cope India** (Air Force) and **Malabar Exercise** (Quadrilateral naval exercise of India, USA, Japan and Australia).
- **People to people Ties:** The 3.5 million Indian American community plays a key role in US society, strengthening India-US ties.

What are the Key Challenges in India-US Relations?

- **Tariff Disputes:** President Trump criticized India's “onerous tariffs” (burdensome and excessively high import duties) and reinforced his policy of “reciprocal tariffs” (tariffs imposed in response to similar tariffs by another country), which could increase costs for

Indian exporters. Further, the absence of a **Free Trade Agreement** increases tariffs, and restricts trade.

- India's current trade surplus with the **US may shrink as it increases imports** to reach the USD 500 billion trade target, potentially requiring selective **tariff reductions that favor US** interests over broader India's economic efficiency.
- **Immigration Policies:** India agreed to facilitate the return of 2,20,000–7,00,000 undocumented Indians immigrants, a move seen as aligning with **Trump's stricter immigration stance**.
 - Despite India's reliance on **H-1B visas** for IT professionals, no clear commitments were made, reflecting **ongoing tensions between Silicon Valley and Trump's nationalist policies**.
- **Technology Transfer:** Despite growing Defence ties, US restrictions on AI, drones, and missile technology hinder India's access to advanced Defence systems.
- **Data Localization:** The US opposes **India's data sovereignty laws**, arguing they hurt **American tech firms**, while India insists on national security and user privacy protections.
- **Geopolitical and Multilateral Differences:** Despite US support for **India's permanent UNSC membership**, differences in global governance persist, with the US urging India to leverage its ties with Russia to end the war, while India maintains neutrality.
 - India's historical Defence and energy ties with Russia conflict with US efforts to isolate Moscow.

India-Qatar Strategic Partnership

Why in News?

Sheikh Tamim Bin Hamad Al Thani, the Amir of Qatar, visited India to **enhance bilateral ties, focusing on trade, energy, and investment**.

- Both nations committed to doubling trade to **USD 28 billion** and increasing Qatari investment in India.

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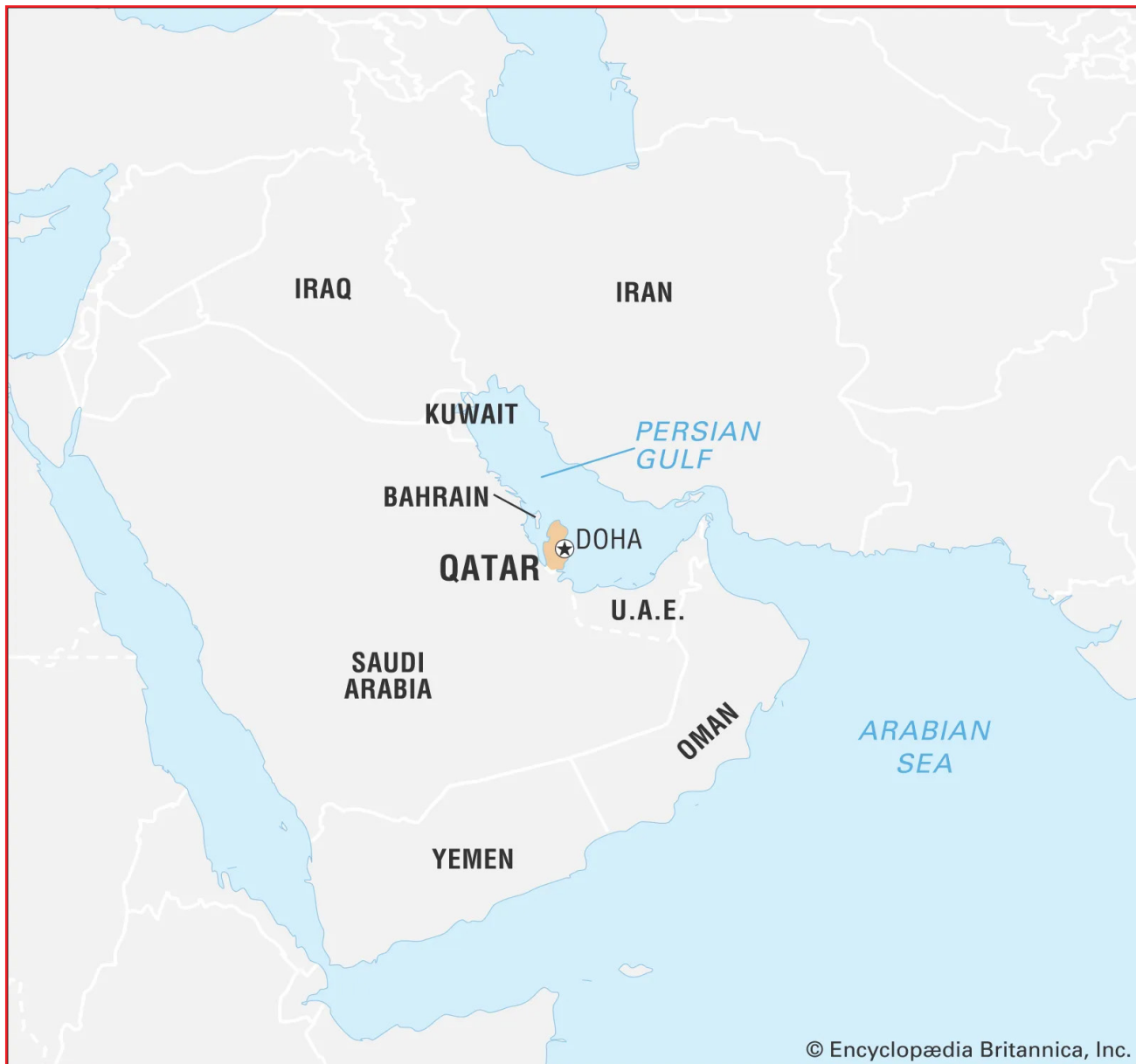
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Note:



What are the Key Highlights of the Visit?

- **Elevation to Strategic Partnership:** Qatar and India have upgraded their bilateral relations to a **strategic partnership**, aiming to deepen cooperation in various sectors, including trade, investment, energy, and security.
- **Target for Bilateral Trade:** India and Qatar have set an ambitious target to double bilateral trade from **USD 14 billion to USD 28 billion by 2030**.
- **Qatar's Investment Commitment:** Qatar's **sovereign wealth fund** has invested USD 1.5 billion in India and committed an additional USD 10 billion in sectors like infrastructure, renewable energy, and emerging technologies such as **artificial intelligence (AI)** and **machine learning**.
- **Avoidance of Double Taxation:** A Revised Agreement for **Avoidance of Double Taxation** was also exchanged, which will foster economic and financial collaboration.

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Note:

- **Status of a Free Trade Agreement (FTA):** Both nations discussed the **possibility of a FTA**.
 - Negotiations are ongoing for an FTA between India and the **Gulf Cooperation Council (GCC)**, which includes Qatar.
- **Infrastructure:** Discussed the operationalization of **India's Unified Payment Interface (UPI)** in Qatar and the expansion of Qatar National Bank's presence in India through **GIFT (Gujarat International Finance Tec-City) City**.
- **Israel-Palestinian Conflict:** India reaffirmed its support for a **two-state solution**.

Why is Qatar Important for India?

- **Energy Cooperation:** In FY 2022-23, Qatar was India's largest **Liquefied Natural Gas (LNG)** supplier, providing over 48% of total LNG imports, and the top **liquefied petroleum gas (LPG)** supplier, accounting for 29% of LPG imports.
 - This stable and uninterrupted energy partnership is vital as **India transitions to cleaner energy** sources and reduces reliance on **coal**, helping meet both climate goals and growing energy demands.
- **Strategic Cooperation:** Qatar is a key partner in **India's Look West policy** (converted to "Link and ACT West"), strengthening ties with the **GCC countries**, including the UAE, Saudi Arabia, Oman, and Kuwait, to enhance **energy security and trade**.
- **Geopolitical Significance:** Qatar's role as a **mediator** in key geopolitical issues, like **Afghanistan** and the **Israel-Palestine conflict**, allows India to engage in regional matters indirectly.
 - Qatar's close ties with the **US on Middle East peace efforts**, also offer India a platform for engagement with the US on regional issues.
- **Counterterrorism Cooperation:** India and Qatar share common interests in **combating terrorism and extremism**, with Qatar's strategic location enabling India's collaboration on **counterterrorism and maritime security** in the **Gulf** (as the Gulf region fulfilled 55.3% of India's total crude oil demand in 2022-23).

India-Qatar Bilateral Relations

- **Defense Cooperation:** India-Qatar defense ties include training, naval visits, biennial **Doha International Maritime Defence Exhibition and Conference (DIMDEX)** participation, and the bilateral maritime exercise **Za'ir-Al-Bahr** (Roar of the Sea).
- **Trade:** Bilateral trade between India and Qatar in 2023-24 stood at USD 14.08 billion, with India's exports at USD 1.7 billion and imports at USD 12.3 billion.
 - India is among the **top three largest export destinations** for Qatar (along with China and Japan) and among the top three sources of Qatar's imports (along with China and the US).
 - Qatar primarily exports **LPG, LNG, chemicals, petrochemicals, and aluminium to India**, while India exports a variety of goods, including cereals, iron, steel, textiles, and machinery.
- **Investment:** Over **15,000 Indian companies operate in Qatar**, with USD 450 million invested by Indian firms.
- **Cultural Cooperation:** Regular cultural exchanges occur under the **2012 Cultural Cooperation Agreement**, with Qataris admiring India's diversity. The year 2019 was celebrated as **India-Qatar Year of Culture**.
- **Indian Community:** Over 835,000 Indians reside in Qatar, forming the largest expatriate community (27% of the population).

China's Weaponization of Supply Chains

Why in News?

China has **weaponised supply chains** by restricting its engineers and technicians at Apple-Foxconn's India facilities and curbing exports of critical manufacturing equipment.

- This move is seen as an attempt to slow down **India's growing electronics manufacturing sector** and impact the country's broader ambitions under the '**Make in India**' initiative.

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Note:

How is China Disrupting India's Supply Chains?

- **Control Over Supply Chains:** China dominates the global electronics supply chain. By restricting technicians and key equipment exports, it aims to disrupt India's production and hinder skill transfer to Indian workers.
 - This pressure tactic strengthens **Beijing's bargaining position against India**.
 - India imports a significant share of smartphone components from China. The latest restrictions highlight India's vulnerability and the need for self-sufficiency.
- **Delaying Tunnel Boring Machines (TBMs):** Since 2019, China has **delayed customs clearance** for **German TBMs** imported by India, crucial for **metro, rail, road, and strategic mountain tunnels** near the **Line of Actual Control (LAC)**.
 - Beijing fears these tunnels **enhance Indian military logistics**, enabling faster troop movement along the LAC.
- **Curbs on Critical Minerals Exports:** Since 2023, China has **imposed curbs on exports of germanium and gallium**, key materials for **semiconductors, solar panels, and advanced electronics**.
 - While **gallium** can be extracted from India's **bauxite reserves**, **germanium imports remain a challenge**, which is critical for semiconductors and military applications.
- **Belt and Road Initiative (BRI):** Through the **BRI** and industrial investments, China ensures multinationals remain reliant on its supply chains.
 - For example, despite US sanctions, companies like Tesla continue major operations in China due to its **cost-effective production ecosystem**.

Why is China Weaponising Supply Chains?

- **Preventing India as Manufacturing Hub:** China's dominance in **high-tech manufacturing** and consumer electronics is being challenged as **Apple and other firms shift to India**.
 - India now produces **14% of the world's iPhones**, with projections to reach **25-40%**.
 - With **unemployment rising in China**, the government fears losing high-value jobs to India, especially in **sunrise industries** like AI-driven consumer tech.

- **Retaliation for India's Economic Restrictions:** Since the **2020 Galwan Conflict**, India has **banned Chinese apps**, restricted Chinese investments and investigated Chinese firms for illegal activities.
 - China's latest export curbs aim to **force India into trade negotiations** by leveraging supply chain disruptions.
 - China uses trade restrictions to punish countries for political disagreements.
- **India's Resilience in Global Trade:** China has struggled with **effective economic sanctions**, unlike the US, which has strong global alliances.
 - These **selective export denials** allow China to assess how India **adapts to supply chain disruptions** before escalating further restrictions.

India's Efforts to Counter Supply Chain Vulnerabilities

- **Production-Linked Incentive (PLI) Scheme**
- **National Manufacturing Mission**
- **Duty Reductions on Components:** Union Budget 2025 removed import duties on **critical mobile phone components** (e.g., printed circuit boards, camera modules, connectors, sensors and lithium-ion battery manufacturing machinery).
- **Skill Development Initiatives:** **National Skill Development Mission, Skill India Mission SANKALP Scheme, TEJAS Skilling Project, Model Skill Loan Scheme.**

What Challenges Does India Face in Electronics Manufacturing?

- **Heavy Dependence on Imports:** India **imports over 75% of electronic components**. Lack of domestic supply chains for **high-end manufacturing equipment** limits India's ability to scale up production.
 - This reliance on imports makes key industries vulnerable to disruptions despite initiatives like the **Semicon India Program**.
- **Shortage of Skilled Workforce:** India lacks specialized talent in **chip design, electronics assembly, and automation**, critical for high-tech manufacturing.
- **Weak Ecosystem for Ancillary Industries:** Unlike China, India **does not have a strong network of local suppliers** for key smartphone and electronics components.

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Note:

- **Lack of R&D:** Most high-tech research and development (R&D) in electronics is concentrated in **the US, Taiwan, South Korea, and China**, with limited innovation in India.
 - India must **invest in research institutions, industry-academia collaboration, and patent generation** to build a competitive edge.

India's Trade with Afghanistan and Nepal

Why in News?

India recorded an unusual **trade deficit with Afghanistan** in the year 2023-24.

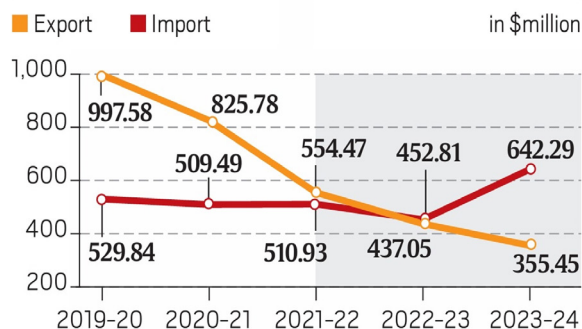
- In another development, **soybean oil imports** from Nepal surged 14-fold (April-November 2024), possibly due to **rule-of-origin (RoO)** violations.

Click Here to Read: [How is India's Relations with Afghanistan?](#)

What are Key Highlights of India Trade with Afghanistan and Nepal?

- **Afghanistan:**
 - **Bilateral Trade Trends:** India's exports to Afghanistan fell from **USD 825.78 million in 2020-21 to USD 355.45 million in 2023-24**, while imports rose from **USD 509.49 million in 2020-21 to a record USD 642.29 million in 2023-24**.
 - Before this, the last time India saw a **trade deficit (USD 0.73 million)** with Afghanistan was in **2000-01**.

INDIA'S TRADE WITH AFGHANISTAN



Source: Ministry of Commerce

- **Imports:** Agricultural products like figs, asafoetida, raisins, apples, garlic, saffron, almonds, onions, pomegranates, and walnuts dominate.
- **Exports:** Mainly **medicines, vaccines, soybean meal, and garments**.
- **Key Products:** In **2023-24**, Afghanistan was the primary supplier of **asafoetida, raisins, and garlic**.
 - In 2023-24, Afghanistan became India's **3rd-largest apple supplier**, (surpassed Italy and the US) after **Iran and Turkey**.
- **Nepal:** India's **total soybean oil imports rose by 19% to nearly USD 3 billion (April-November 2024)** from **USD 2.5 billion in 2023**.
 - **Rule-of-Origin Violation:** Nepal **imports 98% crude edible oil, refines it, and exports it to India** indicating **duty structure exploitation**.
 - Nepal enjoys a **30% tariff advantage** over other exporters due to the **Nepal-India Treaty of Trade (2009)**, allowing **duty-free exports to India**.

Note: Rules of Origin (RoO) are the criteria used to **determine the country of origin** of a product in international trade.

- RoO helps **prevent "trade deflection,"** where goods produced in one country are **routed through another country** to take advantage of lower tariffs.
- RoO is governed by the **World Trade Organization (WTO)** through its **Agreement on Rules of Origin**.

Nepal-India Treaty of Trade 2009

- **Duty-Free Access:** It provides **non-reciprocal duty-free access** for all **Nepali-manufactured goods** except for a **negative list** (e.g., cigarettes, alcohol, cosmetics).
- **Annual Quotas:** It had been prescribed only for **duty-free exports to India** for four sensitive items i.e., **vegetable fats, acrylic yarn, copper products, and zinc oxide**.
- **Trade Mechanism:** India-Nepal bilateral trade is conducted in **Indian rupees**, with the exchange rate fixed at **1.6 Nepali rupee per Indian rupee**.

Click Here to Read: [Areas of Cooperation Between India and Nepal](#)

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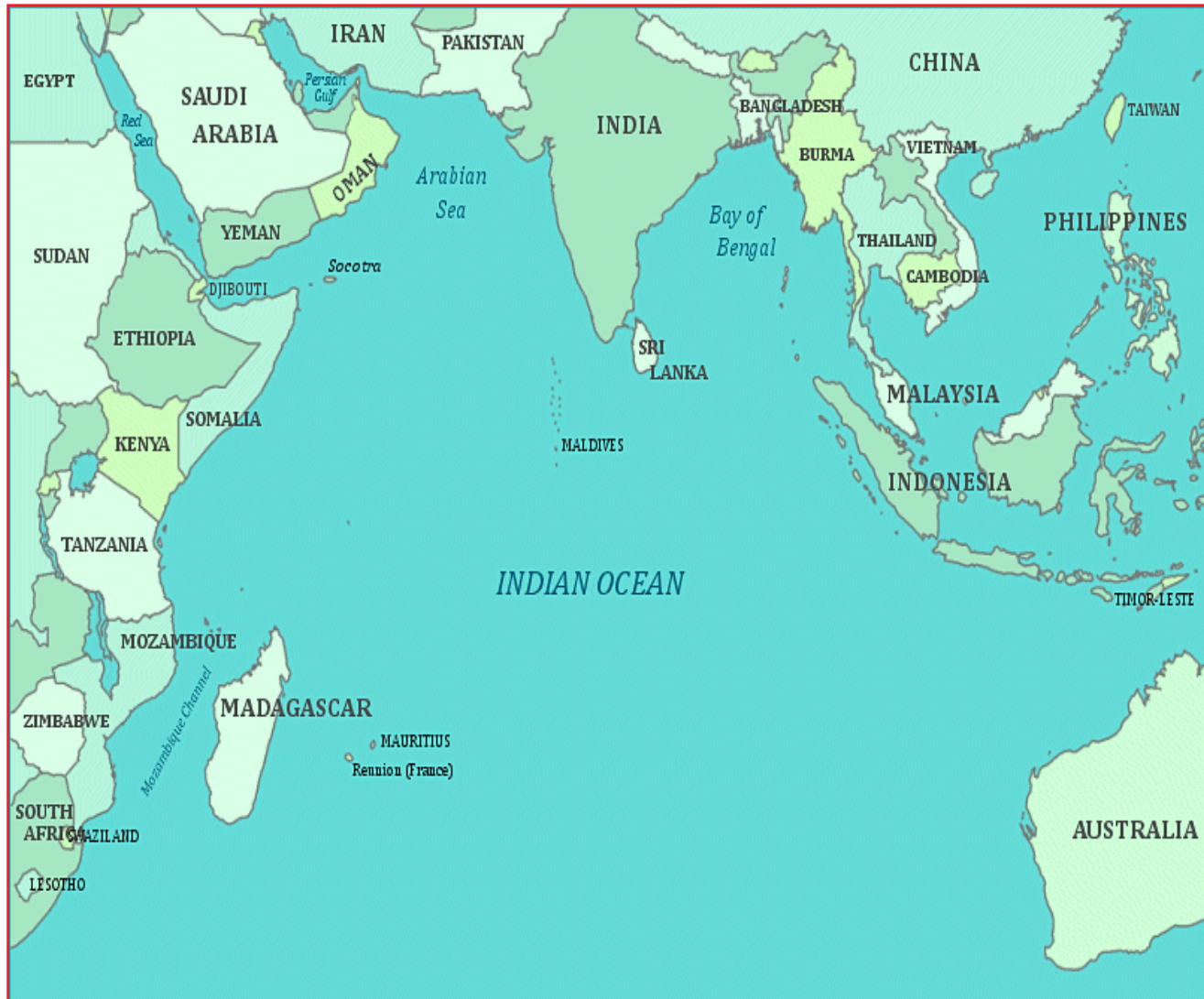


Note:

8th Indian Ocean Conference

Why in News?

India's External Affairs minister S Jaishankar represented India in the 8th Indian Ocean Conference (IOC) held in Muscat, Oman with the theme 'Voyage to New Horizons of Maritime Partnership'.



What is the Indian Ocean Conference?

- **About:** IOC is an annual summit bringing together **leaders, policymakers, and experts** from the **Indian Ocean Region (IOR)** to discuss **geopolitical, economic, and security** challenges.
 - It was established by the **India Foundation** (India based **think tank**) in **2016** in **Singapore** with participation from **30 countries**.
- **Objective:** It aims to unite key states and maritime partners in the IOR to enhance **regional cooperation** under the vision of **Security and Growth for All in the Region (SAGAR)**.

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Note:

SAGAR (Security and Growth for All in the Region) Vision

Launched in 2015 for regional security, sustainable growth, and cooperation in the Indian Ocean Region

Core Principles

- Trust, respect for maritime norms, regional sensitivity, peaceful dispute resolution, & cooperation
- Aligns with India's Act East Policy & Neighbourhood First policy

Significance of IOR for India

- **Economic Vitality:** 95% of India's trade by volume & 68% of trade by value
- **Strategic Leverage:** Controls key maritime chokepoints (e.g. Strait of Malacca), boosting trade security
- **Defense Shield:** Enhances naval security against piracy & threats
- **Regional Influence:** Strengthens India's role in South Asia and Indo-Pacific

Major Initiatives of India Aligning with the SAGAR Vision



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Note:

What is the Indian Ocean Region?

- **About:** IOR refers to the region around the **Indian Ocean**, including the **countries that border it**.
 - It spans from the **Strait of Malacca** and **western Australia** in the east to the **Mozambique Channel** in the west.
 - It covers about **20% of the world's water surface**, a **quarter of the world's landmass**, and **three-quarters of global oil reserves**.
- **Strategic Importance:**
 - **Economic Significance:** Approximately **80% of global maritime oil** and **80% of India's oil imports** pass through the Indian Ocean annually.
 - **Key Choke Points:**
 - **Strait of Malacca** (connects Southeast Asia and the Pacific Ocean to the Indian Ocean).
 - **Strait of Hormuz** (connects the Persian Gulf to the Indian Ocean; crucial for global oil transport).
 - **Bab-el-Mandeb Strait** (connects the Red Sea and the Indian Ocean, impacting trade with Africa and the Middle East).
 - **Mozambique Channel** (important for goods transiting from the Cape of Good Hope to the Middle East and Asia).
 - **Military Significance:** It is home to key **naval bases** and faces **maritime security concerns** like piracy, illegal fishing, and territorial dispute.
 - **Critical Minerals:** The **Central Indian Ocean Basin (CIOB)** is estimated to hold vast reserves of **nickel, copper, cobalt, and manganese**.

Click Here to Read: [What are the Major Challenges Related to the Indian Ocean Region?](#), [How to Deal with Challenges in the Indian Ocean Region?](#)

India's Overseas Port Investment

Why in News?

The US released a Memorandum which enforces “maximum pressure” on Iran, specifically mentioning **Chabahar Port**.

- This raises concerns over **India's overseas port investments and trade**, potentially impacting its **geostrategic and economic interests** in the region.

Click here to Read: [Chabahar Port Agreement](#), [India's Strategic Investment in Chabahar](#)

What are India's Major Overseas Port Investments?

- **Haifa Port (Israel):** It enhances **India-Israel trade**, security ties, and **Mediterranean connectivity**.
- **Mongla & Chittagong Ports (Bangladesh):** Improves **India-Bangladesh trade**, transshipment, and **Northeast connectivity**, reducing transport costs.
- **Duqm Port (Oman):** Strengthens **India's Gulf presence**, **naval operations**, and energy security.
- **Sittwe Port (Myanmar):** Part of the **Kaladan project**, boosting **connectivity to Northeast India and ASEAN** while reducing dependence on the **Siliguri Corridor**.

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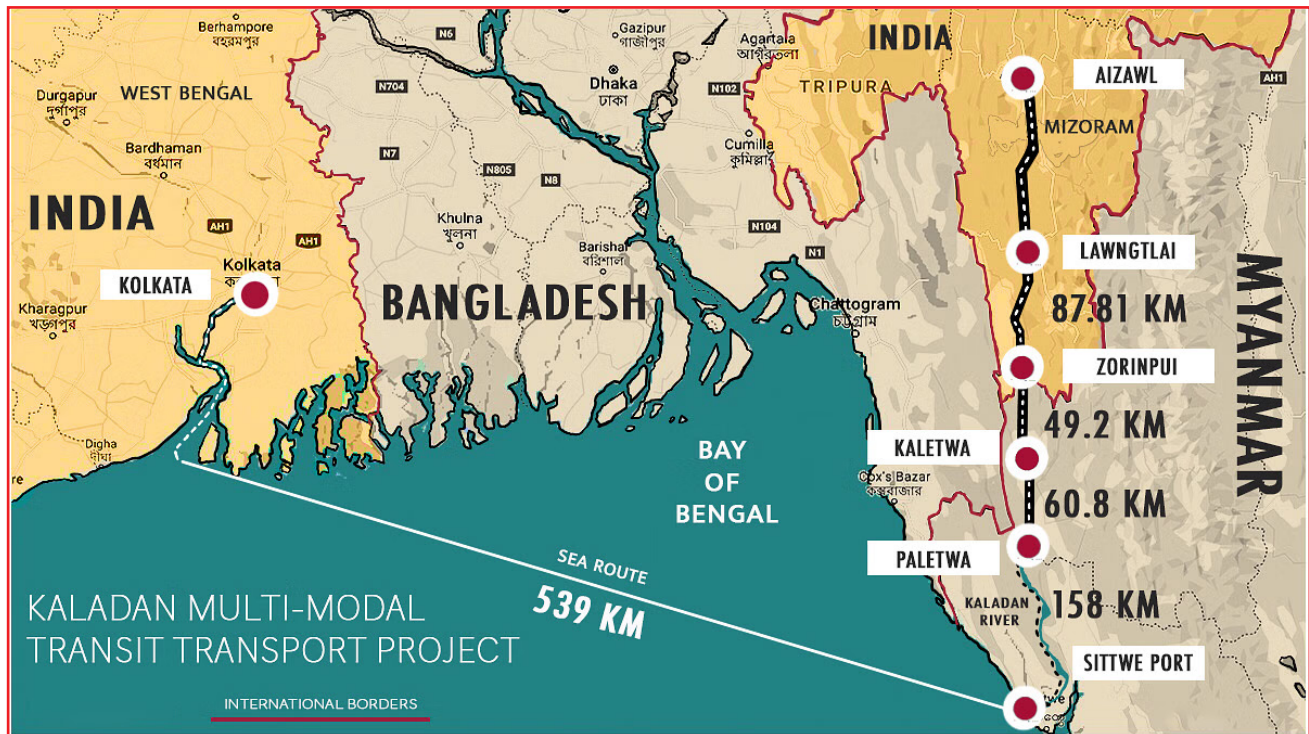
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Note:



- **Sabang Port (Indonesia):** India and Indonesia are collaborating on Sabang Port near the Malacca Strait..



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Note:

- **Trincomalee & Kankesanthurai Ports (Sri Lanka):** Enhancing trade and passenger connectivity, strengthening India-Sri Lanka maritime ties.



What is the Significance of India's Overseas Port Investment?

- **Geopolitical and Strategic Importance:** India's overseas port investments **counter China's BRI dominance** (e.g., Gwadar, Hambantota) by securing key maritime routes.
 - Ports like **Chabahar (Iran) and Colombo (Sri Lanka)** enhance regional connectivity, **bypass hostile routes**, and strengthen trade with Central Asia.
 - Strategic locations like **Duqm (Oman)** provide **military and logistical advantages**, bolstering **India's maritime security** and influence in the Indian Ocean.
- **Economic and Trade Benefits:** India's overseas port investments **enhance trade routes** (e.g., Chabahar, Haifa), **reducing transit costs** and improving **supply chain efficiency**.
 - They **facilitate access to landlocked markets** in Central Asia and Africa, **expanding trade opportunities**.
 - Additionally, these investments **strengthen bilateral ties**, fostering **long-term economic and diplomatic partnerships**.

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Note:

- **Securing Energy:** It also ensures energy security by controlling key transit points in the Indian Ocean Region (IOR), safeguarding vital oil and gas imports.
 - They also mitigate supply chain disruptions by providing alternative routes (e.g., Chabahar), reducing vulnerabilities from regional conflicts or blockades.

What Other Initiatives India is Taking to Expand its Global Maritime Presence?

- **Strengthening Regional Connectivity:**
 - **INSTC.**
 - **Africa-Asia Growth Corridor (AAGC):** AAGC is an India-Japan initiative enhancing Asia-Africa connectivity through infrastructure, trade, and capacity building.
- **Investments in Shipping Infrastructure:**
 - **Sagarmala Programme.**
 - **Maritime India Vision 2030.**
- **Naval Diplomacy and Security Initiatives:**
 - **SAGAR (Security and Growth for All in the Region).**
 - **Indian Ocean Naval Symposium (IONS).**
 - **Indo-Pacific Oceans Initiative (IPOI).**
 - **Quad Maritime Cooperation**
- **Deep-Sea Exploration and Underwater Infrastructure:**
 - **Deep Ocean Mission.**
 - **Undersea Cable and Maritime Connectivity.**

What are the Challenges in Overseas Port Investments?

- **Geopolitical Risks:** China's investments in Gwadar and Hambantota have driven India to expand maritime projects, but political shifts in host nations, like Sri Lanka, impact investment stability.
 - Additionally, terrorism and conflicts, such as Taliban attacks on Indian workers in Chabahar and Myanmar's instability affecting Sittwe Port, pose security challenges.
- **Sanctions & Regulatory Hurdles:** US sanctions on Iran restrict Chabahar Port's operations, impacting India's regional connectivity.
 - Additionally, Western scrutiny of India's partnerships in sensitive regions creates geopolitical pressures on investment decisions.
- **Internal Policy Debates:** There is an ongoing discussion on whether state-owned India Ports Global Ltd (IPGL) or private entities should spearhead overseas port investments.
 - Additionally, concerns over transparency and accountability in awarding contracts and managing projects persist.

India as a Bridge Between the Global North and South

Why in News?

Prime Minister Narendra Modi highlighted India's commitment to amplifying the **Global South's** voice and leading inclusive global governance reforms, aiming to serve as a **bridge between the Global North and South**.

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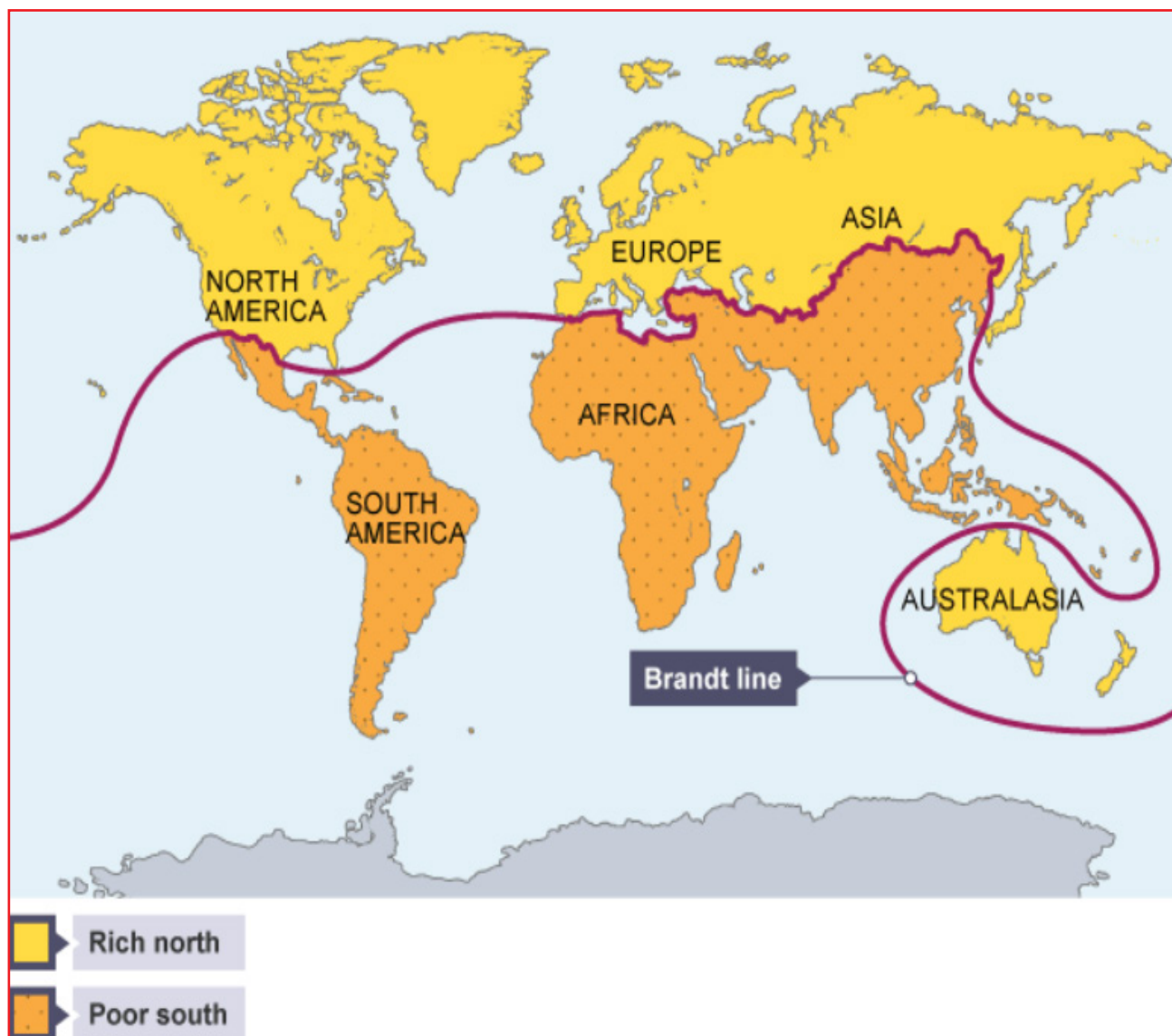
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Note:



How India is Emerging as a Bridge Between North and South?

- **Bridging the Global North-South Divide:** Many developing nations face economic distress due to **debt crises and restrictive International Monetary Fund (IMF) conditions**.
 - India offers a collaborative development model, unlike Western or Chinese approaches, with its proposed “**Global Development Compact**” providing an alternative, non-conditional development cooperation framework.
 - Unlike **Cold War-era** diplomacy, India is **deepening ties with the West (US, Europe)** while expanding engagement with **Africa, Latin America, and Southeast Asia**.
 - India advocates for a **fairer global economic system**, aligning with the Global South’s interests.
 - India advocates for **UN Security Council (UNSC) reform**, arguing that **developing countries deserve greater representation** in global decision-making.
 - India supports **IMF and World Bank reforms** to make financing more accessible for **Global South nations**.

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Note:

- **India's Early Role in the Global South:** India played a key role in establishing the **Non-Alignment Movement (NAM)** to promote self-determination for developing nations.
 - It helped form the **Group of 77 (G-77)** in 1964 to unite developing nations at the **United Nations**.
 - At the **Stockholm Conference, 1972**, India championed **climate justice**, leading to the principle of **Common But Differentiated Responsibilities (CBDR)**.
- **Assertive Foreign Policy:** Unlike the NAM, India is no longer a passive observer but an **active participant** in reshaping global governance.
 - The inclusion of the **African Union in G20 (2023)** under **India's presidency** showcased its **diplomatic leverage**.
 - India's **Voice of Global South Summit** has provided a **platform for developing nations** to collectively push for reforms.
 - India champions the protection of **traditional knowledge** through initiatives like the **World Intellectual Property Organization (WIPO) treaty** and advocates for the inclusion of **Global South voices** in forums like the G20.
 - India's **Vaccine Maitri initiative**, providing millions of vaccine doses during the pandemic, demonstrates its commitment to the welfare of developing nations.
 - India played a key role in establishing the **Loss and Damage Fund**, ensuring climate financing for vulnerable nations.
 - Co-founded the **International Solar Alliance (ISA)** to promote clean energy in developing nations.
- **Strategic Autonomy:** India stays independent on global issues, such as the Russia-Ukraine war, strengthens South-South ties.
 - India is not strictly anti-West but is engaging with both developed and developing nations without aligning with any bloc.
- **Countering China:** China's **Belt and Road Initiative (BRI)** has left many Global South nations in **debt distress**.

- India is positioning itself as an **alternative development partner**, focusing on **transparent, sustainable cooperation** rather than **debt-driven infrastructure projects**.
- India with the **Quad (India, US, Japan, Australia)** is countering China's **maritime expansion** in the **Indo-Pacific**.

What is Global North and South?

Click here to Read: [Global South](#), [Global North](#)

What are the Challenges in India's Global South Leadership?

- **Managing China's Influence:** China's **financial muscle and large-scale investments** in Global South nations pose **competition**.
 - India's **own economic and infrastructure challenges** could limit its ability to offer large-scale aid as compared to China.
- **Delays in Project Implementation** India's **infrastructure and development projects** often suffer from **delays and inefficiencies**.
 - **Kaladan Multimodal Transit Project (Myanmar)** remains incomplete after **two decades**.
 - **Asia-Africa Growth Corridor (AAGC)**, a Japan-India initiative, has made **slow progress** compared to China's BRI.
- **Institutional and Policy Gaps:** India lacks a **well-defined institutional framework** for global development aid.
 - Requires a **structured long-term vision** similar to China's BRI.
 - Additionally, India's bid for permanent **United Nations Security Council (UNSC)** membership is opposed by rival Global South nations (e.g., Pakistan).
- **Lack of Consistent Engagement:** India's limited engagement with traditional Global South platforms like **NAM and G-77**, and the absence of an **India-Africa Summit since 2015**, has created diplomatic gaps and hindered its influence in the developing world.

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Note:

- **Balancing Ties with the Global North:** India's deepening ties with the US and Europe must not alienate Global South allies. Balancing **US, EU, and developing country expectations** remains a **diplomatic challenge**.
- **Big Brother Attitude:** Some Global South nations view India as **over-assertive** in regional politics, leading to mistrust as evident by the **"India Out" campaign in the Maldives** accused India of meddling in domestic affairs.

How Can India Become an Effective Global Development Partner?

- **Institutionalizing Development Diplomacy:** India should set a clear **international development assistance policy**, similar to China's BRI and Japan's **Official Development Assistance (ODA)**.
 - Establishing an **India International Development Agency** can coordinate foreign aid, while the **AAGC** with Japan offers a viable alternative to the BRI.
 - An **India-led Global South Development Fund** can finance sustainable infrastructure projects.
- **North-South Cooperation:** India should make **trilateral partnerships** involving both the Global South and

Global North (e.g., India-US-Africa, India- Russia-ASEAN) to enhance its impact.

- **Deepening South-South Cooperation:** Strengthen regional pacts like **IBSA (India-Brazil-South Africa)** and **BRICS**, prioritize trade with **Africa, Latin America, and ASEAN**, and offer low-cost credit lines to Global South nations for infrastructure.
 - Promote the **Internationalisation of Indian Currency, RuPay, Unified Payments Interface (UPI)**, and digital payments to boost financial connectivity in the developing world.
- **Human-Centric Development:** India's **Mission LiFE (Lifestyle for Environment)** should expand to include **human capital development** in Global South nations through initiatives like **Skill India**, women entrepreneurship, and **ITEC (Indian Technical and Economic Cooperation)**, along with investments in **sustainable development goals (SDGs)**.
- **Enhancing Soft Power:** Expand diaspora engagement in Africa, Latin America, and South Asia while strengthening education and research ties through scholarships and technical training programs.



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Note:

Social Issues

Highlights

- NSO Time Use Survey 2024
- 1st Regional Dialogue on Social Justice
- World Day of Social Justice 2025

NSO Time Use Survey 2024

Why in News?

The **National Statistics Office (NSO)**, under the **Ministry of Statistics and Programme Implementation (MoSPI)**, has released **Time Use Survey (TUS) 2024**, the second such nationwide survey after the first conducted in 2019.

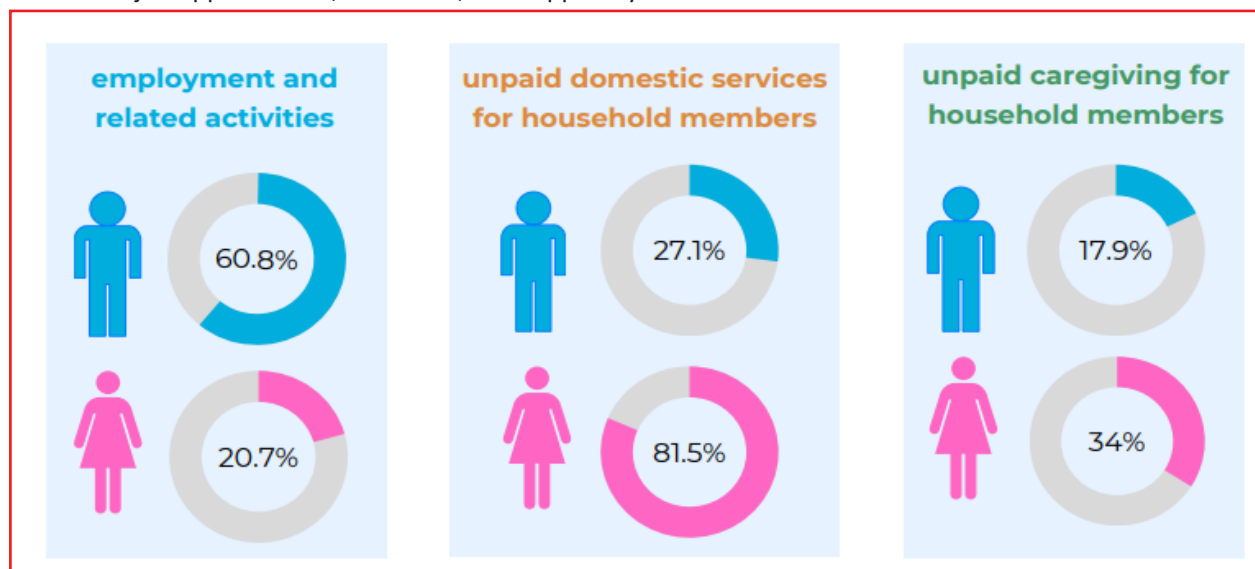
- The survey highlights rising women's employment, greater male caregiving, and increased leisure time, signaling evolving gender roles in India.

Note: The **TUS** tracks time allocation across paid and unpaid activities, providing detailed insights into **various aspects of daily life**, unlike traditional surveys that focus on specific aspects of work.

- Conducted in India, Australia, Japan, Korea, the US, and China, it analyzes gender participation in work, caregiving, learning, and leisure.

What are the Key Findings of TUS 2024?

- **Employment Participation:** **75% of males and 25% of females (aged 15-59 years)** participated in employment-related activities in **2024**, compared to **70.9% males and 21.8% females** in 2019.
 - A reduction in time spent by women in **unpaid domestic work** (from **315 minutes/day** in 2019 to **305 minutes/day** in 2024) indicates a shift from unpaid to paid activities.
 - **Urban women showed a higher rise in employment participation** compared to rural women, possibly due to better job opportunities, education, and support systems.



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Note:

- **Caregiving:** 41% of women participated in **caregiving** compared to 21.4% of men in the 15-59 age group.
 - Women spent **140 minutes/day** on caregiving, compared to **74 minutes/day** by male, while caregiving remains female-dominated, **male participation has increased**.
 - Greater **paternal involvement** in child-rearing and elder care is emerging, influenced by changing gender roles and urbanization.
- **Cultural, Leisure and Education Activities:** People aged **6 years and above** spent **11% of their daily time** on cultural, leisure, mass media, and sports in 2024, compared to **9.9% in 2019**.
 - **89.3% of children (6-14 years)** participated in learning activities, dedicating an average of **413 minutes/day** to education.
- **Household Production:** About 16.8% of the population participated in producing goods for their own final use.

National Statistics Office (NSO)

- **About:** The NSO serves as the **nodal agency for statistical development** in India, ensuring standardization, coordination, and dissemination of data.
 - NSO consists of the **Central Statistical Office (CSO)**, the Data Informatics & Innovation Division (DIID) and the **National Sample Survey Office (NSSO)**.
- **Functions:** NSO compiles and releases the **Index of Industrial Production (IIP)**, conducts the **Annual Survey of Industries (ASI)**, and provides **statistical insights on industrial growth and economic trends**.

1st Regional Dialogue on Social Justice

Why in News?

The first ever **Regional Dialogue on Social Justice** under the **Global Coalition for Social Justice** was held in New Delhi.

- It also marked the 74th Foundation Day of **Employees' State Insurance Corporation (ESIC)** (founded on **24th February 1952**).

What is the Global Coalition for Social Justice?

- **About:** Launched in **2023** by the **International Labour Organization (ILO)**, it aims to tackle **social justice deficits** and fast-track progress toward the SDGs.

- **Objective:** It promotes **strong, sustainable, and inclusive development** through global solidarity, policy coherence, and coordinated action among various stakeholders.
- **Membership:** It is open to **governments, organizations, businesses, and academia**, with members committed to social justice and labor rights under **UN and ILO principles**.
 - Membership is **voluntary** and **India** is a member.

What are India's Constitutional Provisions on Social Justice?

- **Preamble:** It ensures **social, economic, and political justice**, and guarantees equality of status and opportunity.
- **Fundamental Rights:** **Article 23** prohibits **human trafficking** and forced labour and **Article 24** bans child labour in **hazardous occupations**.
- **Directive Principles of State Policy:**
 - **Article 38:** It directs the State to reduce **social and economic inequalities**.
 - **Article 39:** It ensures **equal livelihood, fair wages**, and protection from exploitation.
 - **Article 39A:** It guarantees **free legal aid** for disadvantaged people.
 - **Article 46:** It mandates special **educational and economic promotion** for SCs, STs, and weaker sections to prevent discrimination.

ESIC

- **About:** It is a **statutory body** formed under the **Employees State Insurance Act, 1948** and functions under the **Ministry of Labour and Employment**.
- **Purpose:** It provides **social security and health insurance** to employees in establishments with **10 or more employees** (in less than 10 employees if it's a **hazardous industry** e.g., firecrackers, toxic chemicals etc).
- **Eligibility:** Employees earning up to **Rs 21,000 per month**.
- **Benefits Provided:** Medical care, sickness benefit, Maternity benefit, disability benefit, dependent's Benefit, and unemployment allowance.

Note: The ILO's **World Social Protection Report 2024-26** shows India's social protection coverage (excluding health) rose from **24.4% in 2021 to 48.8% in 2024**.

- The **employability** of Indian graduates has risen from **33.95% in 2013 to 54.81% in 2024**.

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World Day of Social Justice 2025

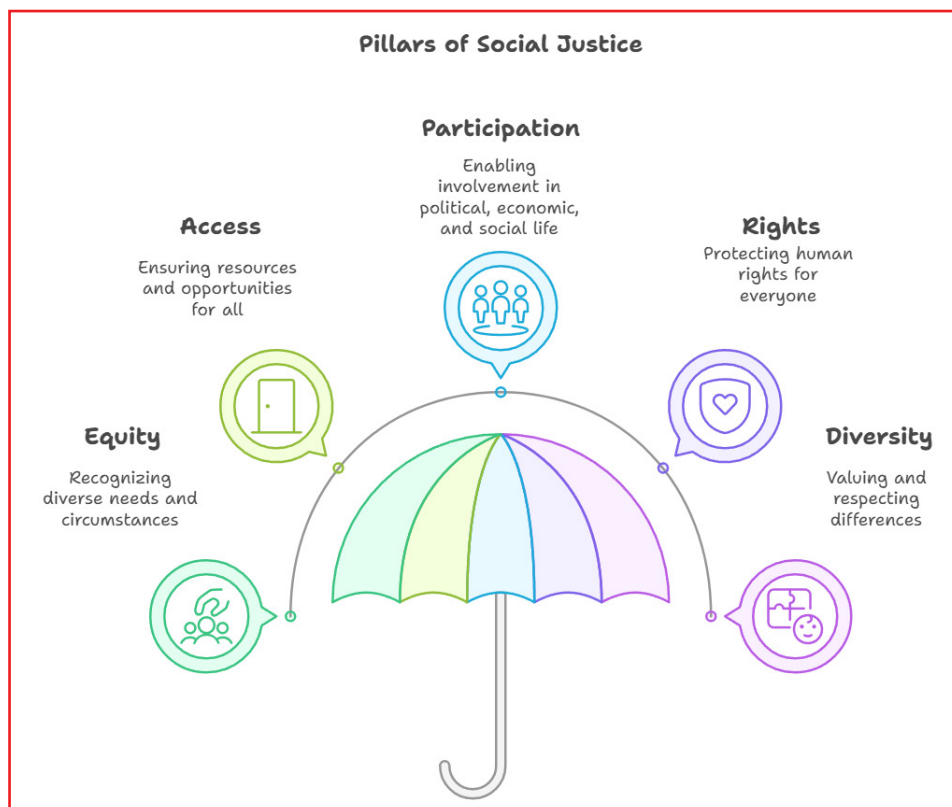
Why in News?

The **United Nations (UN)** observed **World Day of Social Justice (WDSJ)** on **20th February 2025** advocating against **poverty, exclusion, and unemployment** while promoting **equality and solidarity**.

- The **2025 theme of WDSJ**, “**Empowering Inclusion: Bridging Gaps of Social Justice**,” focuses on **inclusive policies and social protection**, while highlighting the importance of “**Strengthening a Just Transition for a Sustainable Future**.”

What is World Day of Social Justice?

- **About:** It is an initiative of the **UN** specifically led by the **International Labour Organization (ILO)** to promote **social justice, equality, human rights**, and fair opportunities for all.
 - It was designated by the **UN General Assembly** on **26th November 2007**.
- **Pillars of Social Justice:**



- **Role of ILO:** ILO unanimously adopted the **Declaration on Social Justice for a Fair Globalization** on **10th June 2008** in response to the World Day of Social Justice.
 - It expands upon the **Philadelphia Declaration 1944** and the **Declaration on Fundamental Principles and Rights at Work 1998**.
 - In 2009, ILO launched **Social Protection Floors** that ensure **basic social security** to prevent or reduce poverty.
- **Social Justice in India:** In India, MoSJE is the **nodal agency** for uplifting vulnerable communities, including:
 - **Scheduled Castes**, Other Backward Classes, and Senior Citizens
 - Victims of Alcoholism and Substance Abuse

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Note:

- Transgender Persons, and **Denotified and Nomadic Tribes (DNTs)**,
- Economically Backward Classes (EBCs), and the **Economically Weaker Section (EWS)**.
- **Significance:**
 - **Globalization:** The declaration redefined the ILO's role in globalization, ensuring **social justice** remains central to **economic policies**.
 - **Alignment with UN Goals:** It supports the UN's vision of **decent work, fair globalization, fundamental rights, social protections**, and productive social dialogue.
 - **Global Stability:** Social justice is essential for **global peace and security** which remains threatened by labor insecurity, inequality, and social contract breakdowns.
 - **Social Justice:** Achieving social justice requires **fundamental freedoms, human rights, and economic stability**.
- **Challenges:** Persistent issues such as **financial crises, insecurity, poverty, exclusion, and inequality** continue to hinder social justice on a global scale.

What are India's Constitutional Provisions on Social Justice?

- **Preamble:** It ensures **social, economic, and political justice**, guarantees **equality of status and opportunity**, and promotes fraternity to uphold individual **dignity** and national unity.
- **Fundamental Rights:**
 - **Article 23:** It **prohibits human trafficking and forced labour**, making such practices punishable by law.
 - **Article 24:** It **bans child labour** in hazardous occupations, protecting children's rights to safety and education.
- **Directive Principles of State Policy:**
 - **Article 38:** It directs the State to **reduce social and economic inequalities**.
 - **Article 39:** It ensures **equal livelihood, fair wages**, and protection from exploitation.
 - **Article 39A:** It guarantees **free legal aid** for disadvantaged people.
 - **Article 46:** It mandates special **educational and economic promotion** for SCs, STs, and weaker sections to prevent discrimination.

What are Initiatives for Ensuring Social Justice in India?

- **PM-AJAY: Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY)** supports Scheduled Caste (SC) communities through **skill development, income generation, and village infrastructure**.
 - It has three components i.e., **Adarsh Gram development, Grants-in-Aid** for socio-economic projects, and **hostel construction** in higher education institutions.
- **SRESHTA: Scheme for Residential Education for Students in High Schools in Targeted Areas (SRESHTA)** funds top **CBSE/State Board schools for SC students** in classes 9-12 and **supports NGOs** to run residential and non-residential schools and hostels.
- **Purple Fests (Festival of Inclusion):** It fosters **inclusion, dignity, and equal opportunities** for persons with disabilities (**Divyangjan**) promoting **solidarity and mutual respect**.
- **NAMASTE: National Action for Mechanized Sanitation Ecosystem (NAMASTE)** is a central sector scheme to ensure the **safety, dignity, and sustainable livelihood** of **sanitation workers** in urban India.
 - It was expanded to include **waste pickers** as a target group from FY 2024-25.
- **SMILE: Support for Marginalized Individuals for Livelihood and Enterprise (SMILE)** scheme is aimed at the **rehabilitation of transgender individuals** and persons engaged in **begging** to create **Begging-free India**.
 - It is currently implemented in **81 cities** and as of November, 2024, **7,660 beggars** were **identified**, and **970 rehabilitated**.
- **PM-DAKSH Yojana: Pradhan Mantri Dakshta Aur Kushalta Sampann Hitgrahi (PM-DAKSH) yojana** provides **free skill training** to SCs, OBCs, EBCs, DNTs, and **Safai Karamcharis** for economic empowerment.
- **Nasha Mukta Bharat Abhiyan (NMBA):** It aims for a **drug-free India** by targeting **272 high-risk districts** through **supply control** (Narcotics Control Bureau), **awareness and demand reduction** (MoSJE), and **treatment** (Ministry of Health).
 - Since its launch (15th August 2020), NMBA has reached **13.57 crore people**, including **4.42 crore youth**, with **3.85 lakh educational institutions** participating.



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Note:

Science & Technology

Highlights

- Black Plastic
- Self-Testing of HIV
- Solar Coronal Holes
- Detection of Most Energetic Neutrino
- China's EAST Reactor and Nuclear Fusion
- DNA Nano Rafts
- ISRO's Space Tech Transfer for Daily Applications

Black Plastic

Black Plastic, widely used in kitchenware and containers, faces scrutiny over potential health risks, raising concerns about its safety.

- **About:** Black plastic is often made from **recycled electronic waste**. Its black color comes from a substance called **Black Carbon** (short-lived pollutant, significant contributor to warming).
- **Composition:** Its composition may **contain toxic substances such as brominated flame retardants**, antimony, lead, cadmium, and mercury.
 - These heavy metals are **toxic at high exposure levels** and banned in many countries. The flame-retardant **decabromodiphenyl ether (BDE-209)** in black plastic poses potential health risks.
 - Despite bans on certain chemicals, **legacy plastics** (cannot be reused or recycled) with harmful elements continue to enter the recycling chain.
- **Concerns:** While exposure through kitchen utensils is lower, concerns about **cumulative chemical exposure** remain.



Read more: [India as the World Largest Plastic Polluter](#)

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Note:

Self-Testing of HIV

Why in News?

A study by the **Indian Council of Medical Research-National Institute of Translational Virology** and AIDS Research (ICMR-NITVAR) and Mizoram University has highlighted the success of **Human Immunodeficiency Virus (HIV)** self-testing in Mizoram.

What are the Key Findings of the Study?

- **HIV Self-Testing:** The study examined HIV self-testing implementation in Mizoram, which has India's highest HIV prevalence (2.73%), **13 times the national average**.
 - The epidemic in the state is largely **driven by injecting drug use and commercial sex work**.
 - **Lack of early testing and stigma** prevents many from accessing timely treatment.
 - HIV self-testing allows individuals to collect their own blood or saliva samples and interpret the results using a test kit.
- **Stigma-Free & Private:** The study found self-testing to be a **convenient, confidential, and more effective way** for high-risk groups to know their HIV status than traditional campaigns, with potential for replication in other states.

Note: The **World Health Organization (WHO)** endorsed self-testing in 2016, and **41 countries** have since adopted it. India has **not yet introduced formal guidelines** for HIV self-testing.

What are the Key Facts About Human Immunodeficiency Virus?

- **About:** HIV is a virus that attacks the immune system by targeting **CD4 cells** (white blood cells). If untreated, it can lead to **AIDS (Acquired Immunodeficiency Syndrome)** and making the body prone to infections and cancers.

- **Transmission:** HIV spreads through **direct contact of infected bodily fluids** like blood, semen, breast milk, vaginal fluids, and via unprotected sex, tattooing, and shared needles **but not through casual contact**.
- **Symptoms:** **Early stage** (fever, rash), **Later stage** (swollen lymph nodes, weight loss, diarrhea), and **Severe stage** (tuberculosis, meningitis, cancers (e.g. lymphoma)).
- **Risk Factors:** Multiple sexual partners or having sexually transmitted infections (STIs), Unsafe blood transfusions.
- **Diagnosis:** **Rapid diagnostic tests** for same-day results, **Self-testing kits**, and Confirmatory **virological tests**.
- **Prevention:** Regular **HIV testing**, **STI screening**, safe blood transfusions, and using sterilized needles for tattoos are essential for prevention.
- **Treatment:** No cure for HIV, **Antiretroviral Therapy (ART)** helps control the virus. ART must be taken daily for life to maintain health.
- **Advanced HIV Disease (AHD):** WHO defines AHD as CD4 <200 cells/mm³. People with AHD are at high risk of death, even after starting ART.
- **Global Response:** End **HIV epidemic by 2030** (UN Sustainable Development Goal 3.3).
- **India's Progress:** **India HIV Estimations 2023** reports 2.5 million people living with HIV, with **0.2% adult prevalence**. New infections dropped **44% since 2010**, surpassing the global **39% decline**.
 - The **National AIDS Control Programme (NACP)**, launched in 1992, remains key in India's fight against HIV/AIDS.

Solar Coronal Holes

The study has revealed that Indian astronomers have **accurately estimated the thermal and magnetic field structures of solar coronal holes (SCH)**.

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Note:

What are Solar Coronal Holes?

- **About:** Coronal Holes are large, **dark regions on the Sun** that are **cooler and less dense than the surrounding plasma**. It was first discovered in the **1970s** by **X-ray satellites**.
- **Occurrence:**
 - They occur in areas where the **Sun's magnetic field is open to interplanetary space**, allowing **high-speed solar wind (geomagnetic storm)** to escape.
 - Open magnetic field lines are **magnetic field lines that do not form closed loops** but extend outward into space without returning to their source.
 - Coronal holes are **most prevalent during the declining phase of a solar cycle** and are typically found near the **Sun's poles**.
- **Properties of Coronal Holes:**
 - **Uniform Temperature:** Coronal holes maintain a consistent temperature across latitudes, indicating a deep origin within the Sun.
 - **Magnetic Field Variation:** Magnetic field strength increases from the solar equator to the poles, likely influenced by **Alfvén wave disturbances**.
 - **Alfvén wave disturbances** are **low-frequency oscillations in the magnetic field** and **ions of a plasma** that can cause fluctuations in the solar wind and geospace.
- **Impacts of SCH:**
 - **Impact on Space Weather:** The high-speed solar wind from coronal holes interacts with Earth's magnetic field, causing **geomagnetic storms** that can disrupt satellites, GPS, and communication networks.
 - **Effect on Indian Monsoon:** The study suggests that, along with sunspots, the radiative effects of coronal holes influence **Indian monsoon rainfall variability**.
 - **Ionospheric Disturbances:** Coronal hole activity affects Earth's ionosphere, impacting **radio wave propagation** and **telecommunication systems**.

Sunspots

- **Sunspots** are **dark areas on the sun's surface** that are **caused by strong magnetic fields**. They are **cooler than the surrounding areas of the sun**, making them appear darker on the surface of the Sun (photosphere).
- Coronal holes and sunspots differ in location, magnetic field, and visibility.

	Coronal hole	Sunspot
Location	In the sun's upper atmosphere, the corona	In the sun's lower atmosphere, the photosphere
Magnetic field	Open magnetic lines that allow solar wind to flow freely	Extremely strong magnetic fields with twisted magnetic lines
Visibility	Only visible in UV or X-ray light	Visible in visible light

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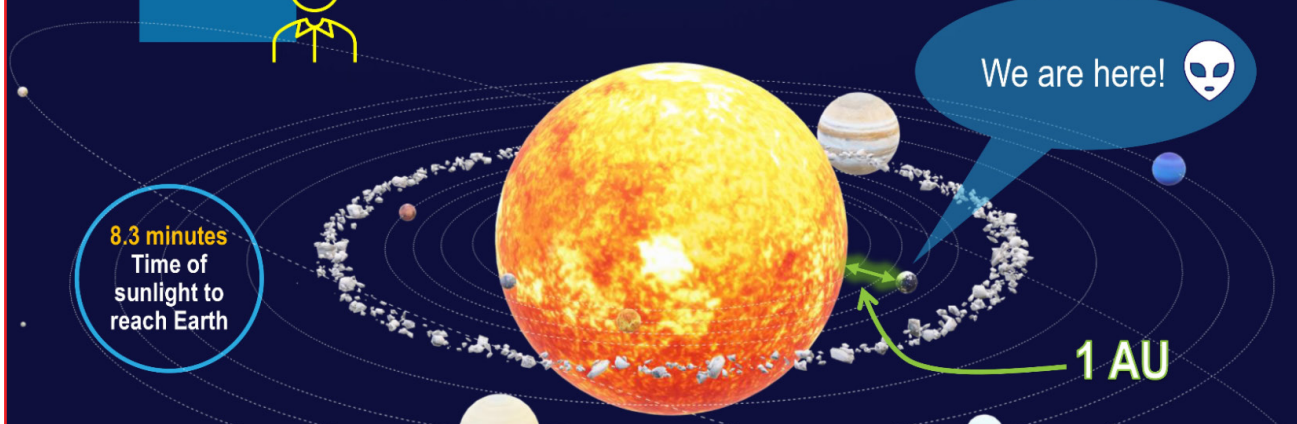
Note:



A dive
into




Space Weather



Space weather

refers to conditions within the solar system due to the Sun's radiation

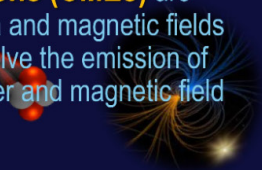
Geomagnetic storms are the temporary disturbance of Earth's magnetosphere caused by a solar wind shock.



400 km / s
Solar wind speed

The disturbance, which drives the magnetic storm, typically is a solar coronal mass ejection.

Coronal mass ejections (CMEs) are eruptions of solar plasma and magnetic fields from the Sun. CMEs involve the emission of electrically charged matter and magnetic field into space.




CMEs are surprisingly thin and scattered along a wide area of 0.25 astronomical unit

150 million km
Astronomical Unit (AU)

The **Solar wind** is a stream of charged particles emitted from the upper atmosphere of the Sun. It is made of electrons and protons. The thermal energy of the plasma of the crown is so high that exceeds the gravitational field of the star and expands in the interplanetary space like the wind.

The **Aurora** is an impressive and bright celestial phenomenon that is observed in the upper layers of the atmosphere and can be seen in the northern parts of the earth. The phenomenon presents a variety of colours and patterns, with sudden appearances and relatively rapid transformations.



Read More: [What is a Geomagnetic Storm?](#)

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Note:

Detection of Most Energetic Neutrino

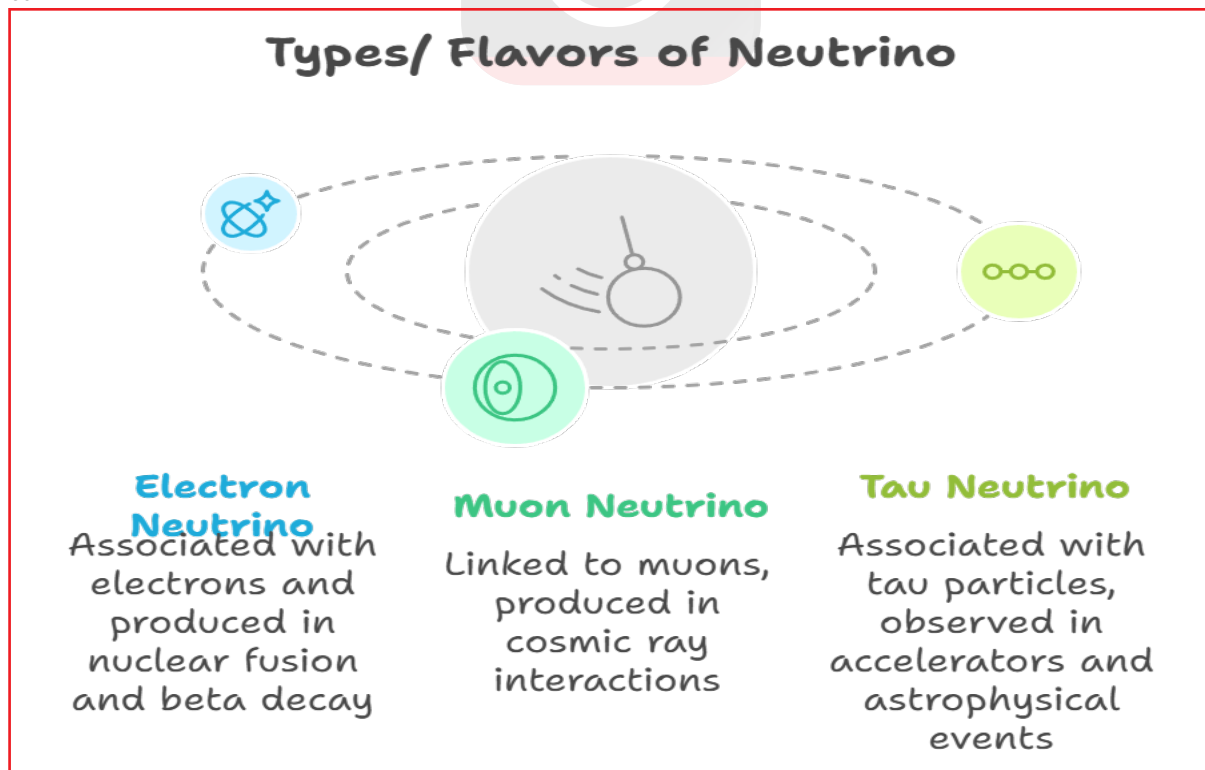
Scientists detected the **highest-energy neutrino** using the **KM3NeT (Cubic Kilometre Neutrino Telescope)** observatory in the **Mediterranean Sea**.

- It was 30 times more energetic than any previously observed, **10^{15} times more energetic than photons**, and **10,000 times more powerful** than particles from the **Large Hadron Collider**, the world's largest particle accelerator.
- **Cubic Kilometre Neutrino Telescope (KM3NeT)**: KM3NeT is an under construction **European research facility** in the **Mediterranean Sea** that studies **neutrinos**.
- It's designed to **detect neutrinos from distant sources** and from Earth's atmosphere.

Note: **India's Neutrino Observatory project** is proposed to be set up at Pottipuram village in Theni (Tamil Nadu) in a 1,200-metre-deep cave.

What are Neutrinos?

- **About:** Neutrinos, often called "**ghost particles**", are electrically neutral, nearly massless subatomic particles that rarely interact with matter.
 - This allows them to **travel vast distances** through stars, planets, and galaxies **without being deflected by magnetic fields**, making them reliable "cosmic messengers."
- **Sources of Neutrinos:**
 - **Natural Sources:** **Sun** (solar neutrinos), **Nuclear reactions in stars, supernovae**, and **cosmic rays**.
 - **Artificial Sources:** Nuclear reactors, radioactive decay and particle accelerators.
 - **Big Bang Neutrinos:** Remnants from the early universe, contributing to cosmological studies.
- **Types/Flavors of Neutrinos:**



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Note:

- Neutrinos undergo **oscillation** (change from one flavour to another) while traveling due to **quantum mixing**.

➤ **Significance in Astrophysics:**

- Neutrinos, unlike cosmic rays, **travel undisturbed**, making them **crucial for tracing high-energy astrophysical events**.
- Scientists detect neutrinos using **deep-sea or ice observatories** that capture **Cherenkov radiation** (a detectable flash of light) from rare interactions.

China's EAST Reactor and Nuclear Fusion

Why in News?

China's **Experimental Advanced Superconducting Tokamak (EAST)** nuclear fusion reactor set a new milestone in nuclear fusion by **sustaining plasma at 100 million°C for 1,066 seconds**.

- This achievement advances the **pursuit of clean and sustainable fusion energy** for future energy security.

Tokamak: A tokamak is an **experimental device** designed to **generate energy through nuclear fusion**.

- Inside the tokamak, the heat produced from the fusion of atoms is absorbed by the vessel's walls.
- Similar to conventional power plants, **this heat is then used to produce steam, which drives turbines and generators** to generate electricity.

What is Experimental Advanced Superconducting Tokamak (EAST)?

➤ **About:**

- EAST is an **advanced nuclear fusion research facility** located at the **Institute of Plasma Physics, Chinese Academy of Sciences (ASIPP)** in Hefei, China.
- It became operational in **2006**.

➤ **Purpose:**

- It aims to **replicate the nuclear fusion process** that powers the **Sun**, contributing to the **development**

of **sustainable energy** (without any **harmful radioactive waste**).

- It is a part of the **International Thermonuclear Experimental Reactor (ITER)** initiative, which will be the **world's largest fusion reactor** when operational by 2035.

- The ITER, established in **1985**, is a collaboration of **35 nations** located in **France**. It aims to build the **world's largest tokamak** to demonstrate the feasibility of fusion as a **large-scale, carbon-free energy source**.

- Its members include **China, the European Union, India, Japan, Korea, Russia and the US**.

➤ **Working Mechanism:**

- EAST is based on the **nuclear fusion** process, where **deuterium and tritium nuclei** (isotopes of hydrogen) fuse to form a **helium nucleus**, releasing a large amount of energy.
- Hydrogen fuel is heated to over **150 million°C** to form a **hot plasma** (ionized gas).
- A **strong magnetic field** confines the plasma, preventing heat loss and enabling sustained fusion reactions.

➤ **Achievements & Significance:**

- EAST has achieved significant milestones such as sustaining plasma at **50 million°C for over 60 seconds (2016)** and **100 seconds (2017)**, achieving **steady-state high-confinement plasma for 403 seconds (2023)**.
- Despite these, EAST has yet to achieve **ignition (self-sustaining fusion)** or **produce electricity**.
- It serves as a **testbed for ITER**, a multinational project, including **India and the EU**, aimed at developing a **tokamak capable of achieving net energy gain**.

Read More: [Why is Prioritizing the Nuclear Energy Sector Crucial for India?](#)

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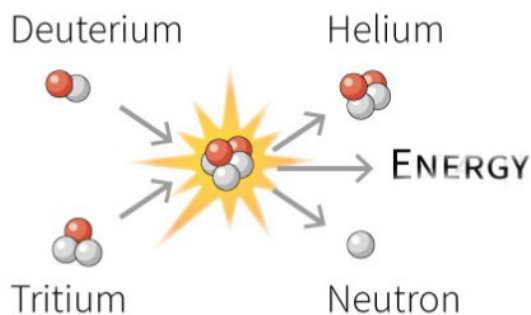
What are Nuclear Reactions?

- **About:** A nuclear reaction is an **interaction between two nuclear particles or two nuclei** that results in the **formation of new nuclei different from the original ones**.
 - Nuclear reactions can be classified **into two main types: nuclear fission** and nuclear fusion.
- **Nuclear Fission:** It is a reaction that occurs when an **atom's nucleus splits into smaller nuclei, releasing energy**.
 - It can occur **naturally (radioactive decay)** or be **induced in a lab by bombarding the nucleus with neutrons** or other particles.
 - The **combined mass of the resulting fragments is less than the original nucleus**, with the lost mass converted into energy.
 - All commercial nuclear reactors operate on nuclear fission.
- **Nuclear Fusion:** It is the process where **two light atomic nuclei combine to form a heavier one, releasing massive energy**.
 - This reaction occurs in **plasma state** (high-temperature & charged state of matter).
 - The **Sun and other stars** are powered by fusion, requiring temperatures of around **10 million°C** to overcome electrical repulsion between nuclei.
 - The **hydrogen bomb** operates on thermonuclear fusion, with a **fission bomb (uranium/plutonium-based)** providing the initial energy to trigger the reaction.

Fusion vs fission

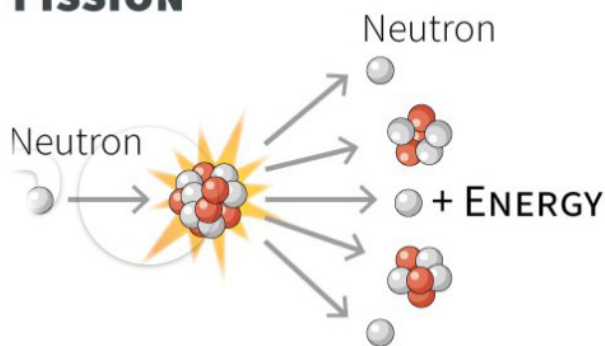
Nuclear reactions that produce massive amounts of energy,
but have different processes

FUSION



Joins 2 or more lighter atoms into a heavier one

FISSION



Splits a larger atom into 2 or more smaller particles

What are the Challenges in Achieving Nuclear Fusion Reaction?

- **Extreme Temperature Requirements:** Fusion requires temperatures exceeding those found at the Sun's core (over 100 million degrees Celsius) to sustain fusion reaction.
- **Magnetic Confinement:** Maintaining the **high-energy plasma in a stable state** requires **strong magnetic fields**, as used in tokamak reactors, to prevent energy loss and sustain reactions.

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Note:

- **Tritium Scarcity:** While deuterium is readily available in seawater, **tritium is scarce and primarily obtained from specific nuclear fission reactions**, raising concerns about long-term fuel supply.
 - Current sources of tritium include **heavy-water reactors** in **Canada, India, and South Korea**, but ITER's demands could exhaust global reserves.
- **Ignition Milestone:** A self-sustaining fusion reaction, where **energy output exceeds energy input**, remains a major goal yet to be achieved.
- **Sustained Reactions:** Currently, **maintaining stable plasma conditions for prolonged periods** remains a major challenge.

Alternative Approaches to Fusion Energy: Apart from tokamaks, researchers are exploring other fusion methods.

- **Stellarators:** It offers a complex yet promising **magnetic confinement method** that eliminates the need for a poloidal field (a kind of magnetic field) in tokamak, though they are harder to build.
- **Laser Inertial Fusion:** It involves the use of **high-power laser beams** to compress a **deuterium-tritium pellet**, triggering fusion. The energy released can generate steam to drive turbines, producing electricity.

DNA Nano Rafts

Why in News?

A study published in Nature Materials has introduced a revolutionary technique using **DNA Nanorafts** to create **Artificial Cells** that can work like **biological membranes**.

- These programmable nanostructures can **reshape membranes, form pathways, and react to surroundings**, advancing **medicine, biosensors, and artificial life research**.

What is DNA Nanorafts?

- **DNA Nanorafts:** **DNA (Deoxyribonucleic Acid)** nano-rafts are **tiny, flat structures** made from **DNA strands** which can be **programmed to control the shape and permeability of cell membranes** in response to **specific chemical signals**.
 - This ability allows them to **influence cell-like membranes in a controlled way**.

Working Mechanism:

- **Attachment to Model Membranes:** DNA nanorafts attach to **Giant Unilamellar Vesicles (GUVs)**, which serve as **simplified models** of biological cell membranes.
 - GUVs are **artificial, cell-sized lipid membranes** that **mimic real cell membranes**, making them useful for studying **membrane behavior and transport mechanisms** in **synthetic biology**.
- **Shape Modification & Reversibility:** DNA nanorafts **expand** when "unlocking" DNA strands are added, **altering the membrane's shape**.
 - This unlocking can be triggered by **enzymes, mechanical devices, or other methods**. The process is **reversed** by adding "locking" DNA strands, restoring the original shape.
 - **Locked Nucleic Acid (LNA)** helps **secure DNA strands together** for stability.
- **Controlled Membrane Manipulation:** This technique allows scientists to precisely control artificial cell membranes.
- **Key Functions:**
 - **Cell Shaping:** Nanorafts can **alter the structure of synthetic cell membranes**, which is essential for **cell movement, division, and communication**.
 - **Gatekeeping (Molecular Transport):** They create **temporary channels in the membrane**, allowing **molecules to pass through**.
 - These channels can **open and close as needed**, similar to **natural protein-based channels in living cells**.

What is an Artificial Cell?

- **About:** Artificial cells are **synthetic structures that mimic living cells** but are made from **non-living components** like synthetic membranes and chemicals.
- **Creation:** Synthetic cells can be created using 2 main approaches:
 - **Top-down approach:** Scientists start with a living cell, remove non-essential genes, and retain only core functions. Eg: **Mycoplasma mycoides JCVI-syn3.0 (minimal synthetic cell)**.
 - **Bottom-up approach:** Researchers **build a cell-like structure from the ground up** by combining **biological and non-biological molecules** to replicate key cellular functions. Eg: **GUVs**

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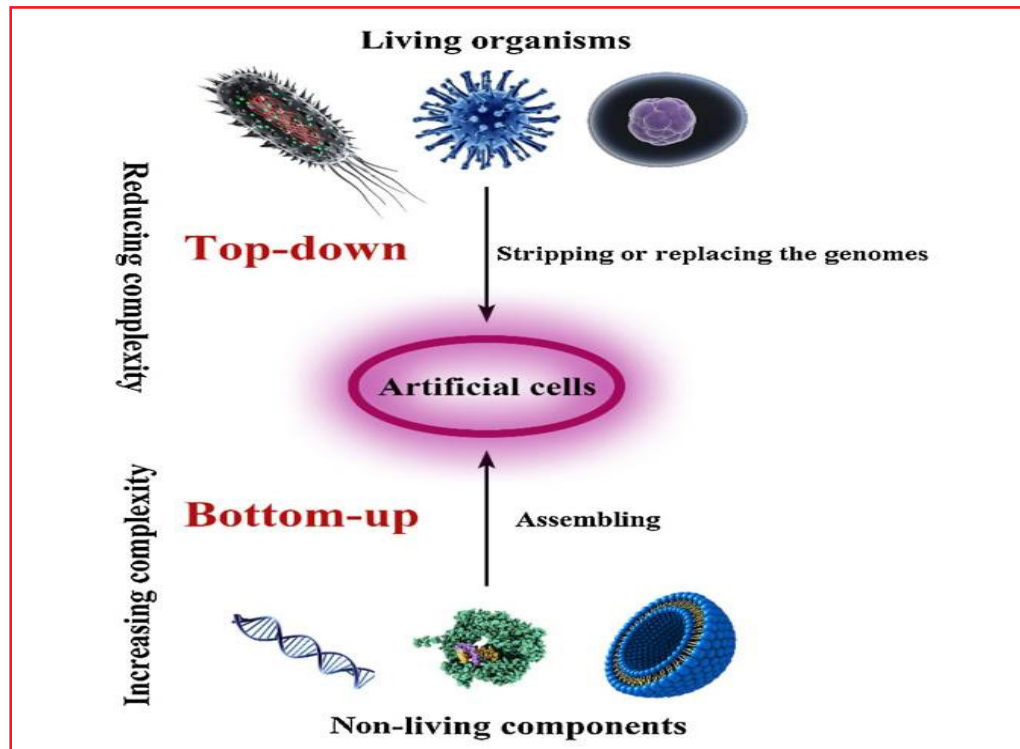
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Note:



➤ **Applications:**

- **Drug Delivery:** Synthetic cells can be designed to **transport and release medicines at specific targets** in the body.
- **Biomedicine:** They can aid in **developing innovative therapies** for chronic diseases such as **cancer**.
- **Organ Transplantation:** It could help in creating **bioengineered tissues or organs**, addressing the shortage of donor organs.

ISRO's Space Tech Transfer for Daily Applications

Why in News?

The **Indian National Space Promotion and Authorization Centre (IN-SPACe)**, has identified 166 technologies developed by the **Indian Space Research Organisation (ISRO)** for **space missions** that can be transferred to industries for **non-space applications**.

- The move is expected to benefit various sectors, including automotive, construction, and logistics, thereby enhancing **daily lives**.

How Will ISRO's Space Tech Impact Various Industries?

➤ **Automotive Industry:**

- **Collision Avoidance Systems:** The software and algorithms developed for **Chandrayaan-3's** landing can be adapted to **prevent car collisions**, improving **vehicle safety**.
- **Airbag Deployment:** **Pressure sensors** used in launch vehicles to **monitor propellants** can be repurposed to determine **optimal airbag deployment times**, enhancing **passenger safety**.
- **3D LiDAR Camera:** Originally developed for space navigation, **3D LiDAR Camera** generates **3D images** with depth information and can assist in **hazard detection, pedestrian safety, and autonomous driving**.

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Note:

- **Sensors:** Niche sensors developed by ISRO can reduce costs in automotive and industrial applications by localizing production and reducing dependency on imports.
- **Healthcare:** The **3D LiDAR Camera** can be used for **accurate body measurements** to predict **lifestyle diseases** or for advanced imaging solutions in medical diagnostics.
- **Construction and Infrastructure:** ISRO's **NRCM-204**, a highly corrosion-resistant coating, protects metals from harsh environments, including acidic corrosion.
 - This can be used in **construction to protect metal structures** and in the automotive industry to prevent vehicle corrosion.
 - Vibration Management Systems originally designed to **protect satellite electronics from vibrations during launch**, this technology can be adapted for seismic isolation in buildings, making them safer during earthquakes.
- **Electronics Devices:** ISRO's **Benzoxazine polymer** is suitable for encapsulating **electronic components** and printed circuit boards.
 - It offers stability across various temperatures and excellent flame-retardant properties.
- **Logistics and Retail:** The LiDAR camera can be used to measure parcels accurately, optimizing packaging and reducing shipping costs.
 - It can also be utilized for people counting in crowded places like markets and events, aiding in crowd management and safety.
- **Energy and Transportation:** ISRO's cost-effective **Lithium-Ion Battery Technology** can accelerate the adoption of **electric vehicles**, supporting cleaner and more sustainable transportation systems.

What are the Benefits of Space Tech Transfers?

- **Boosting India's Manufacturing:** Domestic production of sensors, batteries, and LiDAR-based systems can reduce **dependence on imported automotive and electronic components**, supporting **India's self-reliance (Atmanirbhar Bharat)** while lowering costs and boosting local industries.
- **Industrial Competitiveness:** Indian startups and MSMEs in **aerospace, healthcare, and construction** can leverage these technologies to develop innovative products, fostering entrepreneurship.
- **Public Safety and Urban Management:** With the growing incidents of **stampedes** at major public events in India, crowd monitoring solutions using LiDAR can assist in law enforcement, disaster management, and efficient urban planning.

Indian National Space Promotion and Authorization Centre (IN-SPACe)

- IN-SPACe is a single-window, **independent, nodal agency** that functions as an autonomous agency in the **Department of Space (DOS)**.
- It was formed following the **space sector reforms in 2020** to enable and facilitate the participation of private players.
- IN-SPACe **promotes, authorizes, and supervises** space activities of non-governmental entities, including building launch vehicles, providing space services, sharing ISRO's infrastructure, and establishing new space facilities.
- IN-SPACe bridges ISRO and private entities, assessing space resource utilization and addressing the needs of private players, including research institutions.



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Note:

Environment and Ecology

Highlights

- Environmental Concerns Regarding Ethanol Blended Petrol
- National Green Financing Institution
- AI's Environmental Impact & Mitigation
- Waste Segregation and Waste-to-Energy Plant
- Cleaner Methods of Energy Generation
- Climate Risk Index 2025

Environmental Concerns Regarding Ethanol Blended Petrol

Why in News?

The **Ethanol Blended Petrol (EBP) programme** is facing strong opposition in Andhra Pradesh (AP).

- Environmentalists and farmers are raising concerns over **environmental pollution** and excessive **water consumption** by ethanol factories.

What is Ethanol Blended Petrol Programme?

- **About:** The EBP Programme began with **pilot projects in 2001**. It was launched by the **Ministry of Petroleum and Natural Gas in 2003**, with **5% Ethanol (C₂H₅OH) blending** and extended nationwide (except Andaman & Nicobar, Lakshadweep) by **2019**, allowing **up to 10% blending**.
 - The EBP Programme now **targets 20% ethanol blending in petrol by 2025-26** (advanced from 2030 under the **National Policy on Biofuels-2018 (amended in 2022)**). As of 2024, the blend percentage stood at **15%**.
- **Objective:** EBP aims to reduce **carbon emissions**, **fuel imports**, and **increase farmer income**.
 - Support **India's energy diversification**, enhancing resilience to global oil supply disruptions.
 - Help **India achieve its Net Zero 2070 commitment** under the Paris Agreement.
 - EBP Programme follows the **"Waste to Wealth"** approach, supporting **Swachh Bharat Mission (SBM)** and **Make in India**.
- **Key Milestones:** Ethanol production capacity reached around **1,600 crore litres** as of September, 2024.
 - By cutting crude oil imports, the EBP Programme **saved Rs. 1,06,072 crore in foreign exchange**.
 - EBP has reduced **CO₂ emissions by 544 lakh metric tons** and substituted **181 lakh metric tons of crude oil**.
 - The programme had a significant **economic impact**, with Oil Marketing Companies disbursing Rs. 1,45,930 crore to distillers and Rs. 87,558 crore to farmers.

Note: Ethanol is a biofuel primarily produced from **"first generation" (1G)** sources like sugarcane molasses, juice, wheat, and rice, while **"second generation" (2G)** sources include agricultural residues like rice straw, wheat straw, bagasse, and corn stover.

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Note:



ETHANOL AS A FUEL



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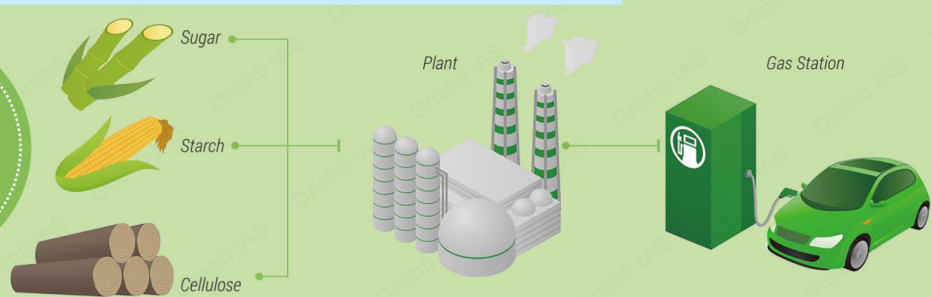
About Ethanol

- One of the principal biofuels
- Also called ethyl alcohol (C₂H₅OH)

Produced

- Naturally by fermentation of sugar (or corn, rice etc)
- By petrochemical processes (ethylene hydration)

World Biofuel Day is celebrated on 10 August to raise awareness about the importance of non-fossil fuels.



Ethanol Blending

Blending ethanol with petrol to burn less fossil fuel while running vehicles.

Blending Target

- 20% ethanol blending in petrol (E20) by 2025

Currently, ethanol makes up 10% of the petrol used in vehicles.

Significance

- Reduce oil imports
- Equivalent efficiency at a lower cost than petrol
- Burns completely and cleaner than petrol
- Ethanol produced from farm residue to boost farmers' income

Challenges in Success

- High land requirement for sugarcane (+ consequent food prices issue)
- High water requirement of biofuel crops

Related Initiatives

- Roadmap for Ethanol Blending in India (Report by NITI Aayog) (2021)
- E100 Pilot Project (Network for production and distribution of ethanol) (2021)
- Pradhan Mantri JI-VAN Yojana (to boost 2G ethanol projects) (2019)
- The National Policy on Biofuels (2018)

What are the Environmental Concerns Regarding EBP?

- **Pollution vs. Emission Reduction:** Achieving 20% ethanol blending target by 2025 requires around **1,000 crore litres** of ethanol, with planned production expansion to **1,700 crore litres**. Increased production may lead to **greater emissions** affecting **air, water, and soil quality**.
- **Water Scarcity:** Ethanol production is highly **water-intensive**, with grain-based factories requiring **8–12 litres of water per litre of ethanol**. Sugarcane and molasses-based production contribute to high water consumption, deforestation, and industrial waste.
 - Distilleries generate **vinasse**, a **pollutant-rich wastewater** that can contaminate water bodies and deplete oxygen if untreated.
 - Factories near rivers like the **Krishna** are diverting water meant for agriculture and drinking. Farmers fear depletion of **water resources**, affecting **crop production**.

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Note:

- **Industrial Pollution:** Ethanol distilleries fall under the “red category” of industries (Pollution Index core 60 and above) due to their high pollution potential.
 - Hazardous chemicals such as **acetaldehyde, formaldehyde, and acrolein** are emitted, increasing risks of respiratory diseases and cancer.
 - In AP, many ethanol factories received environmental clearances without public hearings or proper emission assessments, often located near human settlements.

National Green Financing Institution

Why in News?

The Government is working to set up a **National Green Financing Institution** to aggregate **green finance** from different sources and **lower the cost of capital** to support its **net-zero target by 2070**.

- NITI Aayog is evaluating models like **NaBFID/NABARD, IREDA, Green InvITs**, and **global Green Banks** for a National Green Financing Institution.

What is the Need for Green Finance in India?

- **Escalating Climate Change Risks:** Climate change could lead to an estimated **10% loss** in total economic value and up to **18% of global GDP** wiped out by **2050**.
 - This economic threat is particularly **severe for India**, which aims to grow its economy to **USD 10 trillion by 2030**.
- **India's Net-Zero Ambitions:** At **COP26 UNFCCC**, India pledged to achieve **net-zero emissions by 2070** under the **Panchamrit strategy** that requires over **USD 10 trillion** in investments.

Achieving Climate Goals



Non-Fossil Energy Capacity

Achieving 500 GW of non-fossil energy capacity by 2030.



Renewable Energy Source

Sourcing 50% of energy requirements from renewable sources by 2030.



Carbon Emission Reduction

Reducing projected carbon emissions by 1 billion tonnes by 2030.



Economic Carbon Intensity

Lowering carbon intensity of the economy by 45% by 2030.



Net-Zero Goal

Reaching net-zero emissions by 2070.

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Note:

- **Threat to Financial Institutions:** The financial services industry faces 72% of the potential financial impact of climate change, which banks can mitigate by funding **green infrastructure**, renewable energy, energy-efficient buildings, and industrial decarbonization.
- **Investment Deficit:** India needs **USD 1.4 trillion** in aggregate investments, or **USD 28 billion annually**, to reach its 2070 net-zero goal.
 - As of **February 2023**, India's **green bond** issuances totaled USD 21 billion only, with the private sector contributing 84%.

What are the Current Green Energy Financing Initiatives in India?

- **NCEEF: National Clean Energy and Environment Fund (NCEEF)** funds clean energy ventures and research through **Clean Environment Cess** on coal.
 - **IREDA** uses part of the NCEEF fund to **lend to banks at the rate of 2%**, enabling concessional loans for renewable energy projects.
 - IREDA also sources funds from global banks e.g., the World Bank gave **USD 100 million** for solar parks.

CLIMATE FINANCE

Climate finance refers to local, national or transnational financing—drawn from public/ private/alternative sources of financing—to support mitigation and adaptation actions against climate change.

PRINCIPLES OF CLIMATE FINANCE

- Polluter Pays
- Common but Differentiated Responsibility and Respective Capability (CBDR-RC)

Multilateral Climate Funds Coordinated by UNFCCC

- **Global Environment Facility (GEF):** Operating entity of financial mechanism (1994)
- **Kyoto Protocol (2001):**
 - ▶ **Adaptation Fund (AF):** Gives developing countries full ownership of adaptation projects
 - ▶ **Clean Development Mechanism (CDM):** To carry out emission-reduction projects in developing nations
- **Green Climate Fund (GCF):** estd. - 2010 (COP 16)
 - ▶ Funds under it - **Least Developed Countries Fund (LDCF)** and **Special Climate Change Fund (SCCF)**
- **Long-Term Climate Finance:**
 - ▶ **Cancun Agreements (2010):** Mobilize and provide scaled-up funds in short and long term
 - ▶ **Paris Agreement (2015):** Developed nations agreed to establish new collective goal of at least \$100 billion/year by 2025
- **Loss and Damage Fund (2023) (COP27 & COP28):** Financial assistance to nations most vulnerable and impacted by effects of climate change

Climate Investment Funds (CIFs) under World Bank

- Clean Technology Fund
- Strategic Climate Fund

INDIA'S INITIATIVES REGARDING CLIMATE FINANCE

Fund	Objective
■ National Adaptation Fund for Climate Change (NAFCC) (2015)	■ For vulnerable Indian states
■ National Clean Energy Fund (2010-11)	■ Advancing clean energy (started with initial carbon tax on industrial coal use)
■ National Adaptation Fund (2014)	■ Bridging gap between required and available funds
■ Intended Nationally Determined Contributions (INDCs) (2015)	■ Nationally binding targets adopted under UNFCCC
■ Climate Change Finance Unit (2011)	■ Leads on global climate finance issues

Challenges to Climate Finance

- Gap between national needs and climate finance under NDCs
- Least Developed Countries receive much less approved funding in per-capita terms from the multilateral climate funds
- Slow rate of approvals
- Failure in securing viability-gap funding



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Note:

- **Recognition of PSL:** In April 2015, RBI classified renewable energy as a **priority sector lending (PSL)**, requiring banks to allocate up to **40% of net credit**.
 - Loans up to **Rs 15 crore per borrower** is given to cover **solar, biomass, wind, micro-hydel**, and non-conventional energy utilities.
- **Green Banks:** Green banks accelerate clean energy financing by funding **environmentally sustainable projects**.
 - In India, **IREDA, SBI** and other banks offer **concessional loans** for renewable energy projects.
- **Green Bonds:** They are market-based financial instruments for raising **capital for environmentally beneficial projects**. E.g., **Green Masala Bonds** by IREDA.
- **Crowdfunding:** It is a **decentralized** funding model using **small private investments** for renewable energy. E.g., Crowdfunding platform **Bettervest's** support for **MeraGao Power** and **Boond Engineering** in rural India.

What are Challenges in Green Energy Financing in India?.

- **Limited International Finance:** At **COP29 UNFCCC**, developed nations pledged to mobilize at least **USD 300 billion annually** by 2035 to support **climate mitigation** that is **insufficient** compared to the required financing.
 - Several experts highlight that mobilising **USD 1 trillion per year by 2030** is required to help developing countries cope with **climate change**.
- **High Borrowing Costs:** High interest rates, long gestation period and a lack of fiscal incentives for lenders make **green finance costly**, often rendering projects **financially unviable**.
- **Diversion of Funds:** NCEEF was created for clean energy initiatives, but much of its funds have been **diverted** to non-renewable projects like **GST compensation** and **Namami Gange**.

- **Institutional Barriers for Green Banks:** India has **yet to institutionalize** green banks due to a lack of clear RBI guidelines and **legal recognition**, impacting their credibility and fund mobilization.
- **Underdeveloped Green Bond Market:** Green bonds need **high credit ratings**, which many renewable projects lack due to poor financial health. Investor **skepticism** persists over fund utilization.

AI's Environmental Impact & Mitigation

Why in News?

Amid rising global adoption of **artificial intelligence (AI)**, many experts have raised concerns about the **environmental impacts of the AI life cycle** and recommended **measures to mitigate** them.

What is Artificial Intelligence (AI)?

- **About:** AI refers to the **simulation of human intelligence** in machines, enabling them to perform tasks that typically require **human cognition**, such as **learning, reasoning, problem-solving, perception, and decision-making**.
- **AI Market:** The global AI market is valued at **USD 200 billion** and could contribute **USD 15.7 trillion** to the economy by **2030**.
- **India's Initiatives:** India plans to build its own **LLM (large language model)** to compete with **DeepSeek** and **ChatGPT**.
 - India launched "**AI for India 2030 initiative**" that emphasizes **ethical, inclusive and responsible AI adoption** to position India as a global leader in AI innovation.
- **AI Life Cycle:** It refers to the structured process of **developing, deploying, and maintaining AI models** to deliver meaningful results.

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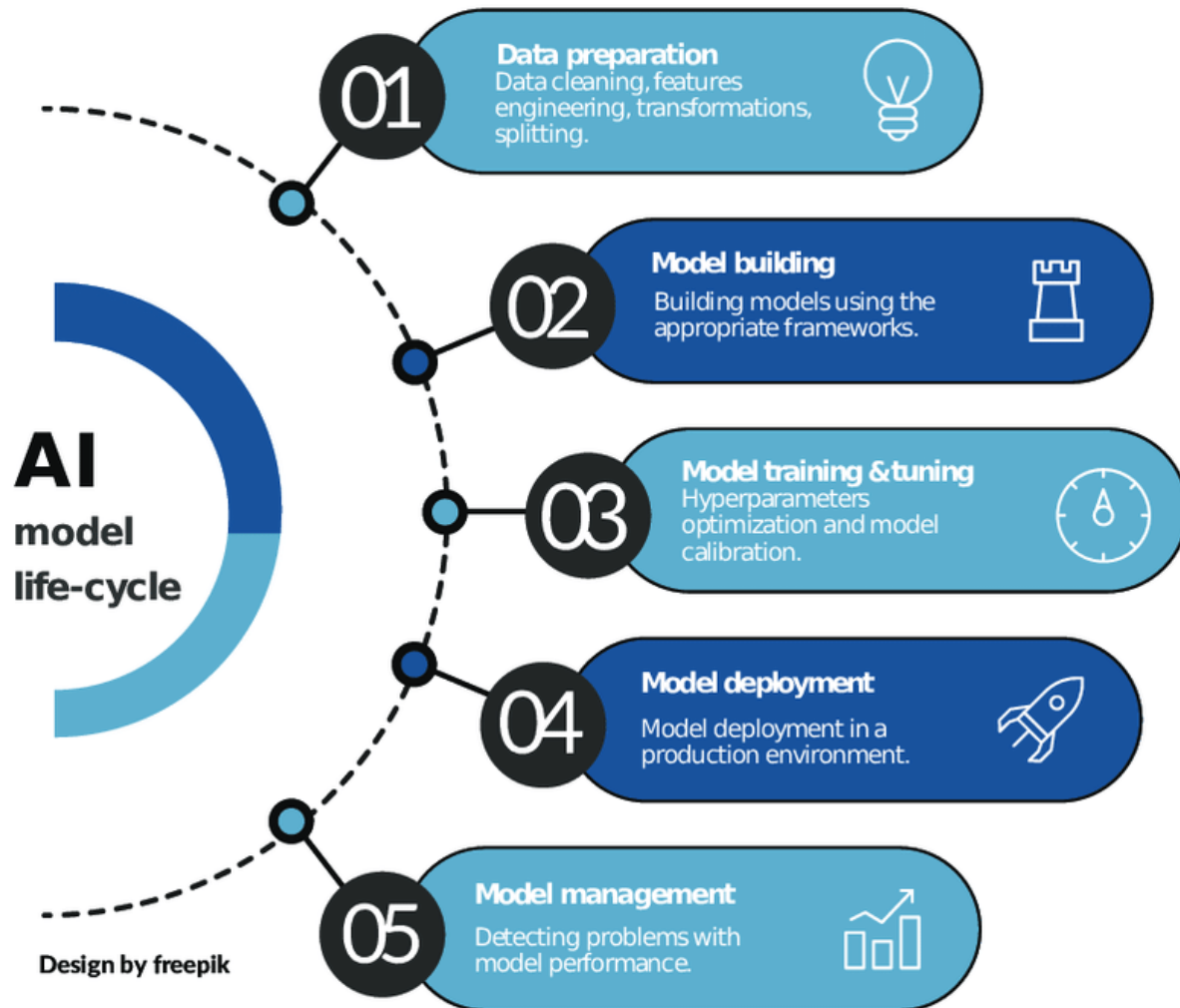
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Note:



AI Data Centers

- **About:** AI data center is a **specialized facility** that provides the **computing power, storage, and networking** needed for AI model processing and training.
- **Key Features:**
 - **High-Performance Computing (HPC):** Uses GPUs, and accelerators for **fast model training** and complex computations.
 - **Massive Storage:** Stores **large training data** and AI outputs e.g., cloud storage.
 - **Efficient Networking:** High-speed **interconnection** ensures real-time data transfer.
 - **Energy Efficiency:** Uses **liquid/air cooling** and renewable energy to manage high power consumption.

What are the Environmental Impacts of AI?

- **GHG Emissions:** AI-driven data centres require vast amounts of **electricity**, mostly sourced from **fossil fuels**.
 - AI hardware and data centres currently contribute **1% of global Greenhouse Gas (GHGs) emissions**, and this is **expected to double by 2026**.
 - E.g., Training one LLM emits **3,00,000 kg of CO₂**, (equivalent to **five cars' lifetime emissions**).

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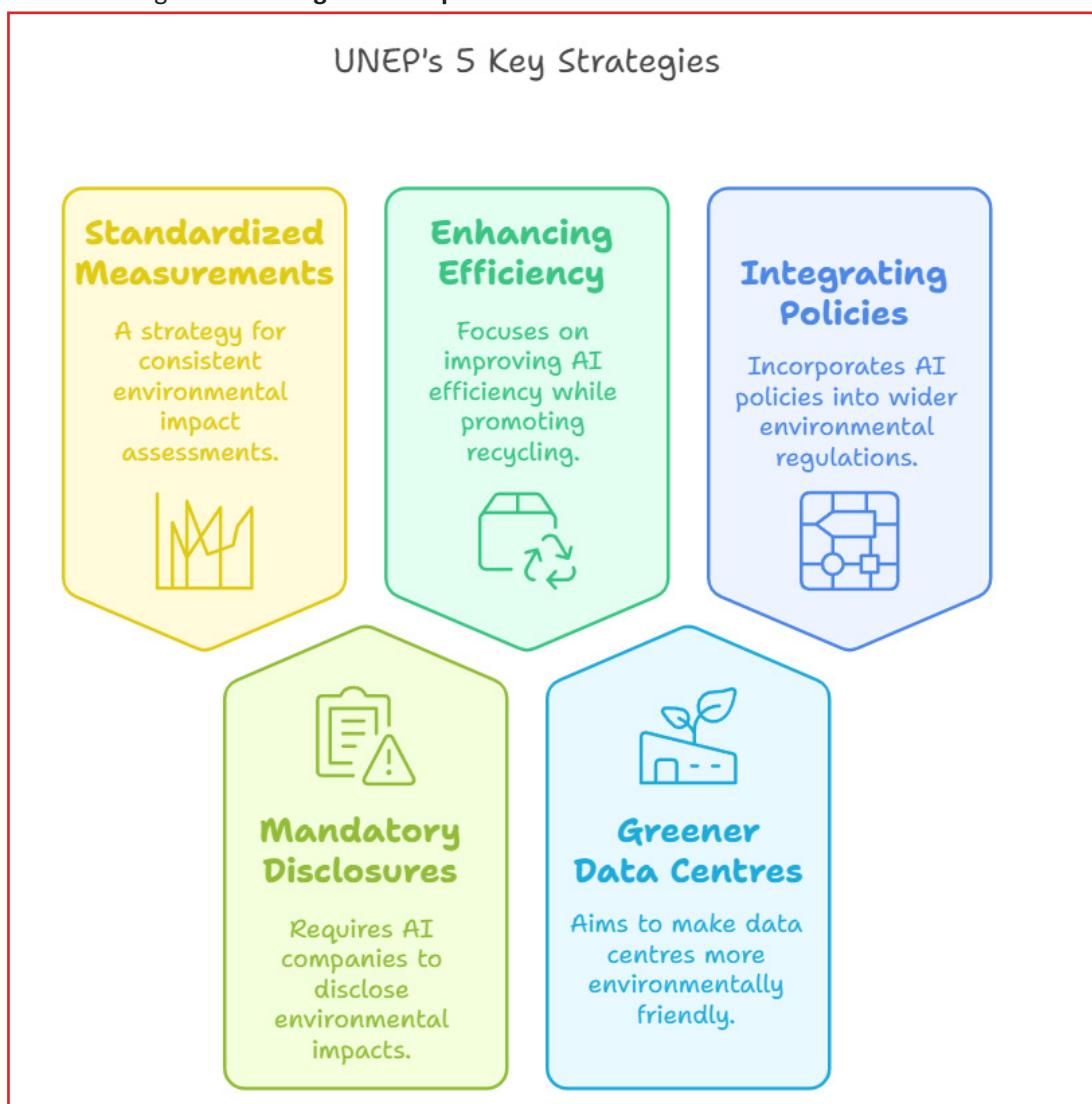


Note:

- **Increased Computing Power:** Generative AI models like ChatGPT use **10–100 times more power** than earlier versions, increasing demand for **graphic processing units (GPUs)** and worsening the **environmental footprint**.
 - E.g., a single LLM query requires **2.9 watt-hours** of electricity, compared with **0.3 watt-hours** for a regular internet search.
- **E-waste Generation:** Data centers generate substantial **e-waste**, including hazardous substances like **mercury** and **lead**, exacerbating the **global e-waste crisis**.
 - Generative AI could account for up to **5 million metric tons of e-waste by 2030**.
- **Impact of Other Inputs Related to AI Industry:** AI data centers require vast raw materials, with AI chips depending on **REEs** from harmful mining.
 - They also consume significant water for **cooling of data centers**.

What Initiatives are Taken to Curb the Environmental Impacts of AI?

- **COP29 of UNFCCC:** At COP29 of **UNFCCC** 2024 in Baku, Azerbaijan, the **International Telecommunication Union** emphasised the urgent need for **greener AI practices**.



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Note:

- **Legislative Actions:** Both the EU (**EU AI Act, 2024**) and the US (**Artificial Intelligence Environmental Impacts Act, 2024**) have enacted laws to **reduce AI's carbon footprint** and promote sustainable practices.
- **Global Ethical Guidelines:** Over **190 countries** adopted **non-binding ethical AI guidelines** at **UNESCO's "Recommendation on the Ethics of Artificial Intelligence"** promoting sustainability by **reducing carbon footprint, and energy consumption**.
- **AI Action Summit 2025:** UN Secretary-General urged countries to **design AI algorithms and infrastructures** that **consume less energy** and integrate AI into **smart grids** to optimize power use.
- **UNEP's Recommendations:** UNEP has proposed **five key strategies** to mitigate AI's environmental footprint:

Waste Segregation and Waste-to-Energy Plant

Why in News?

The **Supreme Court (SC)** emphasised the importance of **waste segregation at source** and questioned **National Capital Region (NCR) states** on the implementation of segregation of waste at source as per the **Solid Waste Management Rules (SWM Rules, 2016)**.

- The SC directed the **Central Pollution Control Board (CPCB)** to report on the public health and environmental impact of **waste-to-energy plants**.

Note: NCR comprises **Delhi** and certain districts of **Haryana, Uttar Pradesh and Rajasthan**.

Click Here to Read: [What are the Solid Waste Management Rules 2016?](#)

What is Waste Segregation at Source?

- **About Solid Waste:** It refers to any type of **garbage, trash, refuse or discarded material** generated from **households, industries, businesses, and other human activities**.
 - They require **proper management** to prevent environmental and health hazards.



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Note:

- **Waste Segregation at Source:** It refers to the **process of identifying, classifying, dividing, and sorting waste at the point of generation** to facilitate proper disposal, recycling, and management.
 - It categorizes waste based on its **biological, physical, and chemical properties**.
- **Provisions in SWM Rules, 2016:** SWM Rules, 2016 categories waste into **3 categories** i.e., **biodegradables, non-biodegradables, and domestic hazardous waste**.
 - **Biodegradables:** Organic waste that can be **degraded by micro-organisms** into **simpler stable compounds** like **food scraps, soiled wrappers, paper** etc.
 - **Non-biodegradables:** Recyclable/non-recyclable items like **plastic, glass, metal, etc.**
 - **Domestic Hazardous waste:** **Diapers, napkins, mosquito repellants, cleaning agents** etc.
- **Significance:**
 - **Prevents Contamination:** Keeps hazardous and non-hazardous waste separate, **reducing pollution**.
 - **Reduces Landfill Waste:** Sends only **non-recyclable** waste to **landfills**.
 - **Enhances Recycling:** Improves **resource recovery** and reduces raw material use. Enables composting, recycling, and waste treatment.
 - **Minimizes Health Risks:** **Prevents disease** from medical and hazardous waste.
 - **Promotes Responsibility:** Encourages **community participation** in waste management.

Solid Waste Generation

- As per **Annual Report** of CPCB for the year 2021-22, the **average quantity** of solid waste generated in India is **1,70,338 tonnes per day (TPD)**, of which **91,512 TPD** is treated.
- **Delhi** generates over **11,000 metric tonnes** of solid waste daily, while waste **treatment** plants can process only **8,073 metric tonnes**.
- In **FY 2014-15**, India processed **only 18%** of its total waste, which **rose** significantly to over **78%** in **FY 2024**.

What is a Waste-to-Energy Plant?

- **About:** Waste-to-energy (WtE) plants **convert municipal solid waste (MSW)** into energy in the form of **electricity, heat, or fuel** through various technologies like **pyrolysis, anaerobic digestion** etc.

- It also generates **Biogas/ BioCNG/Syngas** from urban, industrial and agricultural wastes/residues.
- **Related Provisions in SWM Rules, 2016:**
 - **Utilization of Non-Recyclable Waste:** Waste with a **calorific value of 1500 Kcal/kg or more** must be used for energy generation and **cannot be disposed of in landfills**.
 - **High-calorific waste** should be **co-processed** in **cement or thermal power plants**.
 - **Mandatory Use of RDF:** Industrial units using fuel and located within **100 km of a solid waste-based Refuse-Derived Fuel (RDF) plant** must replace **at least 5% of their fuel** with RDF.
 - RDF is made from **municipal and industrial waste** by removing non-combustibles, leaving **plastics, paper, textiles, and biomass**.
- **Methods of WtE Conversion:**
 - **Incineration:** Waste is burned at **ultra-high temperatures**, producing heat that generates steam to **spin turbines and create electricity**.
 - **Gasification:** Biomass is processed at high temperatures **without combustion** to produce syngas, which serves as **fuel for electricity generation or industrial use**.
 - **Anaerobic Digestion:** **Microorganisms** break down **organic waste** in an **oxygen-free** environment, producing **biogas rich in methane**.
 - **Fermentation and Distillation:** Organic biomass is **fermented and distilled** to produce **ethanol**, an **alternative fuel for engines**.
 - **Pyrolysis:** A **thermo-chemical process** that converts **waste into clean liquid fuels** (bio-oil, syngas, and char) under high temperatures in the absence of oxygen.
 - **Landfill Gas Recovery:** Methane and other gases released from landfills are captured through **wells using blowers and vacuums**, then treated for energy production.
- **Significance:**
 - **Utilization of Waste:** Converts waste into **heat and electricity**, reducing the need for fossil fuels.
 - **Reduction in Landfilling:** Reduces landfill waste and related environmental risks like **emissions, land use, and groundwater contamination**.

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Note:

- **Resource Recovery:** Enables **metal recovery** after incineration and retains valuable materials in the **circular economy**.
- **Reduction in GHG Emissions:** Landfills produce **methane** emissions, a potent **Greenhouse Gas (GHG)** while waste-to-energy reduces them by diverting waste.

Draft SWM Rules, 2024

- The **Draft SWM Rules, 2024** were issued by the Central Government in exercise of the powers conferred by the **Environment (Protection) Act, 1986**.
- **Key Provisions:**
 - **Provision for Fines:** 'Safai Karamcharis' (Sanitation Workers) will be authorized to levy **finest and penalties** on unsegregated waste and **refuse collection** if segregation rules are ignored.
 - **Segregation of Solid Waste:** Segregate and store the **waste generated by them in four separate streams** at source namely **wet waste, dry waste, sanitary waste and special care waste**.
 - **Agricultural Waste Management:** **Gram Panchayats must prevent open burning of agricultural waste**, impose penalties for stubble burning, and **facilitate agri-residue collection and storage for use**.

Cleaner Methods of Energy Generation

Why in News?

India must adopt **cleaner methods of energy generation**, as **coal-based electricity generation** causes significant **air pollution**, harming crops, humans and animals.

- Cleaner methods of energy generation use **renewable, and low-carbon technologies** to produce electricity with **minimal pollution and environmental impact**.

Note: **Nitrogen dioxide** and **ozone** from coal plants reduce wheat and rice yields by over 10% in some parts of India.

- It negated **six years of agricultural growth** despite **better crops, irrigation, and mechanization**.

What are Available Cleaner Methods of Energy Generation?

- **Osmotic Power:** It generates electricity using **osmotic pressure differences** between **freshwater and seawater**.
 - India has a vast **coastline of 7,500 km**, where rivers drain into the sea, and this technology can effectively **generate electricity**.
 - **Osmotic power (salinity gradient energy)** generates electricity using the **salt concentration difference** between freshwater and seawater through **osmotic pressure**.
- **Nuclear Power:** Nuclear power plants use nuclear fission to **heat water, create steam, and spin turbines** to generate electricity.
 - India's Nuclear power generation capacity stands at **8,180 MW in 2024** and is projected to **triple to 22,480 MW by 2031-32**.
 - The government has set an **ambitious target of 100 GW** nuclear power capacity by **2047**.
- **Biomass Energy:** Organic materials (**wood, crop waste, algae**) are burned or converted into **biofuels** to produce electricity.
 - India produces **450-500 million tonnes** of biomass annually, supplying **32%** of the country's **primary energy**.
- **Hydrogen Fuel Cells:** They convert **hydrogen into electricity** through electrochemical reactions.
 - They are used in **vehicles and backup power systems**, emitting **only water vapor** as a byproduct.
- **Waste-to-Energy (WTE):** It converts **municipal solid waste (MSW)** and other waste materials into **electricity, heat, or fuel** through various technologies like
 - **Incineration:** Waste is burned at **high temperatures** to produce **steam**, which drives a turbine to **generate electricity**.
 - **Gasification:** Converts waste into **syngas** (a mixture of **CO, H₂, and CH₄**), a raw material for fuel.
 - **Pyrolysis:** Organic waste is decomposed at **high temperatures without oxygen**, producing **bio-oil, syngas, and biochar** as usable fuels.

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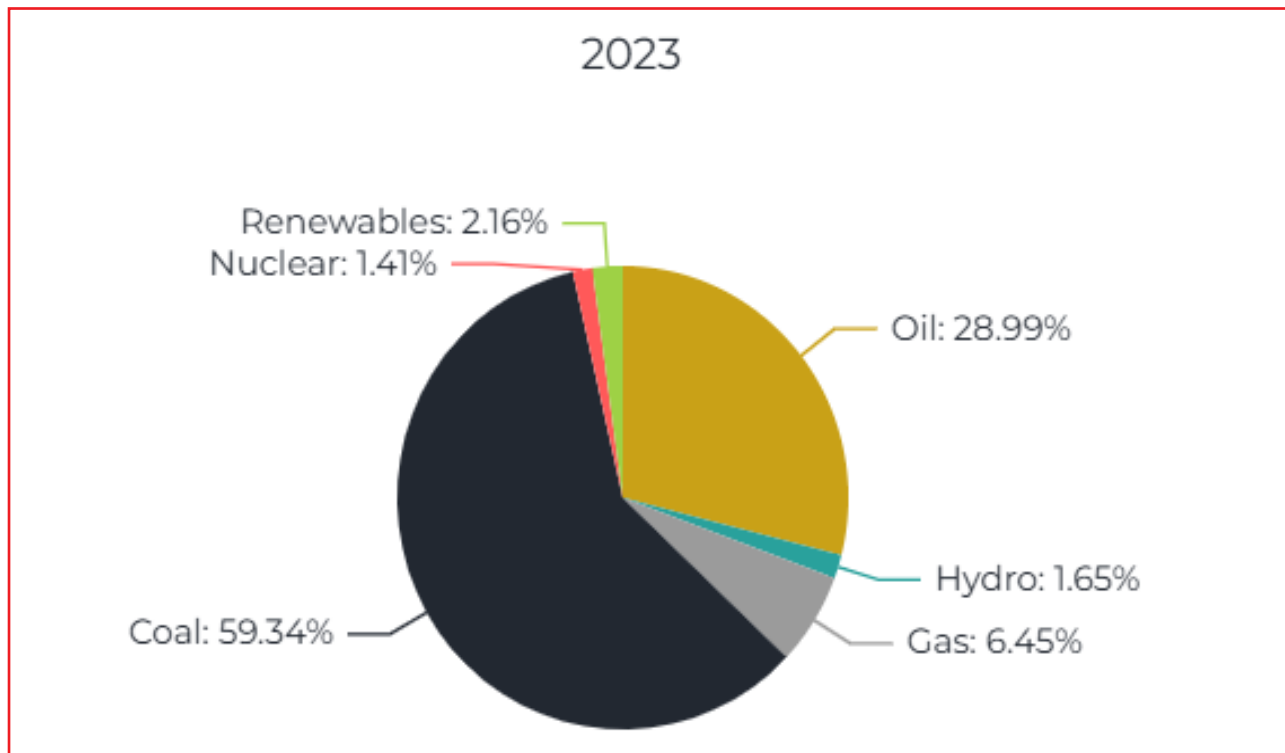


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Note:

- **Wind Energy:** It involves the use of **wind power** by placing **windmills** to generate electricity.
 - India, the world's **4th largest** wind power producer, generates **50 Gigawatts (GW)** of electricity across **nine windy states**.
- **Solar Energy:** It involves setting up **solar panels** on houses, buildings or large-scale solar farms that **absorb sunlight and convert light into electricity**.
 - India is the world's **3rd largest** solar power generator after **China (1st)** and **USA (2nd)**.
- **Hydropower:** It involves blocking part of a **river by a dam** and then water is released to generate **electric power**.
 - The top five dams across India together generate as much as **50 GW** of hydroelectric energy.



Climate Risk Index 2025

Why in News?

The international environmental think tank 'Germanwatch' has released the **Climate Risk Index (CRI) 2025**.

What is Climate Risk Index 2025 and its Key Findings?

- **Climate Risk Index:**
 - **About:** CRI ranks countries based on their **vulnerability to extreme weather events**, assessing **human and economic losses** caused by climate-induced disasters.
 - **Frequency:** Released annually since **2006**, covering data from the past **30 years**.
 - **Methodology & Criteria:** CRI assesses the impacts of extreme weather events on countries across **six key indicators: economic losses, fatalities, and affected people**, both in absolute and relative terms.

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Note:

➤ **Findings of Climate Risk Index 2025:**

- Between 1993 and 2022, over **765,000 lives** were lost, resulting in **economic losses** of **USD 4.2 trillion**.
 - **Floods, droughts, and storms** were the leading causes of **global displacement**.
- In 1993-2022, **Dominica, China, and Honduras** were the **top-3 countries** affected by extreme weather events.
 - Myanmar, Italy, and **India** were among the other highly impacted countries.
- **Pakistan, Belize, and Italy** were the **top-3** affected in 2022.
 - 7 of the 10 worst-affected countries are low- and middle-income countries (LMICs).
- **Impact on India:** India ranked **6th most affected country (1993-2022)**, accounting for **80,000 fatalities (10% of global)** due to extreme weather events and 4.3% of global economic losses (USD 180 billion).
 - India has faced **severe floods** (1993, 2013, 2019), **intense heat waves** (~50°C in 1998, 2002, 2003, 2015), and destructive **cyclones** like **Gujarat (1998)**, **Odisha (1999)**, **Hudhud (2014)**, and **Amphan (2020)**.

Note: The **Asia-Pacific (APAC) Climate Report 2024**, by the Asian Development Bank projects that **India may face a 24.7% GDP loss by 2070** due to **climate change**, driven by rising sea levels and declining labour productivity.

What are the Key Challenges Related to Climate Change Mitigation Strategies as per the Report?

- **Historical Responsibility vs. Future Emissions:** **High-income nations**, despite their historical emissions, demand **greater climate responsibility** from emerging economies like India and China, leading to **tensions over burden-sharing** and climate finance commitments.
- **Global Temperature Breach:** The **1.5°C threshold** was breached for a full year in 2024, exposing inadequate mitigation efforts.
 - Without **higher ambition**, including **nationally determined contributions (NDCs)**, the world is on track for a **temperature increase of 2.6–3.1°C by 2100**.
- **Weak Climate Commitments:** Many countries are **not updating** their **Nationally Determined Contributions (NDCs)**, creating a **gap between promises and action**. Poor policy implementation further weakens mitigation efforts.
- **Insufficient Climate Finance:** The **USD 300 billion annual funding** for developing nations is inadequate, and delays in operationalizing the **Loss and Damage Fund** hinder support for climate-vulnerable countries.

Read More:

- [What are the Major Challenges for India in Climate Adaptation?](#)
- [What Measures can India Adopt to Accelerate Climate Adaptation?](#)



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Note:

History

Highlights

- Battle of Karnal

- Tea Horse Road

Battle of Karnal

Why in News?

The **Battle of Karnal** in **February 1739**, resulted in the decisive defeat of **Mughal Emperor Muhammad Shah Rangila** by **Persian ruler Nadir Shah**, marking a pivotal turning point in Indian history.

- It not only showcased the **military prowess of Nadir Shah** but also exposed the **vulnerabilities of the Mughal Empire**, leading to its eventual downfall.

What are the Key Facts Related to the Battle of Karnal?

- **Background:** After consolidating his rule in Persia, **Nadir Shah** (also known as the Napoleon of Persia) invaded **Afghanistan (1738)** and advanced into **Mughal territory through the Khyber Pass**, exploiting the empire's instability after Aurangzeb's death (1707).
 - By January 1739, Nadir Shah had already captured Kabul (in June 1738) and had seized Lahore.
- **Forces:** Despite having 300,000 soldiers, the **Mughal army lacked coordination**, while Nadir Shah's 50,000 disciplined troops used **advanced tactics** like mounted musketeers with swivel guns, overpowering the Mughals' outdated cavalry charges.
- **Battle & Loot of Delhi:** Nadir Shah crushed the Mughal army (within 3 hours), killing commanders **Khan Dauran** and **Sa'adat Khan** and capturing Muhammad Shah.
 - He then **looted Delhi (capital Shahjahanabad)**, seizing immense wealth, including the **Peacock Throne (takht-i-taus)** and **Koh-i-Noor diamond**.
- **Impact on the Mughal Empire:** The invasion left the **Mughal Empire economically shattered** and weakened,

fueling the rise of Bengal, Awadh, Hyderabad, the Marathas, and the Sikhs.

- The invasion led to the annexation of the Mughal provinces to the west of the Indus viz., Afghanistan, Kashmir, Sindh and Multan to Persia.
- This decline facilitated British expansion in India in the 18th and 19th centuries.
- **Foreign Invasion Due to the Battle: Ahmad Shah Abdali**, the commander of Nadir Shah, established his rule over Afghanistan after **Nadir Shah's death**.
 - He **invaded North India many times between 1748 and 1767**. The most well known was his victory over the Marathas in 1761 (the **third Battle of Panipat**).

Later Mughals Who Faced Foreign Invasions

- **Muhammad Shah (1719–48):** Titled 'Rangeela' due to his luxurious lifestyle.
 - With the help of Nizam-ul-Mulk, killed the Sayyid Brothers.
 - **Faced Invasion:** Nadir Shah (1739) – **Battle of Karnal**.
- **Alamgir II (1754–59)**
 - **Faced Invasion:** Ahmad Shah Abdali (January 1757).
 - **Key Battle: Battle of Plassey** (June 1757) was fought during his reign.
- **Shah Alam II (1760–1806, intermittent rule)**
 - **Faced Invasions:**
 - **Third Battle of Panipat (1761)** – Ahmad Shah Abdali (supported by Najib-ud-Daulah (a Rohilla chieftain), nawab Shuja-ud-Daulah of Awadh).
 - **Battle of Buxar (1764)** – British East India Company.

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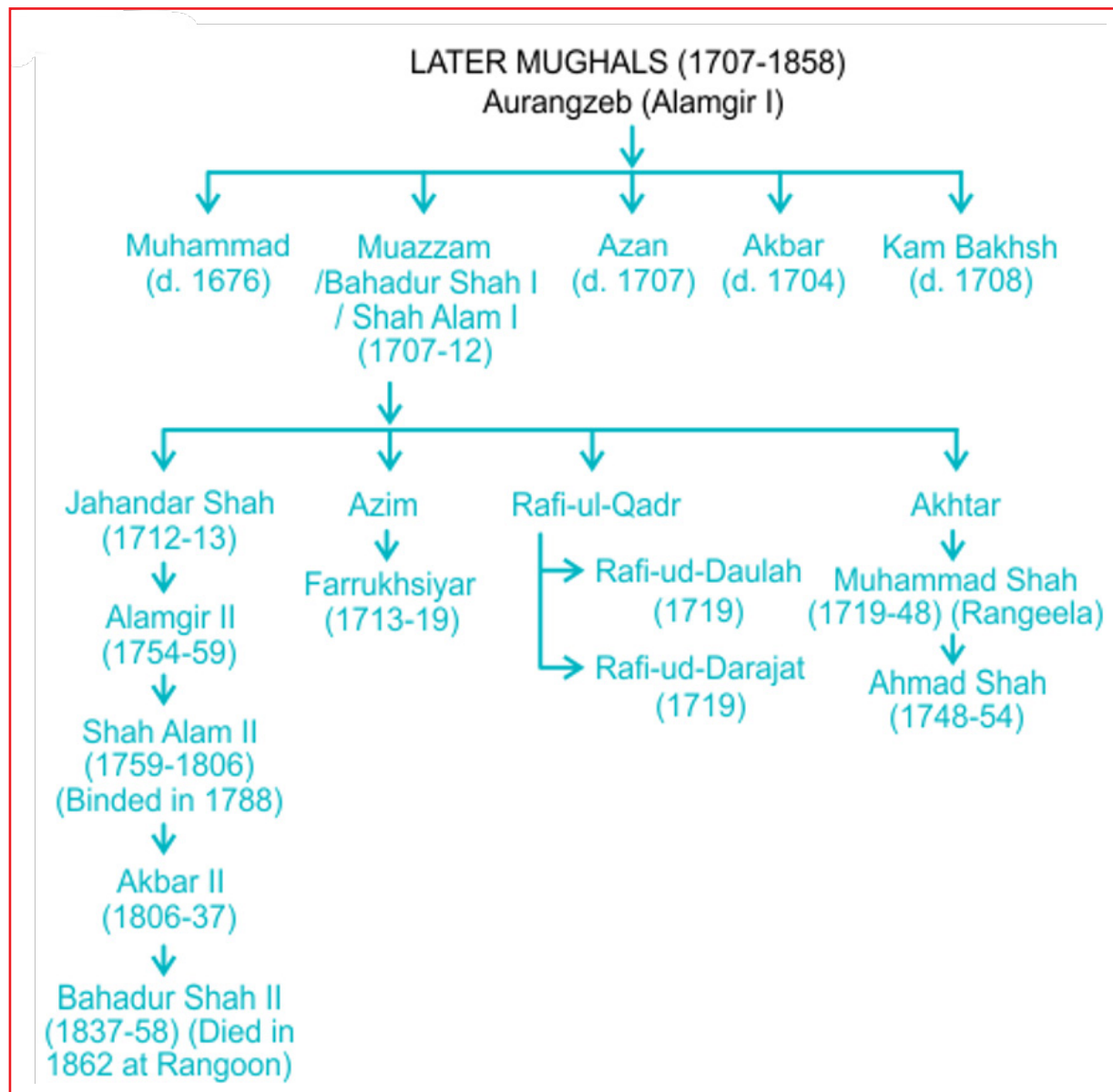
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Note:



Tea Horse Road

Why in News?

China's Ambassador to India highlighted the **Ancient Tea Horse Road**, connecting **China to India via Tibet**, emphasizing its centuries-old role in facilitating **exchanges between China and the Indian subcontinent**.

What is Ancient Tea Horse Road?

➤ About:

- **Tea Horse road**, often referred to as the **Southern Silk Road**, is a network of **caravan paths** and a crucial **trade route** that **connected China, Tibet, and India** for centuries.

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Note:

➤ **Pathway:**

- It stretches from **southwest China (Yunnan & Sichuan)**, passing through **Tibet, Nepal, and India**, eventually reaching **Kolkata**.

○ **Key Centers:**

- **Lijiang & Dali (Yunnan, China):** Tea processing and trade hubs.
- **Lhasa (Tibet):** A major convergence point for tea and Tibetan goods like horses.
- **Kalimpong & Kolkata (India):** Final trade destinations before export to Europe and Asia.

➤ **Major Routes:**

- **Route 1:** Originated from Ya'an (near Chengdu), passed through Kangding, Lhasa, and extended to Nepal and India.
- **Route 2:** Started in central Yunnan, passing Lijiang, Zhongdian, and Deqin, reaching Lhasa before extending into India.



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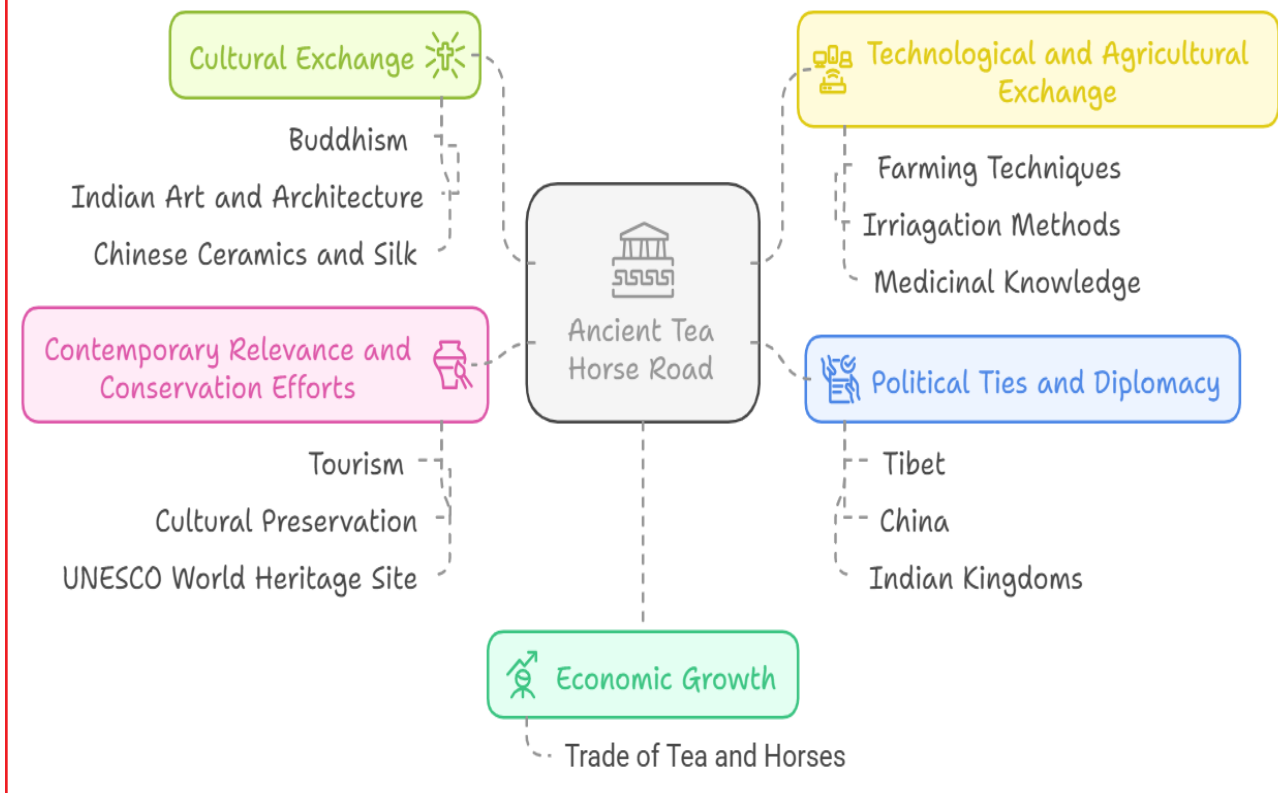
➤ **Origin & Evolution:**

- The **Tea Horse Road** dates back to the **Tang Dynasty (618-907 CE)** and initially **facilitated the trade of sugar, textiles, and rice noodles** from China to Tibet and India, while horses, gold, saffron, and medicinal herbs were traded in the opposite direction.
- The trade eventually centered around **tea and horses**, leading to the route being named the **"Tea Horse Road."**
- **Song Dynasty (960-1279 CE)** formalized the trade, regulating the exchange of Tibetan horses for China's military and Chinese tea for Tibet.
 - The **13th-century Mongol expansion** further **heightened the route's importance** for supplying horses.

➤ **Decline of Tea Horse Road:**

- **End of the Qing Dynasty (1912):** Political instability weakened control over trade routes.
- **Modernization of Infrastructure:** Modern transportation networks made traditional routes obsolete.
- **World War II and Economic Shifts:** Though briefly revived for military logistics, industrial production and mechanized transport led to its decline.
- **Establishment of Modern China (1949):** Land reforms and road construction made the traditional portering system redundant.

Significance of the Ancient Tea Horse Road



Read More: **What is the Silk Road?**



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Note:

Art and Culture

Highlights

- Kashi Tamil Sangamam 3.0

Kashi Tamil Sangamam 3.0

Why in News?

The 3rd edition of Kashi Tamil Sangamam (KTS 3.0), a cultural confluence between Tamil Nadu and Kashi, is being held in Varanasi, Uttar Pradesh.

What are the Key Highlights of KTS 3.0?

- Kashi Tamil Sangamam (KTS 3.0) coincides with **Mahakumbh 2025** in Prayagraj and provides an opportunity to visit the **Ram Mandir in Ayodhya** for the first time post-inauguration.
 - The 1st edition of KTS was held in 2022, while the 2nd in 2023.
- It features around 1,000 delegates from Tamil Nadu across 5 categories, including students, teachers, writers, farmers, artisans, professionals, entrepreneurs, SHGs, and innovation communities.
 - Also, joined by 200 Tamil-origin students from Central Universities, enhancing the event's diversity and engagement.
- Central Theme: "Legacy of Sage Agastya".

What is Kashi Tamil Sangamam?

- About:
 - It is a cultural initiative that aims to celebrate the deep-rooted historical and cultural ties and strengthen the ancient civilizational bond between Tamil Nadu and Kashi (Varanasi).
 - The event aligns with the **Ek Bharat Shreshtha Bharat** initiative, emphasizing the integration of India's diverse cultural heritage.
- Historical Significance:
 - The historical ties between Kashi (Uttar Pradesh) and Tamil Nadu date back to the 15th century when King Parakrama Pandya of Madurai traveled to

Kashi to bring back a sacred lingam for his temple (Sivakasi, Tamil Nadu).

- The Pandya rulers also established the **Kasi Viswanathar Temple** in Tenkasi, located in southwestern Tamil Nadu, near the Kerala border.
- This deep-rooted spiritual and cultural connection underscores the **essence of the Kashi Tamil Sangamam initiative**.
- Nodal Ministry: The Ministry of Education in collaboration with various ministries and the Government of Uttar Pradesh.
- Objectives:
 - **Knowledge Sharing:** Encouraging interactions between scholars, researchers, artisans, and professionals.
 - **Academic Collaboration:** Facilitating discussions on Indian Knowledge Systems in alignment with **National Education Policy (NEP) 2020**.
 - **Promoting Traditional Art and Craft:** Showcasing classical Tamil art, literature, and cuisine to a national audience.
 - **Youth Engagement:** Providing young participants an immersive experience in India's civilizational ethos.

Agastya Muni

- He is a revered **Saptarishi** in Vedic and Puranic texts, considered the father of **Tamil language** and **Siddha medicine**, with his works, **Agastya Samhita** and **Naadi Shastra**, being foundational to Siddha medicine.
- He composed the first **Tamil grammar, Agattiyam**, and introduced the **Tamil script**.
- He is also **revered in Java and Sumatra** for spreading Indian culture and credited with **propagating Vedic culture in South India, Aryanizing the Yadavas**, and **advancing Tampa Parniyan medicine and spirituality**.
- He is mentioned in **Ramayana**, with his hermitage on the banks of the **Godavari River**.



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Note:

Geography

Highlights

- Peatland Conservation
- Sea Ice Loss and Climate Disruptions
- Impact of Marine Heatwaves on Arctic Wildlife
- Inland Waterways in India
- Neotethys Oceanic Plate and Tectonic Movements

Peatland Conservation

Why in News?

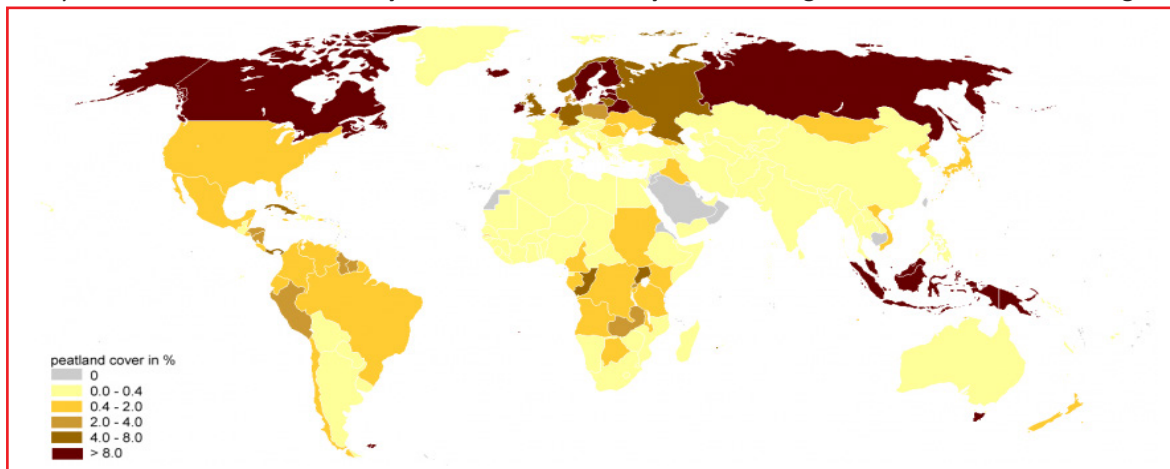
A recent study has highlighted the alarming state of under-protection of **peatlands**, which are crucial for **carbon storage** and **climate regulation**.

What are the Key Highlights of the Study About Peatland?

- **Limited Protection:** Only **17% of global peatlands** are under legal protection, far less than other critical ecosystems such as **mangroves (42%)** and **saltmarshes (50%)** and **tropical forests (38%)**.
- **High Human Pressure:** Around **22% of global peatlands** face high human pressure (mainly in **Europe and US**).
- **Freshwater Security and Biodiversity:** Peatlands contain **10% of the world's unfrozen freshwater** and support diverse ecosystems.
- **Indigenous Role in Conservation:** **27% of global peatlands** are on **indigenous people's land**, where traditional conservation practices have led to **better ecosystem preservation**, yet 85% remain outside formal conservation frameworks.
- **Carbon Storage and Climate Impact:** Peatlands store **600 gigatonnes of carbon**, more than all the world's forests combined, but, when degraded they release **CO₂**, **2-5% of annual human-driven greenhouse gas emissions**.

What are Peatlands?

- **About:**
 - Peatlands are **terrestrial wetland ecosystems** characterized by **waterlogged conditions** that prevent complete decomposition of plant material, leading to the **accumulation of peat (type of soil)**.
 - They **store more carbon than any other terrestrial ecosystem**, making them crucial for climate regulation.



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Note:

➤ **Global Distribution:**

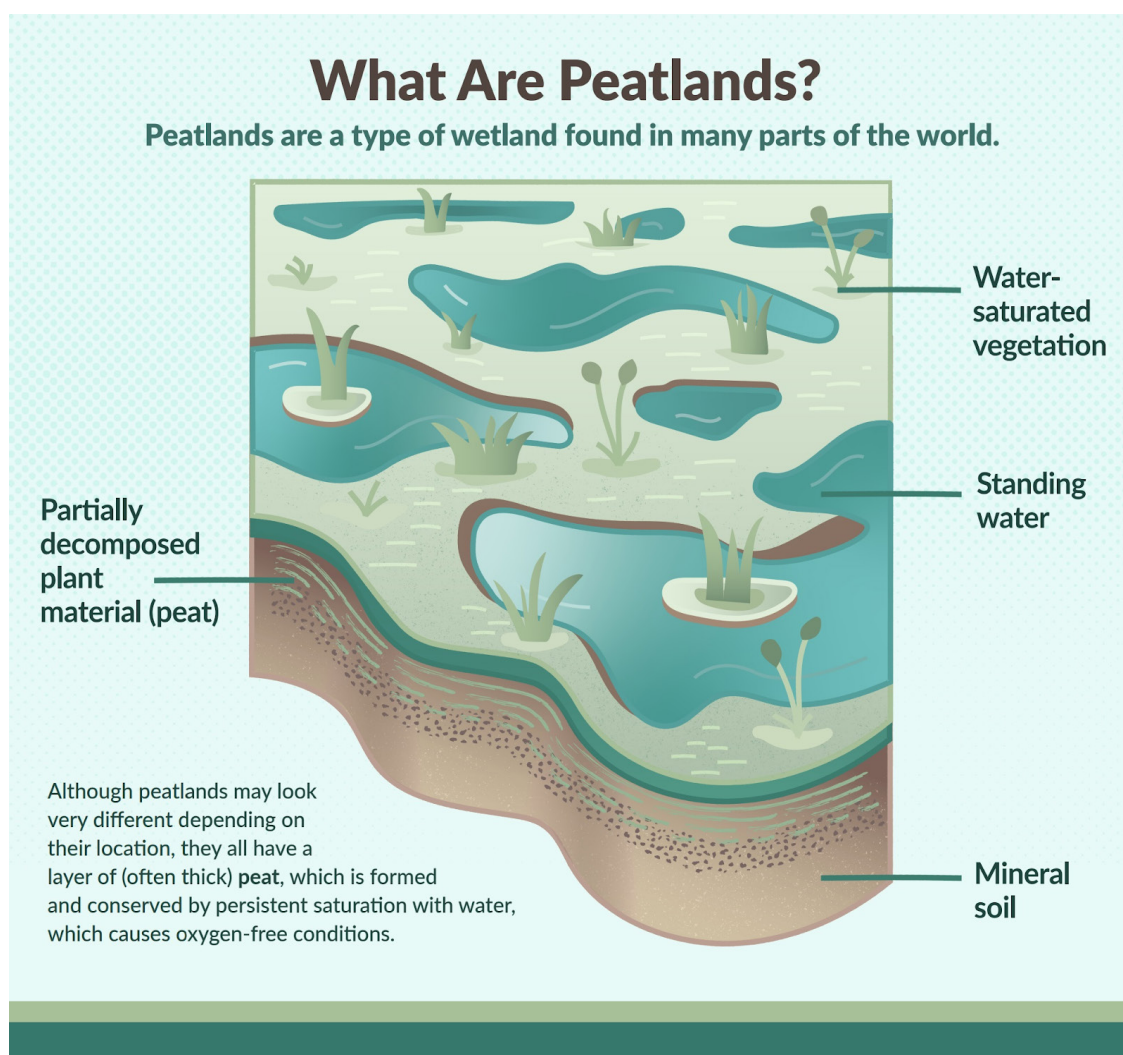
- Peatlands cover approximately **4.23 million km² (2.84% of Earth's terrestrial surface)** and are found in every climatic zone.
- **Canada, Russia, Indonesia, the US and Brazil** contain **70%** of global peatlands.

➤ **Types:**

- **Northern and Temperate Peatlands:** Predominantly found in **Europe, North America, and Russia**, formed under high precipitation and low temperature conditions.
- **Tropical Peatlands:** Found in **Southeast Asia, Central and South America, Africa, and Australasia**, often associated with rainforests and mangroves.

➤ **Significance:**

- **Water Security & Disaster Risk Reduction:** Peatlands play a crucial role in **regulating water flows**, mitigating **floods, droughts, and seawater intrusion**.
 - Healthy peatlands (**soggy and spongy**) help **lower temperatures, prevent wildfires**, and **naturally filter water** for safe drinking, while poor drainage leads to water pollution.



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Note:

- **Biodiversity Conservation:** Peatlands are biodiversity hotspots, supporting endangered species like the **Bornean orangutan**.
 - They also preserve archaeological and ecological records such as pollen data and ancient artefacts.
- **Preventing Zoonotic Disease Risk:** Peatland degradation increases human-wildlife interaction, raising the risk of zoonotic diseases like Ebola and HIV/AIDS (originating from Congo's peatlands).
 - Biodiversity loss also fuels vector-borne diseases like malaria and dengue.
- **Livelihoods & Economic Importance:** They support local economies, traditional knowledge, and cultural heritage by providing food, fibre, and raw materials.

Read More:

- **What are Wetlands?**
- **What is the Ramsar Convention on Wetlands?**

What are the Challenges in Peatland Conservation?

- **Weak Legal Protection:** Only 17% of global peatlands are under legal protection.
 - Weak enforcement, bureaucratic delays, and competing interests hinder restoration efforts.
- **Economic Exploitation:** Peatlands face large-scale drainage for cash crops (palm oil, rice), industrial agriculture, forestry, and peat extraction, while urbanization and infrastructure expansion drive irreversible degradation.
- **Climate Change & Natural Degradation:** Rising temperatures and droughts accelerate peatland drying, increasing wildfires and CO₂ emissions, while human activities further disrupt their ecosystem balance.
- **Financial Constraints:** Limited funding for conservation and short-term economic priorities often lead to unsustainable land use, undermining restoration efforts.
- **Weak Indigenous Land Rights:** Over 85% of peatlands on indigenous peoples' lands are not part of other protected areas.
 - Limited awareness and research gaps further hinder effective policy measures.

Sea Ice Loss and Climate Disruptions

Why in News?

According to the **US National Snow and Ice Data Center (NSIDC)**, global sea ice cover combining **Arctic** and **Antarctic sea** ice dropped to **15.76 million sq km** in **February 2025**.

- According to NASA, between **1981 and 2010** the **Arctic sea ice shrank by 12.2% per decade**.
- In addition, **Jammu and Kashmir (J&K)** in India is adversely affected by **retreating of Himalayan glaciers**.

What is Sea Ice?

- **About:** Sea ice is **free-floating polar ice** that expands in winter, melts in summer, and partly persists year-round.
 - It is found mainly in the **Arctic Ocean** and **Antarctica Ocean**.
- **Features:** Sea ice forms from **frozen saltwater**, unlike icebergs, glaciers, and ice sheets, which originate on land.
 - As sea ice forms, most of the **salt is expelled**, making sea ice **less salty than seawater**.
 - The remaining **salt content** gets trapped in **tiny pockets**, giving the ice a **porous structure**.

Click Here to Read: **What are Glaciers?**

What are the Reasons for Drop in Arctic and Antarctic Sea Ice Cover?

- **Delayed Freezing:** Unusually **warm ocean temperatures** slowed the cooling process, **delaying ice formation**. E.g., slow ice formation around the **Hudson Bay** (northeastern Canada).
- **Marine Heatwaves (MHWs):** Arctic MHWs and heated **Gulf Streams** carry **excess heat** toward the Arctic and **intensify Arctic ice loss** by melting sea ice.
- **Ice-Breaking Winds:** Storms in the **Barents Sea** and **Bering Sea** fragmented ice, making it more **vulnerable to melting**.
 - Antarctic sea ice is particularly vulnerable to **ice-breaking winds** as it **floats in the ocean** that can be **easily broken by winds**, unlike landlocked Arctic ice. E.g., **Colossus A23a** is a **massive Antarctic iceberg** that has been floating in the **Southern Ocean** since 2020.

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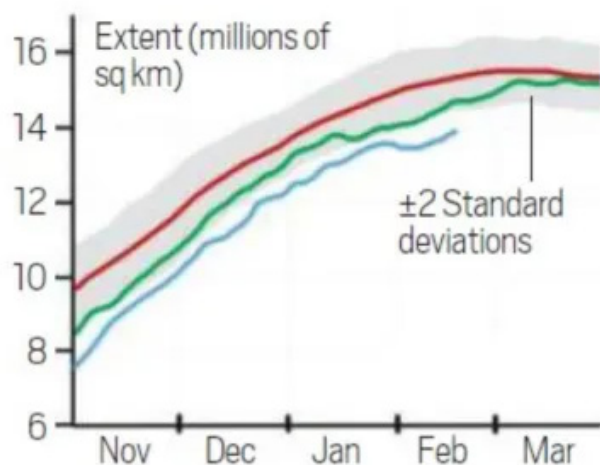
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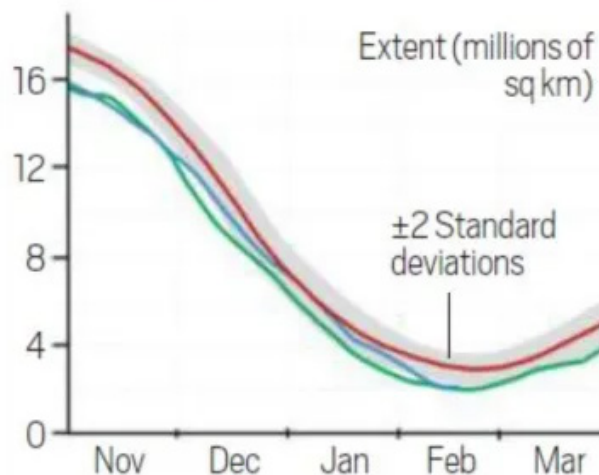
ARCTIC SEA ICE EXTENT

■ 2024-25 ■ 2011-12
■ 1981-2010 Average



ANTARCTIC SEA ICE EXTENT

■ 2024-25 ■ 2023-24
■ 1981-2010 Average



Source: National Snow and Ice Data Center

- **Thinning Ice:** Over the years, Arctic ice has become **thinner and more fragile**, making it more susceptible to breaking due to **storms and temperature fluctuations**.
 - Higher air temperatures led to the **melting of the edges of the Antarctic ice sheet** (ice shelves) which extend over the ocean.
- **Higher Air Temperatures:** Regions like **Svalbard, Norway**, experienced **above-normal temperatures**, leading to additional sea ice loss.
 - Increased air and water temperatures towards the end of the southern hemisphere summer **accelerated ice melting** in the Antarctic region.

What are the Consequences of the Drop in Arctic and Antarctic Sea Ice Cover?

- **Increased Global Warming:** Less sea ice cover means that more water is getting exposed to the Sun and **more heat (solar radiation)** absorption by water, leading to a further rise in temperature of water.
 - **Polar sea-ice** has already lost around **14% of its natural cooling effect** due to the decline in bright and reflective ice since the early-to-mid 1980s.
- **Disruption of Global Ocean Circulation:** Melting sea ice releases **freshwater**, reducing **ocean salinity** and surface water density.
 - This **slows ocean circulation**, disrupting marine ecosystems and global climate patterns.
- **Loss of Climate Regulation:** Sea ice **cools the planet** by **reducing evaporation and heat loss** to the atmosphere by creating an **insulating cap** across the ocean surface. Less ice weakens this effect, speeding up **climate change**.
- **Extreme Weather Events:** Thinner ice and warmer temperatures **may increase the frequency and intensity of storms**.

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How J&K is Impacted by Retreating of Himalayan Glaciers?

- **About:** In India, Jammu and Kashmir (J&K) has abundant ice reserves (glaciers) melting of which have profound consequences on the region's water resources, economy, agriculture, and ecology.
- **Impacts:**
 - **Declining Water Levels:** Climate change has caused reduced snowfall and glacier melting, leading to a 75% drop in water levels in major rivers and springs of the region.
 - **Disruption of Agriculture:** Rising temperatures hurt the Rs 8,000-crore apple industry, causing early ripening, quality loss, and lower prices.
 - Water shortages reduce irrigation, affecting crop yields and food security.
 - **Wetlands at Risk:** Glacial retreat is directly contributing to the shrinking of wetlands like Wular, which act as natural climate buffers.
 - 99.2% of water bodies in J&K are in rural areas, and many are drying up or becoming unusable.
 - **Land Degradation:** Rapid glacier melting increases runoff, weakening Karewa sediments and causing soil erosion.
 - Karewas, plateau-like landforms in Kashmir Valley, have fertile lacustrine (lake) soil supporting saffron and almonds.
 - **Forced Migration:** Shrinking glaciers and declining pasturelands are forcing Gujjar-Bakarwal communities to migrate, leading to loss of traditional livelihoods.

Formation of Ice Caps on Earth

- The research, published in **Science Advances**, challenges the assumption that Earth will naturally return to a cooler climate if emissions are halted.
 - Historically, the planet has preferred warm, high-CO₂ conditions.
- The research has identified the following factors responsible for formation of icecaps on Earth.
 - **Low Volcanic CO₂ Emissions:** Reduced greenhouse gases limited warming.
 - **Increased Carbon Storage:** Forests absorbed more CO₂.
 - **Chemical Weathering:** CO₂ reacted with rocks, further reducing atmospheric carbon.
 - **Geography:** Widely dispersed continents and large mountain ranges increased rainfall, accelerating carbon removal and promoting cooling and glaciation.

Impact of Marine Heatwaves on Arctic Wildlife

Why in News?

A study warns that Arctic marine heatwaves (MHWs) are causing higher mortality, and lower reproductive rates risks in marine mammals.

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Note:



National Snow and Ice Data Center, University of Colorado Boulder

What are the Key Findings of the Study?

- **Increased Mortality & Reproductive Decline:** Arctic and Subarctic marine mammals like whales, seals, and walrus face higher death rates and reduced calf production due to **MHWs**.
 - Rising temperatures lead to **toxic algal blooms** (rapid increase in algae in a body of water), spread of diseases (e.g., avian influenza in polar bears), and prey migration, affecting food availability.
- **Distribution & Human-Wildlife Conflict:** Shifts in prey distribution compel species to **migrate or risk starvation**, increasing their chances of becoming entangled in fishing gear.

What are the Key Facts About Marine Heatwaves?

- **About:** MHWs are **extreme oceanic weather events** characterized by a **sudden rise in sea surface temperature (3-4°C above average)** for at least five days, potentially lasting weeks or longer.
 - These events can cover small coastal areas or extend across entire ocean basins.
- **Key Causes of MHWs:** Climate change, driven by **anthropogenic greenhouse gas emissions**, has increased global ocean temperatures by **1.5°C over the past century**.
 - Disruptions in oceanic currents, such as **El Niño**, amplify heat retention, while **Arctic ice loss** exposes more ocean surface to solar radiation, accelerating warming.
 - Unusual weather patterns, shifts in **atmospheric circulation**, and storm activities further trigger **MHWs**.

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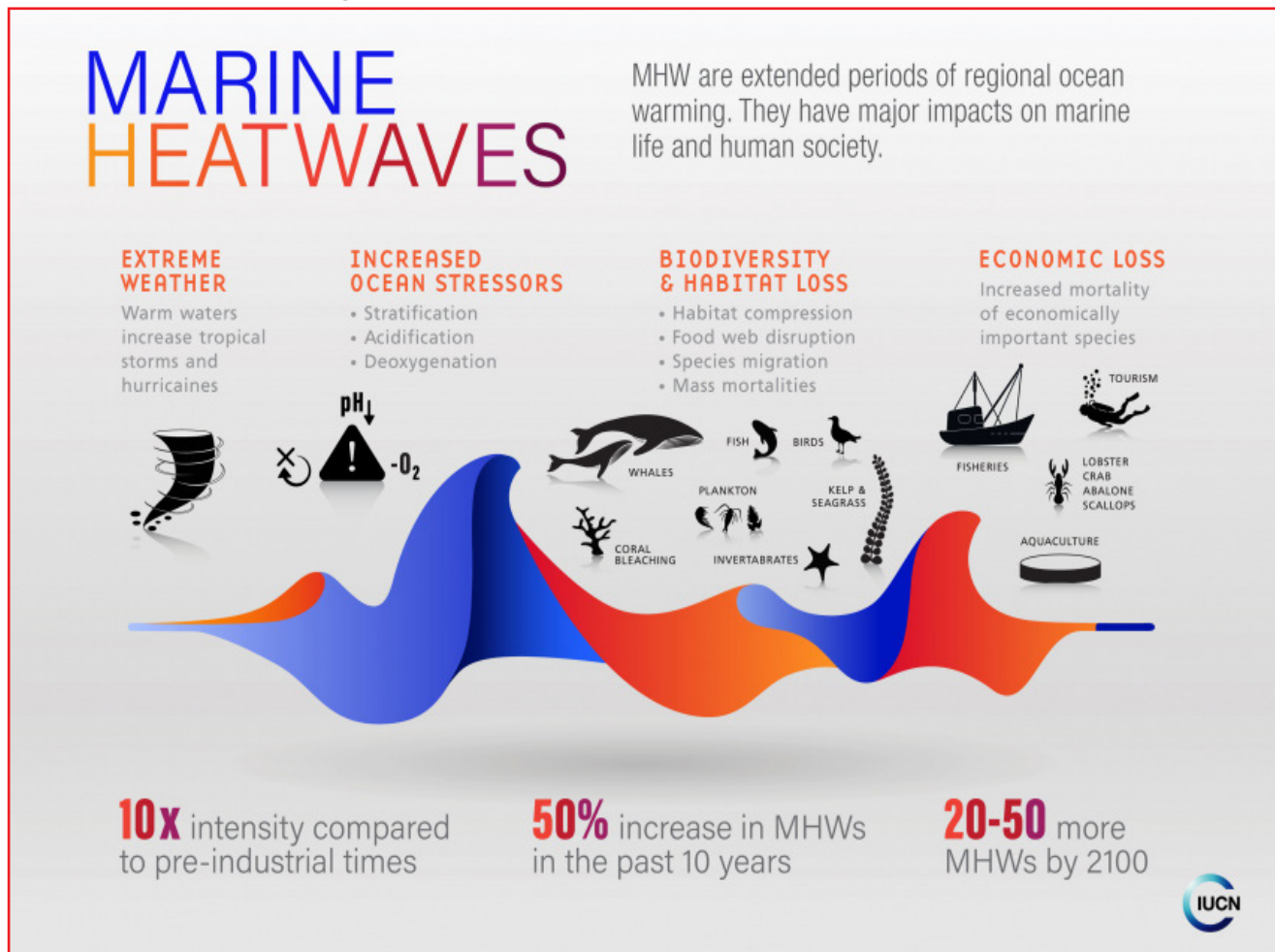
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Note:

➤ **Impact:**

- **Ocean Life:** MHWs cause mass fish deaths and habitat destruction. Higher ocean temperatures lead to widespread coral bleaching (e.g., 2005 Caribbean bleaching event).
 - Rising temperatures wipe out kelp forests, promote invasive species, and alter wildlife migration.
 - **Extreme Weather Events:** MHWs intensify storms, leading to stronger hurricanes, cyclones, and severe flooding.
 - **Humans:** They disrupt fisheries and global seafood supply, threatening the livelihoods of coastal communities that rely on coral reefs.
 - Economic losses mount as MHWs force species migration, impacting tourism and fishing industries.
- **Projected Trends:** MHWs are expected to occur 50 times more often by 2100 compared to pre-industrial times.
- The Arctic and tropical regions are most vulnerable due to their existing temperature extremes.
- **Mitigation and Adaption to MHWs:** Stricter Paris Agreement policies are needed to limit ocean warming.
- Early warning systems can help fisheries and coastal communities prepare for MHWs.
 - Expanding Marine Protected Areas (MPAs) and protecting key habitats like kelp forests, seagrass meadows, and coral reefs will safeguard marine life.



What are the Key Facts About the Arctic Region?

Click here to Read: [Arctic Region](#)

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Note:

Inland Waterways in India

Why in News?

Prime Minister Narendra Modi has lauded the inauguration of the **Inland Waterways Transport (IWT) Terminal** at Jogighopa in Assam, highlighting **India's vast inland waterways'** (about 14,500 km of navigable waterways) potential for freight transport.

What are the Key Facts About Inland Waterways Transport Terminal at Jogighopa?

- **IWT Terminal:** Located in Assam, on the Brahmaputra River (**National Waterway-2 (NW-2)**).
 - The **Bangladesh Border (Dhubri) to Sadiya** stretch of the **Brahmaputra River (891 km)** in Assam was declared **NW-2** under the **National Waterway Act, 1988**.
- **Significance:** The **Jogighopa IWT Terminal** supports **PM Gati Shakti**, enhancing inland waterways for economic growth.
 - It serves as an **international port of call** for Bhutan and Bangladesh, linking to the **Multi-Modal Logistics Park (MMLP)** at Jogighopa, boosting cargo movement and logistics in Assam and the Northeast.
 - It boosts **trade and commerce** with neighboring countries. Reduces **transportation costs** and **transit time**.
 - Strengthens **India's Act East Policy**. Improves **multi-modal connectivity** by integrating road, rail, and waterways. Provides direct waterway access for Bhutan, reducing reliance on road networks.

What is Inland Waterways Transport?

- **About:** It refers to the movement of people and goods on navigable waterways such as rivers, canals, lakes, and other inland water bodies.
- **Legislative Framework:**
 - **Inland Waterways Authority of India Act, 1985:** Led to the **formation of Inland Waterways Authority of India (IWAI)** in 1986.
 - IWAI is an **autonomous organization** responsible for the **development, maintenance, and regulation** of NWs.
 - **National Waterways Act, 2016:** Declared **111 inland waterways** as NWs for **enhanced shipping and navigation**.
 - **Inland Vessels Act, 2021:** Replaced the Inland Vessels Act, 1917, introduced uniform regulations for inland vessels, ensuring safety, navigation, and compliance across India.
- **Criteria to be as a National Waterway:** A waterway qualifies as a **National Waterway** if it is **navigable by propelled vessels, and 50 km long** (except for urban areas and intra-port traffic).
 - It should serve **multiple states** or connect a **prosperous hinterland** or **major ports** or support strategic navigation for national security or link unserved **areas lacking other transport modes**.
- **Growth of Inland Waterways in India:** **767% increase** in operational **National Waterways** since 2014, and **635% rise** in cargo handled.
 - Cargo traffic grew from 18 to 133 million tonnes (FY 2023-24) at a 22% **Compound Annual Growth Rate (CAGR)**.
- **Government Initiatives:** **Maritime India Vision 2030**, **Sagarmala Programme**, and **National Perspective Plan for interlinking rivers**.
- **Major National Waterways in India:**

National Waterway (NW) No.	Location(s)
NW-1: Ganga-Bhagirathi-Hooghly River System (Haldia - Allahabad)	Uttar Pradesh, Bihar, Jharkhand, West Bengal
NW-3: West Coast Canal (Kottapuram - Kollam), Champakara and Udyogmandal Canals	Kerala
NW-4: Krishna River (Muktiyala - Vijayawada)	Andhra Pradesh

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NW-10: Amba River	Maharashtra
NW-68: Mandovi River (Usgaon Bridge to Arabian Sea)	Goa
NW-73: Narmada River	Gujarat, Maharashtra
NW-100: Tapi River	Gujarat, Maharashtra
NW-97: Sunderbans Waterways (Namkhana to AtharaBanki Khal)	West Bengal (through Indo-Bangladesh Protocol Route)

What are the Benefits and Challenges in Developing IWT in India?

Category	Benefits	Challenges
Cost & Efficiency	Cost-effective and fuel-efficient transport mode	High siltation and shoal formation increase maintenance costs
Environmental Impact	Lower carbon emissions and eco-friendly transport	Seasonal depth fluctuations (many rivers have shallow depths) and dredging impact riverbeds, aquatic life, and lead to community resistance due to ecological concerns.
Traffic Reduction	Reduces congestion on roads and railways	Lack of adequate navigational aids and waterways transport terminals
Trade & Connectivity	Enhances domestic and cross-border trade (e.g., Indo-Bangladesh Protocol route)	Inconsistent water flow, as major portion is diverted for irrigation and industrial use
Regional Development	Boosts economic growth in remote areas	Infrastructure gaps, including inadequate jetties and ports
Tourism Potential	Promotes river tourism and cruise industry	Bridges and vertical clearance issues for large vessels
Private Investment	Encourages multi-modal transport integration	Limited private sector participation and investment

Neotethys Oceanic Plate and Tectonic Movements

Why in News?

A study has revealed that the ancient **Neotethys oceanic plate**, which once lay between the **Arabian and Eurasian continental** tectonic plates, is breaking apart under the **Zagros Mountains** in West Asia due to **plate movement**.

- This impacts regional **geography, earthquakes, and resource distribution** offering valuable insights into the **Earth's deep tectonic processes**.

What is Neotethys Oceanic Plate?

- The Neotethys Oceanic Plate was an **ancient oceanic plate** that **once formed the seafloor of the Neotethys Ocean**, which existed during the breakup of **Pangaea**.

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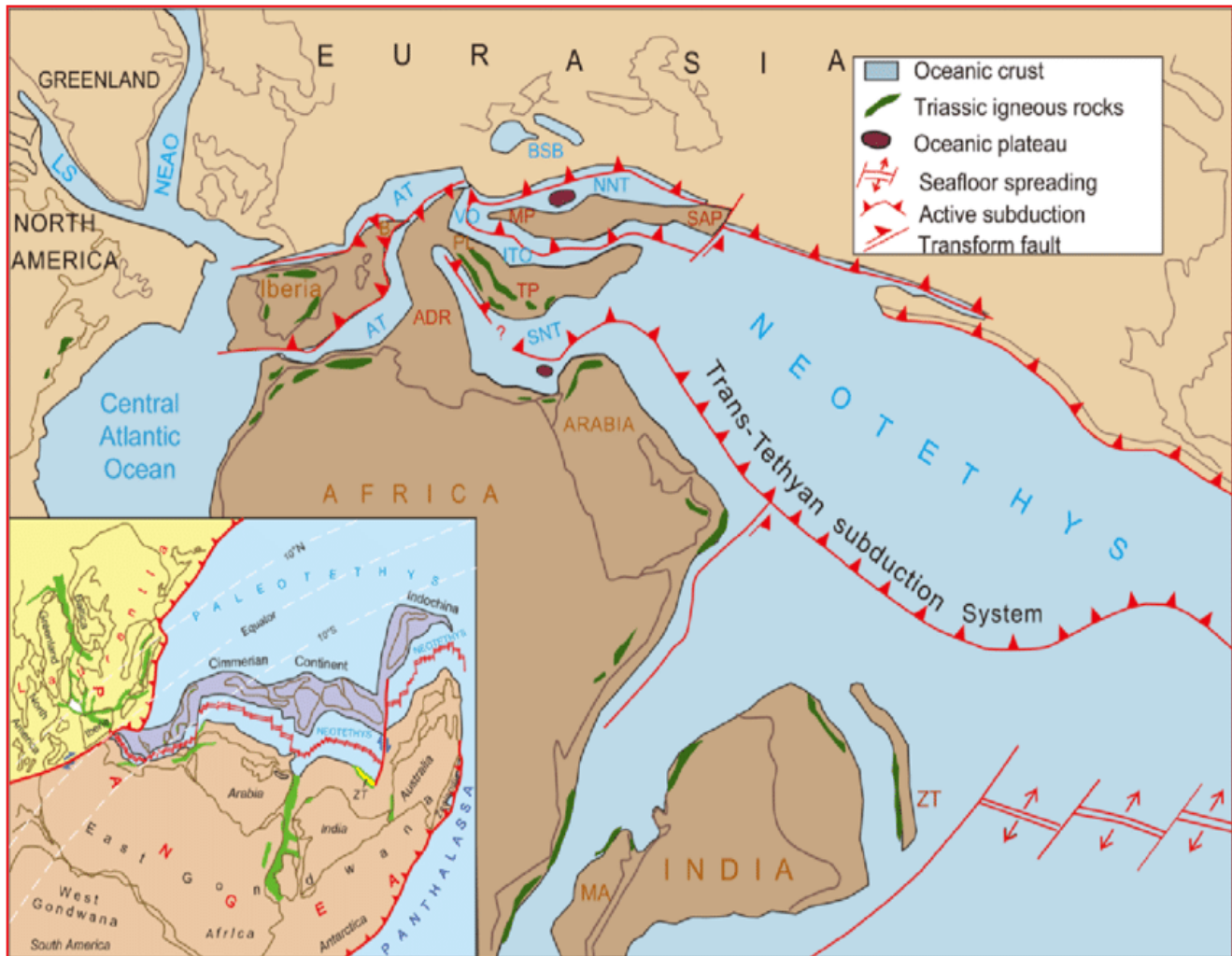


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Note:

- Over time, it was subducted into the Earth's mantle beneath the Eurasian continent as the Arabian and Eurasian plates moved closer.



Arabian Plate

- The **Arabian Plate** is a **minor tectonic plate** in the **Northern and Eastern Hemispheres**, moving **northward** along with the African and Indian plates.
- Its collision with the **Eurasian Plate** has been a major force in mountain formation, contributing to the **rise of the Zagros Mountains, Alborz Mountains, Iranian Plateau, Himalayas**, and other ranges in Southern Europe and Southeast Asia.
- The heavy weight of the **Zagros Mountains** has caused the surrounding land to sink, forming the **Mesopotamian sedimentary basin**.

Eurasian Plate

- The **Eurasian Plate** is a **major tectonic plate** that covers most of **Europe, Russia, and parts of Asia**, with boundaries shared with the North American, African, Arabian, Indian, and Sunda Plates.
- It has a **divergent boundary** with the **North American Plate** in the west and moves at an average rate of **0.25 to 0.5 inches per year**, pulling Iceland apart at **2.5 cm per year**.

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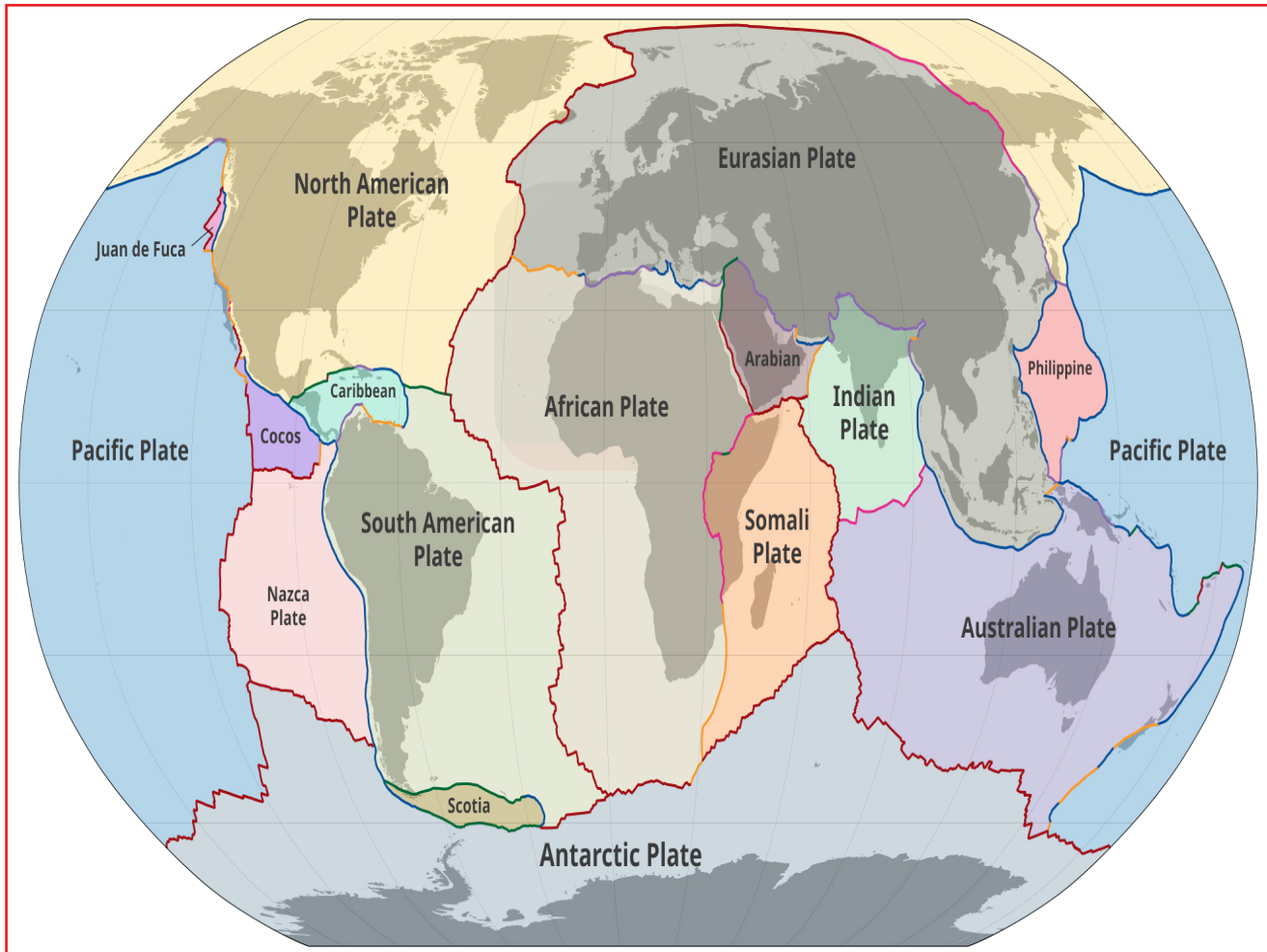
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Note:

What is Tectonic Plates and its Movement?

- **About:** A **tectonic plate** (also called **lithospheric plate**) is a massive, irregularly shaped slab of solid rock, generally composed of **both continental and oceanic plates**.
 - **Continental plates** form the **Earth's landmasses**, while **oceanic plates** lie beneath the **ocean floor**.
 - **Oceanic plates** are composed of **denser basaltic rocks** and **subducted beneath continental plates** at convergent boundaries, as continental plates consist of lighter granitic rocks.
- **Major and Minor Tectonic Plates:** Earth's **lithosphere** is divided into **7 major plates** and several **minor plates**.
 - **Major Plates:** Antarctic Plate, North American Plate, South American Plate, Pacific Plate, Indo-Australian Plate, African Plate, Eurasian Plate.
 - **Minor Plates:** Cocos Plate, Nazca Plate, Arabian Plate, Philippine Plate, Caroline Plate, Fiji Plate, Juan de Fuca Plate, etc.



- **Tectonic Plate Movement:**
 - **Movement of Plates:** The tectonic plates are **not fixed but constantly move horizontally** over the **asthenosphere** as rigid units.
 - Their interactions- **colliding, diverging, or sliding past each other** result in geological events like **earthquakes** and **volcanic eruptions**.

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Note:

- **Rate of Movement:** Tectonic plates move at varying speeds. The **Arctic Ridge** has the slowest movement (<2.5 cm/year), while the **East Pacific Rise** in the South Pacific moves the fastest (>15 cm/year).
- **Driving Force:** The movement is driven by **convection currents** in the mantle which occur due to **primordial heat** from Earth's formation and **radioactive decay** of isotopes like thorium and uranium.
 - Heated material rises, spreads, cools, and sinks, creating a continuous cycle that propels the plates.
- Tectonic Plate Boundaries:
 - **Convergent Boundaries (Destructive Boundaries):** Plates collide, leading to **subduction, mountain formation, and volcanic arcs**.
 - **Oceanic-Continental Convergence:** The denser oceanic plate subducts beneath the continental plate (e.g., **Juan de Fuca Plate** subducting under the North American Plate).
 - **Oceanic-Oceanic Convergence:** The denser plate subducts, forming **deep trenches and island arcs** (e.g., Mariana Trench).
 - **Continental-Continental Convergence:** Collision results in mountain formation (e.g., Himalayas due to the Indian and Eurasian plate collision).
 - **Divergent Boundaries (Constructive Boundaries):** Plates move apart, creating new crust, seafloor spreading, and rift valleys.
 - **Oceanic Divergence:** Mid-ocean ridges form (e.g., Mid-Atlantic Ridge).
 - **Continental Divergence:** Rift valleys emerge (e.g., Great Rift Valley in Africa).
 - **Transform Boundaries (Conservative Boundaries):** Plates slide past each other without creating or destroying crust.
 - They often cause earthquakes due to accumulated stress along faults (e.g., San Andreas Fault in California).

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Note:

Security

Highlights

- *Rising Stress in India's Defence Forces*

Rising Stress in India's Defence Forces

Why in News?

A **Central Reserve Police Force (CRPF)** soldier in Manipur killed two colleagues before taking his own life, highlighting rising stress among **India's security forces**.

- Increasing suicides and resignations across defense personnel emphasize the urgent need for better mental health support and grievance redressal.

What are the Causes of Stress Among Defence Personnel?

➤ Operational Stressors:

- Prolonged Deployment in **Counter-Insurgency/Counter-Terrorism (CI/CT) Operations** and continuous exposure to high-risk environments (extreme weather, difficult terrain, and lack of basic amenities in remote postings), contributes significantly to stress.
 - A study by **United Service Institution of India (USI)**, highlights that **over 50% of Indian Army personnel are under severe stress** and officers experience higher cumulative stress compared to Junior Commissioned Officers (JCOs) and Other Ranks (ORs).
- **Frequent and Long Separations from Family** during combat operations and field posting limits interaction with loved ones affects mental well-being.
- **Unpredictable work hours, irregular shifts**, and high operational pressure demand constant vigilance and quick decision-making under stress, increasing strain on officers.

- For non-officers, **short-term employment (as seen in Agnipath Scheme)** and uncertain career prospects add to job-related anxieties.

- **Casualties and Combat Trauma**, witnessing injuries or deaths of fellow soldiers leads to psychological distress.

➤ Non-Operational Stressors:

- **Leadership and Administrative Issues** like perceived unfair promotions, lack of recognition, and leadership gaps.
- **Conflicts with Seniors and Subordinates** including cases of humiliation, lack of dignity, and interpersonal tensions.
- **Frequent Transfers and Short Command Tenures** causing instability in career progression and family life.
- **Pay and Status Concerns** like downgradation in rank equivalence and financial dissatisfaction.
- **Leave Denial and Excessive Workload** due to delayed or rejected leave applications despite emergencies.
- **Restrictions on Personal Freedom** due to limited use of mobile phones and strict discipline rules.
- **Inadequate Infrastructure and Support** such as poor quality of rations, lack of recreational facilities, and inefficient administrative support.
 - Additionally, the harassment of military personnel's families back home further exacerbates their stress.
- **Mental Health Stigma** leading to reluctance in seeking psychological help due to fear of being seen as weak.
 - Additionally, **using alcohol as a coping mechanism for stress**, leads to long-term health and social issues.

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Note:

How does Stress Impact Defence Personnel?

- **Increased Suicides and Fratricides** as stress leads to extreme actions, endangering both the individual and colleagues.
 - **From 2020 to 2024**, as many as 55,555 CAPF personnel either resigned or took voluntary retirement, and **730 personnel died by suicide**.
- **Decline in Mental and Physical Health** with rising cases of **hypertension, anxiety, depression**, and other stress-related illnesses.
- **Lower Morale and Motivation** reducing operational effectiveness and commitment to duty.
- **Compromised Combat Readiness** as stress affects decision-making, alertness, and overall performance in critical situations.
- **Higher Attrition Rates** with more personnel opting for voluntary retirement, resignations, or early exits.
- **Family and Social Struggles** as work-related stress strains relationships, leading to domestic conflicts and emotional distress.
- **Reduced Trust in Leadership** causing dissatisfaction with management decisions, policies, and organizational support.

India's Initiatives for Mental Well-being in the Army

- **Advisory & Guidelines:** In August 2023, the Indian Army issued an advisory deploying officers, religious teachers, and trained personnel to address stress and mental health issues.
- **Training and Counselling Programs:** Officers are trained at the **Defence Institute of Psychological Research (DIPR)**.
 - **Religious teachers** (Pandits, Maulvis, Granthis, Pastors) posted in every unit for support.
 - Unit **Psychological Counsellor Courses** for Junior and Non-Commissioned Officers (12-week duration).
- **Counseling Support:** Civilian counselors deployed at major military stations and helplines established across all Command Headquarters.
- **Psychiatry Centres:** Set up under the Directorate General of Medical Service at major military stations.
- **Holistic Approaches:** Includes **yoga, meditation, sports, recreation**, improved amenities, and a buddy system for soldiers.

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Note:

The Disaster Management

Highlights

- Disaster Risk and Resilience Assessment Framework (DRRAF)

Disaster Risk and Resilience Assessment Framework (DRRAF)

Why in News?

The **Department of Telecommunications (DoT)** in collaboration with the **Coalition for Disaster Resilient Infrastructure (CDRI)** has launched a report on the **Disaster Risk and Resilience Assessment Framework (DRRAF)**.

- The report, part of **CDRI's study** on National and Sub-national Disaster Risk & Resilience Assessment, aims to **enhance the resilience of India's telecom sector** against natural disasters.

State of Telecom Infrastructure

- Telecom contributes **15% to global GDP** and is projected to reach **USD 2.8 trillion by 2030** (CAGR **6.2%**).
- Disaster risks to infrastructure are rising globally and India is ranked **35th out of 191 countries** in the **UN INFORM Risk Index (2024-25)**.
 - The **UN INFORM Risk Index** is a global, open-source risk assessment tool for humanitarian crises and disasters.
- India faces **high vulnerability** to earthquakes (**58% land area**), floods (**12%**), landslides (**15%**), and forest fires (**10%**), while **5,700 km** of its coastline is at risk from cyclones and tsunamis.

What is Disaster Risk and Resilience Assessment Framework (DRRAF)?

- About DRRAF:** Developed by **CDRI, DoT, and NDMA**, DRRAF adopts a **system-scale approach** covering all connectivity levels and regions.
 - It aims to reduce infrastructure damage, financial losses, and **enhance emergency connectivity and service restoration** aligning with the **Early Warnings for All (EW4All) by 2027'** initiative.
 - EW4All** was launched by the **UN** in **2022** to ensure **global protection from climate-related disasters** through **early warning systems** by year **2027**.
 - It assesses and proposes **disaster resilience measures** across **5 key dimensions**:
 - Technical Planning & Design:** Strengthening telecom infrastructure.
 - Operations & Maintenance:** Ensuring service continuity.
 - Policy, Institutions & Processes (PIPs):** Integrating disaster resilience into governance.
 - Financial Arrangements:** Promoting risk-sharing mechanisms.
 - Expertise:** Enhancing sectoral capacity and knowledge exchange.
 - It helps stakeholders **identify and address disaster risks** through **targeted resilience measures**.

Unique features of the framework

- Intersectionality with global infrastructure resilience frameworks
- Considers multi-hazard cascading and compounding impacts at both asset and system scale
- Strengthens resilience at system levels, identifying the weakest element across the system
- Learns from periodic and event-based changes to adapt to dynamic vulnerabilities
- Peer-to-peer knowledge exchange on managing disaster impact

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Note:

➤ **Key Highlights of the Framework:**

- **At State Level:** The study assesses disaster risks in the **telecom sector across 5 states** (Assam, Odisha, Tamil Nadu, Uttarakhand, and Gujarat).
 - The study found that **100% of telecom infrastructure in Assam and Uttarakhand** were exposed to earthquakes.
 - **83% of towers in Assam and 57% of towers in Odisha and Tamil Nadu** are affected by **Cyclones**.
 - **43% of the towers of Assam** are exposed to **Floods, followed by Tamil Nadu (33%), Odisha and Gujarat**.
 - **At National Level:** A national assessment of 0.77 million telecom towers found **75% exposed to lightning, followed by cyclones (57%), earthquakes (27%), and floods (17%)**.
 - **Disaster Risk and Resilience Index (DRRI):** A new index (DRRI) has been developed to assess **telecom tower vulnerability** across different terrains (mountain, plain, coast) based on intensity, frequency, duration, and spatial extent of hazards.
- **Challenges to Telecom Infrastructure:**
- **Structural Vulnerability:** Telecom towers, especially in **coastal areas, are prone to damage from high winds and cyclones**.
 - Overhead **fiber-optic cables** are more fragile than underground networks.
 - **Power Disruptions:** **Prolonged outages and fuel shortages** for backup generators impact network functionality.
 - **Risk to Undersea Cables:** Damage to undersea cable landing stations can disrupt national

connectivity, with repairs requiring specialized equipment and time.

Read More: What are the Major Challenges Related to the Telecom Sector in India?

What are the Key Recommendations of the Report for Resilient Telecom Infrastructure?

- **Enhancing Technical Planning & Design:** Strengthen **network redundancy**, submarine cable protection, and **seismic resilience** of telecom towers.
 - Improve interoperability, power backup for data centers, and fiber optic cable protection using common ducts in roads.
- **Developing a Multi-Hazard Information Repository:** Enhance **disaster impact data collection**, develop **sub-district-level multi-hazard zonation maps**, and identify **critical telecom infrastructure** for uninterrupted service.
- **Risk-Informed Governance:** Improve **disaster forecasting**, enforce **resilient building codes** and upgrade the **Sanchar Saathi** portal for grievance redressal.
- **Developing Risk-Sharing Instruments:** Introduce **Parametric Insurance** to enhance financial resilience of telecom operators by providing **predefined payouts based on disaster triggers, ensuring faster recovery**.
- **Enhance Stakeholder Collaboration:** By creating a knowledge-sharing platform, uninterrupted power supply, and establishing **dedicated telecom infrastructure at critical industrial zones** and disaster shelters.

Read More: What Measures can be Adopt to Revamp India's Telecom Sector?



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Note:

Rapid Fire Current Affairs

Highlights

- 4,000-Year-Old Wooden Circle of Denmark
- Hague Service Convention
- Hydrocarbon Exploration in Gulf of Mannar
- Death Anniversary of VD Savarkar
- 94th Martyrdom Day of Chandra Shekhar Azad
- WASP-121b Exoplanet
- Gallantry Award for ICG Personnel
- Spinal Muscular Atrophy
- PRAKRITI 2025
- Jurisdiction of Lokpal
- Advancing Small-Scale Fisheries
- Perovskite LEDs (PeLEDs)
- Unusual Rivers Around The World
- Article 101(4)
- White Rhinos
- SC Strikes Down NMC Rule
- NOVA 1
- DBT's North Eastern Programme
- Trination Buddhist Motorcycle Expedition
- Bharat Tex 2025
- Digital Brand Identity Manual
- First BioBank in a Zoo
- Dinesh Khara Committee
- Majorana 1
- Parambikulam Tiger Reserve
- DDoS Cyber-Attack
- Colour Revolutions
- India-Argentina Lithium Partnership
- BTR and BUR under Paris Agreement
- Statehood Day of Mizoram and Arunachal Pradesh
- Saturn's Rings
- DeepSeek AI
- Aravali Safari Park Project
- Reappearance of South American Tapir
- Lake Chad
- Birth Anniversary of Ramakrishna Paramhansa
- Chhatrapati Shivaji Maharaj
- Baltic States Disconnected from Russian Grid
- 4th No Money for Terror Conference
- High-Entropy Alloy for Hydrogen Production
- Arabian Leopards
- DRC Conflict and M23 Militia
- 4th India-EU Urban Forum
- 38th National Games
- Konda Veduru Bamboo in the Godavari Valley
- Gangasagar Mela
- Anti-Migrant Sentiment in Tunisia

4,000-Year-Old Wooden Circle of Denmark

Archaeologists in **Denmark** have discovered a **4,000-year-old Neolithic wooden circle**, resembling **Stonehenge (3100–1600 BCE)** in England.

Key Findings:

- The structure consists of **45 wooden piles** arranged in a **30-meter diameter**, likely used for **rituals or sun worship**.
- Nearby, a **Bronze Age (1700–1500 BCE) settlement** was found, including a **chieftain's grave and a bronze sword**.
 - The **Bronze Age** was the time from around 2,000BC to 700 BC when people used bronze.
- **The discovery** provides insights into Denmark's **neolithic rituals** and possible **cultural links with Britain** through shared artifacts like **pottery and graves**.

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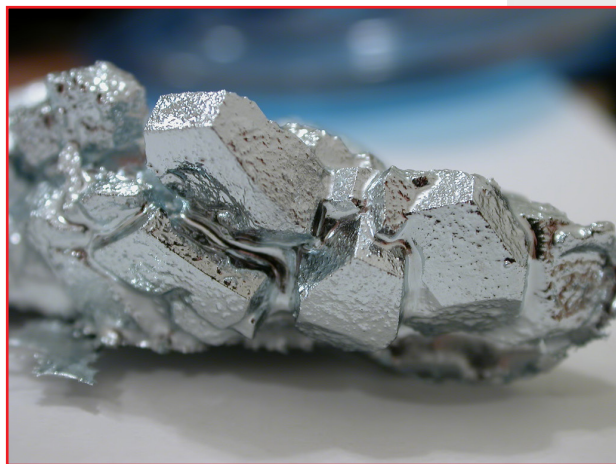
Stonehenge:

- **Stonehenge** is a prehistoric megalithic monument in Wiltshire, **England (3100–1600 BCE)**, with **massive standing stones in concentric circles**, likely used for **astronomical, ritualistic, or burial purposes**.
- It was built with **Sarsen sandstone** and **Bluestone**, with associated monuments like the **Avenue** and **Cursuses**.
- It was recognised as a **UNESCO World Heritage Site** in **1986**.

Read More: **Wooden Artifacts of Stone Age, World Heritage Sites in India**

Unusual Materials

- **Gallium (Ga):** It is a **non-radioactive metal** that **melts near room temperature** (similar to Cesium, Rubidium, and Mercury).
 - It exhibits the rare property of being **denser as a liquid than as a solid**, like **Silicon, Germanium, Bismuth, and Plutonium**.



- **Aerogel:** Aerogel is an **extremely light solid**, composed **mostly of air (over 99% by volume)**.
 - It is made by **removing the liquid component of a gel through supercritical drying**, preserving its porous structure.
- **Concrete:** Concrete is the **second most used material after water**. While **strong in compression**, it has **low tensile strength**, making it **susceptible to cracking**.
 - Scientists have explored **self-healing concrete using bacteria** which uses ***Bacillus* species** to produce **calcium carbonate** upon water exposure, **sealing cracks and enhancing durability**.

- **Aluminium Oxynitride (ALON):** ALON is a **transparent ceramic compound** made of aluminum, oxygen, and nitrogen. It is **extremely durable** and has been **tested to resist armor-piercing bullets**.
- **Tin (Sn): Stanene (Sn)** is a **one-atom-thick layer of tin atoms with a honeycomb structure**, similar to graphene.
 - It is expected to be a **topological insulator**, **conducting electricity along its edges** with minimal energy loss, while its **interior remains insulating**.

Read More: **Moiré Materials and Superconductivity**

Hague Service Convention

The **US Securities and Exchange Commission (SEC)** has invoked the **Hague Service Convention** to issue summons to Indian billionaire **Gautam Adani** and his associates in a securities and wire fraud case.

- **Hague Service Convention (1965):** A **multilateral treaty** that facilitates the **cross-border service of legal documents in civil or commercial matters** among **84 signatory states**, including **India** (accessed to the Convention in 2006 with certain reservations) **and the US**.
- **SEC's Request to India:** The SEC invoked Convention to request India's **Ministry of Law and Justice** to serve summons on Adani and his associates.
- **India's Stance on Service of Process:** India rejects alternative service methods under the **Article 10 of the Convention**, including postal service, diplomatic channels, or direct service by foreign courts.
 - All requests must go through the **Law Ministry**, which can **reject them if they threaten sovereignty or security**.
- **Judicial Precedents on Alternative Service:** Courts worldwide have debated using **email and social media** for summons.
 - **US courts** allowed service through Facebook and email. In ***Punjab National Bank v. Boris Shipping Ltd. (2019)***, a **UK court invalidated a summons served through alternative means**, reaffirming India's strict adherence to the Convention.

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Note:

Hydrocarbon Exploration in Gulf of Mannar

The Indian government has included a around 10,000 sq km deep-sea region of the **Gulf of Mannar (GoM)** in **Tamil Nadu** in its latest **hydrocarbon exploration** tender, raising concerns over its impact on marine biodiversity and local livelihoods.

- **Exploration Tender:** The **Ministry of Petroleum and Natural Gas**, under the **10th Open Acreage Licensing Policy** (a mechanism under India's **Hydrocarbon Exploration and Licensing Policy** that allows investors to select blocks for oil and gas exploration), has included 25 offshore areas.
- **Gulf of Mannar:** It is a part of the **Laccadive Sea** in the Indian Ocean, containing **21 islands**. It spans between the **northwest coast of Sri Lanka and the southeast coast of India**.
 - It is bordered by Rameswaram, the Ram Sethu bridge (also known as Adam's Bridge), and Mannar Island (Sri Lanka).
 - It receives rivers like the **Tambraparni (India)** and **Aruvi (Sri Lanka)** and hosts the **Tuticorin port**.
 - It is home to the **Gulf of Mannar Marine National Park**, the first **Marine Biosphere Reserve** in South and South-East Asia.
 - It hosts **117 coral species**, **over 450 fish species**, and **globally threatened species** like dugongs, whale sharks, and sea turtles.



Read more: [Coral Breach in Gulf of Mannar](#)

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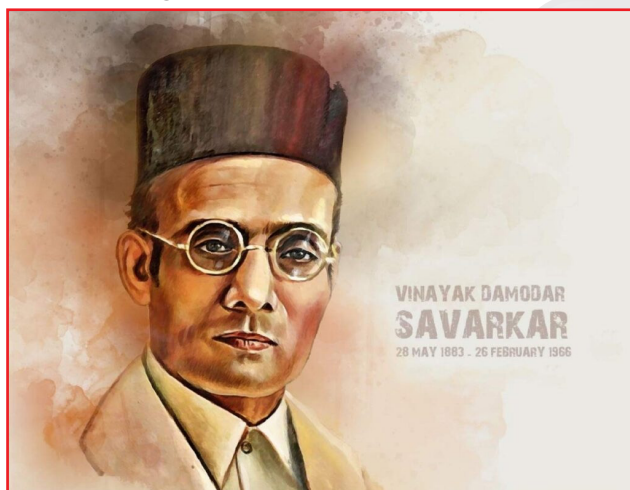


Note:

Death Anniversary of VD Savarkar

The Prime Minister paid tributes to **VD Savarkar** on his death anniversary on **26th February 2025**. He passed away in Mumbai on **26th February 1966**.

- **About VD Savarkar:** He was a **nationalist, revolutionary, and writer** who played a key role in **India's independence** and shaped **nationalist ideology**.
- **Political Ideology:**
 - **Hindutva:** Defined **Hindu nationalism**, arguing for a **cultural and civilizational identity** of India as a Hindu Rashtra.
 - **Hindu Mahasabha Leadership (1937-1943):** Advocated **against partition** and promoted military training for Hindus.



- **Revolutionary Activities:**
 - **Founded Abhinav Bharat Society (Young India Society, 1904):** A secret revolutionary group advocating **armed resistance** against British rule.
 - **Associated with India House & Free India Society:** Played a crucial role in fostering **revolutionary activities** among Indian students in **London**.
 - **Book on 1857 Revolt (1909):** His work, *The First War of Indian Independence - 1857*, redefined the 1857 uprising as a **nationalist struggle**.
 - **Imprisonment (1911-1924):** Arrested for conspiring against British rule, he was sentenced to **50 years** at Kala Pani in **Andaman Cellular Jail**.

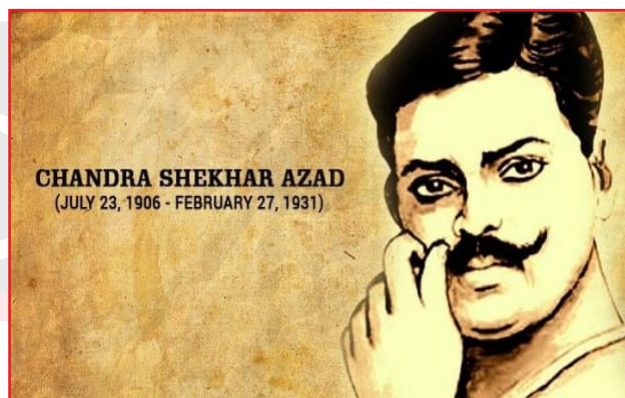
- He was released in **1924** after writing a few **mercy petitions** between **1911 and 1920** for his release.

Read More: [Veer Savarkar](#)

94th Martyrdom Day of Chandra Shekhar Azad

Political leaders across parties paid heartfelt tributes to freedom fighter **Chandra Shekhar Azad** on his **94th martyrdom day** on **27th February 2025**.

- **About Chandra Shekhar Azad:** He was a **revolutionary freedom fighter** known for his **bravery**, and his commitment to **never being captured alive** by the British.



- **Role in Freedom Struggle:** He was deeply impacted by the **Jallianwala Bagh massacre (1919)** and joined the freedom struggle at a **young age**.
 - Joined **NCM (1921)** as a student and became a key member of the **Hindustan Republican Association (HRA)** after **Gandhiji** suspended NCM in 1922.
- **Revolutionary Activities:** Kakori Train Action (1925).
 - Assassination of **JP Saunders (1928)** to avenge **Lala Lajpat Rai's** death.
 - Attempted to blow up the **Viceroy Lord Irwin's** train in 1929.
- **Legacy:** He was martyred in a police encounter at **Alfred Park, Allahabad (now Prayagraj) (27th February 1931)** by **shooting himself** rather than being captured.

Read More: [Chandra Shekhar Azad](#)

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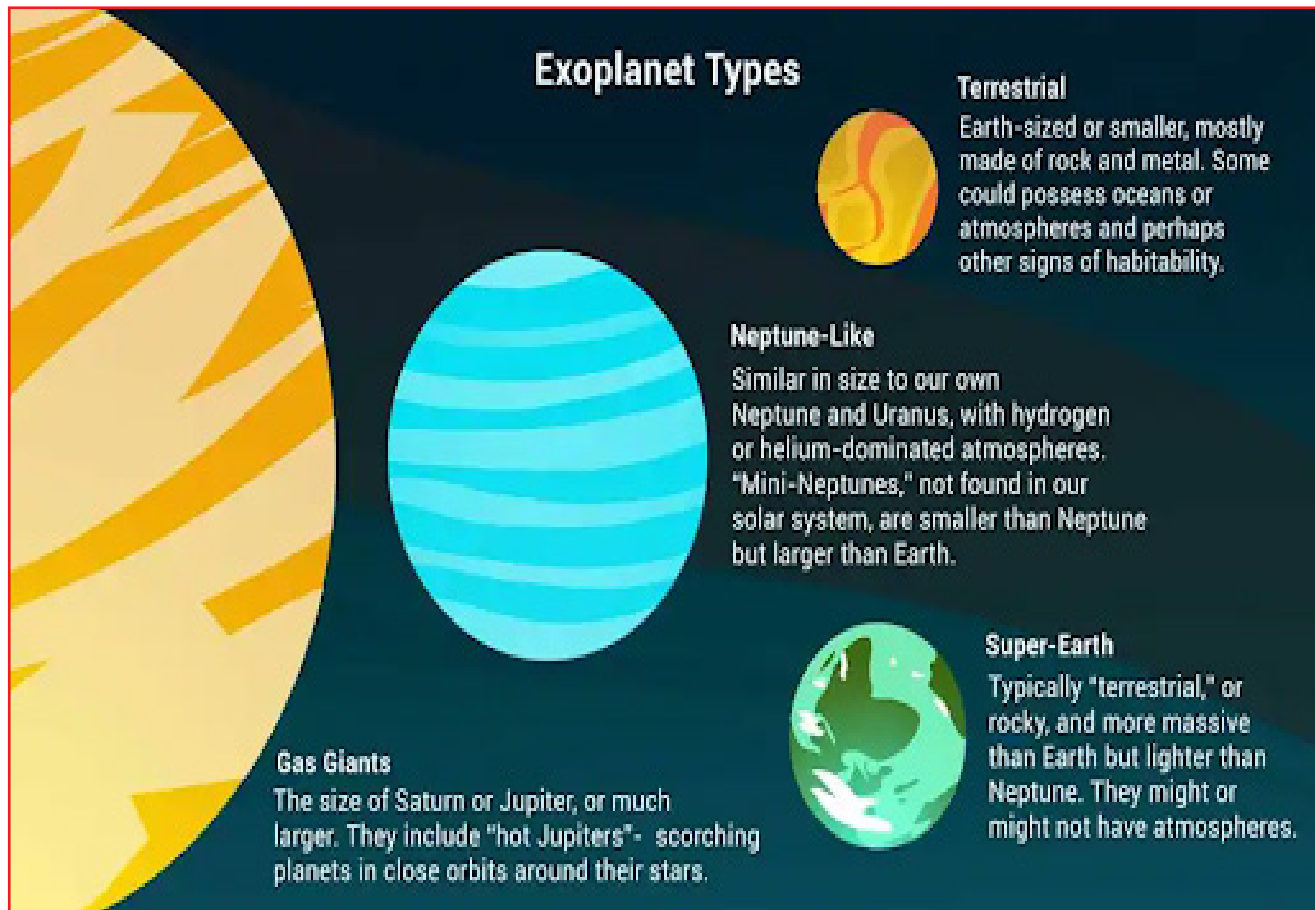
Note:

WASP-121b Exoplanet

Astronomers have mapped the **3D atmosphere of exoplanet WASP-121b (Tylos)**, located **900 light-years** away, using the **ESO's VL Telescope**, revealing **complex weather patterns and chemical composition**.

WASP-121b (Tylos):

- It is a **gas giant exoplanet** discovered in **2016**, orbiting the **yellow-white F-type star WASP-121**.
 - It has a size **1.87 times that of Jupiter** and a **mass 1.18 times greater**.
- **Type:** It is an **ultra-hot Jupiter** (a gas giant orbiting its host star very closely), with an **orbital period of just 30 Earth hours**.



Key Findings:

- **Extreme Climate Conditions:** **WASP-121b** has extreme temperature contrasts due to **tidal locking**, with one hemisphere scorched and the other cooler, driving **dynamic atmospheric patterns**.
- **Jet Streams and Wind Patterns:** Powerful jet streams and winds with speeds, creating distinct atmospheric flows.
- **Chemical Composition:** Its atmosphere comprises iron, sodium, hydrogen, and titanium, with **3 distinct layers**: **iron winds at the base**, a **fast sodium jet stream**, and **hydrogen winds at the top**, shaping its unique climate.

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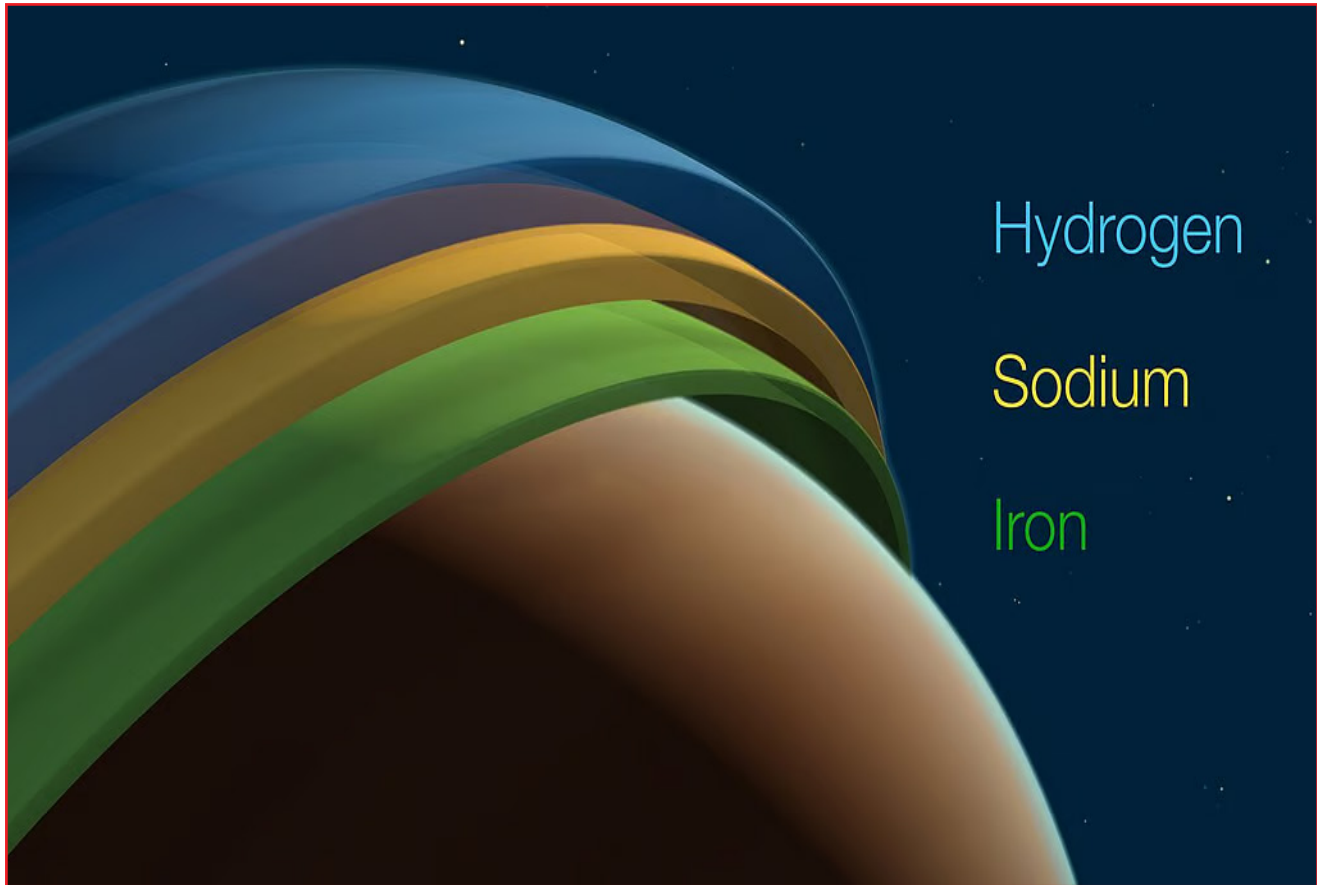
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Note:



Read More: [Detection of Barium in the Exoplanet Atmospheres.](#)

Gallantry Award for ICG Personnel

The Defence Minister conferred **gallantry**, distinguished service, and meritorious service medals to **Indian Coast Guard (ICG)** personnel for their **exemplary service**.

- **About Gallantry Awards:** They honor bravery in the **Armed Forces, other forces, and civilians** and are announced on **Republic Day** and **Independence Day**.
 - **Order of precedence of the Award:** **Param Vir Chakra, Ashoka Chakra, Mahavir Chakra**, Kirti Chakra, Vir Chakra, and Shaurya Chakra.
- **About ICG:** ICG is a maritime security force responsible for **enforcing maritime laws** and operates under the **Ministry of Defence**.
 - It was established on **1st February 1977** and became an independent armed force on **18th August 1978** with the enactment of the **Coast Guard Act, 1978**.
 - In **1972**, **UNCLOS** granted **EEZs** to coastal states. India enacted the **Maritime Zones of India Act, 1976**, claiming **2.01 million sq km** of ocean necessitating policing for which **ICG was required**.
 - It has **jurisdiction** over the **territorial waters (upto 12 nautical miles (nm))** including **contiguous zone (upto 24 nm)** and **EEZ (up to 200 nm)** of India.
 - Also, it is the **4th largest** Coast Guard in the world.

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Note:

CIVILIAN AND GALLANTRY AWARDS

CIVILIAN AWARDS

Bharat Ratna

- India's **highest civilian award**; instituted in **1954**
- Awarded for exceptional service/performance of the highest order in any field of human endeavour
- Award includes certificate & medallion (no monetary grant)
- Recommended to President by the PM
- Can be given (max) thrice per year



Padma Awards

- Instituted in **1954**; announced annually on **eve of Republic Day**
- Recognises achievements in all fields/disciplines involving **public service**
- Categories: Padma **Vibhushan** > Padma **Bhushan** > Padma **Shri**
- Recommended by **Padma Awards Committee** (constituted by PM annually)
- Suspended twice** - 1978-79 and 1993-97
- Max no. of awards per year - **120**



GALLANTRY AWARDS

- Wartime Gallantry** instituted on **26th January 1950**
- Peacetime Gallantry** instituted on **4th January 1952**
- Announced twice** a year - Republic Day and Independence Day
- Order of Precedence - **Param Vir Chakra** > **Ashoka Chakra** > **Mahavir Chakra** > **Kirti Chakra** > **Vir Chakra** > **Shaurya Chakra**

Eligibility -

- » All officers of all ranks (**Army, Navy, IAF**), Reserve forces, **Territorial army**
- » **People providing nursing services** under any of the above forces

Wartime Gallantry Awards



Param Vir Chakra Maha Vir Chakra Vir Chakra

Peacetime Gallantry Awards



Ashoka Chakra Kirti Chakra Shaurya Chakra



Read More: **Indian Coast Guard**

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Note:

Spinal Muscular Atrophy

A 2.5-year-old girl is the first person in the world to receive treatment for **Spinal Muscular Atrophy (SMA)** before birth.

- **About SMA:** It is a **genetic disorder** affecting **motor neurons**, leading to progressive **muscle weakening** due to **SMN1 (survivor motor neuron 1) gene mutation** and protein deficiency.
 - **Occurrence:** It affects **one in every 10,000 births**, making it a leading genetic cause of infant and child mortality.
 - **Gene Transfer:** SMA occurs when both **parents pass SMN1 gene mutations**; they are usually **carriers** without symptoms.
 - **Impact:** It primarily **affects muscles**, which **don't receive signals** from nerve cells.
 - **Symptoms:** Weakness in **voluntary muscles** (shoulders, hips, thighs), respiratory and swallowing difficulties, etc.
- Genetic disorders are medical conditions caused by **abnormalities** in an individual's **genes or chromosomes**, either inherited or caused by DNA mutations.

Read More: **Genetic Disorders**

PRAKRITI 2025

The **PRAKRITI 2025** (Promoting Resilience, Awareness, Knowledge, and Resources for Integrating Transformational Initiatives), the **International Conference on Carbon Markets**, organized by the **Bureau of Energy Efficiency (BEE)**, united global experts to discuss carbon market challenges and opportunities.

- **Insights of PRAKRITI 2025:** Highlighted that India's Carbon Market is influenced by global policies like the **EU's Carbon Border Adjustment Mechanism (CBAM)**, impacting steel, and high-emission sectors. Urgent domestic reforms are needed to mitigate these effects.
- **EU's CBAM:** It imposes a fair carbon price on imports, ensures parity with EU-produced goods, and promotes cleaner industrial production globally.
- **Carbon Markets:** Carbon markets (trading systems), under **Article 6 of the Paris Agreement**, allow entities

to buy **carbon credits** to offset emissions by supporting projects that reduce or remove greenhouse gases.

- **India's Carbon Markets:** India ranks 2nd in global CDM (Clean Development Mechanism) project registrations.
 - The **Perform, Achieve and Trade (PAT) scheme** has saved over **106 million tonnes of CO₂ since 2015**. The carbon market in India is regulated by the BEE.
- **BEE:** Established in 2002 under the **Energy Conservation Act, 2001**, BEE operates under the **Ministry of Power** and aims to reduce India's energy intensity by developing policies, promoting self-regulation, and coordinating with stakeholders.

Read more: **Rise of India's Carbon Marketplace**

Jurisdiction of Lokpal

The **Supreme Court (SC)** has stayed a **Lokpal order** that classified **High Court (HC) judges** as "**public servants**" under the **Lokpal and Lokayuktas Act, 2013**, thereby bringing them under its jurisdiction.

- **Case Background:** Lokpal claimed that High Courts were created under British-era laws like the Indian High Courts Act 1861, and **Article 214** merely recognizes them rather than establishing them, making their judges subject to its jurisdiction.
 - However, it excluded **SC judges**, as the SC was established by the **Constitution (Article 124)**, not an Act of Parliament.
- **SC Ruling:** The SC ruled that all judges, whether in **HCs or the SCs**, are appointed under the Constitution, making them immune from Lokpal oversight.
 - SC judges are appointed under **Article 124**, and HC judges under **Article 217**.
- **Jurisdiction of Lokpal:** Lokpal has jurisdiction over the **Prime Minister** ((with exceptions for matters of national security, international relations, etc.), **Union Ministers, MPs, and Government Officials** (Group A-D).
 - It also covers **chairpersons, members, officers, or employees** of entities established by an **Act of Parliament**, those **partially/wholly funded or controlled by the Central Government**, or organizations receiving **foreign donations over Rs 10 lakh/year** under the **Foreign Contribution (Regulation) Act, 2010**.

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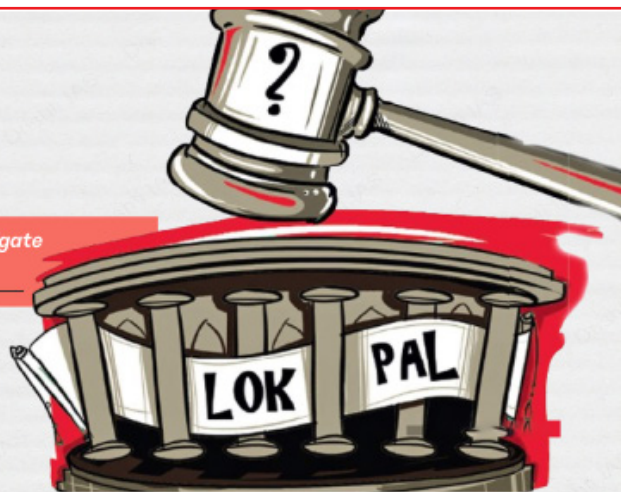
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Note:

LOKPAL

It is a statutory body functioning as "Ombudsman" to investigate corruption allegations against specific public officials and related issues.



HISTORICAL BACKGROUND

World

- 1809: Institution of Ombudsman first created in Sweden

India

- 1963: Idea of ombudsman first came up in Parliament
- 1971: First Lokayukta established in Maharashtra
- 2011: Anna Hazare Movement for Lokpal
- 2013: Lokpal and Lokayuktas Bill, 2011 passed
- 2014: Lokpal and Lokayuktas Act, 2013 came into force and amended in 2016
- 2019: Justice (Retd) Pinaki Chandra Ghose as first Lokpal of India

Statutory Provision: Lokpal And Lokayuktas Act (2013)

Seeks to establish institution of Lokpal at Centre and Lokayukta at State

Jurisdiction

- Includes Prime Minister, Ministers, MPs and Groups A, B, C and D officers, officials of Central Govt
- Institutions financed fully or partly by Government
- Entities getting over ₹10 lakhs annually in foreign donations under FCRA

Power

- Authority to approve public servants' prosecution instead of government or relevant authority
- Power of superintendence and direction over any investigating agency, including CBI, for cases referred to them by Lokpal
- Incorporates provisions for attachment and confiscation of property of public servants acquired by corrupt means, even while prosecution pending

Punishment

- Enhances maximum punishment under Prevention of Corruption Act, 1988

Appointment

- Selection of Chairperson and members through Selection Committee (PM, Speaker-LS, Leader of largest opp. party, CJI or sitting SC Judge nominated by CJI and an eminent jurist nominated by President)
- Search Committee assists Selection Committee in process of selection

Structure

- Chairperson + maximum 8 members
 - 50% Judicial members
 - 50% from SCs, STs, OBCs, minorities and women

Term of office

- 5 yrs or until the age of 70 yrs



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Read more: [Lokpal and Lokayukta](#)

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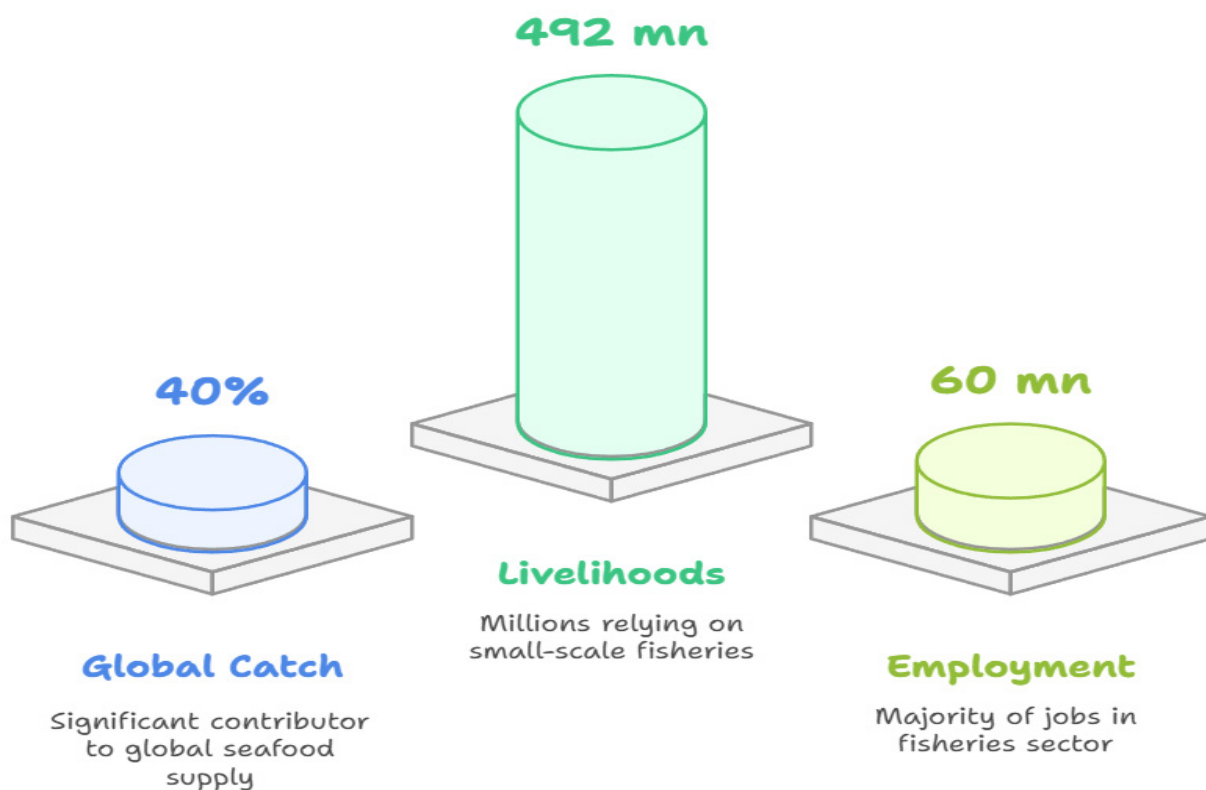
Note:

Advancing Small-Scale Fisheries

India has taken over the Chairmanship of the **Bay of Bengal Inter-Governmental Organisation (BOBP-IGO)** from Bangladesh reinforcing its commitment to the **blue economy**.

- India aims to improve **livelihoods, sustainability, and economic development** of the **Small-Scale Fisheries (SSF)**.
- **About BOBP-IGO (2003)**: It is a **regional** fisheries body supporting SSF in the **Bay of Bengal**.
 - Members include **Bangladesh, India, Maldives, and Sri Lanka**, with Indonesia, Malaysia, Myanmar, and Thailand as cooperating non-contracting parties.
- **About SSF**: SSF are **traditional, low-capital fisheries** by fishing households, using small vessels (if any), making **short, nearshore trips** either for subsistence or commercial purposes.
- **Global Importance of SSF**:

Impact of Small-Scale Fisheries Globally



- **Fisheries Sector in India**: India is the world's **2nd largest fish producer**, with **28 million people** engaged in the sector.
 - India is the **6th largest** marine capture fish producer (**1/3rd of the total fish production**).
 - India has **13 coastal States and UTs**, a coastline of **7,516 km**, and an **Exclusive Economic Zone (EEZ)** of 2.20 million sq. km.
 - India has **5 million active marine fishermen**, with around **50%** of the workforce being **women**.

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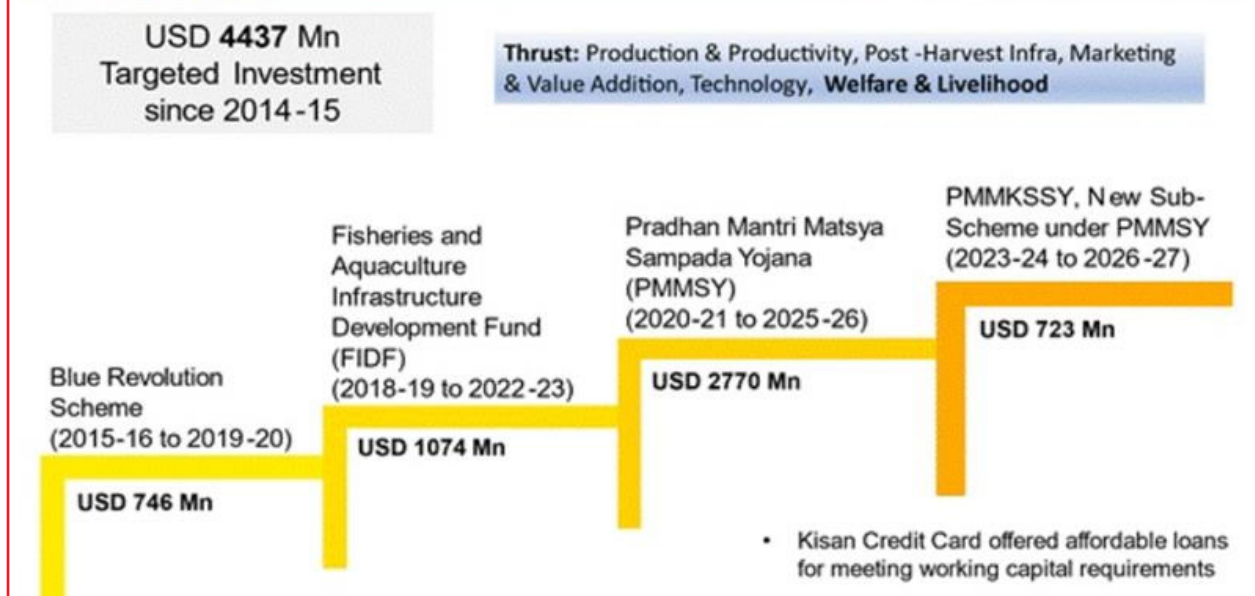


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Note:

Schemes and programs to strengthen SSF value chain and empower stakeholders



Read More: [Transforming Fisheries Sector](#)

Perovskite LEDs (PeLEDs)

India's researchers developed a method to reduce **anion migration** in **perovskite nanocrystals** that can enable **next-gen lighting** and improve **energy efficiency** as lighting consumes nearly **20% of global electricity**.

- Anion migration in perovskite nanocrystals causes **color instability** and **limits their use in lighting**.
- **Perovskite LEDs (PeLEDs)**, made from perovskite nanocrystals, **combine the advantages of Organic LEDs (OLEDs) & Quantum Dot LEDs (QLEDs)**, making them promising for **next-generation lighting**.
 - PeLEDs combine the best features of **OLEDs (flexibility, lightweight)** and **QLEDs (high color purity)** while offering **superior efficiency and cost-effectiveness**.

Evolution of Lighting Technologies

- **Early Technology:** From **incandescent and fluorescent lamps to LEDs** (invented in the 1960s).
- **Breakthrough in 1993:** Shuji Nakamura's team developed high-brightness **blue LEDs**, leading to energy-efficient **white LEDs** and winning the **2014 Nobel Prize in Physics**.
- **Current Technologies:**
 - **OLEDs:** **Thin, flexible**, but costly with **shorter lifespans**.
 - **QLEDs:** Precise **color control**, durable, but **toxic** with resource scarcity concerns.
 - **Micro/Mini-LEDs:** **High brightness and stability** but expensive to produce.

Read More: [Light Emitting Diodes \(LED\)](#)

Unusual Rivers Around The World

- **Caño Cristales River, Colombia:** It is also known as the **"River of Five Colors,"** as it changes its color from yellow, green, black, red, and blue between **July and November**.
 - This is due to **Rhynchospora clavigera**, an **aquatic plant** that changes its color with sunlight and water conditions.

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Note:

- **Shanay-Timpishka River, Peru:** Also known as **La Bomba**, it is the **world's largest thermal and only boiling river (with temperature 45°C to 100°C)**.
 - It is heated by **deep geothermal circulation** where rainwater seeps underground, warms, and resurfaces through **faults**.
- **Hamza Aquifer (Hamza River):** A vast underground **aquifer** beneath the **Amazon River**, ~4 km deep and 6,000 km long, flowing **extremely slowly** through **porous rock formations**.
- **Qiantang River, China:** Known for the **Silver Dragon**, one of the **world's largest tidal bores**, where **ocean tides push upstream at 40 km/hr**, creating **large waves ideal for surfing**.
- **Daldykan River, Russia:** Turned **blood red** due to **nickel and heavy metals contamination**.
- **Onyx River, Antarctica:** The **continent's longest river (32 km)**, flowing inland toward Lake Vanda **only in summer** as meltwater from **Wright Valley glaciers**.

Read More: **Transboundary Rivers of India**

Article 101(4)

An independent **Member of Parliament (MP)**, has approached the **High Court** over concerns regarding the potential loss of his **Lok Sabha** seat due to prolonged absence.

Article 101(4)

- **Article 101** of the Constitution of India deals with the **vacation of seats, disqualifications, and dual membership in Parliament**.
- As per **Article 101(4)** of the Constitution, if an **MP** remains absent from all meetings of the House for **60 days without permission**, the House may declare their seat vacant.
 - However, this period excludes days when the House is **prorogued** or **adjourned for more than 4 consecutive days**.

- This provision is intended to ensure that **MPs actively participate in legislative proceedings**.
- A seat is **vacated only when the House formally declares** it vacant through a vote, **not automatically**.
 - **Barjinder Singh Hamdard**, a Rajya Sabha MP, was **disqualified in 2000** under **Article 101(4)** for **sustained absence**.
- **Procedure for Seeking Leave:**
 - MPs must request leave from the **Committee on Members' Absence**, which **reviews and reports to the House**. The House then **votes on approval or rejection**.
- Leave is granted for up to **59 days** at a time; MPs must submit a **fresh request for extended absences**.

Read More: **Major Constitutional Amendment: Part 1**

White Rhinos

The **northern white rhino** is **functionally extinct**, with only 2 females remaining. However, **In-vitro fertilization (IVF)** advancements have raised hope, with **36 embryos** ready for **implantation** to help save the subspecies.

- **IVF: IVF** is a fertility treatment where an **egg is fertilized outside the body** and the embryo is **implanted into the female's uterus**.

White Rhino

- **About:**
 - **White rhinos** are the **2nd largest land mammal** after the elephant.
 - They are also called **square-lipped rhinoceroses** due to their broad upper lip, and are **not actually white**.
- **Subspecies & IUCN Status:**
 - **Northern White Rhino** (*Ceratotherium simum cottoni*): **Critically Endangered**
 - **Southern White Rhino** (*Ceratotherium simum simum*): **Near Threatened**

Northern white rhino	Southern white rhino
Smaller, weighing 1400-1600 kg (adult male)	Larger, weighing 2000-2400 kg (adult male)
Straight back	Concave back and prominent shoulder hump
Flat skull	Concave skull
No grooves between ribs	May have distinct vertical grooves between ribs
Hairier ears and tails	More body hair
Shorter front horn	Longer front horn

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Note:

➤ **Habitat:**

- **Southern White Rhinos:** South Africa, Namibia, Zimbabwe, and Kenya.
- **Northern white Rhinos:** Now survive only in captivity in Kenya.

RHINOCEROS

World Rhino Day - 22nd September (declared by WWF in 2010)

5 Main Species of Rhino

Species	Found in	IUCN Red List Status	Habitat
African White	Africa	NT	Long/short grass Savannah
African Black	Africa	CE	Semi-Desert Savannah
Greater one-horned	Asia	Vu (CITES - Appendix I, WPA - Schedule I)	Tropical grassland
Javan	Asia	CE	Tropical, subtropical forests
Sumatran	Asia	CE	Same as Javan

Ujung Kulon National Park (a UNESCO WHS) is home to the last remaining wild Javan rhinos on Earth

Greater One-Horned Rhino

Only species found in India (aka Indian Rhino)



CHARACTERISTICS

- Largest of the 5 species
- Identified by a single black horn and a grey-brown hide with skin folds



Threats

- Poaching for horns
- Habitat loss
- Decreasing Genetic diversity



Protected Areas (India)

- **UP**
 - Dudhwa TR
- **West Bengal**
 - Jaldapara NP
 - Gorumara NP
- **Assam**
 - Pabitora WLS
 - Orang NP
 - Kaziranga NP (max no. of Rhinos: ~2400)
 - Manas NP



Conservation Efforts (India)

- National Rhino Conservation Strategy
- Indian Rhino Vision 2020 (launched in 2005)

New Delhi Declaration on Asian Rhinos 2019

Signed by 5 rhino range nations (India, Bhutan, Nepal, Indonesia and Malaysia)



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Note:

- **Social Behavior:** They are **semi-social and territorial**, with males defending their territories (mark their territory with dung) and females roaming larger areas.
 - **Southern White Rhinos are more social**, forming **larger herds**, while Northern White Rhinos have smaller groups.
- **Diet:** Purely **herbivorous**, feeding on short grasses.
- **Threats:** **Poaching, Habitat loss, Low genetic diversity** (especially in **northern white rhinos**), and **climate change**, which alters their habitat and water sources.

Read More: **State of the Rhino 2023**

SC Strikes Down NMC Rule

In *Anmol vs Union of India Case, 2024*, the **Supreme Court (SC)** ruled **National Medical Commission's (NMC)** guideline requiring candidates with disabilities to have **"both hands intact with intact sensations and sufficient strength"** for MBBS admission as arbitrary, discriminatory, and unconstitutional.

- This requirement was held to be **antithetical** to the **Rights of Persons with Disabilities (RPwD) Act, 2016, Article 41** of the Constitution and **United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)**.
 - **Article 41** secures the right to work, to education, and to public assistance in cases of unemployment, old age, sickness and disablement.
- The SC ruled that the **functional assessment** of a candidate's abilities should take **precedence over rigid eligibility criteria**.
- The SC held that NMC's **Assessment Board** failed to meet the standards set in **two landmark judgments**:
 - **Omkar Ramchandra Gond Case, 2024:** It ruled that mere disability quantification is insufficient, **functional ability** must be assessed.
 - **Om Rathod vs Director General of Health Services Case, 2024:** It emphasized **opportunities for PwD candidates**, prioritizing **functional competency** over physical attributes.

- The SC urged NMC to **revise disability admission guidelines** in line with the Constitution, RPwD Act, UNCRPD, and SC judgments.

Read More: **Enhancing Accessibility for Persons with Disabilities**

NOVA 1

Recent research suggests that **genetics played a key role in the evolution of human speech**, with scientists linking the **NOVA1 (Neuro-Oncological Ventral Antigen 1)** gene to the development of spoken language.

- **NOVA1:**
 - **NOVA1** is a gene that **produces a protein** found in most mammals, playing a **key role in processing genetic information, brain development, and neuron activity**.
 - **Modern humans** have a **unique variant of this gene**, distinguishing it from those found in **Neanderthals** and **Denisovans** (ancient human species).
- **NOVA 1 Role in Speech Evolution:**
 - Scientists in an experiment **replaced the NOVA1 variant in mice with the human version** using **CRISPR gene-editing**.
 - The **modified mice** showed **distinct vocalizations**, with **altered distress calls** in infants and **more complex social squeaks in males**, indicating that the gene influenced communication.
- **FOXP2:**
 - **FOXP2** is also a gene linked to **speech and language**. It is found in **both humans and Neanderthals**, while **NOVA1 is unique to Homo sapiens**, making it more likely to explain human speech evolution.

Read More: **ecDNA Challenging Genetics Principles**

DBT's North Eastern Programme

The **Department of Biotechnology (DBT)**'s North Eastern Programme is driving a **biotechnology-led** transformation in **India's North East Region (NER)**.

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- **DBT's North Eastern Programme:** Initiated in 2010-2011, the DBT has since allocated **10% of its annual budget** to biotech programmes in NER, focusing on enhancing education, research, and bio-entrepreneurship.
 - Enabled R&D projects, benefiting researchers and students, and 6 biotech hubs established across NER to support research and training.
 - DBT introduced **Biotechnology Labs in Senior Secondary Schools (BLISS)** to promote biotechnology education. Additionally, the **Visiting Research Professorship (VRP) programme** engages top scientists to drive advancements in biotechnology across NER institutions.
 - DBT also supports farmers through initiatives like the **DBT-North East Centre for Agricultural Biotechnology (DBT-NECAB)**.
- **Major Achievements:** The **"Patkai" rice variety**, developed by **Assam Agricultural University**, integrates **blight resistance** (protection against bacterial blight disease) from **Improved Samba Mahsuri** (rice variety).
 - A **Lateral Flow Assay (LFA)** for rapid brucellosis (bacterial infection) detection in livestock was standardized, improving disease diagnostics.
 - Additionally, the **Pig Disease Diagnosis Expert System (PDDES)**, a mobile application, was developed to assist veterinarians and farmers in diagnosing and managing pig diseases.

Objectives of the NER Programme

To facilitate biotech-based development in the North Eastern Region of India through conceptualization, implementation, mentoring and monitoring of biotechnology intervened R&D programs for holistic developments in the region.

To initiate Bio-resource based Entrepreneurship programmes in NER to uplift rural income of farmers and small entrepreneurs of the Region.

To implement programmes to ensure that human resource development matches the evolving needs of the North East Region.

To establish of Research Resources, Service Facilities and Platforms to provide support to a broad range of multidisciplinary, shared research resources critical for advancing various areas of life sciences and biotechnology in the North East Region.

North Eastern Program

Major Outputs

No. of Projects supported:	>1200
No. of Institutes supported:	>130
No. of Publications:	>2700
No. of Patents filled/ granted:	29
No. of Manpower trained:	>1500

Read more: [India's Biotech Revolution](#)

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Note:

Trination Buddhist Motorcycle Expedition

The Heartfulness Lord Buddha Trination Tri-Services Motorcycle Expedition started in February 2025 in Lumbini (birthplace of Lord Buddha), Nepal.

- It is a historic initiative uniting **Nepal, India, and Sri Lanka** through their shared Buddhist heritage.
- **Key Indian Buddhist landmarks** on the route include:



- The expedition is organized with the **International Buddhist Confederation (IBC)**, **Land Port Authority of India** (Ministry of Home Affairs) and **Nalanda University, Rajgir**.
- Key Buddhist sites in Sri Lanka include **Anuradhapura, Polonnaruwa, Dambulla** etc.

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Note:

BUDDHISM



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ORIGIN

- 6th century BC, based on the teachings of Gautam Buddha

MAIN FEATURES

- Essence - Attainment of enlightenment (Nibbana)
- Supreme Deity - None

PRINCIPLES

- Avoid the extremes; follow Madhyam Marg (middle path)
- Individualistic component (everyone is responsible for their own happiness)
- 4 Noble Truths:
 - Dukkha (suffering)
 - Samudya (cause of suffering)
 - Nirodha (suffering could be ended)
 - Atthanga Magga (8-fold path to achieve this)
- 8-Fold Path:
 - Right - view, intention, speech, action, livelihood, mindfulness, effort and concentration



BUDDHISM REJECTS

- Authenticity of Vedas
- Concept of soul (atman) (unlike Jainism)

MAJOR BUDDHIST TEXTS

- Sutta Pitaka (main teachings of Buddha - Dhamma)
- Vinaya Pitaka (rules of conduct for monks/nuns)
- Abhidhamma Pitaka (philosophical analysis)
- Other imp texts - Divyavadana, Dipavamsa, Mahavamsa, Milind Panha

Buddha's teachings were rehearsed, authenticated & divided in 3 Pitakas at the 1st Buddhist Council

These teachings were written down c. 25 BC in Pali

4 BUDDHIST COUNCILS

Buddhist Council	Patron	Venue	Chairman	Year
First	Ajatashatru	Rajgriha	Mahakashyapa	483 BC
Second	Kalashoka	Vaishali	Sabbakami	383 BC
Third	Ashoka	Patliputra	Mogaliputra	250 BC
Fourth	Kanishka	Kundalban (Kashmir)	Vasumitra	72 AD

Read More: [Buddhism in India](#)

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Note:

Bharat Tex 2025

The **Prime Minister** addressed the **Bharat Tex 2025 event**, which is a global platform for engagement, collaboration, and policy discussions in the **textile sector** in which **over 120 countries participated**.

India's Textile Sector:

- India's textile industry contributes **2.3% to GDP**, **12% to exports**, **13% to industrial production** and employs **45 million**, second only to agriculture.
- India is the **6th largest textile exporter globally** (after China, EU, Vietnam, Bangladesh, and Turkey) and world's **2nd largest producer of textiles and garments**.
- India's textile exports increased **7%** from 2023 to 2024, reaching **Rs 3 lakh crore**, with a target of **Rs 9 lakh crore by 2030**.
- Challenges in Textile Sector:
- India's textile sector faces **high cotton dependence (60%)**, competition from Bangladesh & Vietnam, **logistics inefficiencies (costs at 13-14% of GDP compared to China's 8%)** and **environmental concerns from fast fashion**.

Government Initiatives for Textile Sector:

- Mega Integrated Textile Region and Apparel (MITRA) Parks
- **Mission for Cotton Productivity**: To facilitate improvements in productivity and sustainability of cotton farming.
- **GI tagging for Handloom Products**: E.g. Uppada Jamdani Sarees, Muga Silk of Assam, **Kashmir Pashmina** etc.
- **Samarth Scheme**

Read More: [India's Garment Export Sector](#)

Digital Brand Identity Manual

The **Ministry of Electronics and Information Technology (MeitY)** has launched the **Digital Brand Identity Manual (DBIM)** to establish a **standardized and seamless digital presence** across all government platforms.

- **DBIM**: It standardizes **color palettes, typography, and iconography** across **government websites, mobile apps, and social media** while introducing **Gov.In CMS**, a **centralized content management system** for seamless updates.
 - It ensures **common UI/UX (user interface/user experience) principles** for better accessibility and user experience of all government websites.
 - The **Central Content Publishing System (CCPS) of DBIM** enables **consistent updates** of official announcements, policies, and schemes.
- **Significance**: DBIM enhances "**Minimum Government, Maximum Governance**" by ensuring a **cohesive digital identity**, improving **accessibility**, streamlining **policy access** and strengthening India's **e-governance leadership**.

Read more: [Navigating India's Digital Growth](#)

First BioBank in a Zoo

India's **first wildlife bio-bank** at **Padmaja Naidu Himalayan Zoological Park (Darjeeling Zoo)** is fully operational.

- Since its establishment in **July 2024**, it has collected DNA and tissue samples from **60 animals of 23 species**, prioritizing endangered species.
- **Biobank**: The **biobank (frozen zoo)** preserves **genetic material from animals for conservation and research**.
 - This includes cells, tissues, and reproductive samples of endangered and deceased animals.
 - The samples are stored in **cryogenic conditions (-196°C in liquid nitrogen)** to maintain genetic diversity.
 - It is part of a **national conservation plan**, in collaboration with the **Centre for Cellular and Molecular Biology (CCMB)**, under the **Ministry of Science and Technology**.
 - In future, biobanks are planned to be set up at **Delhi National Zoo and Nandankanan Zoo (Odisha)**.
- Species like the **American black-footed ferret** and **northern one-horned rhino** have been revived using **preserved DNA and captive breeding**.

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Note:

Darjeeling Zoo:

- It is India's largest high-altitude zoo, specializing in **captive breeding of alpine species** like snow leopards, Himalayan wolves, and red pandas.
- It houses endangered fauna, including **gorals, Siberian tigers, and rare birds**.

Read More: **Darjeeling Zoo's Conservation Breeding Programme for Snow Leopards**

Dinesh Khara Committee

The **Insurance Regulatory and Development Authority of India (IRDAI)** has formed a **7 member committee**, chaired by **Dinesh Khara** to review the **Insurance Act, 1938**.

- It aligns with the proposed **Insurance Amendment Bill**, which seeks to increase the **FDI** limit from **74% to 100%**.
 - Currently, **Insurance Act, 1938** provides a broad **legal framework** to regulate the insurance sector.
- **Key reforms under consideration:**
 - **Composite licence** (life, health, and general insurance), Captive licence,
 - Differential capital (Adjusting capital needs based on risk profiles),
 - Reduction in **solvency norms**, Change in **investment regulations**
 - **One-time registration** for intermediaries etc.
- **IRDAI** is the **statutory body** established under the **IRDA Act, 1999** and is **responsible for regulating and promoting** the insurance industry in India.

Read More: **Insurance Sector in India**

Majorana 1

Microsoft has introduced **Majorana 1**, the world's first quantum chip powered by a **Topological Core architecture**, which aims to revolutionize **quantum computing**.

- **Key Facts About Majorana 1:** It is the first quantum chip to utilize a **Topoconductor (Topological Superconductor)**, creating a new state of matter beyond solids, liquids, or gases, but a **topological state**.

- It is composed of **indium arsenide (a semiconductor)** and **aluminum (a superconductor)**, enabling enhanced quantum stability and performance.
- The chip relies on **Majorana fermions** that act as their **own antiparticles**.
- It features **eight qubits**, but its **Topological Core architecture** enables error-resistant scaling to **one million qubits**, ensuring stable quantum computations.
 - Unlike classical computers using **binary bits (0s and 1s)**, quantum computers use **qubits**, which exist in multiple states simultaneously, enabling exponentially faster computations.
- **Applications:** Could help in **breaking down microplastics, creating self-healing materials, improving healthcare solutions, and solving complex chemistry and materials science problems**.

Read more: **Quantum Technology**

Parambikulam Tiger Reserve

A faunal survey at the **Parambikulam Tiger Reserve (TR)** in Kerala highlighted **key species** present in the reserve.

- **Important species:**
 - **Birds:** Rufus-bellied hawk-eagle, **Indian grey hornbill, Great Indian hornbill, Ceylon frogmouth** etc.
 - **Butterfly:** Five-bar swordtail, **Spot swordtail**, Southern birdwing (India's second largest butterfly species), **Nilgiri tiger** etc.
 - **Others:** Leopards, Lion-tailed macaques, **Smooth-coated otters**.
- **About Parambikulam TR:** It is located in the **Palakkad and Thrissur districts** of Kerala and declared a **Tiger Reserve** in 2009 under **Project Tiger**.
 - It is a well-preserved ecological area within the **Nelliampathy-Anamalai landscape** of the Southern **Western Ghats** in India.
 - It is home to the **world's first scientifically managed teak plantation** and boasts the largest and oldest teak tree, named **Kannimara**.
 - The **Parambikulam, Sholayar, and Thekkady rivers** flow through the reserve.

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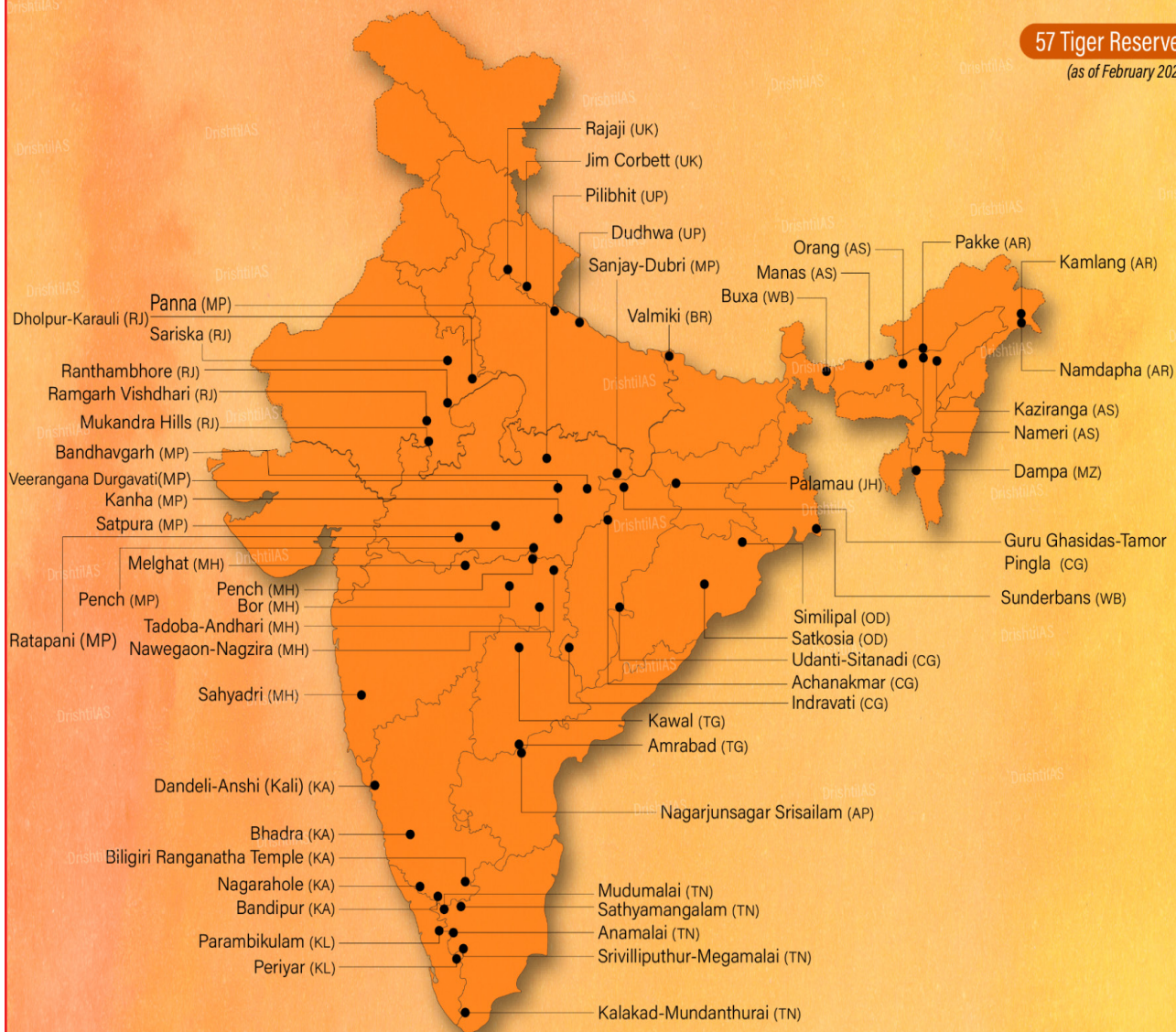


Note:

Tiger Reserves

57 Tiger Reserves

(as of February 2025)



FACTS

- A State Government, on the recommendation of the National Tiger Conservation Authority, notify an area as a tiger reserve.
- Largest Tiger Reserve (Core Area): Nagarjunsagar Srisailem (Andhra Pradesh).
- Smallest Tiger Reserve (Core Area): Orang (Assam).
- Reserve with Highest Tiger Density: Corbett (Uttarakhand) (All India Tiger Estimation 2018).
- State with Maximum Tigers: Madhya Pradesh (All India Tiger Estimation 2018).



Read More: **Early Migration of Butterflies**

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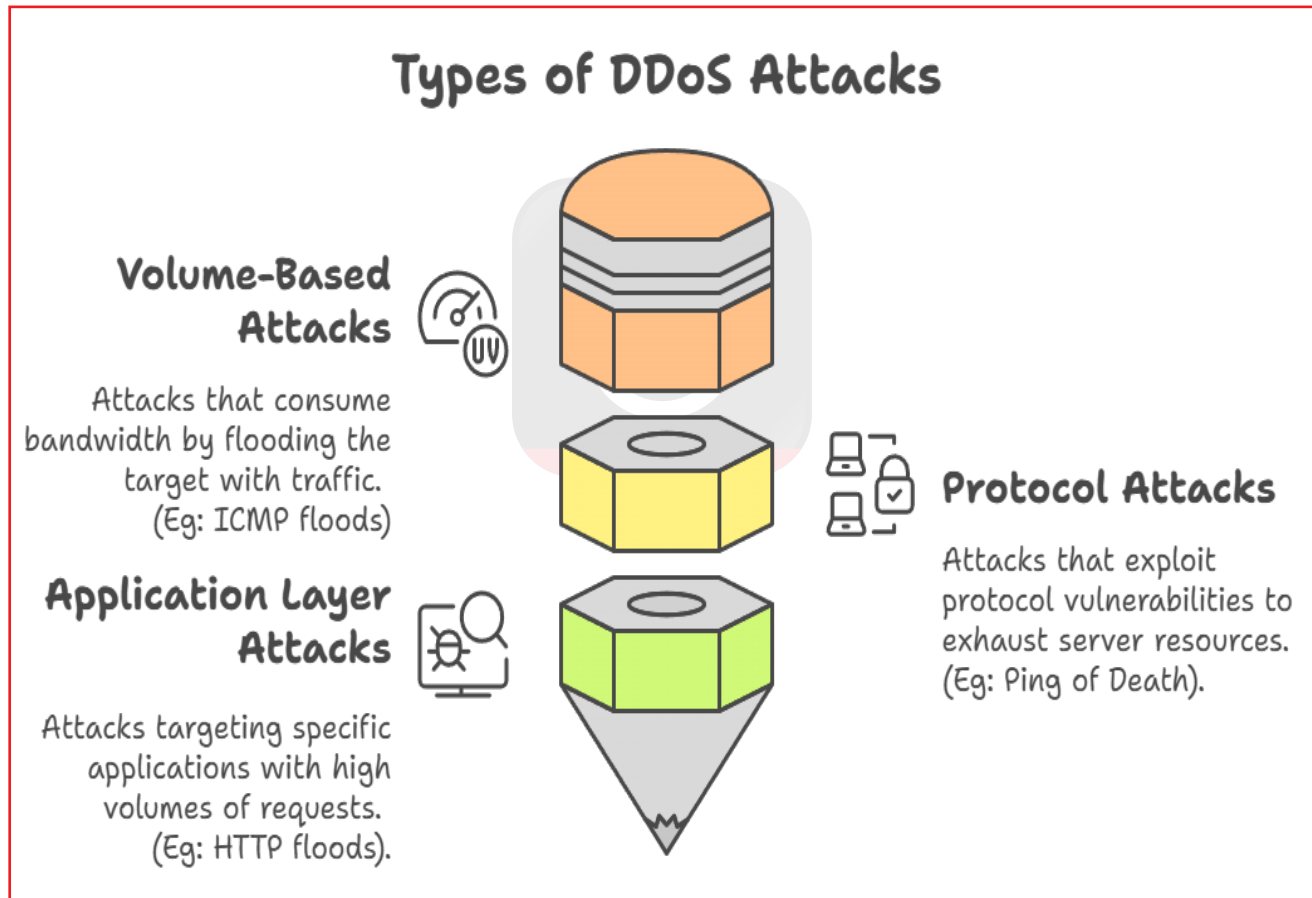


Note:

DDoS Cyber-Attack

Karnataka's Kaveri 2.0 portal that deals with property registration faced severe disruptions due to a **Distributed Denial of Service (DDoS)** attack.

- This overloaded the system with **fake accounts and automated requests**, causing **downtime**.
- Distributed Denial of Service (DDoS) Attack:
- **About: DDoS attack** is a **cyberattack** that **floods** a website or **network with malicious traffic** making it inaccessible.
 - DDoS attacks are **large-scale versions of Denial of Service (DoS) attacks** that use **multiple compromised systems (botnets)** instead of a single source to **overload the target**.
- **Types:**



- **Impact:**
 - DDoS attacks **disrupt services, impact revenue**, and expose cybersecurity vulnerabilities, damaging an organization's reputation.
- **Mitigation Strategies**
 - **Traffic filtering, rate limiting, bot detection** (CAPTCHA, behavioral analysis), security audits, incident response plans, and **multi-factor authentication** enhance defense against DDoS attacks.

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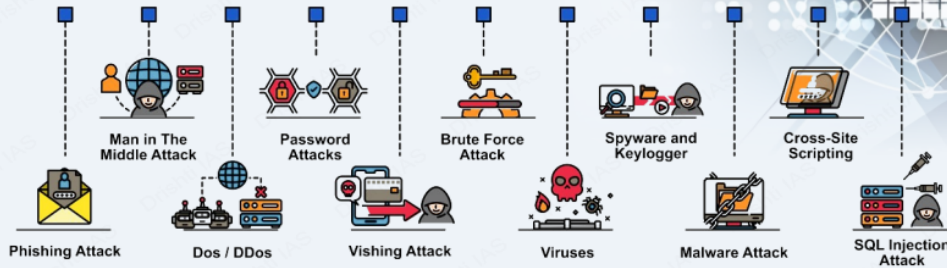


Note:

CYBER SECURITY

Cybersecurity refers to any technology, measure, or practice for preventing cyberattacks or mitigating their impact.

CYBER SECURITY ATTACKS



'Crime in India' Report 2022 (NCRB) highlighted 24.4% surge in cybercrimes in India since 2021.

Common Cybersecurity Myths

- ⊗ Strong passwords alone are adequate protection
- ⊗ Major cybersecurity risks are well-known
- ⊗ All cyberattack vectors are contained
- ⊗ Cybercriminals don't attack small businesses

Cyber Warfare

- ⊗ Digital attacks to disrupt vital computer systems, to inflict damage, death, and destruction.

CYBER THREAT ACTORS

CYBER THREAT ACTOR	MOTIVATION
NATION-STATES	GEOPOLITICAL
CYBERCRIMINALS	PROFIT
HACKTIVISTS	IDEOLOGICAL
TERRORIST GROUPS	IDEOLOGICAL VIOLENCE
THRILL-SEEKERS	SATISFACTION
INSIDER THREATS	DISCONTENT

Types of Cybersecurity

- ⊗ Critical infrastructure security (Robust access controls)
- ⊗ Network security (Deploying firewalls)
- ⊗ Application security (Code reviews)
- ⊗ Cloud Security (Tokenization)
- ⊗ Information security (Data masking)

Recent Major Cyber Attacks

- ⊗ WannaCry Ransomware Attack (2017)
- ⊗ Cambridge Analytica Data Breach (2018)
- ⊗ Financial data of 9M+ cardholders, including SBI, leaked (2022)

Regulations & Initiatives

- ⊗ **International:**
 - ⊗ UN Group of Governmental Experts (GGE) on Advancing Responsible State Behaviour in Cyberspace
 - ⊗ NATO's Cooperative Cyber Defense Centre of Excellence (CCDCOE)
 - ⊗ Budapest Convention on Cybercrime, 2001 (India not a signatory)
- ⊗ **India:**
 - ⊗ IT Act, 2000 (Sections 43, 66, 66B, 66C, 66D)
 - ⊗ National Cyber Security Policy, 2013
 - ⊗ National Cyber Security Strategy 2020
 - ⊗ Cyber Surakshit Bharat Initiative
 - ⊗ Indian Cyber Crime Coordination Centre (I4C)
 - ⊗ Computer Emergency Response Team-India (CERT-In)

Steps Needed for Cyber Security

- ⊗ Network Security
- ⊗ Malware Protection
- ⊗ Incident Management
- ⊗ User Education and Awareness
- ⊗ Secure Configuration
- ⊗ Managing User Privileges
- ⊗ Information Risk Management Regime



Read More: **Denial of Service (DoS) Attack**

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Note:

Colour Revolutions

Georgia's 2024 elections have reignited discussions on colour revolutions, with allegations of Western interference in ongoing political protests, as the former President refused to vacate office, citing electoral malpractices, while the elected President assumed power.

➤ Colour Revolutions:

- **About:** It refers to **peaceful, mass protest uprisings in post-Soviet states**, characterized by symbolic colours, aiming to replace pro-Moscow regimes with peaceful and democratic governments.
 - Though initially successful in creating **pro-Western governments**, these revolutions often resulted in **instability, corruption, and disillusionment**.
- **Examples:**
 - Georgia's Rose Revolution (2003)
 - Ukraine's Orange Revolution (2004)
 - Kyrgyzstan's Tulip Revolution (2005)
- **Russia** sees these movements as **Western interference** threatening its regional influence.

➤ **Georgia:** It is a country located in **Eastern Europe and West Asia**, bordered by **Russia, Azerbaijan, Armenia and Turkey**. It has a sea boundary with **Black Sea**.



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Note:

India-Argentina Lithium Partnership

India and Argentina signed an MoU for **lithium** exploration and investment opportunities in Argentina.

- Argentina is known for its vast lithium reserves and is part of the '**Lithium Triangle**' along with Bolivia and Chile.



- **About Lithium:** It is a soft, silvery-white alkali metal and is also known as white gold.
 - It is the lightest metal and solid element, and classified as both an alkali and a rare metal.
 - It is mined from ores of petalite, lepidolite, spodumene and also subsurface brines.
 - It is highly reactive and flammable and must be stored in mineral oil.
 - It is an essential mineral required for electric vehicle batteries and renewable energy storage.
 - Chile (1st), China (2nd) and Australia (3rd) have the largest reserves of lithium.
 - In India, Salal-Haimna areas (Reasi district of J&K), Koderma and Giridih (Jharkhand), and Mandya (Karnataka) have lithium reserves.

Read More: [Lithium-Deal with Argentina](#)

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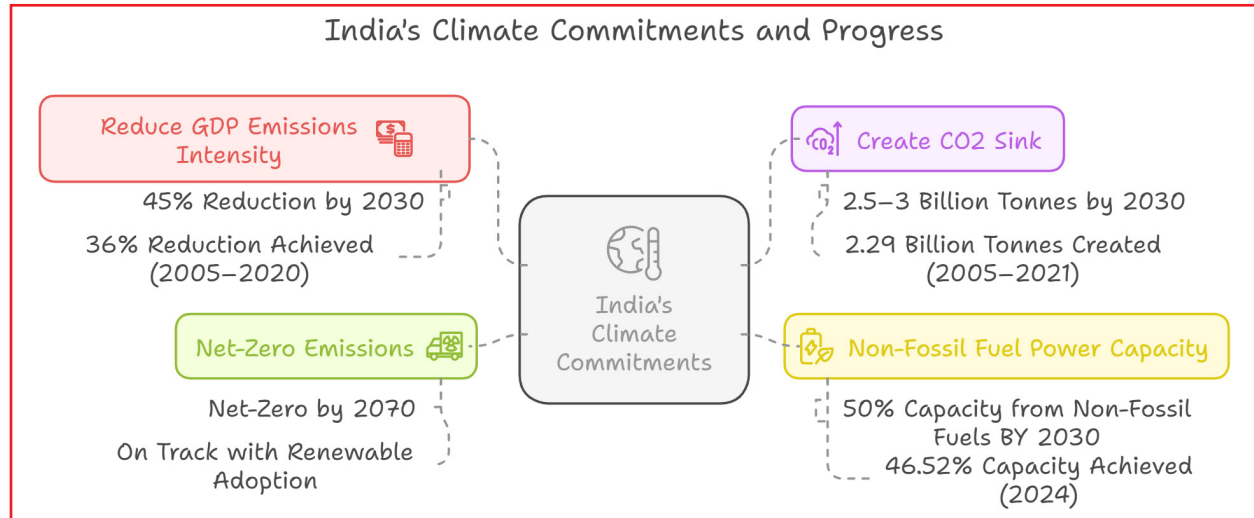


Note:

BTR and BUR under Paris Agreement

India is set to submit its first-ever **Biennial Transparency Report (BTR)** under the Paris Agreement, which will be subject to an independent expert review by the **United Nations Framework Convention on Climate Change (UNFCCC)**.

- **BTR:** Under the **Paris Agreement, 2015**, countries must submit **BTRs every two years** to enhance transparency in climate action. **Small Islands Developing States (SIDS)** and **Least Developed Countries (LDCs)** can submit at their discretion.
 - These reports track progress on **national greenhouse gas (GHG) inventories**, **Nationally Determined Contributions (NDCs)**, and **climate adaptation measures**.



- **BUR:** India has previously submitted **Biennial Update Reports (BUR)**, with the last one in **2024 (BUR- 4)**, covering data till **2020**.
- **Key Highlights of BUR 4:**
 - **India's Emissions by Gas:** Carbon dioxide (80.53%), Methane (13.32%), Nitrous oxide (5.13%), and others 1.02%.
 - **Emissions by sector:** Energy (75.66%), Agriculture (13.72%), Industrial Process and Product Use (IPPU) (8.06%), and Waste (2.56%).
 - **Forests & Tree Cover:** Sequestered 522 million tonnes (mt) of CO₂, equivalent to reducing 22% of the country's total carbon dioxide emissions in 2020.
 - **Emission Intensity Reduction:** 36% decrease in emissions intensity (2005–2020), with India on track to achieve its target of a 45% reduction by 2030.
 - As of 2020, India's emissions, excluding **land use, land-use change and forestry (LULUCF)**, stood at 2,959 mt of CO₂e. Including LULUCF, net emissions were at 2,437 mt of CO₂e.

Read more: **WMO's Greenhouse Gas Bulletin 2023**

Statehood Day of Mizoram and Arunachal Pradesh

President Droupadi Murmu greeted **Arunachal Pradesh and Mizoram on Statehood Day** (20th February).

- **Mizoram:** It was originally known as the **Lushai Hills** district of Assam and was renamed **Mizo Hills** in 1954. The Mautam famine of **1959** led to the rise of the **Mizo National Front (MNF)**, which sought to establish a **sovereign nation for the Mizo people**.
 - This movement culminated in an armed uprising in 1966, particularly after **Nagaland gained statehood in 1963**.

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Note:

- Mizoram became a **Union Territory in 1972** after an accord with MNF moderates and gained **statehood on 20th February 1987** following the **Mizoram Peace Accord (1986)** with the Central government.
- **Arunachal Pradesh:** Formerly the **North-East Frontier Agency (NEFA)**, Arunachal Pradesh became a **Union Territory in 1972** and gained **statehood on 20th February 1987**, under the Arunachal Pradesh Act, 1986. Its capital, **Itanagar**, is named after the **14th-century Ita Fort**.

REORGANISATION OF STATES IN INDIA

The States Reorganisation Commission set up in 1956 suggested the formation of 14 States and 6 UTs. At present, India comprises 28 states and 8 UTs.

1950

States classified into **4 categories**

- **Part A, B, C and D** (1st Schedule)

- **Part A** - Ruled by **Governor** with **elected State Legislature**
 - ◇ **Andhra Pradesh** (first state on linguistic lines) - 1953
- **Part B** - Former **Princely States**
- **Part C** - Former **Chief Commissioners' Provinces**, some **Princely states**
- **Part D** - Andaman and Nicobar Islands

7th Constitutional Amendment (1956) -

- Distinction between Part-A and Part-B states done away
- Part-C states were abolished
- Made total no. of (erstwhile) states - 14 and UTs - 6

Reorganisation/Creation of States/UTs after 1956

States Carved Out of Other States

- **Gujarat and Maharashtra** from Bombay (Bombay Reorganisation Act, 1960)
- **Nagaland** from Assam (State of Nagaland Act, 1962)
- **Haryana** from Punjab (Punjab Reorganisation Act, 1966)
- **Meghalaya** from Assam (North-Eastern Areas (Reorganisation) Act, 1971)
- **Chhattisgarh** from MP (Madhya Pradesh Reorganisation Act, 2000)
- **Uttarakhand** from UP (Uttar Pradesh Reorganisation Act, 2000)
- **Jharkhand** from Bihar (Bihar Reorganisation Act, 2000)
- **Telangana** from Andhra Pradesh (Andhra Pradesh Reorganisation Act, 2014)

States Formed by Granting Statehood

- **Himachal Pradesh** (State of Himachal Pradesh Act, 1970)
- **Manipur and Tripura** (North-Eastern Areas (Reorganisation) Act, 1971)
- **Sikkim** (36th Constitutional Amendment (1975))
- **Mizoram** (State of Mizoram Act, 1986)
- **Arunachal Pradesh** (State of Arunachal Pradesh Act, 1986)
- **Goa** (Goa, Daman, and Diu Reorganisation Act, 1987)

Formation of UTs

- Andaman and Nicobar Islands, Delhi, Lakshadweep - 1956
- Puducherry - 1962
- Chandigarh - 1966
- J&K and Ladakh - 2019
- Dadra & Nagar Haveli and Daman & Diu - 2020



Read more: [Statehood Day of Mizoram and Arunachal Pradesh](#)

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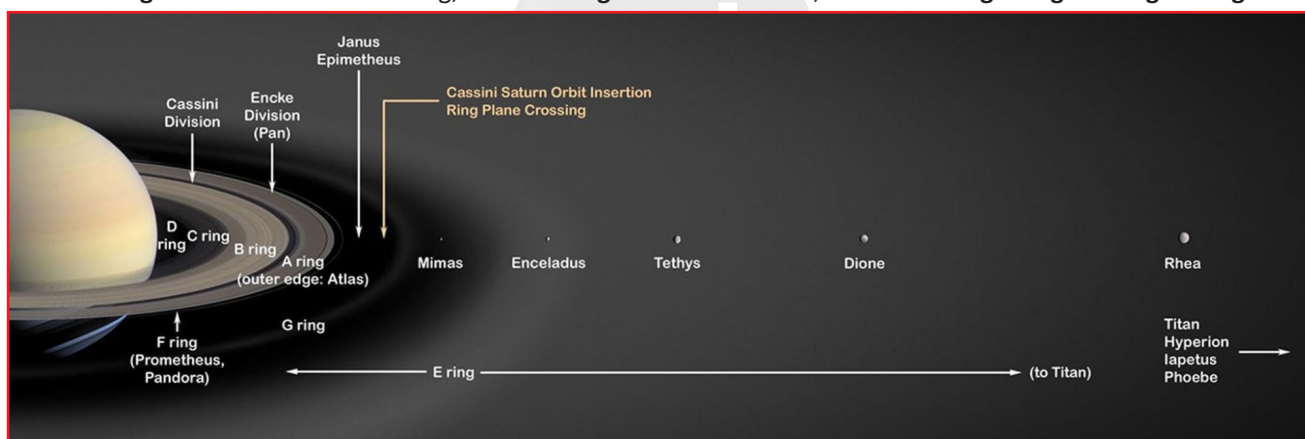


Note:

Saturn's Rings

A study challenges the belief that **Saturn's rings** are 100 million years old, suggesting they could be as old as the **Solar System** itself.

- Earlier assumptions based on **Cassini spacecraft** data suggested Saturn's rings were young due to their cleanliness, surprising scientists who expected dark dust from space debris.
 - But the study finds **dust evaporation keeps them clean**, proving they may be ancient.
- **Cassini**: Launched by **National Aeronautics and Space Administration** along with the **European Space Agency's Huygens probe** to study **Saturn** and its moons.
- **Saturn**: It is the second-largest planet after Jupiter, and is composed of hydrogen and helium. Located at **9.5 Astronomical Unit (AU)** (AU is the distance from the Sun to Earth) from the Sun.
 - Saturn has **146 moons** and is a **gas giant of hydrogen and helium**.
- **Saturn's Rings**: It consists of seven main rings, named in the order of their **discovery (D, C, B, A, F, G, E)**, becoming fainter as they move outward, primarily made of **icy snowballs**.
 - The **main rings** are **A, B, and C**, with the **A ring** easily visible through **Earth-based telescopes**. The **Cassini Division** separates the **B and A rings**.
 - **F Ring** located outside the A ring, **G and E Rings** are much fainter, with the **E ring being the largest ring**.



Read more: **Saturn's Rings Will Briefly Disappear in 2025**

DeepSeek AI

Chinese AI startup **DeepSeek** has launched **generative AI** models (known as **DeepSeek**) that rival global leaders like OpenAI, Google, and Meta while **offering competitive performance at a significantly lower cost**.

DeepSeek

- **About: DeepSeek** is a **free AI-powered chatbot** similar to **ChatGPT**, providing text-based assistance via **web, mobile, and API**.
 - **Deepseek** (AI firm) was founded by **Liang Wenfeng** in **May 2023** that specialises in **open-source Large Language Models (LLMs)**.
- **Recent Advanced Models: DeepSeek-V3** excels in **coding, translation, and writing**, while **DeepSeek-R1** outperforms OpenAI's o1 in reasoning, math, and logic.

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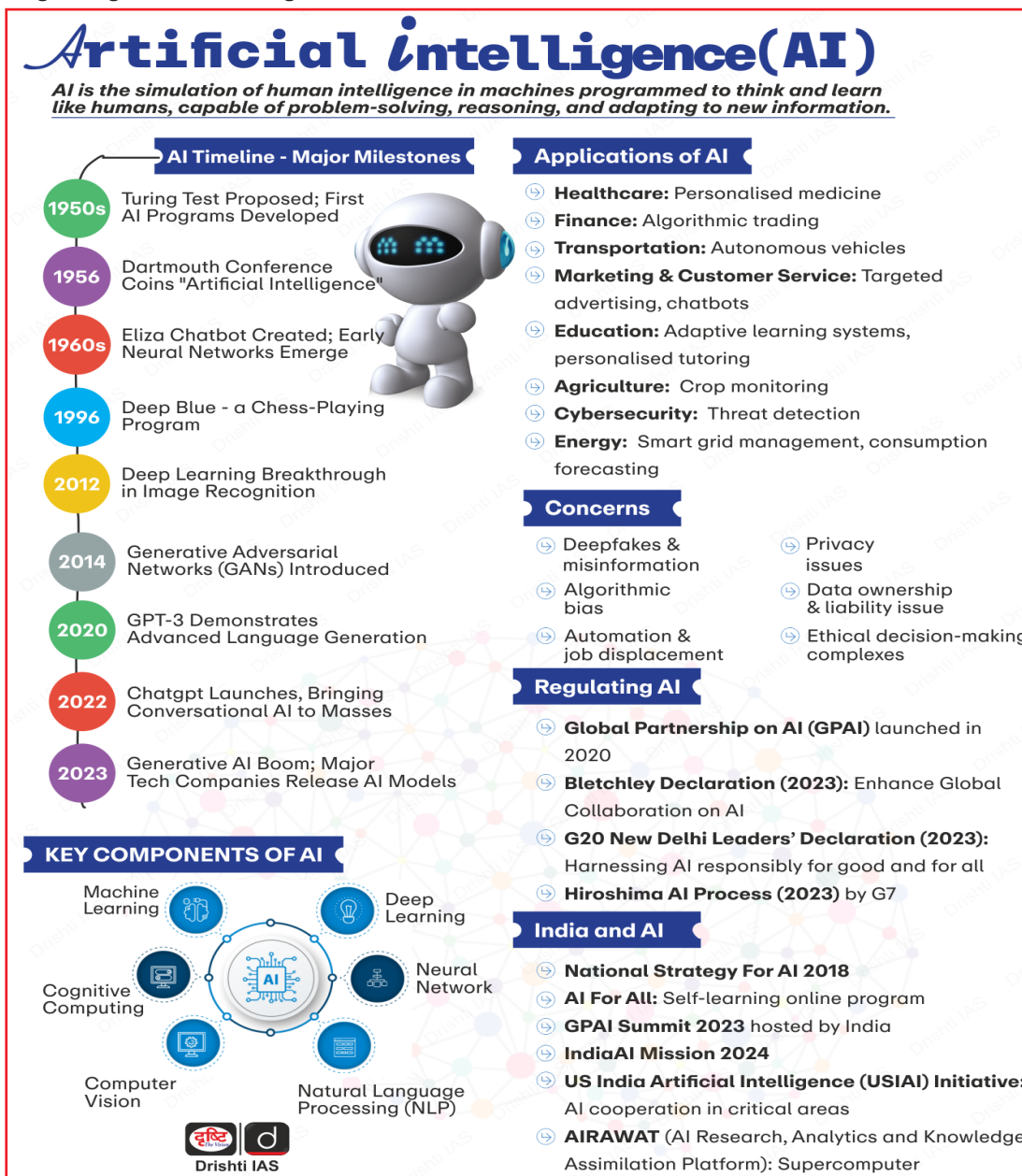
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Note:

➤ **Different With Other AI Models:**

- **Open-Source Advantage:** Unlike **proprietary models** (OpenAI, Google), DeepSeek allows **cost-effective AI adoption without licensing fees**.
- **Advanced Architecture:** Uses **Mixture-of-Experts (MoE)** for specialized tasks and **Multi-Head Latent Attention (MLA)** for efficiency, **reducing training and deployment costs**.
- **Reinforcement Learning:** Enhances reasoning through **trial-and-error learning**, enabling **efficient distillation of large models**.
- **Real-Time Computation:** DeepSeek-R1 displays reasoning in real time, outperforming **OpenAI's o1** in math, coding, and general knowledge.



Read more: **Artificial Intelligence (AI)**

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Note:

Aravali Safari Park Project

Haryana's proposed **Aravali Safari Park**, featuring **wildlife enclosures, hotels, and restaurants**, faces debate over its impact on **ecology, groundwater, and wildlife conservation**.

- **About Aravali Safari Park Project:** It is envisioned as the **world's largest safari park (approx 10,000 acres)** and aims to support **eco-tourism and compensatory afforestation**.
 - Inspired by **UAE's Sharjah Park**, it is planned for **compensatory afforestation** to mitigate the **loss of 26,000 acres** of tropical forests in **Great Nicobar**.
 - It will only be developed in areas where **forest density is less than 40%**.
 - **Forest (Conservation) Act, 1980** was amended in **2023** to bring it under the '**forest**' activity, and allowing **zoos** to be built in **forest areas**.
- **About Aravalis:** It is the **oldest fold mountain range** in the world and runs **diagonally (northeast to southwest)** across **Gujarat, Rajasthan, Delhi, and Haryana** for about **690 km**.
 - It plays a crucial role in **preventing desertification** eastwards and **recharging groundwater**.
 - The **hidden limb** of the Aravalis, extending from **Delhi to Haridwar**, separates the drainage of the **Ganga and Indus rivers**.
 - Its highest peak is **Guru Shikhar on Mount Abu (Rajasthan)** at **1,722 metres**.



Read More: **Critical Threats Facing the Aravalis**

Reappearance of South American Tapir

The **South American tapir** (Lowland tapirs) has been spotted in the **Cunhambebe State Park** (Brazil's Costa Verde region) for the first time in **100 years**.

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Note:

- The last confirmed sighting was in **1914** in the **Serra dos Orgaos National Park** in **Rio de Janeiro, Brazil**.
- **About Tapir:** It is the **largest land mammal in South America** and has **short legs** and a **rounded body**, with a kind of **flexible trunk**.
 - They are **herbivores**.
 - Known as a “**forest gardener**,” the tapir aids **seed dispersal**, and creates **natural trails** that allow **sunlight to reach the forest floor**, enhancing biodiversity.
 - **IUCN Status:** Endangered.
 - South American tapirs are **one of four species** of tapir alongside the **Baird’s tapir**, **mountain tapir** and **Malayan tapir** found in the forests of **Central and South America** as well as **Southeast Asia**.



Lowland Tapir

Tapirus terrestris

Baird's Tapir

Tapirus bairdii

Mountain Tapir

Tapirus pinchaque

Malayan Tapir

Tapirus indicus

Lake Chad

Chad has concluded a military campaign, **Operation Haskanite**, against **Boko Haram**.

- The campaign targeted Boko Haram’s strongholds in the **Lake Chad region**, a strategic hub for militant activity.
- **Boko Haram:** It is a Nigeria-based terrorist group aiming to impose Islamic law in the country. Its name means “**Western education is forbidden**.”
- **Lake Chad:** Situated in **north-west Africa**, the Lake Chad region spans **Nigeria, Cameroon, Niger, and Chad**. It is a dynamic **freshwater body** with human presence dating back to the **Paleolithic era** (2.6 million years ago to 10,000 years ago).
 - The **Sao Civilization (5th century)** left rich archaeological remains, showcasing expertise in fishing, hunting and farming.
 - Lake Chad faces a **humanitarian crisis**, with over 10 million in need due to poverty, climate change, and conflict. **Boko Haram** exploits the instability, worsening the region’s challenges.

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Note:



Read more: [Economic Community of West African States](#)

Birth Anniversary of Ramakrishna Paramhansa

The **Prime Minister** paid tributes to **Swami Ramakrishna Paramhansa** on his birth anniversary on **18th February 2025**.

➤ **About:** Ramakrishna Paramahansa was born as **Gadadhar Chattopadhyaya** on **18th February 1836** in **Bengal**.

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Note:



- **Religious Philosophy:** He was deeply devoted to Goddess Kali, serving as a priest and worshipping her at Dakshineswar Kali Temple.
 - He practiced various spiritual traditions, including Tantric, Bhakti, Vaishnavism, and Advaita Vedanta.
 - Ramakrishna preached religious unity, believing all faiths lead to the same truth.
- **Spreading Legacy:** His foremost disciple, Narendranath Datta (later Swami Vivekananda), established the Ramakrishna Mission in 1897 and spread Ramakrishna's teachings across India, America, and Europe.
- **Teaching Documentation:** Mahendranath Gupta, his disciple, documented Ramakrishna's teachings in the book *Sri Sri Ramakrishna Kathamrita* (Bengali) (*The Gospel of Sri Ramakrishna* in English in 1942).

Read More: **Ramakrishna Mission's Awakening Programme**

Chhatrapati Shivaji Maharaj

The birth anniversary of **Chhatrapati Shivaji Maharaj** was commemorated globally on **19th February**, reflecting his enduring legacy and influence.

- **Chhatrapati Shivaji Maharaj:** Born on **19th February 1630**, at Shivneri Fort, Pune was a visionary leader from the **Bhonsle clan** and the founder of the **Maratha Empire**, known for resisting the **Mughal Empire** and striving for **self-rule**.
 - **Major Battles:** Battle of Pratapgad, Battle of Pavan Khind, Sacking of Surat, Battle of Purandar, Battle of Sinhagad, and Battle of Sangamner.

- The **Wagh nakh**, was used by Shivaji to kill Afzal Khan in the **1659 Battle of Pratapgad**.
- **Titles:** Chhatrapati, Shakakarta, Kshatriya Kulavantas, and Haindava Dharmodhhaarak.
- **Administration:** Centralized administration with the **Ashtapradhan (Council of Eight Ministers)**, abolished the **Jagirdari System**, implemented the **Ryotwari System**, and built a **strong naval force** for coastal defense.
- Shivaji is renowned for his innovative **guerrilla warfare tactics**, which influenced subsequent rulers and shaped the **Maratha Military Landscapes**.
- **Other Prominent Maratha Kings:** After **Shivaji**, **Sambhaji (1681–1689)**, **Rajaram (1689–1700)**, and **Shahu (1707–1749)** fought against the Mughals. Later, the **Peshwa administration** began with **Balaji Vishwanath (1713–1720)**, who strengthened Maratha governance.
 - **Peshwa Madhavrao I (1761–1772)** revived Maratha power after the **Third Battle of Panipat (1761)**.



Read more: **Chhatrapati Shivaji Maharaj**

Baltic States Disconnected from Russian Grid

The **Baltic Nations (Estonia, Latvia, and Lithuania)** have officially disconnected from **Russia's Soviet-era electricity grid** and integrated into the EU's power network through connections with Finland, Sweden, and Poland.

- **Europe's Energy Dependence on Russia:**
 - The **Baltic States** inherited a **Soviet-era power grid** and remained in **Russia's network** even after **1991 independence**.

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Note:

- By 2025, they achieved full electricity independence from Russia and Belarus.
- Europe's reliance on Russian energy has declined significantly. Before the 2022 Russia-Ukraine War, it sourced 40% of gas, 30% of oil, and 50% of coal from Russia. By 2023, gas imports fell to 14.8%.

Baltic States

- The **Baltic states** are located in **northeastern Europe**, bordered by the **Baltic Sea** (west & north), **Russia** (east), **Belarus** (southeast), and **Poland & Russia (Kaliningrad)** (southwest).
- They gained **independence from the USSR in 1991**.
- They **lack natural resources**, relying on **imports** despite Estonia's **oil shale** production. **Agriculture** remains vital, with **grains, potatoes, fodder crops, and livestock farming**.
- All 3 countries are members of **NATO** (since 2004), the **EU**, the **Eurozone**, and the **OECD**.



Read More: [Baltic Nations - Drishti IAS](#)

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Note:

4th No Money for Terror Conference

The Union Minister of State for Home Affairs participated in the 4th **No Money for Terror (NMFT) Conference** in Germany.

- India emphasized global unity in combating terrorism, reiterated its proposal for a **permanent NMFT Secretariat at New Delhi**.
- No Money for Terror (NMFT) Conference:
- **Launch:** It was launched in **2018** by **France**.
 - **Previous Conferences:** France (Paris, 2018), Australia (2019) and India (2022).
- **Objective:** It aims to **enhance international cooperation in curbing terror financing**.
- **Sub-verticals:** The conference focused on global efforts to counter **terror financing** through **4 key sub-verticals**:
 - Multilateral cooperation
 - Financing methods for terrorism
 - Financial inclusion & Risk-based approach
 - Terrorist Financing & Organized Crime
- **Similar Conferences on Counter-Terrorism & Terror Financing:**
 - **Financial Action Task Force (FATF) Plenary Meetings:** Focusing on anti-money laundering (AML) and counter-terrorism financing (CTF).
 - **United Nations Counter-Terrorism Week:** Organized by the UN Office of Counter-Terrorism (UNOCT) to discuss global counter-terrorism strategies.

Read More: **India's Contribution to Counter-Terrorism Efforts**

High-Entropy Alloy for Hydrogen Production

Researchers have developed a **high-entropy alloy (HEA) catalyst** for **water electrolysis**, enhancing **hydrogen production** while **reducing dependence on costly materials like platinum** for clean energy generation.

- **Alloys & High-Entropy Alloys (HEAs):** Alloys are metallic substances composed of **2 or more elements**, while

HEAs are advanced **metallic alloys** materials with **5 or more elements** mixed in **equal or similar proportions**.

- HEA catalyst consists of **platinum, palladium, cobalt, nickel, and manganese**.
- HEAs possess **high strength, corrosion, and wear resistance**, ensuring durability.

HEA Role in Electrolysis:

- In electrolysis, a **catalyst (like platinum)** is used which reduces the minimum amount of energy required to start a chemical reaction (**activation energy**), **accelerating water splitting** into **hydrogen and oxygen**.
- The HEA catalyst **reduces platinum use by 7 times** improving efficiency over pure platinum, and remains stable for **100+ hours in alkaline seawater**, enabling **cost-effective hydrogen production**.

Read More: **Green Hydrogen and Carbon-Neutral Future**

Arabian Leopards

A study published on **World Arabian Leopard Day (10th February 2025)** confirmed the presence of the **Arabian leopard** in Oman's **Nejd plateau**, contrary to earlier beliefs of local extinction due to **hunting and habitat loss**.

Arabian Leopard (*Panthera pardus nimr*)

- **Key Characteristics:** It is among the **smallest leopard subspecies**, with **males weighing 30-40 kg** and **females 25-35 kg**.
 - It has **pale buff-colored fur** with **small, closely spaced rosettes**.
- **Habitat & Population:** Native to the **Arabian Peninsula**. Found in isolated pockets across **Saudi Arabia, Oman, Yemen, and the UAE**.
 - The global wild population is estimated to be **100-120 individuals**, with the largest group in **southern Oman**.
- **IUCN Status:** **Critically Endangered**
- **Threats:**
 - **Habitat loss** due to **urbanization, farming, and overgrazing**.
 - **Poaching and illegal wildlife trade**.
 - **Declining prey populations**, leading to food scarcity.

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Note:

Nejd Plateau

- The **Nejd Plateau** in **Dhofar, Oman**, is a **dry region** with **plateaus, wadis, and low cliffs**.
 - Wadis are **low-lying valleys** that are **usually dry, except during the rainy season**

Leopard Population in India (2024)

- **Total:** 13,874 (1.08% annual growth since 2018).
- **Highest population:** Madhya Pradesh, followed by Maharashtra, Karnataka, and Tamil Nadu.
- **Conservation Status:** **IUCN Red List (Vulnerable)**, **CITES (Appendix-I)** and **Indian Wildlife (Protection) Act (Schedule-I)**.



EAT

- True carnivores that are excellent ambush predators
- Feed on anything they can overpower, from mid-size ungulates, to domestic livestock, dogs, birds, and rodents

ACTIVITY

- Mostly solitary, nocturnal creatures, also seen at dusk and dawn in forests. Entirely nocturnal close to human presence
- Territorial.
- Leopard densities can reach 5 animals per 100 sq km in densely populated human landscapes like western India

BLACK PANTHER


- Dark morphs or black leopards, often called black panthers, are the same species, but with recessive melanistic genes
- Spots are hidden under the dark coat

PANTHERA PARDUS FUSCA

INDIAN LEOPARD

Highly adaptable big cat can live close to humans

POPULATION around 7,910 (2014 census in surveyed areas); thought to be around 12,000-14,000 across India	WEIGHT 50-77 kg (males); 29-34 kg (females)	GEOGRAPHIC RANGE Indian subcontinent (all states), Nepal, Pakistan, Bangladesh, Bhutan, Myanmar, China	HABITAT Forest, shrubland, savanna, grassland, rocky areas, mountains, desert
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Large head, powerful jaws

Have an easily recognisable sawing/rasping call

Coats have black rosettes

Each coat pattern is unique and makes individuals identifiable

PHOTO: DR. ANAND K. SINGH, T. S. MEHRA, P. S. SINGH, T. S. MEHRA

CUBS

- Females usually give birth to two cubs after a gestation period of 90-105 days
- Only the female cares for the cubs, who remain with the mother for about 1.5-2 years

AGILE CAT

- Excellent at climbing trees
- Can run down a tree head-first
- Can carry large prey up a tree to protect it from other carnivores including tigers and wild dogs

THREATS

- A TRAFFIC study reports that between 2001-2010 at least **2 leopards were killed each week** for the illegal wildlife trade in India
- Population has declined by **75-90%** in the last two centuries
- **Poisoning** and retaliatory killing
- **Poaching** for pelts and body parts.
- Become roadkill when roads and highways run through forests
- Conflict with **livestock herders**
- **Hunting**

PROTECTION STATUS:
VULNERABLE on the IUCN Red List

Read More: **Status of Leopards in India 2022**

DRC Conflict and M23 Militia

The ongoing conflict in **the Democratic Republic of Congo (DRC)** has escalated with the **M23 militia**, backed by **Rwanda**, capturing the mineral-rich city of **Goma**.

- The conflict has resulted in **2,900 deaths**, displaced nearly **700,000 people**, and spread to **South Kivu province**, a region rich in resources.

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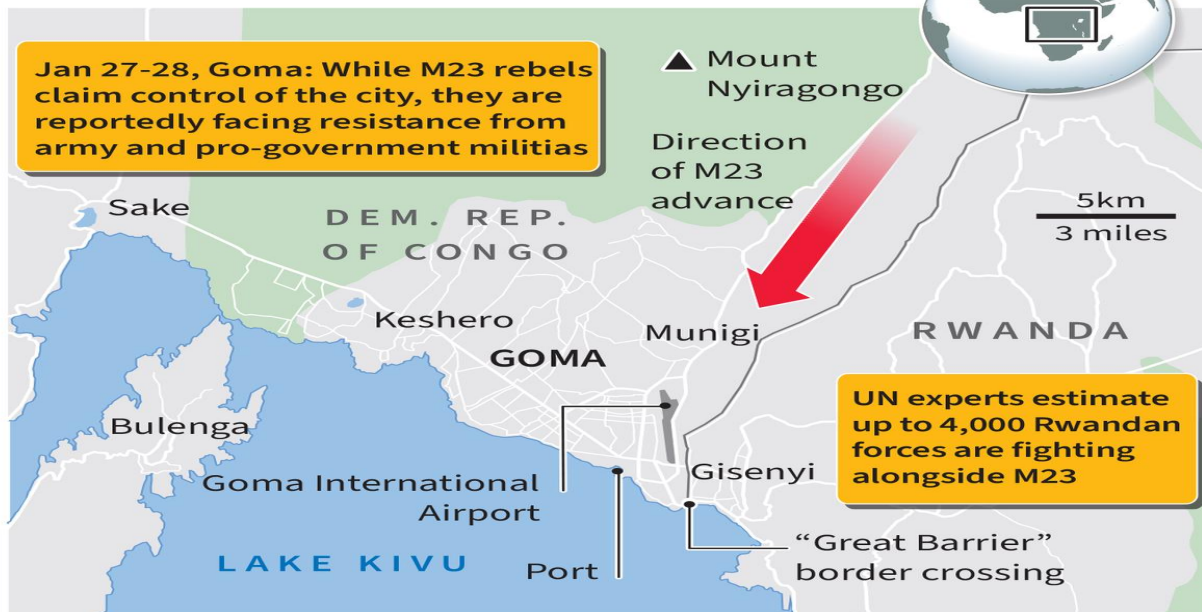
Note:

THE M23 MILITIA

- One of about 100 armed factions vying for a foothold in mineral-rich eastern DRC
- Rwandan-backed group which consists primarily of Tutsis who failed to integrate into the Congolese army
- Led major insurgency against the DRC government in 2012, took up arms again in 2022. The group is estimated to have 6,500 fighters



Jan 27-28, Goma: While M23 rebels claim control of the city, they are reportedly facing resistance from army and pro-government militias



UN experts estimate up to 4,000 Rwandan forces are fighting alongside M23

■ Latest rebel advance has forced thousands to flee Goma. The city of two million people is a vital humanitarian aid hub for the region

■ The UN and other global powers fear that the conflict could spiral into a regional war similar to those of 1996-1997 and 1998-2003

- **M23 Formed in 2012** after the failure of a **2009 peace agreement** between the **DRC government** and **Tutsi-led National Congress for the Defence of the People (CNDP)**.
 - M23 claims to protect **Tutsis** in DRC, while **Democratic Forces for the Liberation of Rwanda (FDLR)** fights for **Hutus**.
 - Hutu-Tutsi conflicts have existed since **Belgian and German colonial rule**, with Tutsis favored in governance.
- **Rwandan Genocide (1994)** was a **mass killing of the Tutsi ethnic group** by **Hutu extremists** in **Rwanda**.
- The DRC supplies **40%** of the world's **Coltan**, used to make **Tantalum** capacitors for electronics due to its **high charge retention**.

Read More: [Conflict in the Democratic Republic of Congo \(DRC\)](#)

4th India-EU Urban Forum

The **4th India-EU Urban Forum**, held in New Delhi has strengthened **India-EU collaboration** on sustainable urban development.

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Note:

India-EU Urban Forum

- **About:**
 - It is a high-level platform for **dialogue and collaboration** between India and the European Union (EU) on **smart and sustainable urbanization**, established as part of the **2017 Joint Declaration on Partnership for Smart and Sustainable Urbanization**.
- **Objective:**
 - It facilitates **discussions among officials, experts, and stakeholders** to exchange best practices, policies, and innovative solutions for sustainable urban development.
- **Focus Areas:**
 - **Urban Alliance & Integrated Approaches, Innovation & Circularity, and Inclusive Urban Mobility.**
 - It aligns with the **EU's Global Gateway Strategy** (for sustainable investments) and **India's urban development missions** (such as **Smart Cities Mission**).
- **Support to India:**
 - Since 2017, Europe has **supported 40+ Indian cities** in **climate-smart development, mobility, waste management, and climate action** and invested over **INR 9000 crores**.

Government Initiatives Related to Urban Areas:

- **Smart Cities**
- **AMRUT Mission**
- **Aspirational Blocks Programme**

Read More: **Revitalizing India's Urban Landscape**

38th National Games

The Union Home Minister addressed the closing ceremony of the **38th National Games** in **Haldwani, Uttarakhand**, highlighting the development in **India's sports infrastructure**.

- The **39th National Games** will be held in **Meghalaya**.
- **About 38th National Games:** It was held from **28th January to 14th February 2025** in Uttarakhand.
 - **Mascot:** The mascot of the games was **Mouli**, inspired by Uttarakhand's state bird, the Monal.
 - **Top Performers:** **Services Sports Control Board (1st)**, **Maharashtra (2nd)**, and **Haryana (3rd)**.

- The **National Games of India** is an **Olympic-style multi-sport event** where athletes from **states and Union Territories** compete for medals.
- **India's sports budget** grew from **Rs 800 crore in 2014 to Rs 3,800 crore by 2025-26**.
- India aims to host the **Olympic Games in 2036**, with athletes already preparing for success through the **TOPS (Target Olympic Podium Scheme)**.

Read More: **National Sports Day 2024 and RESET Programme**

Konda Veduru Bamboo in the Godavari Valley

The **Konda Veduru bamboo variety** (*Dendrocalamus strictus*), often referred to as the '**Green Gold**', plays a significant role in the cultural, nutritional, and economic practices of the **Konda Reddi tribe**.

- **Konda Veduru Bamboo:** Native to the **Eastern Ghats**, primarily found in the Godavari river valley (spreads across **Andhra Pradesh, Telangana, Odisha and Chhattisgarh**).
 - Konda Veduru bamboo shoots is a staple food for the Konda Reddi tribe. Known for its nutritional benefits, rich in proteins, amino acids, vitamins, and iron, with **women traditionally harvesting the Bamboo shoots**.
- **Konda Reddi Tribe:** The Konda Reddis, a **Particularly Vulnerable Tribal Group** in Andhra Pradesh, follow **Folk Hinduism** (worship of local deities, household deities).
 - The family structure is **patriarchal and patrilocal**, with socially accepted marriage practices such as love and exchange.
 - Governed by a **Kula Panchayat** and led by **hereditary headmen**, their livelihood relies on shifting cultivation.

Read more: **Konda Reddy Tribe**

Gangasagar Mela

Rising Sea Levels threatens **Gangasagar Mela** on **Sagar Island in West Bengal**, highlighting the intersection of **climate change and pilgrimage**.

- **Gangasagar Mela:** It is the world's second-largest human congregation, after the **Kumbh Mela**, held at the confluence of the holy river **Ganga and the Bay of Bengal**, celebrated on the eve of **Makar Sankranti**.

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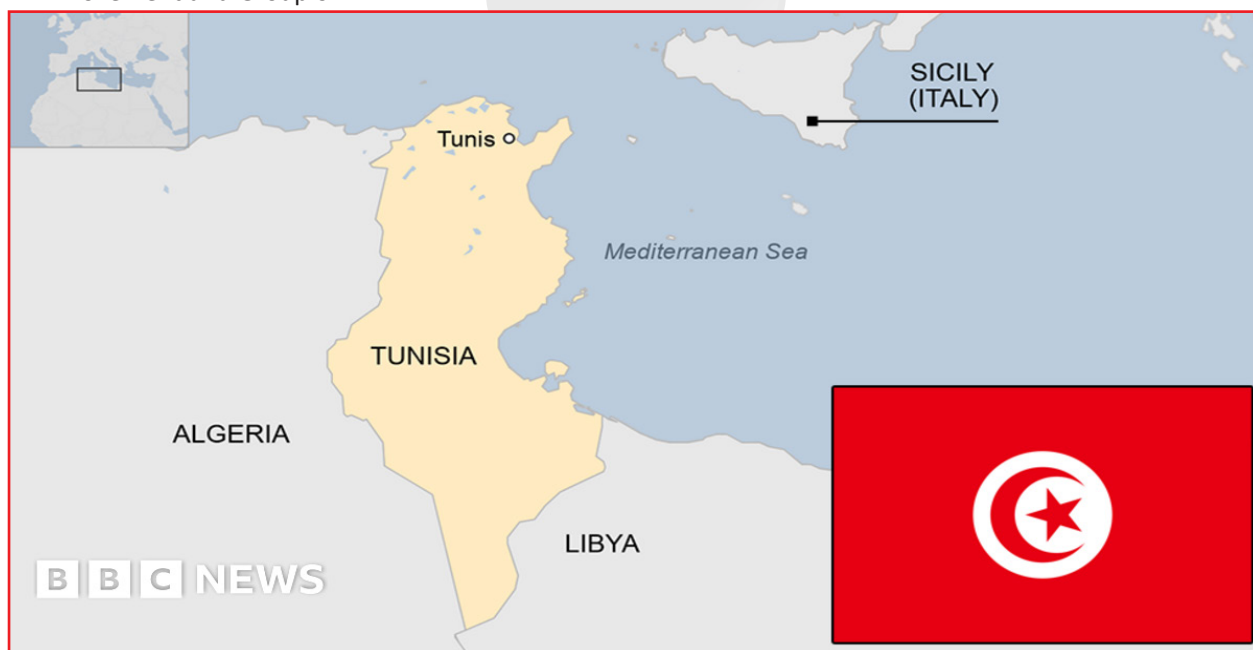
- **Sagar Island:** Also known as *Ganga Sagar or Sagardwip*, Sagar Island is located about 120 km from Kolkata and is the **largest in the Sundarbans archipelago**, with a population of around two lakh (2011 Census).
 - Classified under the **sand group category**, it is accessed by crossing the **Muriganga River**.
- **Impact of Climate Change:** **Rising sea levels** and **soil erosion** threaten the **Kapil Muni temple** (once a central site of the mela), with the **sea encroaching closer**.
 - **Mangrove destruction** for construction for mela worsens exposure to tidal surges, highlighting the need for natural barriers.

Read more: [Right to Protection from Climate Change Impacts](#)

Anti-Migrant Sentiment in Tunisia

The growing **anti-migrant sentiment in Tunisia** has severely impacted **sub-Saharan migrants**.

- **Anti-migrant rhetoric:** Tunisia's President Kais Saied labeled **sub-Saharan migrants** a “**demographic threat**” in **2023**, triggering a surge in racially motivated attacks and discrimination.
 - The **UN Refugee Agency** halted asylum applications due to government pressure, leaving migrants vulnerable.
- **Tunisia:**
 - **Location:** Northernmost country in **Africa**, bordering the **Mediterranean Sea**, between **Algeria and Libya**.
 - **Capital :** Tunis
 - **Ethnic groups:** Arab 98%, European 1%, Jewish and other 1%.
 - **Economy:** Lower middle-income, high unemployment, especially for youth and women.
 - **Terrorism:** **Islamic State of Iraq and ash-Sham (ISIS)** network in Tunisia (known locally as **Ajnad al-Khilafah** or the **Army of the Caliphate**).
 - **International Relations:** Member of UN, **Organisation of Islamic Cooperation**, African Union, Non-Aligned Movement and Group of 77.



Read more: [Power Grab in Tunisia](#)



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