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Environment

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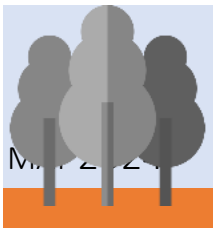


ENVIRONMENT

Goldman Environmental Prize

Context: Chhattisgarh-based environmental activist Alok Shukla was conferred the prestigious **Goldman Environmental Prize** for leading a community campaign to protect the forests of Hasdeo Arand from mining projects.

Decoding the context: Alok Shukla, as a convenor with Chhattisgarh Bachao Andolan (the Save Chhattisgarh Movement), spearheaded a grassroots campaign—the Hasdeo Aranya Bachao Sangharsh Samiti. His tireless efforts rallied forest-dwelling villagers across the region. Their collective determination led to the cancellation of the proposed coal mines in July 2022.

Learning Corner:

1. The Goldman Environmental Prize is an annual award that honours grassroots environmental activists from each of the world's six inhabited continental regions: Africa, Asia, Europe, Islands and Island Nations, North America, and South and Central America.
2. The prize was created in 1989 by philanthropists Richard and Rhoda Goldman.
3. It is often referred to as the "Green Nobel" due to its global impact and recognition.

Criteria for Selection:

4. The Goldman Prize celebrates grassroots leaders who drive positive change through community or citizen participation.
5. These environmental heroes protect endangered ecosystems, combat destructive industries, promote sustainable policies, and fight for environmental justice.
6. Their efforts often come with personal risk, making their impact even more remarkable.

carbon farming

Context: Some techniques within carbon farming can reduce greenhouse gas emissions.

Decoding the context: By adopting carbon-smart farming methods, we can simultaneously meet food demands and combat climate change.

Learning Corner:

- Carbon farming also known as carbon sequestration refers to a **set of practices aimed at reducing greenhouse gas emissions from agriculture and land use.**
- It is aimed at storing carbon in the soil, crop roots, wood, and leaves.

Key Techniques in Carbon Farming:

- **Rotational Grazing:** This involves moving livestock between pastures to allow vegetation to recover, enhancing soil carbon storage.
- **Agroforestry:** Incorporating trees and shrubs into farming systems to sequester carbon in vegetation.
- **Conservation Agriculture:** Practices like zero tillage, crop rotation, and cover cropping to minimize soil disturbance and improve organic content.
- **Integrated Nutrient Management:** Using organic fertilizers and compost to promote soil fertility and reduce emissions.
- **Livestock Management:** Optimizing feed quality and managing animal waste to lower methane emissions.

Challenges in Implementation:

Geographical Factors: Effectiveness varies based on location, soil type, crop selection, and water availability.

Biodiversity: Practices must be balanced with maintaining ecosystem services to avoid negative impacts like biodiversity loss.

Policy and Community Engagement: Requires sufficient policy support and community involvement for successful adoption.

Recharge wells

Context: The Bangalore Water Supply and Sewerage Board has constructed more than 900 **recharge wells** across the city within a span of one month.

Decoding the context: The current water crisis in Bengaluru is not solely due to a lack of water from the Cauvery River. Instead, it arises from inefficient rainwater harvesting practices and inadequate water tanks for recharging groundwater.

Learning Corner:

Recharge wells are structures designed to directly recharge groundwater.

They play a crucial role in replenishing aquifers and maintaining sustainable water availability.

These wells are typically deep shafts (ranging from 0.5 to 3 meters in diameter and 10 to 15 meters deep).

They allow surplus water (such as rainwater) to infiltrate into the aquifer, effectively recharging the groundwater.

Benefits of Recharge Wells:

Groundwater Replenishment: By allowing rainwater to percolate into the ground, recharge wells help maintain groundwater levels. This is especially important during dry periods or when wells are at risk of drying up.

Environmental Sustainability: Recharge wells contribute to overall environmental health by ensuring a balanced water cycle. They prevent excessive runoff and erosion.

Agricultural Productivity: Farmers with augmented water resources can secure two to three crops a year, improving their income and quality of life. Efficient water use also reduces input costs for irrigation and labour.

Urban Water Management: In urban areas, recharge wells help manage stormwater runoff, reduce flooding, and maintain stable water tables.

Energy Savings: Rising groundwater levels due to recharge wells can save energy. For instance, a 1-meter rise in water level saves approximately 0.4 kWh of electricity.

Nilgiri Tahr

Context: Tamil Nadu and Kerala are jointly conducting a synchronized survey to estimate the population of the **Nilgiri Tahr** (also known as Nilgiri Ibex).

Decoding the context: The Forest Departments of both states will use bounded count and double observer methods to estimate the species 'population.

Learning Corner:

The Project Nilgiri Tahr is an initiative by the Tamil Nadu government.

The project aims to protect the endangered Nilgiri Tahr, a **species native to the Western Ghats.**

The project is set to be implemented over a five-year period from 2022 to 2027, with a budget of Rs 25 crore.

The Nilgiri Tahr, also known as the Nilgiri Ibex, is listed as **"Endangered" by the IUCN and under Schedule 1 of the Wildlife (Protection) Act, 1972.**

It is the state animal of Tamil Nadu and is found in the montane grassland habitat of the rain forests ecoregion.

The **Eravikulam National Park has the highest density and largest surviving population of Nilgiri Tahr.**

Objectives of the Project Nilgiri Tahr:

Understanding the population, distribution, and ecology of Nilgiri Tahr.

Reintroducing them to their historical habitats.

Addressing immediate threats to their survival.

Raising public awareness.

Developing eco-tourism activities.

Sahyadri Tiger Reserve (STR)

Context: To revive the population of tigers in **Sahyadri Tiger Reserve (STR)** — the lone tiger reserve in the Maharashtra's western region — the state's forest department will soon translocate tigers from Tadoba-Andhari Tiger Reserve (TATR) in Chandrapur district.

Decoding the context: The tiger population in the region has been historically low due to poaching, poor prey base, and changing habitat. Even after the STR was notified, the number of tigers did not increase as breeding tigers did not colonise the reserve.

Learning Corner:

Sahyadri Tiger Reserve (STR) is a remarkable conservation area located in the Sahyadri Ranges of the **Western Ghats in Maharashtra**, India.

The Sahyadri Tiger Reserve spans across the states of Maharashtra, Karnataka, and Goa.

It comprises **rich evergreen, semi-evergreen, and moist deciduous forests.**

The reserve is situated within the Koyana Sanctuary (KWLS) and Chandoli National Park (CNP).

The reserve is dedicated to the conservation of the Bengal tiger.

Other notable species include leopards, Gaur, Sambar, Four Horned Antelope, Mouse Deer, Giant Squirrel, Vultures, and Crocodiles.

The habitat also supports Hornbills and endemic birds.

Recently, the National Tiger Conservation Authority (NTCA) approved the translocation of eight tigers from the Tadoba-Andhari Tiger Reserve (TATR) to Sahyadri Tiger Reserve. This strategic move aims to rejuvenate the tiger population in the region and enhance genetic diversity within STR.

Maharashtra's Tiger Reserves

Melghat Tiger Reserve: Located in eastern Maharashtra, Melghat comprises the Gugamal National Park, Melghat Wildlife Sanctuary, and a multiple-use area. It was among the first nine tiger reserves declared in 1973–74.

Tadoba Andhari Tiger Reserve: Formed in 1993, Tadoba Andhari Tiger Reserve includes the Tadoba National Park and Andhari Wildlife Sanctuary.

Pench Tiger Reserve: Situated in Nagpur, Pench National Park is another vital tiger reserve in Maharashtra. It **shares its boundaries with Madhya Pradesh**.

Nawegaon-Nagzira Tiger Reserve: This reserve, declared in 2013, encompasses the Nawegaon Wildlife Sanctuary and Nagzira Wildlife Sanctuary. It provides a safe haven for tigers.

Sahyadri Tiger Reserve: The lone tiger reserve in western Maharashtra, Sahyadri is nestled in the hilly terrains and forests of the Western Ghats.

Bor Tiger Reserve: It is a wildlife sanctuary located near Hingani in Wardha District, Maharashtra, India. It was declared as a tiger reserve in July 2014.

Sand mining

Context: The Supreme Court sought a report from the Directorate of Enforcement (ED) related to the illegal **sand mining** case in Tamil Nadu.

Decoding the context: The Enforcement Directorate (ED) has provisionally attached assets worth Rs 130.60 crore in connection with an illegal sand mining case in Tamil Nadu.

Learning Corner:

- **Sand mining involves the extraction of sand from various sources, including rivers, beaches, and seabeds.**
- Sand is a valuable resource used in construction, manufacturing, and other industries.
- Approximately 40-50 billion tonnes of sand are extracted globally each year, but the management and regulation of sand mining are often inadequate in many countries.

Illegal Sand Mining in India

Legal Framework:

Illegal sand mining in India is a crime under Sections 378 and 379 of the Indian Penal Code, 1860.

Natural resources are considered public property, and the state acts as their trustee.

Violating this trust by engaging in illegal sand mining can have severe consequences.

Some of the social and economic impacts:

Displacement: Communities that depend on riverbanks for their livelihoods, such as fishing and agriculture, face displacement due to sand mining.

Environmental Degradation: Excessive sand mining disrupts river ecosystems, alters river channels, and contributes to erosion. For instance, in the Papagani catchment area in Karnataka, illegal sand mining has led to **groundwater depletion and environmental degradation in** communities along the river banks in both Andhra Pradesh and Karnataka.

Biodiversity Loss: Sand mining affects aquatic habitats, threatening native species adapted to pre-mining conditions.

Groundwater Depletion: Unregulated extraction impacts groundwater levels, affecting water availability for communities.

Cloud-seeding

Context: The Supreme Court recently told the Uttarakhand government that **cloud-seeding** would not douse the forest fires that had claimed five lives in the State.

Decoding the context: Forest fires pose a significant threat to ecosystems, wildlife, and human lives.

Learning Corner:

Cloud seeding is a weather modification technique that aims to enhance precipitation, typically in the form of rain or snow.

Cloud seeding **involves introducing substances like silver iodide or dry ice into clouds to stimulate the precipitation process and form rain.**

Methods:

Hygroscopic Cloud Seeding: Disperses salts through flares or explosives in the lower portions of clouds to grow in size as water joins with them.

Static Cloud Seeding: Involves spreading a chemical like silver iodide into clouds, providing a crystal around which moisture can condense.

Dynamic Cloud Seeding: Aims to boost vertical air currents, encouraging more water to pass through the clouds, translating into more rain.

Applications:

Agriculture: Creates rain, providing relief to drought-stricken areas.

Power Generation: Augments production of hydroelectricity.

Water Pollution Control: Helps maintain minimum summer flows of rivers and dilute the impact of wastewater discharges.

Fog Dispersal, Hail Suppression, and Cyclone Modification: Used to increase mountain snowpack for additional runoff during the spring melt season.

Tackling Air Pollution: Can potentially be used to settle down toxic air pollutants through the rain.

Challenges and Concerns:

While cloud seeding has potential benefits, there are also challenges such as the unpredictability of weather patterns, environmental concerns related to the chemicals used, and the ethical implications of modifying weather.

The Global Biofuel Alliance (GBA)

Context: The Global Biofuel Alliance (GBA) outlined a work plan at a recent meeting, focusing on assessing country landscapes, drafting policy frameworks, and conducting biofuel workshops.

Decoding the context: This alliance marks a significant step towards sustainability and clean energy, addressing climate change mitigation and achieving sustainable development goals.

Learning Corner:

- **Global Biofuels Alliance (GBA) is an international initiative led by India, launched on the sidelines of the G20 Summit in New Delhi.**
- The GBA **aims to reduce greenhouse gas emissions, improve energy security, and contribute to economic growth and job creation.**
- It **involves collaboration among governments, international organizations, and industry to facilitate the adoption of biofuels** through international cooperation.

Key Objectives of the GBA:

- Develop an alliance to drive sustainable development and deployment of biofuels.
- Offer capacity-building, technical support, and policy lessons-sharing.
- Mobilize a virtual marketplace for mapping demand and supply of biofuels.
- Facilitate the development and adoption of internationally recognized standards and regulations.

Members of the GBA:

- **19 countries including G20 members like Argentina, Brazil, Canada, India, Italy, South Africa, and the USA.**
- 12 international organizations such as the World Bank, Asian Development Bank, and International Renewable Energy Agency.

Solar power generator

Context: According to a recent report, India overtook Japan to become the world's third-largest **solar power generator.**

Decoding the context: Rapid deployment of solar energy catapulted India's ranking from ninth place in 2015 to its current position.

Learning Corner:

Solar Power Generation refers to the process of converting sunlight into electricity using photovoltaic (PV) panels or through concentrated solar power systems.

It is a clean, **renewable energy source** that harnesses the natural energy provided by the sun.

Benefits of Solar Power Generation include:

Reduction in Electricity Costs: Solar energy can significantly reduce the cost of electricity.

Energy Independence: It can help countries reduce their dependence on imported fuels and enhance energy security.

Environmental Impact: Solar power generation does not produce air pollution or greenhouse gases, making it an eco-friendly option.

Economic Growth: The solar industry creates jobs and spurs economic growth.

Scalability: Solar systems can be installed on a small scale for individual homes or on a large scale for power plants.

Resilience: Solar energy contributes to a resilient electrical grid, providing backup power during outages when paired with storage.

Versatility: Solar technology can be used for a variety of applications, including heating, cooling, lighting, and transportation3.

Increased Home Value: Homes with solar power systems often have higher property values.

Long Performance Warranties: Solar PV systems typically come with long warranties, ensuring performance for many years.

India's Renewable Energy Capacity:

India has successfully achieved its target of having 40% of its installed electricity capacity from non-fossil energy sources by 2030.

This milestone was reached in November 2021 as part of India's Nationally Determined Contributions (NDCs) under the Paris Agreement.

The country's installed **renewable energy (RE) capacity** stands at 150.54 GW, with contributions from various sources:

Solar: 48.55 GW

Wind: 40.03 GW

Small hydro power: 4.83 GW

Bio-power: 10.62 GW

Large hydro: 46.51 GW

- Additionally, **India has the fourth-largest wind power capacity globally.**

Sundarban mangrove ecosystem

Context: A new study by leading environmental scientists indicates that air pollution is a serious threat to Sundarbans, a vital mangrove ecosystem.

Decoding the context: The study has shown how huge amounts of pollutants, mainly enriched with black carbon or soot particles, arriving from not only Kolkata metropolis but the entire Indo-Gangetic Plain region, are significantly deteriorating Sundarbans' air quality, thus affecting its ecosystem.

Learning Corner:

The Sundarbans is the largest mangrove ecosystem in the world.

Named after the dominant mangrove tree species, Heritiera fomes, known as sundri in Bengali,Sundarbans itself literally means 'beautiful forest' in Bengali.

Location:

The Sundarbans mangrove forest lies on the delta of the Ganges, Brahmaputra, and Meghna rivers on the Bay of Bengal.

It spans from the Baleswar River in Bangladesh's division of Khulna to the Hooghly River in India's state of West Bengal.

Size:

The forest covers an area of about 10,277 km^2. The larger part is situated in Bangladesh, and a smaller portion of it lies in India.

Biodiversity:

The Sundarbans is known for its wide range of fauna, including 260 bird species, the Bengal tiger, and other threatened species such as the estuarine crocodile and the Indian python.

It is the only mangrove habitat in the world for the Panthera tigris tigris species.

While the tree community is dominated by Heritiera, other mangrove trees include species of Avicennia, Xylocarpus, Sonneratia, Bruguiera, Cereops, Aegicera, and Rhizophora. Nipa, a palm adapted to estuaries and mangroves, line the channels.

The Sundarbans provides a significant example of ongoing ecological processes. It represents the process of delta formation and the subsequent colonization of the newly formed deltaic islands and associated mangrove communities.

This ecoregion extends across two countries with some of the highest human population densities in the world; thus anthropogenic threats are intense.

Mangrove forests are cut for fuelwood. The surge in prawn farming, fueled by the high prices they fetch abroad, is threatening ecological disaster for the Sundarbans.

River diversion and impoundment projects upriver are affecting the delicate balance of salinity and tidal fluxes that maintain this ecosystem.

Some of the more severe threats originate thousands of kilometers away: the rivers that feed and flush the mangroves carry heavy silt loads from eroding deforested Himalayan mountain slopes. This silt-laden, turbid water has profound impacts on the sensitive mangrove ecosystems, smothering the eggs and juveniles of fishes and shellfishes that use the mangroves as nurseries.

Kaziranga National Park

Context: Assam's Kaziranga National Park collects highest revenue in its 50-year history.The revenue collected by the authorities of Kaziranga National Park, from the tourists, touches ₹8.8 crore.

Decoding the context: Kaziranga National park is sprinkled with elephant-grass meadows, swampy lagoons, and dense forests is home to more than 2200 Indian one-horned rhinoceros, approximately 2/3rd of their total world population.

Learning Corner:

Kaziranga National Park is a national park located in the Golaghat and Nagaon districts of the state of Assam, India. Located on the edge of the Eastern Himalaya biodiversity hotspot, the park combines high species diversity and visibility.

The park is a UNESCO World Heritage Site. It's renowned for its population of the Indian one-horned rhinoceros, which is one of the main attractions for visitors.

Kaziranga is also recognized as an Important Bird Area by BirdLife International for the conservation of avifaunal species.

The park's contribution in saving the Indian one-horned rhinoceros from the brink of extinction at the turn of the 20th century to harbouring the single largest population of this species is a spectacular conservation achievement.

The park is spread over an area of 1,090 km² (420 sq mi) and is home to a large breeding population of elephants, wild water buffalo, and swamp deer.

The Endangered Ganges dolphin is also found in some of the closed oxbow lakes.

Over the time, the tiger population has also increased in Kaziranga, and that's the reason why Kaziranga was declared as Tiger Reserve in 2006.

Due to the difference in altitude between the eastern and western areas of the park, one can see mainly four types of vegetation like alluvial inundated grasslands, alluvial savanna woodlands, tropical moist mixed deciduous forests, and tropical semi-evergreen forests.

Kumbhi, Indian gooseberry, the cotton tree, and elephant Apple are amongst the famous trees that can be seen in the park.

It is criss-crossed by four major rivers, including the Brahmaputra.

The park faces several challenges, including poaching, habitat loss due to human encroachment, and annual flooding from the Brahmaputra River. Efforts to mitigate these threats involve anti-poaching measures, community involvement, and habitat restoration projects.

Mammoth Carbon Capture Plant

Context: Climeworks, a Swiss start-up, opened the biggest carbon absorbing plant in the world on May 8 in Hellisheidi, Iceland.

Decoding the context: Dubbed "Mammoth," the plant is designed to remove 36,000 metric tons of carbon each year, the equivalent of taking 8,600 cars off the road.That makes the new plant nine times bigger than the previous record-holder, the Climeworks "Orca" plant, which opened in Iceland in 2021.

Learning Corner:

Carbon Capture and Storage (CCS) is a technology designed to reduce the amount of carbon dioxide (CO_2) released into the Earth's atmosphere. It involves three main stages:

Capture

This is the process of separating CO_2 from the emissions produced by industrial facilities and power plants. The CO_2 can be captured directly from the gaseous emissions of an industrial source, such as a cement factory. Several technologies are in use for this purpose, including adsorption, chemical looping, membrane gas separation, and gas hydration.

Transport

After capture, the CO_2 is compressed and transported to a storage location.

Storage

The captured CO_2 is stored in deep geological formations or in the form of mineral carbonates. Geological formations are currently the favored option for storage

How Mammoth works

- The Climeworks Mammoth plant is basically a giant air filter. Fans pull air through a series of filters designed to catch stray CO_2 molecules, which make up a tiny share of air's mass — just 0.04 percent.
- Then, another company called Carbfix mixes the CO_2 with water and pumps it deep underground, where it reacts with basalt rock and turns into stone.
- The entire process runs on Iceland's plentiful geothermal energy, so powering the machines doesn't produce more carbon emissions.
- Capturing carbon from the atmosphere remains controversial. Critics say the technology is an unrealistic distraction or an excuse to keep using fossil fuels.
- But a 2022 U.N. report concluded the world is so far behind on cutting greenhouse gas emissions that capturing at least some carbon is now "unavoidable" if humanity hopes to meet its climate goals.

KANWAR LAKE

Context: Once a haven for migratory birds, Asia's largest freshwater oxbow lake, Kanwar, located in Bihar's Begusarai, is gradually disappearing.

Decoding the context: Unrestrained encroachment of land and construction of embankment on the near-by Burhi Gandak river has choked the major water inlet to the wetland.

Learning Corner:

Size and Formation:

- The Kanwar Taal or Kabartal Wetland located in Begusarai district of Bihar, India, is Asia's largest freshwater oxbow lake.
- It is a residual oxbow lake, formed due to meandering of Burhi Gandak river, a tributary of Ganga.
- An oxbow lake is a curved lake formed alongside a winding river as a result of erosion and sediment deposition over time. Oxbow lakes are typically crescent-shaped and are common features in floodplains and low-lying areas near rivers.

Biodiversity:

- The lake is an important stopover along the Central Asian Flyway, with migratory waterbirds using it to rest and refuel.
- It is also a valuable site for fish biodiversity with over 50 species documented. Five critically endangered species inhabit the site, including three vultures – the red-headed vulture (Sarcogyps calvus), white-rumped vulture (Gyps bengalensis) and Indian vulture (Gyps indicus) – and two waterbirds, the sociable lapwing (Vanellus gregarius) and Baer's pochard (Aythya baeri).

Threats:

- Major threats to the site include water management activities such as drainage, water abstraction, damming, and canalization.

Ramsar Site:

- It was declared a Ramsar site in 2020, making it the first wetland in Bihar to be included in the Ramsar convention. The Ramsar Convention is an international treaty for the conservation and sustainable use of wetlands.

Red panda

Context: Red panda was recently captured on camera in the Eaglenest Wildlife Sanctuary (EWS) located in West Kameng district, Arunachal Pradesh.

Decoding the context: This significant sighting, recorded through a camera trap installed by the Wildlife Institute of India in collaboration with EWS, highlights the sanctuary's pivotal role in preserving biodiversity.

Learning Corner:

The Red Panda, also known as the lesser panda, is a small mammal native to the eastern Himalayas and southwestern China. It is solitary and largely arboreal.

Appearance:

It has dense reddish-brown fur with a black belly and legs, white-lined ears, a mostly white muzzle, and a ringed tail. It is slightly larger than a domestic cat with a bear-like body and thick russet fur.

It is well adapted to climbing due to its flexible joints and curved semi-retractile claws.

Habitat:

The Red Panda inhabits coniferous forests as well as temperate broadleaf and mixed forests, favouring steep slopes with dense bamboo cover close to water sources.

Almost 50% of the red panda's habitat is in the Eastern Himalayas.

Diet:

It feeds mainly on bamboo shoots and leaves, but also on fruits and blossoms.

Reproduction:

Red pandas mate in early spring, with the females giving birth to litters of up to four cubs in summer.

Conservation Status:

The species has been listed as Endangered on the IUCN Red List since 2015. It is protected in all range countries.

Community-based conservation programmes have been initiated in Nepal, Bhutan, and northeastern India.

Green Credit Program (GCP)

Context: The Centre has approved 12 greening projects under the Green Credit Program (GCP), which was notified last year as a market-based mechanism designed to incentivize voluntary environmental actions across diverse sectors, officials aware of the development said.

Decoding the context: The GCP, notified on October 13, 2023, seeks voluntary participation in "environmental positive actions" such as afforestation, water conservation, waste management among others from PSUs, private industries, non-profits and individuals.

Learning Corner:

The Green Credit Programme is an innovative market-based mechanism designed to incentivize voluntary environmental actions across diverse sectors.

Objective:

This programme was officially unveiled in October 2023 and has its provenance in Mission Life, a principle frequently articulated by Prime Minister Narendra Modi. Its goal is to lay an emphasis on sustainability, reduce waste and improve the natural environment.

The GCP programme presents itself as an "innovative, market-based mechanism" to incentivise "voluntary actions" for environmental conservation.

Under this, individuals, organisations and companies — public and private — would be encouraged to invest in sectors ranging from afforestation, water conservation, stemming air-pollution, waste management, mangrove conservation and in return be eligible to receive 'green credits.'

It complements the domestic carbon market by incentivizing sustainable actions by companies, individuals, and local bodies.

An autonomous body of the Ministry, the Indian Council of Forestry Research and Education (ICFRE), is in charge of administering the programme. It is responsible for programme implementation, management, monitoring, and operation.

How It Works:

Various stakeholders, including individuals, industries, farmers' producer organizations (FPOs), urban local bodies (ULBs), and private sectors, can earn green credits.

Environment-friendly actions, such as planting trees, conserving water, waste management, and reducing air pollution, qualify for green credits.

These credits are tradable, and participants can sell them on a proposed domestic market platform.

Example

In February, the Ministry prescribed the rules governing the first of these initiatives — afforestation.

Broadly, companies, organisation and individuals could offer to pay for afforestation projects in specific tracts of degraded forest and wasteland. It said, the actual tree planting would be carried out by the State forest departments.

Two years after planting and following an evaluation by the ICFRE, each such planted tree could be worth one 'green credit.'

CHIR PINE

Context: As forest fires rage through Uttarakhand, the chir pine with its inflammable leaves or needles has been in the news for less benign reasons.

Decoding the context: After a government ban in 1981 on felling of trees over 1,000 mt above sea level, the chir got an opportunity to spread lower in the foothills where the sal grows and above too, among the broad-leaved trees because it's the nature of the chir to colonise.

Learning Corner:

A conifer that can grow up to a height of about 30 metres, the chir pine covers almost 16.5 per cent of Uttarakhand's total forested area.

It owes its scientific name, Pinus roxburghii, to William Roxburgh, a Scottish doctor and naturalist, who went on to become superintendent of the East India Company's botanic garden at Calcutta and who is widely regarded as the father of Indian botany.

Native to the Himalayas, chir pine or the longleaf Indian pine, was not introduced to the Himalayas by the British, as is often believed, though they certainly gave it preference for its commercial use, mainly lumber and resin.

Found all over the Western Himalayas at an elevation between 1,000 and 2,000 metres, it covers large parts of Garhwal and Kumaon where it can be seen growing on steep slopes and can be identified by its three needles and its round cone (unlike the elongated cones of other pines).

Chir Pine does not allow any vegetation to grow around it as it makes the soil more acidic through its fallen needles. The accumulating carpet of needles on the forest floor under these trees makes conditions unfavourable for many common plants and trees to grow

A few years ago, the Uttarakhand government had considered cutting pine trees to combat forest fires, an idea it later abandoned.

For the short-term and long-term management of the forests in Uttarakhand, the dense chir pine forest, more like monocultures, must be converted into mixed forests. More broad-leaf species should be promoted and the dense chir pine forests should be effectively managed and their wood used. The state could effectively manage the chir forests and earn some revenue as well.

The needles of chir falling onto the forest floor both suppressed the grass and rendered the hillside dangerous for cattle. Thus, in late April or early May, villagers resorted to the time-honoured remedy of fire to obtain a fresh crop of grass. Steps taken by the British to stop this practice often sparked popular protests.

While its needles tend to catch fire easily because of their high resin content, the bark of the tree doesn't catch fire easily since it has a very high ignition temperature — which is why blacksmiths use the bark of the chir pine in their furnaces to melt metal.

The tree is perennial but its needles shed maximum between fall and spring. The dry spell is also during this time. The needles should be removed in November-December as was done traditionally to stop spread of forest fires.

Venezuela's last remaining glacier

Context: Venezuela has likely become the first country — it certainly won't be the last — in modern history to lose all its glaciers. This comes after scientists reclassified the Humboldt glacier, Venezuela's last remaining glacier, as an ice field earlier this month.

Decoding the context: Scientists expected the Humboldt glacier to last another decade. However, it melted at a faster rate than expected.

Learning Corner:

Venezuela used to be home to six glaciers, located at about 5,000 metres above sea level in the Andes mountains.

By 2011, five of them had vanished. Scientists expected the Humboldt glacier to last another decade. But it melted at a faster rate than expected, and has shrunk to an area of less than 2 hectares, leading to its downgrade from a glacier to an ice field.

What are glaciers?

Glaciers are essentially large and thick masses of ice that are formed on land due to the accumulation of snow over centuries.

According to the United States Geological Survey (USGS), they usually exist and form in areas where mean annual temperatures reach near the freezing point; winter precipitation leads to significant snow accumulations; and temperatures throughout the remaining year do not cause the complete loss of the previous winter's snow accumulation.

Due to their sheer mass and gravity, glaciers tend to flow like very slow rivers. Although there is no universal consensus on how large a mass of ice has to be to qualify as a glacier, the USGS says a commonly accepted guideline is around 10 hectares.

Why are glaciers disappearing?

The reason is quite obvious — it is global warming. Glaciers are melting due to warmer temperatures.

Since the Industrial Revolution kicked off in the 18th Century, human activities such as burning fossil fuels have been releasing GHGs like carbon dioxide and methane into the atmosphere. These invisible gases trap heat — they allow sunlight to pass through the atmosphere but prevent the heat that sunlight brings from returning into space — leading to a rise in global temperatures.

In recent decades, the emission of GHGs has skyrocketed, which has resulted in the global average temperature to increase by at least 1.1 degree Celsius since 1880. The temperature rise may seem small but it has had devastating consequences.

The Andes — a mountain range running through parts of Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, and Venezuela — has witnessed a temperature increase of a high rate of 0.10 degree Celsius in the past seven decades. That is one of the major reasons why Venezuela has lost all of its glaciers.

In the case of the Humboldt glacier, the melting was accelerated by El Niño, which developed in July 2023. El Niño refers to an abnormal warming of surface waters in the equatorial Pacific Ocean and leads to warmer temperatures.

India is also at the risk of losing its glaciers. They are melting at unprecedented rates across the Hindu Kush Himalayan mountain ranges.

What are the impacts of glacier loss?

Glaciers are a crucial source of freshwater, especially during hot, dry periods, for local communities, plants, and animals. Their disappearance would mean that one would have to be entirely dependent on spot rainfall for freshwater.

The cold water that runs off glaciers keeps downstream water temperatures cooler. This is crucial for many aquatic species in the region as they need cold water temperatures to survive. Glacier loss directly impacts such species.

Melting glaciers can also contribute to the rise in sea level. The Greenland and Antarctic ice sheets — they are also considered as glaciers — are the largest contributors to global sea level rise.

For the South American country, however, the biggest impact of losing all of its glaciers will be cultural.Glaciers were a part of the region's cultural identity, and for mountaineering and touristic activities.

Antarctic Parliament

Context: India is hosting the 46th Antarctic Treaty Consultative Meeting (ATCM 46), also known as the Antarctic Parliament, from May 20-30 in Kochi.

Decoding the context: This significant recovery of heavy-caliber, military-grade weapons close to the border area is a commendable achievement for the ongoing border sealing operation by the Assam Rifles.

Learning Corner:

The Antarctic Treaty

Twelve countries — Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the USSR, the United Kingdom, and the United States — were the original signatories to the Antarctic Treaty, which was signed on December 1, 1959.

The treaty came into force in 1961, and a total of 56 countries — including India, in 1983 — have joined it since then.

The Antarctic Treaty, which was signed during the Cold War, effectively designated Antarctica as a "no man's land", outside the bounds of international geopolitical competition.

Few key features of the treaty are:

Antarctica shall be used only for peaceful purposes, and no militarisation or fortification shall be allowed.

All signatories will have the freedom to carry out scientific investigations, and should share plans for scientific programmes, extend required cooperation, and freely make available the data gathered.

Nuclear testing or disposal of radioactive waste materials shall be prohibited anywhere in Antarctica.

Today, the treaty forms the basis of all governance and activities in Antarctica, the fifth-largest continent on the planet.

India in Antarctica

Since 1983, India has been a consultative party to the Antarctic Treaty. In this capacity, India votes and participates in all key decision-making processes regarding Antarctica. Of the 56 nations that are part of the Antarctic Treaty, 29 have consultative party status.

India has undertaken scientific research in Antarctica since 1981. The first Indian Antarctica research station, Dakshin Gangotri, was set up in 1983, some 2,500 km from the South Pole in Queen Maud Land. The station operated till 1990.

In 1989, India set up its second Antarctica research station, named Maitri, in the Schirmacher Oasis, a 3-km wide ice-free plateau with over 100 freshwater lakes. It is still operational.

In 2012, India inaugurated Bharati, its third Antarctica research station, located around 3,000 km east of Maitri, on the Prydz Bay coast. Although the station focuses on oceanographic and geologic study,

the Indian Space Research Organisation (ISRO) utilises it for receiving Indian Remote sensing Satellite (IRS) data.

India plans to open a new station, Maitri II, a few kilometres from the ageing Maitri station. Operations are set to begin by 2029.

In 2022, India enacted the Antarctic Act, reaffirming its commitment to the Antarctic Treaty.

Agenda before Antarctic Treaty Consultative Meeting (ATCM)

The ATCM is meant to facilitate a global dialogue on law, logistics, governance, science, tourism, and other aspects of the southern continent.

During the conference, India will seek to promote the idea of peaceful governance in Antarctica, and underline that geopolitical tensions elsewhere in the world should not interfere with the protection of the continent and its resources.

- During the Kochi meet, India will also officially table its plan to construct Maitri II before the members. Any new construction or initiative in Antarctica requires the ATCM's approval.

Lion tailed macaques

Context: Lion tailed macaques have come down from forest canopies to urban areas in Tamil Nadu.

Decoding the context: The lion-tailed macaques, considered shy, now have lost fear for humans, thanks to habitat degradation, roads passing through their habitats, increased vehicular movement, food offered by tourists and improper waste management.

Learning Corner:

The lion-tailed macaque, also known as the wanderoo, is an Old World monkey endemic to the Western Ghats of South India.

Lion-tailed macaques are covered in black fur, and have a striking gray or silver mane that surrounds their face which can be found in both sexes. The face itself is hairless and black, being pinkish in infants less than a year old.

They are named not for their mane, but for their tail, which is long, thin, and naked, with a lion-like, black tail tuft at the tip. The size of their tail is about 25 cm (9.8 in) in length. Their eyes are a shade of hazelnut with highlighting black eyelids.

With a head-body length of 42–61 cm (17–24 in) and a weight of 2–10 kg (4.4–22.0 lb), it ranks among the smaller macaques species.

The lion-tailed macaque is a rainforest dweller, often being found in the upper canopy of tropical moist evergreen forests or monsoon forests.

It is diurnal, meaning it is active exclusively in daylight hours. When they are active, they will spend half the day foraging, and the other half will be spent resting or finding new areas to forage.

Unlike other macaques, it typically avoids humans when possible.

From 1977 to 1980, public concern about the endanged status of lion-tailed macaque became the focal point of Save Silent Valley, India's fiercest environmental debate of the decade.

Silent Valley (Kerala) has the largest number of lion-tailed macaques in South India.

They are also found in parts of Karnataka & Tamil Nadu.

It is in the 'endangered' category in the IUCN Red List of Threatened Species.

Coastal Regulation Zone (CRZ)

Context: The National Green Tribunal (NGT) has ordered the Chennai Metropolitan Development Authority (CMDA) to get approval from the Tamil Nadu State Coastal Zone Management Authority (TNSCZMA) before carrying out any activity on the city's beaches, besides cleaning and removing encroachments.

Decoding the context: As part of its ₹100-crore Chennai Shoreline Renourishment and Revitalization Project, the CMDA had planned for 'integrated coastal community development 'in Kasimedu, Tiruvottiyur, and Injambakkam-Akkarai stretches involving facilities such as a prefab building, cycle track, food court, landscape, open air theatre, open parking, pedestrian walkway, and a play area in Coastal Regulation Zone (CRZ) II areas, where such activities are prohibited.

Learning Corner:

- The Coastal Regulation Zone (CRZ) is a protective zone along India's coastline, created by the Indian Government for the preservation of the coastal environment and ecosystem.
- The CRZ was first notified under the section 3 of the Environment Protection Act, 1986 of India, in February 1991

COASTAL REGULATION ZONE NOTIFICATION, 2019

- Apart from the conservation and protection of coastal environment, the 2019 notification also leads to enhanced activities in the coastal regions thereby promoting economic growth resulting in employment generation and better standard of living.

Salient features of the Notification of 2019 are as follows –

- CRZ-I : It has been further classified as CRZ-I A, which are environmentally most critical. CRZ-I B comprises of Intertidal zone i.e., area between LTL (Low Tide Line) and HTL (High Tide Line).
- CRZ-II shall constitute the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas, which are substantially built-up.
- Land areas that are relatively undisturbed (viz rural areas etc) and those do not fall under CRZ-II, shall constitute CRZ –III.
- CRZ-III shall be further classified into following categories:
    - CRZ-III A: Such densely populated CRZ-III areas, where the population density is more than 2161per sq km as per 2011 census base, shall be designated as CRZ –III A.
    - CRZ-III B: All other CRZ-III areas with population density of less than 2161 per sq km, as per 2011 census base, shall be designated as CRZ-III B.
- Extend of No development zone (NDZ) differs in both areas.
- CRZ IV is classified as Water area and further classified as CRZ-IV A and CRZ-IV B

- Clearance procedures for projects or activities located in CRZ-I and CRZ-IV to be dealt with by the Ministry of Environment, Forests & Climate Change. Whereas, powers for clearance under CRZ-II and CRZ-III have been delegated to State level with necessary guidance.
- Boost for the tourism industry as temporary tourism facilities like shacks, toilets, change rooms, drinking water facilities have been permitted in the No Development Zone of CRZ-III areas with a minimum distance of 10m from the HTL.
- Critically Vulnerable Coastal Areas (CVCA): Sundarban region of West Bengal and other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 such as Gulf of Khambat and Gulf of Kutchh in Gujarat, Malvan, Achra-Ratnagiri in Maharashtra, Karwar and Coondapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhaitarkanika in Odisha, Coringa, East Godavari and Krishna in Andhra Pradesh shall be treated as Critical Vulnerable Coastal Areas (CVCA) and managed with the involvement of coastal communities including fisher folk who depend on coastal resources for their sustainable livelihood.

Himalayan IBEX

Context: Wildlife authorities in Himachal Pradesh's high altitude, cold desert district of Lahaul & Spiti have started surveys as part of census to estimate the population of blue sheep or bharal and the Himalayan ibex, the main prey of the iconic snow leopard.

Decoding the context: The increase in snow leopard, blue sheep and Himalayan ibex sightings has also led to an increase in wildlife tourism activities in the region.With many locals catering to the thousands of tourists who visit the cold desert every year to see these animals, they consequently do not want to harm but conserve them instead.

Learning Corner:

The Himalayan Ibex (Capra sibirica hemalayanus) is a species of wild goat found in the trans-Himalayan regions of Jammu and Kashmir, Ladakh and Himachal Pradesh.

It was earlier thought to be a subspecies of the Siberian Ibex, but it was proven by the Zoological Survey of India in March 2020 that the Himalayan Ibex is a distinct species.

Habitat: They inhabit steep crags above the tree line in the Himalayas up to 5500 m. In the Himalayas, they are frequently found at 3400-4400 m.

Behaviour and Diet: They are usually found in small herds, that number about 50 together. In winter, they come down to lower elevations in search of food as the mountains get covered in snow. In summer they move back upward as the snow melts. Their diet consists of alpine grasses and herbs.

Conservation Status: The International Union for Conservation of Nature (IUCN) lists the Himalayan Ibex as 'least concerned'.

National Green Tribunal (NGT)

Context: The National Green Tribunal (NGT) on Thursday issued a notice to the government regarding the loss of 2.33 million hectares of tree cover over the past two decades. It has also taken cognisance of the fact that India has the second-highest rate of deforestation in the world.

Decoding the context: The green judicial body stated that the loss of forest violates the Forest Conservation Act, 1980, the Air (Prevention and Control of Pollution) Act, 1981, and the Environment Protection Act, 1986.

Learning Corner:

- The National Green Tribunal (NGT) is a statutory body in India that was established on 18th October 2010 under the NGT Act of 2010.
- The NGT is a specialized body set up for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.
- It also draws inspiration from Article 21 of the Indian Constitution which assures to provide a healthy environment to the citizens of India.
- The Tribunal is not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.
- The NGT comprises of Chairperson, Judicial Members & Expert Members
- There should be a minimum of 10 and a maximum of 20 full-time Judicial as well as Expert members in the NGT. All these members hold the office for five years and are not eligible for reappointment.
- The Chairperson of the NGT is appointed by the Central Government of India in consultation with the Chief Justice of India.
- The NGT has a total of five places of sitting namely: Bhopal, Pune, New Delhi, Kolkata, and Chennai, amongst which, New Delhi is the Principal place of sitting.
- The NGT deals with civil cases under the seven laws related to the environment, these include: The Water (Prevention and Control of Pollution) Act, 1974, The Water (Prevention and Control of Pollution) Cess Act, 1977, The Forest (Conservation) Act, 1980, The Air (Prevention and Control of Pollution) Act, 1981, The Environment (Protection) Act, 1986, The Public Liability Insurance Act, 1991 and The Biological Diversity Act, 2002. Any violation pertaining to these laws or any decision taken by the Government under these laws can be challenged before the NGT.

Sweet sorghum

Context: The southern African region is battling with drought at present. The drought has hit the region's agricultural productivity hard. Malawi, Zambia and Zimbabwe have declared a state of disaster with respect to their current agricultural outputs.Sweet sorghum is a hardy, nutritious, biofuel crop that offers solutions in drought-hit southern Africa.

Decoding the context: Governments should be using their agriculture extension services to raise awareness among farmers, consumers about benefits & practical applications of sweet sorghum in people's diet. Sweet sorghum is viewed as a preferred alternative as it can provide both food and biofuel from the same land.

Learning Corner:

Sorghum (Jowar) is a large stout grass.Sweet sorghum is like any ordinary sorghum but with a high content of sweet juice in its stalks. While the juice is used to produce ethanol biofuel, the grains can be used as food or feed

The grains from sweet sorghum are prepared as steamed bread or porridge malt for traditional beer, as well as in commercial beer production.

They're nutritionally rich, with high energy values (342 calories/100 g), proteins (10g/100 grains), carbohydrates (72.7g/100 grains), and fibre (2.2g/100 grains) as well as essential minerals such as potassium (44mg/100 grains), calcium (22mg/100 grains), sodium (8mg/100 grains) and iron (3.8mg/100 grains).

It produces a lot of plant material (biomass) as it grows, which is left over after harvest. That's why it's useful as animal feed too.

Animal feed is made from what remains once the sweet sorghum crop has been harvested and its grains and stem juice stripped off. The residue is high in nutritional content, which can improve the quality of diets of animals, including cattle. The grains can also be used for animal feed.

The sweet juice in the crop's stalks is what's used to create bioethanol. Sweet sorghum contains sucrose, glucose and fructose, which are essential for bioethanol production.

Resilient

One of the key characteristics of sweet sorghum varieties is their drought resistance. It allows them to enter a dormant state during extended periods of dryness and resume growth afterwards.

Sweet sorghum's ability to withstand low water and nitrogen inputs, as well as its tolerance for salinity and drought stress, makes it an ideal crop for farmers in arid regions.

Indian Context

The sweet sorghum varieties were first introduced in India from the US in the 1970s.

India has achieved more than 10% blending of petrol with ethanol and the next target is 20% blending by 2025. The fact remains that ethanol production from sugarcane molasses alone does not ensure optimum supply levels needed to meet the demand at any given time owing to reasons such as the cyclical nature of sugarcane cultivation, difficulty in increasing sugarcane area due to high water intensiveness of the crop, erratic monsoon and power supply.

Increasing the area under sugarcane at the cost of diverting land from other staple food crops is undesirable. Sweet sorghum, a widely adapted sugar crop with high potential for bioenergy and ethanol production and which produces higher biomass yield with fewer inputs is listed as a candidate crop for biofuel production in our National Policy on Biofuels 2018.

Sweet sorghum is an attractive crop for biofuel production and in the era of climate change.

Namami Ganga

Context: Though the union government has pumped in almost Rs 40,000 crore into the flagship Namami Gange programme since 2014, several concerns – including dysfunctional sewage treatment plants and bad governance – abound.

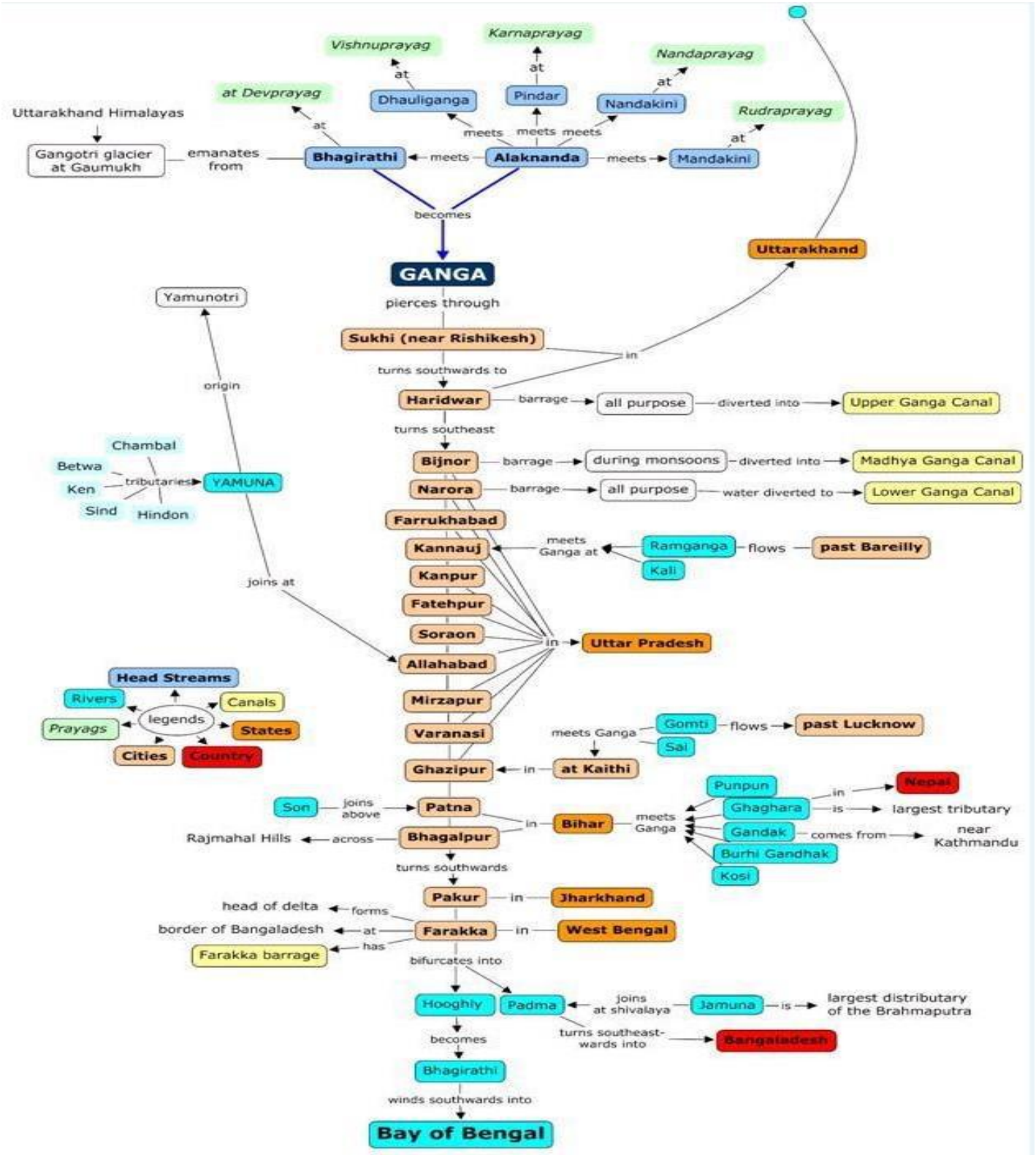
Decoding the context: The Ganga – India's longest river, and one that supports a population of around 400 million by one estimate – has been the target of cleaning programmes since the mid 1980s, due to the sewage and industrial effluents that find their way to the river.

Learning Corner:

- Namami Gange Programme is an Integrated Conservation Mission, approved as 'Flagship Programme' by the Union Government in June 2014 with budget outlay of Rs.20,000 Crore to accomplish the twin objectives of effective abatement of pollution, conservation and rejuvenation of National River Ganga.
- union government launched the Namami Gange programme in 2014 as part of the National Mission for Clean Ganga (NMCG) under the Ministry of Jal Shakti's Department of Water Resources, River Development and Ganga Rejuvenation.
- Main pillars of the Namami Gange Programme are:-
    - Sewerage Treatment Infrastructure
    - River-Front Development
    - River-Surface Cleaning
    - Bio-Diversity
    - Afforestation
    - Public Awareness
    - Industrial Effluent Monitoring
    - Ganga Gram
- Its implementation has been divided into Entry-Level Activities (for immediate visible impact), Medium-Term Activities (to be implemented within 5 years of time frame) and Long-Term Activities (to be implemented within 10 years).

About River Ganga

- The Ganges is a trans-boundary river of Asia which flows through India and Bangladesh.
- The 2,525 km (1,569 mi) river rises in the western Himalayas in the Indian state of Uttarakhand.



- It flows south and east through the Gangetic plain of North India, receiving the right-bank tributary, the Yamuna, which also rises in the western Indian Himalayas, and several left-bank tributaries from Nepal that account for the bulk of its flow.

- In West Bengal state, India, a feeder canal taking off from its right bank diverts 50% of its flow southwards, artificially connecting it to the Hooghly River. The Ganges continues into Bangladesh, its name changing to the Padma. It is then joined by the Jamuna, the lower stream of the Brahmaputra, and eventually the Meghna, forming the major estuary of the Ganges Delta, and emptying into the Bay of Bengal. The Ganges–Brahmaputra–Meghna system is the second-largest river on earth by discharge.
- The main stem of the Ganges begins at the town of Devprayag, at the confluence of the Alaknanda, which is the source stream in hydrology on account of its greater length, and the Bhagirathi, which is considered the source stream in all of Hindu mythology.

JUNE 2024

1.SARUS CRANE

- The sarus crane (Antigone antigone) is a large nonmigratory crane found in parts of the **Indian subcontinent, Southeast Asia, and Australia.**
- The **tallest of the flying birds**, standing at a height of up to 1.8 m (5 ft 11 in), they are a conspicuous species of open wetlands in South Asia, seasonally flooded forests in Southeast Asia, and Eucalyptus-dominated woodlands and grasslands in Australia.
- The sarus crane is easily distinguished from other cranes in the region by its overall **grey colour and the contrasting red head and upper neck**.
- They forage on marshes and shallow wetlands for roots, tubers, insects, crustaceans, and small vertebrate prey.
- Like other cranes, they form long-lasting pair bonds and maintain territories within which they perform territorial and courtship displays that include loud trumpeting, leaps, and dance-like movements.
- The major population of Sarus cranes are found in **Uttar Pradesh, Gujarat and Rajasthan.** They are classified as **"Vulnerable" in the IUCN Red List.**
- In India, they are considered symbols of marital fidelity, believed to mate for life and pine the loss of their mates, even to the point of starving to death.
- The main breeding season is during the rainy season, when the pair builds an enormous nest "island," a circular platform of reeds and grasses nearly two meters in diameter and high enough to stay above the shallow water surrounding it.
- Increased agricultural intensity is often thought to have led to declines in sarus crane numbers, but they also benefit from wetland crops and the construction of canals and reservoirs.
- Sarus crane is known for its ability to live in association with humans, inhabiting open, cultivated, well watered plains, marshlands and jheels.

2.OZONE-DEPLETING SUBSTANCES (ODS)

Ozone is a molecule composed of **three oxygen atoms.**

Ozone is present in two layers of the Earth's atmosphere:

- **Troposphere:** Here, ozone acts as a **greenhouse gas** and is most potent in the cold upper troposphere, located 8–15 km above the surface.
- **Stratosphere:** This layer contains the ozone layer or shield, which **absorbs most of the Sun's harmful ultraviolet radiation**. It is found between approximately 15 and 50 km above the Earth's surface and contains about 90% of atmospheric ozone.

Ozone-depleting substances (ODS)

- **Ozone-depleting** substances (ODS) are chemicals that can destroy ozone molecules in the stratosphere.
- Ozone-depleting substances (ODS) are compounds that release chlorine and bromine when exposed to ultraviolet light, leading to ozone layer depletion.
- These substances include chlorofluorocarbons (CFCs), carbon tetrachloride, hydrochlorofluorocarbons (HCFCs), and methyl chloroform.

International agreements related to the protection of the ozone layer

- **Vienna Convention for the Protection of the Ozone Layer (1985):** A framework convention that formalized international cooperation on ozone layer protection.
- **Montreal Protocol on Substances that Deplete the Ozone Layer (1987):** A protocol under the Vienna Convention that regulates the production and consumption of ozone-depleting substances to protect the ozone layer.

3.NAGARAHOLE TIGER RESERVE

- It is also known as '**Rajiv Gandhi National Park.**
- It was established as a wildlife sanctuary in **1955** and was upgraded into a **national park in 1988**.
- It was declared as the 37th Tiger reserve under Project Tiger in 1999.
- **The Park lies in the Western Ghats and is a part of the Nilgiri Biosphere Reserve.**
- **The Nagarahole River flows through the park, which joins the Kabini River which also is a boundary between Nagarahole and Bandipur National Park**.
- The vegetation consists mainly of moist deciduous forests with predominating trees of teak and rosewood.
- Asian elephants, chital (spotted deer), Indian mouse deer, gaur, stripe-necked and ruddy mongooses, grey langur, bonnet macaque, Asian wild dog, leopard, tiger, sloth bear among others.
- Nagarhole has a high tiger density which is first in the state of Karnataka and 3rd highest in the country after Corbett and Kaziranga Tiger Reserves.
- The Kabini backwaters with their fertile banks attract between 600-800 elephants during the peak summer months in a normal year which is the largest congregation of Asian elephants.
- Nagarhole National Park along with the adjoining Bandipur National Park, Mudumalai National Park and Wayanad Wildlife Sanctuary (Kerala) forms the largest protected area in Southern India.

4.NITROUS OXIDE (N2O) EMISSION

A recent study has ranked India as the world's **second-largest emitter of nitrous oxide (N2O),** a potent greenhouse gas.

- Nitrous Oxide (N2O), commonly known as laughing gas or happy gas, is a colourless, odourless, and non-flammable gas.
- It is used in various fields such as dentistry for sedation, as a propellant in food aerosols, and in the automotive industry to enhance engine performance.

Significance in Climate Change

- N2O is the third most significant greenhouse gas after carbon dioxide and methane.
- It is 273 times more potent than CO2 over 100 years.
- The increase in greenhouse gases has already raised the Earth's average surface temperature by 1.15 degrees Celsius compared to the 1850-1900 average.
- Anthropogenic nitrous oxide emissions contribute to about 0.1 degrees of this warming.

Sources of N2O Emissions

- Nitrous oxide is emitted during agricultural and land use activities, industrial processes, combustion of fossil fuels and solid waste, and during the treatment of wastewater.
- It is also released into the atmosphere when deep water rises to the surface in a process known as upwelling.

- The biggest human sources of N2O are **agriculture, industry, and the burning of forests or agricultural waste.**
- The growing demand for meat and dairy products has also contributed to an increase in emissions through the increase in manure production, which also causes N2O emissions.

Emission Statistics

- **N2O emissions grew by 40 percent between 1980 and 2020.**
- The top 10 emitters are China, India, the US, Brazil, Russia, Pakistan, Australia, Indonesia, Turkey, and Canada.
- Agricultural practices utilizing nitrogen fertilizers like ammonia and animal manure accounted for 74% of total anthropogenic N2O emissions in the past decade.
- make it a significant concern for public health.

5.FILOBOLETUS MANIPULARIS

A rare species of **bioluminescent mushrooms, scientifically known as Filoboletus manipularis**, has been discovered in the forests of Kasaragod.

- **Filoboletus manipularis** is a species of **agaric fungus** in the family Mycenaceae.
- Filoboletus manipularis commonly **found in Australasia, Malaysia, and the Pacific islands**.
- The mycelium and fruit bodies of the fungus grow in forests.
- These mushrooms are capable of producing their own light through a biochemical process.

6.GANDHI SAGAR WILDLIFE SANCTUARY

The **Gandhi Sagar Wildlife Sanctuary** in **western Madhya Pradesh** is set to become the second home for cheetahs in India, after the Kuno National Park.

- **The Gandhi Sagar Wildlife Sanctuary is located on the northern boundary of the Mandsaur and Nimach districts in Madhya Pradesh, India.**
- It was notified in 1974 and added to the list of sanctuaries in 1984.
- **The sanctuary is characterized by diverse topography, including hills, plateaus, and the catchment area of the Gandhi Sagar Dam on the Chambal River.**
- It provides a natural habitat for various species of animals, including Gharial, chinkara (Indian gazelle), blackbuck, Indian wolf, fox, wild boar, and more.
- The avian population is also abundant with several migratory and resident bird species.

7.E-COLI CONTAMINATION

- E-coli, or Escherichia coli, is a type of **bacteria** that normally lives in the intestines of people and animals.

- While most strains are harmless, some can cause serious **food poisoning and infection.**
- Most strains are part of the normal microbiota of the gut and are harmless or even beneficial to humans (although these strains tend to be less studied than the pathogenic ones). For example, some strains of E. coli benefit their hosts by producing vitamin K2 or by preventing the colonization of the intestine by pathogenic bacteria.
- These mutually beneficial relationships between E. coli and humans are a type of mutualistic biological relationship — where both the humans and the E. coli are benefitting each other.
- There are harmful strains of E. coli that causes illness if you accidentally ingest them. But the E. coli that usually live in your gut can also get in places they're not supposed to be (like your urinary tract). This causes an E. coli infection there.
- The most familiar strains of E. coli that make one sick are those producing a **toxin called Shiga**.
- E-coli can lead to diarrhea, urinary tract infections, respiratory illness, pneumonia, and other illnesses.
- It's often spread through contaminated food or water, or through contact with animals or persons.
- **Treatment for E-coli infection typically focuses on relieving symptoms and preventing dehydration,** as most cases resolve on their own without the need for antibiotics.

8.EU CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

British wind and solar farms exporting power to continental Europe could face CO2 fees from 2026 - even though they don't produce any emissions - unless the UK and European Union can agree changes around the **EU's carbon border tax.**

- The EU's Carbon Border Adjustment Mechanism (CBAM) is designed to ensure a fair price on carbon emissions produced during the manufacturing of carbon-intensive goods entering the EU.
- It aims to encourage cleaner industrial production in non-EU countries.

EU's Climate Goals:

- The EU has committed to reducing its carbon emissions by at least 55% by 2030 compared to 1990 levels.
- **The Carbon Border Tax is part of this effort, targeting import-related emissions which account for 20% of CO2 emissions.**

Implementation:

- The transitional phase of CBAM began in October 2023, with a full implementation expected from January 1, 2026.

Impact on Trade:

- There are concerns about increased costs for non-EU exports, including India's metal exports to EU countries.

9.DIRECT SEEDING OF RICE (DSR)

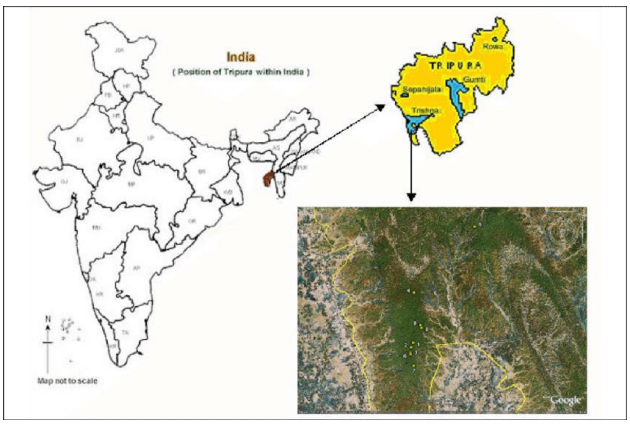
Punjab government is actively promoting **Direct Seeding of Rice (DSR).**

- **Direct Seeding of Rice (DSR)** is a rice cultivation method where pre-germinated seeds are directly sown into the field using a tractor-powered machine, without the need for nursery preparation or transplantation.
- **Farmers have to only level their land and give one pre-sowing irrigation.**

- This technique is considered more efficient and sustainable than traditional methods, as it reduces labour, saves water, and lowers greenhouse gas emissions.
- DSR can potentially increase farmers' profits and contribute to environmental conservation.

10.TRISHNA WILDLIFE SANCTUARY

The population of bison in **Trishna Wildlife Sanctuary** has increased.



- **Trishna Wildlife Sanctuary, located in Tripura**, India, was established in 1988 and spans an area of 197.7 sq km.
- It is dedicated to the conservation of ecology, wildlife, and biodiversity.
- The **vegetation covers four broad categories** of tropical semi-evergreen forest, the east Himalayan lower Bhanar sal, Moist mixed deciduous forest and the Savanah woodland.
- **The Indian Gaur (Bison) is a notable attraction of the sanctuary.**

11.CAECILIAN SPECIES

New species of **Striped Caecilian (Ichthyophis spp)** discovered in Kaziranga National Park.

- **The Caecilians are elongated, segmented, limbless amphibians.**
- They resemble earthworms or snakes due to their lack of limbs.
- Some species are eyeless, while others have small hidden eyes.
- **Classification:**
- Caecilians belong to the order Gymnophiona (or Apoda), which means "without legs."
- **They share a group with frogs and salamanders.**
- **Habitat:**
- **Most caecilians inhabit moist tropical and subtropical regions.**
- Their distribution spans South and Central America, South and Southeast Asia, and Sub-Saharan Africa.
- Caecilians are primarily terrestrial, spending much of their lives underground.
- They burrow in forests, grasslands, savannas, shrublands, and wetlands.

12.NEGLECTED TROPICAL DISEASE (NTD)

In a landmark achievement, **Chad has become the first country in 2024 and the 51st globally to eliminate a neglected tropical disease (NTD) — the gambiense form of human African trypanosomiasis (HAT).**

- **Neglected Tropical Diseases (NTDs)** are a diverse group of communicable diseases that prevail in tropical and subtropical conditions.
- These diseases disproportionately affect impoverished communities, impacting more than one billion people globally.

Prevalence and Impact:

- **NTDs mainly affect marginalized countries in Asia, Africa, and the Americas.**

- They cause devastating health, social, and economic consequences, particularly among women and children.

Complex Epidemiology:

- **NTDs have complex epidemiology, often related to environmental conditions.**
- Many are vector-borne, have animal reservoirs, and involve intricate life cycles, making their control challenging.
- **Examples of NTDs:**
- **Some notable NTDs include:** Buruli ulcer, Chagas disease, Dengue and chikungunya, Dracunculiasis (Guinea worm disease), Leprosy (Hansen's disease), Onchocerciasis (river blindness), Schistosomiasis Snakebite envenoming, Trachoma, Yaws and other endemic treponematoses.

World NTD Day:

- **January 30 is observed as World NTD Day, commemorating the launch of the first NTD road map and the London Declaration on NTDs in 2012.**
- The London Declaration aimed to recognize and address the global burden of NTDs.

13.RAIMONA NATIONAL PARK

- **Raimona National Park is located in the state of Assam** along the Indo-Bhutan border, Raimona National Park is a significant conservation area.

Geography and Boundaries:

- **The park shares its northern border with Bhutan's Phibsoo Wildlife Sanctuary.**
- **The western part is marked by the Sankosh River,** forming the **inter-state boundary between West Bengal and Assam.**
- The eastern part is traversed by the Saralbhanga River (also known as Swrmanga), flowing southward from Bhutan's Sarphang district.

Vegetation and Flora:

- Raimona National Park boasts diverse forests, including **moist sal forests, sub-Himalayan high alluvial semi-evergreen forests, savannah forests, and more.**
- Orchids, tropical rainforest species, and riverine grasslands flourish within the park.

Fauna:

- The park is home to various wildlife, including the Golden Langur, Asian Elephant, Royal Bengal Tiger, and Clouded Leopard.
- Notably, a recent scientific observation recorded a Mainland Serow (Capricornis sumatraensis thar) at an unusually low elevation of 96 meters above sea level in Raimona National Park.

Mainland Serow:

- A mammal resembling a cross between a goat and an antelope.
- Inhabits altitudes ranging from 200 to 3,000 meters.

- Found across the India-Bhutan border in Phibsoo Wildlife Sanctuary and Royal Manas National Park in Bhutan.
- Other species include the Japanese serow, red serow (found in eastern India, Bangladesh, and Myanmar), and Taiwan or Formosan serow.

JULY 2024

1.PENCH TIGER RESERVE

- **The Pench Tiger Reserve, named after the Pench River.**
- Inside the park, the river flows from North to South before going on to join the Kanhan River, while splitting the Park into two, and forming the boundary of Seoni District and Chhindwara District districts of Madhya Pradesh.
- The Meghdoot dam built across Pench River at Totladoh has created a large water body of 72 km2 out of which 54 km2 falls in M.P. and the rest in the adjoining state of Maharashtra.
- The Pench River which emerges from Mahadeo Hills of Satpura Ranges and the various nallas and streams which drain into it, all flow through the forests of the protected area.
- The Pench Tiger Reserve **spans the southern reaches of the Satpura hills in the Seoni and Chhindwara districts of Madhya Pradesh.**
- It also **extends into the Nagpur district in Maharashtra.**

Biodiversity:

- This reserve is home to a rich variety of flora and fauna.
- The **majestic Royal Bengal Tigers are the main attraction**, but it also hosts large herds of **Chital, Sambar, Nilgai, and Gaur (Indian Bison).**
- The area supports over 325 species of resident and migratory birds, including **the Malabar Pied Hornbill, Indian Pitta, Osprey, and Grey Headed Fishing Eagle.**

Vegetation:

- The undulating terrain features a mosaic of vegetation, ranging from moist sheltered valleys to open, dry deciduous forests.
- **Teak, saag, mahua,** and various grasses and shrubs thrive here.
- The Pench region is the real-life setting of Rudyard Kipling's famous novel, "The Jungle Book".

2.TALLEY WILDLIFE SANCTUARY

- Recently, a team of researchers from the Zoological Survey of India recorded the forest-dwelling frog from the **Talley Wildlife Sanctuary** and named it as Xenophrys apatani.

- **Talley Valley Wildlife Sanctuary** is a protected area located in the Indian state of **Arunachal Pradesh.**
- The sanctuary ranges in elevation from 1,200 to 3,000 meters (3,900 to 9,800 feet) and **features subtropical and temperate broadleaved and conifer forests.**
- Notable species include the **clouded leopard, Malayan giant squirrel, Indian muntjac, and Asian palm civet.**

- Additionally, **130 bird species have been observed**, including the **black eagle, collared owlet, and Verditer flycatcher.**
- The **sanctuary is also home to 16 endangered plant species,** such as Panax sikkimensis, Acer hookeri, and Lilium grandiflora.

Xenophrys Apatani

- The **Xenophrys apatani** is a newly discovered species of **horned frog found** in the Tale Wildlife Sanctuary in Arunachal Pradesh, India.
- It has been **named after the Apatani tribe**, which predominantly resides in the Lower **Subansiri Valley of Arunachal Pradesh.**
- It is distributed along the Eastern Himalayan and the Indo-Burma biodiversity hot spots of the country.

3.SENNA SPECTABILIS

- **Senna spectabilis is a deciduous tree native to tropical areas of America.**

- It grows rapidly, reaching heights of 15 to 20 meters in a short period.
- **After flowering, it distributes thousands of seeds.**
- The tree's thick foliage hinders the growth of indigenous trees and grass species, causing food shortages for wildlife, especially herbivores.
- **It adversely affects native species' germination and growth.**
- Classified as '**Least Concern' on the IUCN Red List.**

Invasive Species:

- Invasive species cause ecological or economic harm in new environments where they are not native.
- They compete with native organisms, alter habitats, and reduce biodiversity.

4.MUDUMALAI TIGER RESERVE (MTR)

- **Mudumalai Tiger Reserve (MTR)** is **located in the Nilgiris District of Tamil Nadu**, spread over 321 sq. km. at the **tri-junction of three states, viz, Karnataka, Kerala, and Tamil Nadu.**

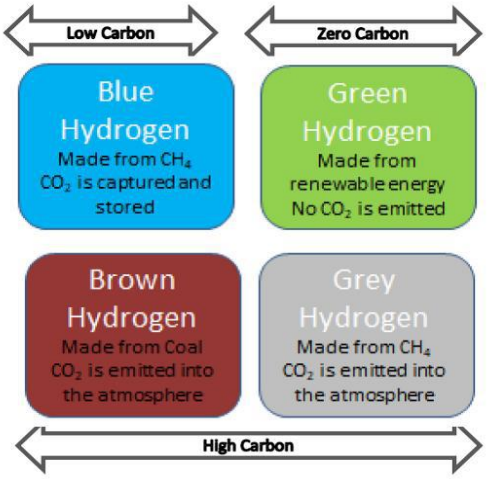
- It lies on the **Northeastern and Northwestern slopes of Nilgiri hills** which is a part of the Western Ghats.
- It is **part of the Nilgiris Biosphere Reserve,** the first Biosphere Reserve in India.
- It has a common boundary with Wayanad Wildlife Sanctuary (Kerala) on the West, Bandipur Tiger Reserve (Karnataka) on the North, the Nilgiris North Division on the South and East, and Gudalur Forest Division on the South West.

Ecological Significance:

- The reserve encompasses diverse ecosystems, including montane forests, grasslands, wetlands, and Shola forests unique to the Western Ghats.
- It is home to a rich variety of flora and fauna, including the Indian rock python and the mugger crocodile.

5.NATIONAL GREEN HYDROGEN MISSION

- The National Green Hydrogen Mission (NGHM) is a pivotal initiative approved by the Union Government of India.
- **The NGHM aims to make India a global hub for the production, usage, and export of green hydrogen and its derivatives.**



- It aligns with India's vision of achieving energy independence by 2047 and net-zero emissions by 2070.
- **Key Components:**
- **Strategic Interventions for Green Hydrogen Transition Programme (SIGHT):** This program funds domestic manufacturing of electrolysers and promotes green hydrogen production.
- **Green Hydrogen Hubs:** States and regions capable of supporting large-scale hydrogen production and utilization will be identified and developed as hubs.
- **Capacity Goals:** The mission targets a green hydrogen production capacity of at least 5 million metric tonnes (MMT) per annum and aims to add about 125 GW of renewable energy capacity by 2030.
- **Investment and Employment**: NGHM is expected to attract over ₹8 lakh crore in investments and generate around six lakh jobs.
- **Environmental Impact:** It will reduce fossil fuel imports by over ₹1 lakh crore and abate nearly 50 million tonnes of annual greenhouse gas emissions.

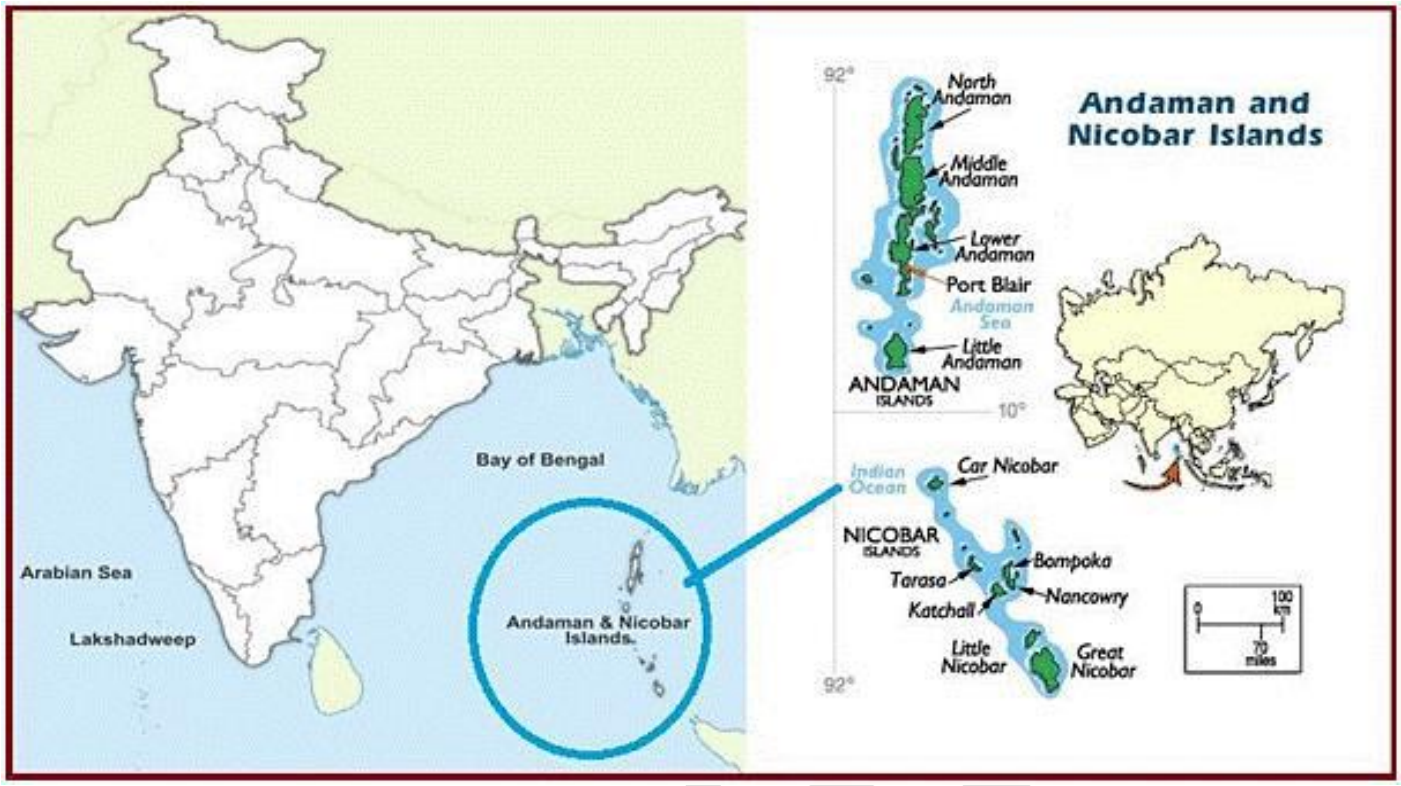
Significance:

- **Decarbonization:** NGHM contributes to decarbonizing industrial, mobility, and energy sectors.
- **Indigenous Manufacturing**: It fosters indigenous manufacturing capabilities.
- **Technology Development:** NGHM encourages research in efficient fuel cells and related technologies.

Challenges:

- **Nascent Industry:** Globally, green hydrogen development is still in its early stages.
- **Economic Sustainability:** Ensuring cost-competitiveness for commercial use remains a challenge.

6.GREAT NICOBAR PROJECT



- The Great Nicobar Island (GNI)Project is a **mega project to be implemented at the southern end of the Andaman and Nicobar Islands.**
- The project **includes an international container trans-shipment terminal, a greenfield international airport, township development, and a 450 MVA gas and solar based power plant over an extent of 16,610 hectares in the island.**
- The port will be controlled by the Indian Navy, while the airport will have dual military-civilian functions and will cater to tourism as well.

Great Nicobar

- **Great Nicobar is the southernmost island of the Nicobar Islands Archipelago.**
- It covers 1,03,870 hectares of unique and threatened tropical evergreen forest ecosystems.
- It is home to a very rich ecosystem, including 650 species of angiosperms, ferns, gymnosperms, bryophytes, among others.
- In terms of fauna, there are over 1800 species, some of which are endemic to this area.

Ecological Characteristics:

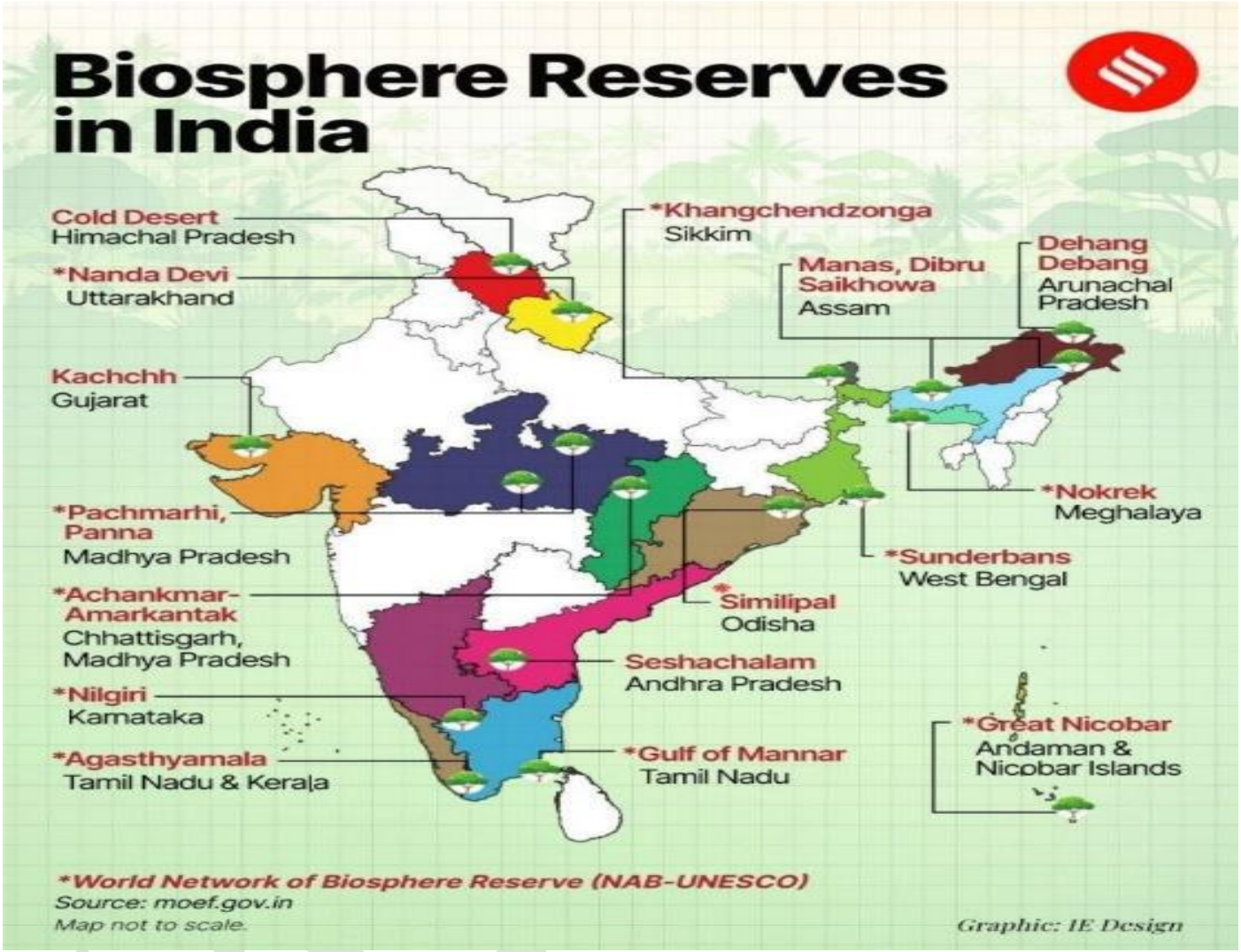
- The Great Nicobar Biosphere Reserve harbours a wide spectrum of ecosystems comprising tropical wet evergreen forests, mountain ranges reaching a height of 642 m (Mt. Thullier) above sea level, and coastal plains.

Tribe:

- The **Mongoloid Shompen Tribe,** about 200 in number, live in the forests of the biosphere reserve particularly along the rivers and streams.
- They are hunters and food gatherers, dependent on forest and marine resources for sustenance.
- Another **Mongoloid Tribe, Nicobarese**, about 300 in number, used to live in settlements along the west coast.

- After the tsunami in 2004, which devastated their settlement on the western coast, they were relocated to Afra Bay in the North Coast and Campbell Bay.

7.BIOSPHERE RESERVES



- UNESCO recently added 11 new **biosphere reserves** worldwide, spanning countries like Colombia, Italy, Mongolia, and the Republic of Korea.
- Biosphere Reserves are internationally designated areas recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO).
- These reserves aim to balance economic development, cultural preservation, and nature conservation

Criteria for Designation of Biosphere Reserve

- A site **must contain a protected and minimally disturbed core area** of value of nature conservation.
- The core area must be a **bio-geographical unit** and should be large enough to sustain a viable population **representing all trophic levels.**
- The **involvement of local communities** and use of their knowledge in biodiversity preservation.

- Area's potential for preservation of **traditional tribal or rural modes of living** for harmonious use of the environment.

Three Main Zones:

- **Core Areas:** These are the **most protected regions within a biosphere reserve**. They conserve endemic plants, animals, and important genetic reservoirs. Human interference is minimal here.
- **Buffer Zone: Surrounding the core zone, this area allows limited activities** like tourism, fishing, and grazing. Research and education are encouraged.
- **Transition Zone:** The outermost part where human activities and conservation coexist harmoniously. Settlements, croplands, and managed forests characterize this zone.

Status of Biosphere Reserves in India:

- There are now 759 reserves in 136 countries, including 24 transboundary sites.
- **India has 18 internationally recognized Biosphere reserves**, with the Nilgiri reserve being the first.
- The latest addition is **Panna in Madhya Pradesh.**
- **Twelve of the eighteen biosphere reserves are a part of the World Network of Biosphere Reserves, based on the UNESCO Man and the Biosphere (MAB) Programme list.**

8.BIODIVERSITY BEYOND NATIONAL JURISDICTION (BBNJ) AGREEMENT

- **Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, or the 'High Seas Treaty', is an international treaty under the United Nations Convention on the Law of the Sea (UNCLOS).**
- It aims to **address** the growing concerns over **the long-term protection of marine biodiversity in the high seas.**
- It **sets precise mechanisms for the sustainable use of marine biological diversity** through international cooperation and coordination.
- **Parties cannot claim or exercise sovereign rights over marine resources derived from the high seas and ensure fair and equitable sharing of benefits.**
- It follows an inclusive, integrated, ecosystem-centric approach based on the precautionary principle and promotes using traditional knowledge and the best available scientific knowledge.
- It helps minimise impacts on the marine environment through area-based management tools and establishes rules for conducting environmental impact assessments.
- **It would also contribute to achieving several SDGs, particularly SDG14 (Life Below Water).**
- **The BBNJ Agreement will be the third implementation agreement under UNCLOS** if and when it enters into force, alongside its sister implementation agreements: the 1994 Part XI Implementation Agreement and the 1995 UN Fish Stocks Agreement

9.REGIONAL ANALYSIS OF INDIAN OCEAN (RAIN)SYSTEM

- **Regional Analysis of Indian Ocean System (RAIN) is a data assimilation system developed by the Indian National Centre for Ocean Information Services (INCOIS).**
- RAIN is designed to gather information on the health of the Indian Ocean.
- **The recent upgrade incorporates sea surface height anomaly (SSHA) in addition to the previous parameters of salinity and sea surface temperature.**

- **This enhancement improves the accuracy of ocean current analysis.**
- The system collects observations at the ocean's surface and below the water at depths ranging from 3 meters to 2,000 meters, depending on the requirement.

Important applications of the Regional Analysis of Indian OceaN (RAIN)

- **Ocean Forecasting:**
- **Climate Research:**
- **Fisheries Management:**
- **Environmental Monitoring:**
- **Disaster Preparedness and Response:**
- **Shipping and Maritime Operations:**
- **Renewable Energy:**

10.VEERANGANA DURGAVATI TIGER RESERVE

- The Veerangana Durgavati Tiger Reserve is located in **Madhya Pradesh.**
- It is the **seventh tiger reserve in the state and the 54th in the country.**
- It spans across Sagar, Damoh, and Narsinghpur districts in Madhya Pradesh.
- It encompasses parts of the Nauradehi Wildlife Sanctuary and the Durgavati Wildlife Sanctuary.

Flora:

- The reserve features dry deciduous vegetation, including species like Teak, Saja, Dhaora, Ber, and Amla.
- Among its diverse wildlife are tigers, leopards, wolves, jackals, Indian foxes, striped hyenas, Nilgai, Chinkara, Chital, Sambhar, Black Buck, Barking deer, Common Langur, and Rhesus Macaque.

Tiger reserves India:

- At present the number of tiger reserves in india is 55.
- The 55th tiger reserve in india is **Dholpur – Karauli Tiger Reserve in Rajasthan.**
- **Veerangana Durgavati Tiger Reserve in Madhya Pradesh** was the 54th Tiger Reserve in India.
- The **Ranipur Tiger Reserve in Uttar Pradesh** has become the 53rd tiger reserve in India.
- Jim **Corbett National Park in Uttarakhand** was India's first tiger reserve, established in 1936.

11.SARUS CRANE

- The **Sarus Crane** is **the tallest flying bird in the world.**
- It was declared as the state bird of Uttar Pradesh in 2014.It is found in **Southeast Asia, northern India, and northern Australia**

Habitat:

- **Prefers wetlands such as canals, marshes, and ponds, often near human habitation.**
- Sarus Cranes are least social among crane species, usually found in pairs or small groups.

Threats:

- **Habitat Loss:** Due to agricultural expansion and urbanization.
- **Predation:** By feral dogs, mongoose, and snakes.
- **Human Activities:** Hunting and disturbance from human activities.

Conservation Efforts:

- **Projects:** The Sarus Crane Conservation Project in Uttar Pradesh involves local volunteers, NGOs, and the U.P. Forest Department.
- **Census:** Regular population monitoring and habitat protection efforts are ongoing.

Conservation Status: vulnerable

12.INDIA'S ELECTRIC VEHICLES (EVS) POLICY

- Electric vehicles (EVs) use one or more electric motors for propulsion. They can be powered by batteries, solar panels, or an electric generator that converts fuel to electricity.
- EVs are seen as a sustainable alternative to traditional internal combustion engine vehicles due to their lower emissions and reduced dependence on fossil fuels.
- **India's E-Vehicle Policy**India's E-Vehicle policy, approved in March 2024, aims to promote the country as a manufacturing destination for EVs and attract investment from reputed global EV manufacturers.

Objectives:

- **Enhancing Access to Technology:** Strengthening the EV ecosystem and promoting competition among players.
- **Lowering Production Costs:** Improving EV economics for Indian consumers.
- **Domestic Manufacturing:** Mandating 50% value addition in manufacturing to occur domestically within five years.
- **Reduced Import Duty:** Lowering import duty on completely built units (CBUs) with a cost, insurance, and freight (CIF) value of $35,000 from 70%-100% to 15%.

Global Comparison:

- India's EV policy aligns with incentives provided in the U.S., China, and Europe for EV manufacturing.
- However, electric cars in Europe and the U.S. remain 10%-50% more expensive than combustion engine vehicles.
- Both regions import 20%-30% of their EV battery demands, highlighting the need for integrated production.

Other Related Steps:

- **The Indian government has set a target to achieve 30% electrification of the country's vehicle fleet by 2030.**
- Initiatives such as the Faster Adoption of Manufacturing of Electric Vehicles Scheme – II (FAME – II) and the Production Linked Incentive Scheme (PLI) have been launched to support this goal.

13.CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

- The **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** is an international agreement aimed at ensuring that international trade in wild animals and plants does not threaten their survival.
- CITES was adopted on March 3, 1973, and entered into force on July 1, 1975.
- As of now, there are 184 member parties to the convention.
- **India has been a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1976.**
- **Objective:** The primary goal is to regulate international trade in specimens of wild animals and plants to ensure that their survival is not threatened.

Structure and Functioning:

- **Appendices:** CITES classifies species into three appendices based on the level of protection they need:
- **Appendix I: Species threatened with extinction**. Trade in these species is permitted only in exceptional circumstances.
- **Appendix II:** Species **not necessarily threatened with extinction but may become so unless trade is closely controlled.**
- **Appendix III: Species that are protected in at least one country**, which has asked other CITES Parties for assistance in controlling the trade.

- **Permits and Certificates:** Trade in CITES-listed species is regulated through a system of permits and certificates to ensure that it is legal, sustainable, and traceable.

Implementation

- **CITES is legally binding on the Parties but does not replace national laws.**
- Each Party must adopt its own domestic legislation to ensure that CITES is implemented at the national level.
- Each party must designate one or more Management Authorities to administer the licensing system and one or more Scientific Authorities to provide scientific advice on the effects of trade on the status of the species.

14.NATIONAL GREEN TRIBUNAL (NGT)

- The **National Green Tribunal (NGT)** is a specialized judicial body in India established to handle environmental disputes.
- The NGT was **established** on October 18, 2010, **under the National Green Tribunal Act, 2010.**

Objectives:

- Effective and expeditious disposal of cases related to environmental protection, conservation of forests, and other natural resources.
- Provide relief and compensation for damages to persons and property.
- Handle environmental disputes involving multi-disciplinary issues.

Structure:

- **Chairperson:** Appointed by the Central Government in consultation with the Chief Justice of India.
- **Judicial Members:** Minimum of 10 and maximum of 20 full-time members.
- **Expert Members:** Appointed by a Selection Committee formed by the Central Government.

Powers & Jurisdiction:

- **Jurisdiction over all civil cases involving substantial questions relating to the environment.**
- Suo motu powers to take up environmental issues across the country.
- **Guided by principles of natural justice, sustainable development, precautionary principle, and polluter pays principle.**
- Can provide relief and compensation to victims of pollution and environmental damage.

Significance:

- India became the third country in the world to set up a specialized environmental tribunal, after Australia and New Zealand.

- The NGT plays a crucial role in ensuring environmental justice and enforcing legal rights related to the environment

15.SATHYAMANGALAM TIGER RESERVES (STR)

- **Sathyamangalam Tiger Reserve is situated at the junction of the Eastern and Western Ghats in the Nilgiri Biosphere Reserve,** Erode District, **Tamil Nadu.**
- It was declared a tiger reserve in 2013.
- **It borders Mudumalai Tiger Reserve, Bandipur Tiger Reserve (Karnataka), and Biligiri Rangaswamy Temple Tiger Reserve and Wildlife Sanctuary (Karnataka).** Together, these reserves form the Nilgiris biosphere landscape, which has the largest tiger population in the world, with over 280 tigers.
- Some of the **prominent rivers in the region include the Bhavani, Moyar, and Noyyal rivers.**
- **Tribal Communities** is home to several indigenous tribal communities, including the **Irula and Kurumba tribes**.

Flora:

- Vegetation includes southern tropical dry thorn forests, mixed deciduous forests, semi-evergreen forests, and riparian forests.
- Around 700 species of flora have been identified, with bamboos being predominant.

Fauna:

- Major species include elephants, tigers, panthers, sloth bears, gaurs, black bucks, spotted deer, wild boars, black-naped hares, common langurs, striped-neck mongooses, and bonnet macaques.
- It is also home to rare and endangered species such as the grizzled giant squirrel, Nilgiri tahr, Nilgiri langur, and four-horned antelope.

16.KASHMIRI WILLOW (SALIX ALBA)

- The Kashmir Willow (Salix alba) is **native to the Kashmir region in India.**
- **It is a deciduous tree** that can grow up to 30 meters tall, with **slender trunks and a narrow, conical canopy.**
- **It thrives in moist and temperate climates**, especially **along riverbanks.**
- Takes 20 to 25 years to mature.
- **The Kashmir Willow is tolerant of flooding** and can **flourish in saturated soils** with oxygen shortages in the root zone.

Uses:

- **Cricket Bat Industry:** Kashmir willow bats are internationally recognized for their quality and affordability.
- **Packing Case Industry:** The wood from Kashmir willow is used for packing cases due to its strength and durability.
- **Basketry and Furniture Industry:** Used to make baskets and furniture.
- **Evapotranspiration:** High rates of evapotranspiration during the growing season make it useful for soil saturation.
- **Metal Accumulation:** Can accumulate toxic metals, especially cadmium, making it useful for phytoremediation.

17.SQUALUS HIMA

- **Squalus belongs to the genus of dogfish sharks** (commonly known as spurdogs) in the **family Squalidae.**
- These sharks are characterized by their smooth dorsal fin spines.
- Squalus hima was **discovered off the coast of Kerala**, specifically at the Sakthikulangara fishing harbor along the Arabian Sea.
- In the Indian coast, **two species of Squalus are found from the southwest coast of India** and the new species, Squalus hima n.sp. very similar to Squalus lalannei, but differs in many characteristics.
- Squalus hima sp.nov differs from other species by the number of precaudal vertebrae, total vertebrae, teeth count, trunk & head heights, fin structure and fin colour.

Importance and Conservation:

- The shark species belonging to the genus Squalus and Centrophorus are exploited for their liver oil, which contains high levels of squalene (or squalane when processed for products).
- This oil is in demand for pharmaceutical industries, especially for high-end cosmetic and anti-cancer products.
- The discovery of the new species is important to conserve such varieties of shark.

18.RATAPANI WILDLIFE SANCTUARY

- **Ratapani Wildlife Sanctuary is located in Madhya Pradesh.**
- **Ratapani was first notified in 1976 and later extended in 1983.**
- The proposal to declare Ratapani wildlife sanctuary as tiger reserve has been in discussion since 2008.
- The National Tiger Conservation Authority (NTCA) has accorded in principle approval to notify Ratapani wildlife sanctuary as the tiger reserve in 2011.
- **It is situated in the Vindhya ranges** and spans an area of 824 square kilometers.
- Ratapani tiger reserve, when notified, will be the first tiger reserve in the country to have proximity to a state capital.
- **The proposed tiger reserve will be the eighth one in Madhya Pradesh**. The seven other existing tiger reserves are Bandhavgarh, Kanha, Panna, Pench, Sanjay-Dubri, Satpura and Veerangana Durgavati.

Flora:

- The sanctuary features a diverse landscape with **teak forests, hills, plateaus, valleys, and plains.**
- Two major reservoirs, **Barna Reservoir and Ratapani Dam** (Barrusot lake), enhance its ecological significance.

Fauna:

- Ratapani hosts over 150 species of birds, including the paradise flycatcher, which is the state bird of Madhya Pradesh.
- The wildlife includes tigers, leopards, wild dogs, hyenas, jackals, foxes, spotted deer, blue bulls, sambhar, barking deer, chinkara, black bucks, and monkeys.

Historical and Cultural Significance:

- The **Bhimbetka rock shelters**, adorned with ancient rock paintings, are a **UNESCO World Heritage Site** within the sanctuary.
- The Chinkara, an endangered species, also finds refuge here.

- Other inhabitants include the Panther, Hyena, Jackal, Indian Fox, Wild Dog, Jungle Cat, Small Indian Civet, Blue Bull, Chinkara, Black Buck, Chausingha, Spotted Deer, and Barking Deer.
- **Historical Connection:Ratapani is home to the Bhimbetka rock shelters,** adorned with ancient rock paintings dating back over 30,000 years. **UNESCO has recognized Bhimbetka as a World Heritage Site**

19.CENTRAL POLLUTION CONTROL BOARD (CPCB)

- **The Central Pollution Control Board (CPCB) is a statutory organization in India, established under the Water (Prevention and Control of Pollution) Act, 1974.**
- It serves as a field formation and provides technical services to the Ministry of Environment and Forests of the provisions of the Environment (Protection) Act, 1986.
- Principal Functions of the CPCB, as spelt out in the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981 are:
  (i) to promote cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution
  (ii) to improve the quality of air and to prevent, control or abate air pollution in the country.
- CPCB along with its counterparts State Pollution Control Boards (SPCBs) are responsible for implementation of legislations relating to prevention and control of environmental pollution.

National Level Functions:

- Advise the Central Government on matters related to prevention and control of water and air pollution and the improvement of air quality.
- Execute a nationwide program for the prevention, control, or abatement of water and air pollution.
- Co-ordinate activities among State Pollution Control Boards and resolve disputes.
- Provide technical assistance and guidance to State Boards, conduct research, and promote pollution prevention measures.
- Organize training programs for personnel engaged in pollution control efforts.
- Raise mass awareness through media about pollution prevention.
- Collect, compile, and publish technical and statistical data on water and air pollution.
- Set standards for water quality and air quality.
- Perform other functions prescribed by the Government of India.

20.CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

- The European Union's Carbon Border Adjustment Mechanism (CBAM) is a **policy tool designed to address the impact of carbon emissions associated with imported goods.**
- CBAM aims to reduce carbon emissions by ensuring that imported products face the same carbon costs as those produced within the EU.

Implementation:

- **Importers will need to declare the quantity of goods imported into the EU and their embedded greenhouse gas (GHG) emissions annually.**
- **To offset these emissions, importers must surrender CBAM certificates**, priced based on the weekly average auction price of EU Emission Trading System (ETS) allowances.

Transition Period:

- **The CBAM has a transitional phase from 2023 to 2025.**
- During this period, reporting obligations apply, but financial obligations (i.e., buying certificates) start from 2026.
- The gradual introduction of CBAM aligns with the phase-out of free allowances under the **European Union Emissions Trading System (EU ETS)**, supporting EU industry decarbonization.

Significance:

- **Encourages non-EU countries to adopt stricter environmental regulations, reducing global carbon emissions.**
- **Prevents "carbon leakage"** by discouraging companies from relocating to countries with weaker environmental rules.
- Revenue generated supports EU climate policies and green energy initiatives.

Impact on India:

- Adverse effect on India's exports of metals (iron, steel, aluminium) to the EU due to extra scrutiny under CBAM.
- Carbon levies ranging from 19.8% to 52.7% threaten India's major exports.
- India's higher carbon intensity (due to coal-dominated energy) compared to the EU may lead to higher tariffs.

21.ITANAGAR WILDLIFE SANCTUARY

- Researchers from the Botanical Survey of India have discovered a new plant species named Phlogacanthus sudhansusekharii in the **Itanagar Wildlife Sanctuary.**
- **The Itanagar Wildlife Sanctuary is a protected area located in the Indian state of Arunachal Pradesh.**
- **It was established on 2nd February 1978; this sanctuary aims to conserve the rich biodiversity found in the northeastern region of India.**
- The sanctuary surrounds the capital city of Itanagar and covers an area of 140.30 square kilometers.
- It is bordered by the River Pam to the east, Pachin in the south, Neorochi to the north-east, and the Chingke stream in the north.

Flora:

- **The forest within the sanctuary includes Tropical Semievergreen and wet evergreen forests. Different bamboo species like** Bambusa pallida (Bijuli) and Bambusa hamiltonii (kako) are also present.
- Other tree species include Duabanga grandiflora (Khokan), Amoora wallichi (Aman), Toona ciliata (poma), and more.

Fauna:

- **The sanctuary is home to diverse wildlife, including tigers, leopards, clouded leopards, Asian elephants, gaurs, sloth bears, barking deer, marbled cats, and capped langurs.**
- The state bird, the hornbill, is a regular sight here. Additionally, the white-winged duck (Cairina scutulata) can also be found.

22,CLIMATE FINANCE ACTION FUND (CFAF).

Azerbaijan, which will host the 29th Conference of Parties to the United Nations Framework Convention on Climate Change, announced a new fund called the **'Climate Finance Action Fund'.**

- The Climate Finance Action Fund (CFAF) is a significant initiative aimed at addressing climate challenges.

Purpose and Capitalization:

- CFAF is **funded by contributions from fossil fuel-producing countries and companies** (oil, gas, coal).
- Azerbaijan plays a crucial role as a founding contributor.
- **It operates as a public-private partnership, mobilizing private sector involvement and reducing investment risks.**

Special Facilities:

- **CFAF includes facilities for concessional and grant-based support.**
- These facilities address natural disasters in developing countries swiftly.

Operational Timeline and Funding:

- **CFAF becomes operational after raising $1 billion in its initial fundraising round.**
- At least 10 contributing countries must commit as shareholders.

Allocation of Capital:

- Fifty percent supports climate projects in developing countries (mitigation, adaptation, research).
- The other fifty percent aids next-generation Nationally Determined Contributions (NDCs) for the 1.5°C target.

Rapid Response Funding Facility (2R2F):

- Twenty percent of investment revenues fund this facility.
- It provides highly concessional and grant-based support.

Headquarters: Baku, Azerbaijan hosts the fund's secretariat.

23.UDANTI SITANADI TIGER RESERVE (USTR)

- **Udanti Sitanadi Tiger Reserve (USTR) is located in the Dhamtari District of Chhattisgarh.**
- **It was declared a tiger reserve in 2008-09** by combining two wildlife sanctuaries Udanti and Sitanadi.
- The reserve spans an area of 1842.54 sq. km and lies in the Gariaband district of Chhattisgarh.
- **Rivers:** The Udanti River flows from west to east within the Udanti Wildlife Sanctuary, while the Sitanadi River originates from the middle of the Sitanadi Wildlife Sanctuary.
- **Topography:** The terrain is a mix of hills and plains, with numerous hill ranges intersected by strips of plains.
- **Vegetation:** The reserve features **dry deciduous forests and various types of tropical and sub-tropical vegetation.**
- **Fauna:** The reserve hosts a diverse range of wildlife, including the **Asiatic Wild Buffalo**, which is the key endangered species found in the core area. Other rare species include the **Indian Wolf, Leopard, Sloth Bear, and Mouse Deer.**

24.POLLUTION UNDER CONTROL (PUC) CERTIFICATE

- A **Pollution Under Control (PUC) Certificate** is an official document that verifies that a vehicle's emissions are within prescribed limits and comply with pollution norms.
- This certificate is issued by the government after a thorough inspection of the vehicle's emission levels.

key points about PUC certificates:

- **Purpose:** The PUC certificate ensures that a vehicle's emissions are under control, contributing to a cleaner environment.
- **Inspection Process:** The verification process takes place at authorized pollution checking centers, typically found at fuel pumps across the country.
- **Validity:** PUC certificates are valid for a specific duration (usually six months) and must be renewed periodically.
- **Importance:** Possessing a valid PUC certificate is essential for vehicle owners to comply with legal requirements and contribute to environmental conservation.

25.MEKEDATU PROJECT

- The **Mekedatu Project** is a significant initiative in Karnataka, India, aimed at addressing water scarcity and energy needs.

Location and Purpose:

- The project involves constructing a balancing reservoir near Kanakapura in Ramanagara district, Karnataka.
- **Mekedatu**, meaning "goat's leap," is a deep gorge **situated at the confluence of the Cauvery River and its tributary, Arkavathi.**
- **The primary objectives are:**
- Providing drinking water to Bengaluru and neighboring areas (totaling 4.75 TMC).
- Generating 400 MW of hydroelectric power.

Benefits:

- **Drinking Water:** The project aims to meet the growing demand for drinking water in Bengaluru and nearby regions, reducing dependence on groundwater.
- **Renewable Energy:** It contributes to renewable energy production by generating hydroelectric power, thus reducing carbon emissions.
- **Flood and Drought Regulation:** The reservoir will regulate water flow, benefiting farmers and communities by preventing floods and droughts.

26.PROJECT TIGER

- **Project Tiger is a wildlife conservation movement initiated by the Government of India in 1973 to safeguard the endangered Bengal Tiger and its habitats.**
- The project aims to establish dedicated tiger reserves for sustaining tiger populations and ensuring their survival in their natural habitats.
- Tiger Reserves consist of a core area (part of national parks or wildlife sanctuaries) and a buffer zone (a mix of forested and non-forested land). The project focuses on maintaining tiger viability in the core area while promoting a balance between people and animals in buffer zones.
- As of 2023, India is home to approximately 3,682 wild tigers, which constitutes nearly 75% of the world's wild tiger population.
- **The National Tiger Conservation Authority (NTCA) oversees the tiger reserves, and Project Tiger operates as a centrally sponsored scheme providing funding for their establishment and administration.**
- As of 2024, India boasts 55 tiger reserves spread across 18 states, covering approximately 75,000 square kilometers—which accounts for nearly 2.21% of India's geographical area.

AUGUST 2024

1.IDEAS4LIFE INITIATIVE

- **The Ideas4LiFE initiative aims to collect innovative ideas that encourage environmentally friendly behaviours.**
- The Ideas4LiFE Ideathon covers seven themes of Mission LiFE- Save Water, Save Energy, Reduce Waste, Reduce E-Waste, Say No to Single-Use Plastics, Adopt Sustainable Food Systems, and Adopt Healthy Lifestyles.
- Winning ideas under each of the seven themes of Mission LiFE will be recognized and awarded with attractive prizes for individuals as well as for institutions.

Purpose of Ideas4LiFE:

- **Inspiration for Sustainability:** Ideas4LiFE is set up to gather creative ideas and innovations online, inspiring people to live more sustainably.
- **Resource Wisdom:** It aligns with Prime Minister Narendra Modi's vision of using resources wisely.
- **Inclusive Participation:** Students, researchers, teachers, and innovators are invited to share their ideas, fostering a culture of innovation focused on protecting the environment.
- **Ideas4LiFE is part of a larger global movement called Mission LiFE, which promotes environmental sustainability.**
- Participants worldwide are encouraged to think creatively and contribute to this vital effort.

2.LANDSLIDES

- **Landslides are a type of "mass wasting," which refers to any downward movement of soil and rock influenced by gravity.**
- Essentially, a landslide occurs when a portion of rock, debris, or soil falls due to gravity's action.
- These natural events can have significant consequences, affecting various regions.
- They often take place in conjunction with earthquakes, floods, and volcanoes.
- Moreover, a prolonged spell of rainfall can cause a heavy landslide that can block the flow of the river for quite some time.

Landslide Vulnerability Zones in India

- India has been categorized into a number of zones based on historical data, frequency, and specific causal relationships with the governing elements including geology, geomorphic agents, slope, land use, vegetation cover, and human activities.
- **Very High Vulnerability Zone:** This zone includes the **Himalayas, Andaman, and Nicobar**, **high rainfall regions with steep slopes in the Western Ghats and Nilgiris, the northeastern regions,** along with regions that frequently experience ground shaking due to earthquakes, etc. It also includes regions that have a high concentration of human activity, especially that related to building roads, dams, etc.
- **High Vulnerability Zone:** This group also includes areas with almost identical conditions to those found in the very high vulnerability zone. The only difference between these two is how the governing factors are integrated, how intensely, and how frequently they occur. **Except for the Assam plains, all of the Himalayan states and those from the northeastern areas are included in the high vulnerability zones.**

- **Moderate to Low Vulnerability Zone:** Areas that receive less precipitation such as Trans Himalayan areas of Ladakh and Spiti (Himachal Pradesh), undulated yet stable relief and low precipitation areas in the Aravali, rain **shadow areas in the Western and Eastern Ghats and Deccan plateau** also experiences occasional landslides. The states of **Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Goa, and Kerala** are those where subsidence and mining-related landslides occur most frequently.

Causes of Landslides:

- **Natural Causes:** Factors like slope, lithology, rock structure, land use/cover, and geomorphology contribute to landslides.
- **Human Causes:** Activities such as road construction, dam building, and deforestation can exacerbate landslide risk.

Mitigation:

- Implementing proper land-use planning, early warning systems, and slope stabilization techniques.
- Reforestation and afforestation to stabilize slopes.
- Monitoring vulnerable areas and promoting sustainable practices.

3.MANGROVES

- **Mangroves are shrubs and trees that grow mainly in coastal saline or brackish water.**
- Mangroves, vital coastal ecosystems, **thrive in tropical and subtropical regions.**
- India hosts approximately 3% of South Asia's mangrove cover.

Unique Adaptations:

- **Salt Tolerance:** Mangroves have specialized adaptations to cope with varying salinity levels.
- **Aerial Roots:** Their aerial roots (pneumatophores) allow them to breathe in waterlogged soils.
- **Salt Excretion:** They excrete excess salt through specialized glands.
- **Environmental Services:**
- **Cyclone Protection:** Mangroves act as windbreaks during cyclones, reducing wind speed and protecting coastal habitats.
- **Delta Formation:** Suspended mud and sand carried by rivers get trapped by mangroves, leading to delta formation.
- **Flood Moderation:** They mitigate monsoonal tidal floods and reduce inundation of lowlands.
- **Erosion Prevention:** Mangroves prevent coastal soil erosion.
- **Biodiversity Hotspots:** These forests support diverse flora, avifauna, and wildlife.

Conservation Efforts:

- **Mangrove Cell:** India has established a dedicated Mangrove Cell for conservation.
- **Marine Biodiversity Conservation Foundation:** Created under the Forest Department to enhance mangrove cover and promote research and livelihood activities.

Distribution of Mangroves in India:

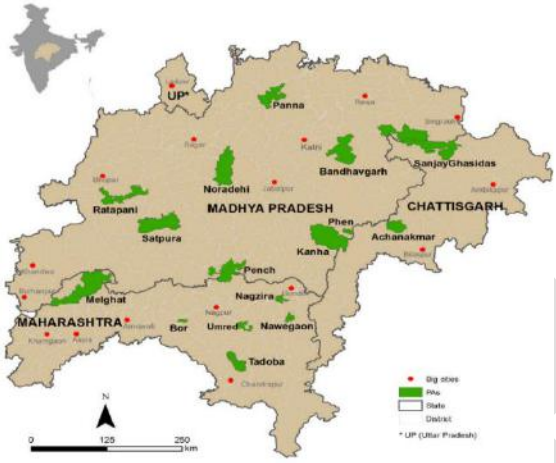
- **East Coast: About 60% of India's mangroves occur along the east coast**, bordering the Bay of Bengal. Notable regions include the Sundarbans in **West Bengal** and the Bhitarkanika mangroves in **Odisha.**
- **West Coast:** Approximately 27% of India's mangroves are found along the west coast, facing the Arabian Sea. States like **Gujarat, Maharashtra, Goa, and Karnataka** harbour mangrove habitats.

- **Island Territories:** The **Andaman and Nicobar Islands** contribute around 13% of India's mangrove cover. These islands host diverse mangrove species and play a crucial role in coastal protection.

Key Highlights of the Report titled 'The State of the World's Mangroves, 2024'

- **Distribution:** Southeast Asia accounts for 33.6 percent of global mangrove cover with Indonesia alone having 21 percent of the world's mangroves.
- **Area under threat:** Mangrove areas of Indonesia, northeast Brazil and northwest Mexico are experiencing significant losses. Mangroves in Lakshadweep archipelago and on the coast of Tamil Nadu are critically endangered.
- **Reasons for Loss:** Conversion to aquaculture, oil palm plantations and rice cultivation together accounts for 43 percent of mangrove losses between 2000 and 2020. Shrimp farms that are mostly constructed within the vital intertidal zones, resulting in the total removal of mangroves.

4.BANDHAVGARH TIGER RESERVE

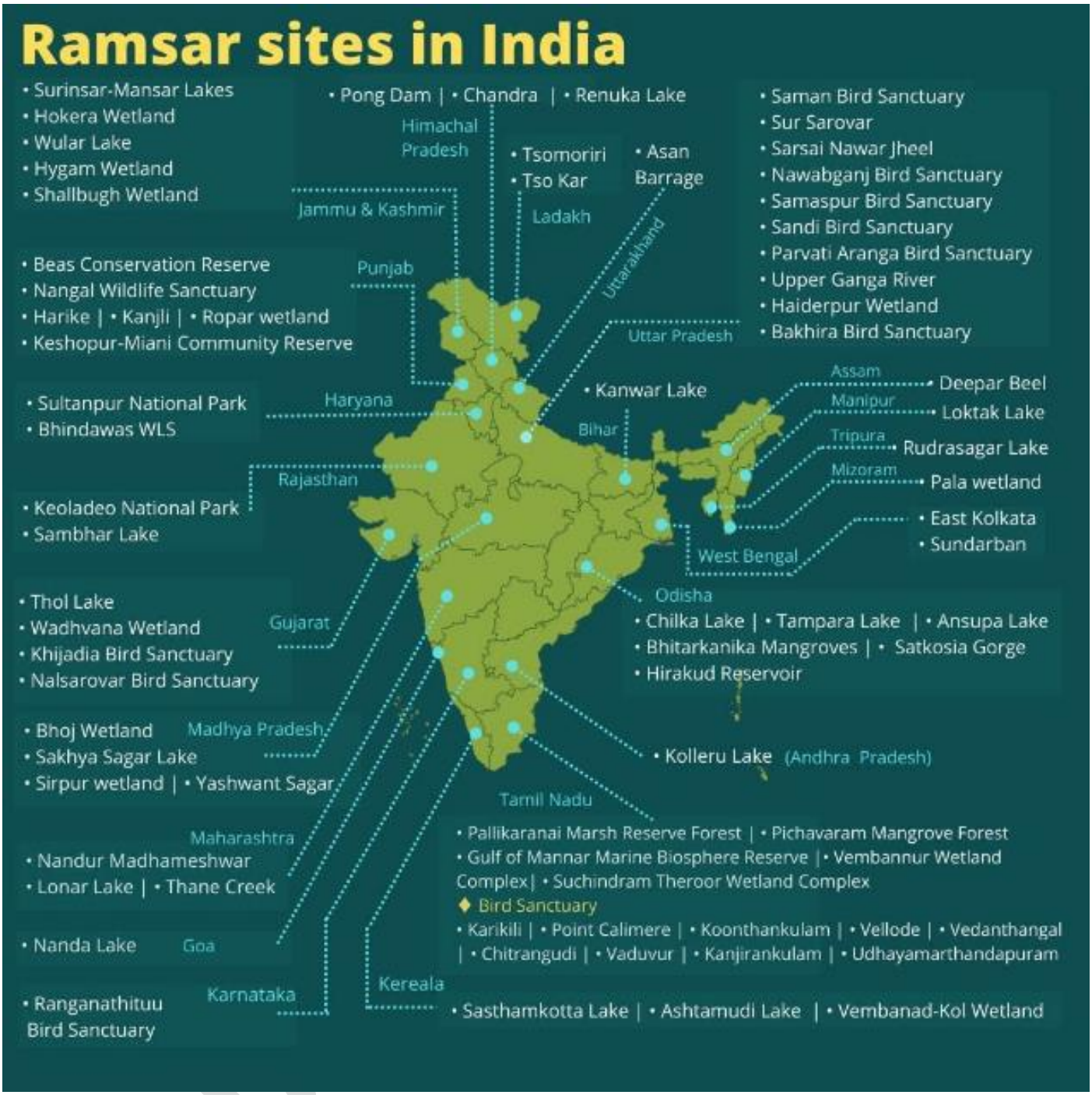


- The **Bandhavgarh Tiger Reserve** is located in the Umaria district of **Madhya Pradesh,** India.
- It lies in the heart of India, between the Vindhya Range and the eastern flanks of the Satpura hill ranges.
- Bandhavgarh boasts one of the highest tiger densities globally.
- **The core area of the Bandhavgarh Tiger Reserve covers a total of 716 km².**
- Apart from tigers, **the reserve is home to various other wildlife species, including leopards, deer, langurs, and numerous bird species.**
- **Bandhavgarh Tiger Reserve was declared a national park in 1968 and later in 1993, it was declared a tiger reserve under the Project Tiger initiative.**
- The reserve is also crisscrossed by several small rivers and streams, including the Charanganga River, the Dammer River, and the Johilla River.

Conservation Challenges:

- **Mining Activities**: Rising mining activities around the park pose a threat to the tigers.
- **Human-Wildlife Conflict:** Historically, villagers and their cattle faced danger from tigers.

5.RAMSAR CONVENTION



- **The Ramsar Convention is an international treaty aimed at conserving wetlands around the world.**
- It was adopted in Ramsar, Iran, in 1971 and entered into force in 1975.
- **Countries that are parties to the convention commit to designating wetlands of international importance within their territories**. These sites are referred to as Ramsar Sites.

Criteria for Ramsar Sites:

- Group A of the Criteria. Sites containing representative, rare or unique wetland types
  - Criterion 1: a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
- Group B of the Criteria. Sites of international importance for conserving biological diversity
- Criteria based on species and ecological communities

- Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
- Criterion 3: supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
- Criterion 4: supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

- Specific criteria based on waterbirds
  - Criterion 5: it regularly supports 20,000 or more waterbirds.
  - Criterion 6: it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
- Specific criteria based on fish
  - Criterion 7: it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
  - Criterion 8: it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
- Specific criteria based on other taxa
  - Criterion 9: it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent nonavian animal species.

Three Pillars of the Convention:

- **Wise Use:** Ensuring the wise use of all wetlands through national plans, policies, and legislation.
- **List of Wetlands of International Importance:** Designating suitable wetlands to the Ramsar List and ensuring their effective management.
- **International Cooperation:** Promoting international cooperation on transboundary wetlands and shared species.

Bhoj Wetland

- Bhoj Wetland was designated as a Ramsar site in November 2002.
- **Bhoj Wetland comprises two contiguous man-made reservoirs,** the "Upper Lake" and the "Lower Lake".
- The Upper Lake was created by Raja Bhoj in the 11th century by the construction of an earthen dam across the Kolans river, and the Lower Lake was constructed nearly 200 years ago, largely from the overflow of water from the Upper Lake.
- **Both the lakes are urban water bodies**, situated in Bhopal, the capital city of **Madhya Pradesh.**

Ramsar sites in India

- **India has been a party to the Ramsar Convention since 1982.**
- **Presently India has 82 sites** designated as Ramsar sites.
- The **latest additions** to the list include:
- Karaivetti Bird Sanctuary (Tamil Nadu)
- Longwood Shola Reserve Forest (Tamil Nadu)
- Magadi Kere Conservation Reserve (Karnataka)
- Ankasamudra Bird Conservation Reserve (Karnataka)
- Aghanashini Estuary (Karnataka)

6.NATIONAL COASTAL MISSION SCHEME (NCM)

- **Category: ENVIRONMENT AND ECOLOGY**
- **Context**: Recently, the Minister of State for Environment, Forest and Climate Change informed the Lok Sabha about **the National Coastal Mission Scheme (NCM).**
- **Decoding the context:** The National Coastal Mission Scheme (NCM) is a part of the National Coastal Management Program.
- The National Coastal Mission Scheme (NCM) was launched in 2014 and is part of the **National Action Plan on Climate Change.**
- Its primary goal is to mitigate and adapt to the impacts of climate change on coastal and marine ecosystems, infrastructure, and communities.
- The scheme is implemented by the state governments of coastal states and Union Territory administrations.

Key components of the NCM:

- **Management Action Plan on Conservation of Mangroves and Coral Reefs:** Focuses on protecting and restoring these vital ecosystems.
- **Research & Development in Marine and Coastal Ecosystems:** Enhances scientific understanding and supports innovative solutions.
- **Sustainable Development of Beaches:** Implemented through the Beach Environment & Aesthetic Management Service (BEAMS) for cleaner, safer, and more sustainable beaches.
- **Capacity Building and Outreach Programs:** Includes training and awareness initiatives for coastal states and Union Territories, along with beach cleaning drives.
- **National Action Plan on Climate Change (NAPCC)**
- The National Action Plan on Climate Change (NAPCC) was launched on June 30th, 2008.
- It aims to promote development objectives while addressing climate change through co-beneficial measures.
- The **NAPCC comprises eight core "National Missions,"** each focusing on different aspects of climate change mitigation and adaptation:
- **National Solar Mission:** Promotes the use of solar energy.
- **National Mission for Enhanced Energy Efficiency:** Aims to improve energy efficiency.
- **National Mission on Sustainable Habitat:** Focuses on sustainable urban planning and waste management.
- **National Water Mission:** Ensures water conservation and management.
- **National Mission for Sustaining the Himalayan Ecosystem:** Protects the Himalayan environment and its resources.
- **National Mission for a Green India:** Enhances Forest cover and ecosystem services.
- **National Mission for Sustainable Agriculture:** Promotes climate-resilient agricultural practices.
- **National Mission on Strategic Knowledge for Climate Change:** Advances research and knowledge on climate change.

7.NAMAMI GANGE MISSION 2.0

- The Namami Gange Mission is an integrated conservation initiative launched by the Government of India in June 2014.

- **The Namami Gange Mission is a Central Sector Scheme under the Ministry of Jal Shakti.**
- This initiative aims to rejuvenate the Ganga River by addressing pollution and promoting conservation efforts with 100% central assistance.

Namami Gange Mission 2.0 (NGM 2.0):

- **It is an extension of the original Namami Gange Programme, an integrated conservation mission launched in 2014 and extended until March 2026.**
- The mission aims to effectively abate pollution and rejuvenate the River Ganga. It focuses on various key areas, including:
- Sewage treatment
- Riverfront development
- River surface cleaning
- Afforestation
- Biodiversity conservation
- Public awareness
- **Managed by the National Mission for Clean Ganga (NMCG)** under the Ministry of Jal Shakti, NGM 2.0 is **fully funded by the central government.**
- The mission has initiated 457 projects, with 280 completed as of February 2024, and has formed 139 District Ganga Committees to oversee local implementation.
- The initiative also includes the development of Common Effluent Treatment Plants (CETPs) to manage industrial waste, reflecting its comprehensive approach to restoring and preserving the Ganga's ecological and cultural significance.
- The mission has received international recognition and support, highlighting its significance in restoring the Ganga River's ecological balance

8.NEELAKURINJI (STROBILANTHES KUNTHIANA)

- Neelakurinji, also known as Kurinji, is a **shrub found in the shola forests of the Western Ghats** in Kerala, Karnataka, and Tamil Nadu.
- It belongs to the Acanthaceae family and is known for its purplish-blue flowers.
- This plant is famous for its unique blooming cycle, **flowering once every 12 years**.
- Neelakurinji grows at altitudes ranging from 1300 to 2400 meters.
- It used to cover the Anamalai Hills, Cardamom Hills, Nilgiri Hills, Palani Hills, Kudremukh, and Bababudangiri.
- The Paliyan tribal people of Tamil Nadu used the blooming of Neelakurinji to calculate their age.
- The flower has also given the Nilgiri Mountains their name, with "Nilgiri" meaning "blue mountains" in Tamil and Malayalam.
- Neelakurinji (Strobilanthes kunthiana) has been added to the IUCN Red List of threatened species. **It is classified as "Vulnerable" on the IUCN Red List.**

- The **main threats** to Neelakurinji include **habitat loss** due to conversion for tea and softwood plantations, **urbanization**, and the **invasion of exotic species** like eucalyptus and black wattle. **Climate change** and **infrastructure development** also pose significant risks.

9.CLEAN PLANT PROGRAMME (CPP)

- **The Clean Plant Programme (CPP) is a transformative initiative for India's horticultural sector.**
- By promoting sustainable and eco-friendly agricultural practices, it aims to reduce dependence on imported planting materials and enhance the quality and productivity of fruit crops.
- **The CPP's implementation by the National Horticulture Board, in collaboration with the Indian Council of Agricultural Research (ICAR), ensures that it leverages the best scientific and agricultural expertise available.**
- This program aligns with broader initiatives like Mission LiFE and One Health, emphasizing environmental sustainability and public health.

Core Components:

- **Clean Plant Centers (CPCs):** Establish nine state-of-the-art centers equipped with advanced diagnostic and tissue culture labs to produce and maintain virus-free planting material.
- **Certification and Legal Framework:** Implement a robust certification system supported by the Seeds Act 1966 to ensure accountability and traceability in planting material production and sale.
- **Enhanced Infrastructure:** Provide support for large-scale nurseries to develop infrastructure for efficient multiplication of clean planting material.

Key Benefits of the Clean Plant Programme (CPP):

- **Farmers:** The CPP will provide access to virus-free, high-quality planting material, leading to increased crop yields and improved income opportunities.
- **Nurseries:** Streamlined certification processes and infrastructure support will enable nurseries to efficiently propagate clean planting material, fostering growth and sustainability.
- **Consumers:** The initiative will ensure that consumers benefit from superior produce that is free from viruses, enhancing the taste, appearance, and nutritional value of fruits.
- **Exports:** By producing higher-quality, disease-free fruits, India will strengthen its position as a leading global exporter, expanding market opportunities and increasing its share in the international fruit trade.

10.PRADHAN MANTRI JI-VAN (JAIV INDHAN- VATAVARAN ANUKOOL FASAL AWASHESH NIVARAN)

- **The Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana is a significant initiative aimed at boosting advanced biofuel projects in India.**
- **It aims to provide financial support to Integrated Bioethanol Projects** using lignocellulosic biomass and other renewable feedstock.
- **Implementation Agency: The Centre for High Technology (CHT), under the Ministry of Petroleum and Natural Gas (MoP&NG), is responsible for implementing the scheme.**

- **Projects:** The scheme aims to set up **12 commercial-scale Second Generation (2G) Bioethanol projects and 10 demonstration-scale 2G Bioethanol** projects based on non-food biomass feedstocks and other renewable feedstocks.

Key Objectives:

- **Remunerative Income for Farmers:** Providing a stable income source for farmers through the sale of agricultural residues.
- **Environmental Pollution Mitigation:** Reducing environmental pollution by utilizing agricultural and forestry residues.
- **Local Employment Opportunities:** Creating job opportunities in local communities.
- **Energy Security and Self-Reliance:** Enhancing India's energy security and self-reliance through biofuel production.
- **Net-Zero GHG Emissions by 2070:** Contributing to India's goal of achieving net-zero greenhouse gas emissions by 2070.
- **Ethanol Blending Program (EBP):** Supporting the establishment of commercially viable projects for 2G Ethanol production to meet ethanol blending targets.

Viability Gap Funding (VGF) Support:

- **Phase-I (2018-19 to 2022-23):** Support for six commercial projects and five demonstration projects.
- **Phase-II (2020-21 to 2023-24):** Support for the remaining six commercial projects and five demonstration projects.

Recent Changes:

- **Implementation Extension:** The scheme's implementation period has been extended by five years, now running through 2028-29.
- **Scope Expansion:** The scheme now includes advanced biofuels produced from a variety of materials, such as agricultural and forestry residues, industrial waste, synthesis gas (syngas), and algae.
- **Eligibility for Existing Plants:** Both 'bolt-on' plants (enhancing existing facilities) and 'brownfield projects' (revamping existing facilities) are now eligible to participate, encouraging existing players to leverage their experience and improve the viability of their operations.

11.CHANDAKA WILDLIFE SANCTUARY

- **Chandaka Wildlife Sanctuary is located** on the eastern side of India, specifically **in the Khurda and Cuttack districts of Odisha.**
- Geographically, **it falls within the Eastern Ghats region**, characterized by hills, plateaus, and forests.
- It was **designated as an elephant reserve in December 1982.**

Flora:

- **The sanctuary is home to a diverse range of flora, typical of the Eastern Ghats region.**
- The vegetation includes dry deciduous trees like Sal (Shorea robusta), Bamboo, Teak, and other species adapted to the prevailing climate.

Fauna:

- Chandaka Wildlife Sanctuary is known for its wildlife, including significant populations of **elephants, leopards, deer, and various bird species.**
- The varied fauna is a result of the diverse habitats within the sanctuary, showcasing the ecological significance of the region.

12.BIOFORTIFIED CROPS

- **Biofortification is the process of improving the nutritional quality of food crops.**
- **This can be achieved through two main methods:**
- **Conventional Breeding:** This involves selecting and crossbreeding plants that naturally have higher levels of certain nutrients. Over time, this process enhances the nutrient content of the crops.
- **Genetic Engineering:** This method involves directly modifying the plant's genes to increase the levels of specific nutrients.
- **It aimed at developing and disseminating crops that are naturally rich in essential micronutrients, containing higher levels of vitamins, minerals, and other nutrients.**

Benefits:

- **Improved Nutrition:** Helps combat micronutrient deficiencies, especially in low and middle-income countries.
- **Accessibility:** Provides essential nutrients to rural populations who may not have access to commercially fortified foods.

Examples:

- **Golden Rice:** Enhanced with beta-carotene to address vitamin A deficiency.
- **Iron and Zinc-Enriched Wheat:** Developed through radiation breeding to improve iron and zinc content.

13.RAMSAR SITES

- Recently three more sites have been added to India's **Ramsar Sites** list, bringing the total to **85**.
- The **Ramsar Convention**, also known as the Convention on Wetlands, is an **international treaty aimed at the conservation and sustainable use of wetlands.**

Adoption and Purpose:

- The convention was adopted on February 2, 1971, in the Iranian city of Ramsar and came into force in 1975.
- Its **primary goal is to halt the worldwide loss of wetlands and to conserve those that remain through wise use and management.**

Ramsar Sites:

- Wetlands designated under the convention are known as Ramsar Sites.
- There are currently over 2,500 Ramsar Sites worldwide, covering more than 250 million hectares.
- These sites are recognized for their ecological, botanical, zoological, limnological, or hydrological importance.

Ramsar Sites in India:

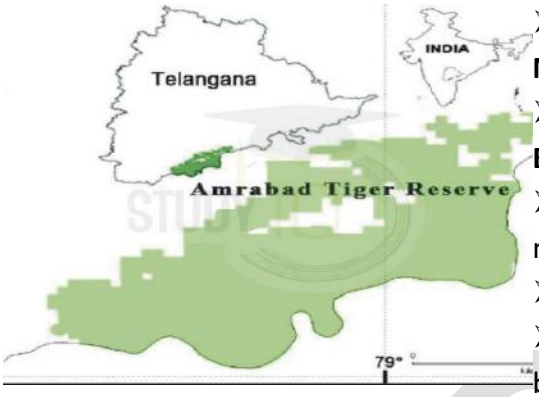
- **Geographical Spread:** India's Ramsar wetlands comprise around 10% of the total wetland area in the country across 18 States.
- **Largest Site:** The Sundarbans, a vast mangrove forest in West Bengal, is the largest Ramsar Site in India.
- **Recent Additions:** The latest additions include the Nanjarayan Bird Sanctuary, Kazhuveli Bird Sanctuary, and Tawa Reservoir.

- **State with Most Sites:** Tamil Nadu has the highest number of Ramsar Sites, with 18 designated wetlands.

New Ramsar Sites in Inda:

- **Nanjarayan Bird Sanctuary in Tamil Nadu:** This sanctuary is a large shallow wetland that supports a rich biodiversity, including 191 bird species, 87 butterfly species, and various other flora and fauna.
- **Kazhuveli Bird Sanctuary in Tamil Nadu:** Located on the Coromandel Coast, this brackish shallow lake is an important stopover for migratory birds and a breeding ground for resident species.
- **Tawa Reservoir in Madhya Pradesh:** This reservoir is crucial for local wildlife and serves multiple purposes, including irrigation, power generation, and aquaculture.

14.AMRABAD TIGER RESERVE



- **The Amrabad Tiger Reserve is located in the Nagarkurnool and Nalgonda districts in the southern part of Telangana, India.**
- **It is situated in the Nallamala Hills, which is a part of the Eastern Ghats.**
- It covers an area of approximately 2,611.4 square kilometers, making it one of the largest tiger reserves in India.
- The area was initially notified as a sanctuary in 1983.
- It was **declared an official Tiger Reserve in 2014** following the bifurcation of the Telugu States.
- It was included in the Project Tiger initiative to protect the **Bengal tiger** population in the area. The reserve is also home to several other threatened species, including the Indian **leopard, sloth bear, dhole, Indian pangolin, and mugger crocodile.**
- Amrabad Tiger Reserve is home to a diverse range of flora, which makes it an important biodiversity zone.
- The vegetation here is characterized by **dry deciduous forests, mixed deciduous forests, and grasslands.** Some of the important floral categories found here include teak, rosewood, bamboo, Indian gooseberry, and Indian kino tree.
- The reserve is also home to **several communities of indigenous people, including Chenchus and Lambadas**, who have been living in the area for generations and have a deep knowledge of the local flora and fauna.

- A **wildlife sanctuary is a protected area where animal habitats and their surroundings are safeguarded from any form of disturbance.**
- The primary goal is to provide a safe and natural environment for wildlife to live and thrive.

Key features of wildlife sanctuaries:

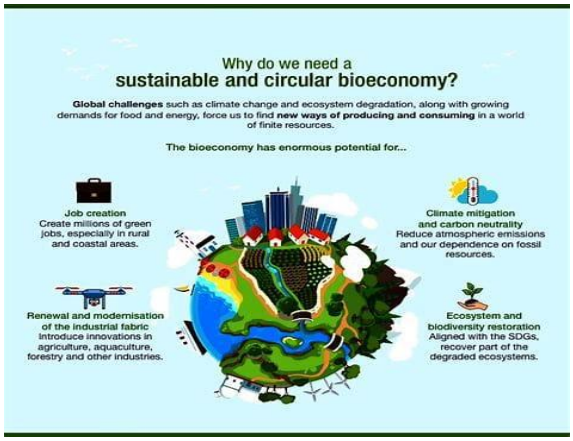
- **Protection from Human Activities:** Activities such as capturing, killing, or poaching animals are strictly prohibited.
- **Natural Habitat:** Animals are allowed to live in their natural habitats without significant human interference.
- **Conservation:** These areas help in the conservation of endangered species and biodiversity.
- **Research and Education:** Sanctuaries often serve as sites for scientific research and environmental education.

De-notification of a Wildlife Sanctuary:

- **De-notification of a wildlife sanctuary refers to the process of withdrawing or revoking the protected status of a previously designated wildlife sanctuary.**
- This can occur due to various reasons, including:
- Changes in government policies or priorities
- Pressure from local communities or interest groups
- Economic development or infrastructure projects
- Re-evaluation of conservation priorities
- **Procedure for denotification of a wildlife sanctuaries in India**
- The procedure for denotification of a wildlife sanctuary in India is quite stringent and involves multiple steps to ensure that ecological and environmental concerns are thoroughly considered. Here is an overview of the process:
- **Proposal Submission:** The **state government initiates the process by submitting a proposal for denotification**. This proposal must include detailed justifications and the ecological impact assessment.
- **State Board for Wildlife:** The proposal is **first reviewed by the State Board for Wildlife**. Their recommendations are crucial for the proposal to move forward.
- **National Board for Wildlife (NBWL):** If the State Board for Wildlife approves the proposal, it is then forwarded to the National Board for Wildlife. **The NBWL evaluates the proposal, considering the national interest and ecological impact.**
- **Supreme Court Approval:** Given the significant impact of denotifying a protected area, the **proposal must also be approved by the Supreme Court of India**. This step ensures that all legal and environmental safeguards are in place.
- **Final Notification:** Upon receiving approval from the Supreme Court, **the Ministry of Environment, Forest and Climate Change (MoEFCC) issues the final notification for denotification.**
- This process ensures that denotification is only carried out under exceptional circumstances, balancing developmental needs with environmental conservation.

15.BIOECONOMY

- The **BioEconomy refers to the knowledge-based production and use of biological resources to create products, processes, and services across various economic sectors within a sustainable framework.**



- It aims to integrate sustainability into economic activities by leveraging biological resources and innovations.
- **Key Sectors of the BioEconomy:**
- **Agriculture:** Sustainable farming practices, genetically modified crops, and precision agriculture technologies.
- **Forestry:** Sustainable forest management and the use of forest resources for bio-based products.
- **Fisheries:** Sustainable fishing practices and aquaculture.
- **Food Production:** Development of sustainable food systems and bio-based food products.
- **Biotechnology:** Utilization of biological processes for industrial and medical applications, including pharmaceuticals and bio-based chemicals.
- **Bioenergy:** Production of energy from biological sources, such as biofuels and biomass.

Sub-Sectors in India:

- **BioPharma or BioMedical:** Development and production of medical products and services, such as pharmaceuticals, medical devices, and lab-grown organoids.
- **BioAgri**: Development and production of genetically modified crops and animals, precision agriculture technologies, and bio-based products (e.g., Bt Cotton).
- **BioIndustrial**: Development and production of bio-based chemicals and products using enzymes, biosynthetic routes, and recombinant DNA technology.

16.GROSS ENVIRONMENT PRODUCT (GEP) INDEX

- **The Gross Environment Product (GEP) Index is a measure that assigns a monetary value to the natural resources and ecosystem services of a region.**
- **It is designed to reflect the economic value of the environment, similar to how the Gross Domestic Product (GDP) measures economic activity.**
- **It helps in assessing the impact of anthropological pressure on our ecosystem and natural resources.**
- It provides a robust and integrated method for assessing a state's ecological growth, capturing various facets of environmental well-being as a result of human actions.Simply put, it does not only calculate what services we get from the environment but also what we put back into the environment.
- There **are four pillars of the Gross Environment Product Index: air, soil, tree and water.**
- The formula is, **GEP index = (Air-GEP index + Water-GEP index + Soil-GEP index + Forest-GEP index)**

Purpose

- **Environmental Valuation:** The primary purpose of the GEP Index is to q**uantify the value of ecosystem services** such as clean air, water, soil, and forests. This helps in recognizing the economic contribution of natural resources.
- **Sustainable Development:** By incorporating environmental values into economic planning, the GEP Index aims to promote sustainable development. It ensures that environmental health is considered alongside economic growth.
- **Policy Making:** The index provides a comprehensive tool for policymakers to assess the impact of development projects on the environment and make informed decisions that balance economic and ecological interests.

17.MIYAWAKI METHOD

- **The Miyawaki method**, developed by Japanese botanist Akira Miyawaki, is an innovative **afforestation technique that involves planting native species densely to create fast-growing, self-sustaining forests.**
- This method mimics natural forest ecosystems and can transform barren or degraded land into lush green spaces within a few years.
- **This method is particularly beneficial in urban areas where space is limited but the need for green cover is high.**
- It has revolutionised the concept of **urban afforestation** by turning backyards into mini-forests.

Features of the Miyawaki Method:

- **Dense Planting:** Trees are planted very close to each other, typically 2-4 trees per square meter.
- **Native Species:** Only native species are used, which are well-adapted to the local environment.
- **Rapid Growth:** Trees grow 10 times faster and the forest becomes 30 times denser than conventional methods.
- **Self-Sustaining:** After the initial 2-3 years of care, these forests become self-sustaining.

Benefits of the Miyawaki Method

- **Biodiversity:** Supports a variety of plant and animal species, enhancing local biodiversity.
- **Climate Mitigation:** Acts as carbon sinks, helping to sequester carbon dioxide and mitigate climate change.
- **Urban Cooling:** Reduces urban heat island effects by lowering temperatures in surrounding areas.
- **Soil Improvement:** Improves soil quality and prevents erosion.
- **Air Quality:** Significantly improves air quality by filtering pollutants.

18.GREEN TUG TRANSITION PROGRAM (GTTP)

- **The Green Tug Transition Program (GTTP) is implemented by the Ministry of Ports, Shipping, and Waterways**.
- The program is **part of the broader 'Panch Karma Sankalp'** initiative, which aims to promote sustainable and environmentally friendly practices in India's maritime sector.
- The program is a significant step towards decarbonizing maritime operations in India.
- The GTTP is designed to phase out conventional fuel-based harbour tugs operating in Indian Major Ports and replace them with green tugs powered by cleaner and more sustainable alternate fuels.

Key Highlights of the GTTP

- **Phase 1:** Begins on October 1, 2024, and continues until December 31, 2027.
- **Participating Ports:** Four major ports—Jawaharlal Nehru Port Authority, Deendayal Port Authority, Paradip Port Authority, and V.O. Chidambaranar Port Authority—will each procure or charter at least two green tugs.
- **Investment:** Expected to involve an investment of around INR 1000 Crores in building green tugs.
- **Tug Specifications:** The first set of tugs will be battery-electric, with provisions for adopting other emerging green technologies such as hybrid, methanol, and green hydrogen as the industry evolves.
- **Domestic Manufacturing:** All tugs built under this program will be constructed in Indian shipyards as part of the Government of India's 'Make in India' initiative.
- **Employment Opportunities:** The program is expected to create significant employment opportunities in shipbuilding and ship design.
- **Goal:** By the end of 2040, all tugs operating in Indian Major Ports are envisioned to transition to green tugs, ensuring a standardized, eco-friendly fleet across the country.

19.TALLEY WILDLIFE SANCTUARY

- **Talley Valley Wildlife Sanctuary is a protected area in Arunachal Pradesh, India.**
- It was established in 1995, the sanctuary ranges from 1,200 to 3,000 meters.
- The rivers Pange, Sipu, Karing, and Subansiri flow through this pristine landscape.
- The **Apatani tribe resides in the sanctuary**, known for their distinctive customs, traditions, and handicrafts.

Flora:

- The sanctuary boasts a diverse range of vegetation, including **subtropical and alpine forests.**
- Notably, the silver fir trees, ferns, orchids, bamboo, and rhododendron contribute to its rich biodiversity.
- The unique Pleioblastus simone bamboo species is found exclusively in Talley Valley.
- Additionally, the sanctuary hosts various medicinal plants and herbs used by local tribes for traditional medicine.

Fauna:

- Notable mammal species in the sanctuary include the clouded leopard (Neofelis nebulosa), Malayan giant squirrel (Ratufa bicolour), Indian muntjac (Muntiacus muntjak), Asian palm civet (Paradoxurus hermaphroditus).

20.ARALAM WILDLIFE SANCTUARY

- **Aralam Wildlife Sanctuary is situated on the western slopes of the Western Ghats.**
- **It is the northernmost wildlife sanctuary in Kerala.**
- It shares borders with the Wayanad-Brahmagiri region, Wayanad's northern slopes, and the protected areas of Karnataka (including the Brahmagiri Wildlife Sanctuary and Coorg forests).

Key Points:

- **Rivers:** The **Cheenkannipuzha river is the primary drainage system** on the southern side, along with other rivers like Narikkadavu thodu, Kurukkathodu, and Meenumuttithodu.
- **Vegetation:** Aralam includes West Coast tropical evergreen forests, west coast semi-evergreen forests, South Indian moist deciduous forests, and Southern hilltop evergreen forests. **It is the only**

protected area of the West Coast Tropical Evergreen Forest of Dipterocarpus-Mesua-Palaquium type.

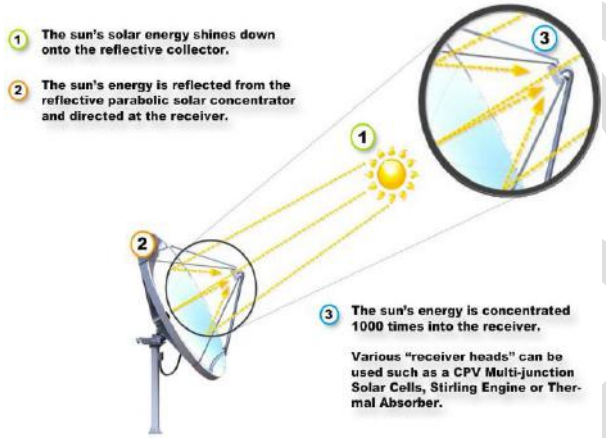
- **Peak:** The **highest peak within the sanctuary is Katti Betta.**
- **Flora:** Notable tree species include Artocarpus heterophyllus, Bishofia javanica, Calophyllum elatum, Cannarium strictum, and more.
- **Fauna:** Aralam is home to diverse wildlife, including elephants, gaurs, tigers, panthers, sambar deer, spotted deer, barking deer, wild boars, and various primate species like Nilgiri langurs, bonnet macaques, and common langurs.

21.SOLAR PARABOLOID TECHNOLOGY

- **Solar paraboloid technology uses a parabolic shape to focus sunlight onto a central point, generating heat or electricity. The paraboloid shape is a curved surface that concentrates sunlight onto a focal point, increasing the temperature or energy output.**

Applications:

- **Solar thermal systems:** Heat water or air for buildings, industrial processes, or power generation.
- **Concentrated Solar Power (CSP):** Generate electricity by heating a fluid, driving a turbine.



- **Solar cooking:** Cook food using focused sunlight.
- **Solar water purification:** Purify water using heat from the paraboloid.

Benefits:

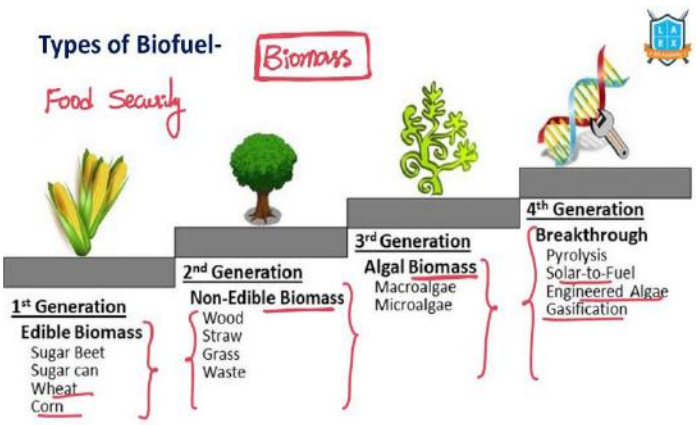
- **Higher Efficiency:** Solar paraboloids operate at higher temperatures, significantly increasing thermal efficiency. This is achieved by reducing heat losses through a smaller absorbing surface area.
- **Economic Potential:** The efficiency of solar paraboloids means more electricity can be generated from the same amount of sunlight, potentially lowering electricity costs and making solar energy more competitive with traditional fossil fuels.
- **Industrial Applications**: The high temperatures achieved by solar paraboloids make them suitable for industrial processes that require direct heat.

Challenges:

- **Cost:** They have a higher initial investment compared to traditional photovoltaic (PV) solar panels.
- **Complexity:** They require precise alignment and tracking systems to focus sunlight effectively.
- **Intermittency:** Their performance is dependent on sunlight, making them susceptible to weather conditions.
- **Heat Management:** Managing the high temperatures generated is crucial to prevent damage and ensure efficiency.

SEPTEMBER 2024

1. 2G BIO-ETHANOL



➢ 2G bioethanol is produced from **non-food biomass** like agricultural residues and wood chips, making it **more sustainable than 1G bio-ethanol**, which relies on food crops.

➢ The process involves breaking down complex carbohydrates into simple sugars using specialized enzymes, followed by fermentation to produce ethanol.

➢ The Indian government **plans to establish dedicated enzyme manufacturing** facilities to boost ethanol production, starting with a plant in Manesar, Haryana. This facility will **supply enzymes to 2G bioethanol plants** in Uttar Pradesh, Punjab, and Haryana, aligning with the **BioE3 policy** to promote biotech-driven manufacturing.

➢ **Benefits:**

- ➢ **Reduces waste:** Utilizes agricultural residues that would otherwise be discarded or burned.
- ➢ **Lower greenhouse gas emissions:** Produces fewer emissions compared to fossil fuels and first-generation bio-ethanol.
- ➢ **Energy security:** Reduces dependence on imported fossil fuels by providing a
- ➢ renewable energy source.

➢ **Ethanol**

- ➢ Ethanol, or ethyl alcohol, is a clear, **flammable liquid** with a distinct odor, produced via sugar fermentation or ethylene hydration.
- ➢ While ethanol can come from **both biological and chemical sources**, bioethanol is solely derived from renewable biomass, making it a more sustainable and eco-friendly option with lower emissions.

2. POBA RESERVE FOREST

➢ Poba Reserve Forest is a rainforest located in the northeastern part of Assam.

➢ The Reserved Forest (RF) was created in the year 1924 and covers an area of 10,221

➢ hectares.

➢ The Poba Reserve Forest in Assam's Dhemaji district will soon be designated as a wildlife sanctuary, protecting local flora and fauna and ensuring a sustainable habitat.

➢ The Poba Reserve Forest is bordered by the Himalayan foothills to the north, the confluence of the Siang, Dibang, and Lohit rivers with the Brahmaputra and Dibru-Saikhowa National Park to the east and south, and Jonai Sub-division villages to the west.

➢ **Ethnic Groups**: Mising, Bodo, Sonowal Kachari, and Hajong (Rabha) communities inhabit the area.

➢ **Biodiversity**: Home to species like slow loris, capped langur, wild boar, birds, and reptiles.

➢ **Fish Species**: The Siang and Lohit river confluence supports diverse fish species.

➢ **Migratory Route**: An important corridor for elephant migration, connecting D'Ering Memorial Wildlife Sanctuary, Kabu Chapri Proposed Reserve Forest, and Dibru-Saikhowa National Park.

➢ **Elephant Migration**: The second major elephant migration route across the Brahmaputra River

3. OPERATION BHEDIYA

➢ 'Operation Bhediya' has been launched in Uttar Pradesh to capture grey wolves responsible for multiple attacks, leading to several deaths and injuries.

➢ **Grey Wolf Distribution in India:**

➢ **Indian Wolf**: Found in peninsular India, including Rajasthan and Gujarat.

➢ **Himalayan Wolf**: Found in upper trans-Himalayan ranges.

➢ **Behavioural Characteristics:**

- ➢ **Social Structure**: Lives in packs of 6-8 individuals.
- ➢ **Speed**: Capable of high speeds.
- ➢ **Monogamy**: Monogamous with male dominance.
- ➢ **Communication**: Uses vocalizations and scent-marking.

➢ **Conservation Status:**

- ➢ **IUCN Red List**: Least Concern globally.
- ➢ **Wildlife Protection Act (WPA), 1972**: Both species listed under Schedule I, offering high protection.
- ➢ **CITES**: Listed in Appendix I for endangered species.

4. FOOD RECOVERY TO AVOID METHANE EMISSIONS (FRAME)

- The Food Recovery to Avoid Methane Emissions (FRAME) methodology, developed by the Global Food Banking Network with the Global Methane Hub and Carbon Trust, aims to reduce methane emissions by redirecting food waste to human consumption.
- By preventing food waste from decomposing in landfills, FRAME helps cut methane emissions, a potent greenhouse gas.
- It supports several UN Sustainable Development Goals (SDGs), including SDG 13 (Climate Action), SDG 12 (Responsible Consumption and Production), and SDG 2 (Zero Hunger), while also enhancing food security through redistribution.

5. LOSS AND DAMAGE FUND (LDF)

- The Loss and Damage Fund (LDF) was established at COP27 in November 2022 under the UNFCCC.
- It provides financial assistance to developing countries vulnerable to climate change impacts, covering both economic and non-economic losses from extreme weather events and slow-onset processes like rising sea levels.
- A key debate is unfolding over whether subnational entities can access compensation from the UNFCCC's Loss and Damage Fund (LDF).
- The LDF's Governing Board is working on mechanisms to potentially allow direct access for these entities.
- **Key Features:**
  - **Beneficiaries:** Developing countries most impacted by climate change but least responsible.
  - **Loss Types:** Covers economic (e.g., infrastructure damage) and non-economic losses (e.g., biodiversity loss).
  - **Funding:** Part of the UNFCCC and Paris Agreement's financial mechanisms, guided by COP and CMA.
  - **Operationalization:** The fund was activated at COP28, with the Philippines hosting the Board.
  - **Transitional Committee:** Formed to recommend operational and funding arrangements.

6. TEAL CARBON

- Teal carbon refers to carbon stored in non-tidal freshwater wetlands, including carbon in vegetation, microbial biomass, and organic matter.
- The term "teal" reflects its classification based on function and location, not physical properties.

- In contrast, black and brown carbon result from the incomplete combustion of organic matter, such as in wildfires, fossil fuel burning, and industrial activities, contributing to global warming.
- Globally, freshwater ecosystems store an estimated 500.21 petagrams of carbon (PgC), with peatlands, freshwater swamps, and marshes holding a significant portion.
- India's first teal carbon study at Keoladeo National Park highlights the role of wetlands in climate resilience.
- Managing pollution can enhance their ability to mitigate climate change.

7. ELONGATED TORTOISE

➢ For the first time, the elongated tortoise (Indotestudo elongata) was spotted in Haryana's Damdama area during a research survey in the Aravallis.

➢ The region's semi-arid nature makes it an unusual habitat for this species.

➢ The elongated tortoise (Indotestudo elongata) is found in Southeast and South Asia.

➢ **Physical Description:**

- ➢ Size: Grows up to 30 cm (12 inches) in length, weighing around 3.5 kg.
- ➢ Shell: Yellowish-brown with black smudges.
- ➢ Sexual Dimorphism: Males have a concave plastron and longer tails, while females have a flatter plastron and curved claws for nest building.

➢ **Habitat and Distribution:**

- ➢ Found across Southeast Asia, from northern India to Peninsular Malaysia, with a disjunct population in eastern India.
- ➢ Prefers dense upland forests and tropical environments.

➢ **Behavior and Diet:**

- ➢ Herbivorous, feeding on plants, fruits, vegetables, and occasionally small invertebrates.
- ➢ Known for their gentle and curious nature.

➢ **Conservation Status:**

- ➢ Critically Endangered on the IUCN Red List due to habitat loss, poaching, and illegal pet trade.

➢ **Reproduction:**

- ➢ Females dig nests with their curved claws to lay eggs, with survival rates depending on environmental conditions.

8. NATIONAL BOARD FOR WILDLIFE (NBWL)

➢ The **National Board for Wildlife (NBWL)** is a statutory body under the **Wildlife Protection Act, 1972**. It was formed in **2003**, replacing the **Indian Board for Wildlife (1952)**.

➢ **Key Facts**

➢ **Chaired by the Prime Minister**, with the **Environment Minister as Vice-Chairperson**.

➢ Serves as the apex advisory body for **wildlife conservation and protection**.

➢ **Approval is mandatory** for any project affecting **protected areas** like national parks and sanctuaries.

➢ It oversees **policy formulation, endangered species conservation, and biodiversity protection**.

➢ **Alters protected area boundaries** only with formal approval.

➢ **Composition**

- ➢ **47 members**, including **19 ex-officio members**.
- ➢ A new board is formed with every **new government**.
- ➢ The **Standing Committee (SC-NBWL)** handles **project clearances** separately.

- **Recent Decisions**
- **Madhya Pradesh** was reprimanded for illegal construction in **Son Gharial Sanctuary** and tiger corridors.
- Despite protests, a **400 kV transmission line** was cleared in **Goa's Bhagwan Mahaveer Sanctuary**.
- **Transmission projects** in **Gujarat's Kutch Desert and Wild Ass Sanctuary** received approval.
- The **Itarsi-Betul NH-46 expansion** was permitted through a **tiger corridor**, with a condition to build **animal passages**.

9. MUMBAI'S SALT PANS

- The Centre recently approved transferring 256 acres of Mumbai's salt pan land to the Dharavi Redevelopment Project Pvt Ltd (DRPPL).
- Salt pans, crucial for the ecosystem, are low-lying areas where seawater evaporates, leaving behind salt and minerals.
- According to the 2011 Coastal Regulation Zone (CRZ) notification, salt pans fall under the ecologically sensitive CRZ-1B category, limiting economic activities.
- Mumbai has 5,378 acres of salt pan land, with 31% in residential/commercial areas and 480 acres encroached.
- Salt pans are vital for flood prevention, collecting rainwater and seawater.
- They also support various bird and insect species and complement mangroves. However, development pressure, driven by land demand, threatens these areas.

10. NATIONAL GREEN TRIBUNAL (NGT)

- The National Green Tribunal (NGT) was established in 2010 under the National Green Tribunal Act. Its aim is to expedite cases related to environmental protection, forest conservation, and natural resource management, and to provide compensation for environmental damages.
- **Structure:**
- The NGT is headed by a Chairperson, with judicial and expert members.
- It has five regional zones: North (Delhi), Central (Bhopal), East (Kolkata), South (Chennai), and West (Pune).
- The Chairperson and Judicial Members must have judicial experience, while Expert Members are environmental professionals.
- **Jurisdiction:**
- The NGT handles cases related to environmental damage under several key environmental laws, including the Water and Air Pollution Acts, Forest Conservation Act, and the Environment Protection Act.
- **Key Principles:**
- **Polluter Pays Principle:** Those responsible for pollution must bear the costs of its management.
- **Precautionary Principle:** Preventive actions should be taken to avoid environmental harm.
- **Sustainable Development:** Balancing environmental protection with development.
- **Powers:**

- The NGT can order compensation, ecosystem restoration, and fines for violations of environmental laws.
- Decisions can be reviewed by the NGT, and appeals can be taken to the Supreme Court or the High Court.

11. PALAMAU TIGER RESERVE

- Forest officials from the Palamau Tiger Reserve have informed the National Tiger Conservation Authority (NTCA) that Naxal insurgency is negatively impacting the reserve.
- **Location:** Latehar district, Jharkhand. It is the state's only tiger reserve.
- **Area:** Covers **1,129.93 sq. km**, including **Betla National Park** and **Palamau Wildlife Sanctuary**.
- **Established:** Among the **first nine tiger reserves** under **Project Tiger (1973)**.
- **Geography:** Located in the **Chota Nagpur Plateau**, with **dry deciduous and tropical forests**.
- **Climate: Drought-prone** due to the **rain-shadow effect**, with rainfall mainly from the **southwest monsoon**.
- **Fauna:** Home to **Tigers, Elephants, Leopards, Grey Wolves, Gaur, Sloth Bears, Four-horned Antelope, Indian Ratel, Otter, and Pangolin**.

12. WORLD OZONE DAY

- September 16 is observed as the International Day for the Preservation of the Ozone Layer. The theme for World Ozone Day 2024 is *"Montreal Protocol: Advancing Climate Actions,"* **Background:** Established by the UN General Assembly in 1994, this day marks the 1987 signing of the *Montreal Protocol on Substances that Deplete the Ozone Layer.*
  - **About the Ozone Layer**
- **Definition & Location:**
  The ozone layer, or ozone shield, is a stratospheric region with a high concentration of ozone (O_3), located 15–35 km above Earth's surface.
- **Formation:**
  Ozone forms when ultraviolet (UV) light splits oxygen molecules (O_2) into atoms, which then combine with O_2 to create ozone (O_3).
- **Importance:**
  The ozone layer absorbs 97–99% of harmful UV-B and UV-C radiation, shielding life from risks like skin cancer, cataracts, and ecosystem damage. It also protects marine life, including phytoplankton, a crucial part of the ocean food chain.

13. SEAWEED

- The **Department of Fisheries**, under the **Ministry of Fisheries, Animal Husbandry & Dairying**, has designated **ICAR-CMFRI** as a **Centre of Excellence for Seaweed Cultivation**.
  - **What is Seaweed?**
- Seaweed includes various **marine algae and plants**, rich in **nutrients** and widely used in **food, biofuels, cosmetics, agriculture, and pharmaceuticals**.

- **Types of Seaweed**
- **Red (Rhodophyta):** Used for **agar and carrageenan** in food and cosmetics.
- **Green (Chlorophyta):** Used in **animal feed and fertilizers**.
- **Brown (Phaeophyta):** Produces **alginate** for food and pharmaceuticals.
- **Importance of Seaweed**
- **Nutritional:** High in **vitamins, minerals, fiber, and omega-3**.
- **Environmental:** Reduces **carbon dioxide** and supports **marine ecosystems**.
- **Industrial:** Extracts like **agar, alginates, and carrageenan** are key in various industries.
- **Economic:** Provides **livelihood opportunities** for coastal communities.
- **Seaweed Cultivation in India**
- **Ideal Coastal States: Tamil Nadu, Gujarat, Maharashtra, Kerala, Andhra Pradesh, Odisha**.
- **Best Conditions:**
  - **Temperature: 20–30°C**
  - **Salinity: 30–35 ppt**
  - **Water Depth: Up to 2 meters**
  - **Cultivation Methods**
- **Raft Culture:** Seaweed spores attached to floating rafts.
- **Longline Culture:** Grown on ropes anchored to the sea floor.
- **Bottom Planting:** Planted directly on the seabed.
- **Government Initiatives**
- **Pradhan Mantri Matsya Sampada Yojana (PMMSY):** Funds allocated to boost **seaweed farming**.
- **India's First Seaweed Park:** Being developed in **Tamil Nadu** to support **seaweed industries**.

14. INDIA'S FIRST CO2-TO-METHANOL PILOT PLANT

- India's first CO2-to-methanol pilot plant is set up at Thermax Limited in Pune, under a PPP with IIT Delhi.
- The plant aims to advance Carbon Capture and Utilization (CCU) technologies, which capture CO2 and use it for valuable products.
- **CCU Process:**
- **Capture:** CO2 is captured through methods like post-combustion, pre-combustion, or oxy-fuel combustion.
- **Transport:** CO2 is transported via pipelines, trucks, ships, or rail.
- **Utilization:** CO2 is used in oil recovery, chemical production, or concrete curing.
- **Storage:** CO2 is stored underground if not utilized.
- **Benefits:** Reduces emissions, meets climate goals, and creates economic value.
- **Challenges:** High costs, energy needs, infrastructure, and storage management.

15. AMUR FALCON

- Manipur has banned hunting, catching, and selling the Amur falcon (Falco amurensis), locally called 'Kahuaipuina.'
- This small raptor migrates from Siberia and northern China to southern Africa, covering up to 500 km a day.
- Males are grey with rufous thighs, while females are duller with white underparts.
- They primarily eat insects, especially termites.
- The species is listed as "Least Concern" by the IUCN but faced poaching issues in Nagaland.
- Efforts like the "Friends of the Amur Falcon" campaign have helped reduce this.
- The bird is protected under the CMS Convention and holds cultural significance in some regions.

16. ONE HORNED RHINOS

- Kaziranga and other protected habitats of the one-horned rhinoceros in Assam recorded an 86% drop in poaching of the herbivore since 2016.
- The **Indian rhinoceros** (*Rhinoceros unicornis*), or **greater one-horned rhino**, is native to the Indian subcontinent. Recognizable by its single black horn and thick, armor-like skin, it thrives in **tropical grasslands and wetlands**.
- **Population & Habitat**
- Once widespread, now primarily found in **northeast India and Nepal**.
- **Kaziranga National Park (Assam)** hosts **over 2,400 rhinos**, the largest population.
- Other key habitats: **Manas NP, Pobitora WLS (Assam), Jaldapara NP (West Bengal)**.
- **Behavior & Diet**
- **Mostly solitary**, except during mating or when mothers raise calves.
- **Grazers**, feeding mainly on **grasses, leaves, fruits, and aquatic plants**.
- **Conservation Status & Threats**
- **Population: ~4,000** due to conservation success.
- **IUCN: Vulnerable** due to **poaching** (horn demand) & **habitat loss**.
- **Legal Protection**:
  - **Schedule I** of **India's Wildlife Protection Act, 1972** (highest protection).
  - **CITES** prohibits international trade in rhino horn.

17. POLLUTION CONTROL BOARDS

- Nearly **half of the sanctioned posts** in **State Pollution Control Boards (SPCBs)** and **Pollution Control Committees (PCCs)** across India are vacant.

➢ ***Central Pollution Control Board (CPCB)***

➢ **Established:** 1974 under the **Water Act, 1974**, and later under the **Air Act, 1981**.

➢ **Role:** A statutory body under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.

➢ **Functions:**

- **Regulation:** Set national standards for air, water, noise, and waste management.
- **Monitoring:** Track pollution levels and report environmental quality.
- **Advisory:** Guide the government on pollution control measures.
- **Coordination:** Work with **State Pollution Control Boards (SPCBs)** to promote clean technologies.

State Pollution Control Boards (SPCBs)

➢ **Established:** Under the **Water Act, 1974** in each state.

➢ **Role:** Operate at the state level under CPCB guidance.

➢ **Functions:**

- **Enforcement:** Implement environmental laws (Water, Air, Environment Protection Acts).
- **Consents:** Grant "Consent to Establish" (CTE) and "Consent to Operate" (CTO) to industries.
- **Monitoring:** Track pollution sources and report to CPCB.
- **Local Management:** Collaborate with municipal bodies, industries, and the public.

18. AGREEMENT ON BIODIVERSITY BEYOND NATIONAL JURISDICTION (BBNJ)

➢ India has signed the **Global Ocean Treaty**, also known as the Agreement on Biodiversity Beyond National Jurisdiction (BBNJ) aimed at conserving and sustainably using marine biodiversity in international waters.

➢ Adopted on June 19, 2023, the treaty addresses areas covering nearly two-thirds of the ocean.

➢ Key Aspects:

➢ **Marine Genetic Resources (MGRs)**: Ensures fair sharing of benefits from marine resources.

➢ **Marine Protected Areas (MPAs)**: Establishes tools for ecosystem conservation.

➢ **Environmental Impact Assessments (EIAs)**: Mandates assessments for activities in international waters.

➢ **Capacity-Building & Technology Transfer**: Supports developing nations' participation.

➢ **Institutional Arrangements**: Establishes a Conference of the Parties (COP) and funding mechanism.

➢ The treaty is open for signature until September 2025 and will enter into force after the 60th ratification.

19. ETURNAGARAM WILDLIFE SANCTUARY

➢ Eturnagaram Wildlife Sanctuary, established in 1952, spans 812 sq km in Telangana's Mulugu district, about 100 km from Warangal and 250 km from Hyderabad.

➢ **Geography**: The sanctuary features plains and hilly areas, with the Godavari River providing a perennial water source.

Flora: It mainly consists of southern tropical dry deciduous forests, with species like teak, bamboo, and madhuca.

Fauna: Home to tigers, leopards, wolves, wild boars, gaur, sambar, spotted deer, and various reptiles

including crocodiles and pythons.

Cultural Significance: Hosts the Sammakka Saralamma Jatara, a major tribal festival.

20. ETHANOL

- India is now the world's third largest producer and consumer of Ethanol.
- Ethanol (ethyl alcohol) is a **renewable, carbon-neutral biofuel** derived from plant-based biomass. It is blended with petrol in India to **enhance energy security, reduce oil imports, and lower emissions**.
- **Properties:**
  - **Volatile, flammable, colorless liquid** with a wine-like odor.
  - Active ingredient in **alcoholic beverages** and the second most consumed drug after caffeine.
- **Production & Types:**
  - **Sources:** Primarily from **sugarcane molasses**, but also from corn, broken rice, and agricultural residues.
- **Types of Ethanol:**
  - **First-Gen:** From food crops (corn, sugarcane).
  - **Second-Gen:** From agricultural waste (wood chips, grasses).
  - **Third-Gen:** From algae.
- **Benefits:**
  - **Energy Security:** Reduces crude oil dependency.
  - **Environmental Friendly:** Cuts vehicular emissions.
  - **Rural Economy:** Boosts demand for crops, creating jobs.
  - **Waste Utilization:** Promotes circular economy.

OCTOBER 2024

1. INTERNATIONAL BIG CAT ALLIANCE (IBCA)

Conservation Status of Big Cats

Species	Scientific Name	IUCN Red List	CITES	Indian Wildlife (Protection) Act, 1972
Tigers	*Panthera tigris*	Endangered	Appendix-I	Schedule-I
Lions	*Panthera leo*	Vulnerable	Appendix-I	Schedule-I
Leopards	*Panthera pardus*	Vulnerable	Appendix-I	Schedule-I
Snow Leopards	*Panthera uncia*	Vulnerable	Appendix-I	Schedule-I
Pumas	*Puma concolor*	Least Concerned	Appendix II (P. c. Costaricensis and cougar: Appendix-I)	NA
Jaguars	*Panthera onca*	Near Threatened	Appendix-I	NA
Cheetahs	*Acinonyx jubatus*	Vulnerable	Appendix-I	Schedule-I

- The Union Cabinet approved **IBCA** on **February 29** with a **₹150 crore budget** for **2023-24 to 2027-28**.
- **Headquarters**: **India**.
- **Members**: **India, Nicaragua, Eswatini, and Somalia**. All **UN members** are eligible to join.
  - **Objectives & Mission**
  - **Global coalition** of big cat range and non-range countries, conservation partners, and corporate groups.
- **Goals**:
  - Strengthen **big cat conservation** by sharing resources and best practices.
  - Reverse **population decline** and enhance biodiversity protection.

- Integrate conservation with **sustainable development** and **climate resilience**.

Approach & Strategies

- **Knowledge Sharing & Capacity Building**: Collaborative research, training, and technical support.
- **Public Awareness**: Education campaigns targeting **youth and local communities**.
- **Partnerships**: Supports **transnational conservation efforts** and aligns with **UN SDGs**.
- **Sectoral Integration**: Merges **biodiversity** with **agriculture, forestry, tourism, and infrastructure**.
- **Climate & Sustainability**: Promotes **habitat restoration, sustainable land use**, and climate mitigation.

Governance

- **Structure**: **Assembly of Members, Standing Committee, and Secretariat**.
- **Model**: Based on the **International Solar Alliance (ISA)**.
- **Leadership**: Interim **Director General** appointed by **MoEFCC**, with a formal selection during the **IBCA Assembly**.

2. BLACK CARBON

- **Definition**: A fine particulate pollutant from incomplete combustion of fossil fuels, biomass, and organic materials. Though not a greenhouse gas, it **absorbs sunlight, heats the atmosphere, and accelerates ice melting**.

Sources & Lifespan

- Emitted from **diesel engines, coal, biomass fires, and household cooking**.
- **Household energy use** accounts for **50% of global emissions**.
- Stays in the atmosphere for **4-12 days**.

Climate & Health Impact

- **Traps heat**, affecting rainfall and regional climate.
- **Accelerates glacier melting** by reducing surface reflectivity.
- **Causes respiratory and cardiovascular diseases**, as a key component of **PM2.5 pollution**.

Black Carbon in India

- **Major sources**: **Diesel vehicles, crop residue burning, forest fires, and solid fuel cooking**.

Policy Measures

- **PM Ujjwala Yojana**: Promotes **LPG for clean cooking**, reducing biomass burning.
- **NCAP**: Targets **PM2.5 and PM10 pollution** reduction.
- **BS-VI Emission Norms**: Stricter fuel standards to curb vehicle emissions.

3. INDIAN WILD ASS

- The population of the Indian Wild Ass (Equus hemionus khur) in Gujarat has increased by 26.14%, rising from 6,082 in 2020 to 7,672 in 2024, according to the latest census.
- The Wild Ass Population Estimation (WAPE) is conducted every four years in the state.
- The Asiatic wild ass (Equus hemionus), or onager, has five subspecies, including the Indian Wild Ass, locally called 'Ghudkhur' in Gujarat.
- **Range:** Found mainly in the Little Rann of Kutch and nearby areas, though historically present in western India and Pakistan.
- **Habitat:** Inhabits arid and semi-arid grasslands, scrublands, saline deserts, and marshes, adapted to extreme conditions.
- **Appearance:** Sandy-colored coat provides natural camouflage.
- **Speed:** Can run at 50–70 km/h.
- **Conservation Status:**
- **IUCN Red List:** Near Threatened.
- **Indian Wildlife Protection Act, 1972:** Listed in Schedule I, granting maximum legal protection.
- **Protected Area:** The Indian Wild Ass Sanctuary (5,000 sq km) in the Little Rann of Kutch, established in 1972.
- **Ecological Importance:**
- **Ecosystem Role:** Helps maintain grasslands by grazing, preventing overgrowth.
- **Keystone Species:** Influences vegetation patterns, supporting birds, smaller mammals, and insects.

4. KAIMUR WILDLIFE SANCTUARY (KWLS)

- The **central government** has approved Bihar's **second tiger reserve** at **Kaimur Wildlife Sanctuary (KWLS)**, following a state proposal.
- **About Kaimur Wildlife Sanctuary (KWLS):**
- Located in **Kaimur and Rohtas districts, Bihar**, within the **Kaimur Range**.
- Established in **1979**, initially proposed in **1973-74**, later expanded in **2010**.
- **Largest sanctuary in Bihar**, forming a key **wildlife corridor** linking forests in **Bihar, Jharkhand, Chhattisgarh, and Uttar Pradesh**.
- **Historic sites: Rohtasgarh Fort, Shergarh Fort, Megaliths, Rock Paintings, and Ancient Inscriptions**.
- **Flora:**
- **Forest types:** Tropical Dry Mixed Deciduous, Dry Sal, Boswellia, and Dry Bamboo Brakes.
- **Key species: Sal, Sheesham, Mahua, Bamboo, and Tendu** along with medicinal plants.
- **Fauna:**
- **Mammals: Bengal tiger, Indian leopard, sloth bear, chital, nilgai, and wild boar**.
- **Birds:** Rich in avian diversity, including **peafowl, partridge, and migratory birds** in winter.
- **Reptiles: Pythons, monitor lizards**, and other species thrive here.

5. CARACAL

- The **Gujarat government** has announced a **Caracal Breeding and Conservation Center** in **Chadva Rakhal, Kutch**.
- **About Caracal:**
- **Medium-sized wild cat** found in **Africa, Central Asia, the Middle East, and India**.
- In India, it primarily inhabits **Rajasthan and Gujarat's arid regions**.
- **Habitat:**
- Prefers **scrub forests, savannas, and semi-deserts**.
- Highly adaptable, thriving where **cover and prey** are available.
- **Physical Features:**
- **Slender body, long legs**, and **reddish-brown/sandy fur** for camouflage.
- **Distinctive tufted black ears** enhance hearing.
- **Diet & Behavior:**
- **Carnivorous**, preying on **small mammals, birds, and reptiles**.
- Can **leap several feet** to catch birds in flight.
- **Solitary and territorial**, mostly **nocturnal** but active during dawn and dusk.
- **Conservation Status:**
- **Globally 'Least Concern' (IUCN)** but **'Near Threatened' in India** (CAMP & IUCN).
- **Protected under Schedule I** of the **Indian Wildlife (Protection) Act, 1972**.
- Included in the **2021 Species Recovery Plan** for conservation efforts in India.

6. SHALE GAS

- A recent **Science & Technology Ministry** study highlights **shale gas potential** in the **South Karanpura coalfield, Jharkhand**.
- **What is Shale Gas?**
- A **natural gas** trapped in **shale formations** (fine-grained sedimentary rocks with low permeability).
- Extracted through **hydraulic fracturing (fracking)**, where high-pressure water, sand, and chemicals create fractures to release gas.
- Mainly consists of **methane (CH4)** with traces of **ethane, propane, and butane**.
- **Shale Gas Reserves in India**
- Major identified basins:
- Cambay Basin (Gujarat)
- Assam-Arakan Basin (Northeast)
- Gondwana Basin (Central India)
- Krishna-Godavari Basin (Andhra Pradesh)
- Cauvery Basin (South India)
- Indo-Gangetic Plains

- **Government Initiatives**
- **2013 Policy**: Allowed **ONGC & Oil India Ltd.** to explore shale gas.
- **HELP (2016)**: Simplified regulations and encouraged investment.
- **2018 Reforms**: Permitted **existing contractors** to explore shale resources.

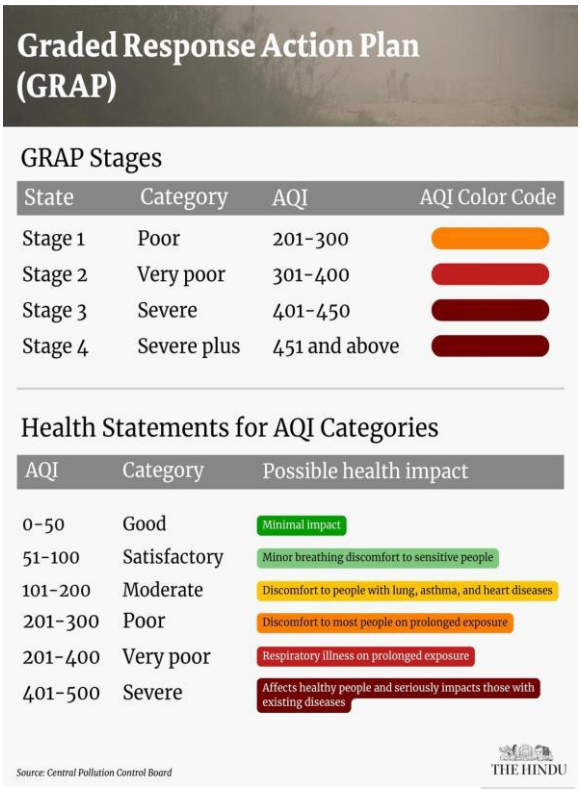
7. NAGARJUNA SAGAR-SRISAILAM TIGER RESERVE

- The **EnviStats India-2024** report ranks **NSTR** first among **India's 55 tiger reserves** for its **leopard population**, with **360 leopards**.
  - **Location & Geography**
  - **States:** Andhra Pradesh & Telangana
  - **Range:** Located in the **Nallamala Hills**, an offshoot of the **Eastern Ghats**.
  - **Boundaries: Nagarjuna Sagar Dam (North)** & **Srisailam Dam (South)**.
  - **Area: 3,568 sq. km**, among **India's largest** reserves.
  - **Conservation & Ecology**
  - **Established in 1978** under **Project Tiger**.
  - **Protected Areas:** Includes **Rajiv Gandhi & Gundla Brahmeswaram Wildlife Sanctuaries**.
  - **River Krishna** flows through, sustaining the ecosystem.
- **Fauna:** Tigers, leopards, sloth bears, dholes, and deer species.
- **Flora: Deciduous forests** with **teak, bamboo, and medicinal plants**.

8. GANDHI SAGAR SANCTUARY

- **Location**: Madhya Pradesh, near the **Chambal River**, spanning **Mandsaur** and **Neemuch** districts.
- **Established**: 1974, to protect the region's **unique biodiversity**.
  - Set to **reintroduce cheetahs**, enhancing biodiversity and ecological balance.
- **Terrain & Ecosystem**:
  - Flat **rocky plateau** with the **Chambal River** dividing it into two halves.
  - **Savanna landscape** with **dry deciduous forests** and **open grasslands**.
  - **Evergreen riverine valleys** along the Chambal.
- **Key Features**:
  - **Chaturbhuj Nala rock shelters**, known for ancient rock art.
  - Surrounds the **Gandhi Sagar Dam**, India's **second-largest reservoir** (after Hirakud).
  - **Flora**: Predominantly **teak, khair, and salai** trees.
  - **Fauna**: Home to **leopards, nilgai, chinkara, wild boar**, and bird species like **peafowl and partridges**.

9. GRADED RESPONSE ACTION PLAN (GRAP)



- GRAP is a set of emergency measures to **prevent worsening air quality** once it crosses a threshold.
- **Activation Stages**
- **Stage 1**: AQI **201-300** ('Poor').
- **Stage 2**: AQI **301-400** ('Very Poor').
- **Stage 3**: AQI **401-450** ('Severe').
- **Stage 4**: AQI **450+** ('Severe+').
- Measures from earlier stages continue when higher stages are activated.
- **Implementation**
- **First notified in 2017**, based on a 2016 CPCB plan.
- Initially enforced by the **Environment Pollution (Prevention and Control) Authority** (dissolved).
- Since **2021, implemented by the Commission for Air Quality Management (CAQM)**.
- **CAQM Role & Structure**
- **Established under the CAQM Act, 2021**.
- Responsible for **monitoring, coordination, and enforcement** in NCR and nearby areas.
- **Chairperson** must have **15+ years in environmental protection or 25+ years in administration**.

10. MARINE HEAT WAVES (MHWs)

- Extreme ocean events where sea surface temperatures rise **3-4°C above average for at least five days**. They can last **weeks, months, or even years**.
  - **Causes**
  - **Climate change** and rising global temperatures.
  - **Ocean currents & weather patterns** (El Niño, La Niña).
  - **Weaker winds & stratification**, reducing ocean mixing.
  - **Consequences**
  - **Coral bleaching & reef damage**.
  - **Disruption of marine ecosystems**, affecting species migration and breeding.
  - **Decline in fisheries productivity**, impacting food security.
  - **Increased marine mortality** (fish, shellfish, seabirds).
  - **Stronger cyclones & hurricanes** due to ocean warming.
  - **New Study Findings**
  - **Deep-ocean MHWs are under-reported**.
  - Unlike surface MHWs, **eddies (swirling currents) drive deep-water temperature shifts**.

➢ **Global warming is affecting not just surface but also deep ocean temperatures** through these currents.

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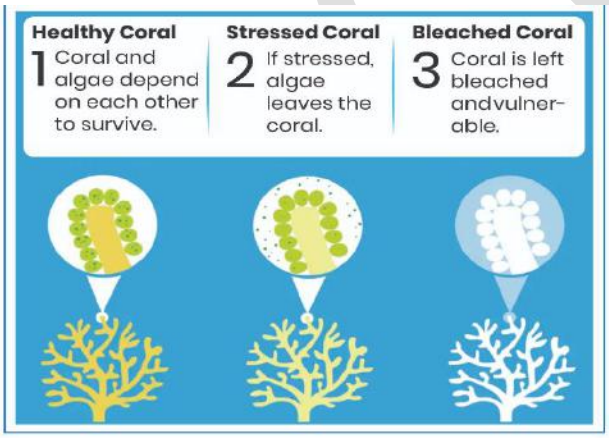
12. CORALS & CORAL BLEACHING



➢ Corals are **sessile marine animals** that attach permanently to the ocean floor. Each coral unit is a **polyp**, living in colonies of hundreds to thousands of genetically identical polyps.

➢ **Types:**

➢ **Hard corals**: Build coral reefs using **limestone skeletons** left behind by dead polyps.

➢ **Soft corals**: Do not form reefs but contribute to marine biodiversity.

➢ **Coral Bleaching**

➢ Corals house **zooxanthellae**, algae that provide **oxygen, nutrients, and color** through photosynthesis. Bleaching occurs when corals **expel these algae** due to stress, turning white.

➢ **Causes of Coral Bleaching**

➢ **Rising sea temperatures** (linked to climate change).

➢ **Ocean acidification** (CO_2 increases acidity, stressing corals).

➢ **Pollution** (runoff from agriculture, deforestation, urban waste).

➢ **Overexposure to sunlight** (UV radiation during low tides).

➢ **Salinity changes** (freshwater influx disrupts coral balance).

- **Consequences**
- **Ecosystem collapse** (loss of marine biodiversity).
- **Economic loss** (fisheries, tourism, and coastal protection decline).
- **Reef degradation** (prolonged bleaching leads to coral death).

13. KUNO NATIONAL PARK (KNP)

- **Location**: Madhya Pradesh
- **Area**: ~748 sq km
- **Established**: Wildlife Sanctuary (1981), upgraded to National Park (2018)
- **Ecoregion**: Khathiar-Gir dry deciduous forests
  - **Biodiversity**
  - **Flora**: Predominantly dry deciduous forests with grasslands and scrub.
  - **Fauna**:
    - **Flagship Species**: Asiatic Cheetah (reintroduced in 2022).
    - **Other Wildlife**: Leopards, Indian Wolves, Jackals, Nilgai, Chinkara, Sambar, birds, and reptiles.
  - **Conservation Significance**
  - Identified in the 1990s for **Asiatic Lion relocation**, but the plan faced delays.
  - Selected for **Cheetah reintroduction** after the species was declared extinct in India in 1952.
  - **Geography**
  - Part of the **Vindhyan hill ranges** in central India's semi-arid region.
  - **Kuno River**, a tributary of the Chambal River, serves as a key water source.

14. BIOLUMINESCENCE

- Bioluminescence is the natural production of light by living organisms through a **chemical reaction** (chemiluminescence).
  - **Mechanism**
  - Involves **luciferin** (light-emitting molecule) and **luciferase** (enzyme).
  - Luciferin reacts with **oxygen** in the presence of luciferase, producing light.
  - **Occurrence**
  - **Marine Species**: Jellyfish, fish, plankton, algae.
  - **Terrestrial Organisms**: Fireflies, fungi, glow worms.
  - **Functions**
  - **Defense**: Distracts predators.
  - **Attraction**: Lures prey or mates.
  - **Camouflage**: Helps deep-sea species blend in.
  - **Communication**: Used for intra-species signaling.
  - **Chennai's Case**
  - Recent **heavy rainfall** likely triggered the phenomenon.
  - **Nutrient influx** and **lower sea surface temperatures** favored the growth of *Noctiluca scintillans*, a bioluminescent dinoflagellate.

➢ Though visually striking, these organisms can **deplete oxygen**, causing **hypoxia** in water bodies.

15. BAOBAB TREE

➢ Baobab trees shape **African landscapes** and can live for **over 1,000 years**, making them one of the **largest living organisms** on Earth.

➢ **Species & Distribution**

➢ **Nine species** exist:

- **Six** native to **Madagascar**.
- **Two** in **mainland Africa & the Arabian Peninsula**.
- **One** in **Australia**.

➢ Found in **semi-arid regions**, they are vital to the **African savannah ecosystem**.

➢ **Characteristics**

➢ **Massive, swollen trunk** can store up to **100,000 liters of water**, earning it the name **"bottle tree"**.

➢ **Deciduous leaves** shed during the dry season.

➢ Can grow up to **30 meters (100 feet) tall** with a broad canopy.

➢ Produces **nutrient-rich fruit ("monkey bread")**, high in **vitamin C, calcium, and antioxidants**.

➢ **Baobabs in India**

➢ **Mandu, Madhya Pradesh:** Home to **around 1,000 baobabs** (*Mandu ki Imli*), introduced by **African traders 4,000 years ago**. The **Bhil tribe** protects them, using their fruit for livelihood.

➢ **Prayagraj, Uttar Pradesh:** Documented presence of baobab trees.

➢ **Mumbai:** Part of the city's **historic landscape**, though declining due to urbanisation.

16. ASIAN GOLDEN CAT

➢ Manas National Park has captured the first photographic evidence of the elusive Asiatic golden cat (*Catopuma temminckii*). Also known as Temminck's cat, this medium-sized wild cat is native to Southeast Asia, the Himalayas, and parts of China.

➢ **Appearance**

➢ Its coat varies in color, ranging from golden brown to dark brown, pale cinnamon, bright red, or gray.

➢ **Habitat and Distribution**

➢ It inhabits diverse environments, including evergreen forests, dry deciduous forests, and grasslands. Its range extends from northeastern India to Southeast Asia and southern China.

➢ **Behavior and Diet**

➢ The Asian golden cat is solitary and territorial, active during the day or at dawn and dusk. It preys on hares, birds, reptiles, and small ungulates.

➢ **Conservation Status**

➢ Classified as **Near Threatened** by the IUCN, it faces threats from habitat loss, poaching, and retaliatory killings due to livestock predation.

17. KEY BIODIVERSITY AREAS (KBA)

- **Key Biodiversity Areas (KBAs)** are regions of global importance for biodiversity conservation, identified using **IUCN's standardized criteria**. They result from collaborations between scientists, conservation groups, and governments.
  - **Purpose**
  - KBAs highlight areas needing protection by governments or agencies. They extend the **Important Bird Area (IBA)** concept to other taxonomic groups.
  - **Types of KBAs**
  - Examples include **Important Plant Areas (IPAs), Ecologically and Biologically Significant Areas (EBSAs), Alliance for Zero Extinction (AZE) sites, Prime Butterfly Areas, Important Mammal Areas, and Freshwater Biodiversity Sites**. Prototype criteria exist for freshwater mollusks, fish, and marine systems.
  - **Identification Criteria**
  - The **Global Standard for KBAs (IUCN 2016)** defines sites based on **11 criteria**, grouped into five categories:
  - **Threatened biodiversity**
  - **Geographically restricted biodiversity**
  - **Ecological integrity**
  - **Biological processes**
  - **Irreplaceability**
  - KBAs apply to **terrestrial, freshwater, and marine ecosystems** across all taxonomic groups except microorganisms.

18. TURMERIC

- Turmeric, known as "the golden spice," is widely used in South Asia. It belongs to the **Zingiberaceae** family and gets its yellow-orange color from **curcumin**, a polyphenol with antioxidant and anti-inflammatory properties.
- India is the world's top producer, exporter, and consumer, producing **80% of global turmeric** mainly in **Andhra Pradesh, Tamil Nadu, and Karnataka**. It is also grown in **Bangladesh, Pakistan, Sri Lanka, and Nepal**.
  - **Common Adulterants in Turmeric**
  - **Artificial Colorants**: Dyes like **Metanil Yellow** and **Sudan dyes** are harmful and can be carcinogenic.
  - **Lead Chromate**: Added for color but is **toxic** and causes neurological and cardiovascular damage.
  - **Chalk Powder & Yellow Soapstone**: Used to increase weight but degrade quality.

NOVEMBER 2024

1. MELANISTIC TIGERS

➢ A tigress from **Tadoba-Andhari Tiger Reserve, Maharashtra**, was relocated to **Similipal Tiger Reserve, Odisha**, to **diversify the genetic pool** and combat inbreeding.

➢ **Why It Matters:**

➢ Odisha's tiger population faces **inbreeding**, leading to an increase in **pseudo-melanistic (black) tigers**.

➢ This relocation is part of a government plan to ensure genetic diversity.

➢ **What Are Pseudo-Melanistic Tigers?**

➢ These tigers appear mostly black, with faint white and orange stripes.

➢ The last recorded sighting in the wild was in **Similipal (2017-18)**.

➢ **Cause of the Black Coat:**

➢ **Genetic mutation** in Bengal tigers leads to this unique coat variation.

➢ This mutation is **rare outside Similipal**, except in **captive tigers** at Bhubaneswar's Nandankanan Zoo and Chennai's Arignar Anna Zoo.

➢ **Why So Many in Similipal?**

➢ **Similipal tigers are isolated**, leading to inbreeding.

➢ **27 of Odisha's 30 tigers** live in Similipal, with **13 being pseudo-melanistic**.

➢ **Genetic drift** increases the likelihood of this rare mutation persisting.

2. GREEN FIRECRACKERS

➢ **Green crackers** are eco-friendly fireworks designed to reduce air and noise pollution. They emit **30% less pollution** than traditional crackers.

➢ **How They Differ:**

➢ **No harmful chemicals** like arsenic, lithium, or barium.

➢ **Lower aluminum content** reduces particulate matter emissions.

➢ **Developed by CSIR** to combat pollution.

➢ **Key Features (CSIR-NEERI Guidelines):**

➢ Smaller shell size.

➢ No ash usage.

➢ Fewer raw materials.

➢ Additives to suppress dust and reduce SO_2 and NO_2 emissions.

➢ **Types of Green Crackers:**

➢ **SWAS (Safe Water Releaser):** Releases water vapor to suppress dust. No potassium nitrate or sulfur. Reduces particulate matter by **30%**.

➢ **SAFAL (Safe Minimal Aluminum):** Uses **magnesium** instead of aluminum, lowering sound levels.

➢ **STAR (Safe Thermite Cracker):** Free of potassium nitrate and sulfur, reducing **both particulate emissions and noise**.

3. AIR QUALITY INDEX (AQI)

- The **Air Quality Index (AQI)** measures and reports air pollution levels in a specific area. It provides a numerical value indicating pollution severity and potential health risks.
- In India, AQI is based on **eight key pollutants**:
- **Particulate Matter (PM10, PM2.5)**
- **Nitrogen Dioxide (NO_2)**
- **Sulfur Dioxide (SO_2)**
- **Carbon Monoxide (CO)**
- **Ozone (O_3)**
- **Ammonia (NH_3)**
- **Lead (Pb)**

AQI	Associated Health Impacts
Good (0–50)	Minimal Impact
Satisfactory (51–100)	May cause minor breathing discomfort to sensitive people.
Moderately polluted (101–200)	May cause breathing discomfort to people with lung disease such as asthma, and discomfort to people with heart disease, children and older adults.
Poor (201–300)	May cause breathing discomfort to people on prolonged exposure, and discomfort to people with heart disease
Very Poor (301–400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases.
Severe (401-500)	May cause respiratory impact even on healthy people, and serious health impacts on people with lung/heart disease. The health impacts may be experienced even during light physical activity.

4. KUNMING MONTREAL GLOBAL BIODIVERSITY FRAMEWORK (KMGBF)

- A global pledge to **halt and reverse biodiversity loss by 2030** and achieve **harmony with nature by 2050**.
- **Not legally binding**, adopted at **COP15 (2022)** under the **Convention on Biological Diversity**.
- Named after **Kunming (initial host city) and Montreal (final host city)**.
  - ***Key Features:***
  - **Four Global Goals (2050) & 23 Targets (2030)**.
  - **NBSAPs:** Countries must align their **National Biodiversity Strategies and Action Plans** with GBF targets.
  - ***Main Objectives:***
  - **Conservation** – Protect **30% of land, inland water, and marine areas** by 2030.
  - **Restoration** – Restore **30% of degraded ecosystems** for biodiversity and ecosystem health.
  - **Sustainable Use** – Balance biodiversity use with ecosystem preservation.
  - **Benefit Sharing** – Ensure **equitable access** to genetic resources.
  - **Funding – $200 billion/year** for biodiversity efforts, including **$30 billion from developed to developing nations**.

5. SIMILIPAL TIGER RESERVE

- **Name Origin:** Derived from the **'Simul' (Silk Cotton) tree**.
- **Location:** Mayurbhanj district, **Odisha**; part of **Similipal Biosphere Reserve**.
- **Established: 1973**, under **Project Tiger** to protect Bengal tigers.

- **UNESCO Status:** Declared a **Biosphere Reserve** in **2009**.
- **Indigenous Tribes:** Home to **Kolha, Santhala, Bhumija, and Gonda** tribes, deeply connected to the forest.
  - ***Ecological Significance:***
  - **Flora: Northern tropical moist deciduous forests** with **semi-evergreen patches**; **Sal** is dominant.
  - **Fauna:** Rich in wildlife, including **Bengal tigers, elephants, leopards, gaur, and sambar deer**.
  - **Endangered Species:** Habitat of the rare **melanistic (black) tiger**.
  - **Waterfalls & Rivers:** Features **Barehipani and Joranda Falls.**

6. PEACE WITH NATURE COALITION

- **Launch:** Colombia, along with **20 nations**, introduced the **"Peace with Nature" Coalition** at **COP16** in Cali.
- **Urgency:** Leaders warn that **rapid environmental destruction** threatens **human survival**.
  - **Objectives:**
  - **Harmony with Nature:** Promote **conservation, restoration, and sustainable use** of biodiversity.
  - **Global Collaboration:** Strengthen **international and national** sustainability efforts.
  - **Awareness & Action:** Encourage **public engagement** in environmental protection.
  - **Key Principles:**
  - **Sustainability:** Reduce **environmental degradation** and **biodiversity loss**.
  - **Equity:** Ensure **fair distribution** of natural resource benefits, recognizing **indigenous communities**.
  - **International Cooperation:** Foster **global partnerships** to tackle environmental challenges.
  - **Membership:**
  - Includes countries from **four continents**, such as **Mexico, Sweden, Uganda, and Chile** (none from **Asia-Pacific**).
  - **Voluntary participation**, with no **legally binding commitments**.
  - Open to nations aligning with principles for a **harmonious relationship with nature.**

7. INTERNATIONAL SOLAR ALLIANCE

- ***Overview:***
- **Intergovernmental organization** promoting **solar energy adoption**.
- Launched in **2015** by **India and France** at the **Paris Climate Conference**.
- Aims to enhance **energy access, security, and transition** through solar power.
- ***Mission - 'Towards 1000' Strategy:***
- Mobilize **$1,000 billion** in solar investments by **2030**.
- Provide **clean energy access to 1 billion people**.
- Install **1,000 GW of solar capacity** to cut **1 billion tonnes of CO_2** emissions annually.
- ***Membership & Structure:***
- Initially limited to countries between the **Tropics of Cancer & Capricorn**.
- **Expanded in 2020** to include **all UN member states**.
- **100+ countries signed**, **90+ ratified** as full members.

- Headquarters at **National Institute of Solar Energy (NISE), Gurugram, India**.
- ***Key Initiatives:***
- **Solar Data Portal:** Provides **real-time insights** on solar resources, projects, and investments.
- **Global Solar Facility:** Unlocks **commercial capital** for solar projects, especially in **Africa**.
- **SolarX Startup Challenge:** Supports **innovative solar solutions**; 2024 winners from **Asia & Pacific**.

- **Global Events:**
  - **International Solar Festival** & **CEO Caucus**.
  - **ISA Pavilion 'Solar Hub'** featured at **COP27 & beyond** to promote solar energy.

8. NATIONAL CLEAN AIR PROGRAMME (NCAP)

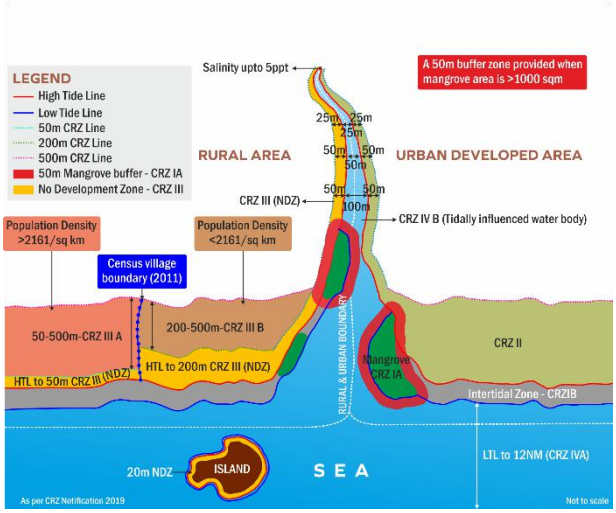
- ***Overview:***
- India's **national strategy** to combat **air pollution**.
- Launched in **January 2019** by the **MoEFCC**.
- Focuses on **131 cities** across **24 States/UTs**.
- ***Objectives:***
- Initially aimed for **20-30% reduction** in **PM10 levels** by **2024-25** (baseline: 2017-18).
- Revised target: **Up to 40% reduction** or meeting the **60 µg/m³** national standard by **2025-26**.
- ***Key Features:***
- **City-Specific Action Plans:** Tailored strategies for **non-attainment cities**.
- **Sectoral Interventions:** Focus on **transport, industry, power, residential, and agriculture**.
- **Monitoring & Evaluation:** Real-time **air quality monitoring** and periodic assessments.
- **Public Participation:** Involves **citizens, NGOs, and academia** for awareness and engagement.
- ***Recent Development:***
- **PRANA Portal (2021):** Tracks **NCAP implementation** and provides public insights on **air quality management**.

9. RIVER CITIES ALLIANCE (RCA)

- ***Overview:***
  - **India's first** platform for **urban river management**.
  - Launched in **November 2021** by the Ministry **of Jal Shakti** and **Ministry of Housing & Urban Affairs**.
- ***Key Objectives:***
  - **Networking:** Connect cities to share **river management strategies**.
  - **Capacity Building:** Train **urban local bodies** in river conservation.
  - **Technical Support:** Assist in **river rejuvenation projects**.
- ***Membership & Expansion:***
  - Started with **30 cities**, now includes **110 river cities** across India.
  - Open to **all river cities**, with no time restrictions on joining.
- ***Global Engagement:***
  - **Global River Cities Alliance (GRCA)** launched at **COP28, Dubai**.
  - Includes **275+ river cities** from **11 countries** (e.g., India, Egypt, Netherlands, Japan).

- Features cities like **The Hague, Adelaide, and Szolnok**.
- Aims to foster **global collaboration** in **river management** and conservation.

10. COASTAL ZONE MANAGEMENT PLAN (CZMP)



- The **Environment Ministry** approved **CZMPs** for **10 coastal districts** in Kerala.
- The plan aligns with the **Coastal Regulation Zone (CRZ) Notification, 2019**, allowing **development activities** towards the **seaward side** under relaxed rules.
- ***What is CZMP?***
- A **Coastal Zone Management Plan** regulates coastal activities, ensuring a balance between **environmental conservation** and **sustainable development**.
- ***Key Objectives***
- **Environmental Protection:** Safeguards **mangroves, coral reefs, and wildlife habitats**.
- **Sustainable Development:** Supports **regulated construction and infrastructure**.
- **Livelihood Security:** Protects **traditional coastal communities, including fisherfolk**.
- ***Components***
- **Coastal Zoning:** Classifies areas as **CRZ-I, II, III, IV**.
- **Regulations:** Defines **permissible activities** to prevent damage.
- **Management Strategies:** Includes **pollution control, disaster planning, and conservation efforts**.

11. RANTHAMBORE NATIONAL PARK & TIGER RESERVE

- ***Tiger Status***
- Officials have traced **10 of 25 tigers** reportedly missing from **Ranthambore National Park**.
- The **2022 census (published in 2023)** estimated **88 tigers** in the reserve.
- ***Location & Geography***
- **Situated in Sawai Madhopur, Rajasthan**, at the **northern edge of the Vindhya Range**.
- **Banas River** borders the park to the **north**, **Chambal River** to the **south**.
- ***History & Importance***
- **Ranthambore Fort**, a **UNESCO World Heritage Site**, was built in the **10th century** by the **Chauhan dynasty**.
- Declared a **National Park in 1980**, it became part of **Project Tiger in 1973**, playing a key role in **tiger conservation**.
- ***Biodiversity***
- **Flora:** Tropical **dry deciduous forests**, including **dhok, babul, and ber trees**, along with **grasslands** and **riverine vegetation**.
- **Fauna:**
  - **Carnivores:** Bengal tigers, leopards, striped hyenas, jackals.
  - **Herbivores:** Sambar deer, spotted deer, nilgai, wild boar, langurs, sloth bears, chinkara.

- **Reptiles:** Crocodiles.

12. MARKHOR

- On 2 May 2024, the United Nations General Assembly declared 24 May as the International Day of the Markhor.
- **Markhor (Capra falconeri)** is a **large wild goat** native to **South and Central Asia**, found in **Pakistan, Afghanistan, India (Jammu-Kashmir), and Tajikistan**.
- ***Physical Features***
- **Height:** 65–115 cm at the shoulder.
- **Length:** 132–186 cm.
- **Weight:** 32–110 kg.
- **Coat:** Light brown to black, short in summer, thick in winter, with black and white fur on lower legs.
- **Horns:** Corkscrew-shaped in both males and females.
- ***Habitat & Behavior***
- Found in the **Karakoram, Himalayas, and Afghanistan**, inhabiting **shrub forests, woodlands, and scrublands** at **600–3,600 meters** elevation.
- **Diurnal:** Most active in the **early morning and late afternoon**.
- **Excellent climbers and jumpers**, adapted to rocky terrain.
- ***Diet & Conservation***
- **Diet:** Grazes on **grass in summer**, browses **leaves and shoots in winter**, sometimes standing on hind legs to reach branches.
- **Conservation Status: Near Threatened (IUCN Red List)** due to **overhunting for meat and horns**.
- **National Animal of Pakistan.**

13. HOKERSAR WETLAND

- **Location:** Near **Srinagar, Kashmir Valley, Jammu & Kashmir, India**.
- **Elevation: 1,585 meters (5,200 feet)** above sea level.
- **Proximity:** Lies **north of Dal Lake**.
- **Ecological Importance:**
- A **major bird sanctuary**, especially during **winters**.
- Serves as a **stopover for migratory birds** along the **Central Asian Flyway**.
- **Protection & Conservation:**
  - **Declared a Ramsar Site** in **2005** for its **global ecological significance**.

14. TADOBA-ANDHARI TIGER RESERVE

- **Location:** Maharashtra
- **Formation:**
  - **Tadoba National Park** was notified in **1955**.
  - **Andhari Wildlife Sanctuary** (506.32 sq km) was added in **1986**.
  - Merged in **1993**, forming **TATR (622.87 sq km)**.

- **Biodiversity**
  - **Flora:** Dry deciduous forests dominated by **teak, bamboo**, and grasslands.
  - **Fauna:**
    - **Tigers** (high population, frequent sightings).
    - **Leopards, wild dogs (dhole), sloth bears**.
    - **Deer species** (sambar, spotted deer, barking deer).
    - **Reptiles** (marsh crocodiles) and **200+ bird species**.
- **Conservation Initiatives**
  - **Under Project Tiger**, ensuring **anti-poaching measures, habitat protection, and regulated tourism**.
  - A major **wildlife tourism** destination, attracting visitors for **tiger sightings**.

15. GLOBAL CARBON PROJECT

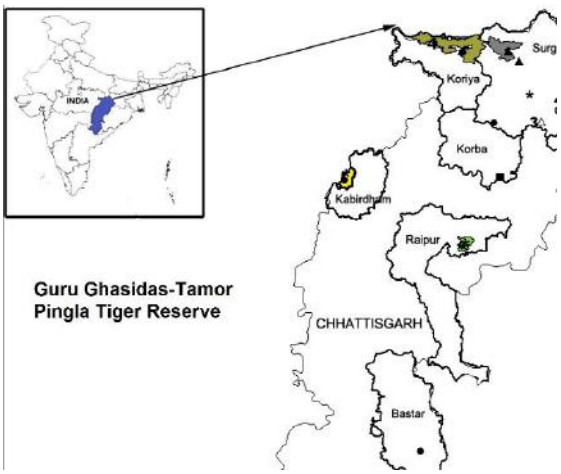
- **Overview:**
  - Established in **2001** as an **international research initiative**.
  - Focuses on **quantifying greenhouse gas emissions** and the **carbon cycle**.
- **Objectives:**
  - **Measure emissions** of CO_2, CH_4, and N_2O.
  - Develop an **annual Global Carbon Budget** tracking carbon sources and sinks.
  - Provide **scientific data** to support **climate policies**.
  - **Collaborate** with researchers and policymakers to improve carbon cycle understanding.
- **Key Projects:**
  - **Global Carbon Budget:** Tracks CO_2 emissions from **fossil fuels, land-use changes, and carbon absorption** by oceans and land.
  - **Methane & Nitrous Oxide Budgets:** Analyzes **emissions and removal** of CH_4 and N_2O.
  - **Urban & Regional Emissions:** Studies **carbon footprints of cities and regions**.
  - **Negative Emissions Research:** Explores **carbon removal techniques** like CCS and reforestation.

16. SENNA TORA

- **Common Names:** Sickle senna, Stinking cassia
- **Type:** Annual herb, grows up to **1 meter** tall
- **Leaves & Flowers:** Pinnate leaves, paired leaflets, pale yellow flowers
- **Stem:** Young stems have a distinct odour.
- **Habitat & Growth**
- **Origin:** Native to **Central America**, now found in **Asia, Africa, and the Pacific**
- **Conditions:** Thrives in **wastelands, cultivated areas**, from **sea level to 1800m**
- **Resilience:** Tolerant to **drought**, seeds remain **viable for 20 years**
- **Concern in Mudumalai Tiger Reserve (MTR)**
- Spreading in **MTR's buffer zone**, raising ecological concerns.
- Could become a **threat** if left unchecked.

➢ **MTR already faces invasion** from species like **Senna spectabilis** and **Lantana camara**.

17. GURU GHASIDAS - TAMOR PINGLA TIGER RESERVE



➢ **Location:** Chhattisgarh

➢ **New Status:** Officially designated as a tiger reserve

➢ **Total Tiger Reserves in Chhattisgarh:** Four

➢ ***Key Details:***

➢ **Approved by:** National Tiger Conservation Authority (2021)

➢ **India's 56th Tiger Reserve**

➢ **Region:** Chota Nagpur & Baghelkhand Plateau

➢ **Total Area: 2,829.38 sq. km**

- **Core Area: 2,049.2 sq. km** (Guru Ghasidas National Park & Tamor Pingla Wildlife Sanctuary)
- **Buffer Zone: 780.15 sq. km**

➢ **Third Largest Tiger Reserve** (After Nagarjunasagar-Srisailam & Manas Tiger Reserves)

➢ ***Connectivity & Conservation:***

➢ Forms a **4,500 sq. km** landscape complex with **Sanjay Dubri Tiger Reserve** (MP).

➢ Connected to **Bandhavgarh Tiger Reserve** (MP) & **Palamau Tiger Reserve** (Jharkhand).

18. COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI)

➢ **About:** A global partnership to enhance the **resilience of infrastructure** against climate and disaster risks.

Launch: 2019 by the **Government of India** at the **UN Climate Action Summit**.
Headquarters: New Delhi, India.
Status: Not an **intergovernmental organization**, as it is not treaty-based.

➢ **Key Focus Areas**

➢ Strengthening **energy, transport, telecom, and water infrastructure**.

➢ **Capacity building, research, and knowledge-sharing** on disaster resilience.

➢ Special focus on **Small Island Developing States (SIDS) and climate-vulnerable nations**.

➢ **Membership**

➢ **Member States:** Includes **Argentina, Australia, Brazil, Canada, France, Germany, India, Japan, the UK, the USA**, and others.

➢ **International Organizations: ADB, World Bank, UNDP, UNDRR, EU, European Investment Bank**, etc.

19. GLOBAL STOCK TAKE

➢ The **GST** is a key mechanism under the **Paris Agreement (2015)** to assess global progress in limiting warming to **well below 2°C, preferably 1.5°C** above pre-industrial levels.

➢ **Key Objectives:**

➢ **Review Climate Actions:** Evaluate countries' **Nationally Determined Contributions (NDCs)**.

➢ **Assess Support:** Examine financial, technological, and capacity-building aid to developing nations.

- **Ensure Transparency:** Improve accountability in climate action reporting.
- **Process & Timeline:**
- Conducted **every five years**.
- **First GST:** Completed in **2023**.
- **Next GST:** Scheduled for **2028**.

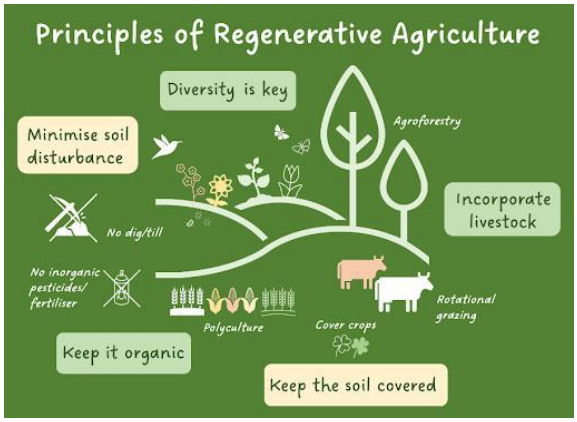
20. COMMISSION FOR AIR QUALITY MANAGEMENT (CAQM)

- The **CAQM** was established in **2020** through an **ordinance**, later replaced by an **Act of Parliament in 2021**, for **better air quality management** in the **National Capital Region (NCR) and nearby areas**.
- **Purpose & Role:**
- Ensures **coordination, research, and resolution** of air pollution issues.
- Replaced the **Environmental Pollution (Prevention and Control) Authority (EPCA)**, which lacked statutory backing.
- Continues measures initiated under EPCA, including the **Graded Response Action Plan (GRAP)** for emergency pollution control.
- **Powers & Authority:**
- Empowered by the **Commission for Air Quality Management Act, 2021**.
- Can **take measures, issue directions, and handle complaints** to improve air quality.
- Under **Section 14**, it can take **strict action against officials** failing to comply with its orders.

21. COKING COAL

- The **NITI Aayog** recommends including **coking coal** in the **critical minerals list** to boost **domestic production**. Since **coking coal** accounts for **42% of steel production costs**, its availability is crucial for **infrastructure development** and **job creation**.
- **What is Coking Coal?**
- Also known as **metallurgical coal**, it is used primarily for **steel production**, unlike **thermal coal**, which is used for **electricity generation**.
- **Key Characteristics:**
- **Low ash, moisture, sulfur, and phosphorus** content.
- **Bituminous rank**, making it ideal for steelmaking.
- **Caking ability**, enabling coke formation when heated in a **low-oxygen environment**.
- **India's Coking Coal Status:**
- **Demand:** India, the **second-largest steel producer**, has **high coking coal demand**.
- **Supply:** India has **limited reserves**, relying on **85% imports**, mainly from **Australia**.
- **Reserves:** Found mainly in **Jharkhand, Odisha, and Chhattisgarh**.
- **Production Process:**
- **Coking:** Heated above **600°C** in **oxygen-free conditions** to remove volatile components.
- **Blast Furnace:** Coke is used as a **fuel and reducing agent** to produce **molten iron** from **iron ore**.

22. REGENERATIVE AGRICULTURE



➢ The **Government of Odisha**, in collaboration with **ICRISAT**, launched a **Compendium of Regenerative Agriculture** to promote sustainable farming.

What is Regenerative Agriculture?

➢ A **holistic farming approach** aimed at **restoring and enhancing ecosystem health**.

➢ **Core Principles:**

➢ **Soil Health** – Practices like **no-till farming, cover cropping, and crop rotation** improve soil quality.

➢ **Biodiversity** – Integrating **diverse crops and livestock** aids pest control and nutrient cycling.

➢ **Water Management** – Techniques like **mulching and agroforestry** enhance water retention.

➢ **Carbon Sequestration** – Captures **CO_2 in soil** to mitigate climate change.

➢ **Key Practices:**

➢ **Cover Cropping** – Protects and enriches soil between crop cycles.

➢ **Composting** – Adds organic matter to improve fertility.

➢ **Agroforestry** – Integrates trees and shrubs into farms for biodiversity and income.

➢ **Holistic Management** – Treats farms as **interconnected ecosystems**.

➢ **Benefits:**

➢ ✓ **Better Soil Health** – Boosts crop yield, reduces chemical use, and improves resilience.

✓ **Enhanced Biodiversity** – Supports beneficial insects and wildlife.

✓ **Climate Mitigation** – Lowers **greenhouse gas emissions**.

✓ **Economic Viability** – Cuts input costs and increases farm profitability.

23. PEATLAND

➢ The **UN Environment Programme (UNEP)** recently released the **Global Peatland Hotspot Atlas** to highlight peatland conservation.

➢ **What Are Peatlands?**

➢ Peatlands are **wetland ecosystems** with **peat soil**, formed by **partially decomposed organic matter in waterlogged conditions**.

➢ **Types of Peatlands:**

➢ **Bogs** – Receive water only from **precipitation**.

➢ **Fens** – Fed by **groundwater and surrounding mineral soil**.

➢ **Global Presence:**

➢ Found in **boreal, temperate, and tropical regions**.

➢ Cover **3% of Earth's land** but store **30% of global soil carbon**.

➢ **Significance of Peatlands:**

✓ **Carbon Sequestration** – Store **twice as much carbon as forests**.

✓ **Water Regulation** – Help **store and filter water**.

✓ **Biodiversity** – Provide **habitats for unique species**.
✓ **Livelihoods** – Support **local economies and indigenous cultures**.

➢ **Threats to Peatlands:**

➢ **Drainage** for **agriculture and urban development**.
➢ **Peatland Fires** release **large amounts of CO_2**.
➢ **Overexploitation** for **horticulture and fuel**.
➢ **Climate Change** disrupts **water balance and accelerates degradation**.

➢ **Peatlands & Climate Change:**

➢ ⚠ **Degraded peatlands** emit **CO_2 and methane**, worsening global warming.
🌍 **Restoration efforts** are crucial for **carbon neutrality goals**.

➢ **Conservation Efforts:**

➢ **Ramsar Convention** protects key peatland sites.
➢ **Global Peatlands Initiative (UNEP)** promotes conservation worldwide.

24. GREEN DIGITAL ACTION

➢ The **COP29 Declaration on Green Digital Action** received widespread endorsement, promoting **digital solutions for climate action**.

➢ **What is Green Digital Action?**

➢ **Launched by the International Telecommunication Union (ITU) at COP28 (2023)**, this initiative aims to **harness digital technologies for sustainability**.

➢ **Key Objectives:**

✓ **Climate Action** – Use digital tools to **reduce greenhouse gas (GHG) emissions** and improve **energy efficiency**.
✓ **Resilient Infrastructure** – Build **climate-resistant digital infrastructure**.
✓ **Emission Reduction** – Adopt policies and tech to achieve **net-zero emissions** while reducing resource use.
✓ **E-Waste Management** – Enhance **electronic waste recycling** to lower environmental harm.

DECEMBER 2024

1. RATAPANI TIGER RESERVE

- **Declared as India's 57th Tiger Reserve**
- **Location**: Madhya Pradesh
- **Approval**: Granted by the **Ministry of Environment, Forest, and Climate Change** through the **National Tiger Conservation Authority (NTCA)**.
- **Significance**: Becomes the **8th tiger reserve in Madhya Pradesh**, following the recent approval of **Madhav National Park** as a tiger reserve.
- **Key Facts**
- **Total Area**: **1,271.4 sq. km**
  - **Core Area**: **763.8 sq. km** (Critical Tiger Habitat)
  - **Buffer Area**: **507.6 sq. km**
- **Legal Basis**: Declared under **Section 38V of the Wildlife (Protection) Act, 1972**.
- **Geography**: Located in the **Vindhya Hills**, encompassing the **Bhimbetka Rock Shelters**, a **UNESCO World Heritage Site**.
- **Biodiversity**: Rich in **teak forests, bamboo**, and diverse **wildlife species**.

2. NITROGEN DIOXIDE (NO2)

- **Bengaluru City railway station** recorded the **highest NO_2 levels** in the city for **over 80% of 2023**, followed by **BTM Layout** and **Silk Board** air monitoring stations.
- The levels **exceeded WHO guidelines**, which recommend an **annual NO_2 concentration below 10 µg/m³**.
- **Understanding NO_2 Pollution**
- **NO_2** is a **reddish-brown, highly reactive gas** with a sharp odor, part of the **NO_x (Nitrogen Oxides) group**.
- **Sources**:
  - **Human-Caused**:
    - **Fossil Fuel Combustion** (vehicles, power plants, industries).
    - **Industrial Processes** (nitric acid, explosives).
    - **Household Sources** (kerosene/gas heaters, stoves).
  - **Natural**:
    - **Lightning strikes** and **soil microbial activity**.
- **Impact of NO_2 Pollution**
- **Environmental Effects**:
  - **Air Quality**: Forms **ground-level ozone and $PM_{2.5}$**.
  - **Acid Rain**: Reacts with water to produce **nitric acid**.
  - **Eutrophication**: Causes **algal blooms** in water bodies.
  - **Climate Influence**: Indirectly impacts **ozone and methane levels**.
- **Health Risks**:
  - **Respiratory Issues**: Triggers **inflammation, asthma, bronchitis**.
  - **Cardiovascular Problems**: Linked to **heart diseases**.
  - **Vulnerable Groups**: Higher risk for **children and immunocompromised individuals**.

3. ARAVALI GREEN WALL PROJECT (AGWP)

- **Launched in 2023**, the **Aravalli Green Wall Project (AGWP)** aims to green a **5 km buffer area** around the **Aravalli range** across **four states**.
- It is part of the **Union Environment Ministry's** vision to create a **green corridor** to combat **land degradation** and **desertification**.
  - **Key Features**
  - **Covers**: Haryana, Rajasthan, Gujarat, and Delhi, spanning **6 million hectares**.
  - **Focus Areas**:
    - Planting **native trees and shrubs** on **scrubland, wasteland, and degraded forests**.
    - **Restoring water bodies** such as ponds, lakes, and streams.
    - **Agroforestry and pasture development** to support local livelihoods.
      - **Objectives**
  - **Improve Aravalli's ecological health**.
  - **Prevent Thar Desert expansion** and reduce **soil erosion, desertification, and dust storms**.
  - **Promote sustainable development** by engaging communities in **afforestation, agroforestry, and water conservation**.
  - **Support India's global commitments** under **UNCCD, CBD, and UNFCCC**.

4. INDIAN STAR TORTOISE

- **Habitat & Distribution**: Found in **dry areas, scrub forests, and grasslands**. Native to **northwestern and southern India, Sri Lanka, and parts of Pakistan**.
- **Physical Traits**: Named for its **distinct star-like shell pattern**, which provides **natural camouflage** in arid habitats.
- **Conservation Status**:
- **IUCN Red List**: **Vulnerable**.
- **CITES Appendix I**: **International trade prohibited**.
- **Wildlife Protection Act, 1972 (India)**: **Schedule I**—highest legal protection.
- **Ecological Role**: **Aids in seed dispersal** and helps maintain **ecosystem balance** in arid regions.

5. ANAMALAI TIGER RESERVE

- **Location & Geography**
- Situated in the **Western Ghats**, a **UNESCO World Heritage Site**.
- Spans **Pollachi, Valparai, and parts of Coimbatore districts** in Tamil Nadu.
- Elevation varies from **340 m to 2,514 m**, featuring **tropical forests, grasslands, and montane shola forests**.
- **Rich Wildlife**
- **Major Species**: **Tigers, elephants, gaur, leopards, Nilgiri langurs, lion-tailed macaques, and Malabar giant squirrels**.

- **Birdlife**: Over **250 bird species**, including the **Great Indian Hornbill and Malabar Trogon**.
- **Reptiles & Amphibians**: Hosts **endemic species** like the **Anamalai flying frog**.
- **Diverse Flora**
- Ecosystems include **tropical rainforests, moist deciduous forests, and evergreen sholas**.
- **Key Plant Species**: **Teak, rosewood, bamboo, and medicinal plants**.
- **Conservation & Tribal Communities**
- **Part of Project Tiger (1973)**, aimed at **tiger conservation**.
- Inhabited by **tribal groups like Malasar, Malai Malasar, and Pulayar**, who **coexist with nature**.
- Conservation efforts focus on **sustainable livelihoods** and **reducing human-wildlife conflict**.

6. OLIVE RIDLEY TURTLES

- **Scientific name: Lepidochelys olivacea**

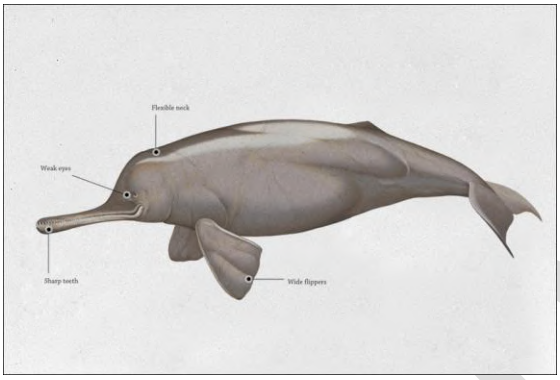
- **Smallest and most abundant sea turtle species** worldwide.
- **Size**: Grows up to **2 feet**, weighs around **50 kg**.
- **Habitat**: Found in **warm tropical waters** of the **Pacific, Atlantic, and Indian Oceans**.
- **Appearance**: Named after its **olive-colored, heart-shaped shell**.
- **Diet**: **Carnivorous**, feeds on **jellyfish, shrimp, snails, crabs, mollusks, and fish eggs**.
- **Unique Behavior**
- **Arribada**: Females gather in **thousands** to nest **simultaneously**.
- **Nesting Sites**:
  - **India**: **Gahirmatha Beach, Rushikulya & Devi River mouths** (Odisha).
  - **Other Locations**: **Mexico, Costa Rica, Andhra Pradesh, Tamil Nadu, Andaman & Nicobar Islands**.
- **Life Cycle**
- **Egg Laying**: Females dig **1.5 ft deep nests** using hind flippers.
- **Hatching**: Eggs hatch in **45-65 days**, hatchlings crawl to the ocean.
- **Survival Rate**: Only **1 in 1,000** hatchlings reach adulthood.
- **Conservation Status**
- **Listed as Vulnerable (IUCN Red List)** due to **habitat loss, pollution, and poaching.**

7. PERSISTENT ORGANIC POLLUTANTS (POPs)

- **Persistent Organic Pollutants (POPs)** are **toxic chemicals** resistant to **degradation** in the environment.
- **Characteristics:**
- **Persistent:** Remain in the environment for long periods.
- **Bioaccumulative:** Accumulate in fatty tissues of organisms.
- **Lipophilic:** Highly soluble in fats, leading to food chain accumulation.
- **Toxic:** Harmful to humans and wildlife.
- **Long-range Transport:** Spread through wind and water far from their source.
- **Sources:**

- **Pesticides:** Includes **DDT** and **aldrin**.
- **Industrial Chemicals:** Such as **PCBs**.
- **By-products:** Emitted from **waste burning** and **industrial processes** (e.g., **dioxins, furans**).
- **Regulation:**
- **Stockholm Convention (2001, effective 2004):** Aims to eliminate or restrict **POPs** globally.
- **India:** A signatory and ratified member.
- **Control Measures:** Prohibits, restricts, and ensures **safe disposal** of POPs.
- **Examples of POPs:**
- **"Dirty Dozen":** Includes **DDT, PCBs, dioxins, and aldrin**.
- **New Additions: PFOS** and other emerging pollutants.

8. GANGES DOLPHIN



- **Gangetic Dolphin (Platanista gangetica)** is a **freshwater dolphin** found in **South Asian rivers**, mainly the **Ganges-Brahmaputra-Meghna** and **Karnaphuli-Sangu** systems.
- **Scientific Family: Platanistidae**, closely related to the **Indus River Dolphin**.
- **Habitat & Characteristics:**
- Inhabits **deep, slow-moving rivers** with abundant fish.
- **Nearly blind**, relies on **echolocation** to navigate and hunt.
- Listed as **'Endangered'** on the **IUCN Red List** since the 1990s.
- **Behavior & Ecology:**
- **Diet:** Feeds on **fish and invertebrates**.
- **Solitary Nature:** Usually found **alone or in small groups** and **shy around boats**.
- **Reproduction:** Gives birth to a **single calf** after **10 months of gestation**.
- **Conservation Efforts:**
- **1986:** Included in **Schedule I** of the **Indian Wildlife (Protection) Act, 1972**.
- **Vikramshila Ganges Dolphin Sanctuary** established in Bihar for protection.
- **2010-2020 Conservation Action Plan:** Addressed threats like **river traffic, irrigation canals, and prey depletion**.
- **2009:** Declared **India's National Aquatic Animal** to boost awareness.
- **2020: Project Dolphin** launched by PM **Narendra Modi** to strengthen conservation.

9. STATE OF FOREST REPORT 2023

- The **India State of Forest Report (ISFR)** is published **biennially** by the **Forest Survey of India (FSI)** since **1987**.
- **FSI** assesses **forest and tree resources** using **remote sensing** and **field surveys (NFI)**.
- The **2023 report** is the **18th edition**, covering **forest cover, tree cover, mangroves, carbon stock, forest fires, and agroforestry**.

➢ **Key Findings (2023):**

➢ **Total Forest & Tree Cover: 8,27,357 sq km** (**25.17% of India's land**).

- **Forest Cover: 7,15,343 sq km** (**21.76%**).
- **Tree Cover: 1,12,014 sq km** (**3.41%**).

➢ **Increase since 2021: 1445 sq km** (**156 sq km in forest cover**, **1289 sq km in tree cover**).

➢ **States with Highest Forest Cover:**

➢ **Largest Area: Madhya Pradesh** (**77,073 sq km**), **Arunachal Pradesh** (**65,882 sq km**), **Chhattisgarh** (**55,812 sq km**).

➢ **Highest % of Land Covered: Lakshadweep** (**91.33%**), **Mizoram** (**85.34%**), **Andaman & Nicobar Islands** (**81.62%**).

10. CHILIKA LAKE

➢ **Issue:** Environmentalists, fishermen, and locals oppose a **4 km bridge** over Chilika Lake, connecting **Satapada** to **Janhikuda**. While residents seek better connectivity, concerns over ecological damage remain.

➢ ***About Chilika Lake***

➢ **Location:** Spans **Puri, Khordha, and Ganjam** districts in Odisha.

➢ **Type: Asia's largest brackish water lagoon** and the **world's second-largest coastal lagoon**.

➢ **Water Sources:** Fed by **52 rivers**, including **Daya, Bhargavi, and Makra**. Outflows into the **Bay of Bengal** via Satpada and Arakhakuda.

➢ ***Ecological Importance***

➢ **Biodiversity Hotspot:** Home to **Irrawaddy dolphins**, **endangered species**, and **225+ migratory bird species** from Siberia and Eurasia.

➢ **Ramsar Site:** Recognized as a **wetland of international importance (1981)**.

➢ **Protected Areas: Nalaban Island** and **Chilika Bird Sanctuary** fall under the **Wildlife Protection Act, 1972**.

➢ ***Cultural & Economic Significance***

➢ **Livelihoods:** Supports **200,000+ fishermen**.

➢ **Tourism:** Popular for **dolphin sightings** and island visits.

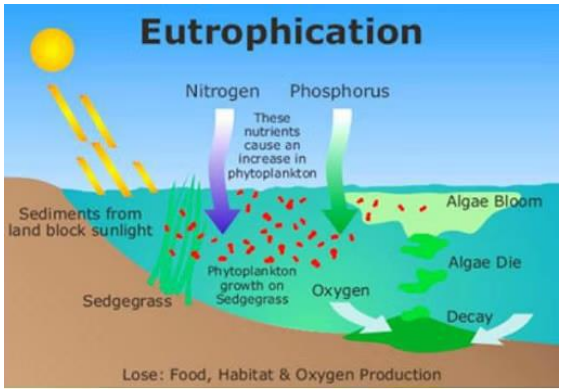
➢ **Conservation:** Managed under the **Ministry of Environment & Forests' Mangroves and Coral Reefs Committee**.

➢ ***Additional Facts***

➢ **Major Islands: Kalijai, Nalabana, Honeymoon, and Breakfast Island**.

➢ **Climate Impact: Salinity varies** from freshwater near river inlets to **oceanic levels** near the sea.

11. EUTROPHICATION



➢ **Definition:** Excessive accumulation of **nitrogen and phosphorus** in water, leading to **algal blooms** and **ecosystem damage**.

➢ **Types of Eutrophication**

➢ **Natural:** A **slow** aging process of water bodies over **centuries**.

➢ **Cultural: Human-induced** acceleration due to **agriculture, industry, and urban runoff**.

➢ **Major Causes**

➢ **Agriculture:** Excessive use of **fertilizers**.

➢ **Industrial & Domestic Waste: Untreated sewage** and **effluents**.

➢ **Aquaculture:** Overuse of **feed and nutrients** in fish farming.

➢ **Impacts**

➢ **Algal Blooms:** Depletes **oxygen (hypoxia)**, harming aquatic life.

➢ **Biodiversity Loss:** Favors certain species, **disrupting ecosystems**.

➢ **Economic Damage:** Affects **fisheries, tourism, and water usability**.

➢ **Health Risks: Toxins** from algal blooms contaminate **drinking water**.

➢ **Examples in India**

➢ **Vembanad Lake (Kerala):** Impacted by **agricultural runoff & urban waste**.

➢ **Chilika Lake (Odisha):** Affected by **nutrient inflow** from catchment areas.

➢ **Hussain Sagar Lake (Hyderabad):** Suffering from **sewage & industrial pollution**.

12. RED PANDA

➢ **West Bengal Welcomes Two Red Pandas from the Netherlands**

➢ **Purpose:** Two red pandas have arrived at **Padmaja Naidu Himalayan Zoological Park (Darjeeling Zoo)** for **conservation breeding**, marking the first such foreign acquisition in a decade.

➢ **Red Panda Overview**

➢ **Scientific Name:** *Ailurus fulgens*

➢ **Native to:** Eastern Himalayas (Nepal, India, Bhutan, Myanmar, and China)

➢ **Size & Weight:** About **50–64 cm** long (excluding the **28–59 cm** tail), weighing **3–6.2 kg**

➢ **Appearance: Reddish-brown fur**, white face markings, and a **bushy ringed tail**

➢ **Habitat & Behavior**

➢ **Altitude:** Found in **temperate forests** at **2,200–4,800 meters**

➢ **In India:** Found in **Sikkim, West Bengal, Arunachal Pradesh, and Meghalaya**

➢ **Diet:** Mostly **bamboo**, also **fruits, acorns, and insects**

➢ **Activity: Solitary and arboreal**, active mainly at dawn and dusk

➢ **Reproduction: Mates in early spring**, females give birth to **up to four cubs** in summer

- **Conservation Status**
- **IUCN Status: Endangered**
- **Threats: Habitat destruction, fragmentation, and poaching.**

13. ARSENIC CONTAMINATION

- ***Alarming Findings***
- **High arsenic levels** have been detected in staple foods like **rice, wheat, and potatoes** in Bihar.
- A study by **Mahavir Cancer Sansthan and Research Centre** found contamination in **11 hotspot districts**.
- This poses a **major public health risk**, especially in rural areas.
- ***What is Arsenic?***
- A **naturally occurring metalloid** found in the Earth's crust.
- Exists in **organic and inorganic forms**, with **inorganic arsenic** being more toxic.
- ***Health Risks***
- **Arsenicosis**: Long-term exposure causes **skin lesions, cancer (skin, bladder, kidney, lung), hypertension, and diabetes**.
- **Group 1 Carcinogen**: Classified by the **International Agency for Research on Cancer (IARC)**.
- **Other Effects**: Leads to **skin pigmentation changes** and **hard patches on palms and soles**.
- ***Arsenic Contamination in India***
- Found mainly in **Ganga-Brahmaputra-Meghna (GBM) basin** states like **West Bengal, Bihar, Jharkhand, Uttar Pradesh, Assam, Manipur, and Chhattisgarh**.
- Often exceeds **WHO's safe limit of 10 µg/L** in groundwater.
- Studies in **Bihar's Middle Ganga Plain** show high arsenic levels in **urine, hair, and nails** of affected individuals.
- ***Sources & Causes***
- **Natural geological presence** in **alluvial aquifers** (90% of affected areas).
- **Groundwater extraction & pesticide use** worsen the problem.
- Arsenic is released into groundwater under **specific geochemical conditions**.

JANUARY 2025

1. PALLAS'S CAT

- The **elusive Pallas's cat (manul)** was recorded for the first time in Himachal Pradesh during a **snow leopard survey** in Kinnaur.
- More elusive than snow leopards, **its full distribution remains largely unknown**.
- **About Pallas's Cat (Otocolobus manul)**
- **Native to Central Asia's** grasslands and montane steppes.
- **Named after** German naturalist **Peter Simon Pallas** (1776).
- **Renowned for** its distinctive appearance and secretive nature.
- **Physical Features**
- **Size**: Similar to domestic cats.
- **Fur**: Densest and longest among wild cats, ideal for extreme cold.
- **Distinctive Traits**: **Stocky build, short legs, flattened face, and low-set ears** for camouflage. **Round pupils**, unlike most small cats.
- **Habitat & Distribution**
- Found in **grasslands, shrublands, and rocky deserts** across **Mongolia, China, Kazakhstan, Iran, Pakistan, and the Tibetan Plateau**.
- Prefers **elevations up to 15,000 feet (4,500 meters)** in cold, arid regions.
- **Behavior & Diet**
- **Solitary** and mostly **nocturnal or crepuscular** (active at dawn/dusk).
- **Ambush predator**, using stealth and bursts of speed.
- Feeds on **small mammals, birds, and insects**.
- **Conservation Status**
- **Listed as "Least Concern"** by the **IUCN**, though **habitat loss and poaching pose threats**.
- **Wildlife Protection Act, 1972 (India)**: **Schedule I**, offering the highest level of legal protection.
- **CITES (Convention on International Trade in Endangered Species)**: **Listed in Appendix II.**

2. NET ZERO BANKING ALLIANCE (NZBA)

- **The Net-Zero Banking Alliance (NZBA)** was founded on **April 21, 2021**, under the **UNEP Finance Initiative**.
- A **UN-backed** coalition of global banks committed to **net-zero emissions by 2050**.
- **Recent Exits**
- **Goldman Sachs, Wells Fargo, Citigroup, Bank of America, and Morgan Stanley** have left.
- **JPMorgan Chase** may follow.
- **Commitments of NZBA Members**
- Align **lending and investment** with **net-zero by 2050**.

- Set **interim 2030 targets**, focusing on **carbon-intensive sectors**.
- Annually **report progress and emissions**.

Current Status

- Despite US bank exits, **NZBA still has 142 members from 44 countries**, representing **nearly half of global banking assets**.
- US banks are **leaving due to political pressure**, particularly with **Donald Trump's return to the White House**.

3. DESERT NATIONAL PARK (DNP)

- **Rare Sighting**: **12 Great Indian Bustards (GIBs)** were recently spotted in **Desert National Park (DNP), Rajasthan**, marking a major conservation success.
- **Local Names**: Known as **"Godawan"** in Rajasthan and **"Maldhok"** in Maharashtra.
- **Location**: Spans **Jaisalmer and Barmer districts** in Rajasthan.
- **Established**: **1980**, covering approximately **3,162 sq km**.
- **Terrain**: Includes **sand dunes, rocky outcrops, salt lakes, gravel plains, and inter-dunal areas**.
- **Climate**: **Extreme** temperatures with **low and erratic rainfall**.
- **Ecosystem**: **Fragile desert habitat** with sparse vegetation like **thorny bushes, xerophytes, and grasses**.
- **Flora**: Includes **cactus, khejri (Prosopis cineraria), and ber (Ziziphus)**.

Wildlife in DNP

- **Great Indian Bustard**: **Critically endangered** and DNP's flagship species.
- **Birds**: **Eagles, vultures, harriers, kestrels, sandgrouse**.
- **Reptiles**: **Spiny-tailed lizards, geckos, snakes**.
- **Mammals**: **Desert fox, chinkara (Indian gazelle), hedgehogs**.
- **Fossils**: Contains **Jurassic-era fossils**, providing insights into ancient life.

4. RANTHAMBHORE TIGER RESERVE

Parbati-Kalisindh-Chambal-Eastern Rajasthan Canal Project (PKC-ERCP)

- **A flagship river-linking project** aimed at diverting surplus Chambal River water for **irrigation, drinking, and industrial use**.
- **Covers 23 districts in Rajasthan**, benefiting **3.45 crore people**.
- **Submerges 37 sq km of Ranthambhore Tiger Reserve**, splitting it into two sections.

Ranthambhore Tiger Reserve: Key Facts

- **Located in Sawai Madhopur, Rajasthan**, at the junction of the **Aravalli and Vindhya ranges**.
- **Became a wildlife sanctuary in 1957** and joined **Project Tiger in 1973**.
- **Covers 1,334 sq. km**, including **Ranthambore National Park, multiple sanctuaries, and part of the National Gharial Sanctuary**.
- **Bordered by the Chambal River in the north and Banas River in the south**.

Geography & Ecology

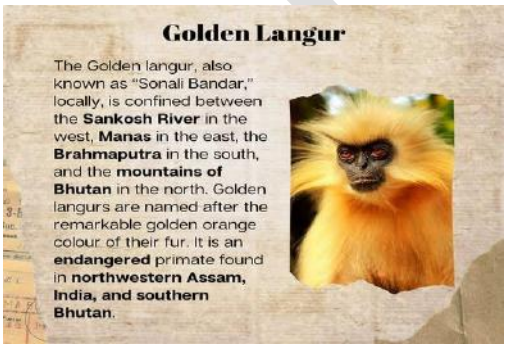
- **Terrain**: Rocky ridges, grasslands, lakes, and dense forests.
- **Climate**: **Dry subtropical monsoon**, with extreme summers and winters.

- **Water Bodies**: **Padam Talao, Rajbagh Talao, and Malik Talao**.
- **Flora**: **Dry deciduous forests** with **dhok, banyan, pipal, and mango trees**.
- **Fauna**:
  - **Apex predator**: **Bengal tiger**.
  - **Other species**: Leopard, sloth bear, striped hyena, sambar deer, chital, nilgai, langurs, marsh crocodiles, and 300+ bird species.
- **Cultural Significance**
- **Home to Ranthambhore Fort**, a **UNESCO World Heritage Site**, showcasing **Rajput architecture and history**.

5. UTRICULARIA

- **Discovery**: Large populations of **Utricularia** have been found in **Keoladeo National Park, Rajasthan**, a region where it is rarely seen.
- **Usual Habitat**: Typically found in **Meghalaya and Darjeeling**.
- **About Utricularia (Bladderworts)**
- **Genus & Family**: Belongs to the **Lentibulariaceae** family.
- **Habitat**: Grows in **freshwater, wetlands, and even tropical rainforest canopies**; can be **terrestrial or aquatic**.
- **Unique Carnivorous Mechanism**
- **No Roots**: Lacks a traditional root system.
- **Bladder Traps**: Has **small bladder-like structures** on horizontal stems (stolons).
- **Prey Capture**: When tiny organisms trigger **sensory hairs**, the trap rapidly **sucks in water and prey**.
- **Diet**: Feeds on **protozoa, rotifers, water fleas, mosquito larvae, nematodes, and even tadpoles**.
- **Nutrient Absorption**: Digests prey with enzymes, extracting **nitrogen and phosphorus** from nutrient-poor environments.
- **Flowers**: Known for **bright, orchid-like or snapdragon-shaped flowers**.
- This discovery highlights **Keoladeo's ecological richness** and the **expanding range** of this fascinating plant.

6. GOLDEN LANGUR



- A **golden langur**, likely from **Kakoijana Reserve Forest**, was killed by a vehicle on **NH-117 in Bongaigaon, Assam**, sparking protests.
- **Population in India**: **7,396**, with **500-600** in **Kakoijana Reserve Forest**, where locals actively protect them.
- ***About Golden Langur (Trachypithecus geei)***
- **Habitat**: Found in **Western Assam (India) and Bhutan**, inhabiting **deciduous, subtropical, and evergreen forests**.
- **Diet**: **Herbivorous**, feeding on **fruits, leaves, seeds, and flowers**.

- **Appearance**: **Golden or creamy white fur**, changing shades with age.

- **Conservation Status**:
  - **IUCN Red List**: **Endangered**
  - **CITES**: **Appendix I**
  - **Wildlife Protection Act (India, 1972)**: **Schedule I** (highest protection).

7. HYDROCLIMATE WHIPLASH

- **Since January 7**, wildfires have ravaged **Los Angeles** and surrounding areas, driven by **rare meteorological conditions** worsened by **global warming**.
- By **January 13**, the fires had **killed 24 people**, destroyed **12,000 structures**, and burned **155 square kilometers**, with **strong winds** posing further risks.

Understanding Hydroclimate Whiplash

- **Hydroclimate whiplash** refers to **sudden shifts** between **extreme wet and dry conditions**, a phenomenon intensified by **climate change**.
- A **warmer atmosphere** holds **7% more moisture per 1°C rise**, leading to:
  - **Heavy Rainfall**: More water vapor results in **intense precipitation**.
  - **Increased Evaporation**: Drier conditions follow, depleting soil moisture and vegetation.

Impact of Hydroclimate Whiplash

- **Wildfires**: Wet periods **boost vegetation growth**, which dries out during droughts, creating **highly flammable fuel**.
- **Flooding & Landslides**: Heavy rains after droughts can cause **flash floods** and **unstable soils**.
- **Agriculture Disruptions**: Crops suffer from **alternating floods and droughts**, affecting **food security**.
- **Water Management Challenges**: Unpredictable water supply **complicates reservoir and resource planning**.

8. PALAMU TIGER RESERVE

- The **Jharkhand Forest Department** has launched a study to **revive the dwindling Bison (Gaur) population** in **Palamu Tiger Reserve (PTR)**.
- Once found across **Jharkhand**, the species has vanished except for **50-70 individuals surviving in PTR**. As a **key prey species for big cats**, its conservation is crucial.

Palamu Tiger Reserve (PTR): Key Facts

- **Location:** Part of the **Chotanagpur Plateau**, Jharkhand.
- **Only Tiger Reserve in Jharkhand.**
- **Established:** 1974 under **Project Tiger**, among India's first nine tiger reserves.

- **Ecosystem:**
  - **Dry deciduous forests** with sal, bamboo, and grasslands.
  - Home to **elephants, leopards, wolves, and sloth bears**.
- **Challenges:**
  - **Declining tiger population** due to poaching and habitat loss.
  - **Water scarcity** due to seasonal rivers and poor rainfall.
  - **Human pressure** from illegal logging, mining, and grazing.

- **Left-Wing Extremism (LWE)** affecting conservation efforts.

Bison (Gaur): India's Largest Wild Cattle

- **Scientific Name:** *Bos gaurus*.
- **Largest bovine species**, standing **1.8 meters tall**, weighing up to **1,500 kg**.
- **Habitat:** Prefers **forests with open grasslands** and abundant water.
- **Threats: Poaching, habitat destruction, competition with livestock, and water scarcity**.

- **Conservation Status: Vulnerable (IUCN Red List)**.

9. BLUE CARBON

- **Blue Carbon** refers to **carbon stored in coastal ecosystems** like **mangroves, salt marshes, and seagrasses**.
- These ecosystems **capture and store CO_2** from the **atmosphere & oceans**, helping **mitigate climate change**.

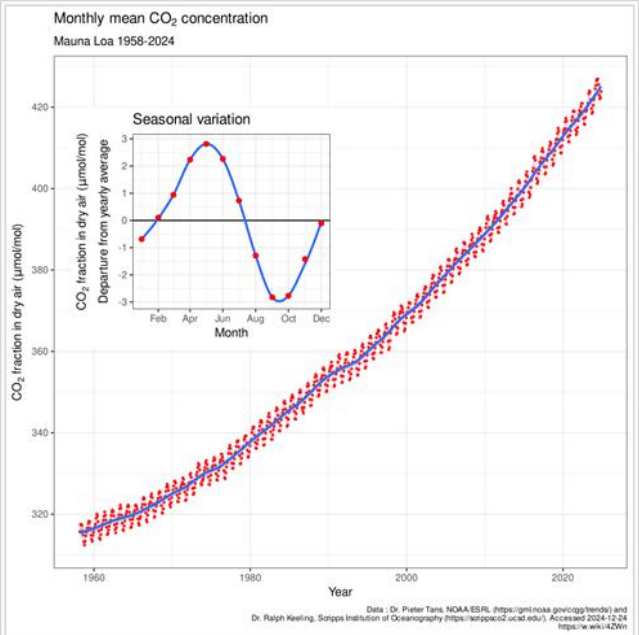
Key Features

- **Storage & Sequestration:**
  - Coastal ecosystems store **carbon in biomass (roots, stems, leaves) & sediments**.
  - Carbon remains **locked for thousands of years** if undisturbed.
- **Ecosystem Services:**
  - Protects **coasts from erosion & flooding**.
  - Supports **biodiversity**.
  - Improves **water quality**.
  - Provides **livelihoods** through **fisheries & ecotourism**.

Restoration & Conservation Efforts

- **MISHTI Initiative (2023-2028):**
  - Aims to restore **540 sq km of mangroves** across **nine states & three Union Territories** in India.
  - Over **250 sq km** have been **restored** so far.

10. KEELING CURVE



Atmospheric carbon dioxide (CO_2) concentrations from 1958 to 2023

➢ In 2024, the average yearly level of carbon dioxide (CO_2) rose faster than ever in the 67-year Keeling Curve record. The annual average was 3.58 parts per million (ppm) higher than in 2023, breaking the previous record of 3.41 ppm set in 2016. In both years, the El Niño climate pattern played a role.

➢ **Learning Corner:**

➢ The **Keeling Curve** tracks atmospheric CO_2 levels over time.

➢ Named after Dr. Charles David Keeling, it began in 1958 at the Mauna Loa Observatory.

➢ The curve shows a steady CO_2 increase and seasonal fluctuations.

➢ Levels drop in spring and summer due to photosynthesis and rise in fall and winter as plants decay.

11. BHITARKANIKA NATIONAL PARK

➢ The saltwater crocodile population in Odisha's Bhitarkanika National Park saw a slight increase in 2025. Forest officials counted 1,826 crocodiles in the annual census, up from 1,811 in 2024. The crocodile breeding and rearing program was stopped in 2024 as the population neared saturation.

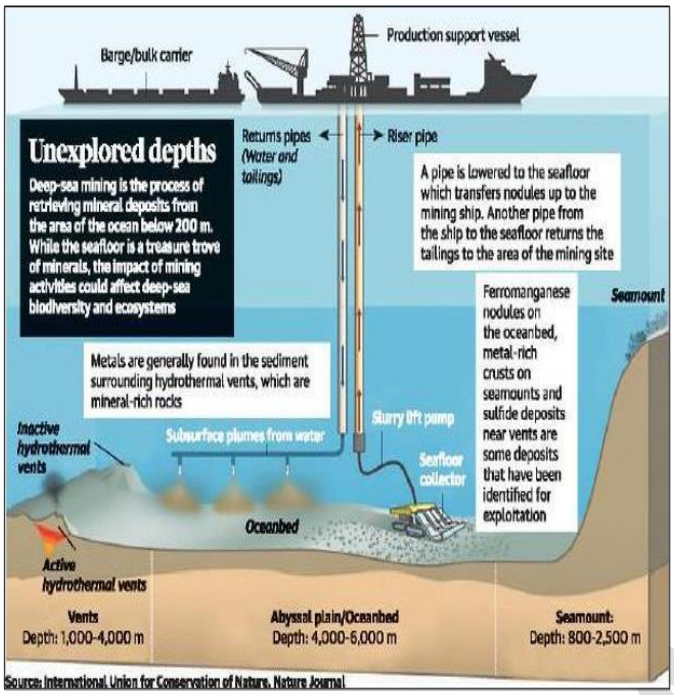
➢ **Learning Corner:**

- ➢ **Bhitarkanika National Park** is a major protected area in Odisha, rich in biodiversity and mangrove ecosystems.
- ➢ Located in the delta of the Brahmani, Baitarani, and Dhamra rivers.
- ➢ Declared a **national park** in 1998 and part of the **Bhitarkanika Wildlife Sanctuary** (established in 1975).
- ➢ Recognized as a **Ramsar Site** in 2002 for its wetland significance.

➢ **Flora & Fauna:**

- ➢ One of India's largest **mangrove ecosystems**, home to species like Avicennia, Rhizophora, and Heritiera.
- ➢ Hosts one of India's largest **saltwater crocodile** breeding populations.
- ➢ Other species include Indian python, king cobra, water monitor lizard, spotted deer, and wild boar.
- ➢ Rich in **avian biodiversity**, with migratory birds like open-billed storks and herons.
- ➢ Near the park lies Odisha's **only Turtle Sanctuary** at Gahirmatha Beach, a key nesting site for **Olive Ridley Turtles**.

12. DARK OXYGEN



➢ Scientists who discovered **"dark oxygen"** on the ocean floor last year are planning a new expedition for further study. The finding challenges long-held beliefs about **oxygen production and the evolution of complex life on Earth**.

➢ **Learning Corner:**

➢ **Dark oxygen** refers to **oxygen (O_2) production without photosynthesis or light**.

➢ Previously, oxygen generation was thought to require **light-driven photosynthesis**.

➢ A **2024 study** found that **polymetallic nodules** on the **abyssal seafloor** might produce oxygen through **seawater electrolysis**.

➢ These nodules, rich in **manganese, nickel, copper, and cobalt**, have **electrical potentials** on their surfaces.

➢ These potentials may **split water molecules** into **oxygen and hydrogen**, enabling **oxygen production in deep-sea regions** once thought to be anoxic.

13. WETLAND ACCREDITED CITIES

➢ **Indore** and **Udaipur** have become the first Indian cities to receive **Wetland City Accreditation** under the **Ramsar Convention on Wetlands**.

➢ **Indore**, known for its cleanliness, is home to **Sirpur Lake**, a **Ramsar site**.

➢ **Udaipur**, famous for its lakes, has **five major wetlands**—Pichola, Fateh Sagar, Rang Sagar, Swaroop Sagar, and Doodh Talai.

➢ **Learning Corner:**

➢ **Wetland City Accreditation (WCA)** was established in **2015** to promote **wetland conservation in urban areas**.

➢ **Eligibility Criteria:**

- Must have **Ramsar Sites** or significant **wetland conservation areas**.
- Should implement **wetland restoration and management**.
- Must integrate **wetland conservation into urban planning**.
- Encourage **public awareness and stakeholder participation**.
- Establish a **local committee** for wetland conservation.

Benefits of Accreditation:

➢ **Global recognition** for sustainable wetland management.

➢ **Increased public awareness** about wetland conservation.

➢ **Boosts eco-tourism** and economic opportunities.

14. NAMDAPHA NATIONAL PARK AND TIGER RESERVE

- An elephant has been camera-trapped in India's easternmost tiger reserve after 12 years, raising hopes for conservation efforts. The Arunachal Pradesh Forest Department reports that elephants historically migrated between the Namsai area and Myanmar via the Namdapha National Park and Tiger Reserve. However, encroachment since 1996 has obstructed this migration route.
- **Location and Geography:**
  - **Changlang District:** Located near the tri-junction of India, Myanmar, and China.
  - **Biodiversity Hotspot:** Situated in the eastern Himalayas, part of the Indo-Burma biodiversity hotspot.
  - **Area:** Encompasses 1,985 square kilometers, making it India's third-largest national park.
  - **Altitude:** Ranges from 200 to 4,571 meters, supporting various ecosystems.
  - **Rivers:** The Noa Dihing River flows through the park.
- **Biodiversity:**
  - **Flora:** Rich in tropical evergreen forests, temperate forests, alpine meadows, orchids, ferns, bamboos, and medicinal plants.
  - **Fauna:** Home to four species of big cats—tiger, leopard, snow leopard, and clouded leopard. Other notable species include the Asiatic black bear, red panda, hoolock gibbons, capped langur, and the critically endangered Namdapha flying squirrel (Biswamoyopterus biswasi).
- **Conservation Status:**
  - **Tiger Reserve:** Declared a tiger reserve in 1983 under Project Tiger. The reserve faces challenges in estimating tiger populations due to its rugged terrain and dense forests.
- **Indigenous Communities:**
  - The area is inhabited by indigenous tribes such as the Lisu, Singpho, and Tangsa. These communities rely on forest resources for subsistence but are increasingly involved in conservation initiatives.

15. ALGAL BLOOM

- A recent study led by **T.M. Balakrishnan Nai**r from the Indian National Centre for Ocean Information Services (INCOIS) has identified nine significant algal bloom hotspots along India's east and west coasts. This research utilized advanced satellite data and field reports to analyze the factors contributing to these blooms, which include nutrient influx during monsoons and coastal upwelling, where cooler, nutrient-rich water rises to the surface.
- **Overview of Algal Blooms:**
- **Definition:** Algal blooms are rapid increases in phytoplankton populations in aquatic environments, often causing noticeable discoloration of the water.
- **Environmental Impact:** These blooms can disrupt marine ecosystems, harm human health, and affect fisheries.
- **Causes of Algal Blooms:**
  - **Nutrient Pollution:** Excess nitrogen and phosphorus from agricultural runoff, wastewater, and industrial discharges lead to eutrophication.
  - **Warm Water Temperatures:** Higher temperatures during summer promote algal growth.

- **Stagnant Water:** Slow-moving water bodies allow nutrient accumulation, increasing bloom likelihood.
- **Climate Change:** Rising temperatures and altered precipitation patterns exacerbate conditions for algal blooms.
- **Human Activities:** Urbanization, deforestation, and agricultural practices contribute to nutrient runoff.

- **Types of Algal Blooms:**
  - **Harmful Algal Blooms (HABs):** These produce toxins harmful to aquatic life and humans. Notable examples include:
    - **Red Tide:** Caused by dinoflagellates, leading to fish kills and respiratory issues in humans.
    - **Cyanobacteria Blooms:** Common in freshwater, producing toxins that can harm both animals and humans.
  - **Non-Toxic Blooms:** While not harmful directly, they can deplete oxygen levels in water upon decomposition.
- **Recent Developments in Monitoring:**
  The INCOIS study emphasizes the need for improved monitoring of algal blooms to manage marine resources effectively. It highlights that specific phytoplankton biomass thresholds have been established to classify bloom phases—likely, bloom, intense, and extreme. This classification aids in better prediction and management of algal blooms.
- **Hotspot Locations Identified:**
  The nine hotspots include:
- Gulf of Khambhat
- Gulf of Kutch
- Mumbai coastal areas
- Goa beaches and estuaries
- Mangaluru region
- Kochi coastal areas
- Chennai region
- Visakhapatnam and Kakinada
- Puri and Gopalpur coastal areas

FEBRUARY 2025

1. FOUR MORE WETLANDS TO RAMSAR LIST

Tamil Nadu now has the highest number of Ramsar sites in India, with 20 designated wetlands, reflecting its commitment to wetland conservation and biodiversity.

Recent additions include **Sakkarakottai Bird Sanctuary and Therthangal Bird Sanctuary,** both recognized for their ecological importance and role in supporting migratory birds.

Key Highlights of Newly Added Ramsar Sites

Sakkarakottai Bird Sanctuary, Tamil Nadu

- Located in southern Tamil Nadu, this peri-urban wetland spans 230.49 hectares across three villages.
- It prevents soil erosion, replenishes groundwater, and acts as a buffer against floods.
- The sanctuary features extensive Babul (Acacia nilotica) plantations, which provide ideal nesting sites for birds.
- It supports over 2,000 water birds, including vulnerable and endangered species such as the Indian Spotted Eagle and Egyptian Vulture.
- The site lies along the Central Asian Flyway, making it a crucial stopover for migratory birds.
- The wetland also benefits local agriculture by storing excess rainwater for later use.

Therthangal Bird Sanctuary, Tamil Nadu

- A marshy lake in Ramanathapuram district, covering 29.3 hectares.
- Fed by two rivers during the rainy season, it supports 96 bird species, including the endangered Egyptian Vulture and vulnerable Indian Spotted Eagle.
- The sanctuary is important for migratory waterfowl and waders, especially those using the East Asia-Australasia Flyway.
- Babul trees offer nesting sites, and the wetland also supports diverse flora and fauna, including butterflies, reptiles, and amphibians.
- Besides ecological value, it is used for irrigation and tourism.

Khecheopalri Wetland, Sikkim

- Sikkim's first Ramsar site, located at 1,700 meters in the Eastern Himalayas.
- A sacred lake, revered by Buddhists and Hindus, known as the "wish-fulfilling lake."
- The wetland is an ecological hotspot, home to migratory birds and diverse aquatic life.
- It plays a key role in water regulation, groundwater recharge, and soil erosion prevention.
- Ramsar recognition will enhance conservation, monitoring, and sustainable management.

Udhwa Lake Bird Sanctuary, Jharkhand

- Jharkhand's first Ramsar site, located in Sahibganj district.
- Comprises two interconnected lakes, Pataura and Berhale, covering 5.65 sq km.
- The sanctuary supports over 150 bird species, including migratory birds like Siberian cranes and open-billed storks.
- It is a vital spot for biodiversity conservation and provides habitat for aquatic plants and other wildlife

2. GUNERI INLAND MANGROVES

- A **32.78-hectare** area in **Guneri village**, Lakhtar tehsil, **Kutch district**, has been declared **Gujarat's first Biodiversity Heritage Site (BHS)**.
- The notification was issued under **The Biodiversity Act, 2002**, which allows state governments to declare BHS after consulting local bodies.
- **Inland mangroves** are extremely rare and reported from only **eight locations worldwide**.
- The **Guneri mangrove site** is the **last inland mangrove** of its kind in India.
- **Typical Mangroves** grow along **coastal, sludgy areas**, flooded by seawater daily.
- However, **Guneri mangroves** lie **45 km** from the **Arabian Sea** and **4 km** from **Kori Creek**, **never accessed by seawater** and **without any sludge**.
- The site spreads like a **forest on flat land**.
- Scientists believe Guneri mangroves originated:
  - **After marine transgression** during the **Miocene period**, or
  - Along the **lost Saraswati River** that flowed in the **Great Rann of Kachchh** around **3000–4000 B.C.**
- Studies suggest **limestone deposits** help sustain these inland mangroves by **providing continuous groundwater flow**.
- The **Western Kutch region** around Guneri also shows **records of limestone formations**.

3. INTERNATIONAL BIG CAT ALLIANCE (IBCA)

- The **International Big Cat Alliance (IBCA)** is now a fully functional, treaty-based inter-governmental organization.
- The **Ministry of External Affairs (MEA)** confirmed that five countries – **Nicaragua, Eswatini, India, Somalia, and Liberia** – are the founding members after depositing their instruments of ratification.
- The IBCA was launched by **Prime Minister Narendra Modi** on **April 9, 2023**, during the **50th anniversary of Project Tiger**.
- The main goal is the conservation of **seven major big cat species**: Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma.
- **27 countries** have joined, including **India**, **Nicaragua**, **Eswatini**, **Somalia**, and **Liberia**.
- Membership is open to **UN member countries**, particularly those hosting big cat species, and non-range countries supporting conservation efforts.
- The IBCA operates under a **framework agreement** with its **headquarters in India**, and includes an **Assembly of Members**, a **Standing Committee**, and a **Secretariat**.
- The **Union Cabinet** approved **Rs 150 crore** as one-time support for the IBCA from **2023-24 to 2027-28**.
- The IBCA aims to be **self-sustaining** after five years through **membership fees**, contributions from **bilateral and multilateral organizations**, and the **private sector**.

4. MARSUPIALS

➢ Australian scientists have created the world's first kangaroo embryo through in vitro fertilisation (IVF). This breakthrough could aid efforts to save endangered species by improving genetic diversity.

➢ **Marsupials** are mammals that give birth to underdeveloped young, which then continue to develop in a pouch (marsupium).

➢ They belong to the infraclass **Marsupialia** under **Mammalia**.

➢ Unlike placental mammals, marsupials have premature births, and the young develop further in the pouch.

➢ **Global Distribution**:

➢ **Australia & Nearby Islands**: Home to diverse marsupials, such as kangaroos, koalas, wombats, and Tasmanian devils.

➢ **South America**: Species like the opossum.

➢ **North America**: The Virginia opossum is the only marsupial found in the wild.

➢ **Evolution & Biogeography**:

➢ Marsupials diverged from placental mammals about 160 million years ago.

➢ Australia's isolation led to marsupials outnumbering placental mammals.

➢ **Convergent Evolution**: Some marsupials resemble placental mammals due to similar ecological roles (e.g., marsupial mole vs. placental mole).

➢ **Conservation & Ecological Importance**:

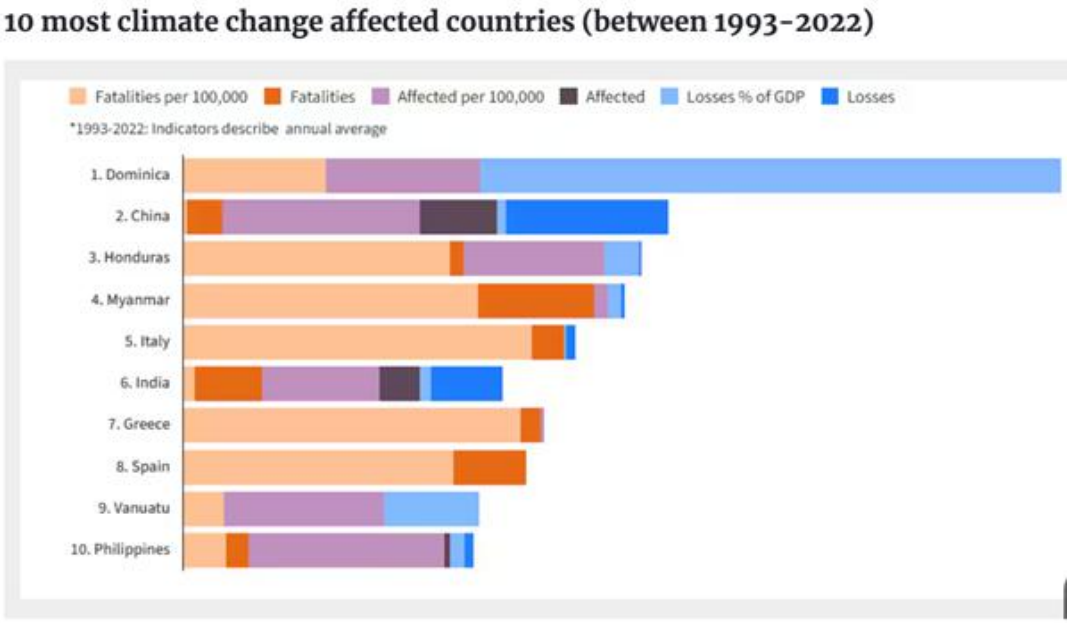
➢ Many marsupials face threats from habitat destruction, invasive species, and climate change.

➢ Conservation efforts focus on predator control and habitat restoration in Australia.

➢ Marsupials play vital roles as herbivores, pollinators, and prey in their ecosystems.

➢ They provide evidence of continental drift, especially with the breakup of Gondwana.

5. CLIMATE RISK INDEX (CRI)



➢ The **Climate Risk Index (CRI)** is an analytical tool developed by **Germanwatch** to assess the impact of extreme weather events on countries and regions. It evaluates **economic losses** and **human fatalities** from these events, providing insights into countries' exposure and

vulnerability to climate risks.

➢ **Key Features:**

- **Assessment Parameters**: The CRI considers fatalities, economic losses (absolute and relative to GDP), and the frequency of extreme weather events.
- **Timeframes**: It offers both **annual assessments** and **long-term evaluations** (20–30 years).
- **Purpose**: The CRI aims to raise awareness about the need for climate adaptation and mitigation strategies.

➢ **Recent Findings:**

- According to the **Global Climate Risk Index 2025**, **India** improved its ranking.
- In **2019**, India was the **7th most affected** country, but by **2022**, it improved to **49th**.
- However, in the **long-term assessment** (1993–2022), India remains in the **top 10 most affected**, ranking **6th**.

6. LOGGERHEAD TURTLES

➢ Loggerhead turtles (Caretta caretta) can learn and remember the magnetic signature of an area and perform a 'turtle dance' when they associate a location with food, a study in *Nature* reports.

➢ Sea turtles are famous for their long migrations.

➢ It is believed they use Earth's magnetic field as a natural map and compass for navigation.

➢ **Habitat & Distribution:**

➢ Loggerhead turtles are found in the Atlantic, Pacific, and Indian Oceans, and the Mediterranean Sea.

- In India, they are occasionally sighted along the western coastline.
- They inhabit coastal bays, estuaries, and open ocean regions.
- **Key Features:**
- Named for their large, broad heads, which have strong jaw muscles to crush prey like mollusks and crustaceans.
- Their omnivorous diet includes crabs, jellyfish, sponges, and seagrass.
- **Reproduction & Nesting:**
- Females return to their natal beaches every 2–4 years to lay eggs.
- Nesting usually happens between May and August.
- Unlike Olive Ridley turtles, they do not practice mass nesting (Arribada).
- **Conservation Status:**
- **IUCN Red List:** Vulnerable
- **CITES:** Appendix I (Trade strictly restricted)
- **Indian Wildlife (Protection) Act, 1972:** Schedule I (Highest protection level)

7. PEATLANDS

- Peatlands, covering only 3% of Earth's surface, store around 600 billion tonnes of carbon — more than all the world's forest biomass combined. Yet, just 17% of global peatlands are protected, with only 11% of boreal peatlands under protection compared to 27% of temperate and tropical ones.
- **About Peatlands:**

- Peatlands are wetland ecosystems where partially decayed plant material accumulates under waterlogged conditions, forming peat.

- **Distribution:**
- Found in boreal, temperate, and tropical regions.
- In India, peat deposits are located in the Sundarbans, parts of Kerala, the Northeast, and the western coast.
- **Ecological and Environmental Significance:**
- **Carbon Sequestration:** Peatlands store twice as much carbon as the world's forests, vital for climate change mitigation.
- **Biodiversity:** They support unique species like orangutans (Southeast Asia) and various migratory birds.
- **Water Regulation:** Peatlands aid in water retention, flood control, and groundwater recharge.
- **Livelihoods:** Communities rely on them for fishing, agriculture, and fuel (peat as biomass).
- **Threats:**
- Drainage and land conversion for agriculture and plantations (e.g., oil palm).
- Peat extraction for fuel and horticulture.
- Impacts of climate change.
- **Global Recognition:**
- The Ramsar Convention on Wetlands acknowledges peatlands as critical ecosystems.

8. SOUTH AMERICAN TAPIR

- After over a century of being considered regionally extinct, the South American tapir was recently spotted alive in Brazil. The last sighting of this herbivorous mammal in Rio de Janeiro state was in Serra dos Órgãos National Park in 1914.
- **South American Tapir:**
- The South American tapir (Tapirus terrestris), also called the Brazilian or lowland tapir, is the largest terrestrial mammal in South America.
- It plays a crucial role in the Amazon rainforest ecosystem by dispersing seeds, helping in forest regeneration.
- **Physical Characteristics:**
- **Size:** Adult tapirs are 6 to 7 feet long and weigh up to 550 pounds.
- **Appearance:** They have a dark back, a lighter underside, and a distinctive prehensile snout for grasping foliage.
- **Habitat and Distribution:**
- **Geographic Range:** Found in tropical South America, including Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, and northern Argentina.
- **Preferred Habitat:** Tapirs live in forested and grassy areas with access to permanent water sources.
- **Conservation Status:**
- The South American tapir is listed as Vulnerable on the IUCN Red List, mainly due to habitat destruction and hunting.
- Despite these pressures, recent conservation efforts have led to positive outcomes, with tapirs reappearing in Rio de Janeiro's Costa Verde region.

9. CALI FUND

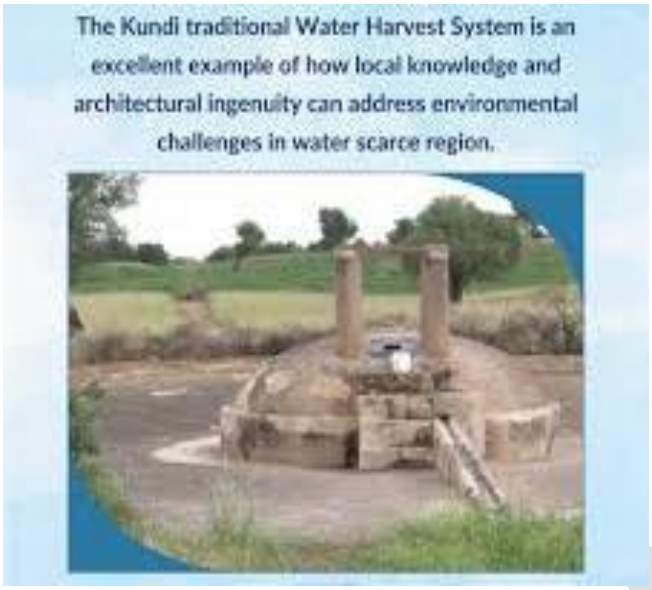
- The **Cali Fund** was launched on **February 25, 2025**, during the resumed **16th Conference of the Parties (COP16)** to the **United Nations Convention on Biological Diversity (CBD)** in **Rome**, Italy.
- The fund is designed to support global biodiversity conservation efforts and contribute to the **Kunming-Montreal Global Biodiversity Framework (KMGBF)** goal of halting and reversing biodiversity loss by **2030**.
- **Key Objectives of the Cali Fund:**
- **Fair Benefit Sharing**: Ensures benefits from **Digital Sequence Information (DSI)** on genetic resources are fairly shared, especially with biodiversity-rich countries and Indigenous communities.
- **Support for Indigenous Peoples and Local Communities**: At least **50%** of the fund's resources are dedicated to addressing the needs of Indigenous peoples, local communities, women, and youth, recognizing their role as biodiversity custodians.
- **Funding Mechanism:**
- The Cali Fund encourages contributions from private sectors that use **DSI**, including pharmaceuticals, cosmetics, biotechnology, and agriculture.
- This marks the first time a global biodiversity fund under the UN will receive direct contributions from businesses.
- **Contribution guidelines** suggest businesses contribute **1%** of profits or **0.1%** of revenues, but there are no enforcement mechanisms yet.
- The **UNDP** and **UNEP** will manage the fund, with administrative tasks handled by the **Multi-Partner Trust Fund Office (MPTFO)**.

10. GHARIALS

- Madhya Pradesh is known as the "gharial state" due to its decades-long conservation efforts, housing over 80% of India's gharials.
- The gharial (Gavialis gangeticus) is a long-snouted, fish-eating crocodilian.
- Its name comes from the Hindi word 'ghara' meaning pot, referring to the bulbous snout of adult males.
- Gharials rely on sandbanks and islands for basking and nesting, typically laying eggs between March and May.
- They help clean river ecosystems by scavenging carrion.
- Madhya Pradesh hosts the highest number of gharials in India, with 2,456 recorded in the 2024 census.
- Gharials are likely extinct in Myanmar and Bhutan, with small populations in Pakistan, Nepal, and Bangladesh.
- **Conservation Efforts:**
- Between 1975 and 1982, India established 16 breeding centers and five sanctuaries.
- Today, they survive mainly in five refuges: National Chambal Sanctuary, Katerniaghat Sanctuary, Chitwan National Park, Son River Sanctuary, and Satkosia Gorge Sanctuary.
- Conservation includes captive breeding, population monitoring, and managing threats like sand mining.
- I**mportance of Chambal Sanctuary:**
- The 435-km stretch of the Chambal River, spanning three states, is crucial for gharials.

- The sanctuary is home to over 290 bird species, including 80% of India's Indian Skimmers.
- It has helped revive gharial populations in other regions, like the Sutlej and Beas rivers.

11. KUNDI WATER HARVEST SYSTEM



- The Kundi water harvesting system is a traditional technique that showcases local knowledge and architectural ingenuity in addressing environmental challenges.
- The Kundi system is common in Rajasthan's Thar Desert and parts of Gujarat, designed to collect and store rainwater in water-scarce regions.
- Key Features:
- **Structure**: The Kundi is a circular or square-shaped underground well with a funnel-like top. Its edges are coated with lime and ash to prevent contamination.
- **Water Collection**: Rainwater is directed into the Kundi through sloping catchment areas. The design minimizes evaporation and seepage, ensuring efficient storage.
- **Material**: The Kundi's walls are made of stone, lime, or mud to maintain water purity and prevent leakage.
- **Usage**: It provides drinking water, irrigation, and water for livestock in drought-prone areas.

12. OLIVE RIDLEY TURTLES

- Olive ridley turtles (Lepidochelys olivacea) are among the smallest and most abundant sea turtles.
- **Appearance and Habitat**:
  - Named for their olive-green, heart-shaped shell, they inhabit warm waters of the Pacific, Atlantic, and Indian Oceans.
  - They grow to about two feet in length and weigh up to 50 kg. They likely live long lives, reaching maturity around 14 years.
- **Conservation Status**:
  - Classified as vulnerable by the International Union for Conservation of Nature (IUCN) and listed in Appendix I of CITES.
- **Arribada Nesting**:
  - Olive ridleys are known for their unique mass nesting behavior called arribada, where thousands of females gather to lay eggs on the same beach.
  - This behavior is unique to the Lepidochelys genus, including Kemp's ridley and olive ridley turtles.
  - During arribada, females emerge over 5 to 7 days to lay eggs in conical nests, about one and a half feet deep.
- **Nesting Locations**:
  - While solitary nesting occurs in around 40 countries, arribada nesting happens only on select beaches.
  - The largest mass nesting site is on Odisha's coast, particularly at Rushikulya and Gahirmatha rookeries, followed by sites in Mexico and Costa Rica.

13. CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

- World leaders at the 16th Conference of the Parties (COP16) to the Convention on Biological Diversity (CBD) in Rome reached a historic agreement on financing global conservation goals. The conference, resumed in Rome on February 25, 2025, after being paused in Cali, Colombia in 2024.
- The CBD is an international treaty to promote biodiversity conservation, sustainable use of its components, and equitable sharing of genetic resources.
- Signed at the Earth Summit in 1992, the CBD came into force in 1993 and has 196 parties, including 195 countries and the European Union.
- The CBD's three main objectives are:
  - **Conservation of Biological Diversity**: Protect ecosystems, species, and genetic diversity from threats like habitat destruction and pollution.
  - **Sustainable Use of Biological Resources**: Ensure resources are used without leading to depletion or degradation.
  - **Fair and Equitable Sharing of Benefits**: Ensure benefits from genetic resources are fairly shared with the countries and communities that provide them.
  - **Supplementary Agreements**:
- **Cartagena Protocol (2003)**: Focuses on the safe handling of genetically modified organisms (GMOs) to protect biodiversity.
- **Nagoya Protocol (2010)**: Ensures fair sharing of benefits from genetic resources.
- **Post-2020 Global Biodiversity Framework (2022)**: Sets targets to halt biodiversity loss by 2030 and 2050, including protecting 30% of land and oceans.