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ENVIRONMENT, ECOLOGY & GEOGRAPHY

Volume - II

Current Affairs for Prelims 2026

(OCTOBER 2025- JANUARY 2026)

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PREFACE

Concise Prelims Current Affairs 2026

Current Affairs-Sine QuaNon of UPSC Preparation

Proficiency in Current affairs is sine non qua for UPSC preparation. It is the basic foundation of any aspirant 's preparation. Knowledge and skill to relate current news with UPSC syllabus is quintessential part of the preparation.

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Wild Elephant Census 2025

Why in News?

The **Synchronous All India Elephant Estimation (SAIEE) 2021-25** reports India's elephant population at **22,446**, an 18% decline from 2017. Western Ghats remain the primary habitat, with threats including habitat loss, fragmentation, mining, and human-elephant conflict.

Description:

- **Conducted by:** Ministry of Environment, Forest and Climate Change (MoEFCC)
- **Implemented by:** Project Elephant & Wildlife Institute of India (WII)
- **Type:** India's **first-ever DNA-based elephant census** under **Synchronous All-India Elephant Estimation (SAIEE 2021–25)**.
- **Result:** 22,446 wild elephants estimated — **18% decline** from 2017 (27,312).
- **Note:** Figures **not directly comparable** with 2017 due to new methodology (genetic mark–recapture model).

Ecological & Cultural Significance:

- Elephants = **Keystone species** — vital for maintaining forest ecosystem health.
- Culturally revered as **symbols of wisdom, strength, and prosperity**.
- India hosts **~60% of global Asian elephant population** — crucial to global conservation.

Habitat & Distribution:

Four major elephant landscapes:

1. **Western Ghats** – 11,934 elephants (largest stronghold)
2. **North Eastern Hills & Brahmaputra floodplains** – 6,559
3. **Shivalik Hills & Gangetic plains** – 2,062
4. **Central India & Eastern Ghats** – 1,891

Top States:

- Karnataka (6,013)
- Assam (4,159)
- Tamil Nadu (3,136)
- Kerala (2,785)
- Uttarakhand (1,792)
- Odisha (912)

Major Threats:

- **Habitat fragmentation** – agriculture, mining, infrastructure.
- **Human-elephant conflict** – deaths & crop damage.
- **Poaching** for ivory.
- **Disrupted migration corridors** – due to railways, highways, and fences.
- **Invasive species** degrading forest undergrowth.

DNA-Based Census – Methodology:

- 21,000+ dung samples collected from 20 states.
- DNA extracted → 4,065 unique elephants identified.
- Used **Genetic Mark–Recapture Model** (non-invasive & statistically robust).
- Covered **6.7 lakh km forest trails** and **3.1 lakh dung plots**.

Conservation & Legal Status:

- **IUCN Status:** Endangered
- **Wildlife (Protection) Act, 1972:** Schedule I
- **CITES:** Appendix I (ban on trade)

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Conservation Initiatives:

- **Project Elephant (1992):** Long-term conservation & habitat management.
- **Elephant Corridors Programme:** 101 critical corridors identified.
- **Gaj Yatra Campaign:** Awareness on coexistence.
- **Tech-based monitoring:** Satellite mapping, M-Stripes app, camera traps.
- **Upcoming: Project Elephant 2.0** – integrates genetic, spatial & ecological data.

Significance of SAIEE 2025:

- Establishes **scientific baseline** for future monitoring.
- Enhances **accuracy & reproducibility** of population estimates.
- Provides **policy basis** for improved corridor protection & conflict mitigation.

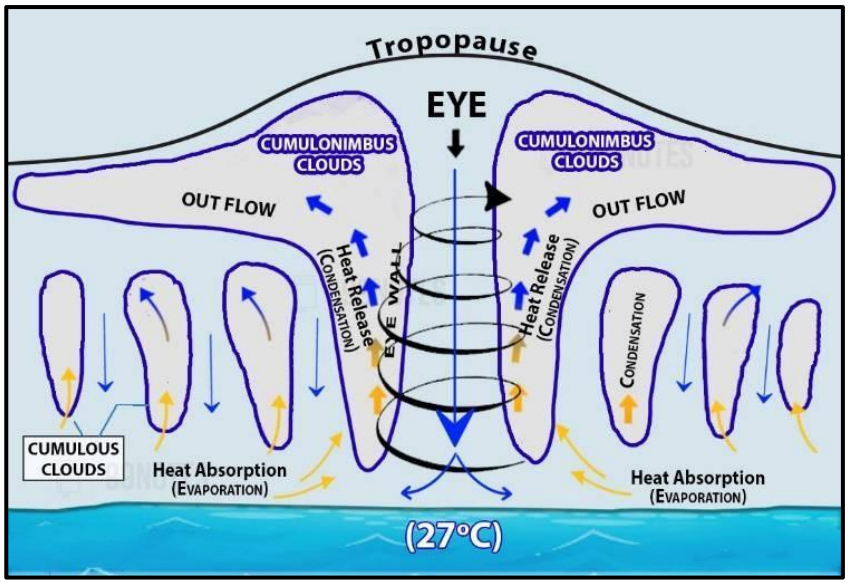
Climate Change and its Impact on Tropical Cyclones over the Bay of Bengal

Why in News?

Experts have linked the **increasing frequency and intensity of cyclones** over the **Bay of Bengal** to a **0.5°C–1°C rise in sea surface temperatures** over the past 50 years, driven by **global warming, La Niña, and Indian Ocean Dipole** effects.

Description:

- **Tropical Cyclones:**
  - Intense low-pressure systems forming over warm ocean waters (SST ⩾ 26.5°C).
  - Energy derived from **latent heat of condensation.**
  - Classified by IMD as *Cyclonic Storm, Severe Cyclonic Storm, Very Severe Cyclonic Storm,* etc.
  - The **Bay of Bengal** accounts for **~75% of India's cyclones**, while the Arabian Sea sees fewer but rising numbers recently.
- **Conditions Favouring Cyclone Formation:**
  - Warm sea surface temperature (>26.5°C).
  - High humidity and unstable atmosphere.
  - Low vertical wind shear.
  - Coriolis force (absent near the Equator).
  - Pre-existing low-pressure disturbance.
- **Indian Ocean Dipole (IOD):**
  - Difference in SST between western (near Africa) and eastern (near Indonesia) Indian Ocean.
  - **Positive IOD** → Warmer west, cooler east → enhances convection over Arabian Sea and Bay of Bengal.
- **La Niña Effect:** Strengthens easterly trade winds and increases moisture convergence over the Bay of Bengal — favourable for cyclone formation.
- **Recent Cyclones:** *Hudhud (2014), Titli (2018), Michaung (2023), Montha (2025)* — marked by high intensity and heavy rainfall.
- **Mitigation Measures:**
  - Coastal ecosystem restoration (mangroves, wetlands).
  - Improved early warning systems and NDRF preparedness.
  - Implementation of National Cyclone Risk Mitigation Project (NCRMP).



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Sundarbans Aquaculture Model Wins FAO Global Recognition

Why in News?

The **Sustainable Aquaculture in Mangrove Ecosystems (SAIME)** model by NEWS in the Sundarbans received **Global Technical Recognition** from FAO for climate-adaptive, conservation-linked, and livelihood-supporting aquaculture.

Description:

The **Sustainable Aquaculture in Mangrove Ecosystems (SAIME)** model, developed by the **Nature Environment and Wildlife Society (NEWS)**, has been awarded **Global Technical Recognition** by the **Food and Agriculture Organization (FAO)** of the United Nations.

- **Event:** FAO's 80th Anniversary Celebrations & World Food Forum
- **Venue:** Rome, Italy
- **Date of Recognition:** October 15, 2025

About the SAIME Model:

- **Location:** Indian Sundarbans, West Bengal
- **Developed by:** Nature Environment and Wildlife Society (NEWS), an NGO
- **Objective:** To integrate **mangrove conservation** with **sustainable aquaculture** for climate-resilient livelihoods.

Key Features:

- Promotes **ecosystem-based, climate-adaptive,** and **conservation-linked livelihoods.**
- Ensures **5%–30% mangrove coverage** in aquaculture ponds.
- Implemented across **~29.84 hectares** by **42 fish farmers.**
- Farmers' **annual net profit increased by over 100%,** primarily due to lower production costs.
- Uses **mangrove litter** as fodder in **Black Tiger Shrimp (Penaeus monodon)** aquaculture.
- Encourages **chemical-free shrimp farming** and **community participation.**

Significance:

- Enhances **coastal resilience** against **sea-level rise.**
- Contributes to **carbon sequestration** and **climate action.**
- Balances **livelihood security** with **mangrove ecosystem conservation.**
- Addresses the negative impacts of **unsustainable shrimp farming** in the Sundarbans.

Sawalkote Hydropower Project

Why in News?

The Sawalkote hydropower project on the Chenab in J&K received fresh environmental clearance, becoming the first major Indus River project approved post-India's Indus Waters Treaty suspension. It will generate 1,856 MW, costing ₹2,31,380 crore, highlighting strategic and energy significance.

Description:

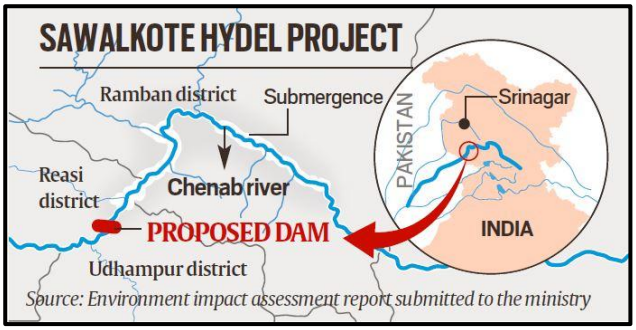
- Located in **Ramban district, Jammu & Kashmir.**
- Situated on the **Chenab River**, one of the **western rivers** under the **Indus Waters Treaty (IWT).**
- **Capacity:** 1,856 MW – one of the **largest hydroelectric projects** in India.
- **Type: Run-of-the-river project** – uses natural river flow with minimal storage.
- **Initiated:** In **1984**, but delayed for several decades.
- Being **fast-tracked (2025)** after the **Pahalgam terror attack** and **suspension of IWT.**
- Expected to generate **over 7,000 million units (MU)** of electricity annually.
- Involves construction of a **concrete gravity dam** with a reservoir.
- Declared a **project of national importance** due to energy and strategic value.

Strategic Importance:

- Enhances **India's control over western rivers** (Indus, Jhelum, Chenab).
- Strengthens **energy security** and **hydropower capacity** in J&K.
- Part of India's **strategic response** after suspension of IWT.
- Helps **optimize water utilization** from rivers allocated to Pakistan under IWT.

Other Chenab River Projects:

- **Dulhasti Project** – 390 MW (Kishtwar)
- **Baglihar Project** – 890 MW (Ramban)
- **Salal Project** – 690 MW (Reasi)



Indus Waters Treaty (1960):

- Signed in **Karachi**, mediated by the **World Bank.**
- Allocated **Eastern Rivers** – Ravi, Beas, Sutlej → **India.**
- Allocated **Western Rivers** – Indus, Jhelum, Chenab → **Pakistan** (≈ 80% of water).
- India allowed **non-consumptive use** – hydroelectricity, navigation, irrigation (limited).

National Disaster Response Force (NDRF)

Why in News?

Ahead of **Cyclone Montha's landfall**, the **National Disaster Response Force (NDRF)** deployed **25 teams** across **Andhra Pradesh, Tamil Nadu, Odisha, Chhattisgarh, and Puducherry**, with **20 teams on standby**, to conduct **evacuation, rescue, and relief operations** in coordination with local authorities.

Description:

- Established under **Section 44 of the Disaster Management Act, 2005.**
- Came into existence in **2006** as India's **specialized disaster response force.**
- Functions under the **Ministry of Home Affairs (MHA).**
- Headed by a **Director General (DG).**

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Composition:
- Initially raised with **8 battalions**, later expanded to **16 battalions**.
- Battalions drawn from **Central Armed Police Forces (CAPFs) – BSF, CRPF, CISF, ITBP, SSB, and Assam Rifles.**
- Each battalion consists of **1,149 personnel** trained for multi-hazard response.

Mandate & Role:
- Aims to provide a **specialized response** to both **natural and man-made disasters.**
- Capable of dealing with: **Floods, cyclones, earthquakes, landslides, building collapses, industrial and nuclear accidents, train/road accidents, and CBRN emergencies** (Chemical, Biological, Radiological & Nuclear).
- Focus on **"proactive deployment"** and **"pre-positioning"** in disaster-prone areas to minimize loss of life and property.
- Also involved in **capacity building, community awareness**, and **mock drills.**

International Operations:
- Responded during major international disasters:
  - **Fukushima (Japan, 2011):** Triple disaster – Earthquake, Tsunami & Radiation leak.
  - **Nepal Earthquake (2015).**
- Participates in **multilateral and bilateral disaster cooperation** efforts.

Training & Coordination:
- NDRF personnel undergo **rigorous multi-hazard training** and simulation exercises.
- Works in coordination with **NDMA, State Disaster Response Forces (SDRFs)**, and **local administration.**
- Ensures synergy among stakeholders during disaster management.

Significance:
- Only dedicated **disaster response force** in the world operating under a legal mandate.
- Credited for **rapid rescue, relief, and rehabilitation** during disasters in India and abroad.
- Plays a key role in implementing India's **disaster risk reduction strategy** aligned with the **Sendai Framework (2015–2030).**

Wildlife Trust of India (WTI)

Why in News:

The Wildlife Trust of India (WTI) released a report highlighting the crucial role, challenges, and sacrifices of India's forest protectors, or Van Rakshaks, over 25 years, emphasizing the need for greater support, recognition, and investment in frontline forest staff.

Description:
- **Type:** Indian **Non-Governmental Organisation (NGO)**
- **Established:** 1998
- **Headquarters:** Noida, Uttar Pradesh
- **Motto:** *"In Service of Nature"*
- **Focus:** Conservation of wildlife and its habitat; welfare of individual wild animals.

Mission:
- To **conserve wildlife and its habitat** across India.
- To **work for the welfare of individual wild animals.**
- To achieve these goals **in partnership with communities and governments.**

Key Conservation Contributions:
- Recovery of **critically endangered species** (e.g., Asiatic elephant, Great Indian bustard, and Gangetic dolphin).

- Successful **translocation of species** (e.g., rhinos in Assam).
- **Rescue and rehabilitation** of injured or displaced wild animals.
- **Conflict mitigation** between humans and wildlife.
- Support to **forest guards and frontline staff** through training and welfare schemes.
- Promotion of **wildlife corridors** and **habitat connectivity**.

Major Programmes / Initiatives:

- **Wildlife Rescue and Rehabilitation Program**
- **Right of Passage – Elephant Corridor Project**
- **Wild Aid (anti-poaching support)**
- **Crash (Rhino conservation)**
- **Whale Shark Conservation Project (Gujarat coast)**
- **Green Corridor Champions** initiative for wildlife connectivity

Institutional Support:

- Supported by:
  - **Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India**
  - **Ministry of Social Justice & Empowerment, Government of India**
  - Various **State Forest and Wildlife Departments**
  - **Corporate CSR partners** and **international conservation bodies** (like IUCN).

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Navi Mumbai International Airport (NMIA)

Why in News:

On **8 October 2025**, **PM Narendra Modi inaugurated Phase 1 of Navi Mumbai International Airport** and **Phase 2B of Mumbai Metro Line-3**, highlighting their role in infrastructure growth, employment generation, and the vision of **Viksit Bharat**.

Description:

Type: Greenfield Airport

Location: Ulwe, Navi Mumbai (≈37 km from South Mumbai)

Inaugurated by: PM Narendra Modi (Oct 8, 2025)

Developer:

- *Navi Mumbai International Airport Ltd (NMIAL)* – Joint venture between
  - Adani Airports Holdings Ltd – 74%
  - CIDCO – 26%

Phase 1 Details:

- Capacity: 20 million passengers annually
- Terminal area: 2,34,000 sq. m
- Runway: 3,700 m long (Code F – for large aircraft)
- 42 aircraft stands (29 contact + 13 remote)
- Investment: ₹20,000 crore (Phase 1); ₹30,000 crore (Phase 2 planned)

Design:

- Designed by *Zaha Hadid Architects*
- Inspired by the *lotus flower* – 12 sculptural columns & 17 mega-columns

Connectivity:

- *Road:* Mumbai Trans Harbour Link, Sion-Panvel Highway, Ulwe Coastal Road
- *Metro:* Navi Mumbai Metro Line 1 (operational), Line 8 (planned – connects NMIA to CSMIA)
- *Other modes:* Suburban rail, water taxi, and proposed high-speed train

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Operations:
- Flights likely from Dec 2025 (8 AM–8 PM initially)
- IndiGo, Akasa Air, and Air India Express to begin operations

Technology & Features:
- 5G-enabled smart airport with IoT integration
- *Digi Yatra* for contactless boarding
- *ILS Category II* – landings at 300 m visibility
- Automated baggage tracking (aviio app)

Sustainability:
- 47 MW solar power
- Rainwater harvesting, EVs, wastewater recycling
- Automated People Mover (planned by Phase 3)

Cargo:
- Phase 1: 0.5 million tonnes capacity
- Full capacity: 3.2 million tonnes
- 7 freighter stands, 49 truck bays

Final Capacity (Full Project):
- 4 terminals, 2 runways
- 90 million passengers per annum

Significance:
- India's *first truly multimodal airport*
- Decongests Mumbai's existing airport (CSMIA)
- Boosts logistics & regional economic growth

Cyclone Montha

Why in News:

The India Meteorological Department (IMD) issued **red and orange alerts** for 23 districts of **Andhra Pradesh** as **Cyclone Montha** intensified over the Bay of Bengal, expected to make landfall near **Kakinada**, prompting high-level preparedness and deployment of NDRF/SDRF teams.

Description:

Name Origin: "Montha" was suggested by **Myanmar** under the **World Meteorological Organization's rotating list** for North Indian Ocean cyclones.

- **Nature:** Expected to intensify into a **Severe Cyclonic Storm (SCS)** with wind speeds **80–100 km/h**, gusting to **110 km/h**.
- **Location:** Over **southeast Bay of Bengal**, moving **west-northwestward**.
- **Forecast Path:** Likely to approach the **Andhra Pradesh coast**, affecting **Tamil Nadu**, **Odisha**, and possibly **West Bengal** and **Jharkhand**.
- **Seasonal Pattern:** Forms part of the **post-monsoon cyclone season (October–December)** — when the **Bay of Bengal** sees nearly **70% of India's cyclonic activity.**

IMD Alert Classification:
- **Green:** No warning
- **Yellow:** Be updated — moderate rain/wind expected
- **Orange:** Be prepared — very heavy rain (115.6–204.4 mm) and winds (62–88 km/h)
- **Red:** Take action — extremely heavy rainfall (>204.4 mm) and damaging winds

Indian Meteorological Department (IMD):

- **Established:** 1875
- **Under:** Ministry of Earth Sciences (MoES)
- **Headquarters:** New Delhi
- **Functions:** Weather forecasting, meteorological data analysis, and issuing warnings for natural hazards including cyclones, monsoons, and heatwaves.
- **Cyclone Monitoring Centres:** Chennai, Kolkata, Mumbai, Ahmedabad, and New Delhi.
- **RSMC, New Delhi:** The **Regional Specialized Meteorological Centre** issues official cyclone advisories for the **North Indian Ocean region** to WMO members.

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Greenhouse Gas Emission Intensity (GEI) Target Rules, 2025

Why in News?

The government has notified its first legally binding emission reduction targets for four high-emission sectors—aluminium, cement, chlor-alkali, and pulp & paper—under the Greenhouse Gas Emission Intensity (GEI) Rules, 2025. Non-compliant industries must buy carbon credits, advancing India's Paris Agreement commitments and domestic carbon trading.

Description:

Objective:

- To legally mandate carbon emission reduction targets for high-emission sectors.
- Facilitate India's climate commitments under the **Paris Agreement (2015).**
- Integrate with India's **Carbon Credit Trading Scheme (CCTS)** for a domestic carbon market.

Sectors Covered:

1. Cement (186 units)
2. Aluminium (13 units)
3. Chlor-alkali (30 units)
4. Pulp & Paper (53 units) **Total:** 282 industrial units.

Key Provisions:

- **Emission Intensity:** Measured in **tCO_2e** (tonnes of CO_2 equivalent) per unit of product output.
- **Compliance Period:** 2 years (2025-26 and 2026-27).
- Industries achieving reductions earn **carbon credits**, tradeable under the domestic carbon market.
- Industries failing to meet targets must **purchase carbon credits** to offset shortfalls.
- **Enforcement:** Central Pollution Control Board can impose **environmental compensation** for non-compliance.

Reduction Targets:

- Modest reductions in first year: ~2–3%
- By second year: up to 7.5%
- Example: Cement sector – 4.7–7.6%; Pulp & Paper – up to 15%.

Significance:

- First **legally binding emission reduction targets** in India.
- Strengthens domestic carbon market under **CCTS.**
- Supports India's goal to reduce **emission intensity of GDP by 45% by 2030** (2005 baseline).
- Builds on the earlier **PAT (Perform, Achieve, Trade) scheme** (2012), now with a trading framework.

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GRADED RESPONSE ACTION PLAN (GRAP)

Why in News?

Delhi's air quality plunged to the 'severe' category with an AQI of 428, prompting the CAQM to enforce **Stage III of the Graded Response Action Plan (GRAP)**. This led to a **ban on construction, demolition, and certain vehicles**, and **classes up to grade 5 shifting to hybrid mode**.

Description:

- **What:** Framework to control **air pollution in Delhi-NCR** through graded, pre-planned actions.
- **Launched: 2017**, under the **Environment (Protection) Act, 1986**, following Supreme Court directions (*M.C. Mehta case*).
- **Implemented by: Commission for Air Quality Management (CAQM)** in NCR and adjoining areas.
- **Nodal Ministry: Ministry of Environment, Forest and Climate Change (MoEFCC).**
- **Operational Body:** Sub-committee under CAQM including members from **CPCB, IMD, IITM**, and State Pollution Control Boards.
- **Trigger:** Activated based on **Air Quality Index (AQI)** levels in Delhi-NCR.
- **Purpose:** To ensure **timely, coordinated action** among agencies to curb pollution peaks, especially during **winter**.
- **CAQM's Authority:** Its directions **override state government orders** in case of conflict.
- **AQI Categories:**

Health Statements for AQI Categories

AQI	Category	Color Code	Possible Health Impacts
0-50	Good		Minimal Impact
51-100	Satisfactory		Minor breathing discomfort to sensitive people
101-200	Moderate		Breathing discomfort to the people with lungs, asthma and heart diseases
201-300	Poor		Breathing discomfort to most people on prolonged exposure
301-400	Very Poor		Respiratory illness on prolonged exposure
401-500	Severe		Affects healthy people and seriously impacts those with existing diseases

Emission Gap Report

Why in News?

According to the **Global Carbon Project**, India's carbon emissions are projected to rise **1.4% in 2025**, slower than the **4% increase in 2024**. The moderation is attributed to a favourable monsoon reducing cooling demand and strong growth in renewable energy.

Description:

Publisher- Released annually by the **United Nations Environment Programme (UNEP).**

Purpose

- Assesses the **gap** between:
  - **Projected global emissions** under current policies & NDCs
    vs.
  - **Emissions required** to limit warming to **1.5°C or 2°C** under the **Paris Agreement.**

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Focus Areas:

- Evaluates:
  - Nationally Determined Contributions (**NDCs**)
  - Emission trajectories
  - Policy effectiveness
  - Required emission reduction pathways

What the "Gap" Means?

- The difference between:
  - What countries **have committed** to (NDCs)
  - What is **scientifically needed** to meet temperature goals

Scope of Assessment:

- Covers emissions from:
  - **Energy sector**
  - **Industry**
  - **Transport**
  - **Agriculture**
  - **Forestry & land-use change**
  - **Methane & non-CO_2 gases**

Relation to Paris Agreement:

- Helps track progress toward:
  - **1.5°C target**
  - **"Well-below 2°C" target**
- Uses IPCC-based pathways for comparison.

G20 Focus (Static Concept):

- G20 countries contribute the **major share** of global emissions.
- The report always highlights their mitigation role.

Climate Risk Index (CRI) 2026

Why in News?

The Germanwatch **Climate Risk Index 2026** ranked India **9th** among countries worst affected by climate-related disasters over the last 30 years. India recorded **80,000 deaths, 430 extreme events**, and **USD 170 billion losses**, reflecting high climate vulnerability despite improving resilience.

Description:

- Published by **Germanwatch** (annual since **2006**).
- Measures **human & economic impacts** of extreme weather.
- Data sources: **EM-DAT, World Bank, IMF.**

India's Position:

- **Long-term (1995–2024): Rank 9** (improved from earlier Rank 8).
- **Year 2024 Rank: 15.**
- **3rd most affected population in 2024** (after Bangladesh, Philippines).
- **30-year impacts on India:**
  - **430+ extreme events**
  - **80,000 deaths**
  - **1.3 billion people affected**
  - **Economic loss: USD 170 billion**
  - **Annual average loss: USD 5.6 billion**

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Global Findings (1995–2024):

- 9,700+ extreme weather events.
- 832,000+ deaths globally.
- Economic losses: USD 4.5 trillion.
- Most affected (long-term): Dominica, Myanmar, Honduras.

Why India Is Highly Vulnerable:

- High dependence on monsoon system.
- Large population → high exposure.
- Back-to-back extreme events → limited recovery time.
- Major drivers: floods, heatwaves, cyclones.

Science & Impacts:

- 600+ studies: Climate change worsened 74% of extreme events.
- Damage distribution:
  - Floods + storms → 58% monetary losses
  - Heatwaves + storms → 2/3 deaths
  - Floods → 50% of people affected

Adaptation & Mitigation Gaps:

- 62 countries submitted National Adaptation Plans (NAPs).
- Weak implementation due to poor financing.
- Developing countries need USD 130–415 bn/year by 2030.
- Adaptation Fund (2024): USD 130 mn (target: 300 mn).

Loss & Damage:

- Global need by 2050: USD 1.1–1.7 trillion/year.
- Fund for Responding to Loss and Damage (FRLD) launched at COP30 (2025).
- First call: USD 250 mn.
- Pledges: USD 788 mn.
- Actual transfers: < USD 400 mn.

Policy Imperatives (CRI Recommendations):

- Rapid emissions cuts to stay below 1.5°C.
- Reform NCQG → target USD 300 bn by 2035.
- Shift from planning → implementation of NAPs.
- Mobilise private sector financing: USD 50 bn/year.

Semeru Erupts – What Causes Volcanic Eruptions?

Why in News / Context?

- Mount Semeru, one of the most active stratovolcanoes of Indonesia, erupted, spewing hot ash clouds, debris, and tephra.
- It is part of Indonesia's 120 active volcanoes, located along the Pacific Ring of Fire.

About Mount Semeru:

- Location: East Java, Indonesia.
- Type: Stratovolcano (Composite Volcano) → high viscosity, highly explosive.
- Tectonic Setting: Convergent Plate Boundary – Indo-Australian Plate subducting under the Sunda Plate.

Why Volcanoes Erupt?

- Extremely high temperatures inside Earth melt rocks → magma forms.
- Being less dense, magma rises and accumulates in magma chambers.
- Pressure builds → eruptions release lava, gases, ash, and pyroclasts.

Space for Notes:

Why Some Eruptions Are More Explosive?

Eruptive power depends mainly on **the viscosity of magma** and **gas content.**

Low-viscosity magma:

- **Runny / fluid**
- Gases escape easily → **gentle, effusive eruptions**
- Found in **shield volcanoes** (Hawaii)

High-viscosity magma:

- **Thick, sticky**
- Traps gases → pressure buildup → **violent, explosive eruptions**
- Produces **pyroclastic flows, tephra, and large ash clouds**
- Seen in **stratovolcanoes** (like Semeru)

Products of Volcanic Eruptions:

Solids:

- Pyroclastic debris
- Tephra (ash → lapilli → bombs → blocks)

Liquids: Lava (magma reaching the surface)

Gases:

- **Water vapour (H_2O)** – largest share
- **CO_2**
- **Sulphur compounds (SO_2, H_2S)**
- **Nitrogen compounds (NO, NO_2)**
- **Chlorine compounds**

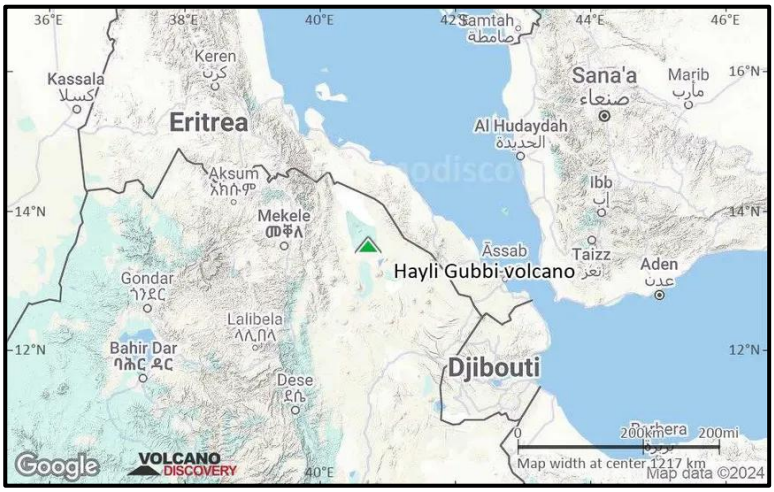
Hayli Gubbi Volcano Eruption – Ethiopia

Why in the News?

- The Hayli Gubbi volcano in Ethiopia's Afar Region erupted after nearly 10,000–12,000 years of dormancy.
- The eruption sent ash plumes up to ~14 km into the sky.
- Ash drifted across the Red Sea → Yemen → Oman and eventually reached parts of India.
- India's DGCA asked airlines to avoid ash-affected routes and altitudes.

Location & Physical Setting:

- Country: Ethiopia
- Region: Afar Region (part of the Afar/Danakil Depression).
- The area is a triple junction where the African, Somali and Arabian plates diverge.
- Hayli Gubbi is the southernmost part of the Erta Ale volcanic range.



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Key Facts about Hayli Gubbi Volcano:

- Type: Shield volcano (broad, gentle slopes formed by basaltic lava).
- Dormancy: No eruption for ~10,000 years before 2025.
- Spread of ash: Moved over the Red Sea, Arabian Peninsula, and drifted towards India. Ash first entered India through Rajasthan, spreading into northern & eastern India.

Glossary:

- Shield Volcano: Broad, gently sloping volcano built by free-flowing basaltic lava.
- Dormant Volcano: Has not erupted for a long time but can erupt again.
- Afar / Danakil Depression: One of the world's most tectonically active zones; a rift valley created by diverging plates.

Saranda Forests

Why in News?

The Supreme Court has directed Jharkhand to declare **31,468.25 hectares** of the **Saranda Sal forest** as a **Wildlife Sanctuary**, citing its rich biodiversity and ecological value, while ensuring that tribal rights remain unaffected despite the region's major iron ore mining presence.

Description:

- Located in **West Singhbhum district, Jharkhand**.
- Lies in the **Chota Nagpur Plateau** region.
- Close to the **Jharkhand–Odisha** border.

Name & Meaning- **Saranda** means *"seven hundred hills"*.

Forest Type:

- **Asia's largest contiguous Sal (Shorea robusta) forest**.
- Classified as **Tropical Moist Deciduous Forest**.

Area:

- Approx. **856 sq km**.
- Mostly **Reserved Forest**, remaining **Protected Forest**.

Terrain & Soil:

- Undulating **hilly terrain**.
- **Red loamy, iron-rich soils** typical of plateau areas.
- Numerous seasonal and perennial streams.

Biodiversity:

- Fauna: **Asian elephant, Sloth bear, Four-horned antelope (Chousingha),** Barking deer, Mouse deer, Civets, jungle cats.
- Rich in **birds** and **butterfly** diversity.

Wildlife Corridors: Contains **three major elephant corridors** linking forests of Jharkhand and Odisha.

Floral Diversity:

- Dominated by **Sal** trees.
- Other species: Asan, Jamun, Kusum, Mahua.

Tribal Communities:

- Lies in **Fifth Schedule Area**.

- Home to:
  - **Ho** (major tribe)
  - **Munda**
  - Some **PVTG presence** in the broader region.

Mineral Significance:

- Part of the **Singhbhum–Chaibasa Iron Ore Belt**.
- Rich in: **Iron ore, Manganese,** Minor limestone & quartzite.

Space for Notes:

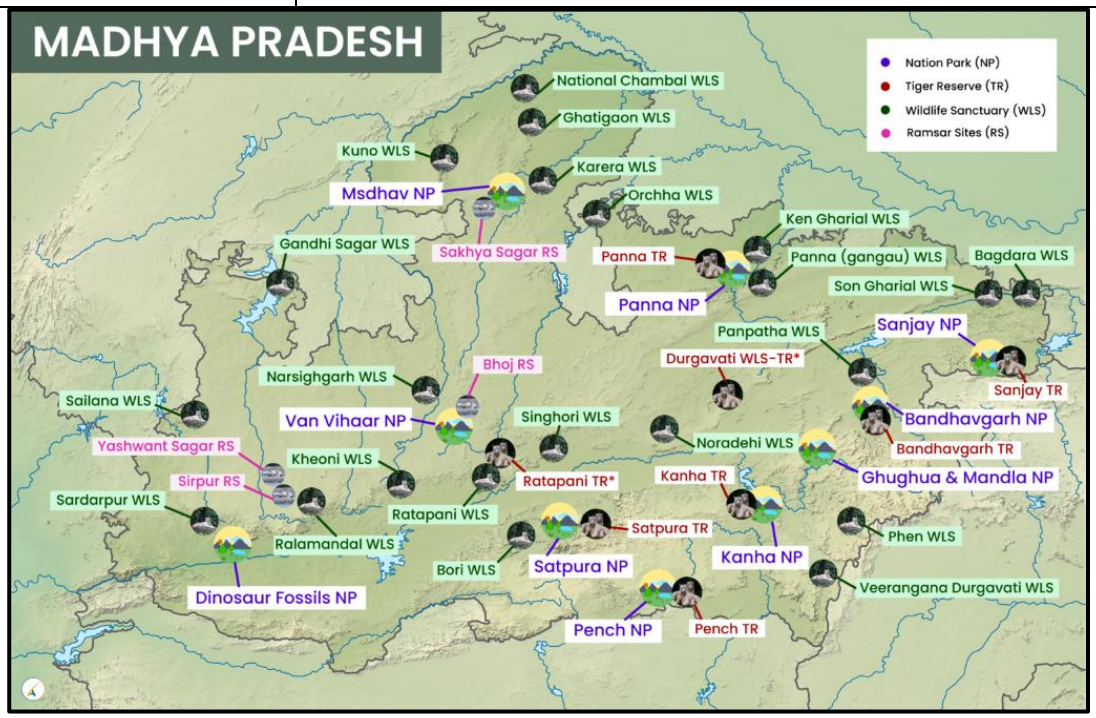
Nauradehi Wildlife Sanctuary

Why in News?

Madhya Pradesh is preparing Nauradehi Wildlife Sanctuary as the third site for cheetah reintroduction after Kuno and Gandhi Sagar. Unlike earlier sites, Nauradehi already has around 25 tigers, making this the first cheetah release in an apex predator inhabited landscape.

Description:

Feature	Details
State	Madhya Pradesh
Declared	1975
Claim to fame	Largest Wildlife Sanctuary in MP
Landscape Type	Upper Vindhyan Plateau
Biogeographic Region	Deccan Peninsula
Forest Type	Tropical Dry Deciduous (Central Indian Monsoon Forests)
River Basins	¾ Yamuna (Ganga) Basin + ¼ Narmada Basin
Major Rivers	Kopra, Bamner, Bearma (tributaries of Ken River)
Key Species	Tiger, Panther, Sloth Bear, Wild Dog, Blue Bull, Chinkara, Sambhar
Corridor Linkage	It acts as a corridor between Panna & Satpura Tiger Reserves. Indirectly links Bandhavgarh (via Rani Durgawati WLS)



Rowmari–Donduwa Wetland Complex: Assam's Potential Second Ramsar Site

Space for Notes:

Why in News?

Conservationists, researchers, and forest officials in Assam have urged the government to declare the **Rowmari–Donduwa Wetland Complex** as a **Ramsar Site**. If approved, it will become **Assam's second Ramsar Site** after **Deepor Beel (2002)** — enhancing the state's global recognition for wetland conservation.

Location and Significance:

- Situated within the **Laokhowa–Burhachapori Wildlife Sanctuary** in the **Kaziranga–Orang landscape**.
- Forms an **interconnected floodplain–marsh system** vital to the **Brahmaputra floodplain ecosystem**.
- Acts as a **connectivity corridor** between **Kaziranga National Park** and **Orang National Park**, ensuring wildlife movement and **genetic diversity**.
- Supports **47,000+ birds from 120 species** (as per the **6th Kaziranga Wetland Bird Census 2025**), surpassing Deepor Beel's count.
- Hosts **globally threatened species** like:
  - *Lesser Adjutant Stork*, *Black-necked Stork*, *Knob-billed Duck*, *Ferruginous Pochard*, and *Common Pochard*.
- Provides **ecosystem services** like flood regulation, groundwater recharge, carbon storage, and eco-livelihoods (fishing, ecotourism).

Ramsar Convention: Key Facts:

- **Adopted:** 1971 (Ramsar, Iran)
- **Objective:** Conservation and wise use of wetlands of international importance.
- **India joined:** 1982
- **Total Indian Ramsar Sites (as of Oct 2025):** 93
- **Largest:** *Sundarbans*
- **Existing Ramsar Sites in Northeast India:**
  1. Deepor Beel – Assam (2002)
  2. Loktak Lake – Manipur (1990)
  3. Rudrasagar Lake – Tripura (2005)
  4. Pala Wetland – Mizoram (2021)

Criteria Fulfilled by Rowmari–Donduwa:

The complex meets **8 of 9 Ramsar criteria**, including:

- Supports endangered species (Criteria 2)
- Maintains biodiversity (Criteria 3)
- Critical for migration/breeding (Criteria 4)
- Supports >20,000 waterbirds (Criteria 5)
- Supports 1% of population of certain species (Criteria 6)
- Important for indigenous fish species (Criteria 7)

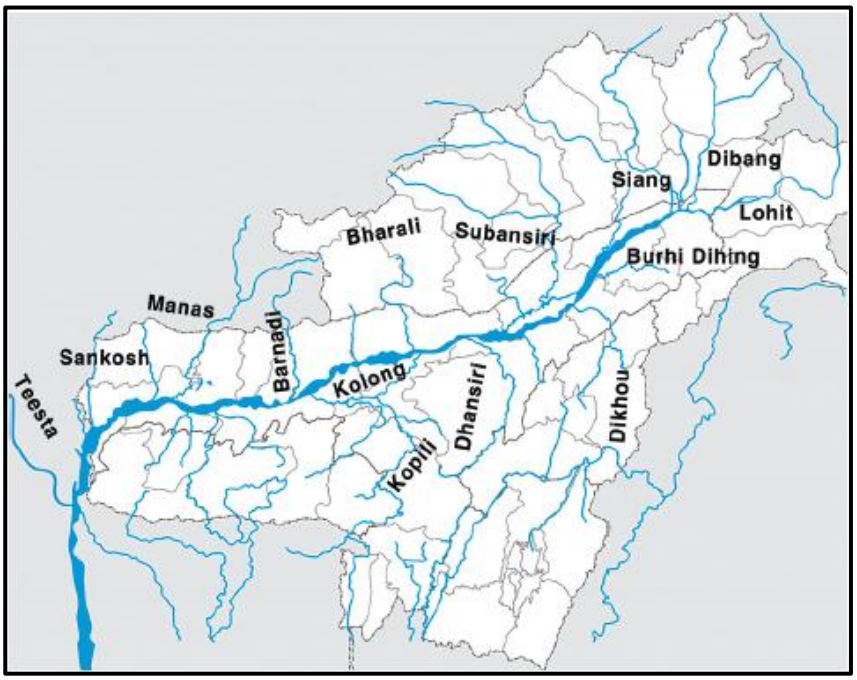
World Wetlands Day 2025:

- **Observed on:** 2 February
- **Theme:** *"Wetlands and Human Well-being"*
- Marks the adoption of the Ramsar Convention (1971).
- Highlights that **wetlands are disappearing 3 times faster than forests** globally.

Importance for Assam:

- Assam has **3,513 wetlands (natural + man-made)** covering about **1.01 lakh hectares**, yet only one Ramsar Site.

- Designation will:
  - Strengthen **Brahmaputra valley wetland management**.
  - Boost **global recognition** and **funding** for conservation.
  - Promote **eco-tourism** and **community livelihoods**.
  - Support **Kaziranga–Orang landscape restoration** and **SDG-15 (Life on Land)**.



Space for Notes:

Project Tiger

Context:

Despite rising tiger numbers under Project Tiger, Madhya Pradesh recorded 55 tiger deaths in 2025—the highest since 1973—mainly due to human-induced causes like electrocution, highlighting enforcement and corridor protection challenges.

Background:

- **Project Tiger** was launched in **1973** to ensure **viable populations of Bengal tigers** in India.
- It focuses on **habitat conservation, anti-poaching,** and **ecosystem preservation.**
- India hosts **over 70% of the world's wild tigers.**

Institutional / Administrative Framework:

- **Nodal Ministry:** Ministry of Environment, Forest and Climate Change (MoEFCC)
- **Statutory authority:** National Tiger Conservation Authority (NTCA)
- **State implementation:** State Forest Departments
- **Tiger reserves notified under:** Wildlife (Protection) Act, 1972
- **Scheme type:** Centrally Sponsored Scheme
- **Funding pattern:**
  - Core areas: **100% Central assistance**
  - Buffer areas: **60:40 (Centre:State)**

Why Is Madhya Pradesh Critical?

- Known as the **"Tiger State of India"**
- Houses major reserves like Bandhavgarh, Kanha, Pench, Satpura
- High density increases **intra-species conflict** and spillover into human landscapes

Space for Notes:

Project Cheetah

Context:

India is finalising permissions to **translocate African cheetahs from Botswana to India** during January–February, as part of **Project Cheetah**, to restore the species after its extinction in India.

What is it?

- **Nature:** World's first intercontinental large wild carnivore translocation project.
- **Objective:** Reintroduction of cheetahs into India after they were declared **extinct** in the country in 1952.
- African Cheetah - **Vulnerable**
- The Asiatic cheetah, **Critically Endangered,** is now found only in Iran, with estimates of the wild population ranging between 30 and 50 individuals.

Institutional / Administrative Framework:

- **Nodal Agency:** National Tiger Conservation Authority (NTCA).
- **International Regulation:** Governed by **CITES** (Convention on International Trade in Endangered Species of Wild Fauna and Flora).

Key Technical Parameters:

- **Population Source:** Botswana holds one of the world's largest wild cheetah populations (est. 1,700–2,000).
- **Current Status:** 8 cheetahs are to be donated by Botswana; 5 are currently in quarantine at Mokolodi Nature Reserve.
- **Timeline:** Expected arrival in India by Jan-Feb 2026.

Indian Sites:

- Kuno National Park (MP), Gandhi Sagar Wildlife Sanctuary (MP)

Significance:

- **Ecological:** Restoring the grassland-savanna biome in India.
- **Diplomatic:** Strengthens South-South cooperation through conservation.

Limitations / Issues:

- **Adaptation:** Challenges regarding "winter coat" synchronization (growing a winter coat in the wrong season) and acclimatization to the Northern Hemisphere.
- **Mortality:** Managing survival rates after previous batches from Namibia and South Africa.

Aravalli Hills

Context:

The Centre failed to finalise a uniform definition of the Aravalli Hills, raising concerns over mining, environmental protection, and compliance with Supreme Court directions.

Why is definition important?

- It determines **Mining restrictions, Environmental clearances** and the **Applicability** of court orders and conservation norms
- Controversy: Allegations that the draft definition would protect **only hills above 100 metres**, leaving large portions open to **mining and degradation**

About the Aravalli Range:

- **Age & Type:** One of the world's oldest fold mountain systems (Proterozoic); part of the Aravalli–Delhi Orogenic Belt of the Indian Shield.

Space for Notes:

- **Orientation & Extent:** Runs south-west to north-east for ~670–700 km from Delhi → Haryana → Rajasthan → Gujarat (near Ahmedabad).
- **Relief:** Discontinuous ridges, hillocks, residual mountains; not a continuous chain.
- **Highest Peak:** Guru Shikhar (1,722 m / 5,650 ft) at Mount Abu — highest point of the Aravallis.
- **Physiographic Role:** Acts as a climatic and hydrological barrier, separating NW arid Thar region from SE comparatively fertile plains.
- **Drainage Divide:** Major watershed —
  - **Western slopes:** Luni–Sabarmati system (inland/Arabian Sea basins)
  - **Eastern slopes:** Chambal–Banas–Berach → Yamuna system
  - Characterised by seasonal rivers and paleochannels.
- **Geology:** Dominated by gneiss, schist, quartzite, marble; heavily eroded over time.
- **Mineral Significance:** Among India's oldest mineral belts — copper, zinc, lead, marble
- **Ecological & Historical Value:**
  - Checks eastward expansion of the Thar Desert
  - Supports wetlands, groundwater recharge, biodiversity
  - Hosts Indus Valley & OCP (Late Harappan) sites along Luni–Sahibi systems.

Cyclone Ditwah

Context:

Cyclone Ditwah, located off Tamil Nadu and Puducherry, weakened into a deep depression. The cyclone's name has highlighted the **WMO/ESCAP system** of naming tropical cyclones in the North Indian Ocean.

Key Terms:

- **Tropical Cyclone:** Intense low-pressure system over tropical oceans with strong winds & heavy rain.
- **RSMC:** Regional Specialised Meteorological Centre (IMD is RSMC for North Indian Ocean).
- **TCWC:** Tropical Cyclone Warning Centre.
- **WMO/ESCAP Panel on Tropical Cyclones (PTC):** Regional body responsible for naming cyclones in this basin.

WMO: World Meteorological Organization

ESCAP: Economic and Social Commission for Asia and the Pacific

About the Naming System:

1. **Who Names Tropical Cyclones?**
   - Cyclones across the world are named by **RSMCs** and **TCWCs** designated by the **WMO**.
     - **RSMC:** Regional Specialised Meteorological Centre (IMD is RSMC for North Indian Ocean).
     - **TCWC:** Tropical Cyclone Warning Centre.
   - For the **North Indian Ocean (Arabian Sea & Bay of Bengal)**, naming is done by: **WMO/ESCAP Panel on Tropical Cyclones (PTC) + IMD (as RSMC New Delhi).**
2. **Origin of the Present Naming System:**
   - In **2000**, eight countries under WMO/ESCAP (Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka, Thailand) decided to begin naming cyclones.
   - Each country submitted name lists; more countries were added later.
   - The Panel finalised a **rotational naming list** used over many years.

3. **Current Members of WMO/ESCAP Panel (13 countries):** Bangladesh, India, Iran, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, UAE, Yemen.

Rules for Naming Tropical Cyclones:

Names proposed by member countries must be:

- **Neutral** to politics, political personalities, cultures, religion, and gender.
- **Short, simple, easy to pronounce.**
- **Not offensive** to any member country.
- **Meaningful** and consistent with the language/culture of the proposing country.
- Once used, the name is **retired** from the list.

NOTE: The name "Ditwah" means "lagoon" and was suggested by Yemen. It specifically refers to the Detwah Lagoon on Socotra Island, Yemen.

Space for Notes:

'Tiger State' status (2025)

Context:

Gujarat regained 'Tiger State' status in 2025 after NTCA confirmed tiger presence in Ratanmahal Wildlife Sanctuary, marking its return to the National Tiger Census after 33 years.

Key Terms:

- **Tiger State**: A state officially recognised as having a **resident** tiger population and included in the National Tiger Census.
- **Resident tiger**: A tiger that has settled in a habitat with sustained presence, not a transient or dispersing individual.
- **Pugmark analysis**: Identification of large carnivores based on footprint morphology.
- **Prey base augmentation**: Measures to increase availability of herbivores essential for sustaining carnivores.

About Ratanmahal Wildlife Sanctuary:

- **Location**: Dahod district, eastern Gujarat
- **Forest type**: Dry deciduous, teak-dominated
- **Ecological significance**: Corridor landscape between Gujarat and Madhya Pradesh
- **Current status**: Wildlife Sanctuary (proposal underway to declare **Tiger Reserve**)
- NTCA confirmed **permanent presence** → Gujarat included in **National Tiger Census**
- Gujarat becomes **India's only state** with **lion, tiger and leopard coexisting in the wild.**

National Tiger Conservation Authority (NTCA):

Aspect	Details
Status	Statutory body under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**
Established	**2006**, under the **Wildlife (Protection) Act, 1972**
Key Objectives	• Provide statutory backing to **Project Tiger** (legal enforceability) • Implement **Project Tiger** as a **Centrally Sponsored Scheme (CSS)** for **in-situ conservation** in Tiger Reserves
Chairperson	Minister in charge of **MoEFCC**
Vice-Chairperson	Minister of State, **MoEFCC**
Members	• Three Members of Parliament • Secretary, MoEFCC • Other expert/official members

Space for Notes:

Rock Eagle Owl

Context:

A stone quarry in Telangana halted operations for nearly 30 days to protect **five eggs of the Rock Eagle Owl (Bubo bengalensis)**, a Schedule I species, after a nest was discovered on a rock ledge.

About Rock Eagle Owl (Indian Eagle Owl):

- **Scientific Name:** *Bubo bengalensis*
- **Large owl species** are native to South Asia.
- **IUCN Status: Least Concern**, but **population is decreasing.**
- **WPA, 1972 Status: Schedule I** (Highest legal protection same protection as tigers, rhinos).
- **Habitat:** Rocky outcrops, scrub forests, cliffs.
- **Characteristics:**
  - Prominent ear tufts.
  - Orange eyes.
  - Excellent camouflage.
  - Nocturnal predator.
  - Incubation Period – **30–35 days**

Why This Species Matters:

- Acts as a **key predator**, controlling rodents and small vertebrates.
- Indicator of **rocky and scrub ecosystem health.**
- Its decline impacts local food chain stability.

Issues & Conservation Concerns:

- Habitat loss from stone quarrying and infrastructure expansion.
- Disturbance from tourism and photography.
- Illegal trapping and superstition-driven killings in parts of India.
- Declining prey base in urbanizing landscapes.

Hornbill Festival

Context:

Nagaland's 26th Hornbill Festival began on December 1, 2025, amid state opposition to the Centre's Protected Area Permit (PAP) regime, which the state says is restricting tourism and investment.

Hornbill Festival (Nagaland):

1. Flagship cultural festival of Nagaland; held annually at Kisama Heritage Village.
2. Organised by the Nagaland Tourism Department; 2025 budget: ₹7 crore.
3. First festival post re-imposition of PAP (Dec 2024) for Nagaland, Manipur, Mizoram.
4. Celebrates the heritage of all major Naga tribes, with events on music, crafts, cuisine, literature and night carnivals.
5. Named after the Hornbill bird, revered in Naga culture for its symbolism of valour and prosperity.

Hornbill (Bird):

1. **Family:** Bucerotidae, found in tropical/subtropical Africa, Asia, Melanesia.
2. **India:** Mostly in Western Ghats and Northeastern states.

Space for Notes:

3. **Diet:** 40–70% fruits → major frugivores; important seed dispersers → called "farmers of the forest".
4. **9 Indian species;** all except the Oriental Pied Hornbill are under WPA Schedule I.
5. **Major species & IUCN status:**
   a. Great Hornbill – **Vulnerable** (State Bird of Arunachal Pradesh & Kerala)
   b. Rufous-necked – **Vulnerable**
   c. Wreathed – **Vulnerable**
   d. Malabar Grey – **Vulnerable**
   e. Malabar Pied – **Near Threatened**
   f. Narcondam Hornbill – **Vulnerable; endemic to Narcondam Island**
6. **Cultural significance:** Central to Naga identity; festival named after it.
7. **Threats:** Habitat loss, illegal logging, hunting for casques, feathers, meat; poaching for "medicinal" use.

Other Relevant Fact:

Pakke Paga Hornbill Festival (Arunachal Pradesh): Community-led conservation festival protecting hornbill species inside Pakke Tiger Reserve.

Corporate Social Responsibility (CSR)

Why in News?

The **Supreme Court of India** held that **corporates have a fundamental duty to protect the environment**, interpreting **Corporate Social Responsibility (CSR)** to inherently include **environmental responsibility.**

Great Indian Bustard:

- Judgment arose from petitions regarding risks to the **Great Indian Bustard (GIB).**
  - One of the **heaviest flying birds in the world**
  - Conservation Status: **IUCN Red List: Critically Endangered**, Wildlife (Protection)Act, 1972: Schedule 1, **CITES: Appendix 1.**
  - Habitat: **Arid and semi-arid grasslands**, mainly in **Rajasthan and Gujarat.**
  - **Distribution:** The species has a current viable population of 100- 150 individuals in India and mainly survives in the Thar Desert of Rajasthan that holds about 100 individuals.

Key Constitutional Provisions:

- **Article 51A(g)** (Fundamental Duty):
  - Duty of every citizen **"to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures."**
- SC extended this duty to **corporate entities (legal persons).**

NATURAL FARMING

Context:

ICAR has urged all State and Central agricultural universities to launch **UG and PG programmes in Natural Farming**, marking the first nationwide institutional push to formalise education and research in this area.

Space for Notes:

Key Terms:

- **Natural Farming (NF):** A chemical-free, ecological farming system relying on on-farm biomass, soil biota, mulching, cow-based inputs, and minimum tillage.
- **ICAR:** India's premier agricultural research body under the Ministry of Agriculture & Farmers' Welfare.
- **Zero Budget Natural Farming (ZBNF):** A popular model of natural farming emphasising low external inputs.
- **Agro-ecology:** Farming practice integrating ecological principles with agriculture.

Natural Farming vs Organic Farming:

Feature	Natural Farming	Organic Farming
Input Source	On-farm, locally prepared bio-inputs (fermented solutions, mulching, cow-based inputs)	External inputs allowed if certified organic (vermicompost, organic fertilisers, biopesticides)
Chemical Use	Zero chemicals	Zero chemicals
Certification	Not mandatory	Mandatory (NPOP, PGS-India)
Cost of Cultivation	Very low	Moderate (due to certified inputs)
Tillage & Mulching	Minimum tillage, heavy mulching	Normal tillage with organic soil amendments

NOTE:

- **NPOP** – National Programme for Organic Production
- **PGS-India** – Participatory Guarantee System–India

Key Features of Natural Farming:

1. **Chemical-free cultivation** – No synthetic fertilisers/pesticides.
2. **Soil biology-centric** – Enhances microbial population through jeevamrit-like formulations (varies by model).
3. **Low-input farming system** – Reduces cost of cultivation.
4. **Emphasis on biodiversity** – multi-story cropping, mixed cropping, intercropping.
5. **Moisture conservation** – Mulching, reduced tillage.
6. **Climate-resilient agriculture** – Reduces emissions and improves soil carbon.

National Improvised Explosive Device Data Management System (NIDMS)

Context:

The Union Home Minister inaugurated **NIDMS**, a national digital platform to systematically collect and analyse IED and bomb blast data to strengthen counter-terror investigations and prevention.

About NIDMS:

- **Full form**: National Improvised Explosive Device Data Management System
- **Nature**: First national **digital database and analytics platform** on IED/bomb blast incidents
- **Coverage**: All IED/bomb blast cases in India **since 1999**

Genesis & Mandate:

- Developed under the **Ministry of Home Affairs (MHA)**.
- Aims to **integrate fragmented data** across States and agencies.
- Mandate includes **standardisation, secure sharing, documentation, and advanced analysis** of blast incidents.

Space for Notes:

Nodal Agency:

- **Nodal agency**: National Security Guard (NSG)
- **Operational unit**: National Bomb Data Centre (NBDC), NSG
- **Location**: Manesar, Haryana

Key Features & Utility:

- **Centralised repository** of IED/bomb blast cases with **uniform data formats.**
- Uses **AI/ML** for pattern and trend analysis.
- **Signature analysis** linking cases by explosive type, circuits/timers, modus operandi, and targeting patterns.
- Enables **post-blast forensic analysis, inter-State case linkage,** and **predictive counter-terror strategies.**
- **Secure, single-window access** for authorised police and security agencies.

Community Forest Resource Management Committees (CFRMCs)

Context:

The Union government is exploring mechanisms to fund **Community Forest Resource Management Committees (CFRMCs)** set up under the **Forest Rights Act (FRA), 2006,** amid coordination issues between the **Ministry of Tribal Affairs** and the **Ministry of Environment, Forest and Climate Change**, as these committees currently lack formal budgetary support.

What is a CFRMC?

- Committee **constituted by the Gram Sabha**
- Mandated to **manage Community Forest Resources (CFRs)**
- Authority derived from **Section 3(1)(i) of the Forest Rights Act, 2006**
- **Not part of the Forest Department hierarchy**
- CFRs cover **customarily used forest landscapes**
- **Gram Sabha is the primary authority** in CFR governance
- CFRMCs **function under Gram Sabha supervision**
- **Over 1 lakh CFR titles** recognised across India

Core Functions of CFRMCs:

- Protection of community forest resources
- Conservation and regeneration of forests
- Regulation of forest access and use
- Sustainable management of **Minor Forest Produce (MFP)**
- Preparation and implementation of **CFR management plans**

Current Issue: Funding of CFRMCs:

Problem:

- CFRMCs have **no dedicated funding mechanism**
- Forest Department working plans are MoEFCC-funded, but **CFR plans are not**
- MoTA issued **CFR management guidelines (2023)** without budgetary backing

Proposal:

- MoEFCC may support **funding of CFRMCs**
- Funds required for: Hiring staff, training communities, Preparing CFR management plans

Forest Rights Act, 2006:

- It recognises **individual and community forest rights** of Scheduled Tribes and Other Traditional Forest Dwellers to correct historical injustice. It empowers **Gram Sabhas** to govern forest resources while integrating **livelihood security with conservation.**

Space for Notes:

India's First Glass Museum

Context:

India's **first-ever Glass Museum** is coming up at **Firozabad (UP)**—the country's glassware hub—to showcase the evolution, craft, and industry of glass beyond bangles.

Key Terms:

- **Churihai nagri:** Nickname of Firozabad, reflecting its bangle-making heritage
- **Glassware cluster:** Concentration of glass-based industries and artisans
- **Experiential museum:** Interactive, learning-focused museum design

About the Glass Museum:

- **Location:** Firozabad district, Uttar Pradesh
- **Status:** Under development
- **Land area:** Over **25,700 sq. m**
- **Facade:** Entirely made of **glass** (iconic architectural design)

Genesis & Purpose:

- To **redefine Firozabad's identity** beyond bangles
- To document and showcase **India's glass-making history**, craftsmanship, and industrial evolution
- To act as a **cultural, educational, and tourism anchor**

Aravalli Range

Context:

The **Supreme Court of India** has proposed constituting a **multi-disciplinary expert committee** to scientifically define the **Aravalli Range** and prepare a roadmap for permissible activities, including regulated mining, under the Court's supervision.

Why is definition important?

- It determines **Mining restrictions, Environmental clearances** and the **Applicability** of court orders and conservation norms
- Controversy: Allegations that the draft definition would protect **only hills above 100 metres**, leaving large portions open to **mining and degradation**

About the Aravalli Range:

- **Age & Type:** One of the world's oldest fold mountain systems (Proterozoic); part of the Aravalli–Delhi Orogenic Belt of the Indian Shield.
- **Orientation & Extent:** Runs south-west to north-east for ~670–700 km from Delhi → Haryana → Rajasthan → Gujarat (near Ahmedabad).
- **Relief:** Discontinuous ridges, hillocks, residual mountains; not a continuous chain.
- **Highest Peak:** Guru Shikhar (1,722 m / 5,650 ft) at Mount Abu — highest point of the Aravallis.
- **Physiographic Role:** Acts as a climatic and hydrological barrier, separating NW arid Thar region from SE comparatively fertile plains.
- **Drainage Divide:** Major watershed —
  - Western slopes: Luni–Sabarmati system (inland/Arabian Sea basins)
  - Eastern slopes: Chambal–Banas–Berach → Yamuna system
  - Characterised by seasonal rivers and paleochannels.
- **Geology:** Dominated by gneiss, schist, quartzite, marble; heavily eroded over time.

- **Mineral Significance:** Among India's oldest mineral belts – copper, zinc, lead, marble
- **Ecological & Historical Value:**
  - Checks eastward expansion of the Thar Desert
  - Supports wetlands, groundwater recharge, biodiversity
  - Hosts Indus Valley & OCP (Late Harappan) sites along Luni–Sahibi systems.

Space for Notes:

Madhav Gadgil

Context:

Renowned ecologist **Madhav Gadgil** (1942–2026) passed away, reviving debates on **people-driven conservation**, Western Ghats protection, and participatory environmental governance.

Who was Madhav Gadgil?

- Eminent **Indian ecologist** and environmental thinker
- Known as the **"people's ecologist"**
- Pioneer of **participatory conservation** and **decentralised environmental governance**
- Strong advocate of integrating **human livelihoods** with ecological protection

Academic & Institutional Contributions:

- Founder of **Centre for Ecological Sciences (CES)**, IISc Bengaluru (1982)
- Former **Director**, Indian Institute of Science (IISc)
- Major works - *Ecology and Equity: The Use and Abuse of Nature in Contemporary India* (1995)

Western Ghats Ecology Expert Panel (WGEEP):

About WGEEP:

- Constituted by the **Ministry of Environment & Forests** (2010)
- Chaired by **Madhav Gadgil**
- Report submitted in **2011**

Key Recommendations:

- Declared entire Western Ghats as **Ecologically Sensitive Area (ESA)**
- Classified Ghats into **ESZ 1, ESZ 2, ESZ 3** based on sensitivity
- ESZ-1 (most sensitive): Ban on mining, thermal power plants, large dams
- Emphasised **bottom-up governance** via Gram Sabhas & Local bodies
- Advocated **people-centric, participatory conservation**

Contributions Beyond Western Ghats:

- Madhav Gadgil's work laid the foundation for ecological research and conservation in the **Nilgiris and Western Ghats.**
- He pioneered **landscape-level, people-centric conservation**, especially for protecting the **Asian elephant habitat.**
- Authored the concept for the **Nilgiris Biosphere Reserve**, India's first UNESCO Man and Biosphere Reserve site.

National Green Tribunal (NGT)

Context:

The **National Green Tribunal** issued a notice to the **Commission for Air Quality Management (CAQM)** and other authorities over alleged violation of construction bans during severe air pollution, highlighting health impacts on vulnerable groups, including a newborn.

About National Green Tribunal (NGT):

- **Nature:** Statutory, specialised **quasi-judicial body**
- **Established under: National Green Tribunal Act, 2010**
- **Purpose:** Expeditious adjudication of **civil cases** relating to environmental protection, forests, and natural resources
- **Global significance:** India is the **3rd country** (after Australia, New Zealand) to establish a dedicated environmental tribunal

Composition & Qualifications:

- **Chairperson:** Supreme Court Judge / Chief Justice of High Court
- **Judicial Members:** Minimum 10 – Maximum 20. SC Judge / HC Judge (serving or retired)
- **Expert Member:** Minimum 10 – Maximum 20. Relevant technical degree + **15 years' experience** (including 5 years practical work in environment/forests)
- *Chairperson may invite subject experts for specific cases*

Appointment & Tenure:

- **Chairperson:** Appointed by Central Government in consultation with **CJI**
- **Members:** Appointed via **Selection Committee**
- **Tenure: 5 years or 65 years**, whichever earlier
- **Reappointment: Not permitted**

Benches:

- **Principal Bench:** New Delhi (Northern Zone)
- **Regional Benches (4):** Bhopal – Central, Pune – Western, Chennai – Southern, Kolkata – Eastern
- **Circuit Benches:** Temporary sittings for wider accessibility (e.g., Bengaluru, Hyderabad)

Jurisdiction & Powers:

- **Covers civil cases** involving "substantial question relating to environment"
- **Natural Justice** (not bound by CPC)
- **Flexible Evidence Rules** (not strictly bound by Evidence Act)
- **Laws under Schedule I:** Water Act, 1974, Water Cess Act, 1977, Forest Conservation Act, 1980, Air Act, 1981, Environment (Protection) Act, 1986, Public Liability Insurance Act, 1991, Biological Diversity Act, 2002

Not empowered under:

- Wildlife Protection Act, 1972
- Forest Rights Act, 2006
- State forest/tree laws

Commission for Air Quality Management (CAQM)

Context:

The **Commission for Air Quality Management (CAQM)** has come under scrutiny by the **National Green Tribunal (NGT)** for enforcement of construction bans and emergency measures during severe air pollution episodes in **Delhi–NCR**, highlighting accountability in air-quality governance.

About CAQM:

- **Nature: Statutory body**
- **Established under: Commission for Air Quality Management in National Capital Region and Adjoining Areas Act, 2021**

Space for Notes:

- **Jurisdiction: Delhi–NCR and adjoining areas** (Haryana, Uttar Pradesh, Rajasthan)
- **Objective:** Coordinated, effective, and sustained management of air quality to prevent, control, and abate air pollution

Composition:

- **Chairperson:** Appointed by the Central Government
- **Members include:** Representatives from Central Ministries. Chief Secretaries / senior officials of Delhi, Haryana, UP, Rajasthan. Experts in air quality, environment, and related fields
- **Ex-officio structure** ensures inter-governmental coordination
- Can issue **binding directions** to State governments, CPCB, SPCBs, and local authorities

Relationship with Other Institutions:

- **Overrides:** State-level pollution control bodies in case of conflict
- **Works with:** CPCB, SPCBs, municipal bodies
- **Subject to Judicial Review:** Actions can be examined by **NGT / Supreme Court**

Space for Notes:

Savannas of Western Maharashtra

Context:

A recent study using **ancient Marathi literature and oral traditions** establishes that **savannas in western Maharashtra are ancient, natural ecosystems**, existing for **700–750 years**, and **not degraded forests**.

Core Findings:

- Literary evidence (13th–20th century CE) shows **dominance of savanna species**, not forest species.
- **27 savanna indicators vs only 3 forest indicators** identified.
- Savannas existed **prior to colonial timber extraction**, disproving degradation theory.
- Misclassification has led to **ecologically harmful afforestation**.

Savanna Biome – Key Ecological Features:

- **Vegetation**: Grasses with scattered, drought-resistant trees.
- **Climate**: Seasonal rainfall; pronounced dry season or seasonal drought.
- **Rainfall range (Maharashtra)**: Fine-leaf savannas → up to ~1000 mm, Broadleaf savannas → ⩾700 mm
- **Adaptations**: Thick bark, Spines, Resprouting ability, Clonal growth
- **Ecological drivers**: Periodic **fire, Grazing** by herbivores
- **Canopy**: Naturally open (not a sign of degradation).

Indicative Savanna Species (Examples):

- **Trees/Shrubs**: *Hivara, Babhul, Khaira, Palas*
- **Grasses**: *Sehima nervosum*

Significance:

- Savannas are **distinct biomes**, not failed forests.
- Tree plantation in savannas can **reduce native biodiversity**.
- Conservation must maintain **grass–tree balance**, fire, and grazing regimes.
- Highlights value of **historical ecology & indigenous knowledge**.

United Nations Framework Convention on Climate Change (UNFCCC)

Space for Notes:

Context:

The United States announced its decision to withdraw from the **United Nations Framework Convention on Climate Change (UNFCCC)**, triggering reactions from the EU and other countries that reaffirmed commitment to multilateral climate action.

What is UNFCCC?

- A **multilateral environmental treaty** adopted in **1992** at the **Rio Earth Summit**
- Entered into force in **1994**
- Serves as the **parent framework** for global climate action

Objective:

- Stabilisation of **greenhouse gas (GHG) concentrations** in the atmosphere
- Prevent **dangerous anthropogenic interference** with the climate system
- Enable **adaptation** and ensure **sustainable development**

Key Principles:

- Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC)
- Equity
- Precautionary Principle
- Polluter Pays (implicit application)

Scope & Coverage:

- **Near-universal membership** (197 Parties)
- Covers both **Mitigation** (reducing emissions) & **Adaptation** (coping with climate impacts)

Institutional Structure:

- **Conference of the Parties (COP):** Supreme decision-making body. Meets annually.
- **Secretariat:** Bonn, Germany

Major Agreements under UNFCCC:

- **Kyoto Protocol (1997):** Legally binding emission targets for developed countries
- **Paris Agreement (2015):** Universal participation. Nationally Determined Contributions (NDCs). Long-term temperature goal: **well below 2°C**, pursuing **1.5°C**

Indus Waters Treaty & Salal Reservoir

Context:

Following the **Indus Waters Treaty (IWT)** being kept **in abeyance**, India has initiated **desilting of the Salal reservoir** in Jammu & Kashmir to maximise water utilisation and hydropower efficiency.

Key Terms:

- **Desilting**: Removal of accumulated sediments from reservoirs to restore storage capacity.
- **Run-of-the-River (RoR) Project**: Hydropower project without large live storage, permitted under IWT on western rivers with conditions.

About the Indus Waters Treaty:

- **Signed**: 1960
- **Parties**: India and Pakistan
- **Brokered by**: World Bank

- River Allocation:
  - **Eastern Rivers** (Ravi, Beas, Sutlej): India
  - **Western Rivers** (Indus, Jhelum, Chenab): Pakistan (with limited Indian use)
- **Status: Kept in abeyance** by India (not withdrawn).

About Salal Hydroelectric Project:

- **Location**: Reasi district, Jammu & Kashmir
- **River**: Chenab River
- **Operator**: NHPC Limited
- **Type**: Run-of-the-River hydropower project
- **Significance**: One of the earliest hydropower projects on the Chenab under IWT constraints.

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