Drishti IAS Presents...

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ENVIRONMENT & ECOLOGY

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Koalas as Endangered Species: Australia

Why in News?

Recently, Australia has officially classified koalas as **'endangered'.**

Why classified as Endangered and its Significance?

- **Classification as Endangered:**
  - Australia's Koala population has been on the road to extinction **for over two decades now.** The number of Koalas in NSW (New South Wales) declined by between 33% and 61% since 2001.
  - But despite several demands by animal rights groups and conservationists, the government has been accused of doing little to protect the species. Koalas were classified as "vulnerable" only in 2012.
  - During the catastrophic 2019 bushfires in Australia, now known as the **'Black Summer', an estimated 60,000 koalas were impacted**, with vast swathes of their habitat being blackened and rendered unliveable.
  - Another major threat is the **spread of chlamydia, a sexually transmitted disease** known to cause blindness and cysts in the koalas reproductive tract.
- **Significance:**
  - The Endangered status of the koala means **they and their forest homes should be provided with greater protection under Australia's national environmental law.**

What are the Key Things about Koalas?

- **About:**
  - Koala is (*Phascolarctos cinereus*) **an arboreal (lives in trees) marsupial.**
    - A marsupial is born **in a very incomplete state**. They are minute, hairless and with hind limbs only partially formed. Around **2/3rd of them live in Australia.** The **other third live mostly in South America.**
    - Instead of the placenta, the mother's milk nourishes the young and allows it to grow and develop.
  - They share **a number of characteristics with wombats**, who are their closest living relatives, **including a backward-facing pouch.**
- **Habitat:**
  - The typical habitat for Koalas **is open eucalypt woodlands**, and the leaves of these trees make up most of their diet. In terms of societal behavior, Koalas are asocial animals and **typically emotional bonding is seen only between mothers and dependent offspring.**
  - They are **endemic to Australia.**
  - Due to the low nutrient levels of the Eucalyptus leaves they feed on, the koala can sleep up to 18 hours each day.
- **IUCN status:**
  - Vulnerable
- **Threats:**
  - Habitat destruction, climate change & severe weather (Droughts, extreme temperatures).

Olive Ridley Turtles

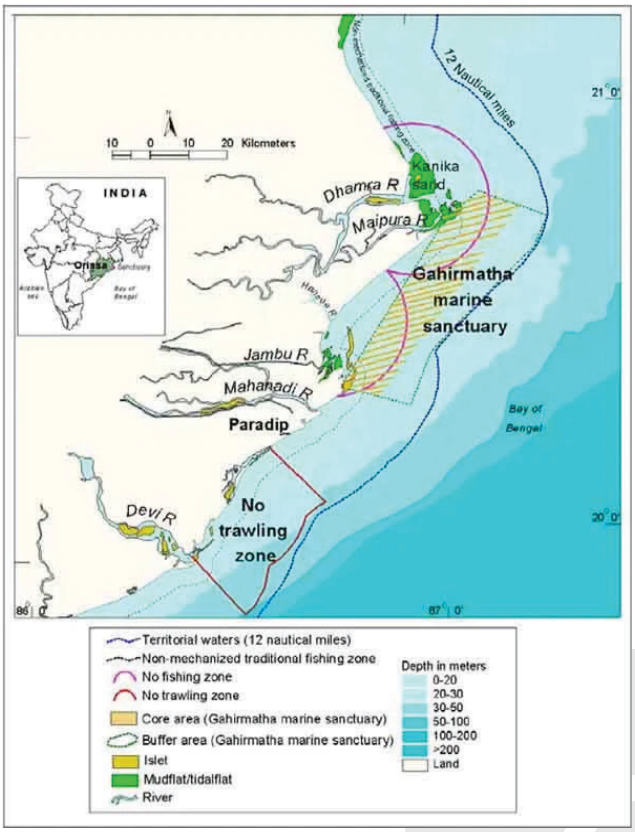
Why in News

The Orissa High Court has taken suo motu cognisance of the death of around 800 **Olive Ridley sea turtles** due to negligence by Odisha's forest and fisheries departments.

Key Points

- **Features of Olive Ridley Turtles:**
  - The Olive ridley turtles are the smallest and most abundant of all sea turtles found in the world.
  - These turtles are carnivores and get their name from their olive colored carapace.

Note:



- **Protection Status:**
  - **Wildlife Protection Act, 1972**: Scheduled 1
  - **IUCN Red List:** Vulnerable
  - **CITES:** Appendix I
- **Habitat:**
  - They are found in warm waters of the Pacific, Atlantic and Indian oceans.
  - The Odisha's **Gahirmatha Marine Sanctuary** is known as the world's largest rookery (colony of breeding animals) of sea turtles.
- **Arribada (Mass Nesting):**
  - They are best known for their **unique mass nesting called Arribada**, where thousands of females come together on the same beach to lay eggs.
  - They lay their eggs over a period of five to seven days in conical nests about one and a half feet deep which they dig with their hind flippers.

Gahirmatha Marine Sanctuary

- Gahirmatha is the mass nesting spot in Indian Ocean region and the only turtle sanctuary in Odisha.
- It is the **world's largest nesting beach** of Olive Ridley Sea Turtles.
- Gahirmatha was declared a **turtle sanctuary in 1997** by the Odisha government after considering its ecological importance and as part of efforts to save the sea turtles.
- Gahirmatha Marine Sanctuary is one of the three parts of the Bhitarkanika National Park. The other two includes the area of Bhitarkanika National Park and the Bhitarkanika Wildlife Sanctuary.

Gangetic River Dolphin

Why in News

Recently, a **Gangetic Dolphin** was beaten to death in Pratapgarh, Uttar Pradesh.

- Killing the Gangetic River Dolphin is a punishable offence under the **Wildlife Protection Act, 1972.**

Key Points

- **About:**
  - **Scientific Name:** *Platanista gangetica*
  - The Ganges River Dolphin was **officially discovered in 1801**.
  - Ganges river dolphins live in the **Ganges-Brahmaputra-Meghna** and **Karnaphuli-Sangu river** systems of **Nepal, India, and Bangladesh.**
    - The Ganges river dolphin can **only live in freshwater** and is essentially blind.
    - They hunt by emitting ultrasonic sounds, which bounces off of fish and other prey, enabling them to "see" an image in their mind. They are also called *'susu'*.
  - Population of Gangetic river Dolphin is **1200-1800.**
- **Significance:**
  - It is a **reliable indicator** of the **health of** the entire **river ecosystem**.

Note:

- It was recognised as the **National Aquatic Animal** in 2009, by the Government of India.

➢ **Conservation Status:**
- **Indian Wildlife (Protection), Act 1972: Schedule I.**
- **International Union for the Conservation of Nature (IUCN): Endangered.**
- **Convention on International Trade in Endangered Species (CITES): Appendix I** (most endangered).
- **Convention on Migratory Species (CMS): Appendix II** (migratory species that need conservation and management or would significantly benefit from international co-operation).

➢ **Steps Taken:**
- **Project Dolphin:** The Prime Minister announced the government's plan to launch a Project Dolphin in his Independence Day Speech 2020. It will be on the lines of **Project Tiger**, which has helped increase the tiger population.
- **Dolphin Sanctuary: Vikramshila Ganges Dolphin Sanctuary** has been established in **Bihar.**
- **Conservation Plan:** The Conservation Action Plan for the Ganges River Dolphin 2010-2020, which "identified threats to Gangetic Dolphins and impact of river traffic, irrigation canals and depletion of prey-base on Dolphins populations".
- **National Ganga River Dolphin Day:** The **National Mission for Clean Ganga** celebrates **5th October** as National Ganga River Dolphin Day.

Wildlife Protection Act, 1972

➢ This Act provides for the **protection of the country's wild animals, birds, and plant species**, in order to ensure environmental and ecological security. Among other things, the Act lays down restrictions on hunting many animal species. The **Act was last amended in the year 2006**.

➢ The Act **created six schedules** which gave varying degrees of protection to classes of flora and fauna.
- **Schedule I and Schedule II** get absolute protection, and offences under these schedules attract the maximum penalties.
- **Schedule 5** includes **species that may be hunted.**

Related Constitutional Provisions

➢ **Article 48A:**
- It directs the State to protect and improve the environment and safeguard wildlife and forests. This Article was added to the Constitution by the **42nd amendment** in 1976.

➢ **Article 51A:**
- Article 51A imposes certain **fundamental duties** for the people of India. One of them is to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures.

Mandarin Duck

Why in News

Recently, **Mandarin ducks** have been sighted in the **Maguri-Motapung beel in Assam's Tinsukia district** after a century.

Key Points

➢ **Scientific Name:** *Aix galericulata*

➢ **Discovery:**
- Mandarin duck was **first identified by Swedish** botanist, physician and zoologist **Carl Linnaeus in 1758.**

➢ **Characteristics:**
- It is **considered the most beautiful duck** in the world.
- **Male mandarins** have elaborate plumage (feathers) with orange plumes on their cheeks, orange 'sails' on their back, and pale orange sides; **females are dull in comparison**, with grey heads, brown backs and white eyestripe.

➢ **Diet:**
- These birds may feed on seeds, acorns, small fruit, insects, snails, and small fish.

Note:

- **Habitat:**
  - These birds **inhabit temperate forests near wetlands** including rivers, streams, bogs, marshes, swamps, and freshwater lakes.
  - It is **native to East Asia** but has established **populations in Western Europe and America too.**
    - It breeds in **Russia, Korea, Japan and northeastern parts of China.**
- **Presence in India:**
  - The duck **rarely visits India** as it does not fall in its usual migratory route.
  - It was r**ecorded in 1902 in the Dibru river** in the Rongagora area in Tinsukia (Assam).
  - More recently, it was sighted in **Manipur's Loktak Lake** in 2013, and in **Saatvoini Beel in Manas National Park** and Tiger Reserve in Assam's Baksa district in 2014.
- **Status on IUCN Red List :** Least Concern.
- **Maguri-Motapung Beel:**
  - The Maguri Motapung wetland, an Important Bird Area as declared by the **Bombay Natural History Society** is located close to the **Dibru Saikhowa National Park** in Upper Assam.
  - In May 2020, the Beel was adversely affected by a **blowout and fire at an Oil India Limited-owned** gas well.
    - The resulting oil spill killed a number of fish, snakes as well as an endangered Gangetic dolphin.

World's Smallest Reptile

Why in News

Scientists believe they may have discovered the **smallest reptile on earth - a Chameleon subspecies** that is the size **of a seed.**

- Two of the tiny lizards were discovered by a **German-Madagascan** expedition team in **Madagascar.**

Key Points

- **About the Discovery:**
  - The team found **one male and one female of the species, named *Brookesia nana***, during an expedition in 2012.

  - The ***Male Brookesia Nana,*** or ***Nano-Chameleon,*** has a body of just **13.5 mm.** Its length from top to tail is 22 mm. The **female** is far **bigger** at around **29 mm**.
  - According to the **Bavarian State Collection of Zoology in Munich**, ***Nano-Chameleon*** is the **smallest of about 11,500 known species** of reptiles.
    - Previously, the chameleon species ***Brookesia micra*** was thought to be the smallest. The average length of adults of this species is **16 mm (29 mm with tail)**, while the **smallest adult male** has been recorded at **15.3 mm.**
    - The **longest**, the **reticulated python**, at 6.25 m is almost as long as 289 *Brookesia nanas.*
  - The New Chameleon is only known from a degraded **Montane Rainforest in Northern Madagascar** and might be threatened by extinction.
    - Nano-chameleons have **previously suffered deforestation**, but their habitat is now protected.
  - In their report, scientists recommended that the chameleon be listed as Critically endangered in the **International Union for Conservation of Nature's (IUCN)** Red List of Threatened Species to help protect it and its habitat.
- **About Chameleons:**
  - **Chameleons (family Chamaeleonidae)** are a distinctive and highly specialized **Clade** of **Old World Lizard** with 202 species described as of June 2015. **Madagascar is home to nearly two-thirds** of all chameleon species.
  - Chameleons are adapted for climbing and visual hunting. They live in warm habitats that range from **Rainforest** and **Desert** Condition. They are best known for their ability to change body colour.

Note:

- The Indian chameleon is found in India, Pakistan, and Sri Lanka.

Black-Necked Crane

Why in News

Recently, a group of **Buddhist** monks in Tawang district has opposed the Arunachal Pradesh government's renewed push for **hydropower projects**.

- The proposed projects would not only affect the **nesting grounds of the endangered Black-Necked Crane** but also threaten several holy Buddhist pilgrimage sites in the region.

Key Points

- **About:**
  - Both the sexes are almost of the same size but **male is slightly bigger than female**.
  - The upper long neck, head, primary and secondary flight feathers and tail are completely black and **body plumage is pale gray/whitish**.
  - A conspicuous **red crown** adorns the head.
- **Special Significance:**
  - The bird is **revered by the community of Monpas** (major Buddhist ethnic group of Arunachal Pradesh) as an **embodiment of the sixth Dalai Lama** (Tsangyang Gyatso).
    - **Monpas** inhabit the West Kameng and Tawang districts, are essentially Buddhists who follow the **Mahayana sect.**

- **Habitat and Breeding Grounds:**
  - The **high altitude wetlands** of the Tibetan plateau, Sichuan (China), and eastern **Ladakh** (India) are the **main breeding ground of the species**, the birds spend winter at lower altitudes.
  - In Bhutan and **Arunachal Pradesh**, it only comes **during the winters.**
  - In Arunachal Pradesh, it can be seen in three areas:
    - **Sangti valley i**n West Kameng district.
    - **Zemithang** in Tawang district.
    - **Chug valley** in Tawang district.
- **Threats:**
  - **Damage to the eggs and chicks,** caused by feral dogs.
  - **Loss of habitat** due to human pressure (Development Projects) on the wetlands.
  - Increased grazing pressure on the limited pastures near the wetlands**.**
- **Steps for their Conservation:**
  - **World Wide Fund for Nature-India** (WWF-India) in collaboration with the Department of Wildlife Protection, Jammu & Kashmir, has been working towards conservation of high altitude wetlands,with **black-necked cranes as a priority species in Ladakh region.**
    - In Arunachal Pradesh, WWF is working for the conservation of the small wintering population.
- **Protection Status:**
  - **IUCN Red List:** Near Threatened
  - **CITES**: Appendix I
  - **Indian Wildlife (Protection) Act, 1972**: Schedule I

Indian Pangolin

Why in News

Recently, the Odisha Forest department has stressed the need for **stricter monitoring of social media platforms** to **check pangolin poaching and trading.**

Note:

Key Points

- **About:**
  - Pangolins are **scaly anteater mammals** and they have **large, protective keratin scales covering their skin**. They are the only known mammals with this feature.
- **Diet:**
  - Insectivore- Pangolins are **nocturnal, and their diet consists of mainly ants and termites,** which they capture using their long tongues.
- **Types:**
  - Out of the eight species of pangolin, the **Indian Pangolin** (*Manis crassicaudata*) and the **Chinese Pangolin** (*Manis pentadactyla*) are **found in India.**
  - **Difference**:
    - Indian Pangolin is a large anteater covered by 11-13 rows of scales on the back.
    - A terminal scale is also present on the lower side of the tail of the Indian Pangolin, which is absent in the Chinese Pangolin.
- **Habitat:**
  - **Indian Pangolin:**
    - It is widely distributed in India, except the arid region, high Himalayas and the North-East.
    - The species is also found in Bangladesh, Pakistan, Nepal and Sri Lanka.
  - **Chinese Pangolin:**
    - It is found in the Himalayan foothills in Eastern Nepal, Bhutan, Northern India, North-East Bangladesh and through Southern China.
- **Threats to Pangolins in India:**
  - **Hunting and poaching** for local consumptive use (e.g. as a protein source and traditional medicine) and international trade for its meat and scales in East and South East Asian countries, particularly China and Vietnam.
  - They are believed to be the world's most trafficked mammal.
- **Conservation Status:**
  - **Wildlife Protection Act, 1972:** Schedule I
  - **IUCN Red List**: Endangered
  - **CITES**: Appendix I

Indian Star Tortoise

Why in News

Recently, **Indian star tortoises** were seized while being smuggled from Andhra Pradesh to Odisha.

Key points

- **Habitat:**
  - **Indian star tortoise** is found across the **Indian sub-continent**, more specifically, in the **Central and Southern parts of India**, in **West Pakistan** and in **Sri Lanka.**
- **Protection Status:**
  - **Wild Life Protection Act 1972: Schedule IV**
    - **Schedule IV:** This list is for **species that are not endangered.** It includes **protected species but the penalty for any violation is less** compared to the Schedules I and II.
  - **Convention on International Trade inSpecies (CITES):** Appendix I
  - **IUCN Status:** Vulnerable
- **Threat:** The species faces two threats- **loss of habitat to agriculture** and illegal harvesting for the **pet trade**.
  - According to the **Wildlife Crime Control Bureau**, 90% of the trade of Star Tortoise occurs as part of the International pet market.
  - If their exploitation had continued at a similar pace or had expanded, a decline of greater than 30% was predicted by 2025.
- **Conservation Efforts:**
  - Recently India's **proposal to upgrade the protection status** of Star Tortoise from **Appendix II to Appendix I** was approved by the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).**

Note:

Danube Sturgeon

Why in News

According to a report released by the **World Wildlife Fund (WWF)**, illegal sale of **Danube Sturgeon**, one of the **most endangered species** in the world, is rampant in the lower Danube (River) region, especially in Bulgaria, Romania, Serbia and Ukraine.

- Danube is the **second longest river in Europe after the Volga**. It **rises in the Black Forest mountains of western Germany** and flows for some 2,850 km to its mouth on the **Black Sea.**

Key Points

- **About:**
  - Sturgeons have **existed since the time of dinosaurs**, for about **200 million years**. Some of the species can grow up to **eight metre in length** and **live more than a century.**
  - They are called **'living fossils'** because their appearance has altered very little over the years.
    - **Living Fossil** is an organism that has **remained unchanged from earlier geologic times** and whose close relatives are usually extinct.
    - Other than Sturgeons, **Horseshoe crab** and ginkgo trees are examples of living fossils.
  - Because the sturgeons live for so many years, mature late and spawn with long intervals, they take a long time to recover from environmental and human pressures, according to WWF. This makes them **great indicators for the health of the river and other ecological parameters.**
- **Habitat:**
  - There are **27 species of sturgeons** and paddlefishes distributed across the Northern hemisphere. While **some species inhabit only freshwater**, most species are anadromous, spawning in freshwater but spending much of their life history in marine or brackish environments.
  - Danube sturgeons live mostly in the **Black Sea**, migrating up the Danube and other major rivers to spawn.
- **Threats**:
  - **Over-exploitation and poaching** (exacerbated by poor fishery management and insufficient legal enforcement of fishing bans).
  - **Blocked migration routes** through dams.
  - Loss or **degradation of habitats.**
  - **Pollution**.
- **Protection Status:**
  - **IUCN Red list:** There are **6 species of sturgeon in the Danube River**. Five of them are now listed as **critically endangered.**
  - **CITES: Appendix-II.**

Blue-finned Mahseer

Why in News

Recently, the **International Union for Conservation of Nature (IUCN)** has moved **Blue-finned Mahseer** from **Endangered to the Least Concern' status** on its **Red List.**

Key Points

- **About:**
  - The Mahseer belongs to the genus ***Tor***, of which there are **several subspecies to be found in India** and in other range countries in South Asia.
  - The Blue-finned Mahseer or ***Tor Khudree*** **is one of the subspecies of the Mahseer**.
- **Habitat:**

Note:

- Mainly found in the **Mota Mola river east of Pune**. This species is also found in other **rivers of the Deccan Plateau.**
- The species is migratory; **moving upstream during rains.** It **prefers clean, fast flowing and well oxygenated waters**.

➢ **Threats:**
- Threatened by **habitat manipulation**, **over harvesting** and **competition from other fish species.**

➢ **Significance:**
- **Freshwater Ecosystem Indicator:**
  - It is very **sensitive to dissolved oxygen levels, water temperature and sudden climatic changes**. It just cannot bear pollution.
- **Cultural:**
  - They have cultural and religious significance as well as they are **protected in 'temple sanctuaries' across India.**

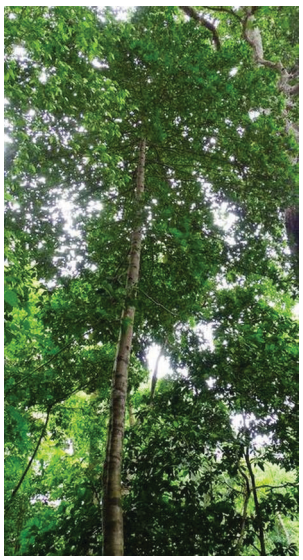
➢ **Conservation Initiatives:**
- Tata Power (private company) is involved in **conservation of the blue-finned for 50 years in Lonavala (near Pune), Maharashtra.**

➢ **Protection status:**
- **IUCN Red List:** Least Concern

Pyrostria laljii: New Species from Andaman

Why in News

Recently, ***Pyrostria laljii,*** a new species which **belongs to the genus of the coffee family** has recently been **discovered from the Andaman Islands.**



➢ A **new species of pokeweed named *Rivina andamanensis*** was also discovered.

➢ **Andaman and Nicobar** is a **group of 572 islands and islets** that are rich and **unique in terms of plant diversity** in India.

Key Points

➢ **About:**
- It is the **first record of the genus Pyrostria** in India. It is a **15-meter-tall tree.**
  - Plants belonging to genus Pyrostria are **usually found in Madagascar** but the recently discovered species is new to science.
  - While the genus **Pyrostria is not found in India**, there are several **genera from the family Rubiaceae that are common in India.**
  - These plants, including **cinchona, coffee, adina, hamelia, ixora, gallium, gardenia, mussaenda, rubia, morinda**, have high potential for economic value.
- **Named Pyrostria laljii after Lal Ji Singh**, Joint Director, Andaman and Nicobar Regional Centre, **Botanical Survey of India.**
- It has been **assessed as 'Critically Endangered'** based on the **International Union for Conservation of Nature's (IUCN) Red List** criteria.

➢ **Features:**
- Distinguished by **a long stem with a whitish coating on the trunk**, and **oblong-ovate leaves with a cuneate base.**
- Another physical feature that distinguishes the tree from other species of the genus is its **umbellate inflorescence with eight to 12 flowers.**

➢ **Habitat in India:**
- First reported from **South Andaman's Wandoor forest**. Other places in the Andaman and Nicobar Islands where the tree could be located are the **Tirur forest near the Jarawa Reserve Forest** and the **Chidiya Tapu (Munda Pahar) forest.**

Rivina andamanensis

➢ Another **new species of pokeweed** named ***Rivina andamanensis*** was also discovered. It was **found growing under large trees, shaded and rocky areas**, along with herbs and shrubby plants.
- **Pokeweed** is a **strong-smelling plant with a poisonous root**. The berries contain a red dye used to colour wine, candies, cloth, and paper.

Note:

- This discovery of new species, representing the **first record of the pokeweed family Petiveriaceae in the Andaman and Nicobar Islands,** adds one more family to the islands' flora.

Pygmy Hog

Why in News

Recently, eight captive-bred **pygmy hogs**, the **world's rarest and smallest wild pigs**, were released in the **Manas National Park of Assam.**

- This is the second batch to have been reintroduced into the wild under the **Pygmy Hog Conservation Programme (PHCP)** in a year.

Key Points

- **Pygmy Hog Conservation Programme (PHCP):**
  - The PHCP is a **collaboration** among **Durrell Wildlife Conservation Trust of UK**, **Assam Forest Department**, Wild Pig Specialist Group of **International Union for Conservation of Nature (IUCN)** and **Ministry of Environment, Forest and Climate Change.**
  - It is currently being **implemented by NGOs - Aaranyak and EcoSystems India.**
  - Conservation of pygmy hog was initiated by noted naturalist **Gerald Durrell and his trust in 1971**.
    - The pygmy hog was brought back from near-extinction by the partnership effort, and now moving towards the establishment of a population across the entire range.
  - Six hogs were captured from the **Bansbari range** of the Manas National Park in 1996 for starting the breeding programme.
  - The reintroduction programme began in 2008 with the **Sonai-Rupai Wildlife Sanctuary**, **Orang National Park** and **Bornadi Wildlife Sanctuary,** all of them are in Assam**.**
  - By 2025, the PHCP plans to release 60 pygmy hogs in Manas.
- **About Pygmy Hog:**
  - **Scientific Name:** *Porcula Salvania*
  - **Features:**
    - It is one of the very few mammals that build its own home, or nest, complete with a 'roof'.
    - It is **also an indicator species.** Its presence reflects the health of its primary habitat, the tall, wet grasslands of the region.

  - **Habitat:**
    - It thrives in **wet grassland.**
    - Once found along a narrow strip of tall and wet grassland plains on the Himalayan foothills – from Uttar Pradesh to Assam, through Nepal's terai areas and Bengal's duars. Today found mainly in a small population in **Assam.**
  - **Protection Status:**
    - **IUCN Red List:** Endangered
    - **CITES:** Appendix I
    - **Wildlife (Protection) Act, 1972**: Schedule I
  - **Threats:**
    - Habitat (grassland) loss and degradation, and illegal hunting.

New Frog Species: Minervarya Pentali

Why in News

Recently, a **new frog species was discovered in the Western Ghats** and named after former DU Vice-Chancellor and plant geneticist Deepak Pental.

Key Points

- The new frog species named **Minervarya Pentali** belongs to the **family of Dicroglossidae**.
  - The **family Dicroglossidae** comprises **202 species of semiaquatic frogs** distributed by the **tropical and subtropical regions** of **Africa and Asia and Papua New Guinea**.

Note:

- The family contains large-sized (e.g., genus Hoplobatrachus) and dwarf species, with a total length about 30 mm (e.g., genus Nannophrys).

- It was discovered from the **Western Ghats biodiversity hotspot**, extending along the **southwest coast of the Indian Peninsula.**
- This new species is **endemic** to the **southern Western Ghats.**
- This species is also among the **smallest known Minervarya** (genus) **frogs.**

The Western Ghats

- These are the **mountain ranges** running parallel **along the western coast of India starting from Gujarat and ending in Tamil Nadu.**
- Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala are the six Indian states covered by Western Ghats.
- The mountain range is also a **"Hottest Hotspot" of biodiversity.**
- The Ghats are often called the **Great Escarpment of India** and are also a **UNESCO World Heritage Site.**
- **High Biodiversity and Endemism** are special features of Western Ghats along with the presence of Evergreen Forests.

New Species of Cascade Frog: Arunachal Pradesh

Why in News

Recently, a team of researchers have discovered a new species of cascade frog in Arunachal Pradesh **named Adi Cascade Frog.**

- Earlier, a new frog species named **Minervarya Pentali** was discovered in the **Western Ghats**.

Key Points

- **About:**
  - It is a predominantly brown colour frog, with a size ranging roughly between 4 cm to 7 cm.
  - It is formally described as Amolops adicolasp.nov., which is morphologically distinguished from its congeners by a suite of characters that include adult size, body colouration and markings, skin texture, snout shape, foot webbing and digit tip morphology.
- **Naming:**
  - It has been named **Adi Cascade Frog** (Amolops Adicola) after the indigenous **Adi tribe** living **in the Adi hills** of Arunachal Pradesh. The literal meaning of Adi is "hill" or "mountain top.
    - Historically, this region was also known as **Abor hills.**
- **Cascade Frog:**
  - Cascade frogs are named so because of their preference of small waterfalls or cascades in flowing hill streams.
  - Cascade Frogs belong to the genus Amolops.
    - The genus Amolops is one of the largest groups of ranid frogs (family Ranidae) with currently 73 known species that are widely distributed across Northeast and North India, Nepal, Bhutan, China, through Indochina, to the Malay Peninsula.

Adi Tribe

- The Adi tribe of Arunachal Pradesh is believed to **have come from southern China in the 16th century.**
- They are the **Tibeto-Burman language speaking** population.
- They reside in the far north inhabiting East Siang and Lower Dibang Valley districts of Arunachal Pradesh.
- The Adis are **experts at making cane and bamboo items.**
- **Solung** (harvesting festival where animal sacrifices and rituals are performed) and **Aran** (a hunting festival where all the male members of the family go for hunting) are **two major festivals of the Adi tribes.**
- It is a **Scheduled Tribe in Arunachal Pradesh.**

Note:

Crocodilian Species in India

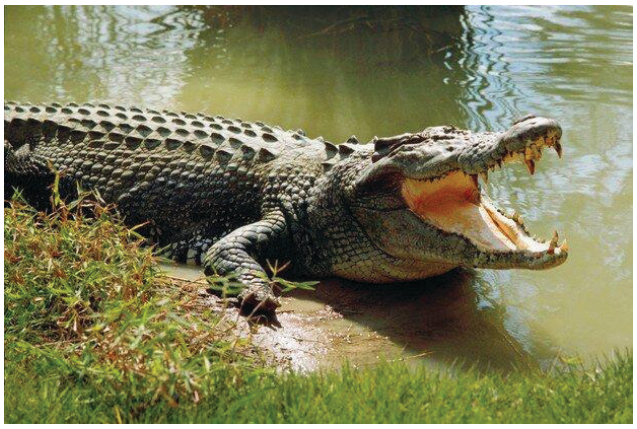
Why in News

Recently, **Odisha's Kendrapara district** has earned the distinction of being the **only district in India where all three species of crocodiles, salt-water, gharial and mugger, are found.**

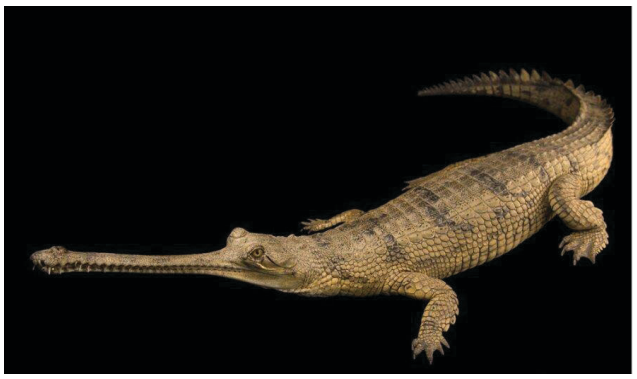
Key Points

- **Mugger or Marsh Crocodile:**

  - **Description:**
    - An egg-laying and hole-nesting species, also known to be dangerous.
  - **Habitat:**
    - Mainly **restricted to the Indian subcontinent** where it may be found in a number of freshwater habitat types and also in coastal saltwater lagoons and estuaries.
    - It is **already extinct in Bhutan and Myanmar.**
  - **Threats:**
    - Habitat destruction, fragmentation, and transformation, fishing activities and use of crocodile parts for medicinal purposes.
  - **Protection Status:**
    - **IUCN List of Threatened Species:** Vulnerable
    - **CITES:** Appendix I
    - **Wildlife Protection Act, 1972:** Schedule I
- **Estuarine or Saltwater Crocodile:**
  - **Description:**
    - Considered as the **Earth's largest living crocodile species,** infamous globally as a known maneater.



  - **Habitat:**
    - Found in Odisha's **Bhitarkanika National Park**, the **Sundarbans** in West Bengal and the **Andamans and Nicobar Islands.**
    - Also found across Southeast Asia and northern Australia.
  - **Threats:**
    - Illegal hunting, habitat loss, and antipathy toward the species because of its reputation as a maneater.
  - **Protection Status:**
    - **IUCN List of Threatened Species:** Least Concern
    - **CITES :** Appendix I (except the populations of Australia, Indonesia and Papua New Guinea, which are included in Appendix II).
    - **Wildlife Protection Act, 1972 :** Schedule I
- **Gharial:**



  - **Description:**
    - Sometimes called gavials, are **a type of Asian crocodilian** distinguished by their long, thin snouts which resembles a pot (ghara in Hindi).
    - The population of Gharials is a **good indicator of clean river water.**

Note:

- Known to be **a relatively harmless, fish-eating species**.

❍ **Habitat:**

- Mostly found in **fresh waters of the himalayan rivers.**
- The **Chambal river** in the northern slopes of the Vindhya mountains (Madhya Pradesh) is known as the **primary habitat** of gharials.
- Other himalayan rivers like **Ghagra**, Gandak river, Girwa river, Ramganga river and the Sone river are **secondary habitats.**

❍ **Threats:**

- Illegal sand mining, poaching, increased river pollution, dam construction, massive-scale fishing operations and **Floods.**

❍ **Protection Status:**

- **IUCN List of Threatened Species:** Critically Endangered
- **CITES:** Appendix I
- **Wildlife Protection Act, 1972:** Schedule I

➢ **Conservation Efforts:**

❍ **Odisha** has announced **a cash award of Rs. 1,000** to conserve gharials in **Mahanadi River Basin.**

❍ The **Crocodile Conservation Project** was **launched in 1975 in different States.**

State Animal and Bird: Ladakh

Why in News

Recently, Ladakh has adopted **Snow Leopard** and **Black-Necked Crane**, as State animal and State bird, two years after it was carved out as a separate **Union Territory (UT)** from the erstwhile State of J&K (Jammu and Kashmir).

Key Points

➢ **Snow Leopard:**

❍ **About:**

- **Snow leopards** *(Panthera uncia)* **act as an indicator of the health of the mountain ecosystem** in which they live, due to their position as the **top predator in the food web.**

❍ **Habitat:**

- Mountainous regions of central and southern Asia. In India, their geographical range encompasses:

  - **Western Himalayas:** Jammu and Kashmir, Himachal Pradesh.
  - **Eastern Himalayas:** Uttarakhand and Sikkim and Arunachal Pradesh.
- **Snow Leopard capital of the world:** Hemis, Ladakh.
  - **Hemis National Park** is the biggest national park in India and also has a good presence of Snow Leopard.

❍ **Threats:**

- Reduction in prey populations.
- **Illegal poaching** and **increased human population** infiltration into the species habitat.
- **Illegal trade** of wildlife parts and products.

❍ **Protection Status:**

- **IUCN**: Vulnerable.
- **CITES**: Appendix I
- **Wildlife (Protection) Act 1972:** Schedule I
- It is also listed in the **Convention on Migratory Species (CMS)**, affording the highest conservation status to the species, both globally and in India.

➢ **Black-Necked Crane:**

Note:

- **About:**
  - The black-necked crane **(*Grus nigricollis*)**, also known as Tibetan crane, is a **large bird and medium-sized crane.**
  - **Both the sexes** are almost of the **same size** but **male is slightly bigger** than female.
  - A conspicuous **red crown adorns the head.**
- **Habitat:**
  - The high altitude wetlands of the **Tibetan plateau**, Sichuan (China), and eastern **Ladakh** (India) are the main breeding ground of the species; the **birds spend winter at lower altitudes.**
  - In **Bhutan and Arunachal Pradesh**, it only comes **during the winters.**
- **Threats:**
  - **Damage to the eggs** and chicks, caused by feral dogs.
  - Loss of habitat due to **human pressure (Development Projects)** on the wetlands.
  - Increased **grazing pressure on the limited pastures** near the wetlands.
- **Protection Status:**
  - **IUCN Red List:** Near Threatened
  - **CITES:** Appendix I
  - **Indian Wildlife (Protection) Act, 1972:** Schedule I

Raptor Species under Threat

Why in News

According to recent research, **around 30% of the 557 raptor species** around the world **are threatened by extinction** to some degree.

- It is an analysis by the **International Union for the Conservation of Nature (IUCN)** and **BirdLife International** (a global partnership of conservation organisations (NGOs)).

Key Points

- **Raptor Species:**
  - **About:** A raptor is a **bird of prey**. A bird of prey is a **carnivore (meat eater)** that kills and eats mammals, reptiles, amphibians, insects, rodents as well as other birds.
    - All raptors have a hooked beak, strong feet with sharp talons, keen eyesight, and a carnivorous diet.
  - **Significance:**
    - Raptors prey on a wide range of vertebrates and thus, **facilitate long-distance seed dispersal**. This indirectly increases seed production and **pest control**.
    - Birds of prey are **predators at the top of the food chain;** because threats like pesticides, habitat loss, and climate change have the most dramatic impact on top predators, these are referred to as **indicator species.**
  - **Population**: Indonesia has the most raptor species, followed by Colombia, Ecuador and Peru.
  - **Examples**:Owls, **vultures**, hawks, falcons, **eagles**, kites, buteos, accipiters, harriers, and osprey.
- **Cause of Threat:**
  - **Use of Diclofenac:** Some **vulture populations** have declined by over 95% in Asian countries **such as India** because of the widespread use of **diclofenac.**
    - Diclofenac is a **non-steroidal anti-inflammatory** drug.
  - **Deforestation**: The population of **Philippine eagles**, the largest variety of eagles in the world, decreased rapidly in the last decades due to extensive deforestation.
    - The Philippine Eagle is **Critically Endangered** under IUCN Red List.
  - **Shooting and Poisoning**: In **Africa, vulture populations** have decreased by an average of 95% in rural areas over the last 30 years as the result of shooting and poisoning through feeding on carcasses of livestock treated with diclofenac.
  - **Habitat Loss and Degradation**: The **Annobon scops-owl**, restricted to Annobon Island off West Africa, was recently classified as '**critically endangered**' under the IUCN Red List because of rapid habitat loss and degradation.
- **Conservation Efforts:**
  - **Raptors MoU (Global):** The Memorandum of Understanding on the **Conservation of Migratory Birds of Prey in Africa and Eurasia** is also known as Raptors MoU.
    - It is an agreement under **Convention on the Conservation of Migratory Species of Wild**

Note:

Animals (CMS). **CMS or Bonn Convention** provides a global platform for the conservation and sustainable use of migratory animals and their habitats.

- It is **not legally binding.**

❍ **India's Conservation Efforts:**

- **India** is **a signatory to Raptors MoU.**
- For the conservation of vultures, India has launched a **Vulture Action Plan 2020-25.**
  - India is also a part of the **SAVE (Saving Asia's Vultures from Extinction)** consortium.
  - The **Jatayu Conservation Breeding Centre in Pinjore (Haryana)** is the world's largest facility within the state's Bir Shikargah Wildlife Sanctuary for the breeding and conservation of Indian vulture species.

New Species of Hybodont Shark

Why in News

Recently, the **Geological Survey of India** (GSI) and the Indian Institute of Technology, Roorkee have discovered a **new extinct species of hybodont shark** from the Jaisalmer Basin of Rajasthan.

➢ **GSI** is a scientific agency under the Ministry of Mines, works as a repository of geo-science information required in various fields in the country.

Key Points

➢ **Newly discovered species:**

❍ The newly discovered **crushing teeth** from Jaisalmer represents a new species named by the research team as **Strophodusjaisalmerensis.**

- The genus Strophodus has been identified for the **first time from the Indian subcontinent** and is only the third such record from Asia, the other two being from Japan and Thailand.

❍ These sharks have been **reported for the first time from the Jurassic rocks** (approximately, between 160 and 168 million years old) of the Jaisalmer region of Rajasthan.

➢ **Hybodont Sharks:**

❍ Hybodonts **dominated both marine and freshwater environments** during the Triassic and early Jurassic periods.

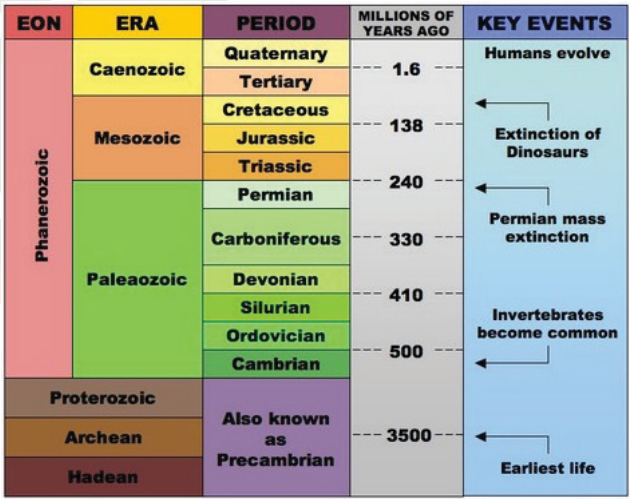
❍ However, **hybodont sharks started to decline in marine environments from the Middle Jurassic onwards** until they formed a relatively minor component of open-marine shark assemblages.

❍ They finally became **extinct at the end of the Cretaceous time** 65 million years ago.

➢ **Significance of the fossil:**

❍ It marks an **important milestone in the study of Jurassic vertebrate fossils** in the Jaisalmer region of Rajasthan, and it **opens a new window for further research** in the domain of vertebrate fossils.

➢ **Geological Time Scale:**



Woolly Mammoths

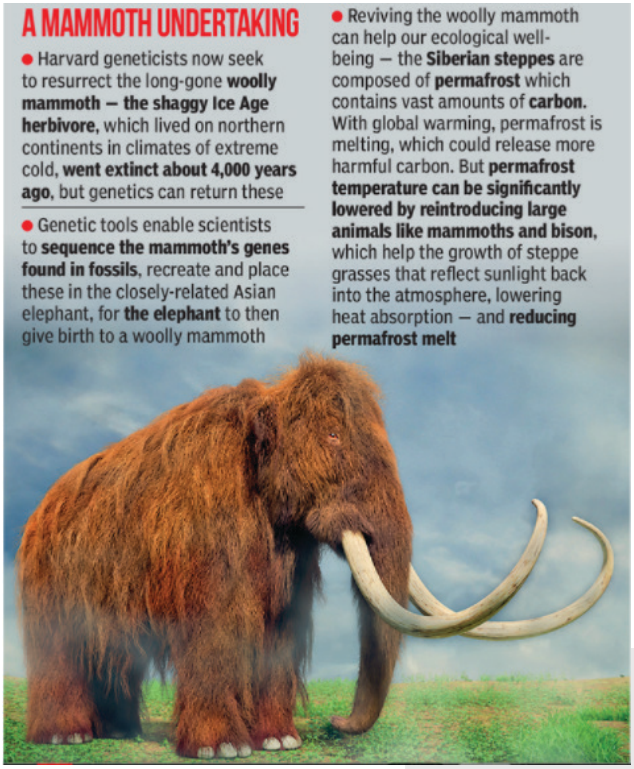
Why in News

The United States' startup Colossal Biosciences has announced its **plan to bring woolly mammoths**, or animals like them, **back from extinction** and into the frosty landscape of the Siberian tundra (treeless polar desert).

Key Points

➢ **About:**

Note:



- Mammoth, (genus *Mammuthus*), **any member of an extinct group of elephants found as fossils in Pleistocene deposits over every continent except Australia and South America** and **in early Holocene deposits of North America.**
  - The **Pleistocene Epoch** began 2.6 million years ago and ended 11,700 years ago.
  - The **Holocene Epoch** began 11,700 years ago and continues through the present).
- **Woolly Mammoths:** The woolly, Northern, or Siberian mammoth ***(Mammuthus primigenius)*** is by far the best-known of all mammoths.
  - The relative abundance and, at times, excellent preservation of this species's carcasses found in the permanently frozen ground of Siberia has provided much information about mammoths' structure and habits.
- **Cause of Extinction**:
  - It is believed that mammoths disappeared because of a **change in climate**, disease, hunting by humans, or perhaps some combination of these.

➢ **De-extinction of Woolly Mammoths:**

- **Need:**
  - **Restoration of Ecosystem:** When mammoths disappeared from the Arctic some 4,000 years ago, shrubs overtook what was previously grassland.
    - Mammoth-like creatures **could help restore this ecosystem** by compressing shrubs, knocking over trees, and fertilising grasses with their faeces.
  - **Reduce Climate Change:**
    - If the current Siberian **permafrost** melts, it will release potent greenhouse gases.
    - De-extinction will prevent the permafrost from melting. Compared to tundra, grassland might reflect more light and keep the ground cooler.
- **Technology Used:** The **CRISPR gene editing technology** will be used to modify **Asian elephant embryos.**
  - Asian elephants are the mammoth's closest living relative so their genomes resemble those of woolly mammoths.

➢ **Concerns Raised:**

- **Disturb the Ecosystem:** Bringing back extinct species, whose ecological niches may no longer exist, will upset existing ecosystems.
- **Opportunity Cost**:
  - The de-extinction could **distract from more cost-effective efforts to protect biodiversity or mitigate climate change.**
  - The **possible moral hazards** that may arise if people start believing extinction is not forever.
  - Even if de-extinction programs are successful, they will likely **cost more than saving existing species** from extinction.
    - Once de-extinction becomes possible, the need to protect species from extinction will seem less urgent.
- **No Guarantee of Behaviour Adoption**: Even if newly engineered mammophants contain mammoth DNA, there is **no guarantee these hybrids will adopt the behaviours of ancient mammoths**.
  - For instance, we inherit more than just DNA sequences from our parents. We inherit **epigenetic changes**, wherein the environment around us can affect how those genes are regulated.
  - We also inherit our parents' microbiome (colonies of gut bacteria), which plays an important role in our behaviours.

Note:

- The behaviours animals learn from observing other members of their species. The first mammophants will have no such counterparts to learn from.

Tundra

- The tundra climate region **occurs between 60° and 75° of latitude**, **mostly along the Arctic coast** of North America and Eurasia and on the coastal margins of Greenland.
- Tundra winters are long, dark, and cold, with mean temperatures below 0°C for 6 to 10 months of the year. There is a layer of permanently frozen ground below the surface, called **permafrost.**
- Structurally, the Tundra is **a treeless expanse** that supports communities of sedges and heaths as well as dwarf shrubs.

Increased Risk of Extinction: Leopards

Why in News

According to a study published in the journal Global Ecology and Biogeography, the **leopard faces an 83% increased risk of extinction in North India due to roadkill.**

Key Points

- **Leopard:**

  - **Scientific Name**: *Panthera pardus*
  - **About:**
    - The leopard is the **smallest of the Big Cats (Of genus Panthera namely the Tiger, Lion, Jaguar, Leopard, and Snow Leopard)**, and known for its ability to adapt in a variety of habitats.
    - A nocturnal animal, the **leopard hunts by night.**
    - It **feeds on smaller species of herbivores** found in its range, such as the **chital, hog deer and wild boar.**
    - **Melanism** is a common occurrence in leopards, wherein the entire skin of the animal is black in colour, including its spots.
      - **A melanistic leopard is often called black panther** or jaguar, and mistakenly thought to be a different species.
  - **Habitat:**
    - It occurs in a wide range in **sub-Saharan Africa, in small parts of Western and Central Asia, on the Indian subcontinent** to Southeast and East Asia.
      - The **Indian leopard (*Panthera pardus fusca*)** is a leopard widely distributed on the Indian subcontinent.
  - **Population in India:**
    - As per a recent report **'Status of leopards in India, 2018'** released by the Ministry of Environment, Forest and Climate Change, there has been a **"60% increase in the population count of leopards in India from 2014 estimates".**
      - The 2014 estimates placed the population of leopards at nearly 8,000 which has increased to 12,852.
    - The **largest number of leopards have been estimated in Madhya Pradesh** (3,421) followed by Karnataka (1,783) and Maharashtra (1,690).
  - **Threats:**
    - Poaching for the illegal trade of skins and body parts.
    - Habitat loss and fragmentation
    - Human-Leopard conflict
  - **Conservation Status:**
    - **IUCN Red List:** Vulnerable
    - **CITES**: Appendix-I
    - **Indian Wildlife (Protection) Act, 1972:** Schedule-I

Indian Flapshell Turtles

Why in News

Recently, forest officials from Odisha found **40 Indian flapshell turtles** in baskets in an alleged smuggling racket.

Note:

Key Points

- **About:**
  - The **Indian flapshell turtle** is a **freshwater species of turtle** and is found in many states.
    - The **"flap-shelled"** name stems from the presence of femoral flaps located on the plastron. These flaps of skin cover the limbs when they retract into the shell.
    - It is a **relatively small soft-shell turtle** with a carapace length of up to 350 millimetres.
  - **Scientific Name:** *Lissemys punctata*
- **Distribution:**
  - They are found in **Pakistan, India, Sri Lanka, Nepal, Bangladesh (Indus and Ganges drainages), and Myanmar** (Irrawaddy and Salween Rivers).
  - They live in the **shallow, quiet, often stagnant wate**rs of rivers, streams, marshes, ponds, lakes and irrigation canals, and tanks.
  - These turtles prefer waters with sand or mud bottoms because of their tendency to burrow.
- **Conservation Status:**
  - **IUCN Red List:** Vulnerable
  - **CITES:** Appendix II
  - **Wildlife (Protection) Act, 1972:** Schedule I
- **Steps Taken for Conservation:**
  - **KURMA App:**
    - It has a **built-in digital field guide** covering 29 species of freshwater turtles and tortoises of India.
    - It was developed by the **Indian Turtle Conservation Action Network (ITCAN)** in collaboration with the Turtle Survival Alliance-India and Wildlife Conservation Society-India.
  - **World Turtle Day** is observed every year on **23rd May.**

Olive Ridley Turtles

Why in News

Researchers of the **Zoological Survey of India (ZSI)** are carrying out **tagging of Olive Ridley turtles at three mass nesting sites** – Gahirmatha, Devi River mouth and Rushikulya.

- The **exercise was undertaken in Odisha in January 2021** after a span of about 25 years and 1,556 turtles had been tagged.

Key Points

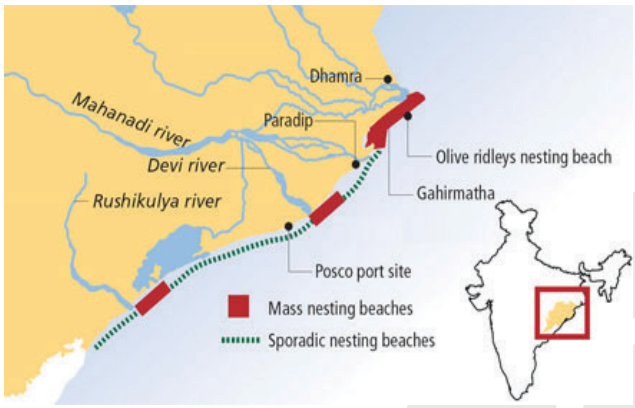
- **Tagging and its Significance:**
  - The metal tags affixed to turtles are **non-corrosive,** which can be removed later **and they do not harm their body.**
  - The tags are **uniquely numbered containing details** such as the name of the organisation, country-code and email address.
  - If researchers in other countries come across the tagged turtles, they will email their location in longitude and latitude to researchers in India. There is an established network working on turtles.
  - It would **help them identify the migration path and places** visited by the marine reptiles after congregation and nesting.
- **Olive Ridley Turtles:**
  - **About:**
    - The Olive ridley turtles are the **smallest and most abundant** of all sea turtles found in the world.

Note:

- These turtles are **carnivores and get their name** from their olive colored carapace.
- They are **best known for their unique mass nesting called Arribada,** where thousands of females come together on the same beach to lay eggs.

❍ **Habitat:**

- They are **found in warm waters of the Pacific, Atlantic and Indian oceans.**
- The **Odisha's Gahirmatha Marine Sanctuary** is known as the **world's largest rookery (colony of breeding animals)** of sea turtles.



❍ **Protection Status:**

- **Wildlife Protection Act, 1972:** Scheduled 1
- **IUCN Red List:** Vulnerable
- **CITES:** Appendix I

❍ **Initiatives to Protect Olive Ridley Turtles:**

- **Operation Olivia:**
  - Every year, the **Indian Coast Guard's "Operation Olivia"**, initiated in the early 1980s, helps protect Olive Ridley turtles as they congregate along the Odisha coast for breeding and nesting from November to December.
    - It also intercepts **unlawful trawling activities.**
- **Mandatory use of Turtle Excluder Devices (TEDs):**
  - To reduce accidental killing in India, the Odisha government has made it mandatory for **trawls to use Turtle Excluder Devices (TEDs)**, a net specially designed with an exit cover which allows the turtles to escape while retaining the catch.

Operation Oliva for Olive Ridley Turtles

Why in News

Recently, the **Indian Coast Guard** has pressed into service an aircraft for **'Operation Oliva'** to protect **Olive Ridley turtles.**

Key Points

➢ **Operation Oliva:**

❍ Every year, the Indian Coast Guard's "Operation Olivia", **initiated in the early 1980s**, helps **protect Olive Ridley turtles as they congregate along the Odisha coast** for breeding and nesting from November to December.

- It also **intercepts unlawful trawling activities.**

❍ Round-the-clock **surveillance** is conducted from **November till May** utilising Coast Guard assets such as **fast patrol vessels**, air cushion vessels, interceptor craft and Dornier aircraft to enforce laws near the rookeries (colony of breeding animals).

- From November **2020 to May 2021**, the **Coast Guard devoted 225 ship days and 388 aircraft hours** to **protect 3.49 lakh turtles** that laid eggs along the Odisha coast.

Great Indian Bustard (GIB)

Why in News

Recently, the Centre has approached the **Supreme Court** seeking **modification of its order directing** that all transmission cables in the habitat of the **Great Indian Bustard (GIB)** be laid underground.

Key Points

➢ **Background:**

❍ Earlier this year (2021), in a **bid to check the dwindling numbers** of the **endangered Great Indian Bustard and Lesser Florican**, a Supreme Court bench directed that **overhead power lines be laid underground**, wherever feasible, passing along the habitat of the birds in Rajasthan and Gujarat.

Note:

Great Indian Bustard (GIB)

- **About:**
  - It is the **State bird of Rajasthan** and is considered India's most critically endangered bird.
  - It is considered the **flagship grassland species**, representing the health of the grassland ecology.
  - Its population is **confined mostly to Rajasthan and Gujarat.** Small populations occur in Maharashtra, Karnataka and Andhra Pradesh.
  - The bird is **under constant threats due to collision/ electrocution** with power transmission lines, hunting (still prevalent in Pakistan), habitat loss and alteration as a result of widespread agricultural expansion, etc.
- **Protection Status:**
  - **International Union for Conservation of Nature Red List:** Critically Endangered
  - **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** Appendix 1
  - **Convention on Migratory Species (CMS):** Appendix I
  - **Wildlife (Protection) Act, 1972:** Schedule 1

Eastern Swamp Deer

Why in News

Recently, the population of the **vulnerable eastern swamp deer** has dipped in the **Kaziranga National Park** and **Tiger Reserve (Assam).** The eastern swamp deer is **extinct elsewhere in South Asia.**

- This decline can be attributed to **two high floods** in 2019 and 2020.
- However, on the brighter side, the **eastern swamp deer** has now been distributed to areas beyond the Kaziranga National Park, such as **Orang National Park** and **Laokhowa-Burachapori wildlife sanctuaries** (Assam).

Key Points

- **About Swamp Deer:** There are three **subspecies of swamp deer** found in the Indian Subcontinent.
  - The **western swamp deer** (*Rucervus duvaucelii*) found in Nepal.
  - **Southern swamp deer/Hard Ground Barasingha** (*Rucervus duvaucelii branderi*) found in central and north India.
  - **Eastern swamp deer** (*Rucervus duvaucelii ranjitsinh*i) found in the **Kaziranga (Assam)** and **Dudhwa National Parks (Uttar Pradesh).**
- **Protection Status of Swamp Deer:**
  - **IUCN Red List:** Vulnerable
  - **CITES:** Appendix I
  - **Wildlife Protection Act, 1972:** Schedule I

Army Tag for New Gecko

Why in News?

Recently, a team of **herpetologists** have recorded a new species of **bent-toed gecko** from a wooded part of the **Umroi Military Station in Meghalaya.**

- Its scientific name is *Crytodactylus exercitus* and its English name is **Indian Army's bent-toed gecko.**
- Further, another new bent-toed gecko, the ***Cyrtodactylus siahaensis*** named after Mizoram's Siaha district where it was found.
- A herpetologist is someone who specializes in the **study of reptiles and amphibians.**

What are Geckos?

- Geckos are **reptiles and are found on all the continents except Antarctica.**
- These colorful lizards have adapted to habitats from **rainforests, to deserts, to cold mountain slopes.**

Note:

- Over a long period of time, **geckos have developed special physical features** to help them survive and avoid predators.
- Gecko tails serve many purposes. They help balance their weight as they **climb branches**, they act as fuel tanks to **store fat, and as camouflage** to help them disappear into their environment.
  - Geckos are also able to shed their **tails if a predator grabs them.**
- Most geckos are **nocturnal,** which means they are active at night, but day geckos are active during the day and **nibble on insects, fruits, and flower nectar.**
- Most geckos make noises such as **chirping, barking, and clicking** when they are defending their territory or attracting a mate.
- There are many species of geckos. Depending on the species, their e**ndangered status can range from least concern to critically endangered.**

Karlapat Wildlife Sanctuary, Odisha

Why in News

Recently, **six elephants died of Haemorrhagic Septicaemia (HS) in Karlapat Wildlife Sanctuary** located in Odisha's Kalahandi district.

Key Points

- **Haemorrhagic septicaemia (HS)**
  - **About:**
    - It is a disease which infects animals that come in contact with contaminated water or soil by a **contagious bacteria (*Pasteurella multocida*).**
    - In this disease the respiratory tract and lungs of the animals are affected, leading to **severe pneumonia**.
  - **Affected Animals:**
    - It mainly affects water buffalo, cattle and bison with a high mortality rate in infected animals.
    - Recently, around 40 buffaloes had succumbed to the infection in Odisha's Kendrapara.
  - **Season:**
    - The disease generally spreads in the period right before and after the **monsoons.**

Karlapat Wildlife Sanctuary

- **Location:** It is spread over 175 square kilometre area in Odisha's Kalahandi district.
- **Vegetation:** Dry Deciduous Forest.
- **Fauna:**
  - **Mammals:** **Elephant**, **Leopard**, **Gaur**, **Sambar**, Barking deer, Indian wolf, **Malbar giant squirrel**, **Pangolin**, etc.
  - **Birds:** Peacock, **Hornbill**, Red jungle fowl, etc.
  - **Reptilians:** **Mugger**, crocodile, monitor lizard etc.
- **Flora:** Sal, Bija, Bamboo, medicinal plants, etc.
- **Water Body: Phurlijharan waterfall** is located within the sanctuary.

Sitanadi-Udanti Tiger Reserve: Chhattisgarh

Why in News

Thousands of **tribals** living in villages located in the **core areas of Sitanadi Udanti Tiger Reserve** are protesting and demanding the recognition of their **Community Forest Resource rights**.

- Community Forest Resource (CFR) rights are given under the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA).**
- The **tiger reserves are constituted on a core/buffer strategy.** The core areas have the legal status of a national park or a sanctuary, whereas the buffer or peripheral areas are a mix of forest and non-forest land, managed as a multiple use area.

Key Points

Note:

- **Provisions of the Forest Rights Act (FRA):**
  - **About:**
    - The Forest Rights Act (FRA) 2006 recognizes and vest the forest rights and occupation in **Forest land in Forest Dwelling Scheduled Tribes (FDST)** and **Other Traditional Forest Dwellers (OTFD)** who have been residing in such forests for generations.
    - It strengthens the conservation regime of the forests while ensuring livelihood and food security of the FDST and OTFD.
    - The **Gram Sabha is the authority** to initiate the process for determining the nature and extent of Individual Forest Rights (IFR) or Community Forest Rights (CFR) or both that may be given to FDST and OTFD.
  - **Individual Rights:** Encompasses Rights of Self-cultivation and Habitation.
  - **Community Rights:** Such as Grazing, Fishing and access to Water bodies in forests, Habitat Rights for **Particularly Vulnerable Tribal Groups (PVTGs)**, right to protect, regenerate or conserve or manage any **community forest resource** for sustainable use etc.
  - **Community Forest Resource Rights:** These are rights of Adivasi and OTFDs over customary common forest land within the traditional or customary boundaries of the village or seasonal use of landscape in the case of pastoral communities.
    - These **can be recognised over any forest land** including reserved forests, protected forests and protected areas such as **Sanctuaries and National Park.**
- **About Sitanadi-Udanti Tiger Reserve:**
  - **Establishment:**
    - Sitanadi-Udanti Tiger Reserve **came into existence in the year 2008-09**, are two separate reserves (Udanti & Sitanadi Wildlife Sanctuaries) combined together.
  - **Location:** It is located in the **Gariaband district, Chhattisgarh.**
  - **Ecological Diversity:**
    - It contains various types of **forest crop** mixed with **Sal forest.**
    - **Asiatic Wild Buffalo** is the key endangered species found in the Core Area.
    - Apart from the tiger, other endangered and rare species are Indian Wolf, **Leopard, Sloth Bear** and Mouse Deer.
  - **Rivers:**
    - **Sitanadi River** originates in the middle of Sitanadi Wildlife sanctuary.
    - **Udanti River** flows from the west to east covering a major part of the Udanti Wildlife sanctuary.
- **Other Tiger Reserves in Chhattisgarh:**
  - **Achanakmar Tiger Reserve.**
  - Indravati Tiger Reserve.

Periyar Tiger Reserve

Why in News

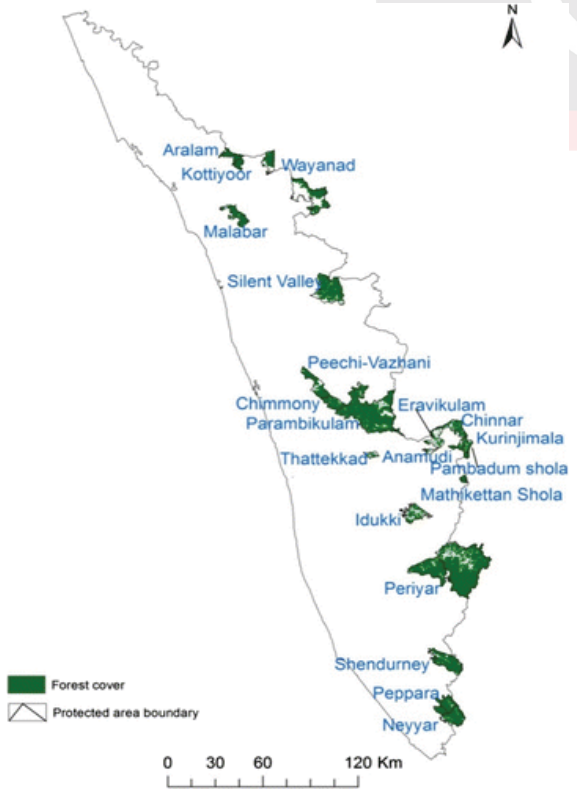
For the first time in the country, the **Periyar Tiger Reserve (PTR) in Kerala** has taken up training of a **tiger** cub to equip it to naturally hunt in the forest environment.

Key Points

- **Location:**
  - It falls in the districts of Idukki and Pathanamthitta in Kerala (saddled in the southern region of Western Ghats).
- **Formation:**
  - Declared a Sanctuary during 1950 and declared as Tiger Reserve during 1978. It gets its name from the River Periyar which has its origin deep inside the reserve.
- **Drainage:**
  - The major rivers through the reserve are **Mullayar and Periyar**.

Note:

- **Flora:**
  - The sanctuary comprises **tropical evergreen, semi evergreen, moist deciduous forests and grasslands.**
  - About **1966 species of flowering plants** grow in the sanctuary.
    - Of this about 516 are endemic to the Western Ghats.
  - The sanctuary is a **repository of medicinal plants** numbering to about 300.
    - Some are endemic to the region like **Syzygium periyarensis (a tree)**, **Habenaria periyarensis (an orchid)** and **Mucuna pruriense thekkadiensis (a climber)** etc.
- **Fauna:**
  - **Mammals**: **Tiger**, **Elephant**, **Lion-tailed macaque**, **Nilgiri Tahr** etc.
  - **Birds**: Darters, Cormorants, Kingfishers, the great Malabar Hornbill and racket-tailed Drongos.
  - **Reptiles**: Monitor Lizards, Python, King Cobra etc.
- **Tribals:**
  - There are **six tribal communities** nestled inside the reserve such as **Mannans, Paliyans, Malayarayans, Mala Pandarams, Uralis and Ulladans.**
- **Protected Areas in Kerala:**



Kanha Tiger Reserve

Why in News

A tigress was found dead in the **buffer zone of Kanha tiger reserve in Madhya Pradesh.**

Key Points

- **Location:** It stretches over an area of 940 square km in the **two districts - Mandla and Balaghat - of Madhya Pradesh.**
- **History:** The present-day Kanha area **was divided into two sanctuaries, Hallon and Banjar. Kanha National Park was created in 1955** and in **1973** was made the **Kanha Tiger Reserve.**
  - Kanha National Park is the **largest National Park in Central India.**
- **Features:**
  - **Fauna:**
    - The **State animal of Madhya Pradesh - Hard Ground Barasingha** (**Swamp deer or *Rucervus duvaucelii***) is found **exclusively** in Kanha Tiger Reserve.
    - Other Species found include **Tiger,** Leopard, Dhole, Bear, **Gaur** and Indian Python etc.
  - **Flora:**
    - It is best known for its evergreen **Sal forests *(Shorea Robusta)***.
  - It is the **first tiger reserve in India to officially introduce a mascot, "Bhoorsingh the Barasingha"**.
- **Other Tiger Reserves in Madhya Pradesh:**
  - Sanjay-Dubri.
  - **Panna.**
  - **Satpura.**
  - **Bandhavgarh.**
  - **Pench.**

Core and Buffer Zone

- For the purpose of management, tiger reserves are constituted on a 'core – buffer' strategy.
- In **core areas,** forestry operations, collection of minor forest produce, grazing, human settlement and other biotic disturbances are not allowed and are singularly **oriented towards conservation.**
- The **buffer zone** is managed as a 'multiple use area' with conservation oriented land use, having the

Note:

twin objectives of providing habitat supplement to the spillover population of wild animals from the core, apart from facilitating site specific eco developmental inputs to stakeholder communities.

Barasingha

- **Subspecies:** There are **three subspecies of swamp deer** found in the Indian Subcontinent.
  - The **western swamp deer** (*Rucervus duvaucelii)* found in **Nepal**,
  - **Southern swamp deer / Hard Ground Barasingha** (*Rucervus duvaucelii branderi*) found in **central and north India** and
  - **Eastern swamp deer** (*Rucervus duvaucelii ranjitsinhi*) found in the **Kaziranga** (Assam) **and Dudhwa National Parks** (Uttar Pradesh).
- **Protection Status of Swamp Deer:**
  - **IUCN Red List:** Vulnerable
  - **CITES:** Appendix I
  - **Wildlife Protection Act, 1972:** Schedule I

Nagi-Nakti Bird Sanctuaries

Why in News

Recently, Bihar's first state-level bird festival **'Kalrav'** started at the **Nagi-Nakti bird sanctuaries** in the Jamui district, Bihar.

- It is a 3-day event and is expected to draw experts and bird lovers from all over the country.

Key Points

- **About:**
  - The **Nagi Dam** and **Nakti Dam** are two sanctuaries so close to each other that they can be taken as one bird area.
  - The Nagi- Nakti Bird Sanctuaries have been the home of a wide variety of indigenous species of birds and of migratory birds that turn up during the winters from places like Eurasia, Central Asia, the Arctic Circle, Russia and Northern China..
- **Avian Fauna:**
  - Over 136 species of birds have been spotted at these sanctuaries.
  - **Bar-headed geese:** Around 1,600 bar-headed geese, which is about 3% of the global population of this variety, have been seen here, as per a report of the **Wetlands International** and because of this rare phenomenon, **the Birdlife International**, a global body, has held the **Nagi Dam Bird Sanctuary to be globally important for conservation of birds'** population and has declared it as an **important bird area.**
    - **Wetland International** is a global not-for-profit organisation dedicated to the conservation and restoration of wetlands.
    - **Bird Life International** is a global partnership of conservation organisations (NGOs) that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources.
  - **Other major birds:** Indian Courser, Indian Sandgrouse, Yellow-wattled Lapwing and Indian Robin.
- **Major threats to the biodiversity of the sanctuaries:** Agricultural runoff; Land dispute between Irrigation and Forest Departments; Leasing out of the site for fishing.
- **Other Bird Sanctuaries of Bihar:**
  - Gautam Budha bird sanctuary, Gaya
  - Kawar Jheel bird sanctuary, Bigusarai
  - Kusheshwar asthan bird sanctuary, Darbhanga

Bandipur Tiger Reserve

Why in News

A stranded wild elephant was rescued in Nugu reservoir, close to **Bandipur Tiger Reserve** in Karnataka.

- According to the **Tiger census 2018,** Karnataka has the second highest number of tigers in the country after Madhya Pradesh.

Key Points

- **Establishment:** It was established in 1973 under **Project Tiger**. In 1985, by including adjacent areas from **Venugopala Wildlife Park**, it was enlarged and named as Bandipur National Park.

Note:

- **Location:** It is situated in two contiguous districts (Mysore and Chamarajanagar) of Karnataka and is located at the **tri-junction area of the States Karnataka, Tamil Nadu and Kerala.** It forms a part of **Nilgiri Biosphere Reserve.**
- **Ecological Diversity**: It lies in one of the richest biodiversity areas of the country. It is surrounded by
  - **Mudumalai Tiger Reserve** (Tamil Nadu) in the South,
  - **Wayanad Wildlife Sanctuary** (Kerala**)** in the South-west &
  - The **Kabini Reservoir** separates the Bandipur and Nagarahole Tiger Reserve on the North-west.
- **Biodiversity:** It is endowed with rich floral and faunal diversity and is recognized as one of the **Mega Biodiversity Areas in the country**.
  - The Bandipur along with Nagarahole, Mudumalai, Sathyamangalam & Wayanad constitutes the single **largest Wild population of Tigers in the world.**
  - This Landscape is also home to the **single largest Asian Elephant population** in the world and is part of the **Mysore Elephant Reserve (MER)**.
- **Rivers and the Highest Point:** The park is located between the **Kabini river** in the north and the **Moyar river** in the south. The **Nugu river** runs through the park. The highest point in the park is on a hill called **Himavad Gopalaswamy Betta.**
- **Other Tiger Reserves in Karnataka:**
  - Bhadra Tiger Reserve
  - **Nagarahole Tiger Reserve**
  - **Dandeli-Anshi Tiger Reserve**
  - Biligiriranganatha Swamy Temple(BRT) Tiger Reserve
  - Besides, **Malai Mahadeshwara Wildlife Sanctuary** has been **proposed** to be made a tiger reserve.

Asian Elephants

- **Subspecies:** There are **three subspecies** of Asian elephant which are the Indian, Sumatran and Sri Lankan.
- **Protection Status:**
  - **IUCN Red List Status:** Endangered.
  - **Wildlife (Protection) Act, 1972:** Schedule I.
- **Conservation Efforts:**
  - Gaj Yatra.
  - **The Monitoring the Illegal Killing of Elephants (MIKE) programme.**
  - **Project Elephant.**

Nilgiri Elephant Corridor Case

Why in News

Recently, the **Supreme Court (SC) appointed a conservationist as Member of a Technical Committee** constituted in the **October 2020 case** to hear complaints by landowners against sealing of their buildings infringing the **Nilgiri Elephant Corridor** in Tamil Nadu by the state authorities.

Key Points

- **Nilgiris Elephant Corridor:**
  - The corridor is situated in the ecologically fragile **Sigur plateau, which connects the Western and the Eastern Ghats** and sustains elephant populations and their genetic diversity.
    - It is situated near the **Mudumalai National Park** in the Nilgiris district.
  - It has the Nilgiri hills on its southwestern side and the **Moyar river valley** on its northeastern side. The elephants cross the plateau in search of food and water.
  - There are about 100 elephant corridors in India of which almost 70% are used regularly.
    - 75% of the corridors are in the southern, central and north-eastern forests.
    - There are an estimated 6,500 elephants in just the **Brahmagiri-Nilgiris-Eastern Ghats ranges.**
- **Initiatives for Conservation of Elephants:**
  - **Gaj Yatra**
  - **Project Elephant**
  - **The Monitoring the Illegal Killing of Elephants (MIKE)**

Nilgiri Biosphere Reserve

- **Origin:**
  - The name '**Nilgiris' with literary meaning 'blue mountains'** has originated from the blue flower clad mountains of the Nilgiris plateau within the State of Tamil Nadu.
  - It was the **first biosphere reserve in India** established in the year 1986.
- **Geography:**
  - The total area of the Nilgiri Biosphere Reserve is 5,520 sq. km.

Note:

- It is **located in the Western Ghats** and encompasses parts of **Tamil Nadu, Kerala and Karnataka.**

➢ **Ecological Characteristics:**

- **Confluence of Biotic zones:** It exemplifies the **tropical forest biome** which portrays the **confluence of Afro-tropical and Indo-Malayan biotic zones** of the world.
- **Biodiversity Hotspot:** Biogeographically, Western Ghats is the most important region and one of the noted **Biodiversity Hotspots (**biogeographic regions having **highest density of endemic species**) for speciation in the tropics.

➢ **Vegetation:**

- The NBR harbors a wide spectrum of ecosystem types. Major parts of the core areas spread over Kerala and Tamil Nadu States, include **evergreen, semi evergreen, moist deciduous montane sholas and grassland types of vegetation.**
- Whereas the core area spread over the State of Karnataka contains mostly **dry deciduous forests and a few patches of moist deciduous, semi evergreen and scrub jungles.**

➢ **Fauna:**

- Animals like **Nilgiri tahr, Nilgiri langur, slender loris, blackbuck, tiger, gaur, Indian elephant and marten** are found here.
- Freshwater fishes such as **Nilgiri danio** (*Devario neilgherriensis*), **Nilgiri barb** *(Hypselobarbus dubuis*) and **Bowany barb** (*Puntius bovanicus*) are endemic to this Biosphere Reserve.

➢ **Water resources:**

- Many of the major tributaries of the river **Cauvery** like the **Bhavani, Moyar, Kabini and other rivers like Chaliyar, Punampuzha**, etc., have their source and catchment areas within the reserve boundary.

➢ **Tribal Population:**

- Tribal groups like the **Todas, Kotas, Irullas, Kurumbas, Paniyas, Adiyans, Edanadan Chettis, Cholanaickens, Allar, Malayan**, etc., are native to the reserve.

➢ **Protected Areas in NBR:**

- The **Mudumalai Wildlife Sanctuary**, **Wayanad Wildlife Sanctuary**, **Bandipur National Park, Nagarhole National Park, Mukurthi National Park** and **Silent Valley** are the protected areas present within this reserve.

Dehing Patkai and Raimona National Parks: Assam

Why in News

Recently, the Assam government notified **Dehing Patkai** as the **7th National Park** of the state.

➢ It was **created shortly after Raimona reserve forest in western Assam's Kokrajhar district was upgraded to a national park (6th)** on the occasion of **World Environment Day (5th June).**

Key Points

➢ **About Dehing Patkai National Park:**

- **Location:**
  - It is located within the larger **Dehing Patkai Elephant Reserve**, which spreads across the **coal- and oil-rich** districts of **Upper Assam** (Dibrugarh and Tinsukia districts).
  - The **oldest refinery of Asia in Digboi** and **'open cast' coal mining at Lido** are located near the sanctuary.
  - The Dehing Patkai Wildlife Sanctuary is **also known as the Jeypore Rainforest.**
- **Naming:**
  - **Dehing** is the name of the **river that flows through this forest** and **Patkai is the hill a**t the foot of which the sanctuary lies.
- **Flora:**
  - It is b**elieved to be the last remaining contiguous patch of lowland rainforest area** in Assam.
- **Fauna:**
  - Rare fauna found in the region include **Chinese pangolin**, flying fox, wild pig, sambar, barking deer, **gaur**, **serow** and **Malayan giant squirrels**.
  - It is the **only sanctuary in India which is home to seven different species of wild cats** - **tiger**, **leopard**, **clouded leopard**, leopard cat, **golden cat**, jungle cat and marbled cat.
  - **Assamese macaque,** a primate found in the forest, is in the **red list of Near Threatened species.**
  - It has the **highest concentration of the rare endangered White Winged Wood Duck.**

➢ **Raimona National Park:**

Note:

- **Location:**
  - The Raimona National Park is **within the Bodoland Territorial Region.**
  - The area of the park **includes the northern part of the notified Ripu Reserve Forest**, which forms the **western-most buffer to the Manas National Park** that straddles the India-Bhutan border.
- **Borders and Boundary:**
  - It is **bounded on the west by the Sonkosh river** and the **Saralbhanga river on the east**.
    - Both the rivers are **tributaries of Brahmaputra.**
  - The **Pekua river** defines Raimona's **southern boundary.**
- **Transboundary Conservation Landscape:**
  - It shares contiguous forest patches of **Phipsoo Wildlife Sanctuary and Jigme Singye Wangchuck National Park of Bhutan** creating a transboundary conservation landscape of more than 2,400 sq km.
- **Flora and Fauna:**
  - It is **famous for Golden Langur,** an endemic species which has been named as the mascot of Bodoland region.
  - It also has Asian elephant, Royal Bengal tiger, Clouded leopard, Indian gaur, Wild water buffalo, Spotted deer, Hornbill, more than 150 species of butterflies, 170 species of birds, 380 varieties of plants and orchids.

Tiger Corridor in Rajasthan

Why in News

The Rajasthan government will develop a **tiger corridor connecting** the newly proposed **'Ramgarh Tiger Reserve', Ranthambore Tiger Reserve and Mukundra Hills Tiger Reserve.**

- **Sariska Tiger Reserve** is another Tiger reserve in Rajasthan.

Key Points

- **About the Animal Corridor:**
  - **Wildlife or animal corridors** are meant to ensure safe passage for animals between two isolated habitats.
  - In wildlife parlance, corridors are mainly of two types: **functional and structural.**

  - **Functional corridors** are defined in terms of functionality from the perspective of the animal (basically areas where there has been recorded movement of wildlife).
  - **Structural corridors** are contiguous strips of forested areas and structurally connect the otherwise fragmented blocks of the landscape.
- When structural corridors are affected by human anthropogenic activities, functional corridors automatically widen because of animal use.
- In 2019, the **National Tiger Conservation Authority** in collaboration with the **Wildlife Institute of India** published a document, mapping out **32 major corridors across the country**, management interventions for which are operationalised through a Tiger Conservation Plan.
  - The states are required to **submit a Tiger Conservation Plan** under section **38V of the Wildlife (Protection) Act, 1972.**

- **Other Protected Areas in Rajasthan:**
  - **Desert National Park**, Jaisalmer
  - Keoladeo National Park, Bharatpur
  - **Sajjangarh wildlife sanctuary**, Udaipur
  - National Chambal Sanctuary (on tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh).
- **Protection Status of Tiger:**
  - **Indian Wildlife (Protection) Act, 1972:** Schedule I
  - **International Union for Conservation of Nature (IUCN)** Red List: Endangered.
  - **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** Appendix I.

Note:

4th Tiger Reserve in Rajasthan

Recently, the **Ramgarh Vishdhari wildlife sanctuary** received a nod from the **National Tiger Conservation Authority's (NTCA)** technical committee to become the **4th Tiger reserve** of Rajasthan.

- This will be **the 52nd Tiger Reserve of India.**
- The **Global Tiger Day**, celebrated **on 29th July,** is an annual event marked to raise awareness about tiger conservation.

Ramgarh Vishdhari wildlife sanctuary:

- **Location:**
  - This Sanctuary is located at a distance of 45 Km from Bundi City on Bundi-Nainwa Road near Village Ramgarh, District Bundi, Rajasthan.
- **Established:**
  - It was notified in the Year 1982 and is spread over an area of 252.79 Sq. Km.
- **Area of Tiger Reserve:**
  - The total area of 1,017 sq. km has been identified as the reserve area comprising two forest blocks of Bhilwara, territorial forest block of Bundi and Indargarh, which falls under the buffer zone of Ranthambore Tiger Reserve (RTR**).**
- **Biodiversity:**
  - Its **flora consists of** Dhok, Khair, Salar, Khirni trees with some Mango and Ber trees.
  - The **Fauna consists** of birds and animals like Leopard, Sambhar, Wild boar, Chinkara, Sloth bear, Indian Wolf, Hyena, Jackal, Fox, deer and Crocodile.

Lemru Elephant Reserve: Chhattisgarh

Why in News

Recently, the Chhattisgarh government has **proposed to reduce the area of Lemru Elephant Reserve** from 1,995 sq km to 450 sq km.

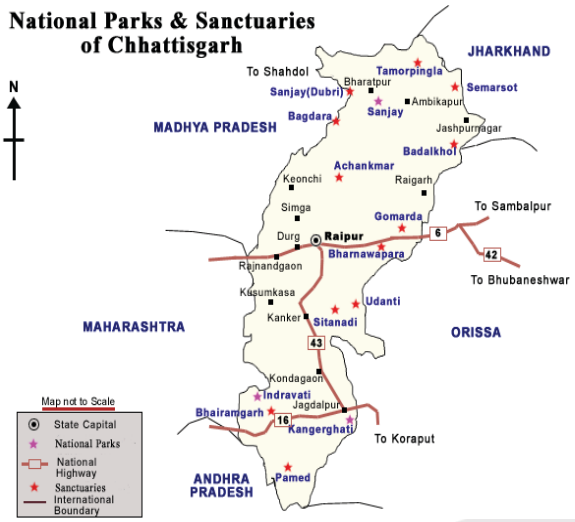
- The Centre gave its approval in 2007 for the creation of the 450 sq km Lemru Elephant Reserve and in 2019, the state government decided to increase the area to 1,995 sq km.

Key Points

- **About:**
  - The reserve is located in the **Cobra district** of Chhattisgarh.
  - The reserve is **aiming at reducing human-animal conflict** and destruction of property in addition to providing a permanent habitat to the elephants.
  - Earlier, the state government notified the reserve (Conservation Reserve) in October 2020 under **Section 36A of the Wild Life (Protection) Act, 1972** (WLPA).
    - Section 36A has a special provision that gives the Union government a say in the process of notification in case the land to be notified as **conservation reserve** has areas belonging to the Centre.
    - Elephant reserves are not recognised under the WLPA.
- **Reason for Reducing Size:**
  - The area proposed under the reserve is **part of the Hasdeo Aranya forests**, a very diverse biozone that is also rich in coal deposits.
  - Of 22 coal blocks in the area, 7 have already been allotted with mines running in three, and in the process of being established in the other four.
  - The biggest challenge in increasing the reserve area was that **several coal mines would become unusable.**
- **Significance of Reserve:**
  - North Chhattisgarh alone is home to over 240 elephants. **More than 150 elephants have died in the state over the last 20 years**, including 16 between June and October 2020.
  - Elephants in Chhattisgarh are relatively new; they started moving into undivided Madhya Pradesh (MP) in 1990.
  - While MP had a policy of pushing back the animals coming from Jharkhand, after Chhattisgarh was formed, the lack of a formal policy allowed elephants to use as a corridor a route in the north and central parts of the state.
  - Since these animals were relatively new, human-animal conflict started once elephants started straying into inhabited areas, looking for food.
- **Other Protected Areas in Chhattisgarh:**
  - **Achanakmar Tiger Reserve.**
  - Indravati Tiger Reserve.

Note:

- Sitanadi-Udanti Tiger Reserve
- Kanger Valley National Park
- Badalkhol Tamor Pingla Elephant Reserve.



Elephants

➢ **About:**
- Elephants are **keystone species.**
- There are three **subspecies of Asian elephant** – the Indian, Sumatran, and Sri Lankan.
- The Indian elephant has the **widest range and accounts** for the majority of the remaining elephants on the continent.

➢ **Conservation Status of Indian Elephants:**
- **Wildlife Protection Act, 1972:** Schedule I
- **IUCN Red List:** Endangered
- **CITES**: Appendix I

New Tiger Reserve: Chhattisgarh

Why in News

Recently, the **National Tiger Conservation Authority (NTCA)** has designated the combined areas of the **Guru Ghasidas National Park** and **Tamor Pingla Wildlife Sanctuary** as a **Tiger Reserve.**

➢ NTCA is a statutory body under the **Ministry of Environment, Forests and Climate Change,** established in 2005 for strengthening tiger conservation.

Key Points

➢ **About:**
- It is located in the **northern part of Chhattisgarh,** bordering Madhya Pradesh and Jharkhand.
- Approval was granted under Section 38V(1) of the **Wildlife (Protection) Act, 1972.**
- This will be the **fourth Tiger Reserve in Chhattisgarh**, after the **Udanti-Sitanadi**, **Achanakmar**, and **Indravati Reserves.**

➢ **Significance:**
- Guru Ghasidas National Park was the last known habitat of the **Asiatic cheetah** in the country.
- It connects Jharkhand and Madhya Pradesh and provides a corridor for tigers to move between the **Bandhavgarh** (Madhya Pradesh) and **Palamau Tiger Reserves** (Jharkhand).

➢ **Guru Ghasidas National Park:**
- **About:**
  - Named after **the Satnami reformist hero** of the place, **Guru Ghasidas,** is the result of the carving of Chhattisgarh from Madhya Pradesh in the year of 2000. It is located in the Koriya district of Chhattisgarh.
  - The park has **undulating topography** and it falls under the **Tropical climate zone.**
- **Biodiversity:**
  - **Flora:** The vegetation consists mainly of mixed deciduous forest with teak, sal and bamboo trees.
  - **Fauna**: **Tiger**, **Leopard**, Chital, Nilgai, **Chinkara**, **Jackal**, Sambar, Four-horned Antelope etc.

➢ **Tamor Pingla Wildlife Sanctuary:**
- **About:**
  - It is **located in the Surajpur district of Chhattisgarh** bordering Uttar Pradesh. It is named after **Tamor hill and Pingla Nalla.**
  - Tamor hill and Pingla Nalla are considered to be the old and prominent features of the sanctuary area.
- **Biodiversity:**
  - **Flora: Mixed deciduous forests dominate the sanctuary**. Sal and bamboo forests are seen all through.
  - **Fauna:** Tigers, Elephants, leopards, bears, sambar deer, blue bulls, chital, bison and many such animals are found here.

Note:

Making Peace with Nature: UNEP Report

Why in News

The **United Nations Environment Programme (UNEP)** has released the **'Making Peace with Nature'** report, **ahead of the fifth session of the UN Environment Assembly (UNEA-5).**

- The Report explains how **climate change, biodiversity loss and pollution add up to three self-inflicted planetary emergencies** that are closely interconnected and put the well-being of current and future generations at unacceptable risk.

United Nations Environment Programme

- **About:** The UNEP is a leading global environmental authority established on 5th June 1972.
- **Functions:** It sets the global environmental agenda, promotes the sustainable development within the **United Nations** system, and serves as an authoritative advocate for global environment protection.
- **Major Reports: Emission Gap Report, Adaptation Gap Report, Global Environment Outlook**, Frontiers, Invest into Healthy Planet.
- **Major Campaigns:** Beat Pollution, UN75, World Environment Day, Wild for Life.
- **Headquarters:** Nairobi, Kenya.

United Nations Environment Assembly

- The United Nations Environment Assembly (UNEA) is the **governing body of the UN Environment Programme.**
- It is the world's highest-level decision-making body on the environment.
- It **meets biennially** to set priorities for global environmental policies and develop international environmental law.
- It was **created in June 2012,** during the United Nations Conference on Sustainable Development, also referred to as RIO+20.

Coelacanth

Why in News

Recently, a group of palaeontologists have **discovered fossils of coelacanth, a giant fish regarded as an iconic example of a "living fossil."**

- The **discovered fossil** of Coelacanth is **believed to be 66 million years old** belonging to the **Cretaceous era.**

Key Points

- **About:**
  - Coelacanths are **elusive, deep-sea creatures**, living in depths up to 2,300 feet below the surface.
  - These were **thought to have gone extinct with the dinosaurs 65 million years ago.** But its **discovery in 1938** started a debate about how this lobe-finned fish fits into the evolution of land animals.
- **Two Species:**
  - There are only two known species of coelacanths: one that lives near the **Comoros Islands** off the

Note:

east coast of Africa, and one found in the waters off **Sulawesi**, Indonesia.

- **Living Fossil:**
  - Living Fossil is an organism that has remained unchanged from earlier geologic times and whose close relatives are usually extinct. Other than Coelacanth, **Horseshoe crab** and **ginkgo trees** are examples of living **fossils**.
  - However, in their new study, palaeontologists have found that Coelacanths gained 62 new genes through encounters with other species 10 million years ago. This suggests that they are actually evolving, albeit slowly.
- **Protection Status:**
  - **IUCN Status:** Critically Endangered
    - **Sulawesi Coelacanth** is listed as **'vulnerable'.**
  - **CITES Status:** Appendix I

Hyderabad: Tree City of the World

Why in News

Hyderabad city (Telangana's Capital) has been recognised as a **'2020 Tree City of the World'** by the **Arbor Day Foundation** and the **Food and Agriculture Organisation** of the United Nations (FAO).

- Hyderabad has **earned recognition in the Foundation's second year of the programme along with 51 other cities** in the world (during 2020 & cumulative 120 cities from 63 countries).
  - Most of the cities were from countries – USA, UK, Canada, Australia etc.
- It is the **only City in India to get this recognition so far.**

Key Points

- **Tree Cities of the World Programme:**
  - **About:**
    - It is an international effort to **recognize cities and towns** committed to ensuring that their **urban forests and trees are properly maintained,** sustainably managed, and duly celebrated.
    - At the **2018 World Forum on Urban Forests in Mantova, Italy**, world leaders issued the **Mantova Green Cities Challenge** and a call-for-action that included joining the Tree Cities of the World programme.
      - The programme intends to connect cities around the world in a new network dedicated to sharing and adopting the most successful approaches to managing community trees and forests.
  - **Organisations Involved:**
    - It is a programme **partnership between the Arbor Day Foundation and the FAO.**
  - **5 Standards for Evaluation:**
    - A city is evaluated on five standards **- Establish Responsibility, Set the Rules, Know What You Have, Allocate the Resources,** and **Celebrate the Achievements.**

Eco-Sensitive Zone Around Wayanad Wildlife Sanctuary

Why in News

The **draft notification of the Ministry of Environment, Forest, and Climate Change (MoEFCC)** on an **Eco-Sensitive Zone (ESZ)** which runs around the **Wayanad Wildlife Sanctuary (WWS)** has triggered protests in Wayanad (Kerala).

Key Points

- **Draft Notification:**
  - The 118.5 sq km area has been earmarked as an Eco-Sensitive Zone (ESZ), of which 99.5 sq km is outside the sanctuary and the remaining 19 sq km comprises revenue villages within the sanctuary.
  - There will be **restrictions on several human activities in ESZ**, including a ban on all new and existing mining, stone quarrying and crushing units and new industries causing pollution.
    - It **also includes a ban on establishment of major hydroelectric projects** and setting up of new sawmills, brick kilns and commercial use of firewood within ESZ.
  - Besides, **no new commercial hotels and resorts shall be permitted** within 1km of the boundary of the protected area or up to the extent of ESZ, whichever is nearer.
  - It also **bars felling of trees in private lands without prior permission of the competent authority** in the state government.

Note:

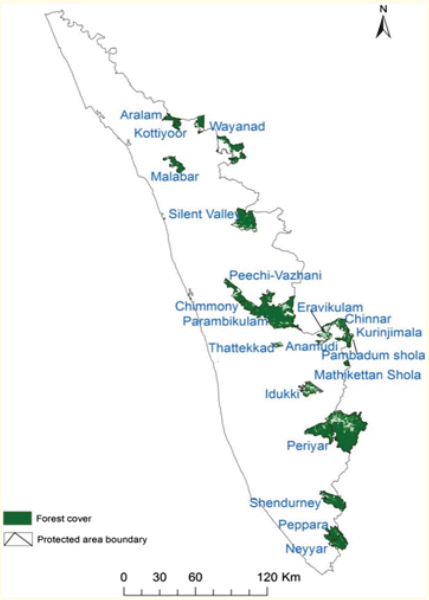
- **Purpose of the Notification:**
  - It is **an important step towards ensuring the safety of people** around the Wildlife Sanctuary, because the lives of farmers on the forest fringes is miserable owing to the **increasing incidents of wild animal attacks.**
    - As many as 147 persons were killed in wildlife attacks in the district in the past 38 years.
- **Issues:**
  - As many as 57 enclosure villages situated inside WWS fall within the eco-sensitive zone.
  - Critics have argued that the draft notification **would cripple both agriculture and business sectors** and will deal a blow to the district as the notification imposes curbs on vehicular traffic.
  - It will **badly affect the lives of thousands of farmers** on the fringes of the sanctuary.
    - As much as 29,291 acres of private land on the fringes of the sanctuary would come under the zone and the development of this area would stop for ever.

Wayanad Wildlife Sanctuary

- **Location:** Located in Kerala, Wayanad Wildlife Sanctuary (WWS) is an **integral part of the Nilgiri Biosphere Reserve.**
  - Spread over 344.44 sq km, WWS is contiguous to the tiger reserves of Nagerhole and Bandipur of Karnataka and Mudumalai of Tamil Nadu.
  - **Kabini river (a tributary of Cauvery river)** flows through the sanctuary.
- **Formation:** It was declared a Sanctuary in the year 1973.
- **Biodiversity:**
  - The **forest types** include South Indian Moist Deciduous forests, West coast semi-evergreen forests and plantations of teak, eucalyptus and Grewelia.
  - Elephant, Gaur, Tiger, Panther, Sambar, Spotted deer, Barking deer, Wild boar, Sloth bear, Nilgiri langur, Bonnet macaque, Common langur, Wild dog, common otter, Malabar giant squirrel etc. are the major mammals.

Eco-Sensitive Zones

- Eco-Sensitive Zones or Ecologically Fragile Areas are **areas within 10 kms around Protected Areas, National Parks and Wildlife Sanctuaries.**



- In case of places with sensitive corridors, connectivity and ecologically important patches, crucial for landscape linkage, **even areas beyond 10 km width can be included** in the eco-sensitive zone.
- ESZs are **notified by MoEFCC**, under **Environment Protection Act, 1986.**
- The basic aim is **to regulate certain activities** around National Parks and Wildlife Sanctuaries so as to minimise the negative impacts of such activities on the fragile ecosystem encompassing the protected areas.

Mission Innovation 2.0

Why in News

Recently, the Union Minister of Science & Technology addressed the **Mission Innovation (MI)** to mark the beginning of phase-2 of the mission or Mission Innovation 2.0.

- **India played a leadership role** in MI Steering Committee and is a member of the Analysis and Joint Research and Business & Investor Engagement sub-groups.

Key Points

- **Mission Innovation:**
  - **Formation**:
    - Mission Innovation was **announced on 30th November 2015**, on the sidelines of the **Paris Climate Agreement** to undertake ambitious measures to combat **climate change.**

Note:

- **Membership**:
  - It is a global initiative of **24 countries and the European Union** to accelerate global clean energy innovation.
- **Principle:**
  - Commitment by all members to seek **to double their clean energy innovation investments over five years** in selected priority areas.
  - Each **member according to its own priorities, policies, processes, and laws independently determines the best use of its funding** and defines its own Research & Development priorities and path to reach the doubling goal.
  - In many cases, MI members prioritise parts of their whole energy innovation budget within their baseline.
- **Objectives**:
  - Enhance the **public sector investment** to a substantial level.
  - Increased **private sector engagement** and investment.
  - Increase **international collaboration.**
  - **Raising awareness** of the transformational potential of innovation.
- **Innovation Challenges (IC):**
  - Innovation challenges are a **major part of the mission innovation** that is aimed at leveraging research, development, and demonstration (RD&D) in technology areas that could ultimately result in **effective ways to reduce greenhouse gas emissions, increasing energy security, and creating new opportunities for clean economic growth.**
  - There are **8 innovation challenges** under the mission innovation:
    - IC1 – **smart grids**, IC2 – **Off-grid access to electricity**, IC3 – **Carbon capture**, IC4 – **Sustainable biofuels**, IC5 – **Converting sunlight**, IC6 – **Clean energy materials**, IC7 – **Affordable cooling and heating of buildings**, IC8 – **Renewable and clean hydrogen.**
  - The first phase has shown that work done under ICs have mobilized in a relatively short period, relying on members' leadership and voluntary efforts to advance IC objectives.
  - These resources have dramatically accelerated the availability of the advanced technologies that will define a future global energy mix which is clean, affordable, and reliable.

- **Mission Innovation 2.0:**
  - To achieve the shared goal of accelerating innovation, all the members have agreed to develop a **second phase (2.0)** that includes:
    - An **enhanced Innovation Platform** building on current activities to strengthen the global clean energy innovation ecosystem and to accelerate learning.
    - **New public-private innovation alliances** – Missions – built around ambitious and inspirational goals backed by voluntary commitments that can lead to tipping points in the cost, scale, availability, and attractiveness of clean energy solutions.

Fishing Cat Conservation Alliance

Why in News

Recently, **the Fishing Cat Conservation Alliance** started a worldwide campaign to raise awareness for conservation of fishing cats.

- **The Fishing Cat Conservation Alliance** is a team of **conservationists, researchers and enthusiasts** working to achieve functioning floodplains and **coastal ecosystems that ensure survival of the fishing cat.**

Key Points

- **Scientific Name:** *Prionailurus viverrinus.*

- **Description:**
  - It is **twice the size of a house cat.**

Note:

- The **fishing cat is nocturnal** (active at night) and apart from fish also preys on frogs, crustaceans, snakes, birds, and scavenges on carcasses of larger animals.
- The species breed all year round.
- They spend most of their lives in areas of dense vegetation close to water bodies and are excellent swimmers.

- **Habitat:**
  - Fishing cats have a patchy distribution along the **Eastern Ghats.** They abound in estuarine floodplains, tidal mangrove forests and also inland freshwater habitats.
  - Apart from **Sundarbans** in West Bengal and Bangladesh, fishing cats inhabit the **Chilika lagoon** and surrounding wetlands in Odisha, Coringa and Krishna mangroves in Andhra Pradesh.
- **Threats:**
  - **Wetland degradation** and conversion for aquaculture and other **commercial projects**, sand mining along river banks, agricultural intensification resulting in loss of riverine buffer and conflict with humans in certain areas resulting in targeted hunting and retaliatory killings.
- **Protection Status:**
  - **IUCN Red List:** Vulnerable. Despite multiple threats, the Fishing Cat was recently **downlisted to "Vulnerable" from "Endangered"** in the IUCN Red List species assessment.
  - **CITES:** Appendix II
  - **Indian Wildlife Protection Act, 1972:** Schedule I
- **Conservation Efforts:**
  - Recently, **the Fishing Cat Conservation Alliance** has initiated a study of the **bio-geographical distribution of the fishing cat** in the unprotected and human-dominated **landscapes of the northeastern Ghats of Andhra Pradesh.**
  - In 2012, the **West Bengal government officially declared the Fishing Cat as the State Animal** and the Calcutta Zoo has two big enclosures dedicated to them.
  - In Odisha, many NGOs and wildlife conservation Societies are involved in Fishing Cat research and conservation work.
  - **The Fishing Cat Project**, launched in 2010 started raising awareness about the Cat in West Bengal.

Centre for Wetland Conservation and Management

Why in News

Recently, on the occasion of the **World Wetland Day**, the Minister of State for Environment, Forest and Climate Change announced the establishment of a **Centre for Wetland Conservation and Management (CWCM)**, as a part of the **National Centre for Sustainable Coastal Management (NCSCM)**.

- **World Wetlands Day** is celebrated every year on the **2nd of February**.
- The year 2021 also commemorates the **50th anniversary** of the **Convention on Wetlands** signed on 2nd February 1971 in the Iranian city of Ramsar.
  - The theme for 2021 is **'Wetlands and Water'.**
  - It was first celebrated in **1997**.

Key Points

- **Significance of Centre for Wetland Conservation and Management (CWCM):**
  - The dedicated Centre would **address specific research needs and knowledge gaps** and **will aid in the application of integrated approaches for conservation, management** and wise use of the wetlands.
  - It will help in **building partnerships** and **networks** with relevant national and international agencies.
  - It would serve as a **knowledge hub** and enable exchange between State/ UT Wetland Authorities, wetland users, managers, researchers, policy-makers and practitioners.
  - It would also **assist the national and State/ UT Governments** in the design and implementation of policy and regulatory frameworks, management planning, monitoring and targeted research for wetlands conservation.
- **Wetlands**:
  - **Wetlands** are ecosystems saturated with water, either seasonally or permanently. They include **mangroves**, marshes, rivers, lakes, deltas, floodplains and flooded forests, rice-fields, **coral reefs**, marine areas no deeper than 6 metres at low tide, as well as human-made wetlands such as waste-water treatment ponds and reservoirs.

Note:

- Though they cover only around **6% of the Earth's land** surface, **40% of all plant and animal species live or breed in wetlands.**

➢ **Significance of Wetlands:**

- Wetlands are a critical part of our natural environment. They **mitigate floods, protect coastlines** and build community resilience to disasters, absorb pollutants and improve water quality.
- Wetlands are **critical to human and planet life**. More than **1 billion people depend on them for a living.**
- They are a **vital source for food, raw materials, genetic resources for medicines, and hydropower.**
- 30% of land-based **carbon** is stored in peatland (a type of wetlands).
- They play an important role in **transport, tourism** and the **cultural and spiritual well-being** of people.
- Many wetlands are areas of **natural beauty** and many are important to Aboriginal people.

➢ **Threats**:

- As per the **IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services)'s** global assessment, wetlands are the most threatened ecosystem.
- Wetlands are **disappearing 3 times faster than forests** due to human activities and global warming.
- According to **UNESCO**, the threat to wetlands will have an adverse impact on 40% of the world's flora and fauna that live or breed in wetlands.
- **Major threats:** Agriculture, development, pollution and **climate change.**

➢ **Status of Wetlands in India:**

- India has nearly **4.6% of its land as wetlands**, covering an **area of 15.26 million hectares** and has **42 sites designated as Wetlands of International Importance (Ramsar Sites)**/
  - Wetlands declared as Ramsar sites are protected under strict guidelines of the convention.
  - There are currently over 2,300 Ramsar Sites around the world.
  - Recently, India has added **Tso Kar Wetland Complex** in Ladakh as its 42nd Ramsar site.
- Wetlands are regulated under the **Wetlands (Conservation and Management) Rules, 2017.**
- The 2010 version of the Rules provided for a **Central Wetland Regulatory Authority**, but new Rules of 2017 replaced it with state-level bodies and created a National Wetland Committee, which functions in an advisory role.
  - The **newer regulations removed some items** from the definition of "wetlands" including backwaters, lagoons, creeks, and estuaries.
  - Under the 2017 regulations, process to **identify the wetlands has been delegated to the States.**

National Centre for Sustainable Coastal Management

➢ **Location:**

- It is located at **Chennai**, Tamil Nadu.

➢ **Divisions**:

- It has various research divisions including, Geo-spatial Sciences, Remote Sensing and Geographic Information Systems (GIS), Coastal environmental impact assessment, Conservation of Coastal & Marine Resources, etc.

➢ **Objective:**

- It aims to **promote integrated and sustainable management of the coastal and marine areas** in India for the benefit and wellbeing of the traditional coastal and island communities.
- It also intends to promote **sustainable coasts** through increased partnership, conservation practices, scientific research and **knowledge benefit** and well being of the current and future generation.

➢ **Role:**

- **Survey of India** and NCSCM have **mapped the Hazard Line for the entire coast of India**, which includes vulnerability mapping of flood, erosion and sea-level rise.
- It also **advises the Union and State Governments and other associated stakeholders** on policy, and scientific matters related to **Integrated Coastal Zone Management (ICZM).**

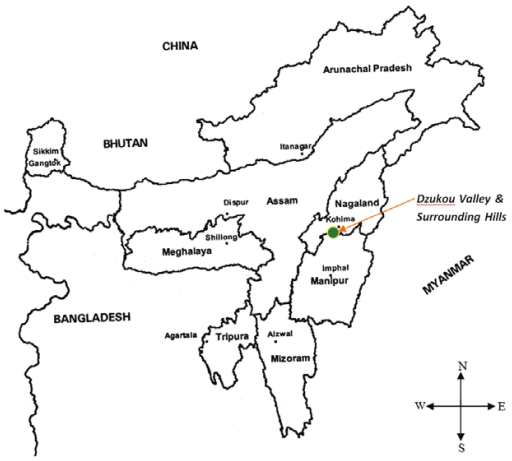
Dzukou Valley

Why in News

The two-week long **forest fire in Dzukou valley on Nagaland-Manipur border** has been doused.

➢ The **90-sq km green valley** has been **prone to forest fires for decades** - in 2015, 2012, 2010 and 2006.

Note:



Key Points

- **Location:** The Dzukou Valley, **popularly known as the 'valley of flower'**, is located at the **border of Nagaland and Manipur**.
- **Features:**
  - Situated at **an altitude of 2,438 metre**s behind the **Japfu mountain range**, it is one of the most **popular trekking spots** in the North East.
    - Dzukou valley and Japfu peak are located **adjacent to the Pulie Badze Wildlife Sanctuary (Nagaland).**
  - There are **no human habitations within the forests,** but they are **home to rare and 'vulnerable' (as per the IUCN Red List) birds** - **Blyth's Tragopan** (Nagaland's state bird), the **Rufous-necked Hornbill** and the **Dark-rumped Swift**, among many others. Also found in the forests are **endangered Western Hoolock Gibbons**.
  - It is **covered with bamboo** and other grass species. The valley harbours many species of flowering plants including the **endemic Dzukou Lily Lilium chitrangada**.
  - The valley is a **source of conflict** for ownership between local tribes and the state governments of Manipur/Nagaland.
  - It is home to the **Angami people**.

CAFE-2 Regulations and BS-VI Stage II Norms

Why in News

The **auto industry** has **requested the government** to **defer the implementation** of **Corporate Average Fuel Efficiency (CAFE-2) regulations** and **BS-VI stage II norms to April 2024**, given the **impact of the lockdown** measures.

- **As of now**, the **CAFE-2 norms** and **BS-VI stage II norms** are set to come into effect in **2022** and **April 2023 respectively.**

Key Points

- **Corporate Average Fuel Efficiency (CAFE-2) Regulations:**
  - **About:**
    - **CAFE or Corporate Average Fuel Efficiency/ Economy** regulations are in force in many advanced as well as developing nations, including India.
    - They **aim at lowering fuel consumption** (or improving fuel efficiency) of vehicles by **lowering Carbon dioxide (CO_2) emissions**, thus serving the **twin purposes** of **reducing dependence on oil** for fuel and **controlling pollution.**
    - **Corporate Average** refers to **sales-volume** weighted average for every auto manufacturer. The idea of CAFÉ is to push manufacturers to achieve fuel efficiency targets by **producing and selling more fuel-efficient models**, including **electric vehicles**
  - **Launch in India:**
    - The CAFÉ standards **were first notified in 2017** by the Union **Ministry of Power** (MoP) under **Energy Conservation Act, 2001.**
      - The regulation is **in accordance with the fuel consumption standards of 2015** that aim to **increase fuel efficiency of vehicles on the road by 35% by 2030.**
    - The **Ministry of Road Transport and Highways (MoRTH)** is the **nodal agency** responsible for monitoring and reporting a summary of annual fuel consumption by automobile manufacturers at the end of each fiscal year.
    - The regulation was **introduced in two target phases: Carbon dioxide emission target of 130 gram/kilometre by 2022-23** and **113 g/km 2022-23 onwards.**
  - **Applicability:**
    - The norms are applicable for **petrol, diesel, Liquefied Petroleum Gas (LPG)** and **Compressed Natural Gas (CNG) passenger vehicles.**

Note:

BS-VI Stage II Norms

- Bharat Stage (BS) emission standards are laid down by the government to **regulate the output of air pollutants from internal combustion engine and spark-ignition engine equipment,** including motor vehicles.
- These standards are targeted at making **improvements in three areas** - emission control, fuel efficiency and engine design.
- The central government has **mandated** that vehicle makers must manufacture, sell and register **only BS-VI (BS6) vehicles from 1st April, 2020.**
  - BS-VI is **equivalent to Euro-VI norms** currently in place across countries in Europe.
- As per BS-VI emission norms, **petrol vehicles** will have to effect **a 25% reduction in their NOx**, or nitrogen oxide emissions. **Diesel engines** will have to **reduce their HC+NOx** (hydro carbon + nitrogen oxides) **by 43%**, their **NOx levels by 68%** and **particulate matter levels by 82%**.
- **Sulphur content** in fuel is a **major cause for concern**. BS-VI fuel's sulphur content is much lower than BS-IV fuel. It is reduced to 10 mg/kg max in BS-VI from 50 mg/kg under BS-IV.

Natural Capital Accounting and Valuation of the Ecosystem Services Project

Why in News

Natural Capital Accounting and Valuation of the Ecosystem Services (NCAVES) India Forum-2021 is being organised by the **Ministry of Statistics and Programme Implementation** (MoSPI) in virtual format.

Key Points

- **About the Project:**
  - The NCAVES Project, funded by the European Union, has been jointly implemented by the **United Nations Statistics Division** (UNSD), the **United Nations Environment Programme** (UNEP) and the **Secretariat of the Convention of Biological Diversity** (CBD).
  - **India** is one of the **five countries taking part in this project** - the other countries being **Brazil, China, South Africa and Mexico.**
  - In India, the NCAVES project is **being implemented by the MoSPI** in close collaboration with the **Ministry of Environment, Forest and Climate Change** (MoEF&CC) and the **National Remote Sensing Centre** (NRSC) under the **Department of Space**.
- **Benefits:**
  - The participation in the project has helped MoSPI commence the compilation of the **Environment Accounts as per the UN-SEEA framework and release environmental accounts in its publication "EnviStats India"** on an annual basis **from 2018.**
  - Several of these accounts are closely related to the social and economic attributes, making them a **useful tool for the Policy.**
  - Another tool under the NCAVES project is the development of the **India-EVL Tool** which is essentially a look-up tool giving the **values of various ecosystem services** in the different States of the country.
  - **Ecosystem accounting** can produce information on the extent of ecosystems, their condition based on selected indicators, and the flow of ecosystem services.

National Energy Conservation Awards

Why in News

Recently, **the Ministry of Power**, in association with the **Bureau of Energy Efficiency (BEE)**, organised the **30th National Energy Conservation Awards (NECA)** function**.**

- During the event, the **Standards and Labelling Programme for Air Compressors and Ultra High Definition (UHD) TV** on a voluntary basis was initiated and **SATHEE Portal** was also launched.

Key Points

- **National Energy Conservation Awards Programme:**
  - The **Ministry of Power** had launched a scheme in 1991, to give **national recognition** through awards to industries and establishments that have taken **special efforts to reduce energy consumption** while maintaining their production.
    - The awards were given away for the **first time on 14th December, 1991,** which was declared as the **'The National Energy Conservation Day'.**

Note:

- It recognizes the energy efficiency achievements in **56 sub-sectors across industry, establishments and institutions.**

➢ **Standards and Labelling Programme for Air Compressors and Ultra High Definition (UHD) TV:**
- It is to be carried out on a **voluntary basis.**
- They are aimed to **further enhance the level of energy conservation.** This conserved energy can then be used for a different purpose in the home or workplace.
- Besides saving energy, this programme could also **facilitate reducing energy bills**.

➢ **SATHEE Portal:**
- The Bureau of Energy Efficiency (BEE) has developed a **Management Information System (MIS) portal** namely **State-wise Actions on Annual Targets and Headways on Energy Efficiency (SAATHEE).**
  - **For SDAs:** It is a portal for the **State Designated Agency (SDA)** for state level activities.
  - **Captures Status of Energy Efficiency:** It will be useful in capturing the physical and financial status/ progress of Energy Efficiency activities being implemented by States/ UTs across the country. Thus, it will **facilitate Real Time Monitoring.**
  - **Streamlines Decision Making and Compliance:** It will also help in decision making, coordination, control, analysis, and implementation and enforcement of the compliance process for various energy consumers at the pan India level.

Note

➢ **SATHI (Sophisticated Analytical & Technical Help Institutes)**:
- It is an initiative of the **Department of Science & Technology (Ministry of Science and Technology)** .
- **Objective:** To provide a shared, professionally managed services and strong Science and Technology infrastructure / facilities, to service the demands of faculty, researchers, etc., to enable them to carry out R&D activities on a round the clock basis with minimum downtime.

➢ **SAATHI** (Sustainable and Accelerated Adoption of efficient Textile technologies to Help Small Industries) Initiative:
- It is an **initiative of the Ministry of Textiles.**
- **Objective:** To sustain and accelerate the adoption of **energy efficient textile technologies** in the powerloom sector and cost savings due to use of such technology.

➢ **SATH** (Sustainable Action for Transforming Human capital) Program:
- It is a **program of NITI Aayog.**
- **Objective:** To initiate transformation in the education and health sectors and build 3 future 'role model' states.

Adaptation Gap Report 2020: UNEP

Why in News

Recently, the **United Nations Environment Programme** (UNEP) **Adaptation Gap Report 2020** estimated the annual cost of adaptation to the effects of **climate change** for **developing countries to at least quadruple by 2050**.

Key Points

➢ **Adaptation Cost:**
- It includes costs of **planning, preparing for, facilitating and implementing adaptation measures.**
- The ever-increasing **adaptation cost has also outpaced the growth in adaptation finance** and that is the reason for a maintained **Adaptation Finance gap.**
  - **Adaptation Finance**: It refers to the flow of funds to developing countries to help them tide over the damages caused by weather events from climate change.
  - **Adaptation Finance gap**: It is the difference between **Adaptation Cost** and **Adaptation Finance.**
- Adaptation costs, in actual terms, is **higher in developed countries** but the **burden of adaptation is greater for developing countries** in relation to their gross domestic product.
- The developing countries, especially in Africa and Asia, which are **least equipped to tackle climate change** will also be the **most impacted by it.**

➢ **Global Challenges:**

Note:

- **Rising Temperature**: The world is heading for at least a **3°C temperature rise** this century, according to current **Paris Agreement** pledges. Even if we limit global warming to well below 2°C, or even 1.5°C, the **poor countries will suffer**.
- **The Pandemic**: The **Covid-19 pandemic** has impacted adaptation efforts but its effect is not yet quantified.
- **Other Challenges**: Last year was not just marked by the pandemic but also by devastating natural calamities like **floods, droughts, storms, forest fires and locust plagues** impacting around 50 million lives globally.

➢ **Global Adaptation for Climate Change**: Three-quarters of all the countries have adopted at least one climate change adaptation planning instrument and **most developing countries are working on national adaptation plans.**

➢ **Some of the Indian Initiatives to Fight Climate Change:**

- India has shifted from **Bharat Stage-IV (BS-IV) to Bharat Stage-VI (BS-VI) emission** norms from 1st April 2020 which was earlier to be adopted by 2024.
- **National Clean Air Programme (NCAP):**
  - It was launched in **January 2019.**
  - It is a five-year action plan with a tentative target of **20-30% reduction in concentrations of PM10 and PM2.5 by 2024**, with 2017 as the base year.
- It has distributed more than **360 million LED bulbs** under the **UJALA scheme,** which has led to energy saving of about 47 billion units of electricity per year and **reduction of 38 million tonnes of CO2 per year.**
- **The Jawaharlal Nehru National Solar Mission:**
  - It was **launched in 2009** with the primary aim of achieving grid parity by 2022 and with coal-based thermal power by 2030.
  - Aims to **increase the share of solar energy in India's energy mix.**
- **National Action Plan on Climate Change (NAPCC):**
  - It was **launched in 2008.**
  - It aims at **creating awareness** among the representatives of the public, different agencies of the government, scientists, industry and the communities on the **threat posed by climate change and the steps to counter it.**

Seabuckthorn Plantation in the Cold Desert

Why in News

The Himachal Pradesh government has decided to start planting seabuckthorn in the cold desert areas of the state.

Key Points

➢ **About Seabuckthorn:**

- It's a shrub which produces an orange-yellow coloured edible berry.
- In India, it is found above the tree line in the Himalayan region, generally in dry areas such as the cold deserts of Ladakh and Spiti.
- In Himachal Pradesh, it is locally called chharma and grows in the wild in Lahaul and Spiti and parts of Kinnaur.
- A major part is covered by this plant in Himachal Pradesh, Ladakh, Uttarakhand, Sikkim and Arunachal Pradesh.**Ecological, Medicinal and Economical benefits.**

➢ The Seabuckthorn Plantation has many **Ecological Benefits:**

- Seabuckthorn is a soil-binding plant which prevents soil-erosion, checks siltation in rivers and helps preserve floral biodiversity.
- In the Lahaul valley, where willow trees are dying in large numbers due to pest attack, this hardy shrub is a good alternative for protecting the local ecology.

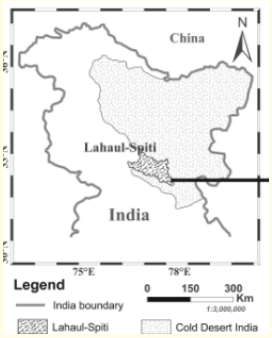
Note:

- Grows well in dry regions and becomes much more important especially in the light of reduced water flow from Himalayan glaciers.

- **Medicinal Benefits:**
  - As a folk medicine, seabuckthorn has been widely used for treating stomach, heart and skin problems.
  - Its fruit and leaves are rich in vitamins, carotenoids and omega fatty acids and it can help troops in acclimatising to high-altitude.
  - In the last few decades, scientific research worldwide has backed many of its traditional uses.
- **Economical Benefits:**
  - Seabuckthorn also has commercial value, as it is used in making juices, jams, nutritional capsules etc.
  - It is an important source of fuelwood and fodder.
  - However, wild Seabuckthorn cannot sustainably supply raw material to the industry, and the plant needs to be cultivated on a large scale as is being done in China.

Cold Desert in India

- The Cold Desert of India is situated in the Himalayas and stretches from Ladakh in the north to Kinnaur (in the state of Himachal Pradesh) in the south.
- The region has harsh climatic conditions such as very low rainfall and very high elevation (ranging from 3000 – 5000m Above Sea Level)] that adds to the coldness in its environment.
- Blizzards, snowstorms and avalanches are common.
- The soil is not very fertile and the climatic conditions allow very short growing seasons making it a bare landscape.
- Water resources are minimal and comprise glacier-fed streams.



Tree Line

- The tree line is the edge of the habitat at which trees are capable of growing. It is found at high elevations and high latitudes.
- Beyond the tree line, trees cannot tolerate the environmental conditions (usually cold temperatures, extreme snowpack, or associated lack of available moisture).

CERAWeek Global Energy and Environment Leadership Award

Why in News

The **Prime Minister of India** was conferred with the **Global Energy and Environment Leadership Award** by **Cambridge Energy Research Associates (CERA)**.

- He was awarded for his commitment to expanding India's leadership in **sustainable development** to meet the country's, and the world's, future energy needs.
- He addressed the **CERAWeek conference** and **highlighted the steps taken by India** to address the issue of climate change and attaining the target of achieving clean fuel.

Key Points

- **About the CERAWeek Global Energy and Environment Leadership Award**:
  - The Award was **instituted in 2016.**
  - It **recognises the commitment of leadership on the future of global energy and environment,** and for offering solutions and policies for energy access, affordability and environmental stewardship.
- **Cambridge Energy Research Associates (CERA)**:
  - It is **a consulting company in the United States** that specializes in advising governments and private companies on energy markets, geopolitics, industry trends, and strategy.
- **CERAWeek**:
  - It was **founded in 1983 by Dr. Daniel Yergin**.
  - It is an **annual energy conference, organized in Houston (USA) in March,** since 1983.
  - CERAWeek **by IHS Markit** is the annual international gathering of energy industry leaders, experts, government officials and policymakers, leaders from the technology, financial and industrial communities - and energy technology innovators.
  - **CERAWeek 2021** was convened virtually from 1st-5th March, 2021.
    - **Theme**: The New Map: Energy, Climate, and Charting the Future.

Note:

Indian Rhino Vision 2020

Why in News

The **Indian Rhino Vision 2020 (IRV2020) program** has come to a close with the recent translocation of two rhinos to Manas National Park in Assam.

- It was the eighth round of rhino translocation under IRV2020.

Key Points

- **About Indian Rhino Vision 2020:**
  - **Launched in 2005**, Indian Rhino Vision 2020 was an ambitious effort **to attain a wild population of at least 3,000 greater one-horned rhinos** spread over seven protected areas **in the Indian state of Assam by the year 2020**.
  - **Seven protected areas** are **Kaziranga, Pobitora, Orang National Park, Manas National Park, Laokhowa wildlife sanctuary, Burachapori wildlife sanctuary** and **Dibru Saikhowa wildlife sanctuary.**
  - **Wild-to-wild translocations** were an essential part of IRV2020 – moving rhinos from densely populated parks like Kaziranga NP, to ones in need of more rhinos, like Manas NP.
  - It is **a collaborative effort** between various organisations, including the International Rhino Foundation, Assam's Forest Department, Bodoland Territorial Council, World Wide Fund - India, and the US Fish and Wildlife Service.
- **Performance of the Program:**
  - **Target of attaining a population of 3,000 rhinos almost achieved** but the **animal could be reintroduced in only one of the four protected areas planned.**
    - The plan to spread the Greater one-horned rhino across four protected areas beyond Kaziranga National Park, Orang National Park and Pobitora could not materialise.
  - The translocated rhinos **helped Manas National Park get back its World Heritage Site status in 2011.**
  - **2018 and 2019 saw significant decreases in poaching**, the results of forestry, local and national government officials coordinating efforts to combat wildlife crime across Assam.
- **About Greater One-Horned Rhino:**
  - There are **three species of rhino in Asia** — Greater one-horned *(Rhinoceros unicornis)*, Javan and Sumatran.
  - **Poaching for the horns and habitat loss** are the two greatest threats to the survival of Asia's rhinos.
  - The **five rhino range nations** (India, Bhutan, Nepal, Indonesia and Malaysia) have signed a declaration 'The New Delhi Declaration on Asian Rhinos 2019' for the conservation and protection of the species.
  - **Protection Status:**
    - **Javan and Sumatran Rhino** are **critically endangered** and the **Greater one-horned (or Indian) rhino** is **vulnerable** under the **IUCN Red List.**
    - All three listed under **Appendix I (CITES).**
    - Greater one-horned rhino is listed under the **Schedule I of the Wildlife Protection Act, 1972.**
  - **Habitat of Greater One-Horned Rhino:**
    - The species is restricted to small habitats in Indo-Nepal terai and northern West Bengal and Assam.
    - In India, rhinos are mainly found in **Kaziranga NP, Pobitora WLS**, Orang NP, Manas NP in Assam, Jaldapara NP and Gorumara NP in West Bengal and **Dudhwa TR** in Uttar Pradesh.

Green Initiatives: Saudi Arabia

Why in News

Recently, Saudi Arabia launched **Saudi Green Initiative** and **the Middle East Green Initiative** to combat the threat of **climate change**.

Note:

Key Points

- **Background and G20 Summit:**
  - One of the main pillars of the Saudi **G20** presidency was to **safeguard the planet**.
    - In 2020, **G20 introduced initiatives** like establishing a **Global Coral Reef Research and Development Accelerator Platform and the Circular Carbon Economy (CCE) Platform.**
  - Saudi Arabia reiterated that it is committed to lead regional efforts to address climate change and has been making steady progress in this direction.
    - Saudi Arabia established the **Environmental Special Forces in 2019.**
- **Saudi Green Initiative:**
  - **Aim:**
    - To **raise the vegetation cover, reduce carbon emissions, combat pollution and land degradation, and preserve marine life.**
  - **Features:**
    - **10 billion trees** will be planted in the Kingdom.
    - To **reduce carbon emissions by more than 4% of global contributions,** through **a renewable energy programme t**hat will generate 50% of Saudi's energy from renewables by 2030.
    - Saudi Arabia is working towards **raising the percentage of its protected areas to more than 30% of its total land area**, exceeding the global target of 17%.
- **Middle East Green Initiative:**
  - **Aim:**
    - To preserve marine and coastal environments, increase the proportion of natural reserves and protected land, **improve the regulation of oil production, accelerate the transition to clean energy and boost the amount of energy generated by renewables.**
  - **Features:**
    - Saudi Arabia will work with the **Gulf Cooperation Council** countries and regional partners to plant an additional 40 billion trees in the West Asian region.
      - It represents 5% of the global target of planting one trillion trees and reducing 2.5% of global carbon levels.
    - Saudi Arabia will **convene an annual summit called the Middle East Green Initiative** which will host leaders from the government, scientists and environmentalists to discuss the details of implementation.
    - In partnership with participating countries, **innovative methods will be researched** to irrigate from treated water, cloud seeding and other purpose-driven solutions such as planting native trees which requires support for three years to grow and will then be able to survive on their own with natural irrigation.
  - **Current Support:**
    - Saudi Arabia has been sharing its expertise and know-how with its neighbouring countries to **reduce carbon emissions resulting from hydrocarbon production in the region by 60% and globally by 10%.**
      - Saudi Arabia currently operates the **largest carbon capture and utilisation plant in the world,** it also operates one of the **region's most advanced CO_2-enhanced oil recovery plants** that captures and stores 8,00,000 tonnes of CO_2 annually.

Sulphur Dioxide Emissions from Caribbean Volcano

Why in News

The **Sulphur Dioxide (SO_2) emissions from a volcanic eruption in the Caribbean (La Soufriere Volcano)** have reached India, sparking fear of **increased pollution levels** in the northern parts of the country and **acid rain.**

- The **Caribbean is the region** roughly south of the United States, east of Mexico and north of Central and South America, consisting of the Caribbean Sea and its islands.

Key Points

- **About La Soufriere Volcano:**
  - It is **an active stratovolcano** on the **Caribbean island of Saint Vincent** in Saint Vincent and the Grenadines.
    - A **stratovolcano** is a tall, conical volcano composed of one layer of hardened lava, tephra, and volcanic ash. These volcanoes are characterized by a steep profile and periodic, explosive eruptions.

Note:

- Saint Vincent and the Grenadines, **located in the southern Caribbean,** consists of more than 30 islands and cays, nine of which are inhabited.

❍ It is the **highest peak in Saint Vincent** and has had five recorded explosive eruptions **since 1718**, most recently in April 2021.

- The last time the volcano had **erupted was in 1979.**

CBC NEWS

➢ **Impact of the Eruption on Global Temperatures:**

❍ **Volcanic emissions** reaching the stratosphere **can have a cooling effect** on **global temperatures.**

❍ The most significant climate impacts from volcanic injections into the stratosphere come from the **conversion of sulphur dioxide** to **sulphuric acid**, which condenses rapidly in the stratosphere to form **fine sulphate aerosols.**

- The **aerosols increase** the **reflection of radiation** from the Sun back into space, **cooling the Earth's** lower atmosphere or troposphere.
- Bigger eruptions during the past century have caused a decrease in temperature of **0.27 degree Celsius** or more on the Earth's surface for up to three years.

➢ **Sulphur Dioxide and Pollution:**

❍ SO_2 emissions that lead to high concentrations of SO_2 in the air generally also lead to the formation of other sulfur oxides (SOx). SOx can react with other compounds in the atmosphere to form small particles. These particles contribute to **Particulate Matter (PM) pollution.**

❍ Small particles may penetrate deeply into the lungs and in sufficient quantities can contribute to health problems.

➢ **Sulphur Dioxide and Acid Rain:**

❍ Acid rain results **when sulphur dioxide (SO_2) and nitrogen oxides (NO_x) are emitted into the atmosphere** and transported by wind and air currents.

❍ The **SO_2 and NO_x react with water, oxygen and other chemicals** to form sulfuric and nitric acids. These then mix with water and other materials before falling to the ground.

Sunderlal Bahuguna: Chipko Movement

Why in News

Recently, **Sunderlal Bahuguna,** the Gandhian who was the driving force behind the **Chipko movement** died due to **Covid-19.**

Key Points

➢ **Chipko Movement:**

❍ It was a **non-violent agitation** which originated in Uttar Pradesh's **Chamoli district** (now Uttarakhand) in **1973.**

❍ The name of the movement **'chipko' comes from the word 'embrace',** as the **villagers hugged the trees** and encircled them to prevent being hacked.

❍ It is best remembered for the **collective mobilisation of women** for the cause of preserving forests, which also brought about a change in attitude regarding their own status in society.

❍ Its biggest victory was **making people aware of their rights to forests,** and **how grassroots activism can influence policy-making** regarding ecology and shared natural resources.

- It led to a **ban on commercial felling of trees above 30 degrees slope** and above 1,000 msl (mean sea level) **in 1981.**

➢ **Sunderlal Bahuguna (1927-2021):**

❍ **Initiated the chipko movement** to guard the trees on the Himalayan slopes.

Note:

- Known for coining the Chipko slogan **'ecology is permanent economy'**
  - After the Chipko movement in the 1970s, he **gave the message across the globe that ecology and ecosystem are more important**. He was of the opinion that **ecology and economy should go together.**
- **Campaigned against the Tehri Dam on River Bhagirathi ,** a mega-project with devastating consequences. Undertook one of **India's longest fasts after Independence, over 56 days**.
- Took **4,800 km Kashmir to Kohima padayatra (foot march)** in the early 1980s to bring attention to the entire Himalayan region.
- Supported **women-led movements** against the liquor mafia in the hills, and for the **Beej Bachao Andolan**, a movement to save Himalayan agricultural biodiversity from being wiped out by the unsustainable, **chemical-intensive Green Revolution**.
- Awarded the **Padma Vibhushan in 2009.**

The Climate Breakthroughs Summit

Why in News

Recently, world leaders convened at the **Climate Breakthroughs Summit** to demonstrate progress in critical sectors of the global economy, including steel, shipping, **green hydrogen** and nature.

Key Points

- **About:**
  - This is a collaboration between the **World Economic Forum**, **Mission Possible Partnership**, the **United Nations Climate Champions**, and the **United Kingdom** (**COP 26** Presidency).
  - It **aims to** demonstrate the need for systemic change to accelerate the global transition to a **zero-carbon economy.**
    - The "**Zero carbon economy**" refers to the green ecological economy based on low energy consumption and low pollution, where emissions are compensated by absorption and removal of greenhouse gases **(net-zero).**
  - One of its key campaigns is the **'Race to Zero' campaign** that mobilises support of 708 cities, 24 regions, 2,360 businesses, 163 investors, and 624 higher education institutions to move towards zero-carbon recovery for a sustainable future.
- **Highlights of the Summit:**
  - The **United Nations** made a call for coordinated action to secure global net-zero emissions and fulfill its goal of limiting global warming to 1.5 degrees Celsius compared to pre-industrial levels by 2050.
  - **Maersk**, the **world's largest container shipping line and vessel operator**, **joined Race to Zero** with the commitment to halving the emission by 2030.
  - **As many as 40 health care institutions worldwide have committed to halving emissions by 2030** and reaching net zero by 2050.
    - These 40 institutions represent more than 3,000 health care facilities in 18 countries.
  - The transitions of individual companies and institutions such as these are **being supported by sector-wide plans**, reflected in the revised **Climate Action Pathways**, **launched with the Marrakech Partnership for Global Climate Action.**
    - The pathways set out sectoral visions for achieving a 1.5°C resilient world in 2050, providing a roadmap to help countries and non-State actors alike to identify actions needed by 2021, 2025, 2030 and 2040 to deliver a zero-carbon world in time.

India's Ethanol Roadmap

Why in News

The central government has released an expert committee report on the **Roadmap for Ethanol Blending in India by 2025.**

Note:

- The roadmap proposes **a gradual rollout of ethanol-blended fuel** to achieve E10 fuel supply by April 2022 and phased rollout of E20 from April 2023 to April 2025.

Key Points

- **About the Report:**
  - The **Ministry of Petroleum & Natural Gas (MoP&NG)** had instituted an Expert Group to study the issues such as pricing of ethanol, matching pace of the automobile industry to manufacture vehicles with new engines with the supply of ethanol, pricing of such vehicles, fuel efficiency of different engines etc.
- **Ethanol Blending:**
  - **About Ethanol:**
    - It is one of the principal **biofuels,** which is naturally produced by the fermentation of sugars by yeasts or via petrochemical processes such as ethylene hydration.
  - **Blending Target:**
    - The Government of India has **advanced the target for 20% ethanol blending in petrol (also called E20) to 2025** from 2030.
    - **Currently, 8.5% of ethanol is blended with petrol** in India.
  - **Objectives of Ethanol Blending**:
    - **Energy Security**:
      - Increased use of ethanol can help **reduce the oil import bill**. India's net import cost stands at USD 551 billion in 2020-21.
      - The E20 program **can save the country USD 4 billion (Rs 30,000 crore) per annum.**
    - **Incentives for Farmers**:
      - The oil companies procure ethanol from farmers that **benefits the sugarcane farmers.**
      - Further, the government plans to **encourage use of water-saving crops, such as maize**, to produce ethanol, and **production of ethanol from non-food feedstock.**
    - **Impact on Emission:**
      - Use of ethanol-blended petrol **decreases emissions such as carbon monoxide (CO), hydrocarbons (HC)** and **nitrogen oxides (NOx).**
      - The **unregulated carbonyl emissions**, such as acetaldehyde emission **were, however, higher with E10 and E20** compared to normal petrol. However, these emissions were relatively lower.

'Sea Snot' Outbreak in Turkey

Why in News

Recently, **Turkey's Sea of Marmara**, which **connects the Black Sea to the Aegean Sea**, has witnessed the **largest outbreak of 'sea snot'.**

- A 'sea snot' outbreak was **first recorded in the country in 2007.**

Key Points

- **Sea Snot and its Formation:**
  - It is **marine mucilage** that is formed when **algae are overloaded with nutrients** as a result of **water pollution** combined with the effects of **climate change.**
    - The **nutrient overload** occurs when **algae feast on warm weather** caused by **global warming.**
  - It looks like a **viscous, brown and foamy substance.**
- **Concerns:**
  - **Threat to the Marine Ecosystem:**
    - It has caused **mass deaths among the fish population**, and also killed other aquatic organisms such as **corals** and sponges.
    - It is now **covering the surface of the sea** and has also **spread to 80-100 feet** below the surface which eventually can collapse to the bottom and cover the sea floor.
  - **Livelihoods of Fishermen Affected:**
    - As the sludge is getting collected in their nets, making them so heavy that they break or get lost.
    - Moreover, the mucilage coating the strings makes the nets visible to fish and keeps them away.
  - **Water-borne Diseases:**
    - It can cause an outbreak of water-borne diseases such as **cholera** in cities like Istanbul.

Note:

- **Steps that are being Taken:**
  - The entire **Sea of Marmara** will be turned into a **protected area.**
  - Moreover, steps are being taken to **reduce pollution and improve treatment of waste water** from coastal cities and ships.
  - Turkey's biggest **maritime clean-up operation** is being launched and called on local residents, artists and NGOs to join hands to extend assistance.

CEM-Industrial Deep Decarbonization Initiative

Why in News

Recently, India and the UK have launched a new workstream to promote **industrial energy efficiency** under **Clean Energy Ministerial's (CEM) Industrial Deep Decarbonization Initiative (IDDI)** coordinated by UNIDO (United Nations Development Industrial organisation).

- It was launched in the **ongoing 12th CEM** (CEM12) **Meeting**, which is **virtually hosted by Chile.**

Key Points

- **Industrial Deep Decarbonization Initiative (IDDI):**
  - **About:**
    - IDDI is an **initiative of CEM.**
    - It is a global **coalition of public and private organisations** who are working to stimulate demand for low carbon industrial materials.
    - In collaboration with **national governments**, IDDI works to standardise carbon assessments, establish ambitious public and private sector procurement targets, incentivise investment into low-carbon product development and design industry guidelines.
  - **Supporting Countries:**
    - Coordinated by UNIDO, the IDDI is **co-led by the UK and India** and current members include Germany and Canada.
  - **Goals:**
    - Encouraging governments and the private sector to buy low carbon steel and cement.
    - Sourcing and sharing data for common standards and targets.

Ambergris

Why in News

Recently, the Mumbai Police has arrested five people and seized nearly 9 kg of **Ambergris.**

Key Points

- **About:**
  - Ambergris, French for **grey amber**, is generally **referred to as whale vomit**.
  - It is a solid waxy substance **originating in the intestine of the sperm whale.**
    - Ambergris is produced only by an estimated **1% of sperm whales.**
  - Chemically, ambergris contains **alkaloids, acids,** and a specific compound called **ambreine, which is similar to cholesterol.**
  - It **floats around the surface of the water body** and at times settles on the coast.
  - Because of its high value it is **referred to as floating gold. 1 kg of ambergris is worth Rs 1 crore** in the international market.
- **Use:**
  - It is used in the perfume market, especially to **create fragrances like musk.**
    - It is believed to be in **high demand in countries like Dubai that have a large perfume market**.
  - **Ancient Egyptians used it as incense.** It is also believed to be used in **some traditional medicines** and as a **spice.**
- **Smuggling**:
  - Due to its high value it has been a target for smugglers especially in coastal areas.
    - There have been **several cases where the coastline of Gujarat has been used for such smuggling.**
  - Since the **sperm whale is a protected species**, hunting of the whale is not allowed. However, **smugglers are known to have illegally targeted the fish** in order to obtain the valuable Ambergris from its stomach.

Sperm Whale

- **About**:

Note:

- Sperm whale, (*Physeter catodon*), also called **cachalot**, the **largest of the toothed whales,** easily recognized by its enormous square head and narrow lower jaw.

- The sperm whale is **dark blue-gray or brownish, with white patches on the belly**. It is **thickset and has small paddle-like flippers** and a series of rounded humps on its back.

➢ **Habitat**:
- They are found in **temperate and tropical waters throughout the world.**

➢ **Threats:**
- The greatest threats to sperm whales are those of **habitat impacts including noise pollution and climate change.**
- Other threats include **entanglement** in fishing gear, **collisions with ships,** and proposals to allow for a **commercial hunt** once again.

➢ **Protection Status:**
- **IUCN Red List:** Vulnerable
- **CITES:** Appendix I
- **Wildlife (Protection) Act, 1972:** schedule I

Bharitalasuchus Tapani: A Carnivorous Reptile

Why in News

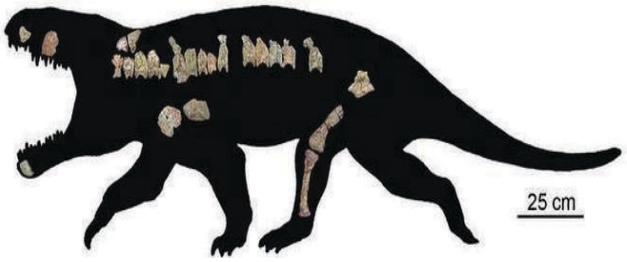
Recently, an international team of paleontologists has thrown light on a carnivorous reptile that lived 240 million years ago (Bharitalasuchus tapani).

➢ The Team studied some of the fossil specimens stored at the Indian Statistical Institute, Kolkata.

➢ In the mid 20th century, researchers from the Institute carried out extensive studies on rocks of the Yerrapalli Formation in what is now Telangana, uncovering several fossils.

Key Points

➢ **About:**
- This reptile belongs to **a genus and species previously unknown to science.** They named it **Bharitalasuchus tapani (BT).**
- BT **were robust animals with big heads and large teeth**, and these probably predated other smaller reptiles.
  - They were **approximately the size of an adult male lion** and **might have been the largest predators in their ecosystems.**
- In the **Telugu language**, Bhari means huge, Tala means head, and Suchus is the name of the Egyptian crocodile-headed deity.
- The species is named after **paleontologist Tapan Roy Chowdhury** in honour of his contribution to Indian vertebrate paleontology and especially his extensive work on the **Yerrapalli Formation** tetrapod fauna.
- Further studies revealed that the reptile **belonged to a family of extinct reptiles named Erythrosuchidae.**
  - Erythrosuchids are known from Lower-Middle Triassic rocks of South Africa, Russia, and China, and there have been preliminary reports from the Middle Triassic Yerrapalli Formation of south-central India.



➢ **Yerrapalli Formation:**
- It is a Triassic (period from 250-201 million years ago) rock formation consisting primarily of mudstones that outcrops in the Pranhita–Godavari Basin in southeastern India.
- Apart from this erythrosuchid reptile, the fossil assemblage of the Yerrapalli Formation **includes many other extinct creatures** such as ceratodontid lungfish, rhynchosaur and allokotosaurian.
- However, **deforestation, mining, agricultural expansion, urbanisation** are gradually destroying the fossiliferous localities of India.

Note:

LEAF Coalition

Why in News

LEAF (Lowering Emissions by Accelerating Forest Finance) Coalition was announced at the **Leaders Summit on Climate, 2021.**

- LEAF coalition will be one of the largest ever **public-private efforts to protect tropical forests** and **intend to mobilize at least USD 1 billion in financing** to countries committed to protecting their tropical forests.

Key Points

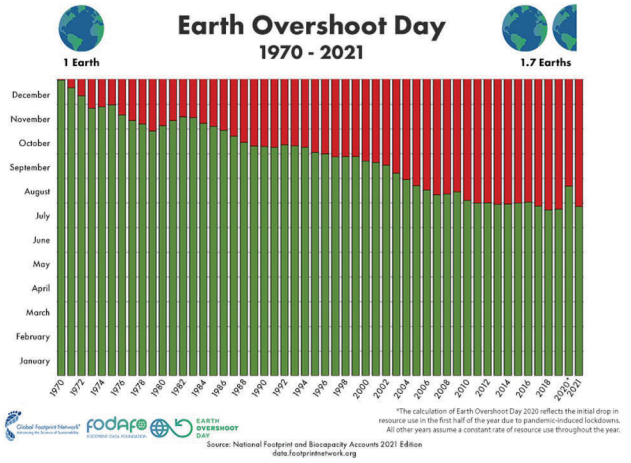
- **About LEAF Coalition:**
  - It is **a collective of the governments of the USA, United Kingdom and Norway.**
  - As it is a public-private effort, thus **also supported by transnational corporations (TNCs)** like Unilever plc, Amazon.com, Nestle, Airbnb etc.
  - A country willing to participate would need to fulfil certain predetermined conditions laid down by the Coalition.
- **Financial Support:**
  - The **results-based financing model** will be used in LEAF.
  - The model **weighs on work by the Environmental Defense Fund** over two decades, in collaboration with Indigenous communities, forest peoples, Brazilian and US NGOs, and other partners, to protect the Amazon and tropical forests globally.
  - Performance will be measured against the **TREES Standard (The REDD+ Environmental Excellence Standard)**.
- **Significance:**
  - **Platform for Private Leadership:** The goal of **net zero emissions** cannot be reached without bold leadership from the private sector and commitment to leverage its scale, investment capacity and political power to build a more sustainable, resilient and equitable future.
  - **Increases Carbon Sink**: Tropical forests are massive carbon sinks and by investing in their protection, public and private players are likely to stock up on their **carbon credits**.
    - It will help in achieving **Nationally Determined Contributions (NDCs)** under the **Paris Agreement**.
  - **Achieve REDD+ Objectives**: It is a step towards concretising the aims and objectives of the **Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism**.
  - **Solve Development versus Ecological Commitment:** Such a financial impetus is crucial as it incentivises developing countries **to capture extensive deforestation and provide livelihood opportunities** to forest-dependent populations.
  - **Complements Other Global Goals:** Ending tropical and subtropical forest loss by 2030 is vital to achieving global climate, **biodiversity** and **sustainable development goals** as well as sustaining the well-being and cultures of Indigenous peoples and other forest communities.

Earth Overshoot Day, 2021

Why in News

According to the **World Wide Fund for Nature (WWF),** humanity has again **used up all biological resources that our planet regenerates** during the entire year **by 29th July, 2021.**

- **Humanity currently uses 74% more** than what the **planet's ecosystems can regenerate** — or 1.7 Earths.
- From Earth Overshoot Day until the end of the year, **humanity operates on ecological deficit spending.**



Key Points

- **About:**
  - The day marks the date when **humanity's demand for ecological resources (fish and forests, for instance) and services** in a given year exceeds what the Earth can regenerate in that year.

Note:

- The **concept of Earth Overshoot Day** was first conceived by **Andrew Simms of the UK think tank New Economics Foundation**, which partnered with Global Footprint Network in 2006 to launch the first global Earth Overshoot Day campaign.
  - **Global Footprint Network** is an **international non profit organization** founded in the year 2003**.** It's key strategy has been to make **available robust Ecological Footprint data.**
  - The Ecological Footprint is a metric that comprehensively **compares human demand on nature against nature's capacity to regenerate.**
- Earth Overshoot Day is **computed by** dividing the planet's biocapacity (the amount of ecological resources Earth is able to generate that year), by humanity's Ecological Footprint (humanity's demand for that year), and multiplying by 365, the number of days in a year:
  - (Earth's Biocapacity / Humanity's Ecological Footprint) × 365 = Earth Overshoot Day

Genome of Salt-secreting Mangrove Species Decoded

Why in News

Recently, the scientists for the first time have decoded the reference-grade whole **genome sequence** of a highly salt-tolerant and salt-secreting **mangrove** species, ***Avicennia marina***.

- This study was **led by the Department of Biotechnology (DBT)-Institute of Life Sciences, Bhubaneswar.**

Key Points

- **Avicennia Marina:**
  - It is **one of the most prominent mangroves species** found in all mangrove formations in India.
  - It is a **salt-secreting and extraordinarily salt-tolerant mangrove** species that grows optimally in 75% seawater and tolerates >250% seawater.
  - It is **among the rare plant species, which can excrete 40% of the salt** through the salt glands in the leaves, besides its extraordinary capacity to exclude salt entry to the roots.
  - It is also **referred to as grey mangrove or white mangrove.**
- **Significance of Study:**
  - This study assumes significance as **agriculture productivity globally is affected due to abiotic stress factors** such as limited water availability and salinization of soil and water.
    - Availability of water is a significant challenge to crop production in dryland areas, accounting for 40% of the world's total land area.
    - Salinity is prevalent in 900 million hectares globally (with an estimated 6.73 million ha in India), and it is estimated to cause an annual loss of 27 billion USD.
  - The genomic resources generated in the study **will pave the way for researchers to study the potential of the identified genes for developing drought and salinity tolerant varieties** of important crop species of the coastal region that is significant for India with 7,500m of coastline and two major island systems.

New Initiatives in Building Energy Efficiency

Why in News

Recently, **"Aiming for Sustainable Habitat: New Initiatives in Building Energy Efficiency 2021"** was launched by the **Bureau of Energy Efficiency (BEE).**

- These initiatives **seek to enhance energy efficiency in the building sector** and were launched as part of **'Azadi Ka Amrut Mahotsav'.**

Bureau of Energy Efficiency

- The BEE is a **statutory body** established through the **Energy Conservation Act, 2001 under the Union Ministry of Power.**
- It **assists in developing policies and strategies** with the primary objective of reducing the energy intensity of the Indian economy.
- BEE **coordinates** with designated consumers, designated agencies, and other organizations **to identify and utilize the existing resources and infrastructure, in performing its functions.**

Key Points

- **Initiatives Launched:**
  - **Eco Niwas Samhita 2021:**

Note:

- It is an **Energy Conservation Building Code for Residential Buildings (ECBC-R)** to give a further fillip to India's energy conservation efforts.
- It specifies code compliance approaches and minimum energy performance requirements for building services, and verification framework with **Eco Niwas Samhita 2021**.

❍ **Hand Book for Learning:**

- The web-based platform '**The Handbook of Replicable Designs for Energy Efficient Residential Buildings'** as a learning tool, which can be used to create a pool of ready-to-use resources of replicable designs to construct energy-efficient homes in India.

❍ **Online Directory of Building Materials:**

- Creating an Online Directory of Building Materials that **would envisage the process of establishing standards for energy efficient building materials.**

❍ **NEERMAN Awards:**

- **NEERMAN Awards**, (National Energy Efficiency Roadmap for Movement towards Affordable & Natural Habitat) were announced, with the **goal of encouraging exceptionally efficient building designs** complying with BEE's Energy Conservation Building Codes.

❍ **Online Star Rating Tool:**

- It **provides performance analysis to help professionals** decide the best options to pick for energy-efficiency of their homes.
- It was launched for **Energy Efficient Homes**, created to improve energy-efficiency and reduce energy consumption in individual homes.

❍ **Training:**

- Training of over 15,000 Architects, Engineers and Government officials on **Energy Conservation Building Code (ECBC) 2017** and **Eco Niwas Samhita 2021.**

➢ **Significance:**

❍ The **building sector is the second largest consumer of electricity** after industry but it is expected to become the **largest energy consuming sector by 2030.**

❍ These initiatives will **help enhance the energy-efficiency levels in residential buildings across the country,** thereby leading to sustainable habitation.

- The initiatives will go a long way to **make India more energy-efficient.**

Red Tide

Why in News

Florida has been battling outbreaks of red tide, caused by the algae Karenia brevis, for several years.

➢ This year's bloom may have been aggravated due to the release of contaminated water into Tampa Bay earlier.

➢ Tampa Bay, arm of the Gulf of Mexico, indenting the west coast of Florida, US.

Key Points

➢ **About:**

❍ **Harmful Algal Blooms, or HABs**, occur w**hen colonies of algae grow out of control and produce toxic or harmful effects** on people, fish, shellfish, marine mammals and birds.

❍ While **many people call these blooms 'red tides,'** scientists prefer the term harmful algal bloom.

❍ **One of the best known HABs in the US** occurs **nearly every summer along Florida's Gulf Coast.**

- This type of bloom **is caused by a species of dinoflagellate known as Karenia brevis.**

❍ On the other hand, blooms in freshwater lakes and reservoirs are **most commonly caused by blue-green algae (also known as cyanobacteria)**.

- Blue-green algae blooms **have a direct relation to agricultural and urban runoff.** Nutrient pollution encourages the growth of cyanobacteria.

Note:

- **Causes of Algal Blooms:**
  - **Eutrophication:**
    - Nutrients promote and support the growth of algae and Cyanobacteria. The **Eutrophication (nutrient enrichment)** of waterways is considered as a major factor.
  - **Temperature:**
    - Blooms are more likely to happen in summer or fall but can occur any time of year.
  - **Turbidity:**
    - Turbidity is caused by the presence of suspended particles and organic matter in the water column.
    - When turbidity is low, more light can penetrate through the water column. This creates optimal conditions for algal growth.
- **Implications of Algal Bloom:**
  - Produce **extremely dangerous toxins** that can sicken or kill people and animals.
    - Fish contaminated with the algae and eaten by other organisms, including humans, can be harmful to them.
    - Algal blooms can also impact aquaculture, or the farming of marine life.
  - There have also been complaints of respiratory distress in humans due to red tide.
  - Algal Blooms deprive aquatic organisms of Sunlight and oxygen and negatively impact a variety of species that live below the water surface.
  - Create **Dead Zones** in the water.
    - "Dead zone" is a more common term for hypoxia, which refers to a reduced level of oxygen in the water.
  - Raise **treatment costs for drinking water.** Hurt industries that depend on clean water.

Atlantic Ocean Current System: AMOC

Why in News

According to the recently released **IPCC's Report**, **Atlantic Meridional Overturning Circulation (AMOC)** is **losing its stability** and is very likely to **decline over the 21st century.**

- The **ocean has an interconnected current, or circulation, system powered by wind, tides, the Earth's rotation (Coriolis effect), the sun (solar energy), and water density differences.**

Key Points

- **About AMOC:**
  - It is a **large system of ocean currents.**
  - It is the **Atlantic branch of the ocean conveyor belt or ThermoHaline Circulation (THC),** and distributes heat and nutrients throughout the world's ocean basins.
- **Working of AMOC:**
  - AMOC carries **warm surface waters from the tropics** towards the Northern Hemisphere, where it cools and sinks.
  - It then **returns to the tropics** and then to the **South Atlantic as a bottom current.** From there it is **distributed to all ocean basins** via the **Antarctic Circumpolar Current.**
    - The **ACC** is the **most important current in the Southern Ocean**, and the **only current** that flows **completely around the globe.**
- **Implications of decline of AMOC:**
  - **Without a proper AMOC and Gulf Stream**, Europe will be **very cold.**
    - Gulf Stream, a part of the AMOC, is a **warm current responsible for mild climate** at the Eastern coast of North America as well as Europe.
  - An **AMOC shutdown would cool the northern hemisphere** and **decrease rainfall over Europe.**
  - It can also have **an effect on the El Nino.**
    - El Nino is a **climate pattern** that describes the **unusual warming of surface waters** in the eastern tropical Pacific Ocean.
  - It can also **shift monsoons** in **South America and Africa.**
- **Causes:**
  - Climate models have long predicted that **global warming** can cause a **weakening of the major ocean systems of the world.**
  - **Freshwater inflow** from the melting of the Greenland ice sheet.
    - In July 2021, **researchers noted** that a **part of the Arctic's ice called "Last Ice Area" has also melted.**
    - The **freshwater from the melting ice** reduces the **salinity and density of the water.**

Note:

- Now, the water is unable to sink as it used to and weakens the AMOC flow.
- **Indian Ocean** may also be helping the slowing down of AMOC.
- **Increasing precipitation** and river run-off.

➢ **Importance of AMOC:**
- It plays a **critical role in redistributing heat** and **regulating weather patterns** around the world.

➢ **Concerns:**
- The AMOC decline is **not just a fluctuation or a linear response** to **increasing temperatures** but likely means the **approaching of a critical threshold** beyond which the **circulation system could collapse.**

Slender Loris

Why in News

Recently, some environmentalists demanded that Tamil Nadu's Kadavur Reserve Forest be declared as a **Wildlife Sanctuary** in order to conserve **Slender Loris** (Loris tardigradus)**.**

➢ The wildlife census conducted during 2016-17 showed an **appreciable population of 3,500 slender loris in the Karur Reserve Forest.**

Key Points

➢ **About:**
- The slender lorises (Loris) are a genus of loris **native to India and Sri Lanka.**
- Slender lorises spend most of **their life in trees, traveling along the tops of branches with slow and precise movements.**
- They generally feed **on insects, reptiles, plant shoots, and fruit.**

➢ **Habitat:**
- They are found **in tropical rainforests, scrub forests, semi-deciduous forests, and swamps.**

➢ **Types:**
- There are **two species of Slender Loris**, the only members of the genus 'Loris':
  - **Red Slender Loris** (Loris tardigradus)
  - **Grey Slender Loris** (Loris lydekkerianus)

➢ **Threat:**
- It is believed that they have **medicinal properties** and they are captured and sold. Since there is great demand for keeping these animals as pets, **they are illegally smuggled.**
- Habitat loss, electrocution of live wires and road accidents **are other threats that have caused its populations to dwindle.**

➢ **Protection Status:**
- **IUCN:** Endangered,
- **Wildlife (Protection) Act of India, 1972:** Schedule I
- **CITES:** Appendix II

Children's Climate Risk Index: UNICEF

Why in News

Recently, the **United Nations Children's Fund (UNICEF)** in collaboration with **Fridays for Future** launched a report named **'The Climate Crisis Is a Child Rights Crisis: Introducing the Children's Climate Risk Index'.**

➢ It is the **first comprehensive analysis of climate risk from a child's perspective.**

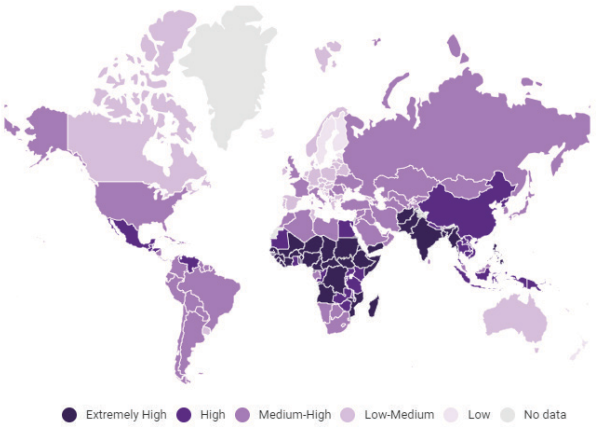
➢ Earlier an analysis, based on **Notre Dame Global Adaptation Initiative (ND-GAIN) index,** had shown the impact of **Climate Change** on children across the world.

Key Points

➢ **Children's Climate Risk Index:**
- It **ranks countries based on children's exposure to climate and environmental shocks,** such as **Cyclones** and **Heatwaves**, as well as their vulnerability to those shocks, based on their access to essential services.

Note:

Level of Climate Risk on Various Countries



- **Pakistan** (14th), **Bangladesh** (15th), **Afghanistan** (25th) **and India** (26th) are among four South Asian countries where children are at **extremely high risk** of the impacts of the climate crisis.

➢ **Indian Scenario:**

- **India is among four South Asian countries** where children are most at risk of the impacts of climate change threatening their health, education, and protection.
- It is estimated that **more than 600 million Indians will face 'acute water shortages'** in the coming years, while at the same time **Flash Flooding is to increase significantly** in the majority of India's urban areas once the global temperature increase rises above 2 Celsius.
  - Twenty-one of the world's 30 cities with the most polluted air in 2020 were in India.

➢ **Global Scenario:**

- **Countries With Maximum Vulnerability:**
  - Young people living in the **Central African Republic, Chad, Nigeria, Guinea, and Guinea-Bissau** are the most at risk of the impacts of climate change.
  - These children face a deadly combination of exposure to multiple climate and environmental shocks with **a high vulnerability due to inadequate essential services, such as water and sanitation, healthcare and education.**

Immune Cells in Sea Corals

Why in News

A new study has identified for the **first time that specialised immune cells (phagocytic cells) exist in certain varieties of sea corals and anemones.**

➢ It will help in **better understanding how reef-building corals** and **other reef animals protect themselves from foreign invaders** like bacteria and viruses found in and around **coral reefs.**

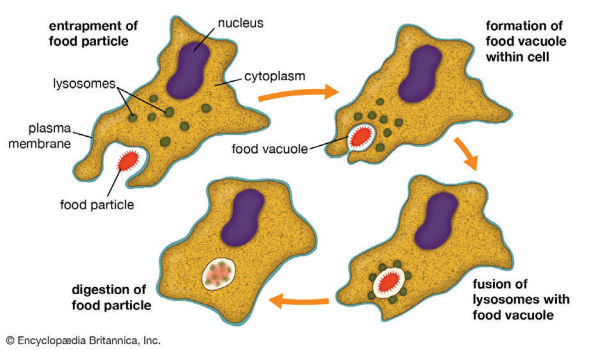
Phagocytosis

➢ It is the process by which **certain living cells called phagocytes ingest or engulf other cells or particles.**

➢ The phagocyte may be a **free-living one-celled organism, such as an amoeba**, or one of the **body cells,** such as a **white blood cell.**

➢ In some forms of animal life, such as **amoebas and sponges, phagocytosis is a means of feeding.**

➢ In higher animals phagocytosis is chiefly a **defensive reaction against infection and invasion of the body by foreign substances (antigens).**



Sea anemones

➢ They are sometimes called the **'flowers of the sea',** sea anemones are actually **beautiful animals**, they are a close **relative of coral and jellyfish**, and are the marine, predatory animals of the order Actiniaria.

➢ They are **found from the tidal zone of all oceans to depths of more than 10,000 metres.**

Key Points

➢ **Coral:**

- Corals are made up of **genetically identical organisms called polyps.** These polyps have **microscopic algae called zooxanthellae** living within their tissues.
  - The corals and algae have a **mutualistic relationship.**
  - The coral **provides the zooxanthellae with the compounds** necessary for **photosynthesis**. In return, the **zooxanthellae supply the coral**

Note:

with organic products of photosynthesis, like carbohydrates, which are utilized by the coral polyps for the synthesis of their calcium carbonate skeletons.

- In addition to providing corals with essential nutrients, **zooxanthellae are responsible for the unique and beautiful colors of corals.**

- They are also called the **"rainforests of the seas".**
- There are two **types of corals:**
  - **Hard, shallow-water corals**—the kind that builds reefs.
  - **Soft corals and deepwater corals** that live in dark cold waters.

➢ **Benefits of Coral:**

- **Habitat:**
  - Corals are home to over **1 million diverse aquatic species**, including thousands of fish species.
- **Income:**
  - Coral reefs and related ecosystems have a **global estimated value of USD 2.7 trillion per year,** or 2.2% of all global **ecosystem service** values', this includes tourism and food.
- **Coastal Protection:**
  - Coral reefs **reduce shoreline erosion** by absorbing energy from the waves. They can protect **coastal housing, agricultural land, and beaches.**
- **Medicine:**
  - Reefs are **home to species** that have the **potential for treatments** for some of the **world's most prevalent and dangerous illnesses and diseases.**

➢ **Threats:**

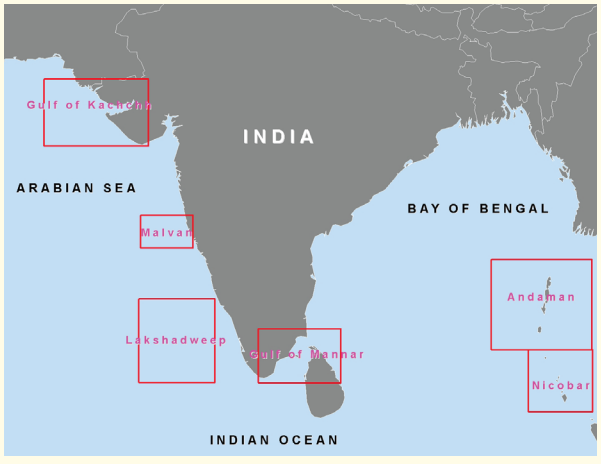
- **Overfishing & Destructive Fishing:**
  - Overfishing can affect the **reef's ecological balance and biodiversity.**
  - Fishing with **dynamite, cyanide, bottom trawling and Muro Ami** (banging on the reef with sticks) can **damage entire reefs** and is unsustainable.
- **Recreational Activities:**
  - Unregulated recreational activities and tourism cause damage to the very environment upon which the industries depend.
- **Coastal Development:**
  - Coastal areas have some of the fastest rates of growth in tropical countries**. Sensitive habitats are destroyed** or disturbed by the dredging of deep-water channels or marinas, and through the dumping of waste materials.
- **Pollution:**
  - Urban and industrial waste, sewage, agrochemicals, and oil pollution are poisoning reefs.
- **Climate Change:**
  - **Coral Bleaching:** When water is too warm, corals will expel the algae (zooxanthellae) living in their tissues causing the coral to turn completely white. This is called coral bleaching.
  - **Ocean Acidification:** The rising acidity of the oceans threatens coral reefs by making it harder for corals to build their skeletons.

➢ **Initiatives to Protect Corals:**

- **Global:**
  - **International Coral Reef Initiative**
  - Global Coral Reef Monitoring Network (GCRMN)
  - Global Coral Reef Alliance (GCRA)
  - **The Global Coral Reef R&D Accelerator Platform**
- **Indian:**
  - India has included the studies on coral reefs under the **Coastal Zone Studies (CZS).**
  - In India, the **Zoological Survey of India (ZSI)**, with help from Gujarat's forest department, is attempting a process to restore coral reefs using **"biorock" or mineral accretion technology.**
  - **National Coastal Mission Programme**, to protect and sustain coral reefs in the country.

Major Locations of Corals in India

Coral reefs are present in the areas of **Gulf of Kutch, Gulf of Mannar, Andaman & Nicobar, Lakshadweep Islands and Malvan.**



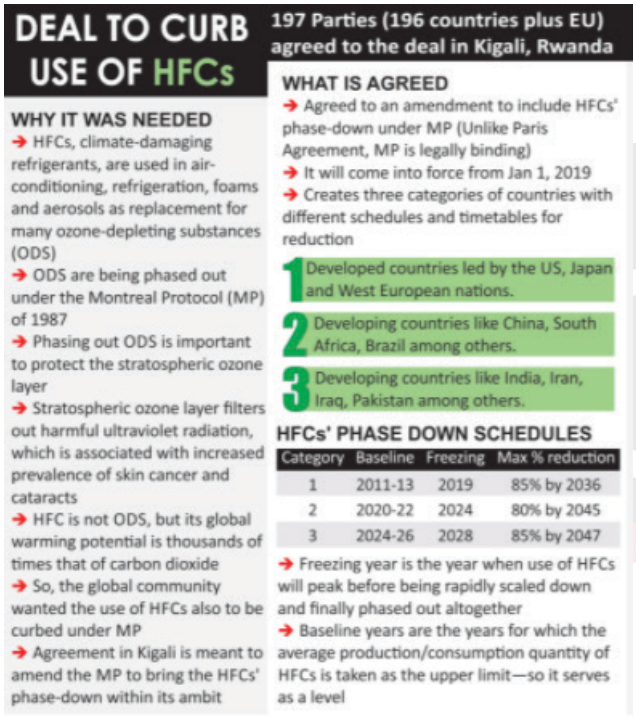
Note:

India Decides to Ratify the Kigali Amendment

Why in News

Recently, the Union Government approved the ratification of the **Kigali Amendment to the Montreal Protocol on phasing down climate-damaging refrigerant Hydrofluorocarbons (HFCs).**

- It comes close on the heels of similar decisions by the United States and China, the world's largest producers and consumers of HFCs. 122 countries had ratified the Kigali Amendment by the end of July 2021.



Key Points

- **About:**
  - The United States, China and India are in separate groups of countries, with different time schedules to phase out their HFCs and replace them with climate-friendly alternatives.
  - India has to reduce its HFC use by 80% by the year 2047, while China and the United States have to achieve the same target by the year 2045 and 2034 respectively.
  - India will complete its phasedown of HFCs in four steps from 2032 onwards with a cumulative reduction of 10% in 2032, 20% in 2037, 30% in 2042 and 80% in 2047.
  - **Amendments to** the existing legislation framework, the **Ozone Depleting Substances (Regulation and Control) Rules** to allow appropriate control of the production and consumption of hydrofluorocarbons to ensure compliance with the Kigali Amendment **will be done by mid-2024.**
- **Background:**
  - The **1989 Montreal Protocol** is not a climate agreement. It is instead **aimed at protecting the earth from Ozone-Depleting Substances (ODSs)** like the ChloroFluoroCarbons (CFCs), that were earlier used in the air-conditioning and refrigerant industry.
    - The widespread use of **CFCs had caused a hole in the Ozone layer of the atmosphere,** which allowed some harmful radiation to reach the earth. These radiations were considered potential health hazards.
  - The Montreal Protocol **led to the replacement of CFCs with Hydrofluorocarbons (HFCs)** which do not destroy the Ozone layer.
  - But they were **later found to be extremely potent in causing Global Warming**. So, the HFCs solved one problem, but were contributing in a major way to another.
  - But these could not be eliminated under the original provisions of Montreal Protocol which was meant to phase-out ODSs only.
  - The **Kigali Amendment enabled the Montreal Protocol to mandate the elimination of HFCs** as well.
    - In October 2016, with the United States' leadership, 197 countries adopted an amendment to phase down HFCs under the Montreal Protocol in Kigali, Rwanda.
- **Kigali Amendment to Montreal Protocol:**
  - The Kigali Amendment aims for the **phase-down of hydrofluorocarbons (HFCs)** by cutting their production and consumption.
  - The goal is to achieve **over 80% reduction in HFC consumption by 2047.**
  - Given their zero impact on the depletion of the ozone layer, **HFCs are currently used as replacements of hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs)** in air conditioning,

Note:

refrigeration and foam insulation, however they are powerful greenhouse gases.

- **Under the amendment:**
  - Developed countries will reduce HFC consumption beginning in 2019.
  - Most developing countries will freeze consumption in 2024,
  - Some developing countries including India with unique circumstances will freeze consumption in 2028.
- The plan also **provides financing to certain countries**, to help them transition to climate-friendly alternatives.
- With the Kigali Amendment, the **Montreal Protocol has become an even more powerful instrument** against global warming.

➢ **Significance:**

- This important instrument is crucial to **achieving the target of restraining the increase in global temperatures to 2 degree Celsius** from pre-industrial times.
  - As pointed out by a recent report of the **Intergovernmental Panel on Climate Change (IPCC)**, the average temperature of the planet has already risen by about 1.1 degree Celsius.
- The collective action is expected to **prevent emissions of upto 105 million tonnes of carbon dioxide equivalent of greenhouse gases helping to avoid up to 0.5 degree Celsius** of global temperature rise by 2100, while continuing to protect the ozone layer.
- Because **HFCs** were not ozone-depleting, they were not controlled substances under the Montreal Protocol. They were part of the problematic greenhouse gases whose emissions are **sought to be curtailed through climate change instruments such as the Kyoto Protocol of 1997 and the 2015 Paris Agreement.**
  - But the Montreal Protocol has been a far more effective and successful agreement than the climate change instruments. It has already resulted in the phase-out of 98.6% of ozone-depleting substances. The remaining 1.4% are the HCFCs that are in the process of being transitioned.

➢ **Significance for India:**

- **India became a party** to the Montreal Protocol on Substances that Deplete the Ozone Layer **in June 1992** and since then has ratified the amendments to the Montreal Protocol. India **has successfully met the phase-out targets of all the Ozone Depleting Substances** as per the Montreal Protocol Schedule.
- India is **one of the first countries in the world to launch a cooling action plan in 2019.** This comprehensive plan is aimed at reducing cooling demand, enabling refrigerant transition, enhancing energy efficiency and better technology options with a 20-year time horizon.
  - The **signing of the Kigali Amendment is a cue for the markets to make a faster transition from HFCs to cleaner gases.**
- It would **boost domestic manufacturing and employment generation goals.**
- The ratification would signify that **India is ready to compete in the market for low-Global Warming Potential GWP (climate-friendly) refrigerants,** which will spur domestic innovation and attract international investments.
- The decision would **pave the way for India to achieve its climate change mitigation goals and cooling commitments.** India is among a small group of countries on track to meet its climate commitments under the Paris Agreement.

Deepor Beel: Eco-Sensitive Zone

Why in News

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has notified the **Eco-sensitive zone** of the **Deepor Beel Wildlife Sanctuary (Assam)**.

➢ Earlier, **Kaziranga National Park** became the **first in the country to use satellite phones** and **Dehing Patkai and Raimona** were **designated as National Parks.**

Key Points

➢ **Deepor Beel:**

- **About:**
  - It is **one of the largest freshwater lakes in Assam** and the **State's only Ramsar site** besides being an **Important Bird Area** by Birdlife International.
  - It is **located towards the southwest of Guwahati city, Assam** and is the erstwhile water channel of **River Brahmaputra.**

Note:

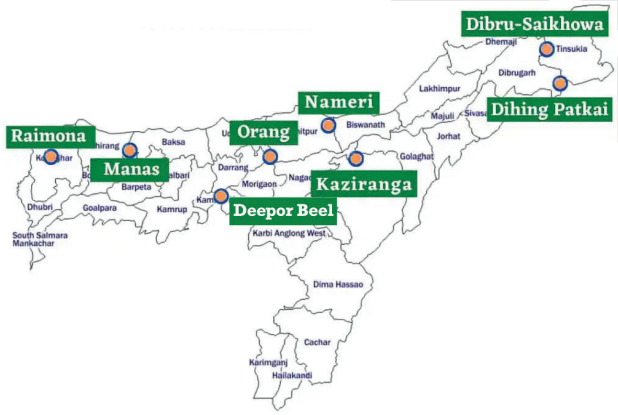
- The lake expands up to 30 sq. km in summer and reduces to about 10 sq. km in the winter. The **wildlife sanctuary** measures 4.1 sq. km within this wetland (beel).

❍ **Importance**:

- It **constitutes a unique habitat for aquatic flora and avian fauna**.
- It has both **biological and environmental importance** besides being the **only major storm-water storage basin** for Guwahati city.
- It provides **a means of livelihood** for a number of local families.
  - Recently, six young girls from the fishing community from Assam have developed a biodegradable and compostable yoga mat called **'Moorhen Yoga Mat'.**

❍ **Concerns**:

- It's **water has become toxic** and it has **lost many of its aquatic plants that elephants** would feed on.
- It has for decades been **threatened by a railway track** — set to be doubled and electrified — on its southern rim, a garbage dump, and encroachment from human habitation and commercial units.



Behler Turtle Conservation Award

Why in News

Recently, **Indian biologist Shailendra Singh** has been awarded the **Behler Turtle Conservation Award** for bringing **three critically endangered turtle conservation species** back from the brink of extinction.

➢ There are **29 species of freshwater turtles and tortoises in the country.**

Key Points

➢ **About Behler Turtle Conservation Award:**

❍ **Established in 2006,** it is **a major annual international award** honoring excellence **in the field of tortoise and freshwater turtle conservation** and biology, and **leadership in the chelonian conservation** and biology community.

❍ Also referred to as the **"Nobel Prize" of Turtle Conservation.**

❍ **Co-presented** by Turtle Survival Alliance (TSA), **IUCN** Tortoise and Freshwater Turtle Specialist Group, Turtle Conservancy, and Turtle Conservation Fund.

❍ In the present context, the **three critically endangered turtles** are being conserved as a part of TSA India's research, conservation breeding and education programme in different parts of the country.

- The **Northern River Terrapin** (Batagur baska) is being conserved at the **Sunderbans;**
- The **Red-crowned Roofed Turtle** (Batagur kachuga) at **Chambal;**
- The **Black Softshell Turtle** (Nilssonia nigricans) at different temples in Assam.

➢ **Northern River Terrapin:**

❍ **Habitat:**

- The **Sundarbans eco-region** is their natural habitat.

❍ **Protection Status:**

- **IUCN Red List:** Critically Endangered
- **CITES:** Appendix I
- **Wildlife (Protection) Act, 1972:** Schedule I

❍ **Threats:**

- Exploited for local subsistence and ritualistic consumption as well as some regional trade, including supply to the Calcutta markets in the 19th and 20th centuries.

➢ **Red-crowned Roofed Turtle:**

❍ **Habitat:**

- Historically, the species was widespread in the Ganga River, both in India and Bangladesh. It also occurs in the Brahmaputra basin.
- Currently in India, the **National Chambal River**

Note:

Gharial Sanctuary is the only area with a substantial population of the species.

- **Protection Status:**
  - **IUCN Red List:** Critically Endangered
  - **CITES:** Appendix II
  - **Wildlife (Protection) Act, 1972:** Schedule I
- **Threats:**
  - Loss or degradation of habitat due to pollution and large scale development activities like water extraction for human consumption and irrigation and irregular flow from the upstream dams and reservoirs.

➢ **Black Softshell Turtle:**

- **Habitat:**
  - They are found in ponds of temples in northeastern India and Bangladesh.
  - Its distribution range also includes the Brahmaputra River and its tributaries.
- **Protection Status:**
  - **IUCN Red List:** Critically Endangered
  - **CITES:** Appendix I
  - **Wildlife (Protection) Act, 1972:** No legal protection
- **Threats:**
  - Consumption of turtle meat and eggs, silt mining, encroachment of wetlands and change in flooding pattern.

Land Sink & Emissions

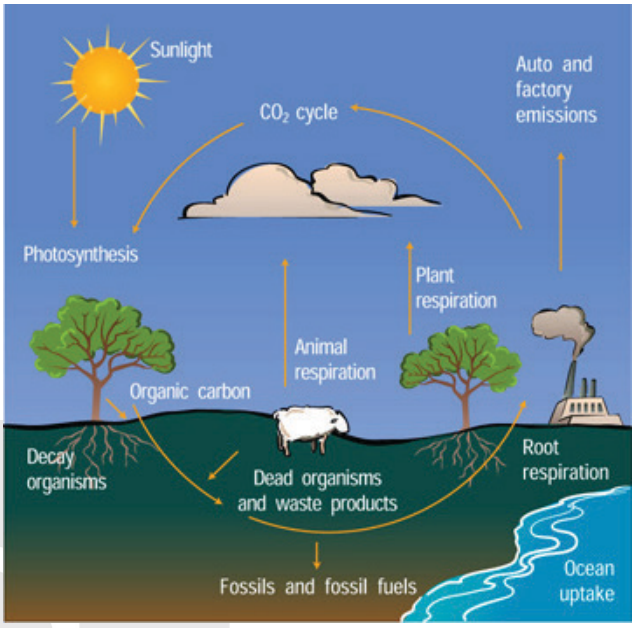
Why in News

Despite caution from scientists, policymakers and corporations still assume that **natural carbon sinks like land and oceans will mop up their fossil fuel emissions**.

Key Points

➢ **Land Sink:**

- Land is a **critical component of the climate system,** actively **engaged in the flows of carbon, nitrogen, water, and oxygen** - essential building blocks for life.
- **Greenhouse Gases** (GHGs such as carbon dioxide) follow a natural cycle - they are constantly released into the atmosphere and are removed from it via natural 'sinks' such as the land and oceans.
- Plants and healthy ecosystems have an **unparalleled capacity to absorb carbon through photosynthesis** and store it in living biomass.
  - About 56% of the carbon dioxide (CO_2) emitted by humans is absorbed by the oceans and land.
  - About 30% by land and the rest by oceans.



➢ **Recognition of Role of Land:**

- The role of land (forests and agricultural land) as a mitigation pathway to reduce CO_2 emissions was **recognised by** the **United Nations Framework Convention on Climate Change (UNFCCC)** in 1992.
- The **Kyoto Protocol** in 1997 **endorsed** the notion that not only should governments employ policies to enhance the land carbon sink capacities of their territories but also that such **mitigation could be set against requirements for reductions in emissions** from fossil fuel consumption.

➢ **Related Data:**

- Land use accounted for 13% of anthropogenic CO_2 emissions during 2007-2016, according to a report by The **Intergovernmental Panel on Climate Change** (IPCC) in 2019.
  - But it also **provided a net sink of around 11.2 gigatonnes** of carbon dioxide per year, equivalent to 29% of the total CO_2 emissions in the same period.
- This means, **29-30% human-driven CO_2 emissions have been soaked up by the world's land sinks** during the past three decades.

Note:

- **Concerns:**
  - **Rising Heat Levels**:
    - Increased heat levels are adding to the **moisture stress in forests and leading to widespread burning.**
    - So, on the one hand, forests are being **cut for different economic activities, reducing their role as sinks** for the CO_2 released from fossil fuel burning.
    - On the other hand, as temperatures increase, the forests will shrink further.
  - **Anthropogenic and Natural Factors:**
    - Human-induced factors such as **deforestation and natural factors** such as climate variability in sunshine, temperature and rainfall can cause a variation in the strength of the land carbon sink.
  - **Rising CO_2 Concentration:**
    - **Climate Change 2021 Report: IPCC** states that **CO_2 emissions are the highest in at least two million years.** Humans have emitted 2,400 billion tonnes of CO_2 since the late 1800s.
- **Suggestions:**
  - **Growing Trees:**
    - The world is not on track to reduce GHG emissions at the scale needed to avert a temperature rise of 1.5°C over pre-industrial levels.
    - The solution, then, is to **find ways in which emissions can be removed** from the atmosphere and growing trees becomes part of this package.
  - **Get off Fossil Fuels:**
    - There is a **need to use land especially in this interim of moving from fossil fuels to Renewables**; but in the end fossil fuels must be gotten rid of.
  - **Artificial Carbon Sequestration:**
    - The **artificial carbon trapping** technologies efficiently **capture carbon in large amounts,** convert it and also store it for thousands of years.
      - The technique is based on passing air through a stack of charged electrochemical plates.
    - The technology aims to **make coal a viable, technical, environmental and economic case** for the future.
- **Related Initiatives:**
  - **Bonn Challenge:**
    - **Bonn Challenge** is a global effort **to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020**, and 350 million hectares by 2030.
  - **UN Decade on Ecosystem Restoration:**
    - In March 2019, the **United Nation General Assembly** declared 2021-2030 as the UN Decade on Ecosystem Restoration **to "prevent, halt and reverse the degradation of ecosystems worldwide".**
  - **LEAF Coalition:**
    - It is **an effort** led by the US, the UK and Norway **to mobilise at least USD 1 billion for financing countries** committed to protecting their tropical forests.

Global Methane Pledge

Why in News

Recently, the US President has announced the **Global Methane Pledge**, which is **an US-EU led effort to cut methane emissions by a third by the end of this decade.**

- The announcement has come ahead of 26th **Conference of the Parties (COP26)** of **United Nations Framework Convention on Climate Change (UNFCCC)** in Glasgow, UK.
- This will also help in abiding by the targets of the **Paris climate deal.**

Key Points

- **About:**
  - The pact between the US and the EU **sets a target of cutting at least 30% from global methane emissions**, based on 2020 levels, by 2030.
  - If adopted around the world, this **would reduce global heating by 0.2C** by the 2040s, compared with likely temperature rises by then.
    - The world is now about 1.2C hotter now than in pre-industrial times.
- **Methane Gas:**
  - **About:**
    - Methane is the **simplest hydrocarbon, consisting of one carbon atom and four hydrogen atoms** (CH_4).
      - It is flammable, and is used as a fuel worldwide.

Note:

- Methane is a powerful **greenhouse gas.**
- Approximately 40% of **methane emitted is from natural sources** and about 60% **comes from human-influenced source**s, including livestock farming, rice agriculture, biomass burning and so forth.

❍ **Impact:**

- **More Global Warming Potential:** It is nearly 80-85 times more potent than carbon dioxide in terms of its global warming capacity.
  - This makes it a critical target for reducing global warming more quickly while simultaneously working to reduce other greenhouse gases.
- **Promotes Generation of Tropospheric Ozone:** Increasing emissions are driving a rise in **tropospheric ozone** air pollution, which causes more than one million premature deaths annually.

➢ **Related Indian Initiatives:**

❍ **'Harit Dhara' (HD):** Indian Council of Agricultural Research (ICAR) has developed an anti-methanogenic feed supplement **'Harit Dhara' (HD)**, which can cut down cattle methane emissions by 17-20% and can also result in higher milk production.

❍ **India Greenhouse Gas Program:** The India GHG Program led by WRI India (non-profit organization), Confederation of Indian Industry (CII) and **The Energy and Resources Institute (TERI)** is an industry-led voluntary framework to measure and manage greenhouse gas emissions.

- The programme builds comprehensive measurement and management strategies to reduce emissions and drive more profitable, competitive and sustainable businesses and organisations in India.

Global Methane Initiative (GMI)

➢ It is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a clean energy source.

➢ GMI provides technical support to deploy methane-to-energy projects around the world that enable Partner Countries to launch methane recovery and use projects.

➢ **India is a partner country.**

❍ **National Action Plan on Climate Change (NAPCC):** **NAPCC** was launched in 2008 which aims at creating awareness among the representatives of the public, different agencies of the government, scientists, industry and the communities on the threat posed by climate change and the steps to counter it.

❍ **Bharat Stage-VI Norms:** India shifted from **Bharat Stage-IV (BS-IV) to Bharat Stage-VI (BS-VI)** emission norms.

Super-Hydrophobic Cotton Composite for Oil Spills

Why in News

Recently, the **Indian Institute of Technology (IIT), Guwahati**, has developed a **super-hydrophobic cotton composite** with **Metal-Organic Framework (MOF)** that can clean-up marine **oil-spill.**

➢ Earlier, a study confirmed that **Stimulating Bacteria (Bioremediation)** with nutrients in the cold seawaters of the Canadian Arctic can help decompose diesel and **Other Petroleum Oil** **after Oil Spills.**

Key Points

➢ **About:**

❍ It is a **novel MOF composite, which is a highly porous and water-repellent material** and can absorb oil selectively from an oil-water mixture.

- MOF are **crystalline porous solids** composed of a three-dimensional (3D) network of metal ions held in place by multidentate organic molecules **suitable for solid-phase extraction.**

❍ This MOF composite has **great capability for selective separation of the oils from oil/water mixtures** and the separation efficiency lies between 95% and 98%, irrespective of the chemical composition and density of the oils.

❍ It can also absorb **large volumes of oils and can be reused for a minimum of 10 times** so that the sorbents can provide more recovery of the spilled oil. Both heavy and light oils can be effectively absorbed by the material, which is easy to prepare, cost-effective and recyclable.

➢ **Significance:**

❍ It will **clean-up the spilled oil from environmental water** (river, sea or ocean water) during oil transportation with high efficiency and large absorption capacity, thus reducing environmental water pollution.

Note:

- It is **environmentally friendly and cost effective**. Such low-cost material will reduce the production cost of the material for large-scale synthesis for real applications, compared to currently available materials.

➢ **Other Remedies for Oil Spills:**

Oil Spills

➢ **About:**

- It refers to **any uncontrolled release of crude oil, gasoline, fuels, or other oil by-products** into the environment. It can pollute land, air, or water, though it is mostly used for oceanic oil spills.
- The severe water contamination threatens the health of humans as well as other living species.
- It has become a major environmental and economic problem, chiefly **as a result of intensified petroleum exploration and production on continental shelves** and the transport of large amounts of oils in vessels.
  - **Major oil spills** are frequently followed by the **immediate suspension of commercial fishing** and also affect **tourism and commerce** through sea routes.
- Oil spills that happen in rivers, bays and the ocean most often are caused by accidents **involving tankers, barges, pipelines, refineries, drilling rigs and storage facilities**, but also occur from recreational boats and natural disasters.

➢ **Related Laws in India:**

- Presently, t**here is no law covering oil spill** as such and its consequential environmental damage in India but India has **"the National Oil Spill Disaster Contingency Plan of 1996 (NOS-DCP)"** to handle such situations.
  - It gives the **Indian Coast Guard** the mandate to coordinate with state departments, ministries, port authorities and environmental agencies to assist in oil spill cleaning operations.
- In 2015 India ratified the **International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001** (Bunker Convention). Convention ensures adequate, prompt and effective compensation for damage caused by oil spills.
  - It was administered by the **International Maritime Organization (IMO).**

Report on Climate Indicators & Sustainable Development: WMO

Why in News

Recently, the **World Meteorological Organization (WMO)** has published a new report on **Climate Indicators and Sustainable Development: Demonstrating the Inter-connections**.

➢ WMO **studied seven climate indicators** — carbon dioxide (CO_2) concentration, temperature, **ocean acidification** and heat, sea ice extent, glacier melt and **sea-level rise**.

➢ Its release coincides with the **United Nations General Assembly** annual session and the opening in September 2021 of the **Sustainable Development Goals (SDGs)** Action Zone, which is dedicated to accelerating action on the SDGs.

Key Points

➢ **Aim:**

- To **contribute to the sustainable development agenda** and to inspire leaders to take bolder climate action.

➢ **Importance:**

Note:

- In the face of ongoing **climate change,** poverty, inequality and environmental degradation**, understanding the connections between climate and international development** is a matter of urgency.
- Increasing temperatures will result in **global and regional changes, leading to shifts in rainfall patterns and agricultural seasons**. The intensification of **El Niño** events is also generating more droughts and floods.

➢ **Rising CO_2 Concentration:**

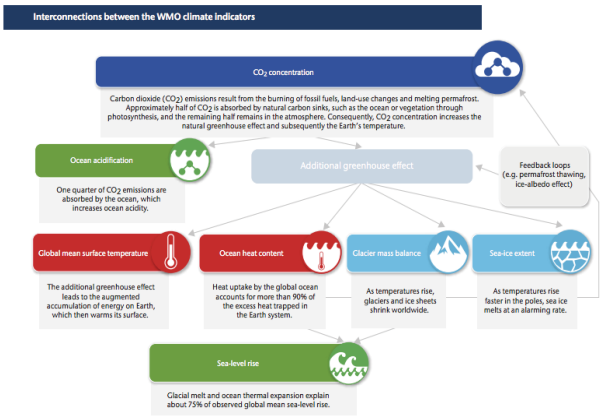
- The rising concentration of CO_2 **will impact all of the 17 United Nations-mandated SDGs.**
- Rising CO_2 concentration **due to human activities** is a key driver of global climate change.

➢ **Impact on SDGs:**

- Rising CO_2 concentration and increasing global temperatures, if left unchecked, would **negatively impact efforts to combat climate change** under the SDG 13.
  - This, in turn, would pose a **significant threat to the achievement of the 16 SDGs other than SDG 13, by 2030.**
- This would happen because uncontrolled rising CO_2 emissions would be **indirectly responsible for risks related to the remaining six climate indicators, namely** temperature, ocean acidification and heat, sea ice extent, glacier melt and sea-level rise.
- For instance, rising concentrations of CO_2 in the atmosphere will **lead to reductions in nutrient content, affecting food security** or the SDG indicator 2.1.2.
  - This would affect the **global goal on tackling poverty, SDG 1,** as well.
- Rising CO_2 in water would cause **ocean acidification,** directly affecting SDG indicator 14.3.1 which addresses marine acidity.
- Both food insecurity and loss of livelihood may drive conflicts related to resource management, thus **threatening regional peace and stability (SDG 16.1).**
- Extreme events attributed to rising temperature affect rainfall patterns and groundwater availability, which leads to a **higher risk of water scarcity, directly affecting SDG 6** on access to water and specially the targets.

➢ **Suggestions:**

- To mitigate climate risks, the WMO recommended to work on:
  - **Improved education** (SDG 4)
  - **Global partnerships** (SDG 17)
  - **Sustainable consumption** (SDG 12)



New WHO Global Air Quality Guidelines

Why in News

Recently, the **World Health Organisation (WHO)** has released **new Global Air Quality Guidelines (AQGs)**. Under these guidelines, WHO has **further lowered the recommended levels of pollutants** that can be considered safe for human health.

➢ This is the **first-ever update of WHO since 2005.** The **goal** of the guideline is **for all countries to achieve recommended air quality levels.**

Key Points

➢ **New Guidelines:**

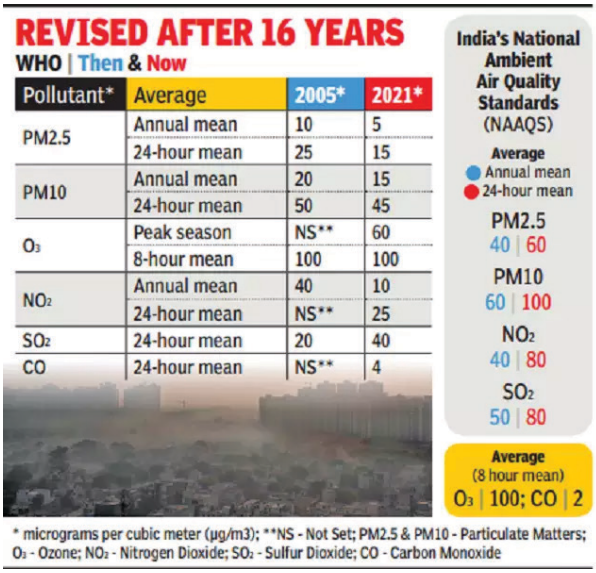
- The guidelines recommend **new air quality levels** to protect the health of populations, by **reducing**

Note:

levels of key air pollutants, some of which also **contribute to climate change.**

- By striving to achieve these guideline levels, **countries will be both protecting health as well as mitigating global climate change.**
- WHO move sets the stage for eventual shifts in policy in the government towards **evolving newer stricter standards.**
- WHO's new guidelines recommend air quality levels for **6 pollutants,** where evidence has advanced the most on health effects from exposure.
  - 6 classical pollutants include **particulate matter (PM 2.5 and 10), ozone (O_3), nitrogen dioxide (NO_2) sulfur dioxide (SO_2)** and **carbon monoxide (CO)**.

➢ **New WHO Global AQGs vs India's NAAQS:**



➢ **Effect of Air Pollution on Human Health:**

- According to WHO, **Air pollution is one of the biggest environmental threats** to human health, alongside **climate change.**
- Every year, exposure to air pollution is estimated to cause **7 million premature deaths** and result in the **loss of millions more healthy years of life.**
- In **children**, this could include **reduced lung growth and function**, respiratory infections and aggravated asthma.
- In **adults**, **heart disease and stroke** are the most common causes of premature death attributable to outdoor air pollution, and evidence is also emerging of other effects such as **diabetes and neurodegenerative conditions.**
- This puts the burden of disease attributable to air pollution **on a par with other major global health risks such as unhealthy diet and tobacco smoking.**
- **Disparities in air pollution** exposure are increasing worldwide, particularly as low- and middle-income countries are experiencing growing levels of air pollution because of large-scale urbanization and economic development that has largely relied on the burning of fossil fuels.

➢ **Status of Pollution in India:**

- India continues to remain **one of the most polluted areas in the world**, with pollutant levels several times higher than recommended levels.
  - For example, a **Greenpeace study** found the average concentration of **PM2.5 in New Delhi in 2020 to be nearly 17 times higher than the recommended levels.**
  - In **Mumbai**, pollution levels were **eight times** higher; in Kolkata, over nine times higher; and in Chennai, over five times higher.
- According to experts of **Global Burden of Disease study, over 95% of India's population already lived in areas where pollution levels were higher than WHO's 2005 norms.**
- India's own **national air quality standards are much more lenient**, even compared to WHO's 2005 norms.
  - For example, the recommended PM2.5 concentration over a 24-hour period is 60 micrograms per cubic metre, compared to 25 micrograms advised by WHO's 2005 guidelines.
  - But even these lower standards are hardly met.

➢ **Impact of New Guidelines on India:**

- The new air quality guidelines mean that nearly **entire India would be considered a polluted zone for most of the year.**
  - However, by WHO's own admission, more than **90% of the world's population lived in areas** which did not meet its 2005 pollution standards.
- The new WHO norms **should push India** to work harder to make its air cleaner and safer.
- Further, the **feasibility of implementing the new guidelines is questionable**, especially in challenging geo-climatic zones like south Asia, including India.
  - Experts point out that this region has **challenging meteorological and climatic conditions,** with the added challenge of haze columns**,** heat island effects and very high base pollution.

Note:

- However, as the WHO's guidelines are **not binding,** the move doesn't immediately impact India as the **National Ambient Air Quality Standards (NAAQS)** don't meet the WHO's existing standards.
  - The government has a dedicated **National Clean Air Programme** that aims for a 20% to 30% reduction in particulate matter concentrations by 2024 in 122 cities, keeping 2017 as the base year for the comparison of concentration.

Arsenic Contamination of Food Chain

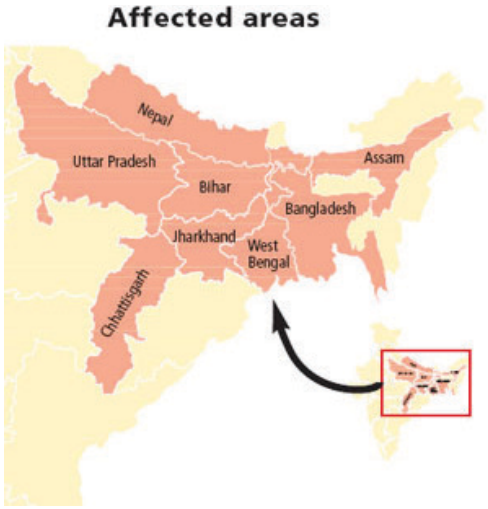
Why in News

A recent study in Bihar has found that **Arsenic contamination** not only in groundwater but in **the food chain** as well.

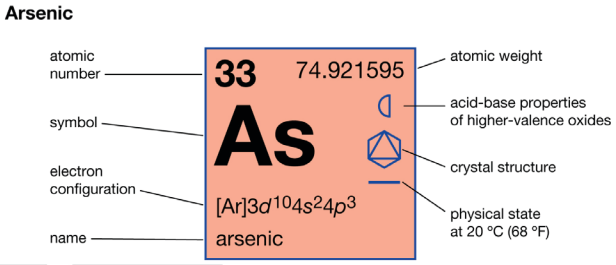
- The research study was a part of the **Project Nature and Nurture in Arsenic Induced Toxicity of Bihar** jointly funded by the **British Council in the United Kingdom** and **Department of Science and Technology** in India.

Key Points

- **Major Findings:**
  - **Food Chain Contamination:**
    - Arsenic has found its way into the food chain - mainly **rice, wheat and potato.**
      - Arsenic **contamination in groundwater has been a growing concern in several parts** of the country.
    - Arsenic is present **in the groundwater as it is used on a large scale for irrigation by farmers**. That is how it finds its way into the food chain as well.
  - **Food vs Water Contamination:**
    - The food had more arsenic content than drinking water, even when arsenic levels in drinking water was above the **World Health Organization (WHO)** provisional guide value of 10 micrograms per litre (µg /L).
      - The **concentration was higher in cooked rice compared to raw rice.**
- **Arsenic:**
  - **About:**
    - It is an **odourless and tasteless metalloid** widely distributed in the earth's crust.



- It is naturally present at high levels in the earth crust and groundwater of a number of countries. **It is highly toxic in its inorganic form.**



  - **Arsenic Poisoning:**
    - It can **get into the human body through drinking water as well as eating food** that has been contaminated with arsenic.
    - **Arsenicosis** is the medical word for **arsenic poisoning,** which occurs due to accumulation of large amounts of arsenic in the body.
    - It **leads to adverse health effects through inhibition of essential enzymes**, which ultimately leads to death from multi-system organ failure.
    - Long-term exposure to arsenic from drinking-water and food can cause **cancer and skin lesions.** It has also been associated with **cardiovascular disease** and **diabetes**.
    - In utero and early childhood exposure has been linked to **negative impacts on cognitive development** and increased deaths in young adults.
  - **Steps Taken:** Under the **2030 Agenda for Sustainable Development**, the indicator of "safely managed drinking water services" calls for tracking the population accessing drinking water which is free

Note:

of faecal contamination and priority chemical contaminants, including arsenic.

- **Jal Jeevan Mission** is envisioned to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India.
- Recently, the **Jal Jeevan Mission (Urban)** has also been launched.

World Ozone Day

Why in News

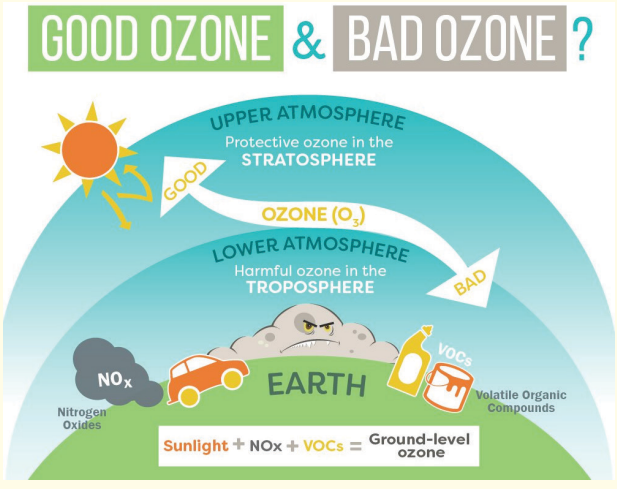
Every year, **16th September** is observed as the **International Day for the Preservation of the Ozone layer** (World Ozone Day).

Key Points

- **About:**
  - After the **Montreal Protocol** on Substances that deplete the ozone layer signed by almost every country in 1987, the **United Nation General Assembly**, in 1994, proclaimed this day as the **International Day for the Prevention of the Ozone Layer.**
    - The Montreal Protocol has **led to the phase-out of 99% of ozone-depleting chemicals in** refrigerators, air-conditioners and many other products.
    - The latest Scientific Assessment of Ozone Depletion completed in 2018, shows that parts of the ozone layer have **recovered at a rate of 1-3% per decade since 2000.**
    - Ozone layer protection efforts have also **contributed to the fight against climate change** by averting an estimated 135 billion tonnes of carbon dioxide equivalent emissions, from 1990 to 2010.
    - In September 2009, the **Vienna Convention** and the **Montreal Protocol** became the first treaties in the history of the United Nations to achieve universal ratification.
      - Establishment of a mechanism for cooperation to take action to protect the ozone layer was formalized in the **Vienna Convention in 1985.**
    - In 2016 as a continuation of the global effort the Parties to the Montreal Protocol **reached agreement at their 28th Meeting of the Parties in Kigali, Rwanda** to phase-down **hydrofluorocarbons** (HFCs).

Ozone

- **About**:
  - It is a **special form of oxygen with the chemical formula O_3**. The oxygen we breathe and that is so vital to life on earth is O_2.
  - Most ozone resides high up in the atmosphere, **between 10 and 40km above Earth's surface**. This region is called the **stratosphere** and it contains about 90% of all the ozone in the atmosphere.
- **Classification:**
  - **Good Ozone:**
    - Ozone occurs naturally in the **Earth's upper atmosphere (Stratosphere)** where it **forms a protective layer** that shields us from the sun's harmful ultraviolet rays.
    - This "good" ozone is gradually being destroyed by man-made chemicals referred to as **Ozone-Depleting Substances (ODS),** including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride, and methyl chloroform.
  - **Bad Ozone:**
    - In the **Earth's lower atmosphere (troposphere) near ground leve**l, ozone is formed when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react chemically in the presence of sunlight.
      - Surface level ozone is a harmful **air pollutant.**



Note:

- Recently, the **Indian Government approved the ratification of the Kigali Amendment** to the Montreal Protocol.

➢ **2021 Theme:**

- Montreal Protocol – **Keeping us, our food, and vaccines cool.**

United in Science 2021: WMO

Why in News

Recently, the **World Meteorological Organization (WMO)** released a report named **United in Science 2021.**

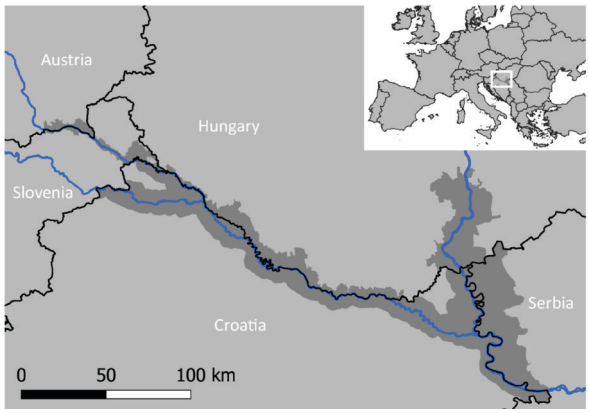
➢ It is a **multi-organization high-level compilation** of the latest climate science information.

➢ The report is coordinated by the WMO, with inputs from the **United Nations Environment Programme**, **World Health Organization, Intergovernmental Panel on Climate Change**, Global Carbon Project, World Climate Research Programme and the Met Office (UK).

World's First 'Five-Country Biosphere Reserve'

Why in News

Recently, **Mura-Drava-Danube (MDD)** was declared as the **world's first 'five-country biosphere reserve'** by the **United Nations Educational, Scientific and Cultural Organization (UNESCO).**



Key Points

➢ **About MDD:**

- The biosphere reserve **covers 700 kilometres** of the **Mura, Drava and Danube rivers** and stretches across **Austria, Slovenia, Croatia, Hungary and Serbia.**
- The total area of the reserve is a **million hectares** - in the so-called **'Amazon of Europe'**, which is now the **largest riverine protected area in Europe.**
- The biosphere "represented **an important contribution to the European Green Deal** (climate action plan) and contributed to the **implementation of the EU Biodiversity Strategy** in the Mura-Drava-Danube region."
  - The strategy's aim is to revitalise 25,000 km of rivers and protect 30% of the European Union's land area by 2030.

➢ **Importance of the MDD:**

- The area is **one of the richest in Europe** in terms of species diversity.
- It is **home to** floodplain forests, gravel and sand banks, river islands, oxbows and meadows.
- The area is home to the **highest density in Europe of breeding pairs** of white-tailed eagle and endangered species such as the little tern, black stork, otters, beavers and sturgeons.
- It is also an **important stepping stone** for more than 2,50,000 migratory waterfowls every year.

Biosphere Reserve (BR)

➢ **About:**

- BR is an international designation by **(UNESCO)** for representative parts of natural and cultural landscapes extending over large areas of terrestrial or coastal/marine ecosystems or a combination of both.
- BR tries to **balance economic and social development** and maintenance of associated cultural values along with the preservation of nature.
- BRs are **nominated by national governments** and remain under the sovereign jurisdiction of the states where they are located.
- These are **designated under the intergovernmental MAB Programme** by the Director-General of UNESCO following the decisions of the MAB International Coordinating Council (MAB ICC).
  - The Man and the Biosphere (MAB) Programme is **an intergovernmental scientific programme** that aims to establish a scientific basis for enhancing the relationship between people and their environments.

Note:

- Their status is **internationally recognized.**
- There are **727 biosphere reserves in 131 countries**, including 22 transboundary sites.

➢ **Three Main Zones:**

- **Core Areas:** It comprises a strictly protected zone that contributes to the conservation of landscapes, ecosystems, species and genetic variation.
- **Buffer Zones:** It surrounds or adjoins the core area(s), and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.
- **Transition Area:** The transition area is where communities foster socio-culturally and ecologically sustainable economic and human activities.

➢ **Biosphere Reserves in India:**

- Presently, there are **18 Biosphere Reserves in India**, among which **12 Biosphere reserves in India** find their place in **UNESCO's List of Man & Biosphere Reserves Programme.**
  - The latest included under the MAB was **'Panna Biosphere Reserve'** (Madhya Pradesh).

Blue Flag Certification

Why in News

Recently, **Foundation for Environment Education (FEE), Denmark has awarded the Blue Flag Certification to Kovalam (Tamil Nadu) and Eden (Puducherry)**, taking the total number of **such beaches in the country to 10.**

➢ A waving "Blue Flag" is an indication of 100% compliance to the 33 stringent criteria and sound health of the beach.

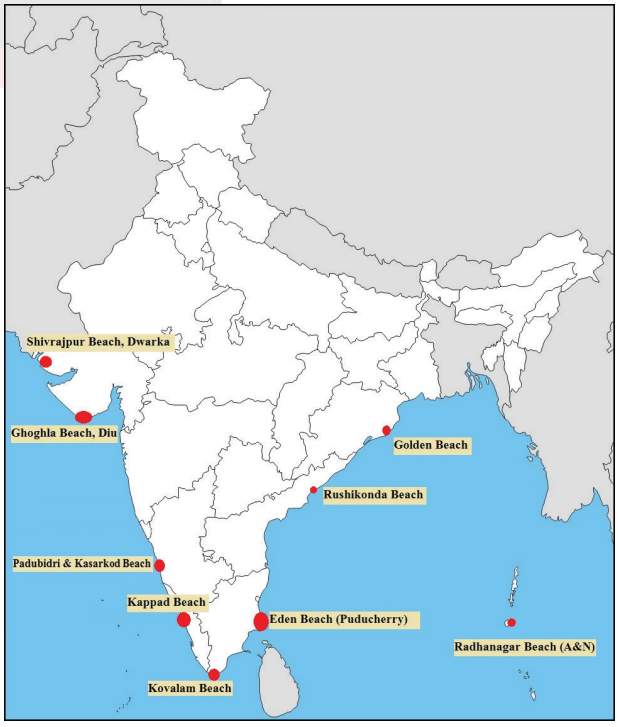
Key Points

➢ **About:**

- It is an **internationally recognised eco-label** that is accorded based on **33 criterias.** These criterias are **divided into 4 major heads** namely,
  - Environmental education and information
  - Bathing water quality
  - Environmental management
  - Conservation and safety services in the beaches
- Blue Flag beaches are considered the cleanest beaches of the world. It is an **eco-tourism model endeavouring to provide the tourists/beachgoers** clean and hygienic bathing water, facilities, a safe and healthy environment and sustainable development of the area.
- It is accorded by the international jury composed of eminent members - **United Nations Environment Programme** (UNEP), **United Nations World Tourism Organisation** (UNWTO), Denmark-based NGO Foundation for Environmental Education (FEE) and **International Union for Conservation of Nature** (IUCN).
- On the lines of Blue Flag certification, **India has also launched its own eco-label BEAMS** (Beach Environment & Aesthetics Management Services).

➢ **Other Eight Beaches which have Received the Certification:**

- Shivrajpur in Gujarat,
- Ghoghla in Daman & Diu,
- Kasarkod in Karnataka and,
- Padubidri beach in Karnataka,
- Kappad in Kerala,
- Rushikonda in Andhra Pradesh,
- Golden beach of Odisha,
- Radhanagar beach in Andaman and Nicobar.



Note:

BEAMS

- Beach Environment & Aesthetics Management Services comes under ICZM **(Integrated Coastal Zone Management)** project.
- This was **launched by** the Society of Integrated Coastal Management (SICOM) and the Union Ministry of Environment, Forest and Climate Change (MoEFCC).
- The **objectives of BEAMS program is to:**
  - Abate pollution in coastal waters,
  - Promote sustainable development of beach facilities,
  - Protect & conserve coastal ecosystems & natural resources,
  - Strive and maintain high standards of cleanliness,
  - Hygiene & safety for beachgoers in accordance with coastal environment & regulations.
- It has helped in saving 1,100 ml/year of municipal water through recycling; educating around 1,25,000 beachgoers about responsible behaviour at the beaches; providing alternate livelihood opportunities to 500 fishermen families through pollution abatement, safety and services and has also increased footfall for recreation activities at the beaches by approximately 80% leading to economic development.

Blue Food

Why in News

Recently, a report titled **Environmental performance of blue foods** has stated that the Aquatic or blue foods can be made more environmentally sustainable than they are now.

- The report is published as **part of the Blue Food Assessment (BFA).**
- The BFA is a **collaboration between** Sweden-based Stockholm Resilience Centre, United States-based Stanford University and the non-profit EAT.

Key Points

- **About Blue Foods and its Advantages:**
  - Blue foods are food derived from **aquatic animals, plants or algae** that are caught or cultivated in **freshwater and marine environments.**
  - They are found to **rank more highly than terrestrial animal-source foods** in terms of their **nutritional benefits and potential for sustainability gains**.
    - Many blue food species are **rich in important nutrients** like omega-3 fatty acids, vitamins and minerals.
  - On average, the major species produced in **aquaculture,** such as tilapia, salmon, catfish and carp, were found to have **lower environmental footprints** comparable to terrestrial meat.
- **About the Report:**
  - The report has uncovered that Blue foods and the waters in which they grow will have **an essential role to play in the shift towards healthy, equitable and sustainable food systems.**
  - The production of blue food **generates the fewest greenhouse gas and nutrient emissions** and **uses the least land and water.**
    - **Capture fisheries** refers to all kinds of harvesting of naturally occurring living resources in both marine and freshwater environments. These have the potential to reduce greenhouse gas emissions through improved management and optimising gear types.
  - **Investing in innovation and improving fisheries management** could increase consumption even more and have profound effects on **malnutrition.**
  - Promotion of Blue food will help in fulfillment of many **Sustainable development Goals** (SDG 2 - Nutrition and 14 - Sustainable use of marine resources).

Global Climate Risk Index 2021

Why in News

The **international environmental think tank 'Germanwatch'** released the **Global Climate Risk Index 2021.**

- This is the **16th Edition** of the Index. It is published **annually**.
- **Germanwatch**, based in **Bonn and Berlin (Germany)**, is an **independent development and environmental organisation** which works for sustainable global development.

Key Points

- **About the Index**
  - The Index **analyses the extent** to which **countries** and **regions** have been affected by the **impacts of**

Note:

weather-related loss events (storms, floods, heat waves etc.).

- The impact is calculated in terms of **fatalities** and **economic losses**, both.
- The most recent data available **for 2019** and from **2000 to 2019** were taken into account.
- The 2021 Index **does not include data from United States of America.**
- The Climate Risk Index clearly signals that repercussions of escalating climate change can no longer be ignored, on any continent or in any region.

Ranking 2019 (2018)	Country
1 (54)	Mozambique
2 (132)	Zimbabwe
3 (135)	The Bahamas
4 (1)	Japan
5 (93)	Malawi
6 (24)	Islamic Republic of Afghanistan
7 (5)	India
8 (133)	South Sudan
9 (27)	Niger
10 (59)	Bolivia

- Impacts from extreme-weather events **hit the poorest countries hardest** as these are particularly vulnerable to the damaging effects of a hazard, have a lower coping capacity and may need more time to rebuild and recover.
- **High-income countries** are also getting severely **impacted by climate change**.

➢ **India's Ranking**: India has **improved its rankings** from last year. It is **ranked 7th in the 2021** Index as compared to **5th in 2020 Index**.

High Ambition Coalition for Nature and People

Why in News

Recently, India joined the **High Ambition Coalition (HAC) for Nature and People**.

➢ India is the first of the **BRICS** (Brazil, Russia, India, China and South Africa) to join the HAC.

Key Points

➢ **About:**

- It is **an intergovernmental group** championing a global deal for nature and people that can **halt the accelerating loss of species, and protect vital ecosystems** that are the source of our economic security.
- It was **launched in 2019** by **Costa Rica, France** and **Britain.**
- It is **co-chaired by Costa Rica** and **France** and the **Ocean co-chair** belongs to the **United Kingdom.**

➢ **Aim:**

- To **promote an international agreement** to protect at least 30% of the world's land and ocean by 2030 **(Global 30×30 target)**.
- To **manage the planet sustainably** with no net loss of natural habitats, supported by a circular economy, and strives for the sustainable and equitable sharing of benefits from nature.

➢ **Members:**

- It has **more than 70 countries** which are a mix of countries in the global north and south, European, Latin American, Africa and Asia countries are among the members.

Kunming Declaration on Biodiversity

Why in News

Recently, the **Kunming Declaration** was adopted by over 100 countries at the ongoing **15th Conference of the Parties** to the **United Nations Convention on Biological Diversity** in china.

➢ The adoption of the declaration will **create momentum for a new global biodiversity pact.**

➢ In a previous agreement, **Strategic Plan for Biodiversity 2011-2020,** signed in Aichi, Japan, in 2010, governments agreed on **20 targets to try to slow biodiversity loss and protect habitats by 2020.**

Key Points

➢ **About:**

- It calls for **urgent and integrated action** to reflect **biodiversity considerations in all sectors of the global economy** but crucial issues - like funding conservation in poorer countries and committing to biodiversity-friendly supply chains have been left to discuss later.

Note:

- It is **not a binding international agreement.**

❍ It **calls upon the parties to mainstream biodiversity protection in decision-making** and recognise the importance of conservation in protecting human health.

- The theme of the declaration is **Ecological Civilization: Building a Shared Future for All Life on Earth.**

❍ By adopting this, the **nations have committed themselves to support the development, adoption and implementation** of an effective post-2020 implementation plan, a capacity building action plan for the **Cartagena Protocol on biosafety.**

- The Protocol seeks to protect biological diversity from the potential risks posed by **living modified organisms** resulting from modern biotechnology.

❍ As per the declaration the signatory nations will ensure that the **post-pandemic recovery policies, programmes and plans contribute to the conservation** and sustainable use of biodiversity, promoting sustainable and inclusive development.

➢ **30 by 30 Target:**

❍ The declaration made a reference to the '30 by 30' target which is a **key proposal being debated at the COP15,** that would afford **30% of the Earth's land and oceans protected status by 2030.**

- Apart from this, the goal to halve the use of chemicals in agriculture and stop creating plastic waste is also being debated.

➢ **Kunming Biodiversity Fund:**

❍ China has also pledged to **inject USD 233 million into a new fund** to protect biodiversity in developing countries. The fund is being referred to by China as **Kunming Biodiversity Fund.**

❍ It is the right step in this direction. However, some countries have reservations regarding this fund.

- Some countries have called this fund as **"a drop in the bucket"** given that China is the world's biggest polluter.
- Further, some rich country donors say a new fund for conservation is unnecessary because the **United Nations' Global Environment Facility** already helps developing nations finance green projects.

Emissions Gap Report 2021: UNEP

Why in News

Recently, the **United Nations Environment Programme (UNEP)'s** Emissions Gap Report 2021 has been published.

➢ This is the **twelfth edition** of the UNEP **Emissions Gap Report.** It informs that the **new national climate pledges** combined with other mitigation measures put the world on track for a **global temperature rise of 2.7°C** by the end of the century.

COP26 Climate Conference

➢ The **COP 26 United Nations Climate Change Conference** will be hosted by the UK from **31st october to 12th November.**

➢ Earlier, **Intergovernmental Panel on Climate Change (IPCC) published its assessment report** on Earth's climate, highlighting **heat waves, droughts, extreme rainfall** and **sea-level rise** in the coming decades.

Conference of Parties (COP)

➢ **About:**

➢ The Conference of Parties comes under the **UNFCCC** which was formed in 1994. The UNFCCC was established to work towards "stabilisation of **greenhouse gas** concentrations in the atmosphere.

- COP is the **apex decision-making authority of UNFCCC.**

❍ It laid out **a list of responsibilities for the member states which included:**

- Formulating measures to mitigate climate change.
- Cooperating in preparing for adaptation to the impact of climate change.
- Promoting education, training and public awareness related to climate change.

➢ **Meetings:**

❍ COP members have been **meeting every year since 1995.** The UNFCCC has 198 parties including **India, China and the USA.**

- Generally it meets in Bonn, the seat of the secretariat, unless a Party offers to host the session.

➢ **Presidency**:

Note:

- The **office of the COP President normally rotates among the five United Nations regional groups** which are - Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe and Western Europe and Others.
- The **President is usually the environment minister of his or her home country**. S/he is elected by acclamation immediately after the opening of a COP session.

COP's with Significant Outcomes

- **1995: COP1 (Berlin, Germany)**
- **1997: COP 3 (Kyoto Protocol)**
  - It legally binds developed countries to emission reduction targets.
- **2002: COP 8 (New Delhi, India) Delhi Declaration.**
  - Focuses on the development needs of the poorest countries and the need for technology transfer for mitigating climate change.
- **2007: COP13 (Bali, Indonesia)**
  - Parties agreed on the Bali Road Map and Bali action plan, which charted the way towards a post-2012 outcome. The Plan has five main categories: shared vision, mitigation, adaptation, technology and financing.
- **2010: COP 16 (Cancun)**
  - Resulted in the **Cancun Agreements,** a comprehensive package by governments to assist developing nations in dealing with climate change.
  - The **Green Climate Fund,** the Technology Mechanism and the Cancun Adaptation Framework were established.
- **2011: COP 17 (Durban)**
  - Governments commit to a new universal climate change agreement by 2015 for the period beyond 2020 (Resulted in the Paris Agreement of 2015).
- **2015: COP21 (Paris)**
  - To keep global temperature well **below 2.0C** above pre-industrial times and endeavor them to limit them **even more to 1.5C.**
  - It requires rich nations to maintain USD 100bn a year funding pledge **beyond the year 2020.**
- **2016: COP22 (Marrakech)**
  - To move forward on writing the **rule book of the Paris Agreement.**
  - Launched the **Marrakech Partnership** for Climate Action.
- **2017: COP23, Bonn (Germany)**
  - Countries continued to negotiate the finer details of how the agreement will work from 2020 onwards.
  - First set of negotiations since the US, under the presidency of Donald Trump, announced its intention earlier this year to withdraw from the Paris deal.
  - It was the first COP to be hosted by a small-island developing state with Fiji taking up the presidency, even though it was being held in Bonn.
- **2018: COP 24, Katowice (Poland)**
  - It finalized a "rulebook" to operationalise the 2015 Paris Agreement.
  - The rulebook covers climate financing facilities and the actions to be taken as per **Nationally Determined Contributions (NDC).**
- **2019: COP25, Madrid (Spain)**
  - It was held in Madrid (Spain).
  - There were no **concrete plans regarding the growing climatic urgency.**

World Meteorological Congress 2021

Why in News

Recently, the **World Meteorological Congress 2021** has endorsed a **Water Declaration**, including the **Water and Climate Coalition.**

- It has also **approved a new vision and strategy for hydrology** and an associated plan of action.

World Meteorological Congress

The World Meteorological Congress is the **supreme body of the World Meteorological Organization (WMO)**. WMO is a **specialised agency of the United Nations** for meteorology, operational hydrology and related geophysical sciences. **India is a member.** It **produces annually the State of the Global Climate Report.**

Key Points

- **Water Declaration:**

Note:

- By 2030 **early warnings for early action related to floods and droughts** will be **available for people everywhere** on the planet to access.
- **Policies for water and climate action** developed within the sustainable development agenda **will be integrated to yield maximum benefit for people.**
- Members will **pursue these goals through partnerships** for capacity development, knowledge exchange and information sharing, etc.

➢ **Water and Climate Coalition:**

- The coalition is **made for promoting sharing and access** to integrated hydrological, **cryosphere**, meteorological and climate information.
- It aims to **boost resilient water adaptation** to **climate change** as well as demographic and socio-economic development for the future.
- It is also aimed at accelerating the progress of water-related United Nations **Sustainable Development Goals (SDG),** especially SDG6 (water and sanitation for all).

Save Hornbills, Save Tropical Forests

Why in News:

Scientists from two organizations studied **how fruiting plants and hornbills influenced each other's distribution** in the **Namdapha Tiger Reserve, Arunachal Pradesh.**

➢ The study strengthens the argument that **hornbills are gardeners or farmers of the forest**, demonstrating that they farm their own food-rich patches **through their seed dispersal.**

Key Points

➢ **About the Study:**

- Hornbills have **a symbiotic relationship** with several canopy trees in **tropical forests**. I**n the longer term, this likely creates orchards** that continue attracting hornbills.
- The study shows that forest patches that have **rare trees like Canarium**, attract hornbills in large numbers (for food). In turn, hornbills end up **dispersing seeds of a diverse array of plant species** in higher numbers in these patches.

➢ **Hornbills:**

- **About:** The hornbills (Family Bucerotidae) are a family of birds **found in tropical and subtropical Africa and Asia.**
- **In India:** India is **home to nine species** of hornbills.
  - The n**ortheastern region has the highest diversity** of hornbill species within India.
  - They are the cultural symbols of some ethnic **communities in the northeast,** specifically the **Nyishi of Arunachal Pradesh.**
  - The **Hornbill festival** celebrated **in Nagaland** is named after the bird – Hornbill which is the most revered and admired bird for the Nagas.
- **Threats:**
  - Hornbills are **hunted for their casques - upper beak - and feathers** for adorning headgear. They are also **poached for their meat and medicinal value** of their body parts.
    - A **conservation programme promoting the use of fibre-glass beaks** for headgear instead of real hornbill casques has helped reduce some threat to it.
  - **Illegal logging i.e. cutting of tall trees** where the hornbill birds nest and feed has led to destruction of its natural habitat.

UNEP Production Gap Report

Why in News

Recently, the **2021 Production Gap Report** was released by the leading research institutes and the **United Nations Environment Programme (UNEP).**

➢ The Production Gap Report, **first launched in 2019, tracks the discrepancy between governments' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C.**

➢ **UNEP's Major Reports**: **Emission Gap Report, Adaptation Gap Report, Global Environment Outlook, Making Peace with Nature.**

Mass Fish Death in Kameng River

Why in News

Recently, the landslides caused by an earthquake of 3.4 magnitude close to the border with China has led

Note:

to mass fish death in the **Kameng river in Arunachal Pradesh.**

- The region has been placed into **Seismic Zone V**, thus most vulnerable to earthquakes.

Key Points

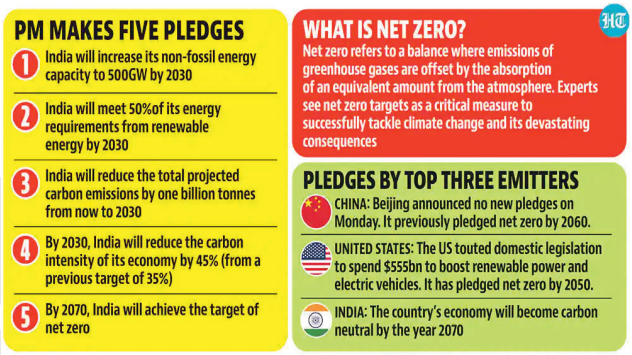
- **About:**
  - The **earthquake** happened in the vicinity of the source of the river at an elevation of about 6,300 metres above Mean Sea Level.
  - The **landslides dumped several tonnes of mud and rocks** into the river, substantially reducing the flow of water.
  - The river **turned blackish due to very high turbidity** resulting in **low dissolved oxygen** that killed the fish.
    - Low dissolved oxygen concentrations **can arise through** natural phenomena that include seasonality, changes in river flow, and both saline and thermal stratification of the water column.
    - Low dissolved oxygen levels can also indicate an **excessive demand on the oxygen** in the system.
- **Kameng River:**
  - It originates in **Tawang district** from the glacial lake below snow-capped **Gori Chen mountain** on the India-Tibet border.
    - **Kameng is not a transboundary river.**
  - It flows through Bhalukpong circle of **West Kameng District**, Arunachal Pradesh and **Sonitpur District of Assam.**
  - It becomes a braided river in its lower reaches and is one of the **major tributaries of the Brahmaputra River**.
    - It joins Brahmaputra river at Tezpur, just east of the **Kolia Bhomora Setu bridge, Assam.**
  - It forms the boundary between East Kameng District and West Kameng Districts.
    - It also forms the boundary between the **Sessa and Eaglenest sanctuaries** to its west (Arunachal Pradesh) and the **Pakke tiger reserve** to the east (Arunachal Pradesh).
  - The **Dafla Hills** are east and the **Aka Hills** are located west of the Kameng River.
  - **Tributaries:** Tippi, Tenga, Bichom and Dirang Chu.

India to Reach Carbon Neutrality by 2070

Why in News

Recently, India announced that it will **reach carbon neutrality by 2070** as part of a **five-point action plan** that included reducing emissions to 50% by 2030.

- India made this pledge at the **Conference of the Parties (COP) 26 climate summit in Glasgow**, where it also urged developed countries to deliver on their promise of **climate financing**.



Key Points

- **About:**
  - Net Zero is a **state in which a country's total emissions are offset by absorptions of carbon dioxide** from the atmosphere, like that done by trees and forests, and physical removal of carbon dioxide through futuristic technologies.
- **India's New Renewables Target:**
  - In 2019 India announced that it would take up its installed capacity of **renewable energy to 450 GW by 2030**.
    - At that time, India's publicly stated target was **175 GW by the year 2022.**

Initiatives Taken

- **PM-KUSUM:**
  - It was **launched by the Ministry of New and Renewable Energy (MNRE)** to support installation of off-grid solar pumps in rural areas and reduce dependence on grid, in grid-connected areas.
- **Production Linked Incentive (PLI) Scheme:**
  - Production Linked Incentive Scheme **"National Programme on High Efficiency Solar PV Modules"**

Note:

was introduced with an outlay of Rs. 4500 crores to support and promote manufacturing of high efficiency solar PV modules, including the upstage vertical components like cells, wafers, ingots and polysilicon in India and thus reduce the import dependence in Solar PhotoVoltaic (PV) sector.

- **Solar Parks Scheme:**
  - To facilitate large scale grid connected solar power projects, a scheme for **"Development of Solar Parks and Ultra Mega Solar Power Projects"** is under implementation with a target capacity of 40 GW capacity by March 2022.
- **Roof Top Solar programme Phase-II:**
  - It provides for **financial assistance of upto 4 GW of solar roof top capacity** to the residential sector and there is a provision to incentivise the power distribution companies for incremental achievement over the previous year.
- **Central Public Sector Undertaking (CPSU) Scheme:**
  - A scheme for setting up **12 GW Grid- Connected Solar PV Power Projects** by **Central Public Sector Undertakings** with domestic cells and modules is under implementation. **Viability Gap Funding support** is provided under this scheme.
- **Hydrogen Mission:**
  - The Prime Minister announced the launch of the **National Hydrogen Mission** and stated the **goal to make India a global hub for Green Hydrogen production and export.**
- **International Solar Alliance:**
  - The ISA is an **intergovernmental treaty-based organisation** with a global mandate to catalyse solar growth by helping to reduce the cost of financing and technology. Recently, the **United States of America has become the 101st member** country to join the **ISA.**
- **OSOWOG:**
  - The OSOWOG was jointly released by India and UK at the COP26 Climate Meet in Glasgow.
- **National Wind-Solar Hybrid Policy:**
  - The main objective of the National Wind-Solar Hybrid Policy, 2018 is to provide a framework for promotion of large grid connected wind-solar PV hybrid systems for optimal and efficient utilization of wind and solar resources, transmission infrastructure and land.
- **National Offshore Wind Energy Policy:**
  - The National Offshore wind energy policy was notified in October 2015 with an objective to develop the offshore wind energy in the Indian **Exclusive Economic Zone (EEZ)** along the Indian coastline of 7600 km.
- **Other Renewables for Power Generation:**
  - Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues
  - Scheme to support Promotion of **Biomass** based cogeneration in sugar mills and other industries
  - Biogas Power (Off-Grid) Generation and Thermal application Programme (BPGTP)
  - New National Biogas and Organic Manure Programme (NNBOMP)

Green Financing

Why in News

Recently, India announced that it will **reach carbon neutrality by 2070** as part of a **five-point action plan** that included reducing emissions to 50% by 2030.

- In order to meet these climate targets, countries like India will need approximately **USD 1 trillion in additional financing** over the next ten years.

Key Points

- **About:**
  - Green financing is to **increase the level of financial flows** (from banking, micro-credit, insurance and investment) from the public, private and not-for-profit sectors **to sustainable development priorities.**
  - A key part of this is to **better manage environmental and social risks,** take up opportunities that bring both a decent rate of return and environmental benefit and deliver greater accountability.
- **Need for Climate (Green) Finance:**
  - **Polluter Pays:**
    - The **'polluters pays' principle** is the commonly accepted practice according to which those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment.
  - **Common but Differentiated Responsibility and Respective Capability (CBDR–RC):**

Note:

- It acknowledges the different capabilities and differing responsibilities of individual countries in addressing climate change.

❍ **Underlying Principle: Developed Countries historically have been the major environmental polluters.**

- Therefore, based on above mentioned principles, the developed countries are morally responsible to provide technology and finance to combat **climate change.**

➢ **Status of Climate Financing:**

❍ **Expected Contributions from Developed Countries:** Required climate finance from developed countries is to transfer USD 1 trillion annually to developing countries to meet their climate targets.

❍ **Actual Contributions by Developed countries:** Through the **Cancun Agreements in 2010 developed countries** committed to a goal of mobilising jointly USD 100 billion per year by 2020 to address the needs of developing countries.

- However, the **Glasgow Climate Pact (COP26)** noted that the goal of developed country parties has not yet been met.
- In this regard, the COP26 has requested the Standing Committee on Finance to the **United Nations Framework Convention on Climate Change (UNFCCC)** to prepare a report in 2022 on progress towards achieving the goal of mobilising **USD 100 billion per year** to address the needs of developing countries.

➢ **Global framework for Climate Financing:**

❍ To facilitate the provision of climate finance, the **UNFCCC** has established the financial mechanism to provide financial resources to developing country Parties.

- **The Adaptation Fund under Kyoto Protocol: I**t aims to finance concrete projects and programmes that help vulnerable communities in developing countries that are Parties to the **Kyoto Protocol** to adapt to climate change.
- **Green Climate Fund:** It is the financial mechanism of the UNFCCC, established in 2010.
  - India has been pushing for rich countries to meet their **Paris Accord** climate finance commitment of USD 100 billion per year.
- **Global Environment Fund (GEF)**: GEF has served as an operating entity of the financial mechanism since the Convention came into force in 1994.
  - It is a private equity fund focused on seeking long term financial returns by investments in clean energy under climate change.
  - GEF also maintains two additional funds, the **Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF).**

Climate Financing in India:

➢ **Financing From Domestic Resources:** India's climate actions have so far been largely financed by domestic resources.

❍ According to India's Third Biennial Update Report 2021 to the UNFCCC between 2014 and 2019, while the **Global Environment Facility** and **Green Climate Fund** has provided grants to a total of only US USD 165.25 million, the corresponding domestic mobilisation amounts to USD1.374 billion.

➢ **Funds for Green Financing:** Green financing related to climate change is majorly mobilised from **National Clean Energy Fund (NCEF)** and **National Adaptation Fund (NAF)**.

❍ The Government of India also provides funding through eight missions established under the **National Action Plan for Climate Change**.

❍ It has established a **Climate Change Finance Unit (CCFU)** in the Ministry of Finance, which is the nodal agency for all climate change financing matters.

Glasgow Glacier: Antarctica

Why in News

Recently, the 100-km long body of ice in Antarctica, which has been experiencing rapid melting, was formally named Glasgow after the **Glasgow climate summit**.

Key Points

➢ **Research**: Scientists from the University of Leeds in England have **studied a chain of glaciers in the Getz basin of Antarctica.**

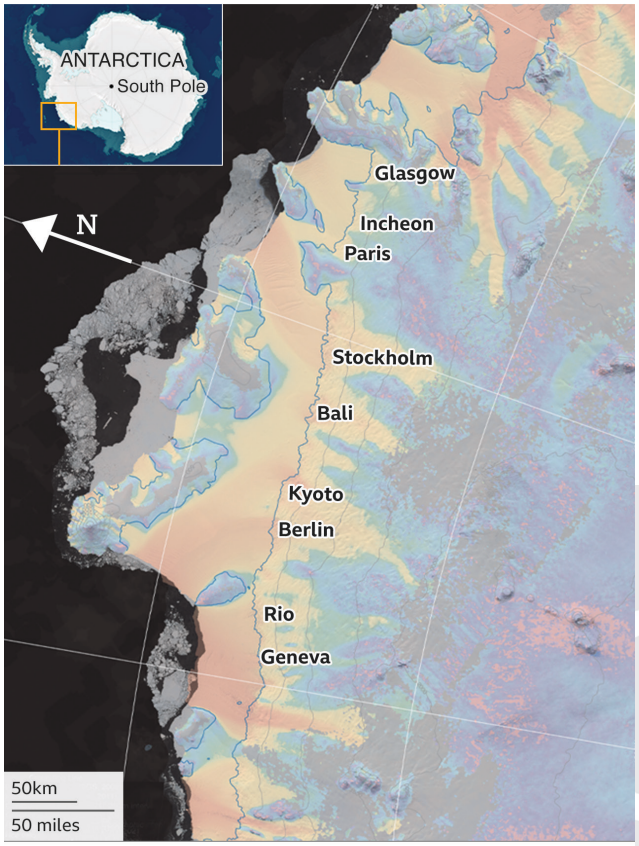
❍ **14 glaciers** in the Getz Basin of West Antarctica are **thinning by an average of 25% between 1994 and 2018** due to climate change. The 315 gigatonnes of ice were lost from the region in the last 25 years and **contributing to rising global sea levels**.

❍ The Getz basin is **part of Antarctica's largest ice shelf**. The shelf is **subject to more changeable**

Note:

oceanic forcing - a process where relatively warm deep ocean water melts the glaciers from below - than other Antarctic shelves.

Getz glaciers named after 'climate cities'



Source: British Antarctic Survey BBC

- **Other Glaciers Named**: The eight newly named glaciers are based on:
  - **Stockholm Conference (1972)**: One of the major results of the Stockholm conference was the creation of the **United Nations Environment Programme (UNEP).**
  - **World Climate Conference, Geneva (1979)**: The World Climate Conference, now usually referred to as the First World Climate Conference was held in Geneva.
  - **Rio Summit (1992):** It recommended a list of development practices called **Agenda 21.** It gave the concept of **sustainable development** to be combined economic growth with ecological responsibility.
  - **COP1 (Berlin, Germany, 1995)**: The first Conference of the Parties to the **UN Framework Convention on Climate Change** (COP-1) met in Berlin in 1995.
  - **Kyoto Protocol (1997)**: In Kyoto, developed countries agreed to a collective target of a 5.2% reduction in greenhouse gas emissions below 1990 levels by between 2008 and 2012.
  - **COP13 (Bali, Indonesia, 2007):** Parties agreed on the Bali Road Map and Bali action plan, which charted the way towards a post-2012 outcome.
  - **COP21 (Paris, 2015)**: To keep global temperature well below 2.0C above pre-industrial times and endeavor to limit them even more to 1.5C.
    - It requires rich nations to maintain USD 100bn a year funding pledge beyond the year 2020.
  - **Incheon**: The **Green Climate Fund (GCF)** is based in Incheon, South Korea.
- **Significance**: Over the past 40 years, satellites have observed huge **iceberg calving events**, changes in the flow of glaciers and rapidly thinning ice demonstrating the devastating impact of global warming.
  - The naming of the glaciers after the locations of major climate treaties, conferences and reports is a great way to celebrate the international collaboration on climate change science and policy over the last 42 years.

Perform, Achieve and Trade Scheme

Why in News

A recent report released by the **Centre for Science and Environment (CSE)** mentions that the **Perform, Achieve and Trade (PAT) scheme** introduced in 2008 is not effective.

- The PAT scheme was introduced to improve energy efficiency in Indian industries and consequently reduce greenhouse gas.
- The report attributed the inefficiency of the scheme to **non-transparency**, **unfastened targets** and **neglected deadlines**.

Key Points

- **About**:
  - It is a **market-based mechanism** to further accelerate as well as incentivize energy efficiency in the large energy-intensive industries.

Note:

- The **Energy Savings Certificates (ESCerts)** were introduced in India in 2011 under the PAT by the **Bureau of Energy Efficiency (BEE)** under the **National Mission of Energy Efficiency**.
  - NMEEE is one of the eight national missions under the **National Action Plan on Climate Change (NAPCC)** launched by the Government of India in the year 2008.

➢ **Energy Savings Certificates (ESCerts):**

- This market- based mechanism is facilitated through the **trading of Energy Savings Certificates (ESCerts)** which are issued to those plants who have overachieved their targets.
- The **underachievers are entitled to purchase ESCerts** through two power exchanges - **Indian Energy Exchange (IEX)** and Power Exchange India Limited (PXIL).
- Industries that take part in this scheme are referred to as **designated shoppers (DC)**.

➢ **Sectors Covered**:

- PAT covered about **13 energy-intensive sectors**: Thermal power plants (TPP), cement, aluminium, iron and steel, pulp and paper, fertiliser, chlor-alkali, petroleum refineries, petrochemicals, distribution companies, railways, textile and commercial buildings (hotels and airports).

➢ **Other initiatives to Promote Energy Conservation and Energy Efficiency:**

- **Standards and Labeling**
- **Energy Conservation Building Code (ECBC)**
- **Demand Side Management**
- **SAATHEE Portal**

Flex Fuel Vehicles

Why in News

Recently, the Government has advised the **Automobile Manufacturers in India**, to start manufacturing **Flex Fuel Vehicles (FFV) and Flex Fuel Strong Hybrid Electric Vehicles (FFV-SHEV)** complying with **BS-6 Norms** in a time bound manner.

Key Points

➢ **About FFV and FFV-SHEV:**

- **Flex-fuel vehicles (FFV):** They have engines that can run on flexible fuel — a combination of petrol and ethanol, which can include up to **100% ethanol.**
- **Flex Fuel Strong Hybrid Electric Vehicles (FFV-SHEV):** When FFV is integrated along with strong **hybrid electric technology**, it is referred as FFV-SHEVs.
  - **Strong hybrid** is another term for full hybrid vehicles, which have the capability to run solely on **either electric or petrol modes.**
  - In contrast, **mild hybrids** cannot run purely on one of these modes and use the secondary mode merely as a supplement to the main mode of propulsion.
- In order to accelerate the introduction of FFVs, the **Production Linked Incentive (PLI) scheme** has included automobile and auto components of flex fuel engines.

BS-VI Fuel Norms

➢ The Bharat Stage (BS) are **emission standards instituted by the Government of India** to regulate the output of air pollutants from motor vehicles.

➢ India **directly shifted from BS-IV to BS-VI norms.** The switch to BS-VI vehicles was to happen in 2022 but looking at the poor air condition, the move was advanced by four years.

➢ In BS-VI fuel, the volume of **Particulate Matter 2.5** ranges from 20 to 40 micrograms per cubic metre whereas in BS-IV fuel it is up to 120 micrograms per cubic metre.

➢ BS-VI fuel **will bring down sulphur content by 5 times** from the current BS-IV levels. It has 10 ppm of sulphur as against 50 ppm in BS-IV.

- Sulphur in the fuel contributes to fine particulate matter emissions. High sulphur content in the fuel also leads to corrosion and wear of the automobile engine.

➢ With BS-VI fuel, for every one kilometre, **a car will emit 80% less particulate matter** and nearly 70% less nitrogen oxide.

➢ **Air pollutants** in BS-VI fuel are much less as compared to BS-IV fuel.

➢ BS-VI norms also **seek to reduce the level of certain harmful hydrocarbons** in the emissions that are produced due to incomplete combustion of fuel.

Note:

Bioenergy Crops Create Cooling Effect on Cultivated Areas

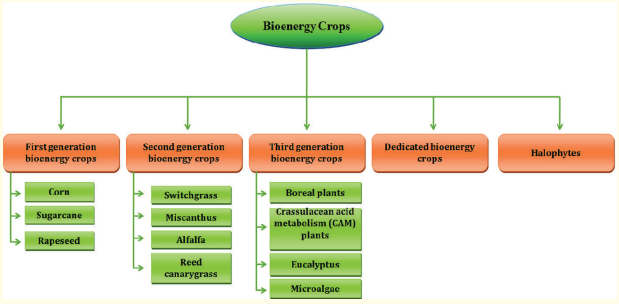
Why in News

A new study has found that converting annual crops to perennial bioenergy crops **can induce a cooling effect on the areas** where they are cultivated.

- The researchers simulated the biophysical climate impact of a range of future bioenergy crop cultivation scenarios. Eucalyptus, poplar, willow, miscanthus and switchgrass were the bioenergy crops used in the study.
- The study also demonstrated the importance of the crop type choice, the original land use type upon which bioenergy crops are expanded, the total cultivation area and its spatial distribution patterns.

Bioenergy Crops

- Crops from which Biofuels are produced or manufactured are called Biofuel crops or Bioenergy Crops. **"Energy crops" is a term used to describe biofuel crops.**
  - Wheat, corn, main edible oilseeds/edible oils, sugarcane, and other crops are among them.
- Biofuels have a number of advantages over fossil fuels, including the ability to burn cleaner and emit fewer pollutants and greenhouse gases, such as carbon dioxide, into the sky. They're also environmentally friendly, and energy corporations frequently mix Biofuels with gasoline.



Key Points

- **−0.08 ~ +0.05 Global Net Energy Change:**
  - Cultivation area under bioenergy crops occupies 3.8% ± 0.5% of the global total land area, but they exert strong regional biophysical effects, leading to a global net change in air temperature of −0.08 ~ +0.05 degrees Celsius.
  - Global air temperature will decrease by 0.03~0.08 °C, with strong regional contrasts and inter-annual variability, after 50 years of large-scale bioenergy crop cultivation.
- **Can Impact Carbon Capture and Storage:**
  - Large-scale bioenergy crop cultivation with carbon capture and storage (BECCS) has been identified as a major negative emission technology (NET) for removing CO_2 from the atmosphere.
- **Large Spatial Variations:**
  - Large-scale bioenergy crop cultivation **induces a biophysical cooling effect at the global scale**, but the air temperature change **has strong spatial variations and inter-annual variability**.
  - Temperature changes in the bioenergy crop scenarios may have very large spatial variations and important climate teleconnections to other areas of the globe.
- **Protect Permafrost from Thawing:**
  - Strong cooling effects in Eurasia, between 60°N and 80°N, may protect permafrost from thawing or reduce methane emissions from wetlands.
  - Permafrost is any ground that remains completely frozen—32°F (0°C) or colder—for at least two years straight.
- **Eucalypt is Superior to Switchgrass:**
  - Cultivating eucalypt shows generally cooling effects that are more robust than if switchgrass is used as the main bioenergy crop, implying that eucalypt is superior to switchgrass in cooling the lands biophysically.
  - Cooling effects are more for eucalypt and the greatest warming effects are seen for switchgrass.
  - Replacing forests with switchgrass not only results in biophysical warming effects but could also release more carbon through deforestation than converting other short vegetation to bioenergy crops.

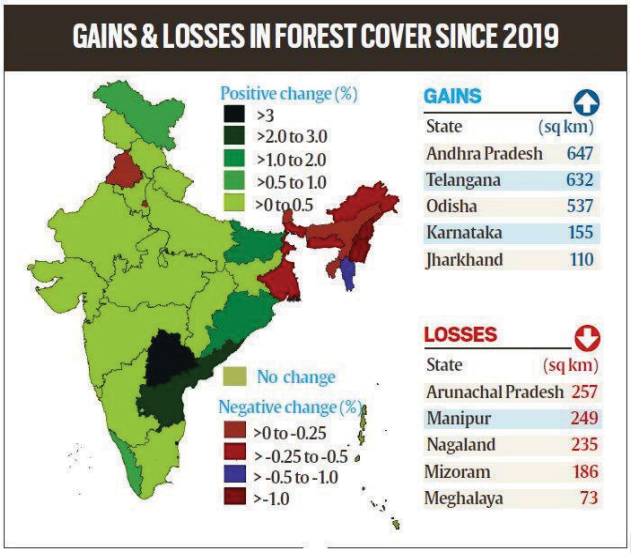
India State of Forest Report-2021

Why in News

Recently, the **Union Ministry of Environment, Forests and Climate Change (MoEFCC)** released the India State of Forest Report-2021.

Note:

- In October, 2021 an amendment was proposed by MoEFCC to the **Forest (Conservation) Act, 1980** to bring significant changes to forest governance in India.



Key Points

- **About:**
  - It is an assessment of **India's forest and tree cover**, published every two years by the Forest Survey of India.
  - The first survey was published in 1987, and ISFR 2021 is the 17th.
  - India is **one of the few countries in the world** that brings out such a survey every two years, and this is widely **considered comprehensive and robust.**
  - The ISFR is used in **planning and formulation of policies** in forest management as well as forestry and agroforestry sectors.
  - Three categories of forests are surveyed – **very dense forests** (canopy density over 70%), **moderately dense forests** (40-70%) and **open forests** (10-40%).
  - Scrubs (canopy density less than 10%) are also surveyed but not categorised as forests.
- **New Features of ISFR 2021:**
  - It has for the **first time assessed forest cover in tiger reserves**, **tiger corridors** and the **Gir forest** which houses the **Asiatic lion.**
  - The forest cover in tiger corridors has increased by **37.15 sq km (0.32%) between 2011-2021**, but decreased by 22.6 sq km (0.04%) in tiger reserves.
  - Forest cover has increased in 20 tiger reserves in these 10 years, and decreased in 32.
  - **Buxa (West Bengal), Anamalai (Tamil Nadu) and Indravati reserves (Chhattisgarh)** have shown an **increase in forest cover** while the **highest losses** have been found in **Kawal (Telangana), Bhadra (Karnataka) and the Sunderbans reserves (West Bengal).**
  - **Pakke Tiger Reserve** in Arunachal Pradesh has the **highest forest cover**, at nearly 97%.
- **Findings of the Report:**
  - **Increment in Area:**
    - The **forest and tree cover in the country continues to increase** with an additional cover of 1,540 square kilometres over the past two years.
    - India's forest cover is now **7,13,789 square kilometres**, **21.71%** of the country's geographical area, an increase from **21.67% in 2019.**
    - Tree cover has increased by 721 sq km.
      - Tree cover is defined as all tree patches of size less than one hectare occurring outside the **recorded forest area**. This covers trees in all formations including scattered trees.
  - **Increase/Decrease in Forests:**
    - The states that have shown the highest increase in forest cover are **Telangana (3.07%), Andhra Pradesh (2.22%) and Odisha (1.04%).**
    - Five states in the Northeast – **Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland** have all **shown loss in forest cover.**
  - **States with Highest Forest Area/Cover:**
    - **Area-wise: Madhya Pradesh has the largest forest cover** in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
    - **In terms of forest cover as percentage of total geographical area, the top five States are** Mizoram, Arunachal Pradesh, Meghalaya, Manipur and Nagaland.
      - The term **'forest area'** denotes the **legal status of the land** as per the government records, whereas the term **'forest cover' indicates presence of trees over any land.**
  - **Mangroves:**
    - **Mangroves** have shown an increase of 17 sq km. India's total mangrove cover is now 4,992 sq km.
  - **Forest Prone to Fires:**

Note:

- 35.46% of the forest cover is prone to **forest fires**. Out of this, 2.81% is extremely prone, 7.85% is very highly prone and 11.51% is highly prone.
  - By 2030, **45-64% of forests** in India will experience the effects of **climate change** and rising temperatures.
  - Forests in all states (except Assam, Meghalaya, Tripura and Nagaland) will be highly vulnerable climate hot spots. Ladakh (forest cover 0.1-0.2%) is likely to be the most affected.

❍ **Total Carbon Stock:**

- The total **carbon stock** in the country's forests is estimated at 7,204 million tonnes, an increase of 79.4 million tonnes since 2019.
  - Forest carbon stock is the **amount of carbon that has been sequestered from the atmosphere** and is now stored within the forest ecosystem, mainly within living biomass and soil, and to a lesser extent also in dead wood and litter.

❍ **Bamboo Forests:**

- Bamboo forests have grown from 13,882 million culms (stems) in 2019 to 53,336 million culms in 2021.

➢ **Concerns:**

❍ **Decline in Natural Forests:**

- There is a **1,582 sq km decline in moderately dense forests**, or "natural forests".
  - The decline, in conjunction with an increase of 2,621 sq km in open forest areas – shows a degradation of forests in the country.
  - Also, scrub area has increased by 5,320 sq km – indicating the complete degradation of forests in these areas.
  - Very dense forests have increased by 501 sq km.

❍ **Decline in Northeast Forest Cover:**

- The forest cover in the region has shown an overall decline of 1,020 sq km in forest cover.
- The Northeast states account for **7.98% of total geographical area but 23.75% of total forest cover.**
- The decline in the Northeastern states has been attributed to a spate of natural calamities, particularly **landslides and heavy rains**, in the region as well as to anthropogenic activities such as **shifting agriculture**, **pressure of developmental activities and felling of trees.**

Deforestation in Cerrado: Brazil

Why in News

Deforestation in 2021 rose to the highest level since 2015 in Brazil's Cerrado, prompting scientists to raise alarm over the state of the world's most species-rich **savanna**.

➢ Earlier, it was also found that the area **deforested in Brazil's Amazon** reached a 15-year high after a 22% jump from the prior year (2020).

Key Points

➢ **About:**

❍ The Cerrado is spread across several states of Brazil and is **one of the world's largest savannas, is often called an "upside-down forest"** because of the deep roots its plants sink into the ground to survive seasonal droughts and fires.

❍ **Cerrado** is a major carbon sink that helps to stave off **climate change.**

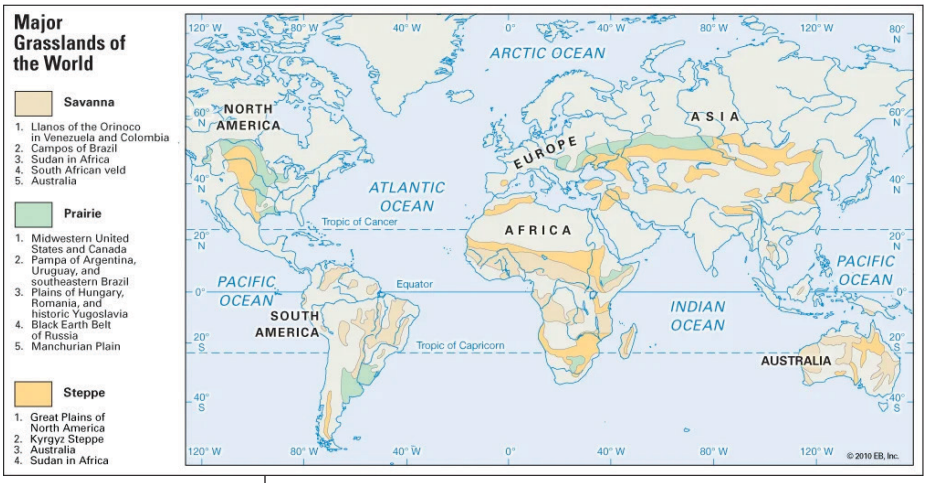
➢ **Destruction of Cerrado:**

❍ Destruction of these trees, grasses and other plants in the Cerrado is a major source of Brazil's **greenhouse gas** emissions, although it is far less densely forested than the more famous Amazon rainforest that it borders.

- Deforestation and other clearances of native vegetation in the Cerrado rose 8% to 8,531 square kilometers in the 12 months through July 2021.

Note:

- Scientists blame the **government for encouraging deforestation** with his pro-development rhetoric and for rolling back environmental enforcement.



Savanna

➢ **About**:

- Savanna, also spelled savannah, **vegetation type that grows under hot, seasonally dry climatic conditions** and is characterized by an **open tree canopy (i.e., scattered trees) above a continuous tall grass** understory (the vegetation layer between the forest canopy and the ground).
- The largest areas of savanna are found in **Africa, South America, Australia, India, the Myanmar (Burma)–Thailand region in Asia, and Madagascar.**

➢ **Environment of Savannas**:

- In general, savannas grow in **tropical regions 8° to 20° latitudes from the Equator.**
- Conditions are **warm to hot in all seasons,** but significant **rainfall** occurs for only a few months each year—about October to March in the Southern Hemisphere and April to September in the Northern Hemisphere.
- Mean **annual precipitation is generally 80 to 150 cm** although in some central continental locations it may be as low as 50 cm .
- The dry season is typically longer than the wet season, but it varies considerably, from 2 to 11 months. **Mean monthly temperatures are about 10 to 20 °C** in the dry season and **20 to 30 °C in the wet season.**

➢ **Sub-Divisions of Savannas:**

- Savannas may be subdivided into three categories—**wet, dry, and thornbush**—depending on the length of the dry season. In wet savannas the dry season typically lasts 3 to 5 months, in dry savannas 5 to 7 months, and in thornbush savannas it is even longer.
- An **alternative subdivision** recognizes savanna woodland, with trees and shrubs forming a light canopy; tree savanna, with scattered trees and shrubs; shrub savanna, with scattered shrubs; and grass savanna, from which trees and shrubs are generally absent.

- In spite of their differences, all savannas **share a number of distinguishing structural and functional characteristics.**
- Generally, **they are defined as tropical or subtropical vegetation types** that have a **continuous grass cover** occasionally interrupted by trees and shrubs and that are found in areas where bushfires occur and where main growth patterns are closely associated with alternating wet and dry seasons.
- Savannas can be **considered geographic and environmental transition zones** between the rainforests of equatorial regions and the deserts of the higher northern and southern latitudes.

➢ **Vegetation**:

- Grasses and trees that grow in the savanna have **adapted to life with little water and hot temperatures.**
- Grasses, for example, grow quickly in the wet season when water is abundant and turn brown in the dry season to conserve water.
- Some trees store water in their roots and only produce leaves during the wet season.
- Due to frequent fires, **grasses are short and close to the ground and some plants are fire resistant**. Examples of vegetation in the savanna include wild grasses, shrubs, baobab trees, and acacia trees.

➢ **Fauna**:

- It is **home to many large land mammals,** including **elephants**, giraffes, zebras, **rhinoceroses** etc. Other animals include baboons, **crocodiles**, antelopes etc.
- Many of the savanna biome animals are g**razing herbivores that migrate through the region.**

Note:

Fly Ash Management and Utilisation Mission

Why in News

Recently, the **National Green Tribunal (NGT)** directed the constitution of a **'Fly Ash Management and Utilisation Mission.**

Key Points

- **About**:
  - The order by the NGT takes note of the **'unscientific handling and storage'** of the fly ash by coal thermal power stations.
    - For example, the draining of industrial effluents and fly ash in the **Rihand Reservoir.**
  - The Fly Ash Management and Utilisation Mission, besides monitoring the disposal of annual stock of unutilised fly ash, will also see how 1,670 million tonnes of legacy (accumulated) fly ash could be utilized in the least hazardous manner and how all safety measures could be taken by the power plants.
  - The Mission will **hold its first meeting within one month to assess the fly ash management situation in coal power plants** and to prepare action plans to build road maps for ash utilisation by individual plants.
    - These meetings shall be **conducted each month, for a year.**
- **Aim**:
  - To 'coordinate and monitor issues relating to the handling and disposal of fly ash and associated issues.'
- **Head & Nodal Agency:**
  - The Mission is to be jointly headed by the secretaries of the Union **Ministry of Environment, Forest & Climate Change (MoEF&CC),** Union **Ministry of Coal and Power, keeping on board chief secretaries of respective states** where the mission is being implemented.
  - The secretary of **MoEF&CC will be the nodal agency** for coordination and compliance.

Fly Ash

- **About:**
  - Fly ash is an **unwanted unburnt residue of coal combustion in a coal thermal power plant.**
  - It is **emitted along with flue gases** during the burning of coal in a furnace and collected using the electrostatic precipitators.
  - The fly ash **collected with the help of precipitators is converted into a wet slurry** to minimise fugitive dust emissions.
  - It is then **transported to the scientifically designed ash ponds** through slurry pipelines.
- **Composition**: Fly ash includes substantial amounts of silicon dioxide (SiO_2), aluminium oxide (Al_2O_3), ferric oxide (Fe_2O_3) and calcium oxide (CaO).
- **Properties**:
  - **Resemble Portland cement** but is chemically different.
    - Portland cement is a binding material in the form of a finely ground powder that is manufactured by burning and grinding a mixture of limestone and clay.
    - Its chemical composition includes calcium silicates, calcium aluminate and calcium aluminoferrite.
  - **Exhibit cementitious properties.**
    - A cementitious material is one that hardens when mixed with water.
- **Uses**: It is used in **concrete and cement products, road base, metal recovery, and mineral filler** among others.
- **Harmful Effects:** Fly ash particles are toxic air pollutants. They can trigger heart disease, cancer, respiratory diseases and stroke.
  - When combined with water they cause leaching of heavy metals in ground water.
  - It also pollutes the soil, and affects the root development system of trees.
  - **Gross under-utilisation of this by-product over the years has led to the accumulation** of 1,670 million tonnes of fly ash according to the Summary of Ash Generation and Utilisation during 2020-2021 by the Joint Committee earlier constituted by the NGT.
- **Related Initiatives:**
  - **Pradhan Mantri Awas Yojana (Urban)** has focused on new construction technologies such as using fly ash bricks that are innovative, and environmentally friendly.

Note:

- Even state governments have come out with their Fly ash utilisation policies, e.g. **Maharashtra was the first state to adopt the policy.**
- A web portal for monitoring of fly ash generation and utilisation and a mobile based application titled "**ASHTRACK**" has been launched by the Government.
- **Goods and Services Tax (GST)** rates on fly ash and its products have been reduced to 5%.

Environmental Emergency in Peru

Why in News

The Peruvian government declared a **90-day "environmental emergency"** in **damaged coastal territories,** after an oil spill that saw **6,000 barrels of crude oil pour into the sea.**

- The spill was caused by **freak waves,** which resulted from the **eruption of a volcano in Tonga.**
- The oil spill came out of a tanker belonging to the Spanish energy firm Repsol. The incident occurred at the La Pampilla refinery, some 30 kilometers north of the Peruvian capital of Lima in the Ventanilla district of the port city of Callao.

Key Points

- **About Freak Waves:**
  - A freak wave or rogue wave is usually defined as a **wave that is two times the significant wave height of the area.**
  - The significant wave height is the average of the highest one-third of waves that occur over a given period.
    - Rogue waves can disable and sink even the largest ships and oil rigs.
  - These so-called **"freak waves"** are not confined to the **Atlantic Ocean or North Sea.**
  - One of the places rogue waves appear to happen most frequently is off the southeast coast of South Africa.
- **Oil Spill:**
  - **About:** An oil spill refers to any uncontrolled release of crude oil, gasoline, fuels, or other oil by-products into the environment.

  - Oil spills can pollute land, air, or water, though it is mostly used for oceanic oil spills.
- **Major Causes:**
  - Oil spills have become a major environmental problem, chiefly as a result of intensified petroleum exploration and production on continental shelves and the transport of large amounts of oils in vessels.
  - Oil spills that happen in rivers, bays and the ocean most often are caused by accidents involving tankers, barges, pipelines, refineries, drilling rigs and storage facilities.
  - **Environmental Impacts:**
    - **Threat to Indigenous people:** Oil pollution poses health hazards for the indigenous population who depend on seafood.
    - **Harmful to aquatic life:** Oil on ocean surfaces is harmful to many forms of aquatic life because it prevents sufficient amounts of sunlight from penetrating the surface, and it also reduces the level of dissolved oxygen.
    - **Hypothermia:** Crude oil ruins the insulating and waterproofing properties of feathers and fur of birds
      - Thus, oil-coated birds and marine mammals may die from hypothermia (decrease in body temperature to below-normal levels).

Note:

- **Toxic Effects:** Moreover, ingested oil can be toxic to affected animals, and damage their habitat and reproductive rate.
- **Threat to Mangroves:** Saltwater marshes and **Mangroves** frequently suffer from oil spills.

❍ **Economic Impacts:**

- **Tourism:** If beaches and populated shorelines are fouled, tourism and commerce may be severely affected.
- **Power Plants:** The power plants and other utilities that depend on drawing or discharging sea water are severely affected by oil spills.
- **Fishing:** Major oil spills are frequently followed by the immediate suspension of commercial fishing.

❍ **Remedies:**

- **Bioremediation:** Bacteria can be used to clean up oil spills in the ocean through bioremediation.
  - Specific bacteria can be used to bioremediate specific contaminants, such as hydrocarbons, which are present in oil and gasoline.
  - Using bacteria such as Paraperlucidibaca, Cycloclasticus, Oleispira, Thalassolituus Zhongshania and some others can help remove several classes of contaminants.
- **Containment Booms:** Floating barriers, called booms, are used to restrict the spread of oil and to allow for its recovery, removal, or dispersal.
- **Skimmers:** They are devices used for physically separating spilled oil from the water's surface.
- **Sorbents:** Various sorbents (e.g., straw, volcanic ash, and shavings of polyester-derived plastic) that absorb the oil from the water are used.
- **Dispersing agents:** These are chemicals that contain surfactants, or compounds that act to break liquid substances such as oil into small droplets. They accelerate its natural dispersion into the sea.

❍ **Related Laws in India:**

- Presently, there is no law covering oil spill as such and its consequential environmental damage in India but India has "the **National Oil Spill Disaster Contingency Plan of 1996 (NOS-DCP)**" to handle such situations.
  - The document was issued by the **Ministry of Defense in 1996**; it was last updated in March 2006.
  - It gives the **Indian Coast Guard** the mandate to coordinate with state departments, ministries, port authorities and environmental agencies to assist in oil spill cleaning operations.
- In 2015 India ratified the **International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Convention)**.
  - Convention ensures adequate, prompt and effective compensation for damage caused by oil spills.
  - It is administered by the **International Maritime Organization (IMO).**

World Wetlands Day and Two New Ramsar Sites

Why in News?

Recently, World **Wetlands Day** was celebrated on the **2nd of February 2022** across the globe.

➢ On the occasion, **"National Wetland Decadal Change Atlas"** was prepared by the **Space Applications Center** (SAC - one of the major centers of **ISRO**).

❍ The original Atlas was released by SAC in 2011 and has over the years been used extensively by all the State Governments also in their planning processes.

➢ Two new **Ramsar sites (Wetlands of International Importance), Khijadia Wildlife Sanctuary in Gujarat** and **Bakhira Wildlife Sanctuary in UP** were also announced on the occasion.

Why is The Day Celebrated on 2nd February?

➢ This day marks the date of **the adoption of the Convention on Wetlands on 2nd February 1971** in the Iranian city of Ramsar.

❍ The Ramsar Convention is **an intergovernmental treaty** that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

❍ The **countries with the most Ramsar Sites are the United Kingdom (175) and Mexico (142),** as per the Ramsar List. Bolivia has the largest area with 148,000 sq km under the Convention protection.

➢ It was first celebrated in 1997.

➢ **Theme for 2022:** Wetlands Action for People and Nature.

Note:

What is the status of Wetlands in India?

- India has a network of **49 Ramsar sites** covering an **area of 10,93,636 hectares**, the **highest in South Asia.**
  - **Bakhira Wildlife Sanctuary in UP** provides a safe wintering and staging ground for a large number of species of the Central Asian Flyway while **Khijadia Wildlife Sanctuary (Gujarat)** is a coastal wetland with rich avifaunal diversity providing a safe habitat to endangered and vulnerable species.
- In **India**, according to the National Wetland Inventory and Assessment compiled by the Indian Space Research Organisation (ISRO), **wetlands are 4.63% of the total geographical area of the country.**
  - India has 19 types of wetlands.
  - In state-wise distribution of wetlands**, Gujarat is at the top** (17.56% of total geographical area of the state or 22.7%of total wetlands areas of the country thanks to a long coastline.
  - It is followed by Andhra Pradesh, Uttar Pradesh, and West Bengal.

What is the Significance of Ramsar Listing?

- It is like an **ISO certification.** They can take it off the list as well if it doesn't meet their standards continuously. It's **a feather in the cap** but there is a cost to it and that cost can be paid only if there is brand value.
- **Ramsar tag makes it incumbent upon authority to strengthen the protection regime** there and also creates defenses against encroachment.
- A number of species of birds prefer to **avoid the Himalaya and instead choose the route passing through Afghanistan and Pakistan** to enter the Indian sub-continent via Gujarat and Rajasthan. Thus, **Gujarat becomes the first landing point of many international migratory species** of ducks, waders, plovers, terns, gulls etc and shorebirds as well as birds of prey.
- Wetlands in India **act as foraging and resting grounds for the migratory birds** during winter.
  - According to **Convention on the Conservation of Migratory Species of Wild Animals (CMS),** CAF (Central Asian Flyway), which includes 30 countries, covers at least 279 populations of 182 migratory waterbird species, including 29 globally threatened and near-threatened species, which breed, migrate and winter within the region.

Volatile Organic Molecules & EVs

Why in News?

Recently, a study conducted by **Indian Institute of Science Education and Research** revealed that India can slash emissions of **Volatile Organic Molecules** (VOC) by 76% in the next eight years by swapping all two- and three-wheelers with **electric vehicles** and all diesel-fuelled ones with **Compressed Natural Gas (CNG).**

What are Volatile Organic Molecules?

- VOCs are **carbon-containing chemicals** released by petrol and diesel vehicles. They impact air quality and human health.
  - However, VOCs can have a **natural origin, too.**
  - **Plants emit** these chemicals **to attract pollinators, defend themselves from pests and predators** and adapt to environmental stress.
- **Effect of VOCs on Health:** VOCs can irritate the eyes, nose and throat, damage body organs and cause **cancer**.
  - Long-term exposure to VOCs is not good because the majority of the VOCs are **carcinogenic (cancer-causing).**
  - It is also linked to medical conditions such as **asthma and heart disease.**
  - **Black carbon** is linked to health problems such as respiratory and cardiovascular disease, cancer and congenital disabilities. It also contributes to **climate change.**
- **Positive Feedback Loop:** VOCs can drive the **formation of other dangerous pollutants.**
  - For instance, they react with sunlight and nitrogen dioxide to form **ground-level ozone.**
  - VOCs also trigger the **formation of Particulate Matter (PM2.5),** a pollutant that reaches deep into the lungs, affecting their normal functioning.
  - They react in the air to **produce secondary organic aerosols, minute particles suspended in the air.**
- **Issues Related to VOCs:** Human-made VOCs are a cause for concern, yet they don't draw enough attention.
  - Benzene, a chemical that induces cancer, is the only VOC included in the **National ambient air-quality standards.**

Note:

- The other pollutants under ambient air-quality standards considered are PM10, PM2.5, nitrogen dioxide, sulphur dioxide, carbon monoxide, ozone, ammonia, lead, nickel and benzo(a)pyrene.

Sovereign Green Bonds

Why in News?

Recently, the **Finance Minister** in the **Budget 2022** announced that the government proposes to issue **sovereign green bonds** to mobilise resources for green infrastructure.

- The proceeds will be deployed in public sector projects which help in reducing the **carbon intensity of the economy.**
- The announcement is in sync with India's commitment to achieving **net-zero carbon emissions by 2070.**

What are Green Bonds?

- Green bonds are **issued by companies, countries and multilateral organisations** to **exclusively fund projects that have positive environmental** or climate benefits and provide investors with fixed income payments.
- The projects can include **renewable energy, clean transportation and green buildings, among others.**
- Proceeds from these bonds are **earmarked for green projects.** This is unlike standard bonds, the proceeds of which can be utilised for various purposes at the discretion of the issuer.
- The international green bond market has seen cumulative issuance worth more than **USD 1 trillion** since market inception in 2007.
- By the end of 2020**, 24 national governments had issued Sovereign Green, Social and Sustainability bonds** totalling a cumulative USD 111 billion dollars, according to the **London-based Climate Bonds Initiative.**

What is the Significance of Sovereign Guarantee to Green Bonds?

- Sovereign green issuance sends a **powerful signal** of intent **around climate action and sustainable development to governments and regulators.**
- It will catalyze **domestic market development** and provides impetus to institutional investors.
- It will provide benchmark **pricing, liquidity and a demonstration effect** for local issuers, helping to support the growth of a local market.
- With the **IEA's World Energy Outlook 2021**, estimating that 70% of the additional USD 4 trillion spending to reach net-zero is required in emerging/developing economies, sovereign issuance can help kickstart these large inflows of capital.

■■■

Note:

Key Points	Details

Summary

Key Points	Details

Summary