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CONCISE

ENVIRONMENT, ECOLOGY & GEOGRAPHY Volume - I

Current Affairs for Prelims 2026
(April 2025 - September 2025)

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PREFACE

Concise Prelims Current Affairs 2026

Current Affairs-Sine Qua Non 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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What if we told you we have panacea for all the problems related to preparation of current affairs!? A one stop solution for revising all current affairs material in a style where mains answer writing becomes very easy.

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- Systematic segregation of monthly news in tandem with syllabus
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Space for Notes:

Western Ghats

Why in News?

A study reveals increasing monsoon intensity in the Western Ghats over 800 years, highlighting climate change impacts and disaster preparedness needs.

Description:

1. UNESCO World Heritage Site & Biodiversity Hotspot:

- Recognized as a UNESCO World Heritage Site in 2012.
- One of the 36 global biodiversity hotspots due to its rich flora and fauna.

2. Geographical Extent:

- Stretches for 1,600 km along the western coast of India.
- Covers six states – Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.

3. Climatic & Hydrological Importance:

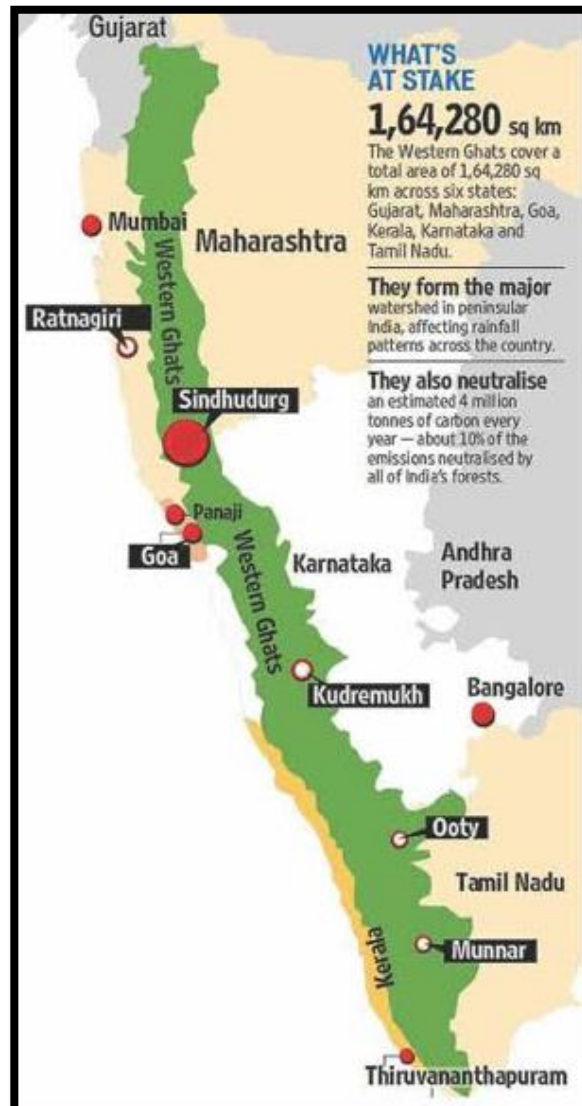
- Acts as a climatic barrier, influencing monsoon rainfall in peninsular India.
- Source of major rivers like Godavari, Krishna, and Kaveri.

4. Flora & Fauna:

- Home to many endemic species like the Malabar Civet, Lion-tailed Macaque, and Nilgiri Tahr.
- Contains Shola forests and montane grasslands in high-altitude regions.

5. Environmental Concerns & Conservation Efforts:

- Threats: Deforestation, mining, tourism, and infrastructure projects.
- Gadgil Committee (2011) proposed strict conservation measures but faced opposition.
- Kasturirangan Committee (2013) recommended a balanced approach, reducing the protected area to 37%.



The Lancet Planetary Health journal & Arsenic

Why in News?

A study in The Lancet Planetary Health found that climate change may increase arsenic levels in rice by 2050, posing serious health risks in Asian countries due to rising temperatures and CO₂.

Description:

- Publisher: It is published by The Lancet, one of the world's leading medical journals, under Elsevier.
- Focus Area: The journal explores the intersection of human health and the environment, including climate change, pollution, biodiversity, and food systems.

- **Peer-Reviewed:** It is a peer-reviewed journal, ensuring high standards of scientific credibility and accuracy.
- **Launch Year:** The Lancet Planetary Health was launched in April 2017 to address urgent global health issues linked to environmental change.
- **Global Scope:** It features interdisciplinary research from public health, environmental science, ecology, and policy domains, aiming for evidence-based solutions for sustainable development.

Space for Notes:
Arsenic:

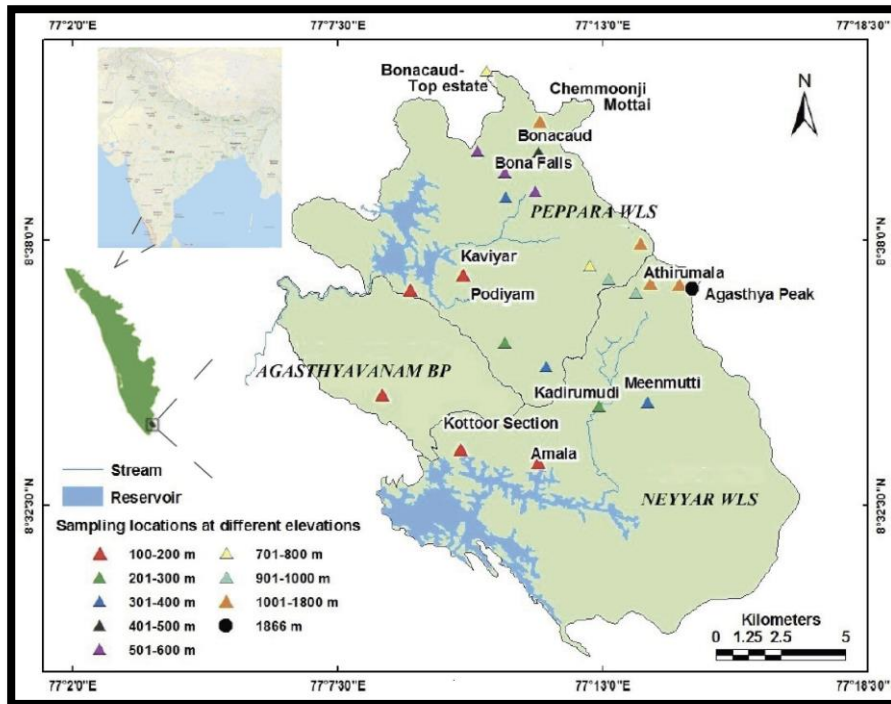
- **Chemical Info:** Arsenic (As), atomic number 33, is a toxic metalloid found in nature, often as arsenic sulfide.
- **Sources:** Naturally occurs in earth's crust; human sources include industrial activities, mining, and pesticide use.
- **Toxicity:** Long-term exposure causes skin lesions, cancer, and cardiovascular diseases; acute poisoning leads to nausea, vomiting, and organ failure.
- **Water Contamination:** High arsenic levels in groundwater, especially in West Bengal, Bihar, and Bangladesh, are a major health concern.
- **Regulations:** WHO recommends 0.01 mg/L (10 ppb) limit in drinking water; BIS allows up to 0.05 mg/L.
- **Remediation:** Methods like reverse osmosis and activated alumina help reduce arsenic levels in water.
- **Environmental Impact:** Contaminates soil and water, affecting agriculture and the food chain.
- **Industrial Use:** Used in semiconductors and wood preservation (e.g., CCA), but with environmental concerns.
- **Poisoning in India:** Reported in West Bengal, Assam, Bihar; government works on safe water solutions.
- **International Action:** Countries like the U.S. and Bangladesh have developed arsenic filtration technologies to tackle contamination.

Agasthyavanam Biological Park
Why in News?

The Supreme Court directed the Central Empowered Committee(CEC) to survey Agasthyamalai forests to identify encroachments and restore degraded tiger habitats and wildlife sanctuaries.

Description:

- **Agasthyavanam Biological Park** was established in **1997** as a **wildlife sanctuary** in **Kerala**, near **Thiruvananthapuram**.
- It shares boundaries with **Neyyar** and **Peppara Wildlife Sanctuaries**.
- Named after the **Agasthyakoodam Peak**, visible from the park, and part of the **Agasthyamala Biosphere Reserve**.
- The **Agasthyamala Biosphere Reserve** lies at the southern end of the **Western Ghats**, covering **3,500 sq. km** across parts of **Kerala** and **Tamil Nadu**.
- The biosphere includes peaks rising up to **1,868 meters** and hosts tropical forest ecosystems.
- The park spans **23 sq. km**, with **17.5 sq. km** set aside for **natural forest regeneration**.
- The remaining area is used for **systematic conservation programs**.
- It is rich in **biodiversity** and home to many **endemic medicinal plants**.


Space for Notes:
Central Empowered Committee (CEC):

- The Central Empowered Committee (CEC) is a statutory body constituted to assist the Supreme Court of India in matters related to forest and environmental conservation.
- Established: Originally set up in 2002 by the Supreme Court during the N. Godavarman Thirumulpad v. Union of India case (1997).
- Purpose: To monitor and report on violations of forest and environmental laws, advise the court, and recommend actions for protection and restoration of forest lands.

Recent Update (2023):

- Reconstituted as a permanent statutory body under the Forest Conservation (Amendment) Act, 2023.
- Composition: 1 Chairperson, 1 Secretary, and 3 Expert Members (no NGO members now).
- Functions under the Ministry of Environment, Forest and Climate Change (MoEFCC).
- Government must provide written justification if it disagrees with CEC's recommendations.

Pamban Rail Bridge
Why in News?

The Pamban Rail Bridge is in news for becoming India's first vertical lift sea bridge, inaugurated in 2025, enhancing maritime clearance and modernizing rail connectivity to Rameswaram Island.

Description:
Overview:

- **Name:** Pamban Rail Bridge (also called Rameswaram Bridge)
- **Type:** Historic cantilever railway bridge
- **Location:** Connects Rameswaram Island to the mainland of Tamil Nadu, India
- **Opened:** 24th February 1914
- **Significance:** First sea bridge in India; vital for regional connectivity

Key Developments and Modernization:

- **Modernization Period:** 2019–2025
- **New Feature (2025):** Vertical Lift Span
 - First of its kind in India
 - Provides 22 meters vertical clearance for maritime movement (previously 19 meters)
- **Electrification:** Supports double-line electrified rail operations
- **Outcome:** Facilitates faster and more efficient train movement

Historical and Strategic Significance:

- **Infrastructure Importance:** Sole rail link between Rameswaram Island and mainland India for decades
- **Pilgrimage Access:** Key route for devotees visiting Ramanathaswamy Temple, a major Hindu pilgrimage site
- **Humanitarian Role:** Served as a corridor for Sri Lankan Tamil refugees during the civil war

Technical & Engineering Aspects:

- **Engineering Type:** Cantilever design; upgraded with vertical lift mechanism
- **Strategic Location:** Built across the Palk Strait

Current Relevance:

- **Economic Role:** Supports trade, tourism, and regional mobility
- **Cultural Link:** Enhances religious tourism to Rameswaram


Simlipal Tiger Reserve
Why in News?

A citizens' forum approached the NGT opposing Odisha government's move to allot 100 acres near Simlipal Biosphere Reserve for a hotel, citing environmental threats and tribal community impact.

Description:
Location:

- Northern part of Odisha, in Mayurbhanj District.
- Part of Mayurbhanj Elephant Reserve (includes Hadgarh and Kuldiha Wildlife Sanctuaries).

Key Features:

- **Area:** ~2750 sq. km.
- Famous **waterfalls:** Joranda and Barehipani.
- **Terrain:** Hilly and undulating with open grasslands, forest patches.
- **Highest Peaks:** Khairiburu and Meghashini (1515m).

Space for Notes:

Legal Status & History:

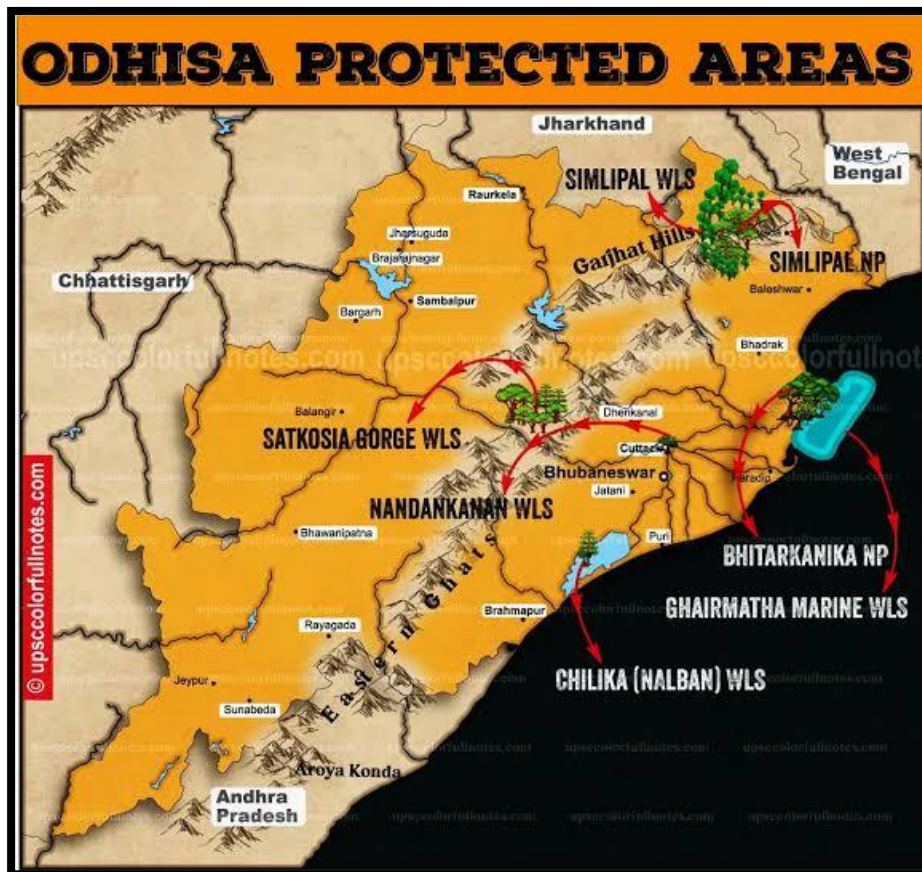
- Wildlife Sanctuary: 1979
- Proposed National Park: 1980 (303 sq.km.)
- Tiger Reserve under Project Tiger: May 1973
- Declared Biosphere Reserve by UNESCO: May 2009

Vegetation:

- Dominated by Northern Tropical Moist Deciduous Forests.
- Some semi-evergreen patches.
- Rich plant biodiversity with 1078 species, including 94 species of orchids.

Fauna Highlights:

- Home to tigers, elephants, and hill mynah.
- Highest tiger population in Odisha.
- Biodiversity includes:
 - 55 species of mammals
 - 304 species of birds
 - 60 species of reptiles
 - 21 species of amphibians
 - 38 species of fish
 - 164 species of butterflies

Space for Notes:

Gandhi Sagar Wildlife Sanctuary
Why in News?

Two male cheetahs, Prabhas and Pawak, were relocated from Kuno to Gandhi Sagar Wildlife Sanctuary in Madhya Pradesh to boost cheetah conservation and promote eco-tourism in the region.

Description:

- **Location:** Northwestern Madhya Pradesh
 - **Border:** Runs along the Rajasthan border
 - **Ecoregion:** Katihar-Gir dry deciduous forests

Space for Notes:

- **Establishment:** Notified in 1974
- **Area:** 368 sq.km
- **River:** Chambal River flows through the sanctuary, dividing it into two parts
- **Topography:**
 - Hills and plateaus
 - Catchment area of Gandhi Sagar Dam
 - Diverse terrain
- **Designation:**
 - Important Bird and Biodiversity Area (IBA)
- **Vegetation:**
 - Northern tropical dry deciduous forest
 - Northern tropical dry mixed deciduous forest
 - Dry deciduous scrub
- **Flora:**
 - Khair, Salai, Kardhai, Dhawda, Tendu, Palash
- **Fauna:**
 - **Herbivores:** Chinkara, Nilgai, Spotted Deer
 - **Carnivores:** Indian Leopard, Striped Hyena, Jackal
 - **Others:** Crocodiles, Fish, Otters, Turtles



Sandy Cay Reef

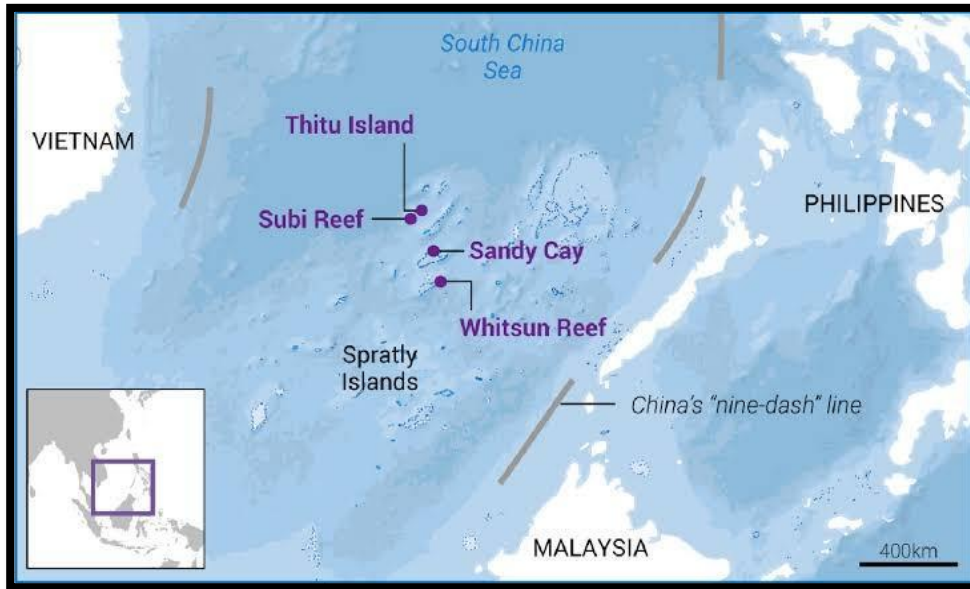
Why in News?

China and the Philippines defended their claims over Sandy Cay reef in the South China Sea after Manila accused Beijing of intimidation following a Chinese state media report suggesting seizure.

Description:

- **Location:** Sandy Cay Reef is a small coral reef in the northern Thitu Reefs group of the Spratly Islands, located in the South China Sea, at coordinates 11°03'36.0"N 114°13'08.0"E. It lies about 1.5 nautical miles northwest of Thitu Island and 9.3 nautical miles northeast of Subi Reef.
- **Disputed Territory:** Sandy Cay Reef is claimed by four countries – China, the Philippines, Vietnam, and Taiwan (Republic of China).

- **Geopolitical Importance:** In 2017, the Philippines planned to build shelters for fishermen but halted the plan after opposition from China, citing possible violations of the 2002 Declaration on the Conduct of Parties in the South China Sea.
- **Recent Developments (2025):** In April 2025, the China Coast Guard raised a Chinese flag on the sandbank claiming sovereign jurisdiction, but the Philippine Navy and Coast Guard later reported that no permanent Chinese presence was established.
- **Current Status:** As of 2025, Sandy Cay Reef remains unoccupied by any country, although Chinese maritime vessels frequently loiter around the area, leading to ongoing tensions.


Space for Notes:

Development of Buffer Zones in Tiger Reserves

Why in News?

Madhya Pradesh (MP) government approved a scheme to develop buffer zones around its 9 tiger reserves.

Description:

- **Name of the Scheme:**
 - Development of Buffer Zones in Tiger Reserves
- **State Involved:**
 - Madhya Pradesh – has the highest number of tiger reserves in India (now 9).
- **Financial Outlay:**
 - ₹145 crore for 2025–26 and 2027–28.
- **Recent Tiger Reserve Added:**
 - Madhav National Park became the ninth tiger reserve (inaugurated on March 10, 2023).
- **Tiger Reintroduction:**
 - Three tigers (including two females) introduced in Madhav National Park in 2023.
- **Tiger Population Growth in MP:**
 - Increased from 526 (2019) to 785 (2023).
- **Buffer Zone Development Activities:**
 - Chain-link fencing (in eco-sensitive areas)
 - Grassland and water resource development
 - Wild animal monitoring, fire safety
 - Skill development programs for local communities

Space for Notes:

PROJECT TIGER

FUNDING
It is a centrally sponsored scheme.

During the 12th Plan, the budget had allocated Rs.1245 crore for Project Tiger.

29TH JULY
INTERNATIONAL TIGER DAY

SCIENTIFIC NAME:
Panthera tigris
Indian Sub Species:
Panthera tigris tigris

ABOUT 70%
of the tigers in the world are in India.

LAUNCHED
Project Tiger was launched by the Indira Gandhi government in 1973 from the Jim Corbett National Park in Uttarakhand.

PROTECTION STATUS:
Indian Wildlife (Protection) Act, 1972: **Schedule I**
International Union for Conservation of Nature (IUCN) Red List: **Endangered**
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): **Appendix I**

POACHING IS THE MAIN THREAT

TIGER RESERVES IN INDIA: 53

TIGERS ARE PRESENT IN 19 STATES

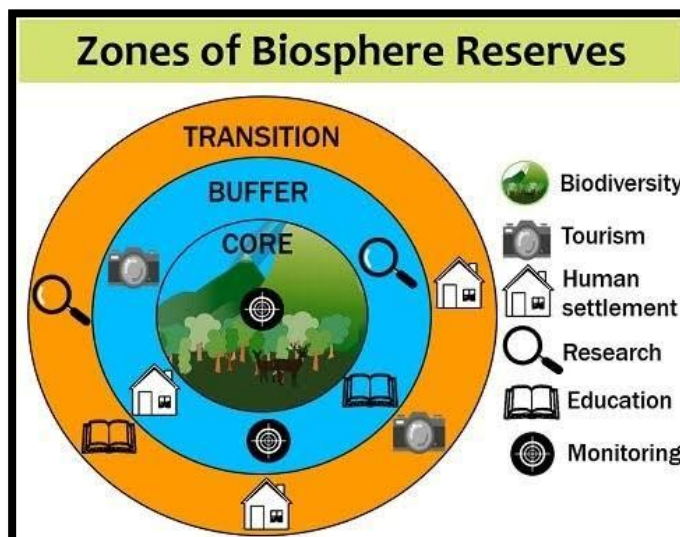
BUFFER CORE AREA

TIGER RESERVE:
The tiger reserves are constituted on a core/ buffer strategy.
The core areas have the legal status of a national park or a sanctuary.

OBJECTIVES:

- Project aims at ensuring a viable population of Bengal tigers in-situ conservation of wild tigers in designated tiger reserves.
- National Tiger Conservation Authority was created for conservation management.

TIGER RESERVE:



Gangetic Dolphin

Why in News?

Toxic chemicals in the Ganga are endangering the Gangetic dolphin. A study highlighted severe endocrine disruption due to pollutants from agriculture, industry, and urban waste, urging immediate conservation action.

Description:

- **Scientific Name:** Platanista gangetica
- **Common Names:** Blind dolphin, Ganges dolphin, Ganges susu, hihu, side-swimming dolphin, South Asian River Dolphin
- **Habitat:** Freshwater species found in Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh
- **National Recognition:** Declared as the **National Aquatic Animal of India**
- **Ecological Role:** Indicator of the health of the freshwater ecosystem

Physical Features:

- **Body:** Long thin snout, rounded belly, stocky body, large flippers
- **Color:** Calves are chocolate brown; adults become grayish brown with smooth, hairless skin
- **Size & Weight:**
 - Weight: Up to 150 kg
 - Female: Up to 2.67 m
 - Male: Up to 2.12 m
- **Sexual Dimorphism:** Females are larger than males

Sensory & Behavior:

- **Eyesight:** Eyes lack lens – effectively blind
- **Sonar:** Uses a highly developed bio-sonar system to hunt
- **Sound:** Emits ultrasonic sound to locate prey
- **Breathing:** Must surface every 30–120 seconds to breathe
- **Nickname:** Known as 'Susu' due to the sound made while breathing

Diet:

- Feeds mainly on fish
- Typically found in counter-current systems of the main river channel

Conservation Status:

- **IUCN Red List:** Endangered
- **Wildlife (Protection) Act, India:** Schedule I
- **CITES:** Appendix I

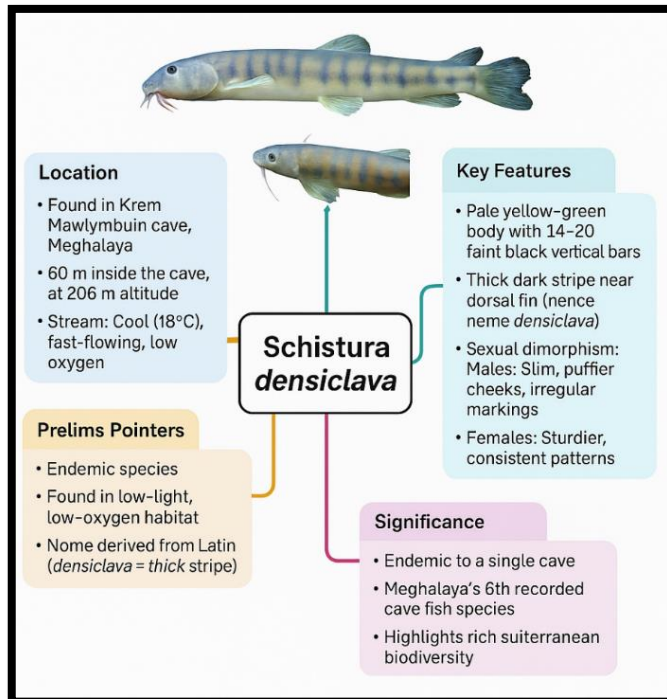

Schistura densiclava: A New Cave-Dwelling Fish from Meghalaya
Why in News?

A new cave-dwelling fish species, *Schistura densiclava*, was discovered in Meghalaya's Krem Mawjymbuin cave, highlighting subterranean biodiversity and its unique adaptation to low-light, low-oxygen environments.

Space for Notes:

Description:

- **Discovery Site:** Found 60 meters inside Krem Mawjymbuin cave (1.6 km long) at 206 m altitude; habitat is a cool (18°C), fast-flowing, low-oxygen stream.
- **Habitat:** Subterranean, indicating adaptation to low light and oxygen.
- **Appearance:** Pale yellow-green body with 14–20 faint black bars; a thick dark stripe near the dorsal fin inspired the name *densiclava* (“thick stripe” in Latin).
- **Sexual Dimorphism:**
 - Males: Slim, irregular patterns, puffer cheeks.
 - Females: Sturdier, consistent markings.
- **Endemism & Conservation:**
 - Genetically confirmed as a new, endemic species.
 - Known only from this cave, making it Meghalaya’s sixth recorded cave fish species—underlining the region’s unique subterranean biodiversity.


Space for Notes:
Carbon Tax
Why in News?

India-UK trade talks have stalled due to the UK’s proposed Carbon Border Adjustment Mechanism (CBAM), which may hurt Indian exports. India proposes a “rebalancing mechanism” to offset potential economic losses.

Description:
What is Carbon Tax?

- An environmental tax on the carbon content of fossil fuels (coal, oil, natural gas).
- Aims to reduce greenhouse gas (GHG) emissions.
- Creates a financial disincentive for pollution.
- Encourages the use of clean energy alternatives.
- Calculated based on the amount of CO₂ or other GHGs emitted.
- Acts as a market-based climate solution.

Types of Carbon Tax:

1. **Emissions Tax:** Tax on total GHG emissions based on the carbon content of the fuel.
2. **Energy Tax:** Levied on fossil fuel consumption, calculated from carbon or energy usage.
3. **Cap-and-Trade System:**
 - Sets a cap on emissions.
 - Emission permits are traded in a carbon market.
 - Incentivizes emission reductions.
4. **Border Tax Adjustment:**
 - Applies carbon tax on imported goods based on emissions during their production.
 - Prevents **carbon leakage** (shift of emissions to countries with lax regulations).

Carbon Tax in India:

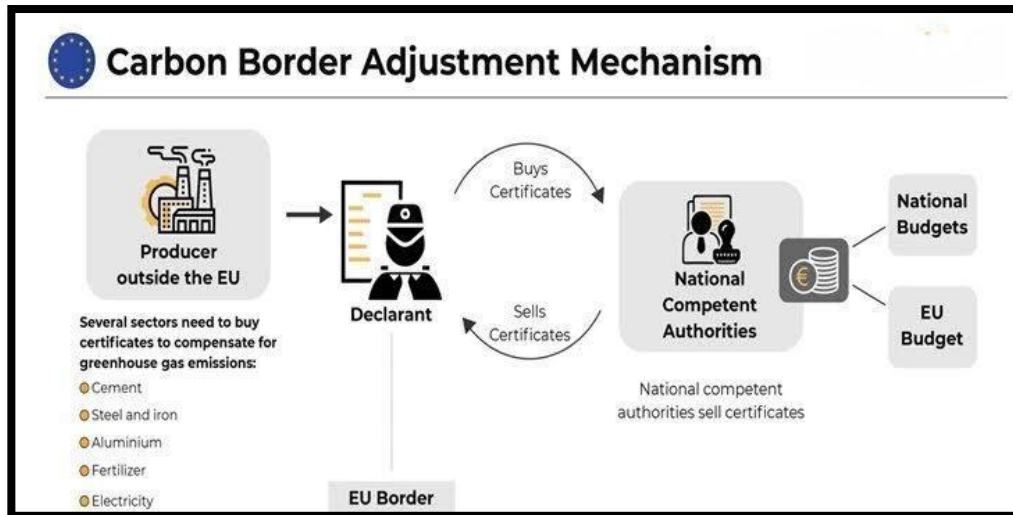
- **No nationwide carbon tax** currently implemented.
- **2015 proposal:** Carbon tax of INR 50 per metric ton on coal production/import (not implemented).

- **State-level initiatives:**

- Tamil Nadu and others have levied carbon-related taxes, especially on coal in power generation.

Clean Energy & Emission Reduction Initiatives in India:

- National Clean Energy Fund (NCEF)
- National Solar Mission
- Energy Conservation Building Code (ECBC)


Sariska Tiger Reserve
Why in News?

A tigress in Sariska Tiger Reserve gave birth to four cubs, raising the sanctuary's population to 48. This conservation success follows past relocations after poaching nearly wiped out the tiger population.

Description:

- Located in Rajasthan, India
- Situated in the Aravalli Hills, one of the world's oldest mountain ranges
- Covers approximately 800 sq.km

Historical Background:

- Formerly a hunting ground of the Maharaja of Alwar
- Declared a natural reserve in 1955
- Became a national park in 1979

Global Significance:

- First reserve in the world to successfully relocate tigers

Topography & Landscape:

- Rocky terrain, scrub thorn arid forests, grasses, hilly cliffs, and semi-deciduous woods

Vegetation Type:

- Northern Tropical Dry Deciduous Forests
- Northern Tropical Thorn Forests

Flora of Sariska:

- Dominated by dhok trees
- Other species: salar, kadaya, gol, ber, banyan, gugal, bamboo, kair, adusta

Fauna of Sariska:

- Tiger, leopard, sambhar, chital, nilgai, four-horned antelope, wild boar

Tourist Attractions within the Reserve:

- Pandu Pol, Bhangarh Fort, Ajabgarh, Pratapgarh, Siliserh Lake, Jai Samand Lake

Space for Notes:

Eurasian otter

Space for Notes:

Why in News?

The Eurasian otter, feared extinct in Kashmir for nearly 30 years, was recently sighted in South Kashmir's Lidder River, reviving hopes for its comeback and aquatic ecosystem restoration.

Description:

1. **Species & Conservation Status:** The Eurasian otter (*Lutra lutra*), once thought extinct in Kashmir, has been globally classified as 'Near Threatened' by the IUCN.
2. **Recent Sighting:** After nearly 25–30 years, the Eurasian otter was spotted in the Lidder River in Srigufwara, South Kashmir. Earlier sightings in 2025 were also reported from Gurez Valley and Heerpora in Shopian district.
3. **Ecological Role:** The Eurasian otter is a **key predator** in aquatic ecosystems, feeding primarily on **fish**. It plays a vital role in maintaining ecological balance in freshwater habitats.
4. **Threats to Survival:** Pollution of water bodies, especially with **pesticides**, and declining fish populations are major threats. This pollution reduces the **primary food source** for otters.
5. **Distribution & Behavior:** Eurasian otters are found in **Asia, northern Africa, and Europe**. They are **territorial**, grow up to **10 kg**, can swim up to **10 km/hr**, and dive to depths of **20 metres**, staying submerged for minutes.



National Tiger Conservation Authority (NTCA)

Why in News?

NTCA is engaging diplomatically with South Africa, Botswana, and Kenya to bring more cheetahs under Project Cheetah. SDRF is involved in ground-level preparations. Talks are delayed due to political changes and legal clearances in partner African nations.

Description:

- Statutory body under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**

Established:

- In 2006, under Section 38L of the Wildlife (Protection) Act, 1972 (amended in 2006)

Objectives:

- Legal Backing to Project Tiger**
 - To provide statutory authority to Project Tiger for legally enforceable directives.
- Center-State Accountability**
 - Ensures shared responsibility in managing Tiger Reserves by enabling MoUs between the Centre and States.
- Parliamentary Oversight**
 - Brings tiger conservation under regular review by Parliament, improving transparency and governance.
- Local Livelihood Integration**
 - Addresses the livelihood concerns of people living in and around Tiger Reserves.

NTCA Composition:

- Chairperson:** Minister-in-charge of MoEFCC
- Vice-Chairperson:** Minister of State for MoEFCC
- Members:**
 - Three Members of Parliament (2 Lok Sabha, 1 Rajya Sabha)
 - Secretary, MoEFCC
 - Officers from Ministries of Tribal Affairs, Social Justice, Tourism, etc.
 - Five experts/conservationists (non-official members)
 - Director General of Forests, Inspector General of Forests (Wildlife)

Key Functions:

- Lays down guidelines for Tiger conservation.
- Approves tiger reserve management plans.
- Conducts tiger status assessments and habitat evaluations.
- Ensures protection measures and anti-poaching operations.
- Monitors funding and activities under Project Tiger.


Kaziranga National Park
Why in News?

Kaziranga Tiger Reserve in Assam recorded the third-highest tiger density in India (18.65/100 sq. km) after Bandipur (19.83) in Karnataka and Corbett (19.56) in Uttarakhand, as per the 2024 report released on Global Tiger Day (July 29th).

Description:**Location:**

- Situated in **Assam**, northeastern India.
- Lies in the **Brahmaputra Valley floodplain**.
- Represents the **largest undisturbed area** in this ecosystem.

Status: Declared a **UNESCO World Heritage Site** in 1985.

Geography & Terrain:

- **Features:** Tall elephant grass, dense forest, rugged reeds, marshes, and shallow pools.
- **Rivers:**
 - **Diffalu River:** A tributary of the Brahmaputra, flows through the park.
 - **Moradifalu River:** Flows along the southern boundary.

Flora:

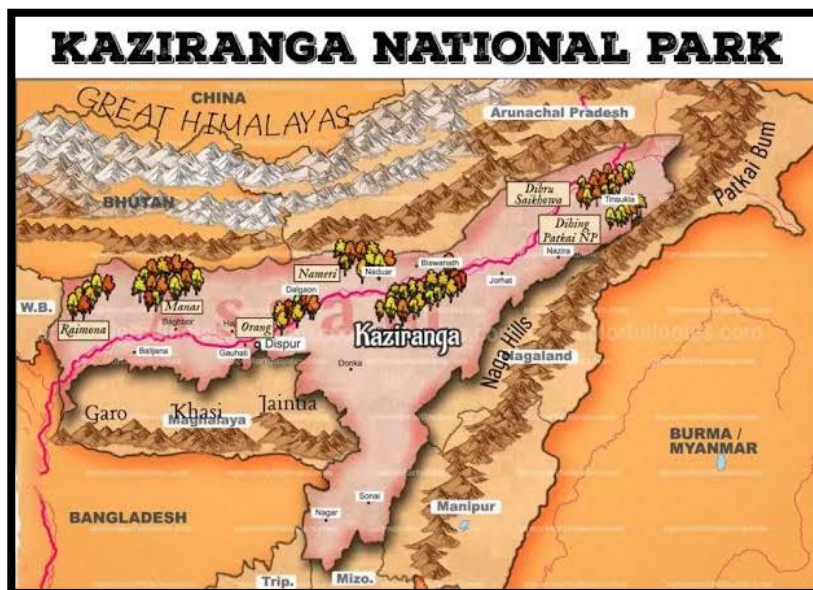
- Dominated by:
 - **Elephant grasses**
 - **Swamplands**
 - **Water lilies, water hyacinths, and lotus**

Fauna:

- Home to many **endangered and threatened species**, including:
 - **One-horned Rhinoceros** (World's largest population)
 - **Tiger** (Kaziranga is a Tiger Reserve)
 - **Eastern Swamp Deer**
 - **Asian Elephant**
 - **Wild Buffalo**
 - **Hoolock Gibbon, Capped Langur**
 - **Gangetic River Dolphin**

Birdlife – Grassland Bird Survey Report:

- **43 grassland bird species** recorded across Kaziranga's three wildlife divisions.
- **Highlights:**
 - **Finn's Weaver** (IUCN: Endangered, local name: Tukura Chorai) is **successfully breeding**.
 - Considered a **key indicator of grassland ecosystem health**.
 - Known for **building nests atop trees**.

**Project Tiger (1973):**

- Launched in 1973 due to an alarming drop in tiger population (from ~1 lakh in early 1900s to 1,827 in 1972).

Space for Notes:

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- **Type: Centrally Sponsored Scheme (CSS)**
 - Central share: 60% for non-recurring, 50% for recurring costs.
- **Objective:** Ensure viable population of **Bengal Tiger** (*Panthera tigris tigris*) in natural habitats.
- **Implemented by:** **National Tiger Conservation Authority (NTCA)** under **Wildlife Protection Act, 1972**.

Biodiversity Hotspots

Why in News?

A new global underground atlas has mapped biodiversity hotspots of mycorrhizal fungi—organisms vital for plant health and soil ecosystems. Using 2.8 billion DNA sequences and machine learning, scientists revealed hidden hotspots in regions like the Alaskan tundra and Mediterranean woodlands.

Description:

A **Biodiversity Hotspot** is a biogeographic region that:

- Has exceptionally high species richness, especially **endemic species** (found nowhere else), and
- Is under **severe threat** from human activities.

Origin of Concept:

- **Term coined by:** Norman Myers (1988)
- **Institutionalized by:** Conservation International (CI) in 1989
- **Quantitative Criteria established:** CI Global Assessment, 1999

Criteria to Qualify as a Biodiversity Hotspot:

To be designated as a hotspot, a region must:

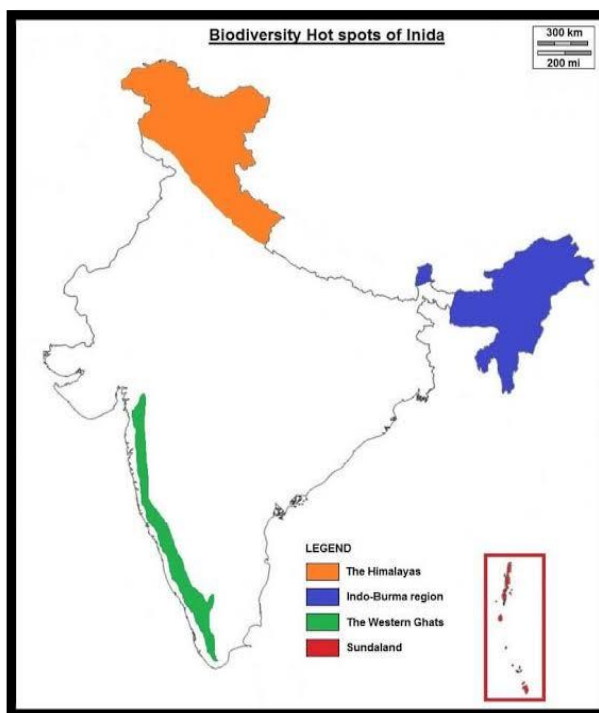
1. Have $\geq 1,500$ species of vascular plants as endemics ($\geq 0.5\%$ of global total)
2. Have lost $\geq 70\%$ of its original vegetation

Implication: The area is **irreplaceable and threatened**

Biodiversity Hotspots of the World:

- **Total:** 36
- **Area:** Only 2.3% of Earth's land surface
- **Contains:**
 - ~50% of world's endemic plant species
 - ~43% of all terrestrial vertebrates
- Mostly found in tropical forests

Biodiversity Hotspots in India (4 Total):



No.	Hotspot Name	Details
1	Eastern Himalayas	Nepal, Bhutan, NE India; Red Panda, Snow Leopard
2	Western Ghats & Sri Lanka	Endangered Nilgiri Tahr, Lion-tailed Macaque
3	Indo-Burma	NE India, Myanmar; high amphibian diversity
4	Sundaland (incl. Nicobar)	Marine biodiversity & unique island species

Threats to Biodiversity Hotspots:

- **Habitat destruction** (deforestation, urbanization, agriculture)
- **Climate change**
- **Pollution** (plastic, pesticides, industrial waste)
- **Invasive species** (non-native competitors and predators)
- **Overexploitation** (logging, overfishing, poaching)

Importance of Conservation:

- Preserves **genetic & ecological diversity**
- Supports **ecosystem services** (air, water, pollination)
- Maintains **cultural and indigenous heritage**
- Prevents **species extinction**

New Species Added to India's Biodiversity (2024)
Why in News?

India added 683 new species to its fauna and 433 taxa to its flora in 2024, led by Kerala in discoveries. The Western Ghats and North-East contributed 35% of findings, enriching India's documented biodiversity with significant new species. India's total recorded plant species (all groups): ~56,177, Includes angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, fungi, algae.

Description:
Overall Additions in 2024:

- **Fauna:** 683 species added
 - 459 new species discovered
 - 224 new records (species known elsewhere but newly recorded in India)
- **Flora:** 433 taxa added
 - 410 new species
 - 23 infra-specific taxa

State-wise Highlights – Fauna Discoveries:

- **Kerala:** Highest
 - 101 total (80 new species + 21 new records)
- **Karnataka:** 82 total (68 new + 14 records)
- **Tamil Nadu:** 63 total (50 new + 13 records)
- **Eastern/Northeastern states:**
 - Arunachal Pradesh: 72 total (42 new + 30 records)
 - Meghalaya: 42 total (25 new + 17 records)
 - West Bengal: 56 total (25 new + 31 records)
 - Andaman & Nicobar Islands: 43 total (14 new + 29 records)

Plant Discoveries – 2024:

- **Total taxa added:** 433
 - 410 new species
 - 23 infra-specific taxa
- **By state:**
 - Kerala: 58 (highest)
 - Maharashtra: 45
 - Uttarakhand: 40

Types of Plants Discovered:

- 154 angiosperms (flowering plants)
- 4 pteridophytes (ferns)
- 15 bryophytes (mosses/liverworts)
- 63 lichens
- 156 fungi
- 32 algae
- 9 microbes

Space for Notes:

Biodiversity Hotspots Contribution:

- Western Ghats + North-East = 35% of total discoveries

Notable Faunal Discoveries:

- 2 new genera of reptiles
- 37 new species of reptiles
 - Example: *Dravidoseps gouensis* (new genus)
 - Example: *Anguiculus dicaprio* (Colubridae family, named after Leonardo DiCaprio)
- 5 new species of amphibians

Notable Floral Discoveries:

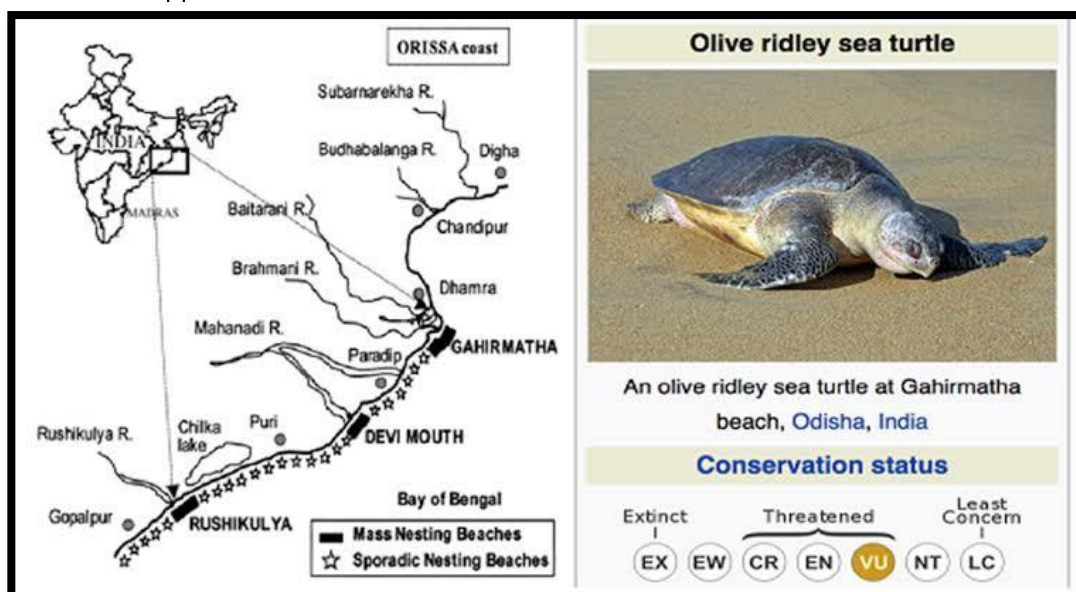
- Important new orchid species:
 - *Bulbophyllum gopalianum*
 - *Coelogyne tripurensis*
 - *Gastrodia indica*
 - *Gastrodia sikkimensis*
- Andaman & Nicobar Islands = Biological hotspot.

Olive Ridley Sea Turtle
Why in News?

The Environment Ministry deferred forest clearance for Puri's Shree Jagannath International Airport due to concerns over threats to Olive Ridley turtles, Irrawaddy dolphins, migratory birds, cyclone-protecting trees, and possible violations of forest and coastal regulations.

Description:

- **Scientific Name and Description:** The Olive Ridley Turtle, scientifically known as *Lepidochelys olivacea*, is the smallest and most abundant species of sea turtle, recognized for its olive-green shell.
- **Arribada Phenomenon:** Olive Ridley turtles are famous for their unique mass nesting behavior known as "Arribada," where thousands of females gather on the same beach to lay eggs.
- **Geographic Distribution:** These turtles are found in the warm waters of the Pacific, Atlantic, and Indian Oceans, with Odisha's Gahirmatha Marine Sanctuary being the largest rookery in the world.
- **Physical Features and Behavior:** Adult Olive Ridleys measure 62-70 cm in length and weigh 35-45 kg. They are solitary, omnivorous, and migrate long distances between feeding and mating areas.
- **Conservation Status:** The Olive Ridley Turtle is classified as "Vulnerable" by the IUCN Red List, is protected under the Wildlife Protection Act, 1972 (Schedule 1), and is listed in CITES Appendix I.


Space for Notes:

Rhinoceros

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Why in News?

Genetic analysis of 2,573 rhino horn samples has begun in Assam under the RhoDIS India programme. The samples, mostly from horns destroyed in 2021, are being analysed at the Wildlife Institute of India to aid rhino conservation.

Description:

Recent Study Highlights:

- Study analysed **artwork and photographs** spanning over 500 years.
- Shows **decline in horn length** due to **trophy hunting** and **directional selection**.
- **Sumatran Rhino**: Highest horn length decline.
- **White Rhino**: Lowest horn length decline.
- Similar pattern observed in:
 - **Elephants** (tusk size).
 - **Wild sheep** (horn length).

Threats Faced by All Rhino Species:

- **Poaching** for horns.
- **Habitat loss** due to human encroachment.
- Impact of **directional selection** from trophy hunting.

Directional Selection:

- Process where traits like **large horns or tusks** are **selected against** due to **human hunting pressure**.
- Leads to evolution of **smaller horn sizes** over generations.

Five Surviving Rhino Species:

Species	Region	IUCN Status	Key Traits
Greater One-Horned Rhino (Indian Rhino)	India (Assam), Nepal, Bhutan, Pakistan	Vulnerable	Largest species; single black horn, folded skin
White Rhino	Northern & Southern Africa	Near Threatened (Southern)	Most populous; broad mouth
Black Rhino	Eastern & Southern Africa	Critically Endangered	Hooked lip, aggressive behaviour
Javan Rhino (Sunda Rhino)	Indonesia (Ujung Kulon NP)	Critically Endangered	Lesser one-horned; very rare
Sumatran Rhino	Indonesia (Sumatra, Borneo)	Critically Endangered	Smallest species; two horns

Greater One-Horned Rhino – Details:

- Also known as **Indian Rhino**.
- Identified by:
 - **Single black horn**
 - **Grey-brown hide** with prominent skin folds
- **Largest among all rhino species**.

Habitat & Behaviour:

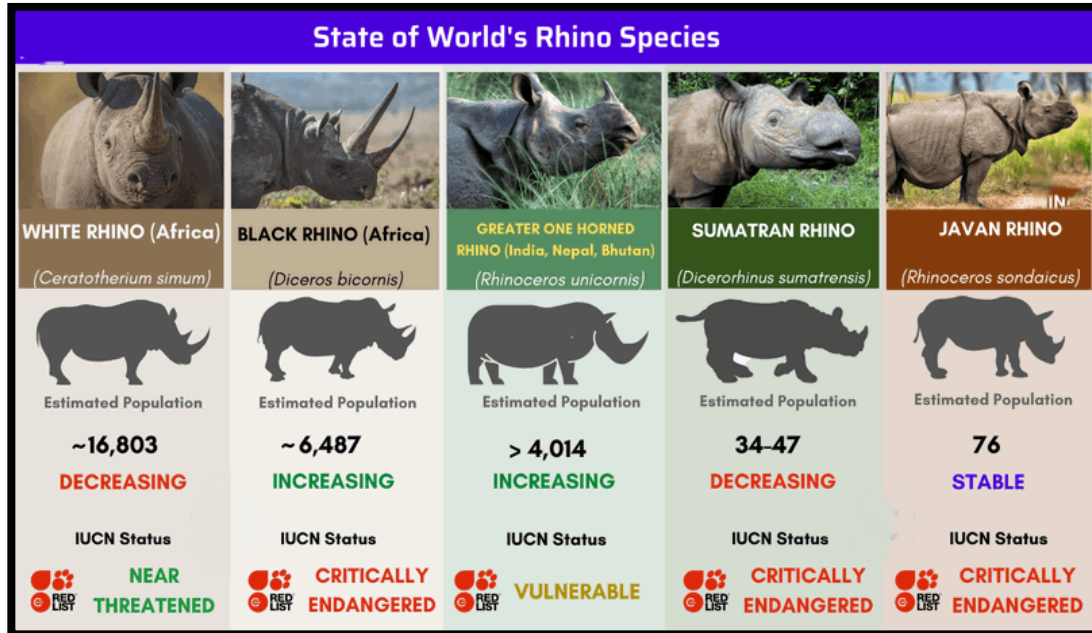
- **Grazers** – eat grasses, aquatic plants.
- Found in **swampy grasslands and floodplains**.
- Often seen immersed in water.

Geographical Spread:

- **India (Assam)** – Kaziranga, Orang, Pobitora NPs
- Also in **Nepal, Bhutan, and Pakistan**

Legal Protection:

Protection Law/Organisation	Status
IUCN Red List	Vulnerable
CITES	Appendix I
Wildlife Protection Act, 1972 (India)	Schedule I

Space for Notes:

Coral Reefs
Why in News?

A 24-year study reveals a 50% decline in coral cover in Lakshadweep since 1998 due to repeated marine heatwaves intensified by climate change. The findings highlight the role of local conditions in reef resilience and recovery potential.

Description:

Coral reefs are **marine ecosystems** formed by colonies of tiny animals called **coral polyps**, which secrete calcium carbonate to form hard skeletons. These structures support a wide range of marine biodiversity.

- Known as "Rainforests of the Sea"
- Cover <0.1% of the ocean floor, but support ~25% of marine species
- Corals live symbiotically with **zooxanthellae** algae

Ideal Conditions for Coral Reef Formation:

Factor	Ideal Range/Requirement
Temperature	23°C to 29°C
Depth	Less than 50 meters (for sunlight penetration)
Salinity	Stable and high salinity
Water	Clear and low nutrient (oligotrophic)
Substrate	Hard surface (e.g. volcanic rocks)

Types of Coral Reefs:

Type	Description
Fringing	Directly attached to the shore (e.g. Gulf of Mannar, Andamans)
Barrier	Separated from the land by a lagoon (e.g. Great Barrier Reef)
Atolls	Ring-shaped reefs surrounding a lagoon (e.g. Lakshadweep)
Patch	Isolated small reefs, often found in lagoons (e.g. Gulf of Kutch)

Coral Reef Locations (World):

- **Coral Triangle:** Indonesia, Philippines, Malaysia, PNG, Solomon Islands
- **Great Barrier Reef:** Australia
- **Red Sea Reefs:** Egypt, Sudan, Saudi Arabia
- **Indian Ocean:** Maldives, Seychelles
- **Caribbean:** Belize, Bahamas
- **Pacific:** Fiji, Marshall Islands
- **Atlantic:** Bermuda, Brazil

Coral Reefs in India:

Region	Type	Features
Gulf of Kutch	Fringing	High salinity, tidal fluctuations
Gulf of Mannar	Fringing	>3,600 species, Biosphere Reserve
Palk Bay	Fringing	High sedimentation, resilient corals
Andaman & Nicobar	Fringing, Patch, Barrier	Diverse fauna, clownfish, reef sharks
Lakshadweep	Atolls	Coral banks, tuna fisheries, seaweed cultivation

Importance of Coral Reefs:
Environmental:

- Biodiversity hotspot (25% of marine species)
- Coastal protection (reduce wave energy up to 97%)
- Carbon sink & ecosystem balance

Economic:

- Fisheries: ~500 million people depend on them
- Tourism: ~\$36 billion/year globally
- Jobs: Fishing, diving, boat tours, etc.

Scientific/Medicinal:

- Marine organisms yield **anti-cancer, HIV, and anti-inflammatory drugs**

Cultural/Heritage:

- Integral to **Pacific island cultures**
- Reefs preserve shipwrecks and artefacts

Threats to Coral Reefs:
Climate Change:

- **Bleaching** due to ocean warming (e.g. 2016 El Niño → 29% of GBR bleached)
- **Ocean Acidification** weakens coral skeletons
- Sea-level rise → sedimentation
- Increased storm frequency

Pollution:

- Marine debris (plastics, oil, toxins)
- Fertilizer runoff → algal blooms
- Wastewater discharge

Overfishing:

- Disrupts food chains
- **Destructive practices:** blast fishing, cyanide fishing

Coastal Development:

- Sedimentation and habitat loss
- Dredging, tourism infrastructure

Human Activities:

- Unsustainable tourism
- Coral mining
- Recreational diving damage

Space for Notes:

Conservation Efforts:

Global Initiatives:

- ICRI: International Coral Reef Initiative
- CTI: Coral Triangle Initiative
- GCRMN: Global Coral Reef Monitoring Network
- Aichi Target 10: Minimize climate-related coral damage
- UNESCO WHS: Protects key reef sites

Indian Initiatives:

- Wildlife Protection Act, 1972: Hard corals in Schedule I
- Environment Protection Act, 1986: Pollution control
- CRZ Notification 1991/2011: Bans coral mining
- Island Protection Zone (IPZ)
- Marine Protected Areas (MPAs)
- Coral Reef Research Centre: Andaman & Nicobar

Way Forward:

- Stricter enforcement of environmental laws
- Restoration: Coral gardening, Biorock Technology
- Carbon mitigation: Reduce emissions
- Community awareness
- International cooperation on marine conservation

Space for Notes:

Climate change and coral bleaching

Imagine you've gone snorkelling in the Great Barrier Reef. Instead of the famously coloured corals, you see a drab sea floor dominated by algae and seaweed. What happened to the corals?



coral
is made of ...



polyps
which are home to ...



zooxanthellae
(lots and lots of them!)

Corals are colonial creatures. They're made of hundreds of animals called polyps. Sharing the polyps' home are tiny algae called zooxanthellae (zo-zan-thell-eye). The zooxanthellae, and the compounds made by coral polyps to protect them, are what make corals so colourful.

The zooxanthellae make energy from sunlight. Most of this energy is given to the coral polyps. So, the polyps provide shelter, and the zooxanthellae provide energy. It's a win-win relationship. Everyone's happy.


+

→


sunlight zooxanthellae energy for the coral polyps

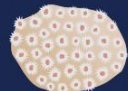
Corals and zooxanthellae are fussy about water temperature. If it stays too warm for a while, the zooxanthellae become stressed. They can't convert the sunlight to energy efficiently anymore. The extra energy turns into chemicals that are toxic to the coral, and the zooxanthellae get kicked out.


→

→

→


increased heat stressed zooxanthellae inefficient energy toxic chemicals


→


If this goes on for long enough, all the zooxanthellae will be gone, and the coral turns white. It is bleached. Corals can recover from bleaching, but if the zooxanthellae are gone for too long, the coral starves and the reef turns into a wasteland.

As the world's oceans become warmer, coral bleaching might occur more frequently on the Great Barrier Reef and coral reefs the world over.

LEARN MORE:
nova.org.au/coral-bleaching

nova SCIENCE FOR CURIOUS MINDS

Dibru-Saikhowa National Park (Assam)

Why in News?

A 2025 study reveals that invasive and native “grassland invaders” like *Bombax ceiba* and *Lagerstroemia speciosa* are altering Dibru-Saikhowa National Park’s riverine ecosystem, threatening endemic species and feral horses, urging targeted grassland restoration and community-based conservation measures.

Description:

Location & Status:

- Situated on the **south bank of the Brahmaputra River**, eastern Assam.
- **Boundaries:** North – Brahmaputra & Lohit Rivers; South – Dibru River.
- Functions as both a **National Park** and a **Biosphere Reserve**.

Vegetation & Climate:

- **Vegetation:** Moist mixed **semi-evergreen** and **deciduous** forests.
- **Unique feature:** Largest **salix swamp** forest in northeastern India.
- **Climate:** Tropical monsoon – hot, wet summers; cool, usually dry winters.

Flora: Key species: *Dillenia indica*, *Bischofia javanica*, *Bombax ceiba*, *Lagerstroemia parviflora*, etc.

Fauna:

- **Mammals:** Tiger, Elephant, Leopard, Jungle Cat, Bears, Small Indian Civet, Squirrels, Assamese Macaque, Slow Loris.
- **Aquatic species:** Gangetic Dolphin.

Avifauna:

- **Important Bird Area (IBA)** – 382+ bird species.
- **Key birds:** Greater Adjutant Stork, Lesser Adjutant Stork, Greater Crested Grebe, etc.

Significance:

- Biodiversity hotspot of Assam.
- Supports **rare swamp** forests, endangered species, and migratory birds.



Asiatic Lion (*Panthera leo persica*)

Why in News?

The India–Middle East–Europe Economic Corridor (IMEC) progress has slowed due to the ongoing Gaza war, which disrupted Middle East stability, strained Israel–Arab ties, and increased trade risks, despite recent multi-nation talks in New Delhi to advance its eastern leg.

Description:

- **Scientific Name:** *Panthera leo persica*
- **Unique Feature:** Longitudinal belly fold (absent in African lions).
- **Social Unit:** Smaller prides (2–3 females) vs African (4–6 females).
- **Current IUCN Status (2025):** Vulnerable.
- **CITES:** Appendix I.

Distribution & Population:

- **Exclusive to India** – mainly in Gir National Park & Wildlife Sanctuary, Gujarat.
- **Lion Census 2020** (Gujarat Forest Dept.):
 - **674** lions in ~30,000 sq km across **9** districts & **53** talukas of Saurashtra.
- Once ranged across **West Asia & Middle East** – now extinct outside India.

Space for Notes:

Habitat:

- Dry deciduous forests, scrublands, savannas.
- Major protected habitats:
 - **Gir National Park & Wildlife Sanctuary** (Est. 1965, 1,412 sq km core + 470 sq km buffer = 1,882 sq km)
 - **Girnar Wildlife Sanctuary** (Est. 2008, Junagadh district) – extension habitat.

Asiatic vs. African Lion:

Feature	Asiatic Lion	African Lion
Size	Slightly smaller	Larger
Mane	Shorter, less developed	Fuller, denser
Social Behaviour	Males stay with pride	Males usually leave pride
Habitat	Dry deciduous forest (India only)	Savannas, shrublands, deserts
Distribution	Gujarat only	Widespread Sub-Saharan Africa
IUCN Status	Vulnerable	Vulnerable
CITES Listing	Appendix I	Appendix II
Protection (India)	WPA 1972 – Schedule I	–

Conservation Efforts:

- **Wildlife Protection Act, 1972** – Schedule I (maximum protection).
- **Project Lion (2020):**
 - Create a second free-ranging population in **Kuno-Palpur, MP**.
 - Strengthen disease surveillance, habitat management, community participation.
- **Relocation Challenges:** Political resistance, ecological suitability debates.

**About Gir and Girnar:****Gir National Park and Wildlife Sanctuary:**

- Established in 1965.
- Covers an area of 1,412 sq km, with an additional buffer zone of 470 sq km.
- Total protected area: 1,882 sq km.
- Main habitat of the Asiatic Lion.

Girnar Wildlife Sanctuary:

- Established in 2008.
- Located in Junagadh district, Gujarat.
- Encompasses the Girnar hills in the Saurashtra region.
- Habitat: Dry deciduous forests, with flora like teak, dhak, and acacia.
- Rich fauna including:
 - Asiatic lions, leopards, Chinkara, Chousingha.
 - Over 300 species of birds.
- Serves as an extension habitat for lions beyond Gir National Park.

Space for Notes:

National Designated Authority (NDA) for Carbon Emissions Trading Regime

Why in News?

The Environment Ministry has set up a 21-member National Designated Authority (NDA), mandated under **Article 6 of the Paris Agreement**, to operationalise carbon markets in India, evaluate and authorise projects, and help achieve India's **2030 NDC emission reduction targets**.

Description:

- Within the **Paris Agreement (2015)**, **Article 6** provides the framework for **carbon markets/emissions trading regime**.
- A major point of contention in past COPs → finally resolved at **COP29 (Baku, Azerbaijan, Nov 2024)**.
- Creation of **NDA** is a **mandatory requirement** under Article 6.

Structure of NDA:

- **21-member committee**
- **Headed by:** Secretary, Ministry of Environment, Forest and Climate Change (MoEFCC)
- **Members include officials from:**
 - Ministry of External Affairs (MEA)
 - Ministry of Steel
 - Ministry of Renewable Energy
 - NITI Aayog

Responsibilities of NDA:

- Recommend to the Union govt. a **list of activities** eligible for trading of **emission reduction units** under Article 6.
- Modify activities from time to time → align with **national sustainable goals & priorities**.
- **Evaluate, approve, and authorise** projects/activities.
- Authorise the use of **emission reduction units** from projects → to meet **India's NDCs**.

About NDC (Nationally Determined Contributions) – India:

- Commitments under Paris Agreement:
 - Reduce **emission intensity of GDP by 45% by 2030** (from 2005 levels).
 - Achieve **50% electric power capacity** from **non-fossil fuel sources** by 2030.
 - Create an additional **carbon sink of 2.5–3 billion tonnes of CO₂** by 2030 through **afforestation/reforestation**.

Significance:

- Strengthens **India's carbon market framework**.
- Ensures alignment of **emission trading activities** with **domestic development goals + global climate commitments**.
- Provides institutional mechanisms for **carbon credits** and **sustainable financing**.

Bonnet Macaque (*Macaca radiata*)

Why in News?

Nine bonnet macaques were found dead near Palode, Thiruvananthapuram, raising fears of poisoning or disease. Foam around their mouths suggests toxicity. Post-mortem was inconclusive, with toxicology and disease tests, including for Kyasanur Forest Disease, underway. The Forest Department has registered a case.

Description:

- **Type:** Old-World monkey (Family: Cercopithecidae).
- **Region:** Native to the **Oriental region**, especially **Southern India**.
- **Feature:** Distinct **bonnet-like whorl of hair** on its head.
- **Habitat:**
 - Natural: Evergreen & dry deciduous forests of the **Western Ghats**.
 - Human-dominated: Urban, suburban, and agricultural landscapes.

Behaviour & Ecology:

- **Lifestyle:** Arboreal + terrestrial quadrupeds; diurnal.
- **Social structure:** Multi-male, multi-female troops (~30 members).

Space for Notes:

- **Communication:**
 - Visual (grinning, clicking), tactile, and vocal.
 - **Alarm calls** for predators.
 - Can recognize alarm calls of **sympatric primates** → Hanuman langurs & Lion-tailed macaques.

Reproduction & Lifespan:

- **Maturity:** Females mature ~3 years.
- **Birth age:** Around 4 years.
- **Gestation:** ~24 weeks.
- **Infant care:** Nurse for 6–7 months, remain close to mothers ~1 year.

Feeding Habits:

- **Omnivorous:** Fruits, leaves, insects, bird eggs, lizards.
- **Near humans:** Known to raid food offerings, trash bins, and gardens → frequent human-wildlife conflict.

Conservation Status:

- **Wildlife (Protection) Act, 1972:** Schedule I (highest protection in India).
- **IUCN Red List:** Vulnerable.

Green Credit Vs Carbon Credit

Why in News?

The Environment Ministry has revised rules under the **Green Credit Programme (GCP)**, mandating that tree plantation credits will be awarded only **after 5 years**, based on **40% canopy density and survival rate**, replacing the earlier benchmark of 1,100 trees/hectare.

Description:

Feature	Green Credit (GC)	Carbon Credit (CC)
Governing Law	Environment (Protection) Act, 1986	Energy Conservation Act, 2001
Nodal Ministry	MoEF&CC	Ministry of Power / Bureau of Energy Efficiency
Beneficiaries	Individuals, communities, industries	Primarily industries & corporations
Objective	Encourage eco-actions (afforestation, water conservation, sustainable farming, waste mgmt.)	Reduce GHG emissions by setting emission limits
Market Mechanism	Traded on domestic platform	Traded on national & international markets
Climate Co-benefits	May qualify for carbon credits (indirectly reduces emissions)	Cannot be converted into green credits
Scope	Broader: covers multiple environmental aspects	Narrow: specifically targets carbon emissions

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Geography

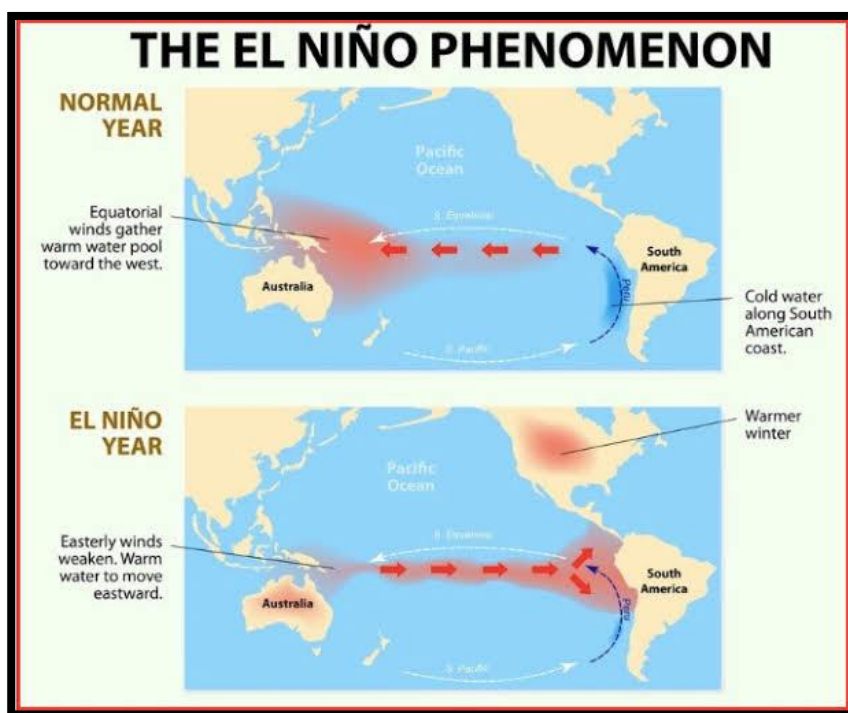
El Niño

Why in News?

IMD ruled out El Niño for the upcoming monsoon, predicting neutral conditions. However, India may experience above-normal summer temperatures with increased heat wave days.

Description:

- **Definition & Mechanism:** El Niño is the warm phase of the El Niño-Southern Oscillation (ENSO) cycle, characterized by the abnormal warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean.
- **Impact on Trade Winds:** During El Niño, the trade winds weaken or even reverse, leading to reduced upwelling of cold water near the South American coast and disrupting normal weather patterns.
- **Effects on Indian Monsoon:** El Niño is typically associated with weaker monsoons and below-normal rainfall in India, often leading to drought-like conditions, affecting agriculture and water availability.
- **Global Climatic Impact:** El Niño influences weather worldwide, causing droughts in Australia and India, heavy rainfall in South America, and warmer-than-average global temperatures.
- **El Niño Years in India:** Historically, major drought years in India (e.g., 2002, 2009, 2015) have coincided with strong El Niño events, making it a crucial factor in monsoon forecasting and agricultural planning.



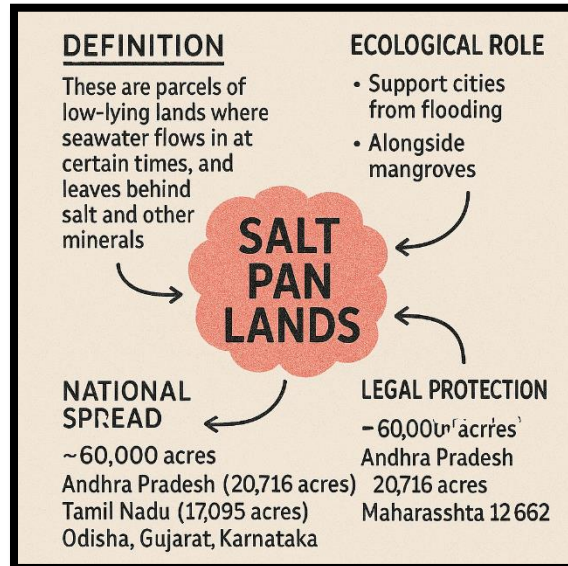
Salt pan lands

Why in News?

Maharashtra approved 256 acres of salt pan land for Dharavi Redevelopment Project to rehabilitate slum dwellers, aiming for a slum-free Mumbai, amid environmental concerns and political criticism.

Description:

- **Definition:** Salt pan lands are low-lying areas where seawater enters at certain times and evaporates, leaving behind salt and minerals.
- **Ecological Role:**
 - These ecosystems help protect cities from flooding.
 - They support biodiversity, hosting various bird and insect species.
 - Often found alongside mangroves, they form a natural flood defense.
- **Legal Protection (CRZ Notification 2011):**
 - Classified under CRZ-1B category, indicating ecological sensitivity.
 - Economic activities are prohibited, except:
 - Salt extraction
 - Natural gas exploration
- **National Spread:**
 - Total area: ~60,000 acres
 - States with salt pan lands:
 - Andhra Pradesh: 20,716 acres (largest)
 - Tamil Nadu: 17,095 acres
 - Maharashtra: 12,662 acres
 - Also found in Odisha, Gujarat, and Karnataka


Space for Notes:
Bet Dwarka Island
Why in News?

The ASI's Underwater Archaeology Wing is conducting fresh onshore and offshore explorations at Dwarka and Beyt Dwarka to study submerged remains and determine their historical antiquity.

Description:
Location:

- **Bet Dwarka** (also spelt **Beyt Dwarka**) or **Shankhodhar** is an inhabited island at the mouth of the **Gulf of Kutch** situated 3 km (2 mi) off the coast of **Okha, Gujarat, India**.
- Northwest to southeast, the island measures 13 km (8 mi) long with an average east-west width of 4 km (2 mi). It is a strip of **sandstone** situated 30 km (19 mi) north of the town of **Dwarka**.



Historical significance of the Island:

- **Religious:**
 - The **Muslim-majority Island** is famous for the **DwarkadhishMukhya Mandir** that is said to have been the residence of **Lord Krishna** when he ruled **Dwarka**.
 - The temples on the island were built around the end of the **eighteenth century**.
 - The establishment of the temple is credited to **Guru Vallabhacharya**.
 - In the ancient epic, **Mahabharata**, Bet Dwarka is known by the name of '**Antardvipa**'.
- **Ancient period:**
 - Archaeological remains found under the sea suggest the **existence of a settlement** during the **Late Harappan period** of the **Indus Valley civilization**, or immediately after it.
 - It can be reliably dated to the time of the **Maurya Empire**.
 - It was a **part of the Okha Mandal** or **Kushdwip** area. Dwarka is mentioned in a **copper inscription** of **Simhaditya**, the minister of **Vallabhi** under **Maitraka**, dated **574 AD**.
 - He was the **son of Varahdas**, the king of **Dwarka**.
 - The shipwrecks and stone anchors found during excavations suggested the **historic trade relation with the Romans**.
- **Medieval period:**
 - The island, along with the **Okhamandal region**, was under **Gaekwad of Baroda State**.
 - During the **Indian rebellion of 1857**, the **Vaghers** captured this region.
 - Later by the joint offensive of the British, Gaekwad and other princely state troops ousted the rebels and recaptured the region in **1859**.
- **Modern period:**
 - After the **Indian Independence in 1947**, it was **integrated** into the **Saurashtra State**.
 - Later, **Saurashtra** merged with **Bombay State** under the state reorganization plans.
 - When Gujarat was created from the bifurcation of Bombay State, **Bet Dwarka** was under the jurisdiction of the **Jamnagar district of Gujarat**.
 - Later, **Devbhoomi Dwarka district** was created from the **Jamnagar district** in **2013**, and as such became part of it.

Mansarovar Yatra

Why in News?

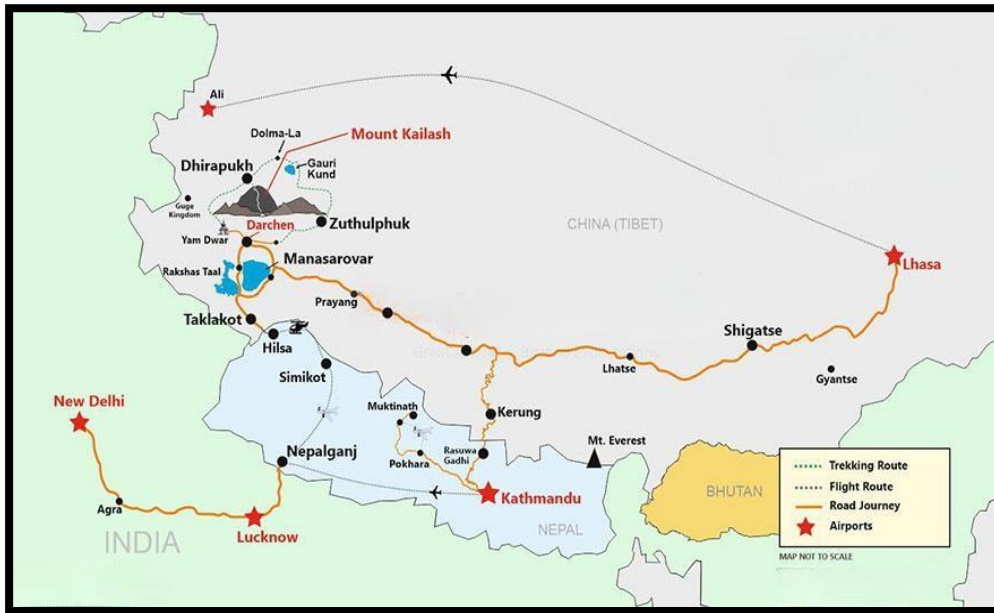
India and China are expediting efforts to restart the Kailash Mansarovar Yatra, suspended since 2019 due to COVID-19 and border tensions, with a breakthrough expected soon before pilgrim selection.

Description:

- India and China have agreed to revive the annual Kailash Mansarovar Yatra (KMY).
- Mount Kailash is a diamond-shaped black rock peak located in Tibet.
- India organizes the KMY annually between June and September:
 - Via Lipulekh Pass (Uttarakhand) since 1981.
 - Via NathuLa Pass (Sikkim) since 2015.
- Mount Kailash stands at 6,638 meters.
- It is considered sacred by four religions:
 - **Hinduism:** Abode of Lord Shiva and Goddess Parvati.
 - **Buddhism:** Regarded as Mount Meru, the cosmic axis connecting heaven and earth.
 - **Jainism:** Known as Ashtapada, where Rishabhanatha attained enlightenment.
 - **Bon religion:** An indigenous Tibetan faith that also reveres the mountain.

Space for Notes:

- Mount Kailash is considered the spiritual center of the Earth.
- Four major rivers originate near Mount Kailash:
 - Sutlej
 - Brahmaputra
 - Karnali
 - Indus
- Lake Mansarovar is located at the base of Mount Kailash.
- Although lower than Mount Everest (8,849 meters), Mount Kailash remains unclimbed.
- Climbing Mount Kailash is prohibited due to its deep religious and spiritual significance.



La Niña

Why in News?

Skymet forecasted a 'normal' monsoon for June–September with 3% above-average rainfall, weak La Niña conditions, and expected good rains in western and southern India, but below-normal in northeast.

Description:

- La Niña is a cooling phase of the El Niño-Southern Oscillation (ENSO), marked by below-normal sea surface temperatures in the central and eastern Pacific Ocean.
- In India, La Niña usually brings normal to above-normal monsoon rainfall, which supports agriculture and water availability.
- Globally, it causes more hurricanes in the Atlantic, droughts in parts of Africa, and increased rainfall in the southern USA.
- During La Niña, north India experiences colder winters, and higher wind speeds can help reduce air pollution.
- In 2024, La Niña is delayed, with only a 57% probability of forming later in the year, as the Oceanic Niño Index is currently at -0.3°C , not meeting the threshold of -0.5°C .

Siang River

Why in News?

Villagers in Arunachal Pradesh are protesting multiple hydropower projects, including those on the Siang, Dri, and Lohit rivers, citing lack of consent, environmental concerns, and threats to indigenous communities' cultural and spiritual sites.

Description:

- The **Tsangpo River** (also known as **Yarlung Zangbo** in China) enters **Arunachal Pradesh**, where it is called the **Dihang** or **Siang River**.
- It flows over **1,000 km eastward** before curving around the **Namcha Barwa peak**.
- After forming a horseshoe bend around Namcha Barwa, it enters Arunachal Pradesh as the **Siang (or Dihang)**.
- The river then turns **south** and enters **Assam**.
- In Assam, it is joined by two mountain streams:
 - **Lohit River**
 - **Dibang River**
- After this confluence, it is known as the **Brahmaputra River**.
- Further downstream in **Bangladesh**, the **River Teesta** joins the **Jumna** (the Brahmaputra in Bangladesh) as a **right bank tributary**.
- The **Jumna** then joins the **Padma**, which subsequently joins the **Meghna**.
- The **Meghna River** finally flows into the **Bay of Bengal**.
- The **Brahmaputra sub-basin** spans several Indian states:
 - **Arunachal Pradesh**: Subansiri, Kameng, and Bhareli rivers
 - **Assam**: Manas, Kopili, Sankosh, and Dikhow rivers
 - **Nagaland**: Doyang River (flows into Dhansiri)
 - **Meghalaya**: Umngot and Kynshi rivers
 - **West Bengal and Sikkim**: Teesta River
- The **Siang River** flows through central **Arunachal Pradesh**, a region inhabited by the **Adi tribe**.

Space for Notes:


Left/ South bank Tributaries of Brahmaputra	Right/ North bank Tributaries of Brahmaputra
Dibang	Subansari
Lohit	Kameng
Burhi Dihang	Manas
Kopilli	Sankosh
Dhansiri (South)	Dhansiri (North)
Kelang	Teesta (Sikkim, WB)
Noadehing	Ronganadi

Mount Etna

Space for Notes:

Why in News?

Mount Etna erupted for the 14th time in recent months, sending smoke and ash into the air after a crater collapse, prompting a raised alert but no public threat.

Description:

- **Location:** East coast of Sicily, Italy.
- **Type:** **Stratovolcano** – built up of layers of lava, ash, and rock.
- **Height:** ~3,300 metres above sea level.
- **Area:** ~1,200 sq. km.
- **Activity:** One of the world's most active volcanoes; erupting frequently since **1500 BC**.
- **Recent Activity:** Continuous eruptions since **February 2023**, with ash plumes and lava fountains.
- **Features:** Has 4 summit craters and hundreds of lateral vents; eruptions can be **explosive**, **effusive**, or **mixed**.



Volcano:

- **Definition:** Natural vents where **lava, gas, and ash** escape from beneath Earth's crust.
- **Cause:** Result of **tectonic plate movements**, especially at convergent and divergent boundaries.

Types by Activity:

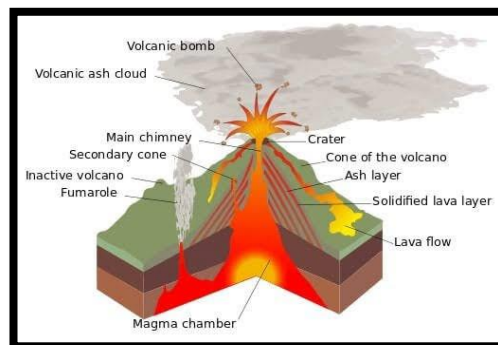
- **Active:** Frequently erupting (e.g., Kilauea – Hawaii, Etna – Italy).
- **Dormant:** Currently inactive, but may erupt again (e.g., Mount Kilimanjaro – Tanzania).
- **Extinct:** No signs of future eruptions (e.g., Dhinodhar Hill – Gujarat).

Types by Lava Composition:

- **Basic (Basaltic):** Dark, fluid lava, low in silica; forms shield volcanoes.
- **Acidic (Rhyolitic/Andesitic):** Viscous, high-silica lava; forms cone-shaped stratovolcanoes.

Prediction Tools:

- Seismic activity monitoring
- Ground deformation
- Gas emissions analysis
- Magnetic and gravity field studies



Siang Upper Multipurpose Hydropower Project – Arunachal Pradesh

Why in News?

NHPC's 11.2 GW Siang Upper Project in Arunachal Pradesh faces delays due to local protests over displacement, prompting efforts to fast-track site selection amid strategic concerns near China border.

Description:

Key Facts:

- **Location:** Upper Siang district, Arunachal Pradesh
- **Capacity:** Proposed 11,000 MW – among India's largest hydropower projects
- **Executing Agency:** NHPC (National Hydroelectric Power Corporation)

Purpose:

- **Strategic necessity:** Counter China's proposed 60,000 MW dam on Yarlung Tsangpo in Tibet.
- **Water security:** Ensure year-round natural flow in the Siang River and regulate floods from sudden Chinese releases.

Concerns:

- **Displacement:** Estimated to affect over 1,00,000 local residents.
- **Environmental impact:** Potential harm to river ecology and forest landscapes.

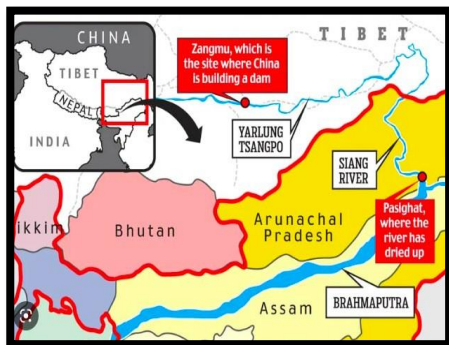
About Siang River:

- Originates as **Yarlung Tsangpo** in Tibet, becomes **Siang (Dihang)** in Arunachal Pradesh.
- Joined with **Lohit** and **Dibang** in Assam to form the **Brahmaputra**.
- Flows further into Bangladesh as **Jumna**, then merges with **Padma** and **Meghna**, draining into the **Bay of Bengal**.

Cultural Aspect:

Region is home to **Adi tribes**, whose livelihoods and cultural ties are deeply linked to the Siang River.

NHPC Limited (National Hydroelectric Power Corporation), established in 1975 under the Companies Act, is a Mini Ratna Category-I PSU under the Ministry of Power. Headquartered in Faridabad, it has an authorized share capital of ₹15,000 crore. NHPC focuses on hydroelectric power development, along with wind, tidal, and small hydro projects. It handles planning, execution, and maintenance of power projects, explores new sites, engages in R&D, and sells electricity through long-term PPAs to state and private DISCOMs.



Left/ South bank Tributaries of Brahmaputra	Right/ North bank Tributaries of Brahmaputra
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Kopilli	Sankosh
Dhansiri (South)	Dhansiri (North)
Kelang	Teesta (Sikkim, WB)
Noadehing	Ronganadi

Kingdom of Eswatini

Why in News?

The US deported five immigrants from countries like Vietnam and Cuba to Eswatini, a rare African absolute monarchy. This raised concerns about human rights, political repression, and Eswatini's controversial role in accepting third-country deportees under U.S. immigration policy.

Description:

- Landlocked country in **Southern Africa**, bordered by **South Africa** and **Mozambique**.

Government:

- **Absolute monarchy** – The only one in Africa.
- **King Mswati III** rules with complete executive, legislative, and judicial powers.
- Political parties have been banned since **1973**.

Capitals:

- **Mbabane** – Administrative capital
- **Lobamba** – Legislative and royal capital

Languages:

- **Swazi** (siSwati) and **English** (official languages)

History:

- Formerly known as **Swaziland**, renamed to **Eswatini** in **2018** to reflect indigenous identity.
- King Mswati III ascended the throne in **1986** at age 18, succeeding his father **Sobhuza II**.

Public Health:

- One of the **highest HIV prevalence rates** in the world (~26% of adults).
- Heavily dependent on international health aid (e.g., US PEPFAR funding).

International Relations:

- Member of the **Southern African Customs Union (SACU)**.
- Recently accepted **third-country deportees** from the **United States**.

Economy:

- Closely linked to South Africa.
- Faces high poverty and unemployment despite natural resources.
- Ranked by World Bank as **lower-middle income**.

Culture:

- Rich in traditional ceremonies such as:
 - **Umhlanga** (Reed Dance)
 - **Incwala** (First Fruits Festival)


Subansiri Lower Hydro Electric Project (SLHEP)
Why in News?

The Union Environment Ministry's Expert Appraisal Committee cleared the **2,220 MW Oju Hydroelectric Project** on the Subansiri River near the China border, the largest in the basin, involving forest diversion, family displacement, and glacial flood risk assessments.

Description:

- **Type:** Under-construction **gravity dam**, run-of-river hydroelectric project.
- **Location:** On Subansiri River, at the Arunachal Pradesh–Assam border.
- **Developer:** National Hydro Power Corporation (NHPC) (state-run).
- **Significance:** Will be the **largest hydroelectric plant in India** upon completion.

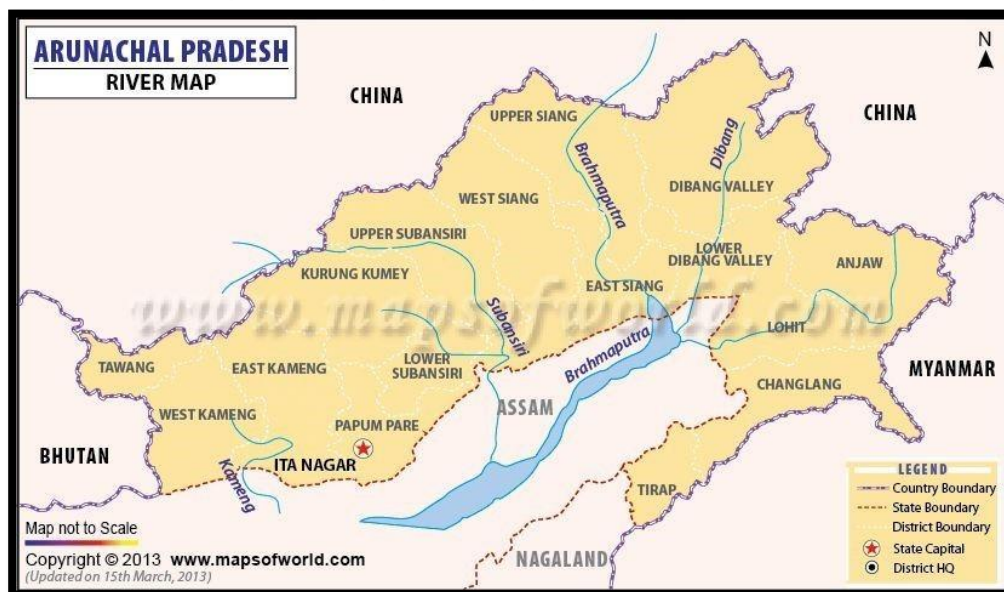
Technical Features:

- **Dam height:** 116 m (from river bed), 130 m (from foundation)
- **Dam length:** 284 m
- **Power generation:** 2,000 MW (8 × 250 MW units)
- **Purpose:** Hydropower generation (renewable energy, regional development)

Space for Notes:

Subansiri River – Key Facts:

- **Tributary:** Right-bank tributary of the Brahmaputra River
- **Nicknamed:** Gold River (known for gold dust)
- **Origin:** Himalayas in China
- **Course:** Flows through Tibet Autonomous Region (China) → Arunachal Pradesh → Assam
- **Confluence:** Joins Brahmaputra in Lakhimpur district, Assam
- **Length:** ~518 km
- **Drainage basin:** 32,640 sq.km
- **Contribution:** Largest tributary of Brahmaputra, ~7.92% of total flow


Space for Notes:
Cloudburst
Why in News?

The IMD Chief stated that while there is no rising trend in cloudbursts and they remain impossible to forecast, India is witnessing an increase in “mini-cloudbursts,” with above-normal monsoon rainfall recorded across most regions except the northeast.

Description:

- **Cloudburst** = Rainfall of 10 cm or more within an hour over a 10 km × 10 km area.
- Example: 5 cm rainfall in 30 minutes in the same area = also a cloudburst.
- **Key point:** It is not just “heavy rain,” but heavy rain in a very short duration over a small area.

Characteristics:

- **Localized event** (small geographical area).
- **Sudden and intense rainfall**, difficult to measure due to sparse instruments in hilly areas.
- Common during **monsoon months**, especially in **Himalayan states** (J&K, Himachal, Uttarakhand, NE India).

Consequences:

- Flash floods, landslides, soil erosion, destruction of life & property.
- Heavy water discharge affects **downstream areas**, even beyond the localized region.

Forecasting Challenges:

- IMD predicts light / heavy / very heavy rainfall but not exact quantum at micro-level.
- Cloudbursts are **not predictable with current technology** due to:
 - Need for a dense **weather instrument network**.
 - High computing power requirements.
- Thus, **specific cloudburst forecasts are not possible**.

Cloudburst & Landslides:

- Cloudbursts often trigger **landslides** in mountainous terrains.
- **Natural triggers:** heavy rainfall, earthquakes, snowmelt, slope undercutting.
- **Anthropogenic triggers:** deforestation, infrastructure expansion, hill cutting, overgrazing.

India's Landslide Vulnerability:

- India = among **top 5 landslide-prone countries**.
- **12.6% land area** (0.42 million sq. km) prone to landslides.
- Distribution of reported landslides:
 - **66.5% → Northwestern Himalayas**
 - **18.8% → Northeastern Himalayas**
 - **14.7% → Western Ghats**

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